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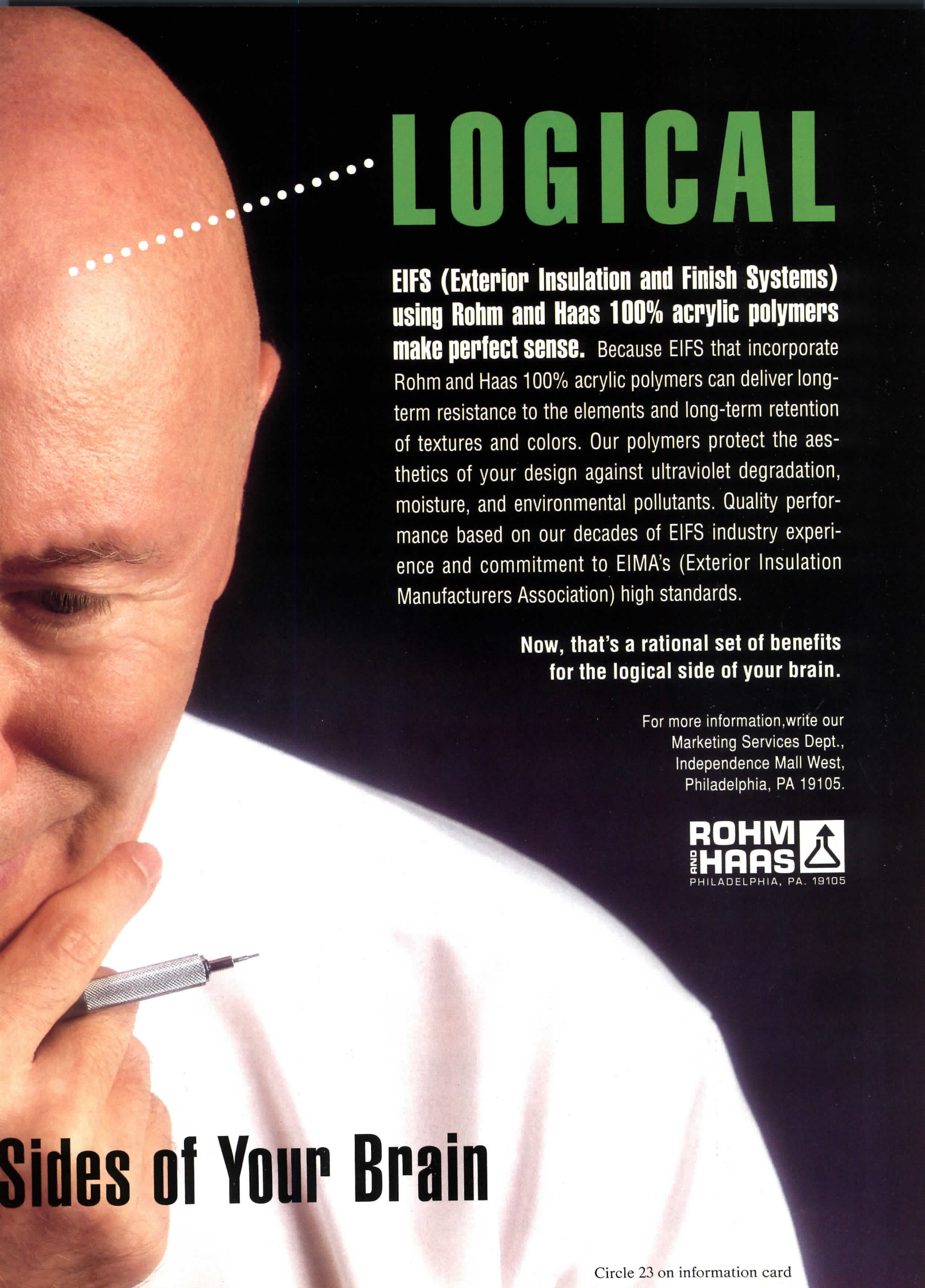

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NEWS

DETAILS

Hellmuth, Obata & Kassabaum, St. Louis, is designing two schemes for a new U.S. embassy chancery in Moscow, on the site of the current embassy or in a different location. The State Department wants to raze the existing embassy, discovered to be rife with Soviet listening devices, but Congress has yet to decide on the building's fate.

Anshen + Allen, San Francisco, is transforming an abandoned Russian school building in Kiev, 60 miles from Chernobyl, into a health clinic for children who were victims of the 1986 nuclear disaster.

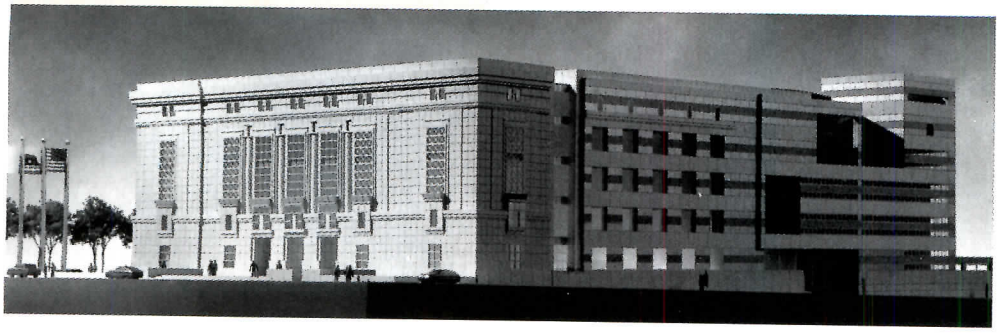
The double-decked Embarcadero Freeway, badly damaged in the 1989 San Francisco earthquake, will be replaced, either by an underground freeway or an open cut road scheme.

Kohn Pedersen Fox Associates has taken over design of the Newport Harbor Art Museum in Newport Beach, California, from Renzo Piano.

Gensler and Associates, Los Angeles, is renovating and expanding the former site of the Metro-Goldwyn-Mayer studio for its new owner, Columbia Pictures of Culver City, California. The plan calls for 1.1 million square feet of office, retail, and production facilities.

In October, Davis Brody & Associates named J. Max Bond, Jr., a partner of the firm, and employed the architects from his firm, Bond Ryder Associates. Bond is dean of architecture at the City University of New York.

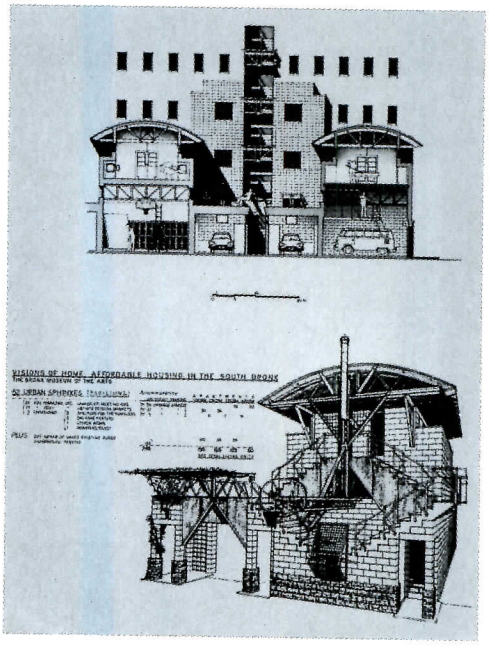
San Francisco's 377,000-square-foot New Main Public Library (below), designed by Pei Cobb Freed & Partners and Simon Martin-Vegue Winkelstein & Moris, is scheduled for construction in March 1993.



Home New York Home

RICHARD PLUNZ WRITES IN HIS NEW BOOK, *A History of Housing in New York City,* that while the number of soup kitchens in New York increased from 30 in 1982 to 500 in 1987, "the teapot emerged as a design object worthy of high discourse." Plunz's observation, while arguably true for the 1980s, may already be outdated for the 1990s. The economy is clearly in a recession, a situation which has, in the past, ushered in an era of inventive designs for social housing. The current cultural scene shows signs of change too, as suggested by five exhibitions devoted to the middle-class home which opened in New York last fall.

Five museums and the New School for Social Research collaborated to produce "Home: A Place in the World," a vast array of conferences, workshops, courses, and film programs as well as several exhibitions at museums around the city. "Night Journeys: Home is Where I Sleep," at The Brooklyn Children's Museum through October 1992, explores children's first experience of home through the rituals of bedtime and sleep. "The Urban Home: Images by Contemporary Black Photographers," at The Studio Museum in Harlem until December 30, presents pictures that document contemporary urban life in New York, Newark, Philadelphia, Chicago, Los Angeles, and Houston. Of particular interest to architects is the exhibition "Visions of Home: Designs for Affordable Housing in the South Bronx," at the Bronx Museum of the Arts until January 27, 1991. The show represents the culmination of an architectural competition sponsored by the museum for a seven-acre site in the South Bronx and features 40 of the 120 renderings and models received.



Recent New York exhibitions on housing range from "urban sphinxes" for the South Bronx (above) to photographs of typical 1910 tenement kitchens from "Getting Comfortable in New York: The American Jewish Home, 1880-1950" (below).

The architectural team of Christopher P. Morris and Timothy Morris of Armonk, New York, deservedly took first place. They propose to rehabilitate the site's existing five-story apartment blocks to which they attach new pavilionlike structures housing laundries, markets, homeless shelters, locker rooms, daycare centers, candy stores, artists' lofts, and garages. The "urban sphinxes," as the architects call them, anchor the existing apartments to the street and add a dash of Gehryesque bravado to the South Bronx.

The Jewish Museum in Manhattan offered "Getting Comfortable in New York: The American Jewish Home, 1880-1950" from September 16 through November 15, an ex-

Continued on page 26

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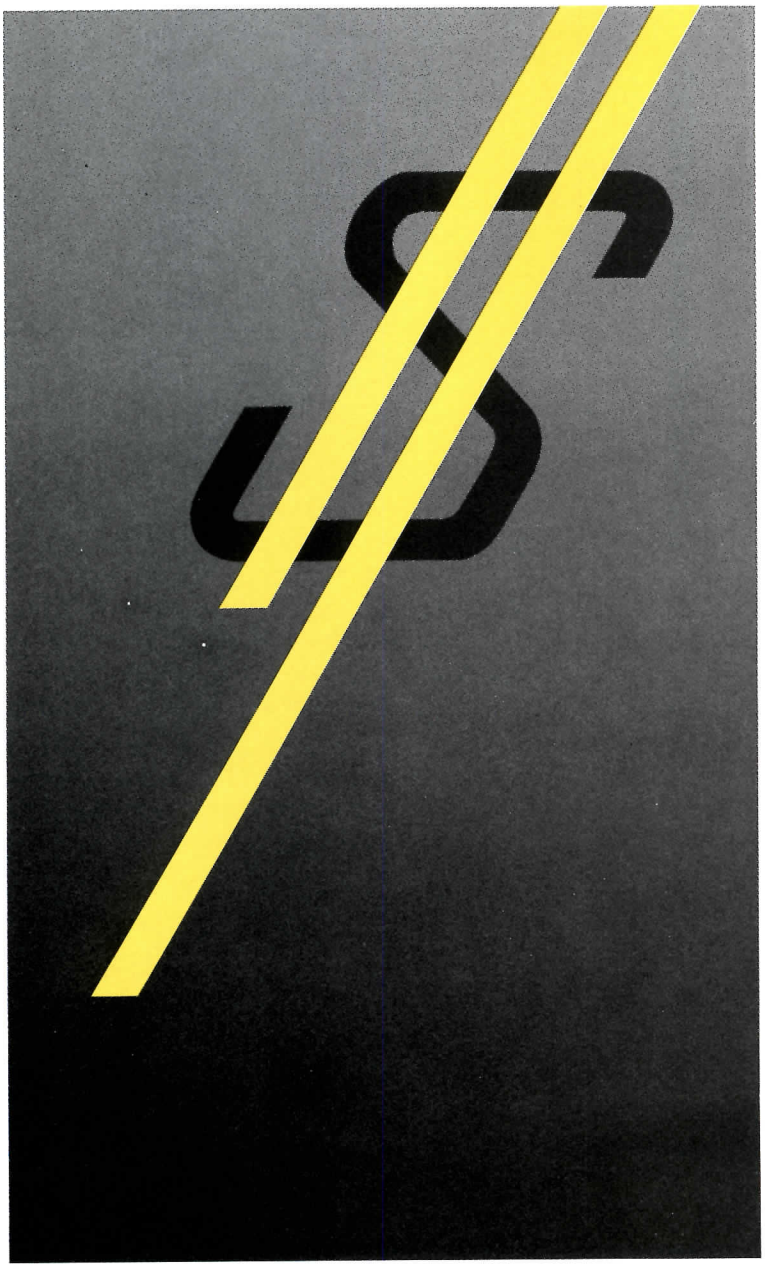

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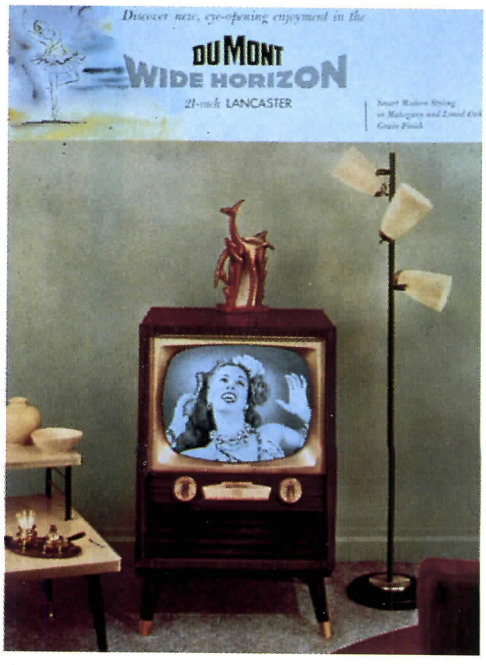
NEWS

Home N.Y. Home *continued*

hibition that charted the assimilation of Eastern European Jews into the mainstream of New York life. The exhibition focused on three residential building types: Lower East Side tenements, which housed the first immigrants; Art Deco apartment blocks in Brooklyn and the Bronx, to which the first generation of American-born Jews moved between the wars; and tract houses of Levittown, which embodied the American dream for millions around 1950.

Although the exhibitions presented as part of "Home: A Place in the World" dominated the agenda this fall, they fell short of a monopoly. In September, The New Museum of Contemporary Art launched "From Receiver to Remote Control: The TV Set," which attempted to interpret the impact on the home of that most ubiquitous piece of postwar domestic technology. Conceived by artist Matthew Geller and designed by video artist Judith Barry and architect Kenneth Saylor, the free-form show provided large doses of wit and style: from a 1950s kitchen that resonated with the ideal domesticity of the Cleaver family, to a sexy boudoir of the 1980s that suggested the more lurid possibilities of video technology recently practiced by Rob Lowe. —DONALD ALBRECHT

Donald Albrecht is curator of exhibitions at the American Museum of the Moving Image in Astoria, New York.



At "From Receiver to Remote Control," a 1950s advertisement (above) offered insight into how television has changed the home.

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NEWS

During the October meeting, design committee members toured the Charlestown Navy Yard on Boston's waterfront. The 43-acre site is now being privately developed to incorporate waterfront housing such as low-cost rowhouses designed by William Rawn (right), which were completed last year.

STEVE ROSENTHAL

Boston Waterfronts

BILLED AS A CONFERENCE ON WATERFRONTS, the AIA Committee on Design's October meeting offered an unsentimental view of Boston's harbor and neighboring districts. Stereotypes of the New England capital as quaintly historic and reverent of its past were dismissed by several speakers, notably Alex Krieger, director of the urban design program at Harvard. He began the three-day event with a chronology of large-scale urban developments, asserting, "There were no good old days in Boston." Krieger explained that the design of the city's great open spaces, such as Olmsted's "emerald necklace" of parks, resulted from more mundane civic improvements such as road-building. He also revealed that Boston's harborfront began to shrink in the 19th century, as districts such as Bulfinch Triangle and Back Bay were built on landfill. Krieger's history lesson helped to illuminate his own designs for seven squares in Boston, as well as schemes proposed by other architects for sites along the Central Artery, which will eventually be relocated underground.

Journalist J. Anthony Lukas echoed Krieger's connection between urban development and transportation. He eloquently traced the history of Charlestown, a working class community notorious for its 1970s school desegregation battles. Discussing the relationship between the environment of Charlestown and its racial intolerance, Lukas concluded that the community's tradition of alienation is in part a result of physical barriers, such as highway ramps, that isolate it from the city.

The Navy Yard along Charlestown's waterfront was visited by boat the following day. Now under private development as a mixed-use neighborhood, the former military enclave served as an impressive case history of waterfront rehabilitation. Nancy Coolidge, director of the Society for the Preservation of New England Antiquities, outlined plans for the 43-acre site, including her organization's proposal to renovate an early 19th-century shed in which rope was produced. A walking tour revealed several new housing blocks and the controversial drydock site of a new aquarium, designed by Joseph Esherick. After a dinner held in the New England Aquarium, which is slated to be torn down and replaced by the Charlestown facility, Esherick gave a talk on waterfronts, but did not reveal his scheme for the new aquarium. No doubt the conference's focus on the pragmatic and political realities of waterfronts was in part responsible for his reluctance. —D.K.D.

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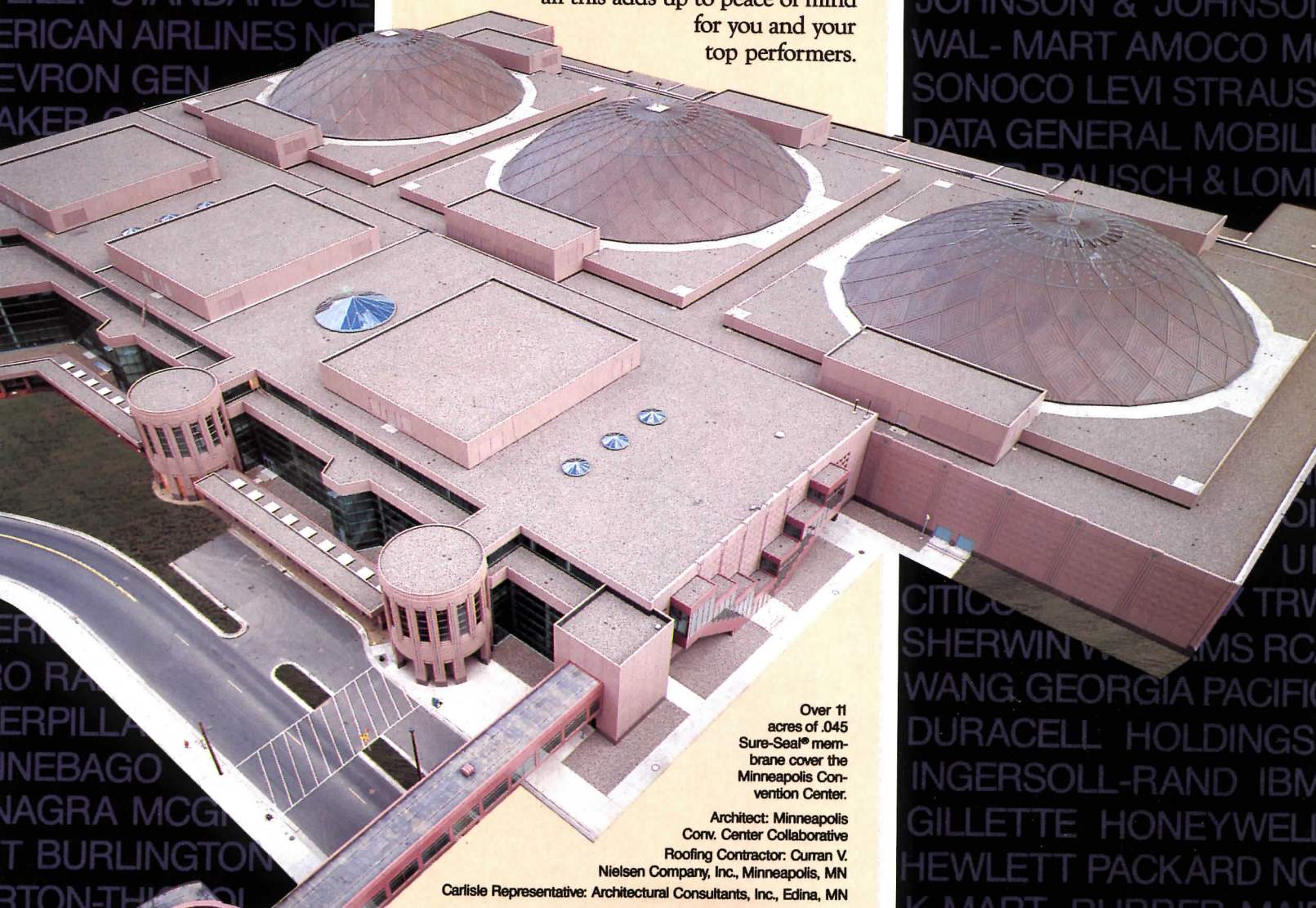

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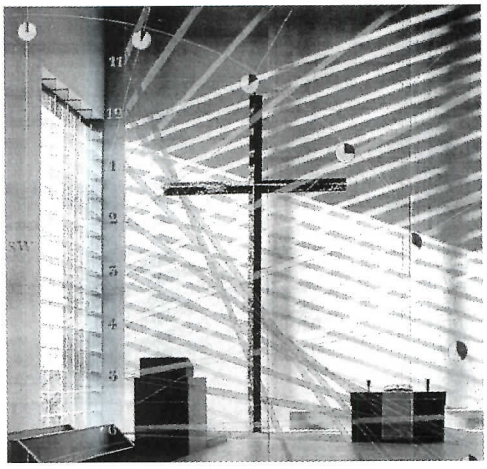
NEWS

Architectural Research in Boston and New York

THE GOAL SEEMED SIMPLE ENOUGH. A HANDful of architecture students at Harvard University's Graduate School of Design set out 18 months ago to investigate the meaning of architectural research, intending to publish the results in the *Harvard Architecture Review.* By the time they were through, the students had conducted scores of interviews with academicians and theoreticians, knocked at the doors of a few luminaries, and sought out the young and the restless among generational colleagues who are pushing architecture to the speculative edges of art and philosophy. They had found a willing collaborator in Kyong Park, director of Storefront Gallery for Art and Architecture in New York, organized a two-day symposium that took place in two cities, and pulled the whole thing off on a shoestring.

"The term architectural research is thrown around a lot, and yet it didn't seem to any of us to have any fixed definition. We also had a sense that there was a lot of exploration going on out there," *Review* member Byron Bronston explained. "As students, we had been asked to do our share of research projects, but many of us felt that they ended up solely as design projects, not research. We hoped to bring some attention to the subject for ourselves and architecture in general."

The students did just that in two daylong sessions held recently at Harvard's Graduate School of Design and at Parsons School of Design in New York City. They rounded up a wide-ranging roster of participants at the first meeting—including Philadelphia architect Denise Scott Brown; McGill University architecture professor Alberto Perez-Gomez; John Whiteman, newly appointed head of the Glasgow School of Art; and Henry Cobb of Pei Cobb Freed and Partners. Allan Wexler, an artist who teaches at Parsons; Taeg Nishimoto, an architect who teaches at Columbia; and Sheila Kennedy, an assistant professor at Harvard's Graduate School of Design were among those who spoke at the second meeting. The sessions drew a combined audience of 300 or more, although



Sculptor James Carpenter created a window (above) for a chapel designed by Edward Larabee Barnes in Columbus, Indiana. Carpenter, who explores technical properties of glass, was one of more than a dozen panelists at a recent symposium on architectural reseach. His work, along with that of the other participants, will be published next fall in the *Harvard Architecture Review*.

only a few hardy souls attended both of the sessions.

During the course of each session, it became apparent that questions about architectural research may be every bit as fluid and uncertain as questions about architecture today. Participants generally agreed that research currently encompasses more than architectural history, human behavior in the built environment, and technological study of building materials and construction techniques. "The word research is so specific in one sense, but the kind of research we are going to hear about today is quite broad," Park explained at the start of the New York panel meeting noting that, in his view, architectural research is as diverse as the architects, artists, and philosophers who are doing it.

The research presented at Harvard included London architect Bill Hillier's study of the ubiquity of the urban grid, Hashim Sarkis's consideration of the cultural influences that color our understanding of perspective, a rarefied John Whiteman discourse on architectural discourse, and Lars Lerups' playful design explorations for a library for a Swiss client. The work at Parsons was more eclectic and covered more territory, ranging from Joan Ockman's resurrection of an obscure Dada figure to Michael Kalil's work on space stations for NASA and sculptor James Carpenter's new construction techniques for glass. The presentations will be published next fall in the *Harvard Architecture Review* issue devoted to the symposium.

Not surprisingly, both sessions raised more questions than they answered. How different is architectural research from research in any other field of knowledge? Why does architectural research fail to garner the same kind of funding and grant support as other kinds of academic research? Does research presuppose that one knows what one is looking for? How subjective, solipsistic, or useful are some current preoccupations? Who should be served by architectural research—individuals, the profession, the world at large—and how?

In these parlous times for architects and architecture schools, the questions raised may be especially germane. As a somewhat sardonic Denise Scott Brown later observed in an interview, architectural research may provide an avenue for "bright young people" to establish themselves in the profession during a recessional economy. Today, there are simply not enough buildings to be designed or built, so once again architects are turning to theory.

Symposium organizer Eric Fang harbored no illusion that the fall sessions would produce a 25-words-or-less solution to the issues raised at both sessions. "I spoke with [Harvard professor] Jorge Silvetti right after the day at the GSD, and he said, 'I told you so. There will be no conclusions,'" Fang explained. "But I think we will have succeeded if we at least provoke some further thought."

—Otile McManus

Otile McManus writes about design for The Boston Globe.

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NEWS

Regional Urban Design in Los Angeles

THE LOS ANGELES REGION NEEDS A NEW vision to guide its inexorable growth. That vision did not take shape at AIA's Regional Urban Design Conference, held October 3-6 in Santa Monica, but participants did identify key elements of a regional urban design agenda. They included reasserting the physical environment as a basis for physical form; integrating transportation systems and open spaces with land-use planning; concentrating growth in identified centers, corridors, and neighborhoods; and improving the regional planning process through community participation, the empowerment of regional government, and the direction of resources for the study of critical areas.

Conference sessions began with presentations on planning and urban design issues. Keynote speaker Dan Garcia, former president of the Los Angeles Planning Commission, called the planning process in the city "a shambles," a result of petty political warfare that has produced "an orgy of moratoria and interim control ordinances" and a city department of regulators, not planners. He pointed to the needs of the urban poor for mass transit, housing, and jobs. In the tower room high atop L.A. City Hall, historian Kevin Starr sketched the economic and physical development of the region, its diverse population now more than 13 million.

On the second day, conferees set out on one of four daylong bus expeditions. Organized around the region's principal themes—economy, housing, transportation, and open space—the tours included visits to typical as well as exemplary sites and meetings with designers, officials, and community representatives. That evening and the next morning, each tour team, composed about equally of visitors and local residents, met to discuss their observations. They presented their findings in an informal plenary session the following afternoon.

Some observations were provocative. The city is engineered, not designed, some participants argued, the result of single-purpose problem-solving versus the multifaceted solutions designers seek. The area's private realm is strong; its public realm, weak.

The tour and workshop format developed by conference chair Patric Dawe, AIA, served to focus discussion, although the tours were necessarily circumscribed. All visited downtown L.A., but only one group touched the San Fernando Valley, another Long Beach, and none reached Orange County or the San Gabriel Valley.

The conference challenged visitors to grasp the shape of Southern California from limited contact. It presented locals, many of whom had assisted in conference preparations, with an opportunity to refocus attention and reformulate strategies for the region's complex urban problems. Seasoned visitors cautioned conferees to avoid such simplistic solutions as urban design "perfume," or urban design "cheerleading." Follow-up, they urged, makes all the difference.

—ARTHUR GOLDING, AIA

Arthur Golding is a Los Angeles-based architect.

NEWS

PSMA Conference: Winds of Change

MORE THAN 150 EXECUTIVES OF DESIGN firms from across the country were encouraged "to say and do the difficult and/or unpopular thing" at the Professional Services Management Association annual meeting in Charleston, South Carolina, October 10-12. That advice came from Jerry Harvey, professor of management science at George Washington University, who railed against "blind acquiescence" that results from managers' fear of ridicule by their colleagues, and their perceived risk of isolation when they oppose group consensus.

Ray Johnson (above) addressed executives of design firms at the PSMA conference in Charleston.

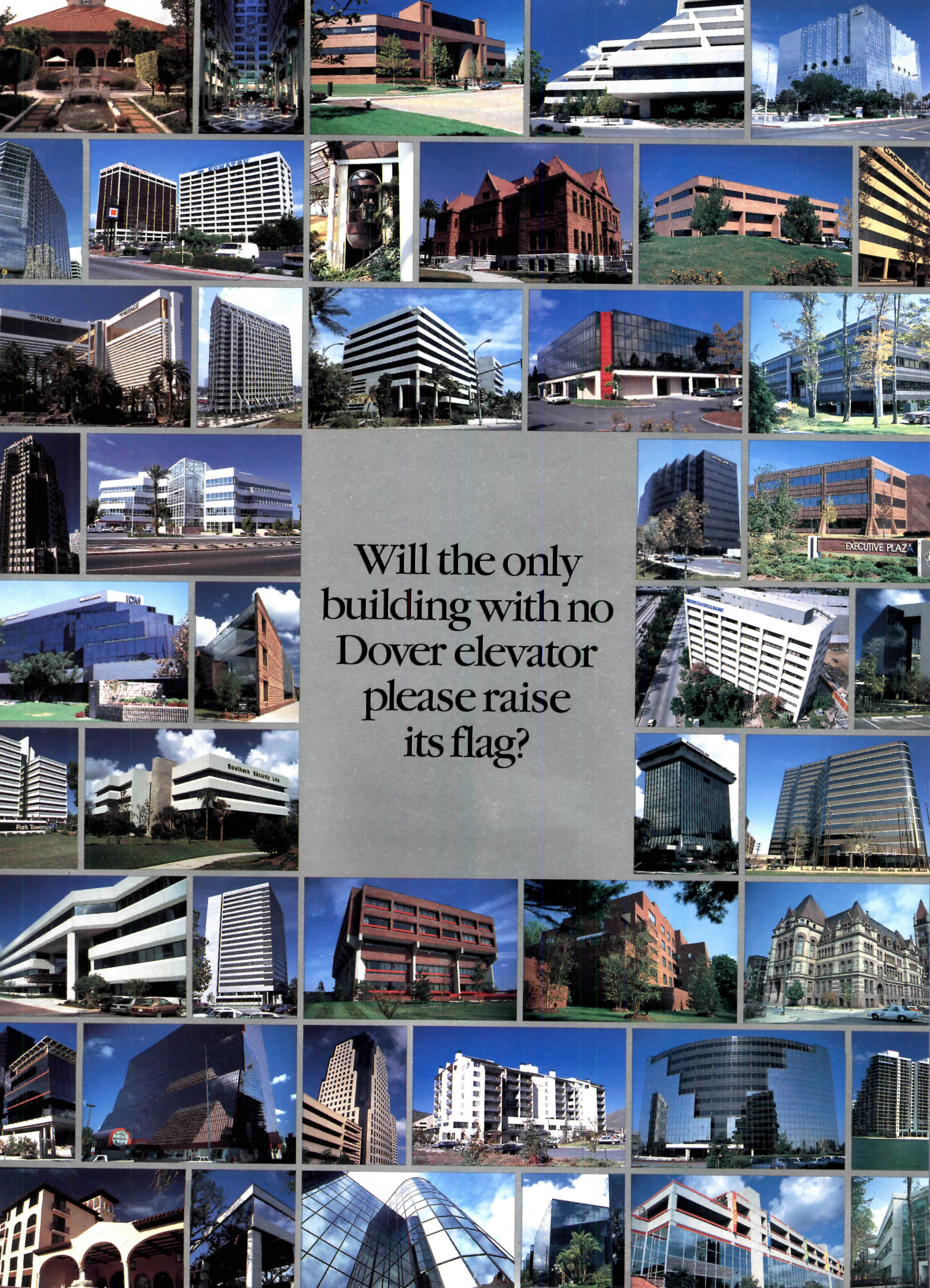
However, some types of risk avoidance are still sound management practice, as PSMA's sessions on liability insurance and loss prevention made clear. These and most seminars were well attended by a serious audience of mainly large-firm executives, also bent on avoiding the risks of torrential rains and winds from a near-hurricane battering Charleston throughout the conference.

Among the more significant celebratory rituals at the meeting, PSMA honored 10 members who have earned Professional Services Management Institute certification in one of five areas—general management, finance, marketing, operations, or human resources. Well-managed firms were also recognized with PSMA's Management Achievement Awards. This year's winners included: Saxelbye, Powell, Roberts and Ponder, Architects and Planners, Jacksonville, Florida (general management); CTA Architects and Planners, Billings, Montana (production); Sear-Brown Group, Rochester, New York (human resources); and WWCG, A Joint Venture of CH2M Hill, Inc., and Metcalf & Eddy, International (financial). Significantly, in a year marked by a slumping economy, there were no submissions—and hence no award—in the marketing category.

As many conference attendees made clear, the burden of management during the current recession is both exhilarating and daunting. "Managers must become psychiatrists," says Frank Callahan of Greiner Engineering in Dallas Texas, "enduring a great deal of personal and emotional stress, both in the lives of those they deal with, and in themselves." Callahan added, "Many small steps are needed to create the right change...there must be a vision, it must be persuasive, and it must make people want to leave the past behind." ■

—LOU MARINES

Lou Marines is executive director of the A & E Management Academy, a graduate business school for the design professions in San Francisco.



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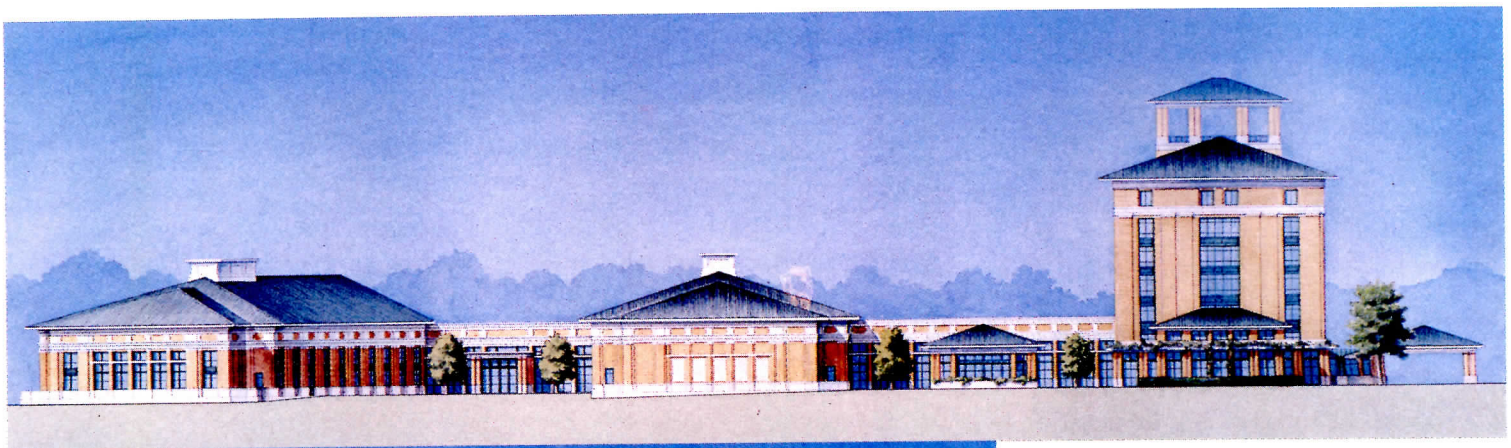
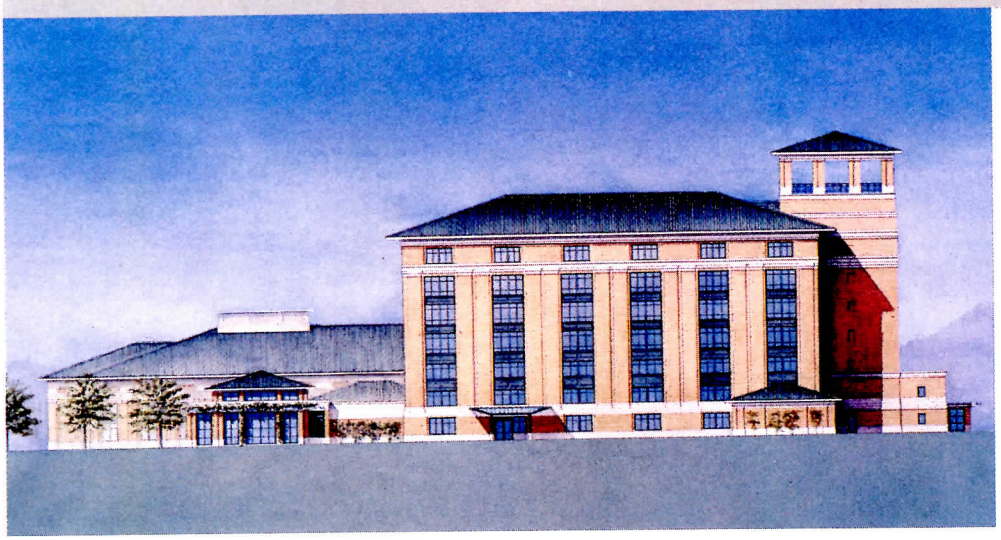


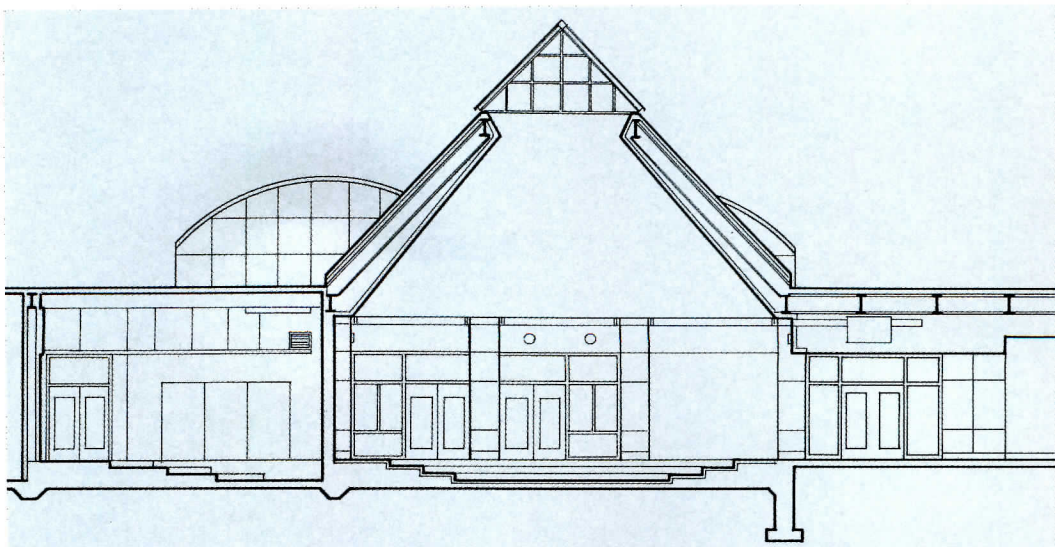


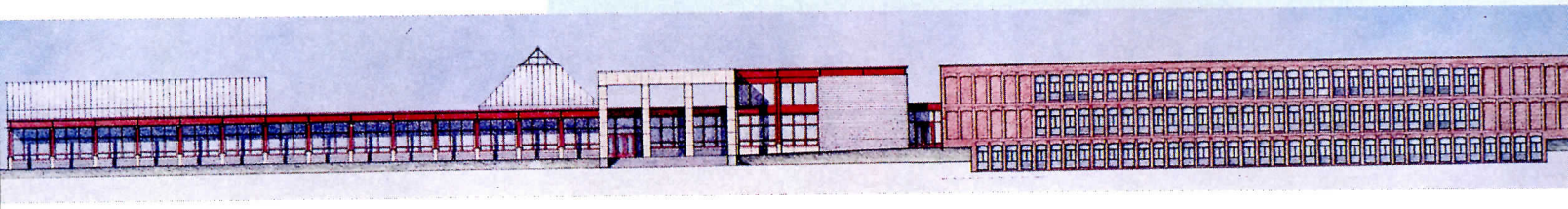
Bartholomew County Hospital
Robert A.M. Stern Architects
and Falick/Klein Partnership

DRAWING THE ECLECTIC BUILDINGS OF THE existing hospital into a coherent, state-of-the-art facility, the architects devised a master plan (fees partially paid by Cummins) for a 38-acre site to provide opportunities for future growth. New construction will include 60,000 square feet of office space, a psychiatric facility, and a new driveway. The existing tower of patient rooms (left) will be refurbished inside and out; an array of two-story pavilions will extend and enliven the west facade (top). Completion is scheduled for 1993.

Northside Middle School
Leers, Weinzapfel Associates

THE RENOVATION AND EXPANSION OF Harry Weese's 1961 Northside Middle School replicates the original courtyard arrangement by adding a larger one-story wing (left in elevation below) and centering the entire composition on a pyramidal commons (right). The architects continued the original's height along the south elevation, then punctuated the rigid envelope with the commons, a barrel-vaulted cafeteria, and sawtooth skylights over the art studio. As with the Weese original, Cummins paid the Boston firm's fees; completion is scheduled for late 1992.





Corporate Tradition

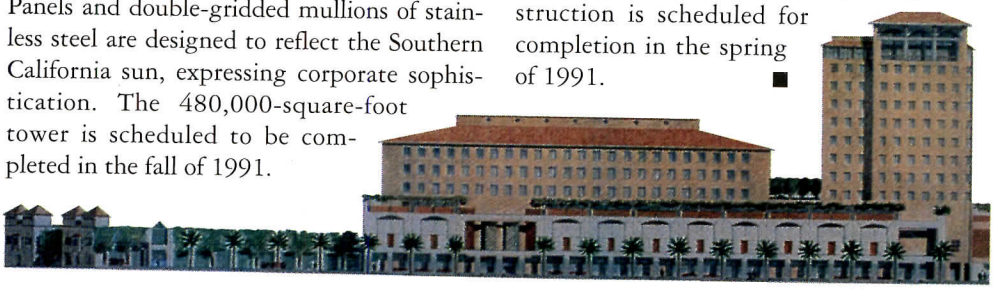
IBM participates in new developments.

Plaza Tower
Costa Mesa, California
Cesar Pelli & Associates and CRSS, Inc.

JOINT DEVELOPMENT PARTNERS IBM AND Anton Boulevard Associates commissioned Cesar Pelli & Associates to forge a presence in the Orange County landscape with a mixed-use building of 21 stories (left), comprising office space, retail space, and a six-level parking garage. The curved front facade, double loggias, and setbacks at the 17th and 21st floors are integrated in a formal composition. Panels and double-gridded mullions of stainless steel are designed to reflect the Southern California sun, expressing corporate sophistication. The 480,000-square-foot tower is scheduled to be completed in the fall of 1991.

Columbus Center
Coral Gables, Florida
Mitchell/Giurgola Architects and The Nichols Partnership, Inc.

CORAL GABLES WAS PLANNED IN THE 1920s to create a town center of buildings rendered in Mediterranean revival styles; the architects preserve that spirit in their 470,000-square-foot mixed-use complex (below). Arcades, pools, and a trellis are rendered in materials such as stucco and clay. The center adheres to the urban context while providing office buildings, retail space, and parking. Construction is scheduled for completion in the spring of 1991. ■



ABOUT THIS ISSUE

Patrons of Architecture

"PATRONAGE," TO ARCHITECTS, IS VIRTUALLY synonymous with the Medici family, whose support for the palaces and basilicas of Filippo Brunelleschi and Michelozzo di Bartolomeo endowed Florence with its rich architecture. Similarly, the legacy of Leon Battista Alberti is due to the generosity of the wealthy Florentine merchant Giovanni Rucellae. More recently, 19th- and early 20th-century American patrons—with names like Carnegie, Vanderbilt, Morgan, and Rockefeller—lent their support to such architects as Richard Morris Hunt (Carnegie Hall, the Metropolitan Museum of Art); McKim Mead and White (the Morgan Library); and Edward Durrell Stone (the Museum of Modern Art).

The treasures left by the likes of the Medicis and the Morgans are more than relics of family power and wealth. As well as creating elaborate private retreats, Renaissance and modern patrons alike sought to leave a public legacy of built form, sometimes, as Andrew Carnegie's libraries across the country demonstrate, as a way of repaying a debt to society.

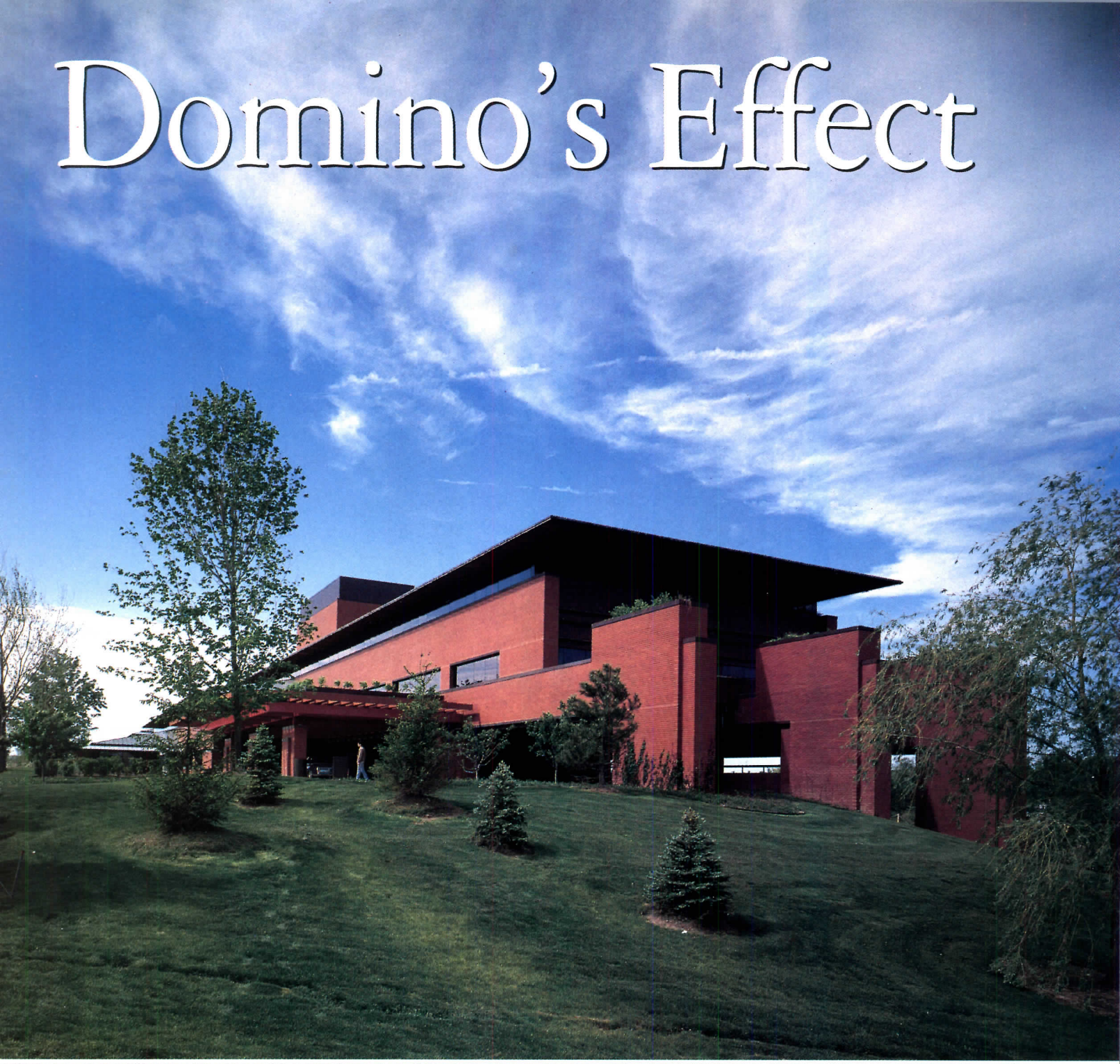
Today's patrons, on the other hand, are inclined toward an array of architectural endeavors as rich as their fortunes, which are built upon everything from soft drinks to scotch. Tom Monaghan, a true rags-to-riches millionaire, is utilizing his pizza wealth to create a modern-day garden suburb, where buildings by Fay Jones + Maurice Jennings Architects, Mockbee Coker Architects, and Hardy Holzman Pfeiffer Associates will comprise a Michigan residential community. Leslie Wexner, a first-generation American, built his capital on an assemblage of retail clothing chains and now hires first-rate architects to design his stores. Corporations such as ABC, soon to enhance its New York image with a new tower by Kohn Pedersen Fox, are another form of 20th-century patron. The Coca-Cola corporation, which has contributed to public architecture throughout Atlanta, has recently opened a museum devoted to its product, designed by a local team. Phyllis Lambert is the only patron featured in this portfolio who has practiced architecture, and is perhaps closest to the Medici-style benefactor, using her inheritance to fund the most remarkable architectural museum and study center in the western hemisphere.

Conservation is the theme of our technology section, in which we take a serious look at dwindling resources that all the money in the world can't revive. In arid regions, architects are exploring new methods of water recycling, and innovative systems are now available to both builders and clients seeking alternatives to fossil fuels. An updated ASHRAE standard reflects advances in building technologies to encourage energy conservation.

Gunnar Birkerts' office tower at the Domino's Pizza complex (below), cantilevered at 15 degrees, is dubbed "the leaning tower of pizza."

With this month's computer feature, we tackle a contemporary dilemma by creating two teams—supporters of Macintosh versus DOS-based computers—who face off on the merits of the two platforms. The result is a thorough evaluation that will benefit new users and intrigue the advocates of either side. We also evaluate ConDoc, AIA's recently developed methodology for organizing, simplifying, and formatting construction documents. It integrates project specifications and working drawings into a consistent and logical system. ■

Domino's Effect



SHORTLY AFTER MEETING THE MAN WHO WOULD EVENTUALLY TAP HIM TO DESIGN the world headquarters for Domino's Pizza, architect Gunnar Birkerts quizzed the mutual friend who had introduced them: "This Tom Monaghan, is he for real?"

Thomas S. Monaghan, the 54-year-old founder and president of Domino's Pizza, whose personal worth is estimated at half a billion dollars, must appear to the architects he has employed as too good to be true. He is an authentic patron of the discipline, whose interest in architecture springs not from some Ivy League refinement or a quest to ride the cultural wave of architectural chic, but a genuine love of the discipline. A frustrated architect himself (Monaghan twice attempted to study architecture at the University of Michigan), he is a self-taught aficionado of the work of Frank Lloyd Wright, and has assembled what many consider to be the largest collection of Wright artifacts in existence, now housed in a museum at Domino's headquarters in Ann Arbor. Monaghan has undertaken a score or more building projects over the past dozen years, engaging architects such as 1990 AIA Gold Medalist E. Fay Jones, who has designed his private home; Charles Moore, who has a number of projects in the works for his retreat on Drummond Island in Lake Huron; Hugh Hardy, who has designed a recreation center for the Monaghan family compound; and Mexican architect Ricardo Legorreta, who was commissioned to design a cathedral for Managua, Nicaragua.

Monaghan's beginnings were humble, and his rise from poverty in eastern Michigan to the head of a multimillion dollar company reads like a Frank Capra movie script. When Monaghan was four his father died, and his mother placed Tom and his brother in an orphanage. While in high school he worked as a farm laborer, flirted with the Catholic priesthood but was bounced out of the seminary for acting up, and enlisted in the Marines. In 1959, with a blossoming love of architecture, Monaghan entered the architecture program at Michigan, but three part-time jobs, including a stint at a local pizza parlor, distracted him from study. In 1960 he bought his own pizzeria in Ypsilanti, Michigan, and the rest, as they say, is history.

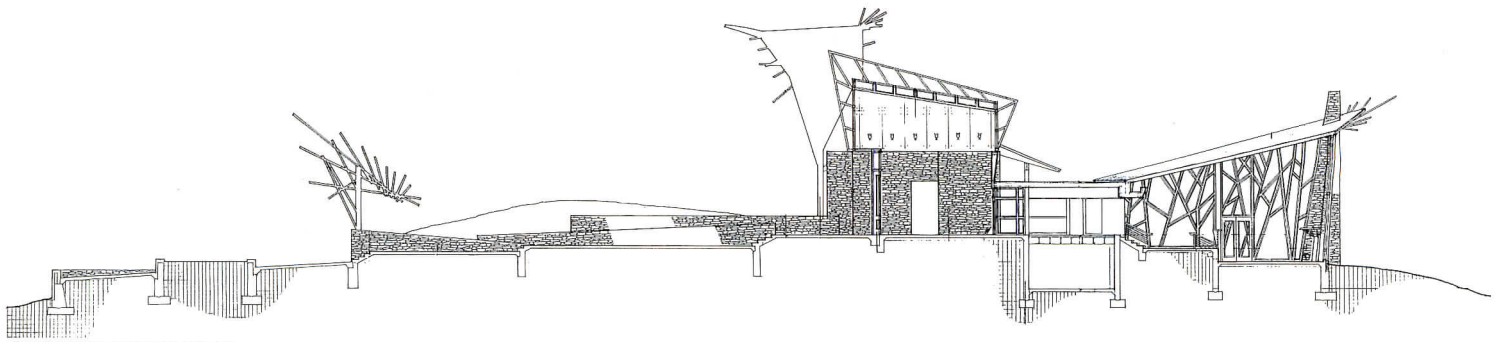
Today, Monaghan occupies an office that overlooks Domino's Farms, a 320-acre corporate enclave in Ann Arbor, not more than 20 miles from his first pizza parlor. Located on Frank Lloyd Wright Drive, Domino's Farms includes the company's headquarters, a petting farm for children, Monaghan's collection of antique automobiles, an archive for Domino's Pizza and the Detroit Tigers (Monaghan bought the ball team in 1983), and the Domino's Center for Architecture and Design (formally the National Center for the Study of Frank Lloyd Wright). This is the only place on earth where one admission ticket

"It's always distressed me that architects seem to be so underpaid for what they contribute to society. They're so little appreciated."

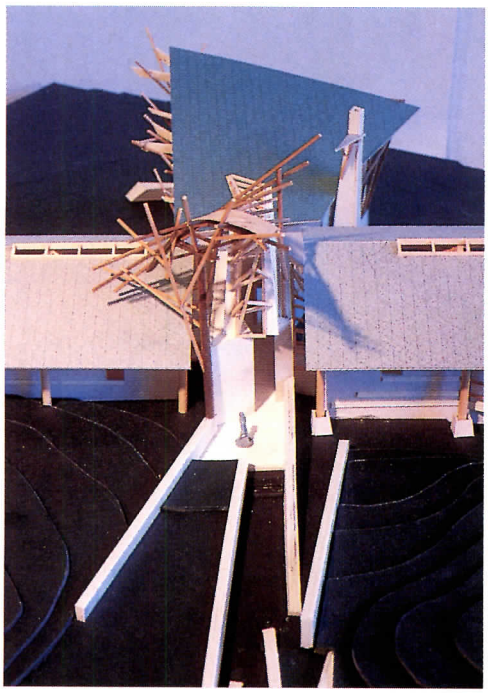
– THOMAS MONAGHAN

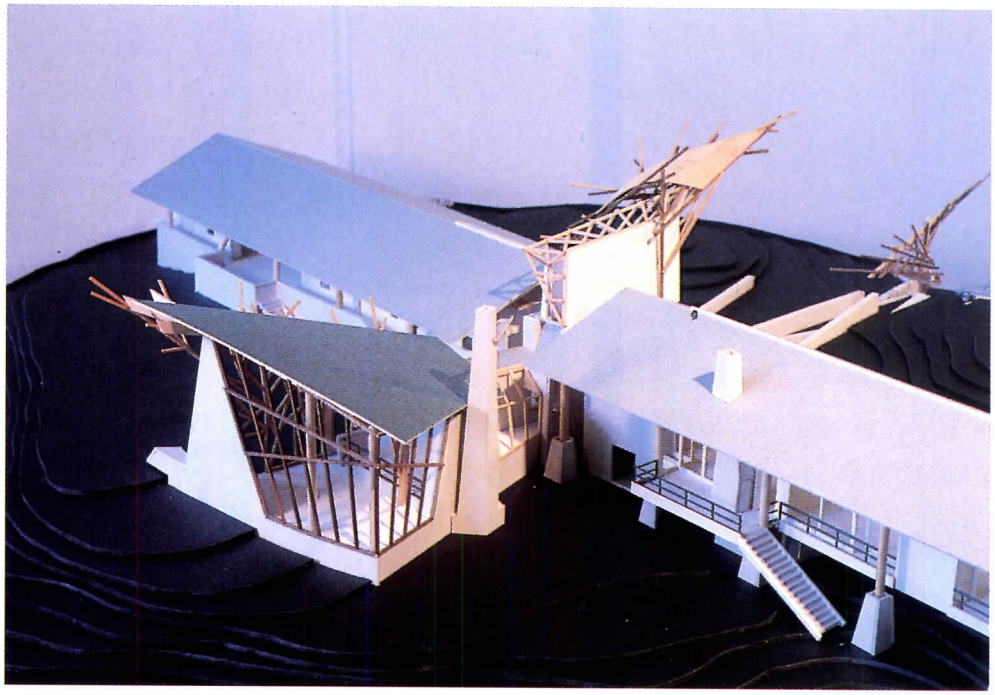
Domino's headquarters (facing page, top and bottom left), designed by Gunnar Birkerts, takes the form of a long Prairie Style house overlooking Domino's Center for Architecture and Design (facing page, bottom right). Birkerts also designed a prototypical Domino's Pizza outlet (left) for Monaghan.

BALTHAZAR KORAB PHOTOS



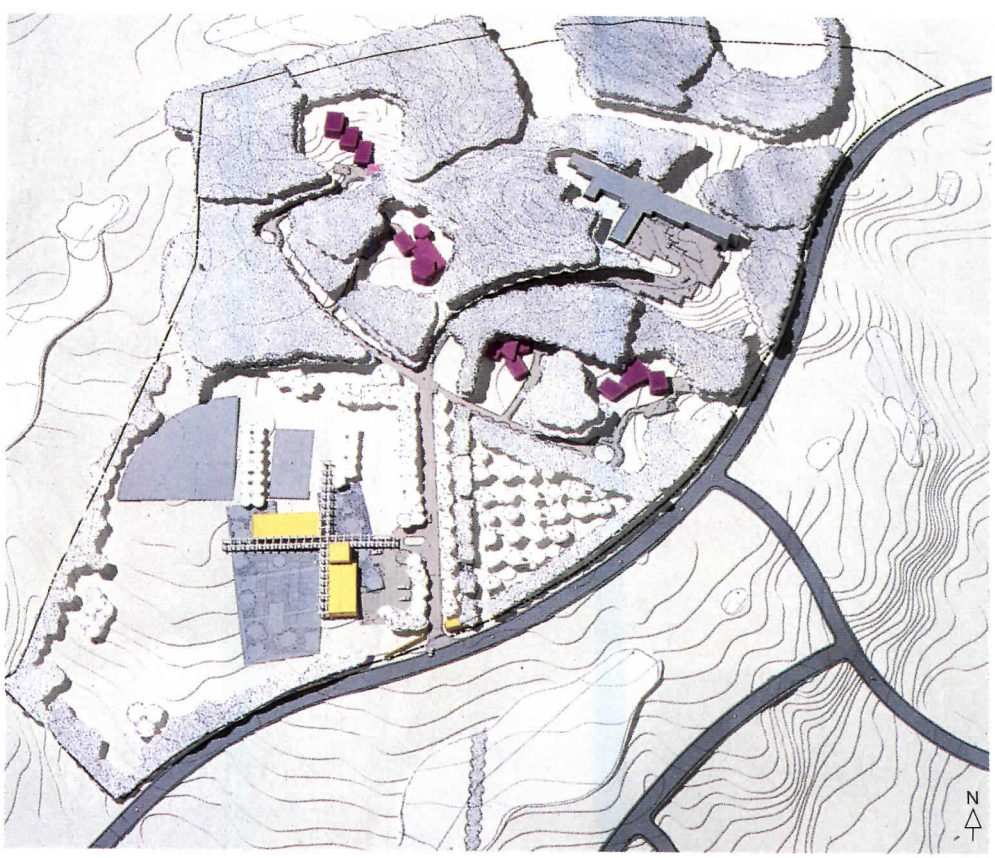
SECTION LOOKING WEST





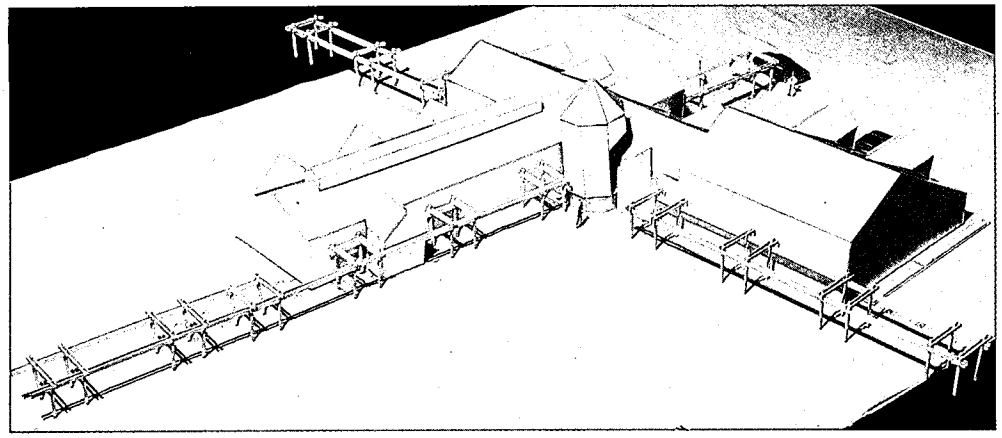
Private House, The Settlement
Mockbee Coker Architects

The client for this house at The Settlement (partial site plan, right) requested a comfortable design that would be practical, but out of the ordinary. According to architect Sam Mockbee, the client also had no preferences about its architectural style. The 5,000-square-foot house is sited between two hills, in a valley thick with maple, oak, and hickory trees. The idea was to disturb as few trees as possible and to marry the house with the wooded site through man-made tree branches, which appear to grow from the house itself (top section). A small structure of painted steel "sticks" meets a branch at the front walkway (above), which leads to the entry foyer crowned with more steel "branches." Mockbee refers to the space with the slanted trapezoidal roof as the "tree room" (above right). The roof slopes up to open the room to views of the hills, visible through a patchwork pattern of branches that creates window openings. Cutting through the middle of the entrance sequence axis is a cross-axis with garages and maid's quarters to the west, and private living and entertaining spaces extending to the east. Construction is scheduled to begin next year, with completion in 1992.



THE SETTLEMENT – SITE PLAN

POOL HOUSE; HARDY HOLZMAN PFEIFFER ASSOCIATES
PRIVATE RESIDENCES; VARIOUS ARCHITECTS
THOMAS MONAGHAN RESIDENCE; FAY JONES + MAURICE JENNINGS ARCHITECTS

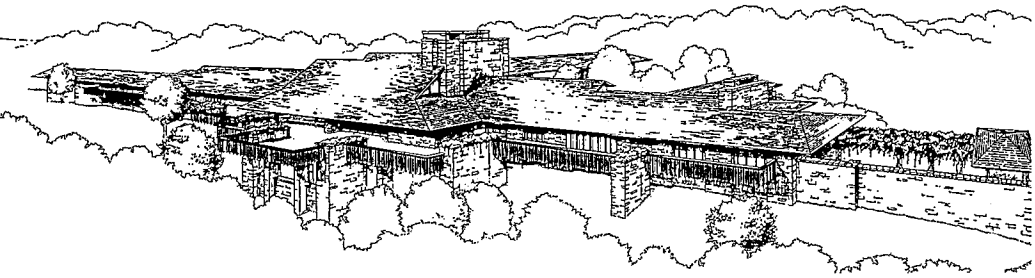


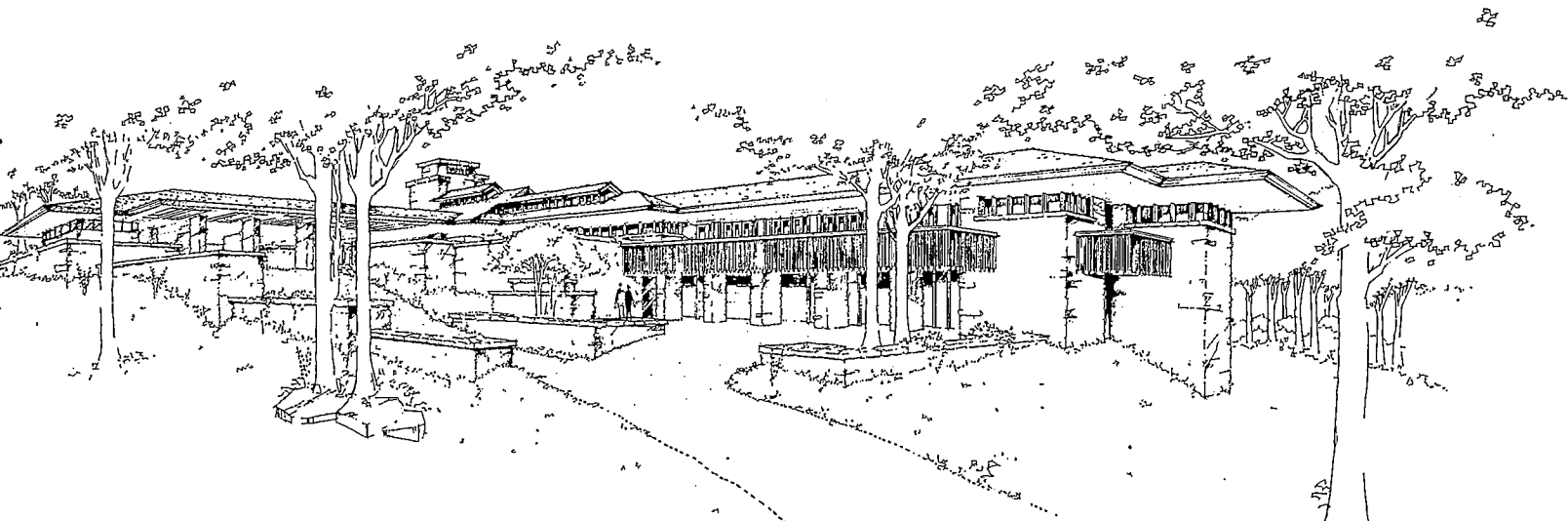
The Pool House, The Settlement
Hardy Holzman Pfeiffer Associates

Responsible for the layout of the master plan of Monaghan's private family compound at The Settlement (site plan, facing page), Hardy Holzman Pfeiffer also designed a recreational building (above) for use by the Monaghan family. Sited in a meadow at the compound's southwest corner (yellow on site plan), the 8,000-square-foot building is a pin-wheel in plan to allow for future expansion. Long, trellised walkways extend out from the center of the facility, and steep, landscaped terraces offer views of the surrounding forest and of residences to the north. The facility will include a variety of amenities, including a 75-foot indoor lap pool, a whirlpool, exercise room, sauna, and racquetball court. There will also be a lounge and loft space, providing a reading nook at the top of a 24-foot tower. An outdoor heated pool, a children's pool, a play structure, and gravel paths through ornamental flowering trees will surround the building.

Monaghan Residence, The Settlement
Fay Jones + Maurice Jennings Architects

Plans for Thomas Monaghan's own private home (below), now under construction at The Settlement, reflect his interest in the qualities found in the architecture of Frank Lloyd Wright and Fay Jones, who studied under Wright. The 22,000-square-foot structure also shares Monaghan's interest in the use of natural materials. Like the Domino's headquarters building, Monaghan's home will be distinguished by low, overhanging roofs, deep shadow lines, and rows of ribbon windows (bottom). The house will command the brow of a hill with views to the north. Private living, entertaining, and guest spaces will be located on the main level, with lower-level spaces devoted to recreation and service. Monaghan has worked closely with Jones during the design process, often spending hours with the architect in deciding the finishes. The house's exterior walls will be faced with stone, while woodwork and ceilings will be constructed of cherry.





can get you in to see Tigers memorabilia, an $8.1-million, 1932 Buggati, and hundreds of Frank Lloyd Wright artifacts.

Just outside Monaghan's office door hangs a window from Wright's Geneva Inn of 1911. Inside the mahogany-lined executive suite, Monaghan pores over a roll of drawings for his own new house—a 22,000-square-foot composition of rough stone walls, broad overhangs, and low roofs designed by Fay Jones, now under construction across the road from Domino's Farms. In the corner of his office is a pile of material samples for the house, which is scheduled for completion in 1992. As he explains the plan on paper, Monaghan points out the various spaces and finishes. He's comfortable leafing through a set of working drawings, and his enthusiasm for this project is contagious. "I love working with Fay on this house," says Monaghan, more collaborator than client. "But every time I get involved, the price goes up."

Monaghan traces his architectural yearnings to the orphanage in Jackson, Michigan, where he lived as a youngster: he knew every square inch of the late-19th-century mansion. "It had carved Italian marble fireplaces," Monaghan recalls, "all kinds of parquet floors, decorative friezes. I was interested in what that house was made of."

During a visit to the public library in Traverse City, Michigan, when he was 12, Monaghan discovered a book on Frank Lloyd Wright, and he was hooked. "I was completely dumbfounded by his buildings," says Monaghan. "I couldn't believe that all of them were by the same man. They were so different—the Robie House, Fallingwater, Johnson Wax. I'd never seen anything this beautiful." Monaghan read everything on Wright that he could get his hands on, and developed a preference for the architect's Prairie Style houses. To this day, Monaghan's idea of a perfect vacation is driving around, hunting down Wright houses.

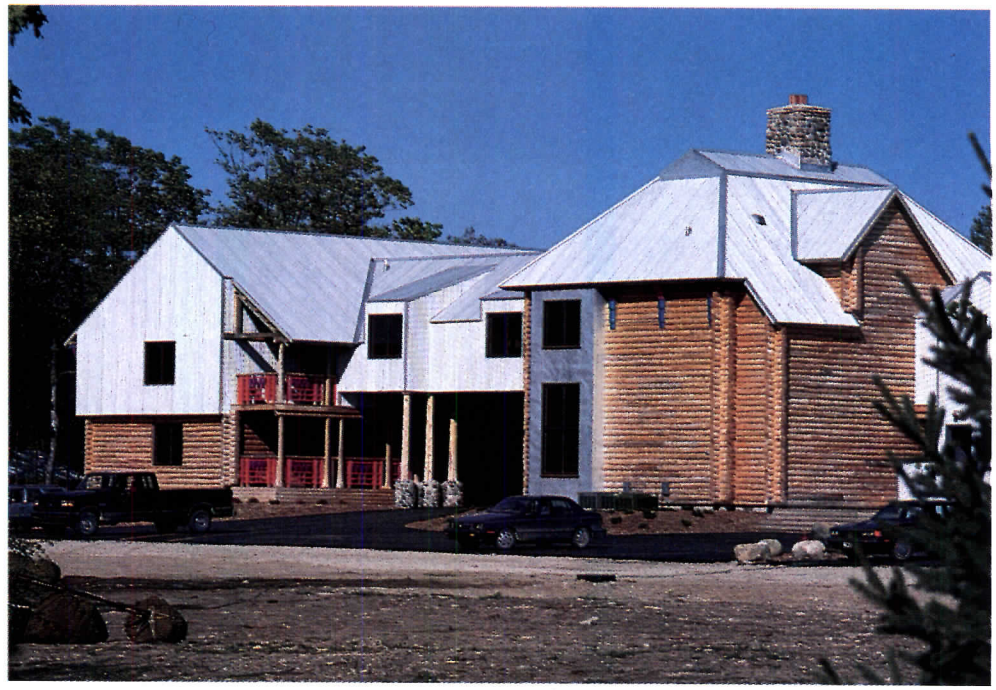
Monaghan was bitten by the collecting bug in the late 1970s, after seeing an exhibit on the decorative designs of Frank Lloyd Wright at the Renwick Gallery in Washington, D.C. With the help of architectural his-

torian Leonard K. Eaton of the University of Michigan, Monaghan started snatching up Wright furniture, lamps, metalwork, tableware, drawings, fabrics, dozens of windows—sometimes every Wright item at an auction—often setting record prices for his purchases. "At the time I started collecting," says Monaghan, "I thought I could buy just about anything on the market that I wanted for $500,000. If I had been early enough I probably could have. Breaking records always got a lot of publicity, and sold a lot of pizza. I figure I got the collection for free because of the amount of advertising that Domino's got through the collection."

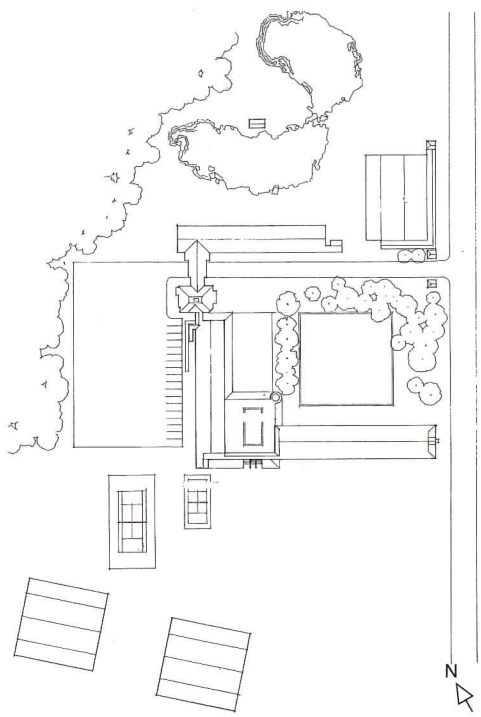
Today, Monaghan's collecting is guided by David A. Hanks, author of *The Decorative Designs of Frank Lloyd Wright* and a New York-based museum curatorial consultant, who assembled the Renwick show. The buying frenzy is over, although last June an exquisite $165,000 model of Fallingwater commissioned by Monaghan was unveiled as the collection's newest acquisition. Now at 350 pieces and valued at $20 million, the collection is being refined by swapping duplicate items for choice artifacts. The museum personnel has shrunk from nine full-time staff and volunteers to just two full-time staff. Approximately a fifth of the collection is now touring the country as part of the Smithsonian Institution Traveling Exhibition Service, and will close in New York City in late 1991.

While the collection is an impressive achievement in itself, it is housed in Monaghan's most ambitious project to date—the Domino's headquarters building, designed by Gunnar Birkerts in 1984 and still under construction. The more than half-mile-long building emerges from a man-made hill and races across its flat, farmland site—a trajectory of low hipped roofs, ribbon windows, and brick walls that is something of a cross between Wright's Robie House and the Marin County Civic Center. The Domino's building is Monaghan's architectural rite of passage, a watershed that widened his architectural interests from "Wright only" to the work of contemporary architects.

Monaghan met Birkerts through Eaton, and quickly came to the conclusion that he was the "world's greatest living architect," and was fascinated by Birkerts' design for a college dormitory and library complex at Tougaloo College in Mississippi, which has a strong resemblance in plan to the Domino's building. "I didn't tell Birkerts that I wanted the building to look like Wright," recalls Monaghan. "I told him I wanted hipped copper roofs, ribbon windows, horizontal lines, site berms, and it couldn't go over four stories." Birkerts came back with a building incorporating all of those features, but composed into a tight circle. "It looked like a



BALTHAZAR KORAB PHOTOS

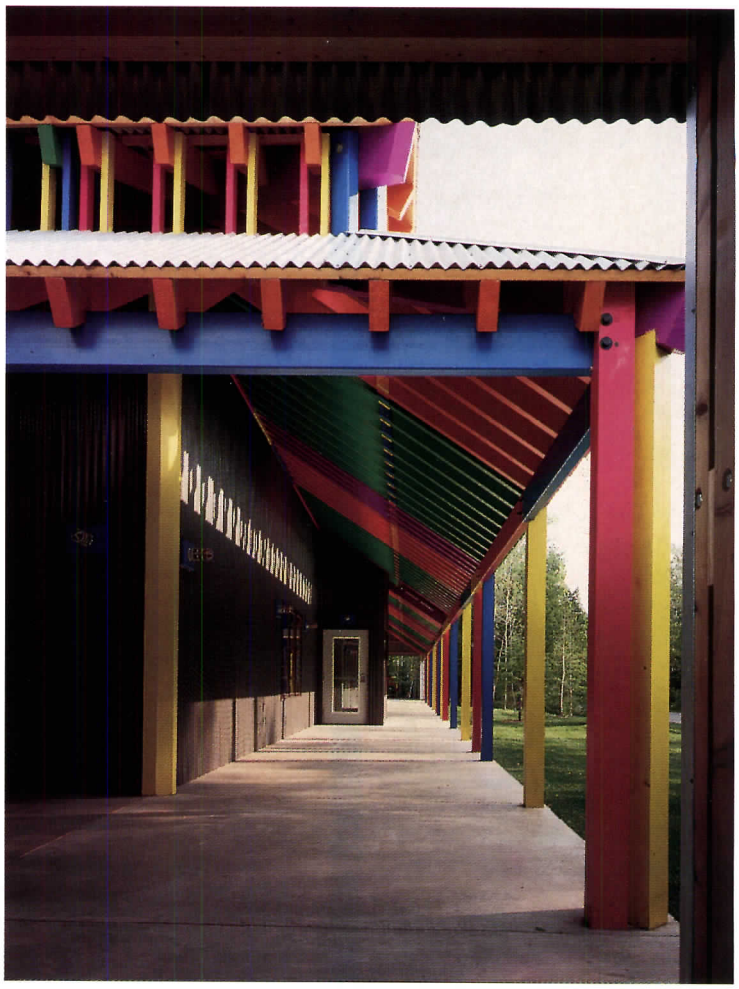


Hotel, Drummond Island
Charles W. Moore, Architect

Monaghan's development of Drummond Island in northern Michigan's Lake Huron has included a resort hotel offering a range of recreational activities including golf, tennis, bowling, swimming, and croquet (plan). The notion of an escape to the wilderness for fresh air and fitness prompted architect Charles Moore to model the hotel on a traditional 19th-century country town, with a main street and town square. Covered walkways on the buildings' perimeter reinforce the idea of a frontier village with rustic architecture (facing page), where pedestrians can stroll in the shade. The materials selected—steeply pitched, corrugated metal roofs (above), log construction, and heavy timber railings—recall the architecture of early American logging communities in the surrounding area.

Outdoor Chapel, Drummond Island
Gunnar Birkerts and Associates

Located within walking distance of Monaghan's boat dock on Drummond Island, an outdoor chapel (left) was designed by Birkerts to fill a small clearing in a densely wooded area. A canopy of trees above the clearing offered a natural site for an outdoor cathedral. The chapel is constructed of 8-by-8-inch stepped oak timbers that culminate in the center behind the altar. Birkerts intended the timber backdrop to symbolize the mount upon which Christ was crucified, while incorporating the 12 stations of the cross. The chapel seats approximately 50 and, because it is located in a protected wilderness area, the architect did not alter the natural contours of the land.



BALTHAZAR KORAB PHOTOS

high-tech Polynesian village," Monaghan frowns. He then showed Birkerts a drawing of Wright's 1907 scheme for the never-built McCormick House (Monaghan's favorite Wright design) and asked Birkerts to give him something more like it.

"I had a very trying time with Tom," confesses Birkerts. "I told him that you can't take a residential building and blow it up to a million square feet and still have all the qualities you want. You need flexibility and expansion." Birkerts developed a scheme modeled on McCormick, but he also designed a building of seven long, linear bays that extended into the landscape as tracks, starting and stopping as space was required.

After agonizing over the decision for days, Monaghan called Birkerts and said he wanted the track scheme. "Whatever dogma he has, Tom listens to logic," says Birkerts, though the architect feels that he came uncomfortably close to losing his design identity in the Domino's building. "The strength of the concept is in the track system," he explains. "It's a very contemporary notion—Frank Lloyd Wright updated into the 21st century, in a way. I don't know what Wright would have done. He would have had a hard time with Tom."

Birkerts has also completed designs for a 435-foot-tall tower next to the headquarters building (a tenth-scale model of it now sits

Continued on page 127

Bowling Center, Drummond Island
Charles W. Moore, Architect

The Bowling Center in the Drummond Island development (top left) is a departure from the heavy wood log construction of the architect's Drummond Island hotel. The Bowling Center is topped by a gable roof of corrugated metal, which steps down to create clerestory openings (facing page). The underside of the roof is a vibrant study in bright painted colors (top right), reminiscent of Mexican toys, which Moore collects. Clerestory openings enliven the underside of the roof, without sacrificing protection from the weather. The entrances are marked by corrugated metal towers, which are punctuated by ornamental structures inspired by Russian wooden churches (above and facing page).

Television Romance

DURING THE 1980s, KOHN PEDERSEN FOX ASSOCIATES seemed to be designing office towers everywhere—from New York and Chicago to London and Frankfurt. By 1990, the Manhattan-based firm, which recently opened a satellite office in London, numbered more than 200 employees and had nearly 50 built projects to its credit. Clearly, a lot had happened since July 4, 1976, when A. Eugene Kohn, Sheldon Fox, Bill Pedersen, and Patricia Conway decided to start the firm in the middle of a recession with one client to its name—the American Broadcasting Company.

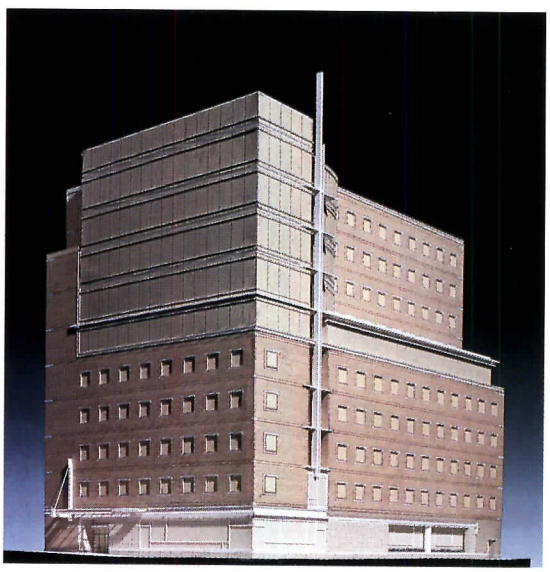
Since those early years, ABC has proven to be one of KPF's most consistent patrons. In fact, ABC and KPF have come of age together, with KPF designing a total of 14 projects (seven built) for the broadcasting company, as well as numerous interior renovations and master plans. "ABC has been very critical to our success," says Kohn. "When we first started, the corporation was still a fairly young network, and we were only a handful of people."

With the exception of Studio 23/24 and the ABC News Bureau in Washington, D.C., all KPF's projects for ABC are situated within a two-block radius on 66th and 67th Streets, sitting—as ABC vice president Bob Goldman says—"cheek by jowl" with apartment buildings. To blend into the neighborhood, KPF adapted several consistent strategies that acknowledged the area's residential character, including a limestone and brick palette, incorporation of setbacks and bay windows, and a scale sympathetic with the surrounding early 20th-century buildings.

KPF's first project for ABC was the 1978 alteration into studios of the 1905 New York State Medical Battalion Armory on 66th Street. In addition to cleaning and upgrading the brick and granite exterior, the interior was revamped to include makeup and dressing rooms in the basement, control and technical facilities on the first floor, and writers' and directors' offices on the second. Two more projects followed in rapid succession: WABC Studio and 30 West 67th Street, both completed in 1979. The studio for WABC-TV, a technical facility that also includes some offices, is located on the corner of 67th Street and Columbus Avenue. The 14-story building to the east of the studio on West 67th Street was designed to house ABC's broadcasting operations and engineering groups.

Studio 23/24, a high-technology factory for television production, finished in 1984, was constructed on the site of an abandoned generator plant near the Hudson River. Its sparsely fenestrated and bold geometric form vigorously announces its function as a "black box" environment for television studios. With its emphasis on collage, decoration, and materials, 47 West 66th Street, housing primarily studios and completed in 1986, reveals the firm's exploration of a Classical vocabulary, evident in the facade's division into a base, middle, and top. At the same time, the use of setbacks, street walls, and closely spaced mullions nod to the neighborhood context. While the ABC facilities in Manhattan incorporate studios above ground, the 1981 ABC News Bureau in Washington, D.C., has its studios underground—a concession to D.C.'s height limitations. By extending the studios more than 70 feet underground, KPF reserved the six floors above ground for administrative needs. In 1986, after Capital Cities bought ABC, the new owners decided to consolidate their headquarters into a new building at 77 West 66th Street, an L-shaped site near most of the existing Manhattan facilities. This 22-story structure, the sixth building in KPF's master plan, is intended as a showcase for the newly merged company.

Viewed as a whole, the earlier projects for ABC, such as the WABC Studio, adopt a more Modern form than the later projects, which embody a historicist vocabulary. Now, according to several KPF partners, the firm is again embracing a Modern idiom. "During the 1980s, many people called us Postmodernists," says Kohn, "but we always felt we were trying to be contextual. There is no question that many of our past buildings, because of their stone detailing, suggest a Classical language. We did take lessons from history, and we still will, but our current projects are far more Modern." Adds Bill Pedersen, "About five years ago, I became somewhat frustrated with the potential of Classical strategies because the buildings tended to point in an excessively retrospective direction."



To be built at 147 Columbus Avenue, (6 in site plan, facing page) KPF's eighth project for Capital Cities/ABC reveals the firm's new design direction.

KPF's latest office building for ABC derives its identity from its location between two other KPF projects—WABC Studio and the Capital Cities/ABC headquarters, and its role in "completing the corner" of 66th Street and Columbus Avenue. Facing 66th Street, the building will rise six stories, then set back 20 feet to rise an additional four stories. On the side facing Columbus, the building will rise to its full 10-story height, with a recess at the eighth story. These setbacks acknowledge the building's intimate connection to its site and surrounding structures.

From the patron's perspective, ABC's Goldman explains, "The benefit of our long-term relationship with KPF was clear when we decided to commit to the corporate headquarters. It was of vital importance that the architects understand our needs and be able to execute them so well."

The compliment cuts both ways. "It is rare to have a client that you work for year after year, because relationships have their ups and downs," says Gene Kohn. "So many clients collect architects as they would paintings. It's wonderful to have clients that you don't have to call every day. It's wonderful when they call *you* up." ■

—VICTORIA GEIBEL

Victoria Geibel is a New York-based freelance writer.

JOCK POTTLE

ABC Studios 23/24 (1984)

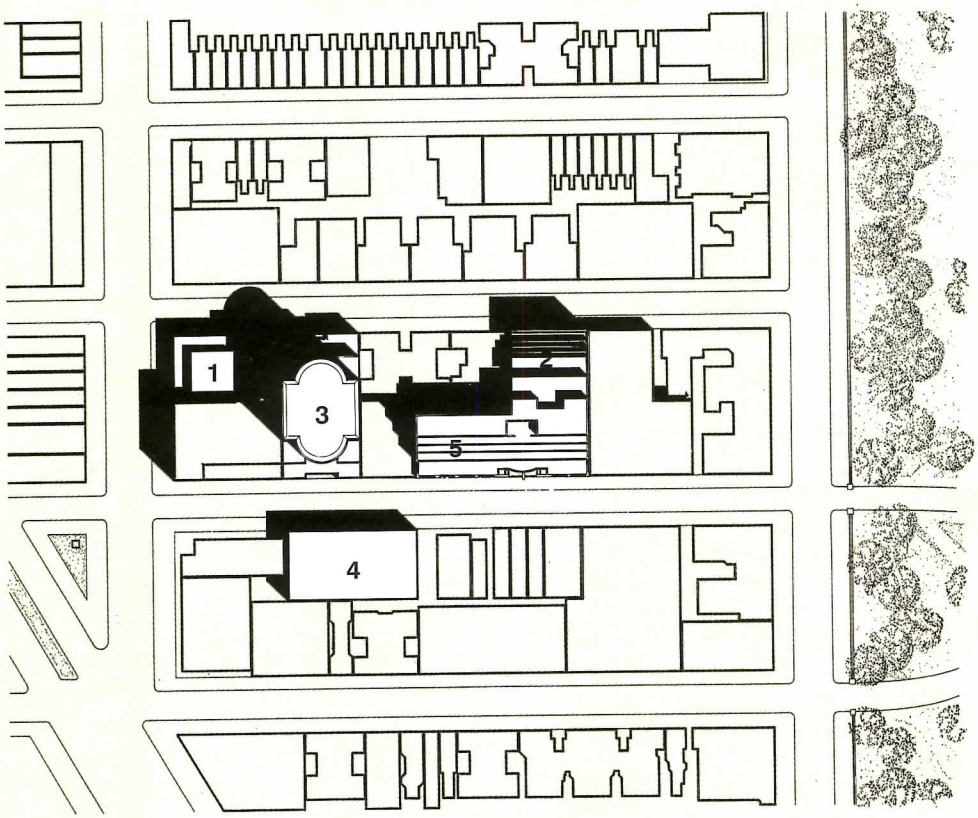
WOLFGANG HOYT

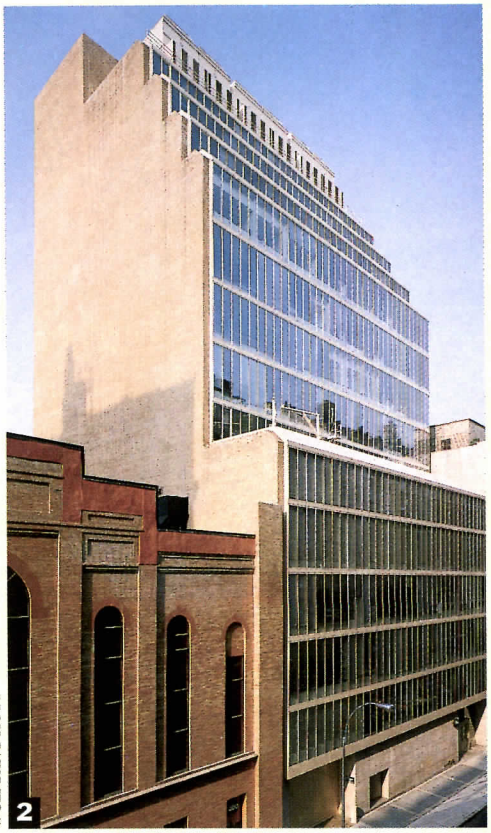
ABC Studios, Washington, D.C. (1981)

WOLFGANG HOYT

1

WABC Studio (1979)





WOLFGANG HOYT

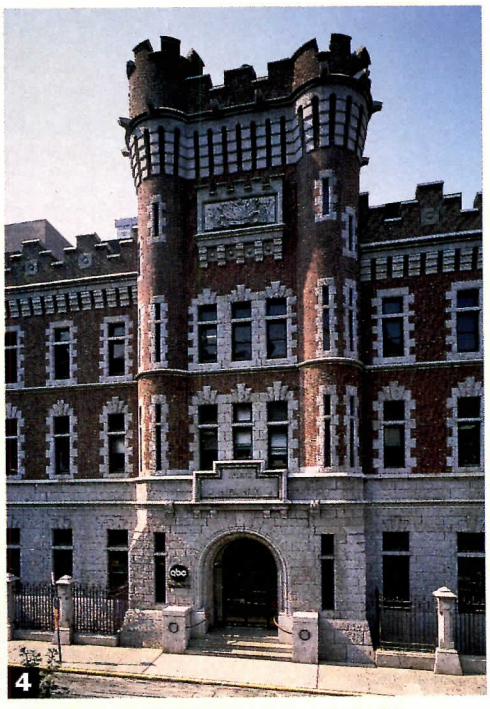
2

30 West 67th Street (1979)

CERVIN ROBINSON

3

Capital Cities/ABC Headquarters (1989)



WOLFGANG HOYT

4

ABC Armory (1905, renovated 1978)

CHUN LAI

5

47 West 66th Street (1986)

CERVIN ROBINSON

JOCK POTTLE

JOCK POTTLE

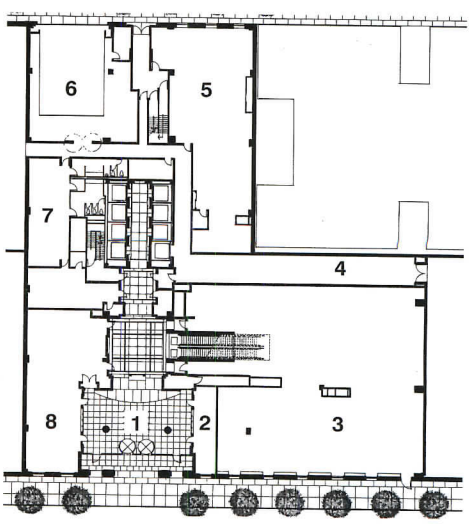
Capital Cities/ABC Inc.
New York City
Kohn Pedersen Fox Associates

The most recent built project during the 14-year relationship between Kohn Pedersen Fox and Capital Cities/ABC is 77 West 66th Street, which demonstrates the meticulous detailing for which the Manhattan-based firm is known. Designed at a time when KPF was exploring a more historicist approach to architecture, the 22-story tower features decorative brick coursing and large semicircular bays rising above a six-story base—all gestures intended to lessen the building's apparent mass as seen from the street.

Stainless steel storefront windows with bronze glazing stops line the building at ground level, enlivened by planter boxes of granite, like the wainscot (below left). Sills and spandrels are constructed of Indiana limestone, and decorative soldier-course bricks reflect the residential nature of the surroundings.

While the base of the building is designed to blend with its surrounding early 20th-century streetscape, the top of the new ABC tower adopts a distinctly contemporary vocabulary, signifying the presence of a modern-day communications company headed for the 21st century. A painted aluminum cornice supported by polished aluminum columns caps the building (facing page), and a diagonal screen wall of perforated aluminum panels hides cooling towers and elevator equipment.

Inside, the building's lobby (top), characterized by rich materials and refined detail, is flanked by a newsstand on one side and a credit union on the other (plan below), transforming the space into a bustling public meeting place for company employees.



GROUND LEVEL

1 LOBBY
2 NEWSSTAND
3 CAFETERIA
4 SERVICE CORRIDOR
5 MAIL ROOM
6 LOADING DOCK
7 MAINTENANCE
8 CREDIT UNION

CERVIN ROBINSON (FACING PAGE)

Garden Allegory

MICK HALES PHOTOGRAPHY, EXCEPT AS NOTED

UNTIL THE CANADIAN CENTER FOR ARCHITECTURE OPENED IN MAY OF 1989, PHYLLIS Bronfman Lambert was best known for commissioning Mies van der Rohe to design the 1958 Seagram Building, New York headquarters for her father's whiskey empire. Today, having studied under Mies and designed her own buildings, Lambert is most famous for creating the Canadian Center for Architecture (CCA), its museum and study center beautifully designed by Montreal architect Peter Rose, and its recently opened sculpture garden designed by local architect and artist Melvin Charney. Lambert, now the CCA's director, doesn't like to think of herself as a patron, although "everybody else does," she ruefully admits. "The Medicis were patrons," Lambert insists, in her softspoken yet emphatic manner that belies her reknowned passion for architecture. "They built buildings for themselves. But I am working *with* people."

Lambert has worked with Montreal's preservation groups for two decades to save the city's greystones, 18th-century limestone dwellings built by the French. Unique to Quebec, these stone houses are unusual in North America, where most colonial housing was brick, built by the British. Like the greystones, the CCA is clad in limestone, and Lambert is passionate about such historical references. "If you don't understand the profound history of a place," she queries, "how do you make people become attached to it?"

The history of Montreal, then, is the subject of the CCA's garden, a profound, if complicated, public space located across a busy boulevard from the Center's grand rear facade. In plan, the garden mirrors the CCA, beginning with a reconstruction of Shaughnessy House, the French Second Empire-style mansion that is now the improbable centerpiece of Rose's contemporary building. The reconstruction is cut off at the second story, creating a rampart that beckons a visitor to mount its stairs and discover what is beyond the concrete barrier. Behind it lies a long esplanade that displays nine sculptures by Charney.

From the sculpture garden, the site drops down to the Ville-Marie Expressway, the factories, and the working-class neighborhoods of Montreal that stretch to the St. Lawrence River. The Adirondack Mountains in New York state, more distant in culture than in miles, are visible on the horizon.

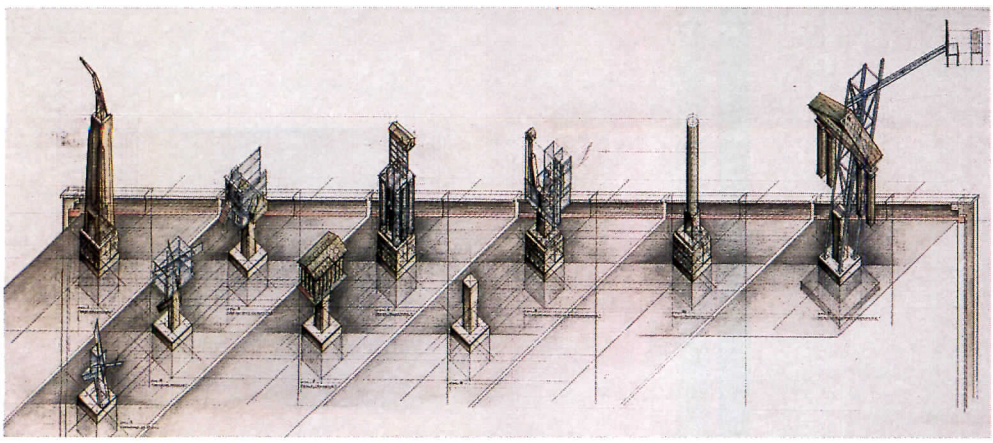
"If you don't understand the profound history of a place, how do you make people become attached to it?"

—PHYLLIS LAMBERT

The CCA garden is bordered by highways on all sides (top left). "Silo" (facing page) depicts a grain elevator on the rue Notre-Dame, directly south of the garden. A row of tenements forms the pedestal of the column, which elevates a peasant's shack, clad in copper like Montreal's church spires. Phyllis Lambert stands before the CCA's Canadian granite staircase (below), which is enclosed by walls clad in maple and limestone.

HUGUETTE LEDUC

Boulevard René Lévesque divides the CCA (right in photo) from the sculpture garden (left in photo). Shaughnessy House (facing page, top) is mirrored by a rampart wall (facing page, second from top) across the boulevard. As seen from the rampart (facing page, center), sculptural columns are arranged to mark rectangular plots of land that formed colonial Montreal (site plan, bottom right).



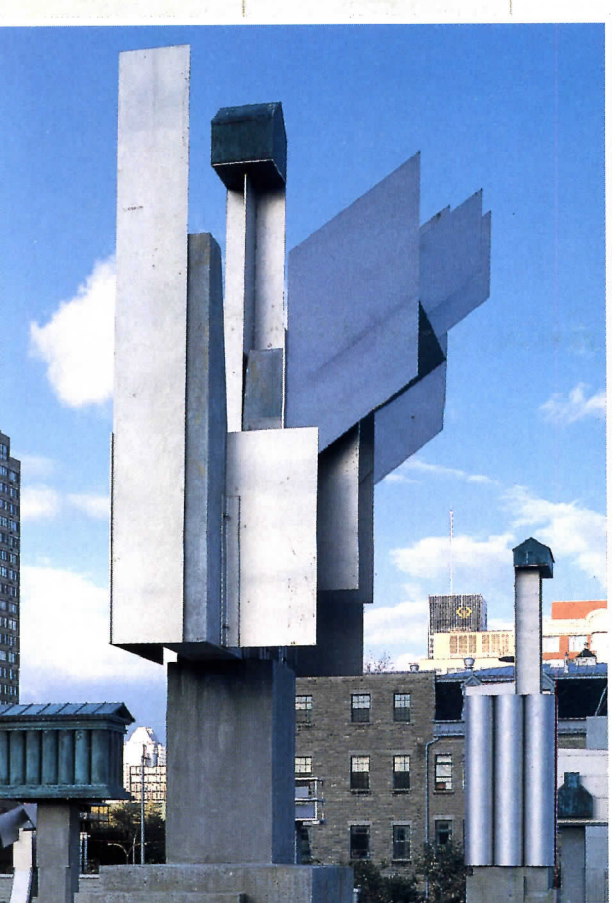
Bordered on the east and west by on- and off-ramps for the Ville-Marie, it is an odd, noisy place to put a garden, though a good location for depicting the plight of urban architecture. Charney tells the story of Montreal by reviving symbols of its past: an apple orchard, a meadow, drystone walls, and roses all recall the farms of the Sulpician priests who first settled from riverbank to mountain. He quotes 15th-century architect Leon Battista Alberti in his explanation of the garden, and the space indeed seems Albertian in its rigid adherence to capturing the city's original order, to Classical strictures that require columns to mark boundaries, and to imbuing every last element with meaning. It is an intellectual approach, yet the space functions as a dramatic unit whose puzzling character invites return visits, whether or not one bothers to investigate its layers of meaning.

Charney's steel and concrete sculptures portray elements of Montreal architecture, the artist's social philosophy, and a few jokes about Modern architecture that will be totally lost on anyone who visits the site without the artist in tow. (But Charney does frequent the garden, where, in this neighborly city, people stop to chat.) Grain elevators, Le Corbusier's Maison Domino, an obelisk, church spires—all are depicted here. Even the floor of the esplanade is composed of crushed limestone, the medium of Montreal's first French builders.

Although a visitor may yearn for a bit of graffiti to humanize the rampart wall, or at least a meaningless pebble, this ordered and unusual garden is the perfect reflection of its patron, who, after all, once fostered the abstraction of Mies. Lambert was merely one of the jurors who selected Charney's composition in 1987, but it is likely that her extraordinary intellect as architect, historian, and communicator has informed this compelling space, as it has the CCA. Lambert and Charney share the conviction that any 20th-century building is a culmination of its precedents—whether architectual or cultural movements. "There's no question," says the reluctant patron, "that architecture is the study of civilization." ■

—HEIDI LANDECKER

"Temple-Silo" (top left), "Sacred Column" (facing page, bottom left), "Dancing Domino," and "Dancing De Stijl" (facing page, bottom right) represent religious, architectural, and cultural influences on Montreal and present-day architecture. Each of the nine sculptures, called the "Allegorical Columns of the CCA Garden" (left), are illuminated at sunset by light from recessed lamps (center left). Shaughnessy House and Peter Rose's composition are visible from the garden (facing page, top), where "Obelisk-Chimney" portrays architecture and urban renewal.



Unlimited Vision

"THERE IS NO FORMULA FOR CREATING EXCITEMENT," WROTE LESLIE WEXNER IN A recent annual report of The Limited, Inc. "Ideas are constantly being sought out and tried. We don't just fuss with details—we're continually questioning basic premises. We work hard to make risk acceptable." An elegant and soft-spoken, self-made billionaire, Wexner was talking about marketing clothing, but he could just as easily have been explaining his approach to architecture.

As a patron of public architecture, Leslie Wexner's name is attached to one of the most publicized and debated buildings of the last decade, Ohio State University's Wexner Center for the Visual Arts, designed by New York architect Peter Eisenman in partnership with the late Richard Trott of Columbus. Wexner contributed $25 million toward the center's $43 million cost, yet, by his own account, he played a minor role in its development. "I came into the project through the back door after the university president asked me to chair the endowment drive," recalls Wexner. The team of Eisenman/Trott had already been selected through a juried competition, held in 1983. "Many people assume Wexner was behind our selection," notes Eisenman. "In reality, it took him quite a while to warm up to the scheme." And although Eisenman and Trott showed Wexner their designs throughout the process, Wexner acknowledges that tinkering around with the architects' scheme would have been wrong. "Great architecture is produced by great artists, not by lay people who critique and edit the work," he says.

However, Wexner did meddle when there were questions about substitution of lesser materials and the quality of the finishes for the Arts Center. "I believed the architects had created a spectacular design," says Wexner, "and I told the university if the completed building was to be a work of art, it had to be executed to the original conception of scale and quality of construction."

Committed to improving the built environment throughout Columbus, Wexner also provided the financial support for a competition for his hometown's new convention center. The city repeated the jury process that Ohio State had employed for the Wexner Arts Center, and ironically, the team of Eisenman/Trott came up the winner for the convention center. "Again, people thought I had a secret vote, but it was a totally democratic process," recalls Wexner. "In fact, I was quite surprised by the choice."

Now the most populous city in Ohio, Columbus is an anomaly in the middle of the Rust Belt. In addition to Wexner's greatly expanding retail empire, the city is home to growing banking, insurance, and other service industries. Columbus is also on the verge of expanding its art and science museum. "Although it is up to the individual institutions," Wexner states, "I will do what I can to assure the city gets really distinguished buildings."

For any major public commissions in Columbus, Wexner supports all types of collaborative efforts. "I think it is good for local architects in communities like ours to do joint

MICHAEL MORAN (FACING PAGE)

"The role of a benefactor is to get buildings built, not tinker with the design of the architect."

– LESLIE WEXNER

For the new Henri Bendel store on Fifth Avenue in Manhattan (facing page), Beyer Blinder Belle renovated the 1907 Rizzoli (left in photo) and 1908 Coty buildings (center), and added a compatible five-story structure (right). Behind the trio is a new mixed-use tower designed by Kohn Pedersen Fox Associates. At the Wexner Center, the third in a trilogy of inaugural exhibitions presents 13 works commissioned for the museum, including Chris Burden's temporary reconfiguration of Eisenman's tower, displayed behind Leslie Wexner (below).

ROMAN SAPECKI

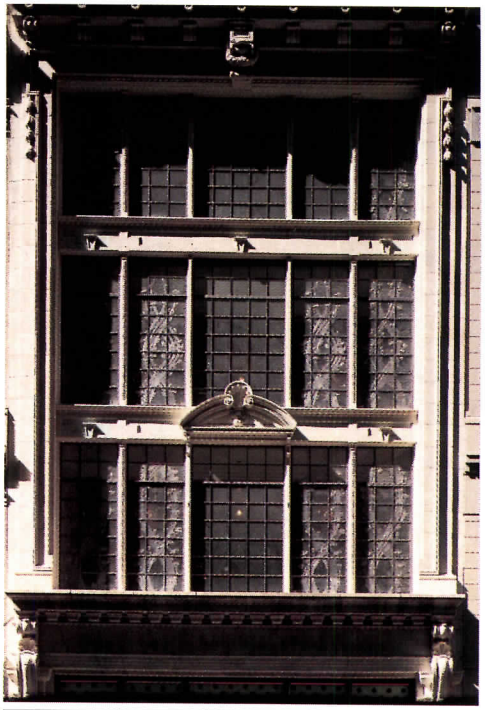
Henri Bendel
New York City
Beyer Blinder Belle, Architects

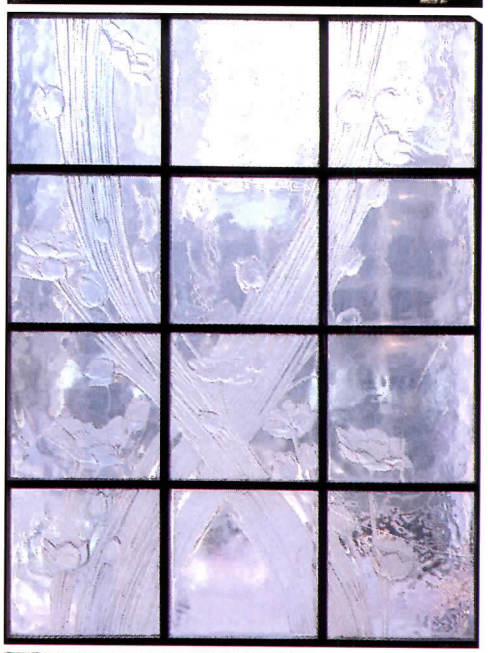
Scheduled to open early next year, the new Henri Bendel is housed in three interconnected buildings, the historic Rizzoli and Coty buildings and a new five-story structure that echoes the scale and proportions of the neighboring landmarks (preceding pages). Beyer Blinder Belle restored the Coty building's glass facade (top right), which features one of the few surviving windows by French craftsman Rene Lalique. Rising three stories high and spanning the width of the building, the glass storefront is composed of 204 lead crystal panels with a twisted vine motif (center right). Damaged panels were repaired or replaced and their original painted steel frames restored. At ground level, new bronze and steel storefronts will be installed, and original slate and copper mansard roofs will be preserved. A four-story central atrium (facing page), finished in French limestone and marble, opens onto a series of boutiques, and is surrounded by balconies from which to view the restored glass front (bottom right). Six floors of retail (ground and second levels, below) are interconnected by an elegantly proportioned curving stairway and a secondary, more intimately scaled staircase. The 80,000-square-foot shop is the base of a new 52-story, mixed-use tower designed by Kohn Pedersen Fox Associates.

ventures," he explains. "When you bring in outside architects with a reputation, obviously there is a presumption about talent, but there is also the reality of experience. That kind of cross-fertilization is good for the community as well as for the architects."

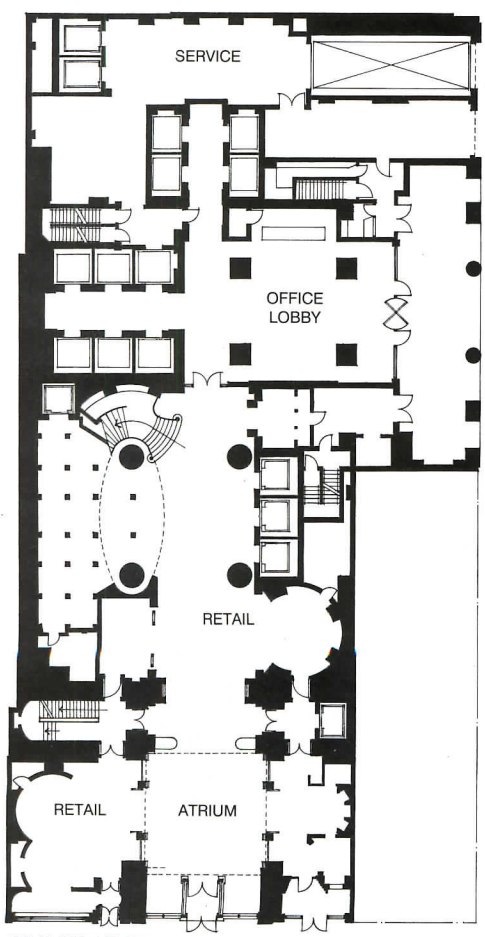
Not surprisingly, Wexner was attracted to architecture and art at an early age and recalls drawing in perspective when he was only five or six years old, although he "didn't know what the word meant." At Ohio State University, Wexner had serious ideas about becoming an architect or city planner, but his parents urged him to take up a "more legitimate profession like business or law." Wexner received a degree in business and later tried law school for a while, but quit in 1961 to join his family's clothing store in Columbus—named Leslie's, after him. Two years later, he opened his own women's clothing store, which offered a limited selection of sportswear—hence the name. Through constant expansion and the acquisition of other retail chains, Wexner established The Limited, Inc., a company that includes Limited stores, Limited Express, Victoria's Secret, Lerner, Lane Bryant, Structure, Abercrombie & Fitch, and Henri Bendel, bringing the total to more than 3,400 stores around the country.

Architects who have designed retail outlets for Wexner credit him with an uncanny ability to define merchandising through architecture. According to Wexner, he learned

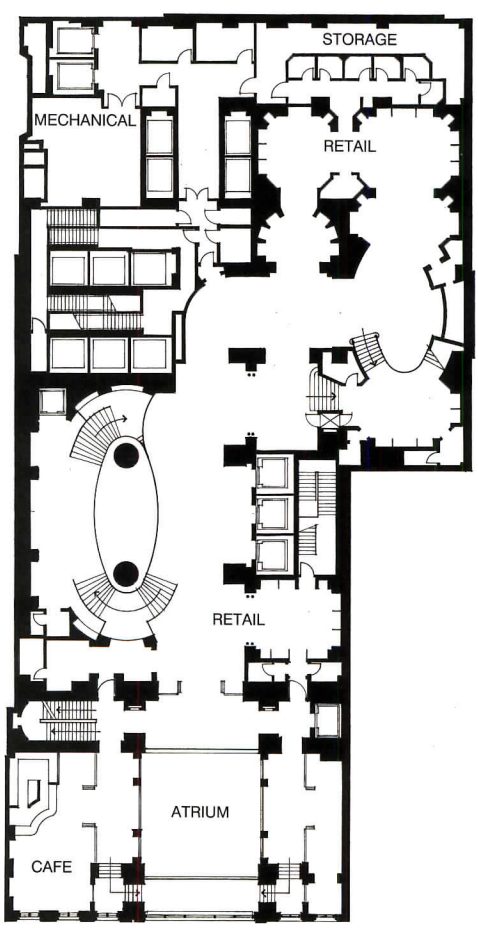




PHOTOGRAPHY BY MICHAEL MORAN, EXCEPT AS NOTED



GROUND LEVEL



SECOND LEVEL

STEVE ROSENTHAL PHOTOS (THESE PAGES)

from shopping center developer A. Albert Taubman the importance of good design. Wexner recalls a conversation in which Taubman referred to Wexner's early Limited stores as a "blight" on his malls. "He forced me to focus on elevating the design of my stores," admits Wexner.

No one today could disparage the design of Wexner's stores. For The Limited in the main concourse of Union Station in Washington, D.C., for example, Wexner commissioned Benjamin Thompson & Associates to design a transparent storefront with vaulted skylights that appear to float below the historic train shed. "The Limited is setting a new standard for retail," notes Graham Gund, who designed The Limited's Boston store. "I think their displays actually enhance the architecture of my building."

"Wexner has a talent for judging how something will work on a functional level, and how people will relate to the design of a store," says Christopher Barriscale of Beyer Blinder Belle, architects of the 1985 renovation of a McKim Mead & White building on Madison Avenue into the largest Limited store in New York City, and of the soon-to-open Henri Bendel on Fifth Avenue.

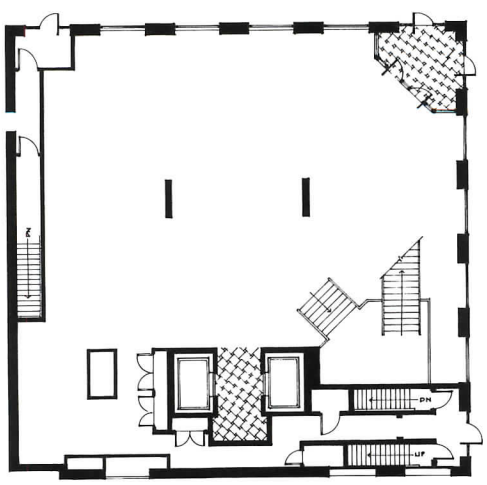
"When I was 30 years old, I thought I would sell my business when I turned 35 and go to Florence to study architecture," recalls Wexner. "I think it was a great idea, but I'm happy I didn't do it." Instead, the entrepreneur seems content to use his position to influence all kinds of design.

Applying his vision to a larger scale, Wexner, in association with local real estate developer John W. Kessler, is building a 5,000-acre community northeast of Columbus near the rural town of New Albany, Ohio. For this ambitious endeavor, they have assembled a team of respected designers headed by the dean of Harvard Graduate School of Design, Gerald McCue. Major participants include New York architect Jaquelin Robertson of Cooper Robertson & Partners, who is also designing the country club facilities and a number of houses; Philadelphia landscape architect Laurie Olin, who was originally to design Wexner's personal gardens and is now working on the whole complex; French-born architect Thierry Despont, who is designing Wexner's and Kessler's own houses; Miami architect Elizabeth Plater-Zyberk of Seaside fame; and San Francisco landscape architect Peter Walker.

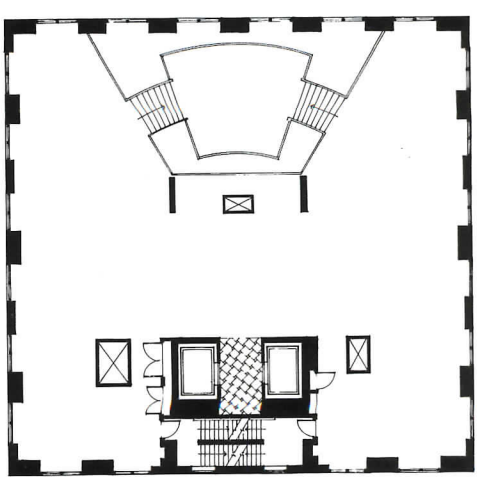
To create a cohesive sense of place in the Ohio countryside, Wexner and the design team have agreed the architectural expression will be American Georgian. "We are melding the historical rural tradition of farms and houses with the late 19th-century invention of the country club, which has become a surrogate village center," says Robertson. "Our goal is to create open, accessible communities

The Limited
Boston, Massachusetts
Graham Gund Architects

Adjacent to historic Faneuil Hall marketplace, the 48,000-square-foot structure (above) was originally designed by Gund as a speculative office building, then was leased by The Limited midway through construction, allowing in-house store designers to modify floor plans (right) and circulation patterns. Allowing views into elaborate product displays (facing page, bottom), the fenestration pattern visually lightens the massing of the seven-story granite building by defining a top, middle, and base (facing page, top).



GROUND FLOOR



TYPICAL UPPER FLOOR

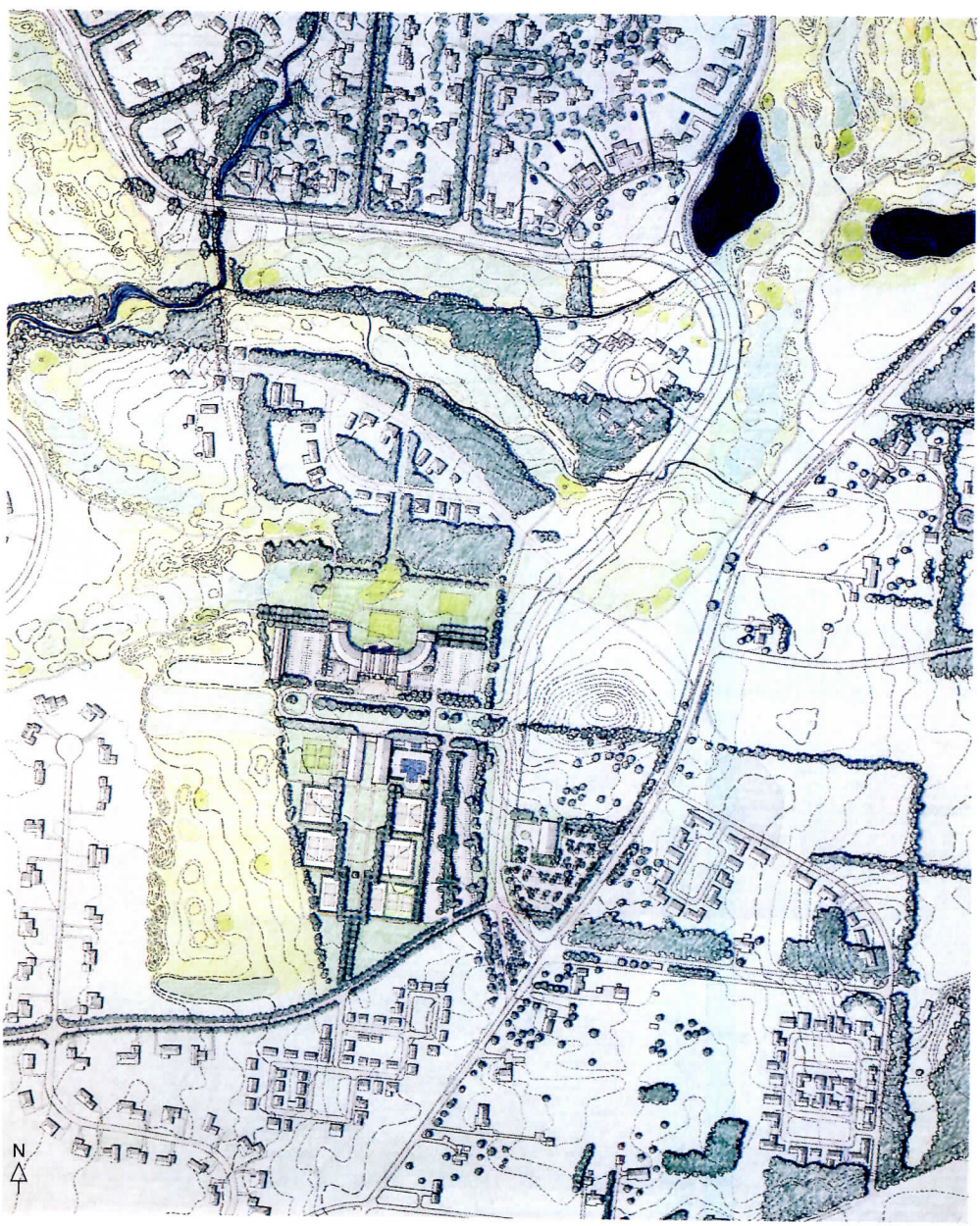
that respect and build up what is here, and enhance the value of the entire region," adds McCue. Unlike many of the planned residential communities springing up around the country, the New Albany project, with its patchwork land holdings, incorporates existing development. The scheme is intended to preserve and enhance the rural character of the existing roads with new roadways recognizing existing settlement patterns. "We also hope to maintain the agricultural fabric by preserving existing vernacular farm structures and planting real crops," notes Laurie Olin.

Drawing from the landscape theories of Frederick Law Olmsted, the community's golf course is treated more like a great greenway than a private enclave for a select few. Portions of the golf course run alongside the public road and are set behind traditional white wooden rail fences to provide vistas of open space. "Most planned communities tend to turn their backs on the things they can't control," says McCue. "Where postwar developments tended to put their most precious things in the innermost places, we are trying to create wonderful public places."

Like Wexner's other endeavors, the New Albany project is meticulously thought out from the regional concept down to the smallest detail. To assure the best possible construction, Wexner flew a group of Columbus builders to Richmond for a tour led by Robertson of some of the best examples of American Georgian houses. By setting architectural and construction standards of the highest quality, New Albany's goal is to create something that will endure, according to Olin. "Ralph Lauren creates it with a photo," notes Olin, "Wexner hopes to create the authentic item that will last a hundred years."

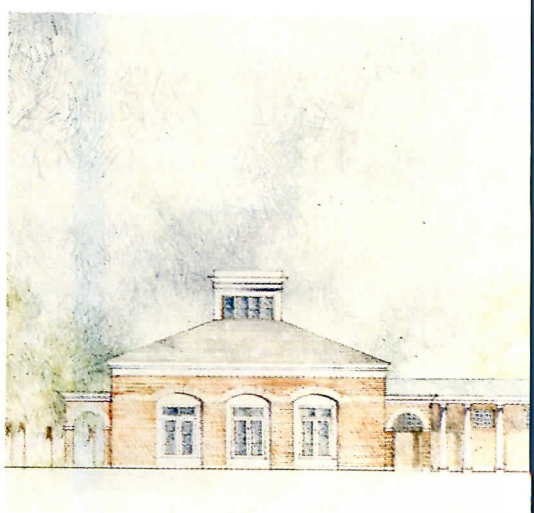
For all his contributions to architecture, Wexner doesn't consider himself a patron, "but I do like working with architects," he claims. And it's obvious architects of diverse theoretical and stylistic philosophies like working with him. "Leslie has an absolute understanding of the subtle differences of design," says Robertson, "and for all the people working for him, that means everything." ■

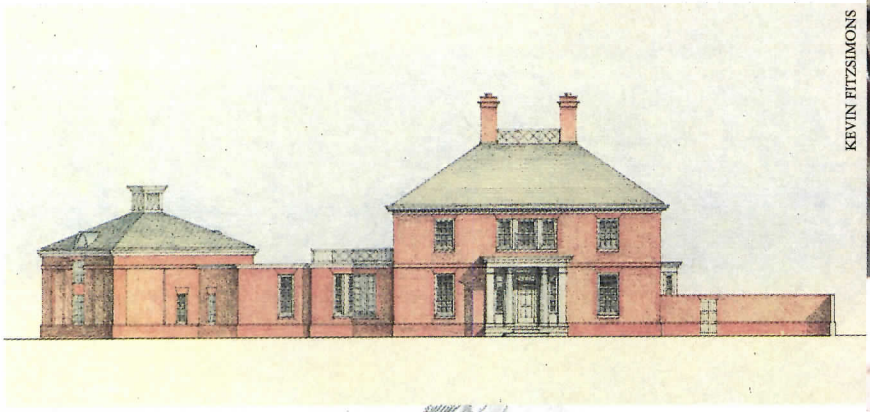
—LYNN NESMITH



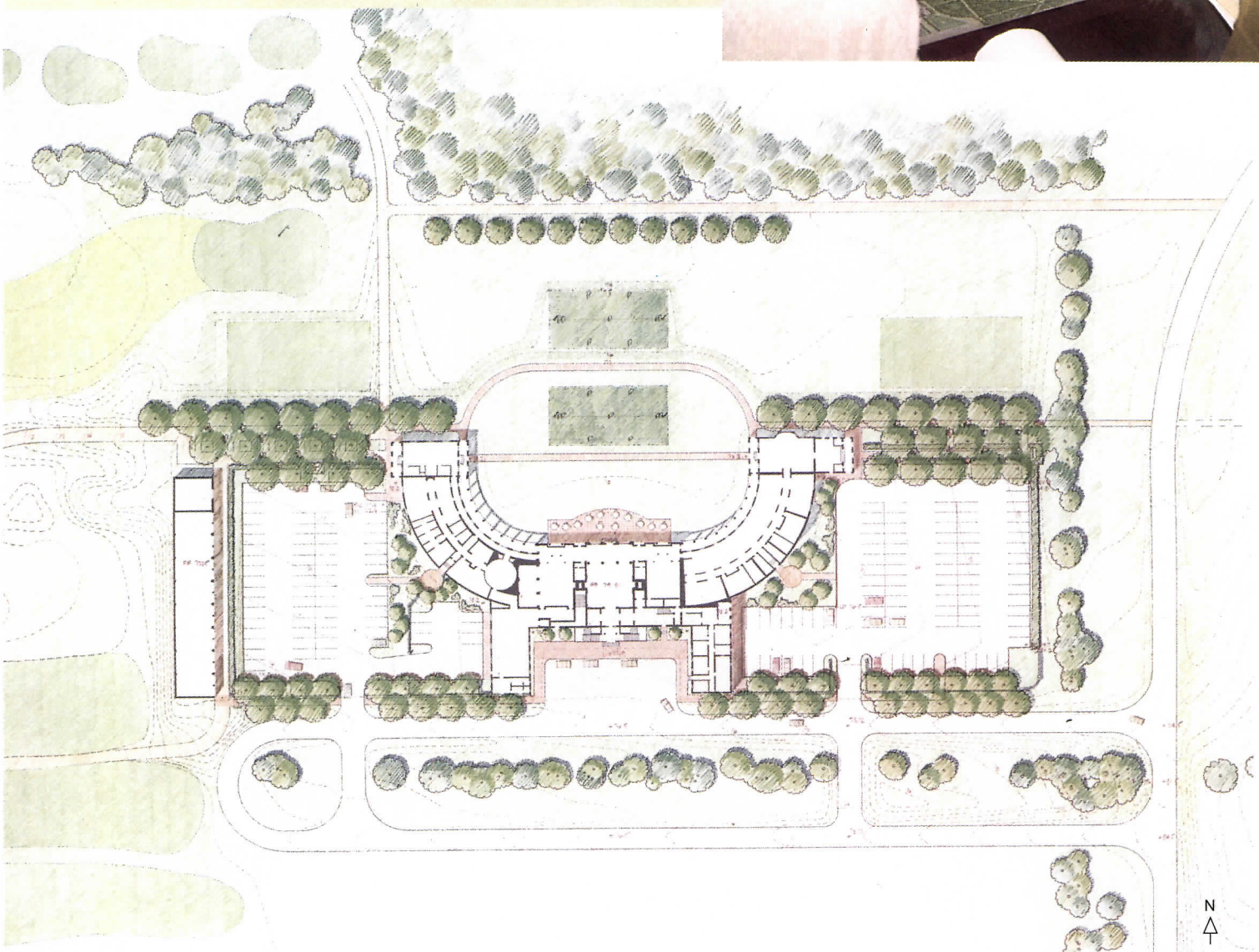
New Albany, Ohio

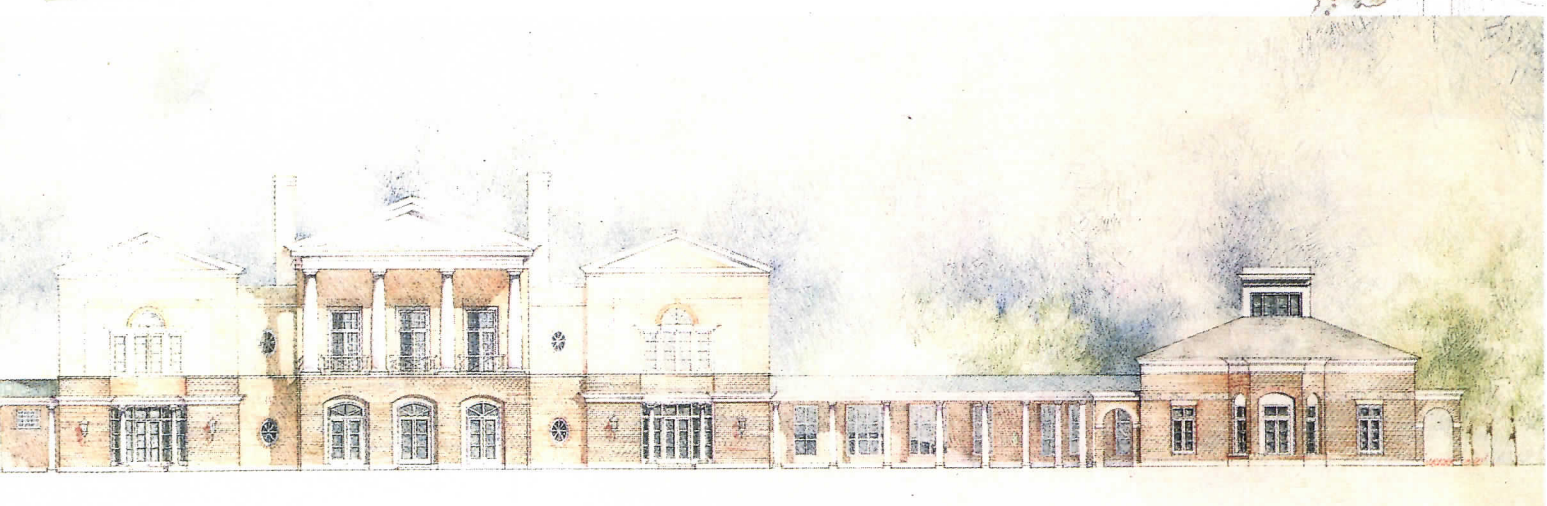
Working with a team of internationally known architects and landscape architects, Wexner and partner John W. Kessler are developing a planned community approximately 15 miles northeast of downtown Columbus near the rural town of New Albany. Rather than transforming a single tract of land, the New Albany project comprises a patchwork pattern of 5,000 acres around an existing farming community of about 500 people. (To put New Albany in perspective, Seaside, Florida, consists of only 80 acres.) The ongoing process of acquiring land forces the advisory panel of designers to reevaluate constantly the master plan for New Albany. Wexner's hands-on approach is evident at a recent panel meeting (facing page, top right). New Albany's master plan (below left) lacks a rigid and formal geometrical composition that would probably have been imposed if the designers had started with a blank canvas of land. Dwellings will be clustered in small neighborhoods around internal village greens, encompassing a variety of lot sizes and housing types. The project eschews typical village and suburban developments deferring to American rural traditions. The architectural expression selected to reflect this "country living" theme is American Georgian, inspired by Tidewater Virginia country estates dating from the 18th century and the work of 20th-century Georgian revivalist William Lawrence Bottomley. Serving as the project's surrogate town center is Jaquelin Robertson's 42,000-square-foot clubhouse (elevation, bottom) for a 27-hole golf course designed by Jack Nicklaus. Influenced by a pair of Virginia precedents—Mount Airy, the 1755 Palladian-inspired mansion, and Bottomley's 1923 Nordley house—Robertson created a two-story main structure with curving wings set amid Hanna/Olin's landscape (site plan, middle right). Robertson also designed a crescent of four houses (facing page, top left), which are intended to become signature residences for the development.





KEVIN FITZSIMONS





A Pause that Refreshes

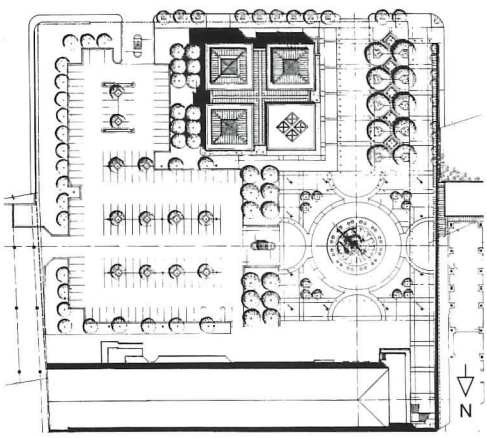
LONG BEFORE THE GLOBALIZATION OF THE world's economy, Coca-Cola led the way in breaking down international trade barriers in even the most remote countries. Yet Coca-Cola has always been a hometown company as inextricably linked to Atlanta as cars to Detroit or the movies to Hollywood.

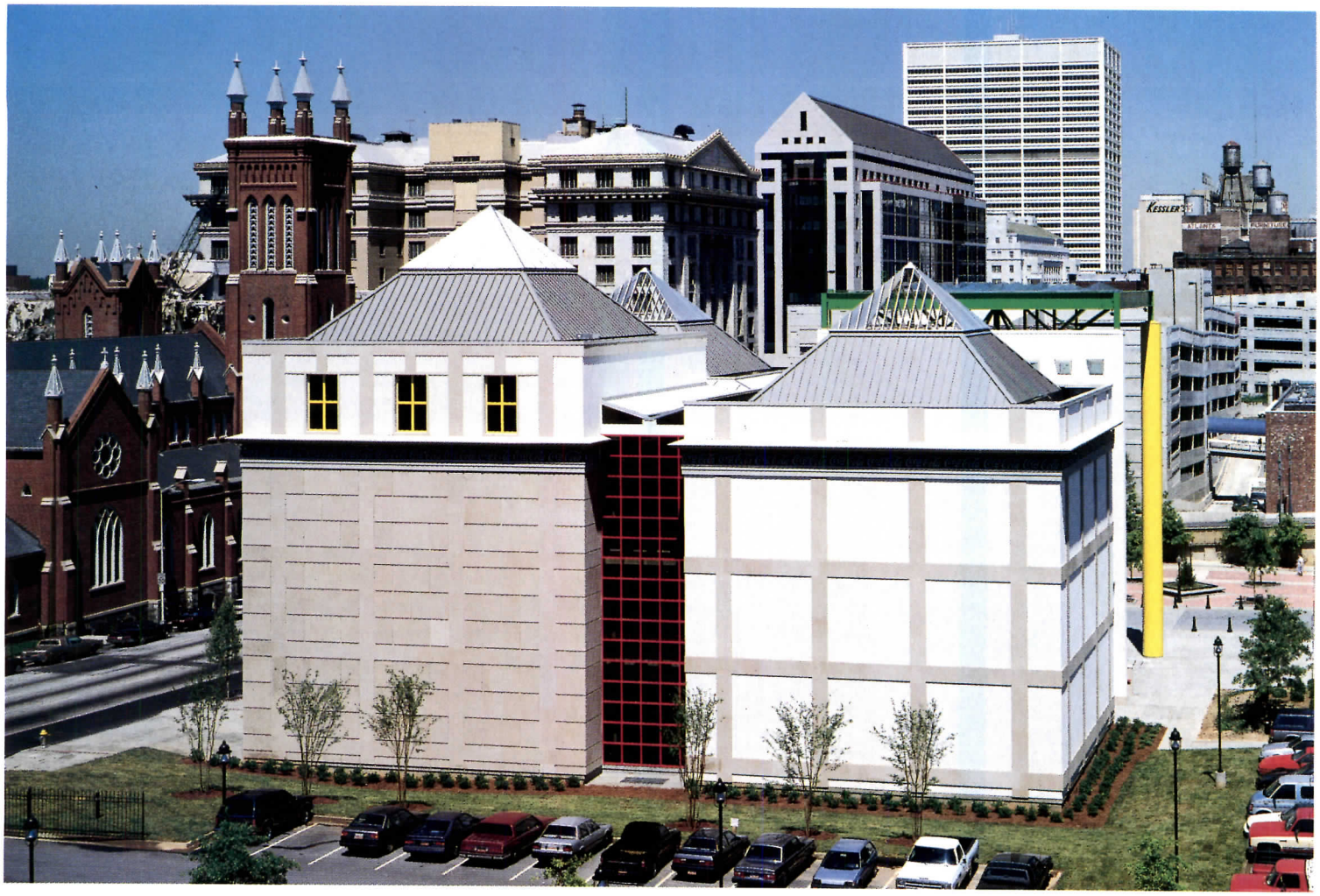
"The company and the city have grown up together since Coke was invented here 104 years ago," notes Carlton Curtis, vice president of communications for the Coca-Cola Company. Indeed, it is difficult to separate the patronage of the company from some of its early patriarches, beginning with Coke's first owner, Asa Candler, and later president Robert W. Woodruff, who joined the company in 1923 and remained involved until his death in 1985. Woodruff's personal philanthropy and his corporate influence were a major financial force behind the construction of Atlanta's Memorial Arts Center and the adjacent 1983 High Museum designed by Richard Meier. In 1984 this entire complex, which houses the Atlanta Symphony Orchestra, Alliance Theatre Company, the Atlanta College of Art, the High, and a landscaped plaza, was renamed the Robert W. Woodruff Arts Center. Not only a patron of architecture for the arts, Woodruff was a major financial sponsor of a number of buildings at Emory University, as well as public parks located throughout the city.

In addition to contributing to public architecture throughout Atlanta, Coca-Cola this summer opened its own museum devoted to tracing the history of the world's ultimate consumer product. Called the World of Coca-Cola, the 45,000-square-foot building is designed by the local firms Thompson, Ventulett, Stainback & Associates and Turner Associates as a playful exhibition facility, sparked by the company's familiar images.

"Through both direct and indirect corporate patronage, Coca-Cola has had a positive impact on Atlanta and continues to be instrumental in elevating the art of architecture in the city," explains TVS principal Bo Crum. "Yet for its museum, the company knew the pavilion shouldn't be an architectural jewel in and of itself. Coke wanted a

The entrance to the World of Coca-Cola is announced by a colorful canopy and sign (facing page) on one edge of a landscaped public plaza (bottom) that leads into revitalized Underground Atlanta. The pavilion is a counterpoint to the State Capitol (left in bottom photo) and the Atlanta City Hall (right in bottom photo) to the south. Existing parking (site plan) is scheduled to be replaced with high-density government office structures.





Viewed from the adjacent governmental structures to the south, the World of Coca-Cola presents a reserved facade of limestone and stucco (above), punctuated by pyramidal roofs that reduce the structure's monolithic quality. The 25-foot rotating sign set within a globe dominates the entrance cube (facing page, bottom left and bottom right), which is enlivened by square punched openings. By day, the Coke bottle sculpture at the southwest corner becomes almost transparent (facing page, top right). A Coca-Cola frieze wraps around three cubes (facing page, top left and bottom right).

building that would make people smile."

Facing a public plaza designed by TVS in 1989, the new museum serves as a transition between the dignified stone edifices of state government to the east and the revitalized Underground Atlanta festival marketplace to the west. Along the northern boundary of the block is Atlanta's oldest building, the Freight Depot, which is now used as a conference facility. The northeast section of the block is slated for high-density office development for the state government.

Although it has more in common with the pavilions of Chicago's 1933 Century of Progress or other world's fairs than serious museum architecture, the World of Coca-Cola is nevertheless an appropriate solution for its unusual program and site. To break down the apparent mass of the building, the architects divided the pavilion into four cubes, each 54 feet square in plan but different in architectural character. For each of the quadrants, they applied a range of corporate iconography to maintain a consistent theme.

In deference to the staid governmental complex, the quadrants closest to the State Capitol are subdued, with facades of limestone and stucco. Slightly varied in height, these volumes are articulated with a classically inspired entablature incorporating the sculpted words, "Coca-Cola." By day the pattern is subtle while at night, backlighting gives the signage a much stronger presence.

For the cube fronting an entrance to Underground, the architects literally and figuratively broke out of the box to create a lively forecourt for the pavilion's most prominent feature, a rotating logo, 25 feet in diameter, that re-creates a neon sign that stood on an Atlanta street corner from 1948 until 1981.

On the southwest corner, the architects took a bite out of the pavilion and inserted an 18-foot-high abstract sculpture of an original Coke bottle. Constructed of eight intersecting panes of glass, the sculpture is lit from within to identify this corner with another Coke icon.

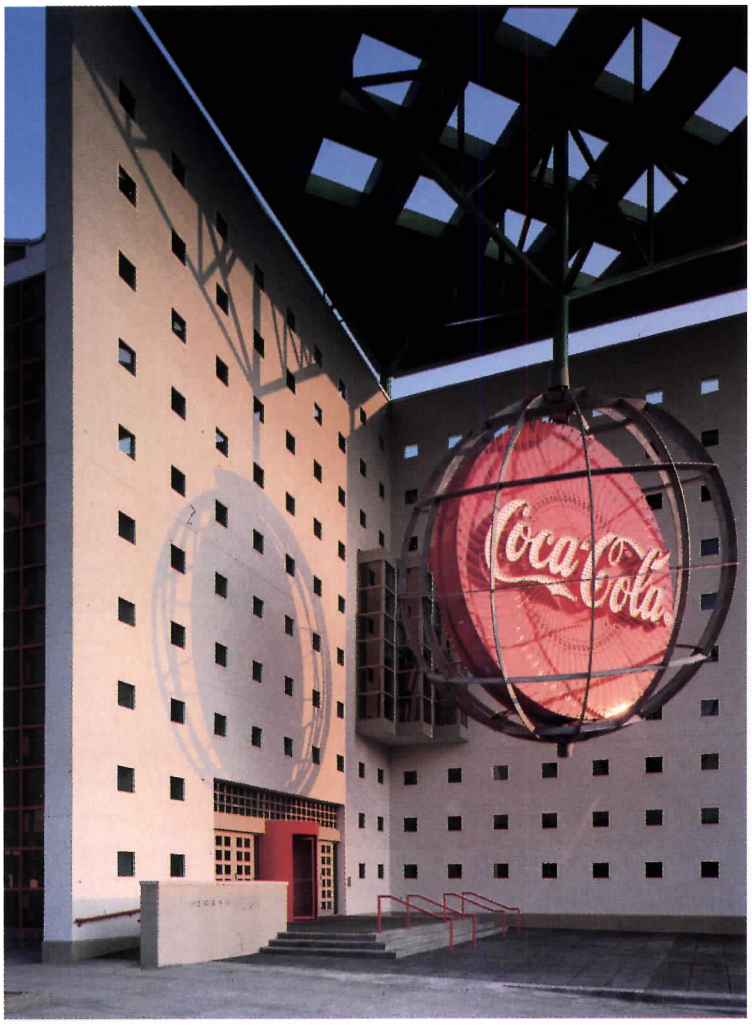
Inside the pavilion, the spaces between the four cubes are enclosed with skylights and floor-to-ceiling windows detailed with a grid to create an atrium of modest dimensions but dramatic proportions. At night, the illumination of the spaces, in conjunction with the building's lighted signage, makes the building glow from every perspective.

The museum interior is organized for one-way traffic. Visitors ascend via elevator to the third floor and walk down through 15,000 square feet of exhibitions that chronicle the evolution of the company and the beverage through memorabilia, radio jingles, television commercials, interactive displays, and video presentations. The architects established an orienting circulation pattern among exhibits by allowing visitors to traverse the atrium space on bridges with views that almost always include the neon Coke sign outside. The pavilion also houses a 5,000-square-foot retail store on the first floor and 25,000 square feet of lobby space and support areas.

A few years ago when the Atlanta Tourism Bureau conducted a survey, the top three tourist attractions were Tara, the Underground, and something having to do with Coke. "At the time, Underground had gone kaput, there was no Coke museum, and there has never been a Tara," notes Curtis. Although visitors to Atlanta still won't find Tara, those hoping for a fix on Coke will certainly be gratified to find "The Real Thing." ■

—Lynn Nesmith


Coca-Cola

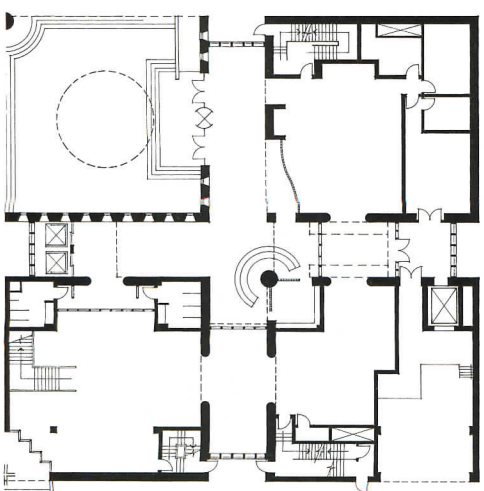

Coca-Cola

GABRIEL BENZUR PHOTOS (THESE PAGES)

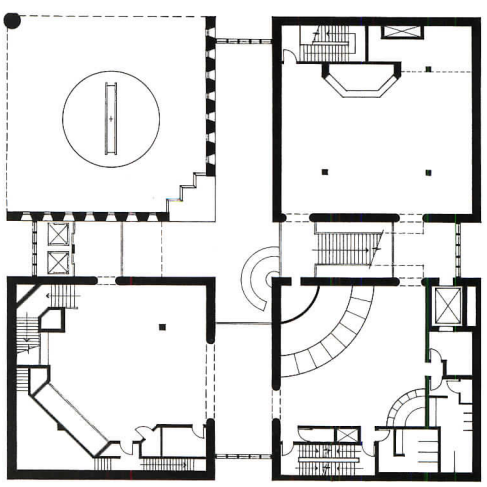
The museum is organized as four pavilions (plans, bottom) containing a 92-seat theater, exhibitions, soda fountain, and gift shop. An atrium rises up through the facility at the juncture of the four cubes (top right), where balconies and bridges provide circulation through the 45,000-square-foot facility. Flags of the 160 countries where Coke is distributed hang from the atrium's three-story skylighted ceiling. The large square windows of the entry cube (facing page) provide views from each floor out to the rotating neon Coca-Cola sign. Tracing the history of Coke through artifacts and audiovisuals, a series of exhibitions terminates with a kinetic sculpture of neon and liquid that doubles as a working soda fountain (top left).

WORLD OF COCA-COLA
ATLANTA, GEORGIA

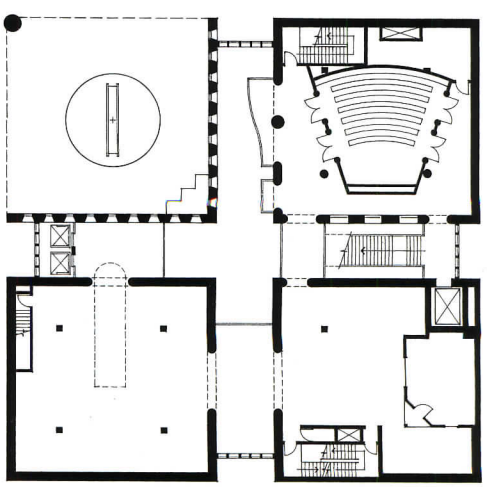
ARCHITECTS: Thompson, Ventulett, Stainback & Associates, Atlanta, Georgia—H. Preston Crum (partner-in-charge); Anna Owens Gillon (project architect); Nancy Mauney Cartledge, Scott H. Sickeler, Danny Fernandez (design team)
CONSULTING ARCHITECTS: Turner Associates/Architects and Planners, Atlanta, Georgia—Oscar L. Harris (partner-in-charge); Michael Maginnis, Alvin Allen (design team)
EXHIBITION DESIGNERS: Staples & Charles Ltd., Washington, D.C.; Rod Lopez-Fabrega Design, Norwalk, Connecticut
ENGINEERS: Nielsen/Uzun Structural Engineers (structural); Newcomb & Boyd Consulting Engineers (mechanical); Prad Group, Inc. (electrical)
CONSULTANTS: David Mintz, Inc. (lighting); Acoustical Design Inc. (acoustical); Jack Morton Productions (audio-visual); Young Electric Sign Company (exterior rotating sign); BHW Custom Metal Fabricators (corner bottle sign)
GENERAL CONTRACTOR: Holder Russell Construction Company
PHOTOGRAPHER: Timothy Hursley/ The Arkansas Office, except as noted



GROUND LEVEL



SECOND LEVEL



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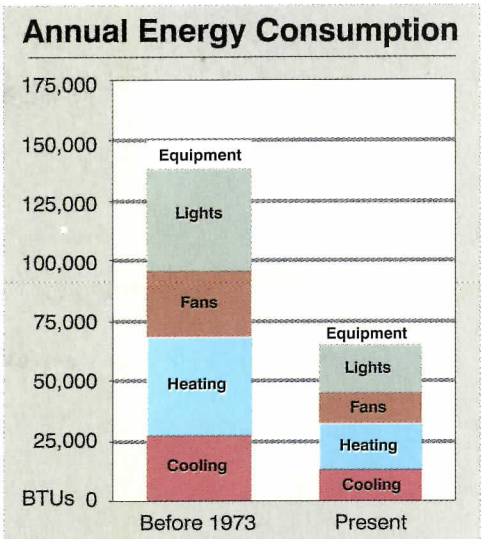
BUILDING SYSTEMS:
ALTERNATIVE ENERGIES

Solar water heating and photovoltaics promise to provide alternative sources of energy in future construction.



Equipment	11,600	5,300
Lights	42,100	19,400
Fans	28,200	13,000
Heating	40,400	19,100
Cooling	27,700	13,200

ILLUSTRATIONS BY PETER HOEY

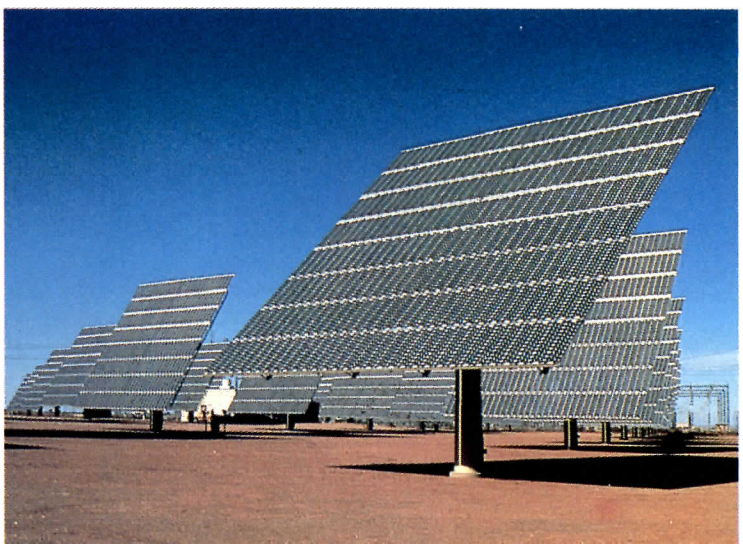
THIS YEAR, TWO POLITICAL EVENTS ONCE again focused public attention on alternatives to fossil fuels. The Iraqi invasion of Kuwait was the most dramatic, followed by a rapid doubling of petroleum prices, a precipitous downturn in world financial markets, and reawakened concerns over long-term oil supply. The other major event was Earth Day 1990, ushering in the "environmental decade." Concerned over acid rain, urban smog, oil spills, ozone depletion, and global warming, millions of Americans nationwide participated in environmental awareness activities on April 22 and the surrounding weeks. Both events refocused our attention on that ubiquitous and elusive substance that is the basis of most of our environmental problems—energy.

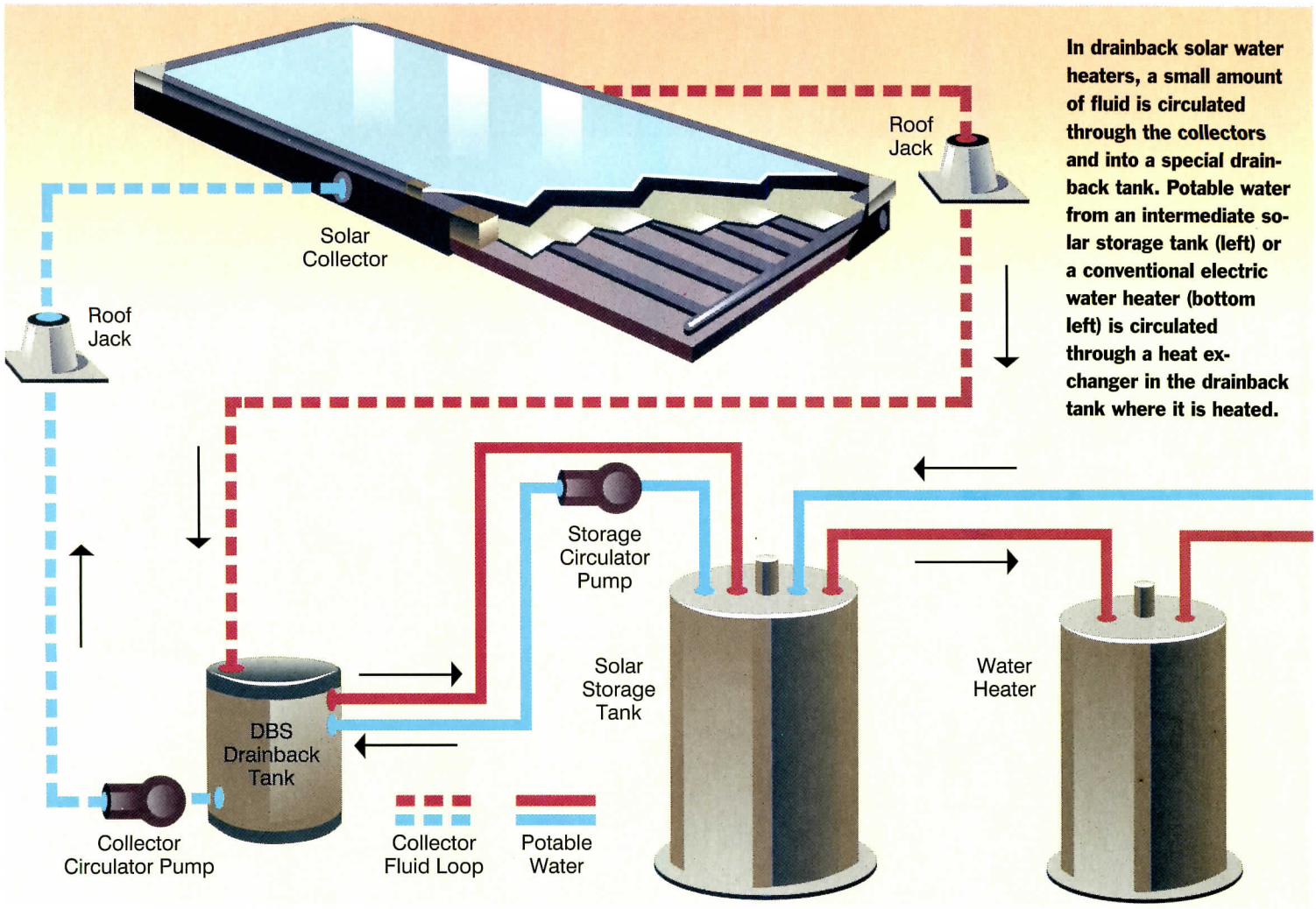
Currently, residential and commercial buildings consume roughly one third of the nation's energy at a cost of $160 billion per year. In coming to grips with environmental degradation and dependence on fossil fuels, both new and existing structures provide excellent opportunities to begin putting alternative sources of energy to work. Already, a great deal of research and development of new products and systems has been accomplished since the 1970s; energy efficiency levels have more than doubled since then. Today, a state-of-the-art, energy-efficient home or light commercial building may consume less than a quarter of the energy required for an average structure of comparable size.

A 3,500-square-foot home in Morristown, New Jersey, (bottom left) built in 1987, for example, incorporates many energy-saving features commonly available to architects today: R-19 walls; R-30 ceilings; continuous air/vapor barrier; high-performance, low-emissivity windows; southern orientation with passive solar gain; minimal window area on the north; high-efficiency, gas-fired furnace; and carefully planned landscaping to provide summertime shading on the east and west. The manufacturer of the house, Acorn Structures of Concord, Massachusetts, calculated that the residence would use less than 3 BTUs per square foot per degree-day (for heating). Actual energy bills for the two years since the house was completed confirm the builder's prediction, which translates into a yearly heating cost of only around $500.

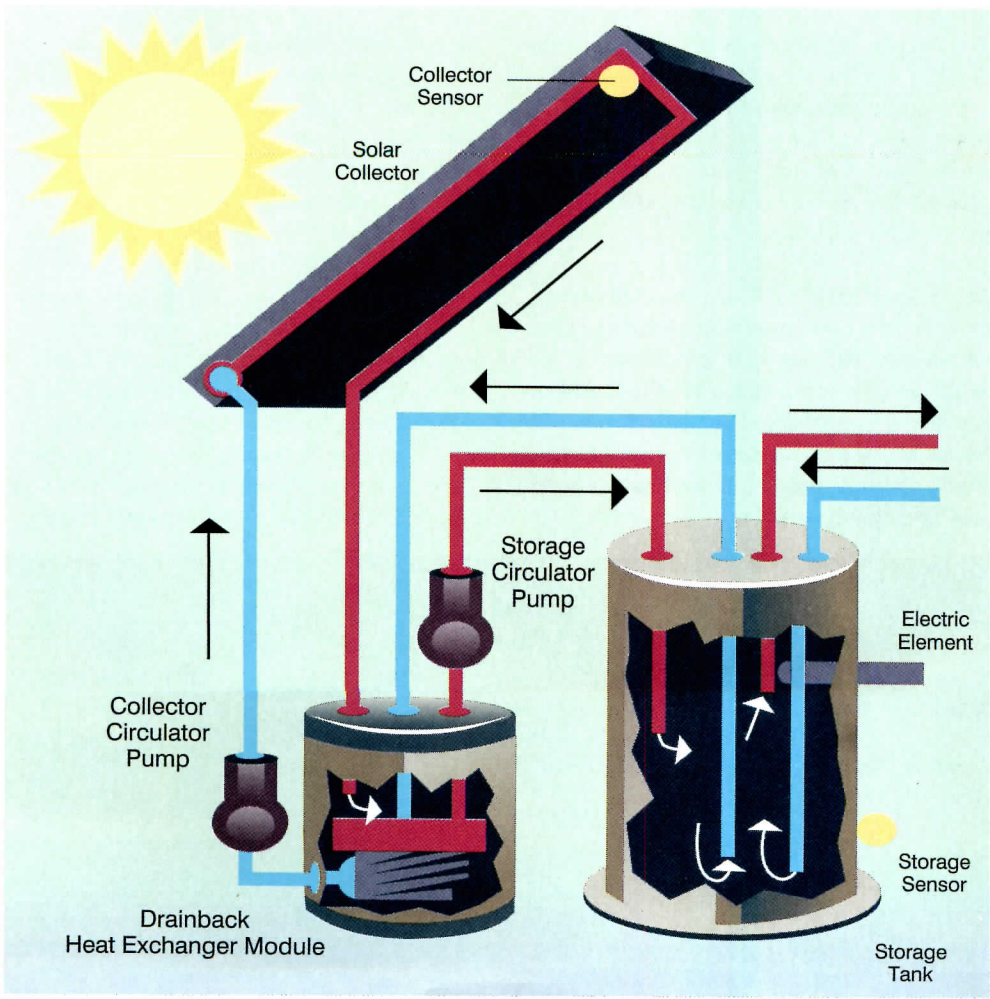
As we move into the '90s, given the current environmental awareness and dependence on foreign oil, more and more clients will most likely search for alternative energy sources in addition to such energy-efficient designs. Increased interest in solar water heating—the conversion of sunlight into hot water—has already begun. Photovoltaics—the direct conversion of sunlight into electricity—is quickly becoming the power system of choice for homes and commercial buildings that do not have ready access to grid power.

Acorn Structures' 3,500-square-foot home (bottom left) consumes only 700 therms of natural gas per year, at an annual cost of $500. Energy consumption of office buildings has also dropped since 1973 (left), and power companies are employing photovoltaic panels (bottom right) to convert solar energy into electrical power.





In drainback solar water heaters, a small amount of fluid is circulated through the collectors and into a special drainback tank. Potable water from an intermediate solar storage tank (left) or a conventional electric water heater (bottom left) is circulated through a heat exchanger in the drainback tank where it is heated.

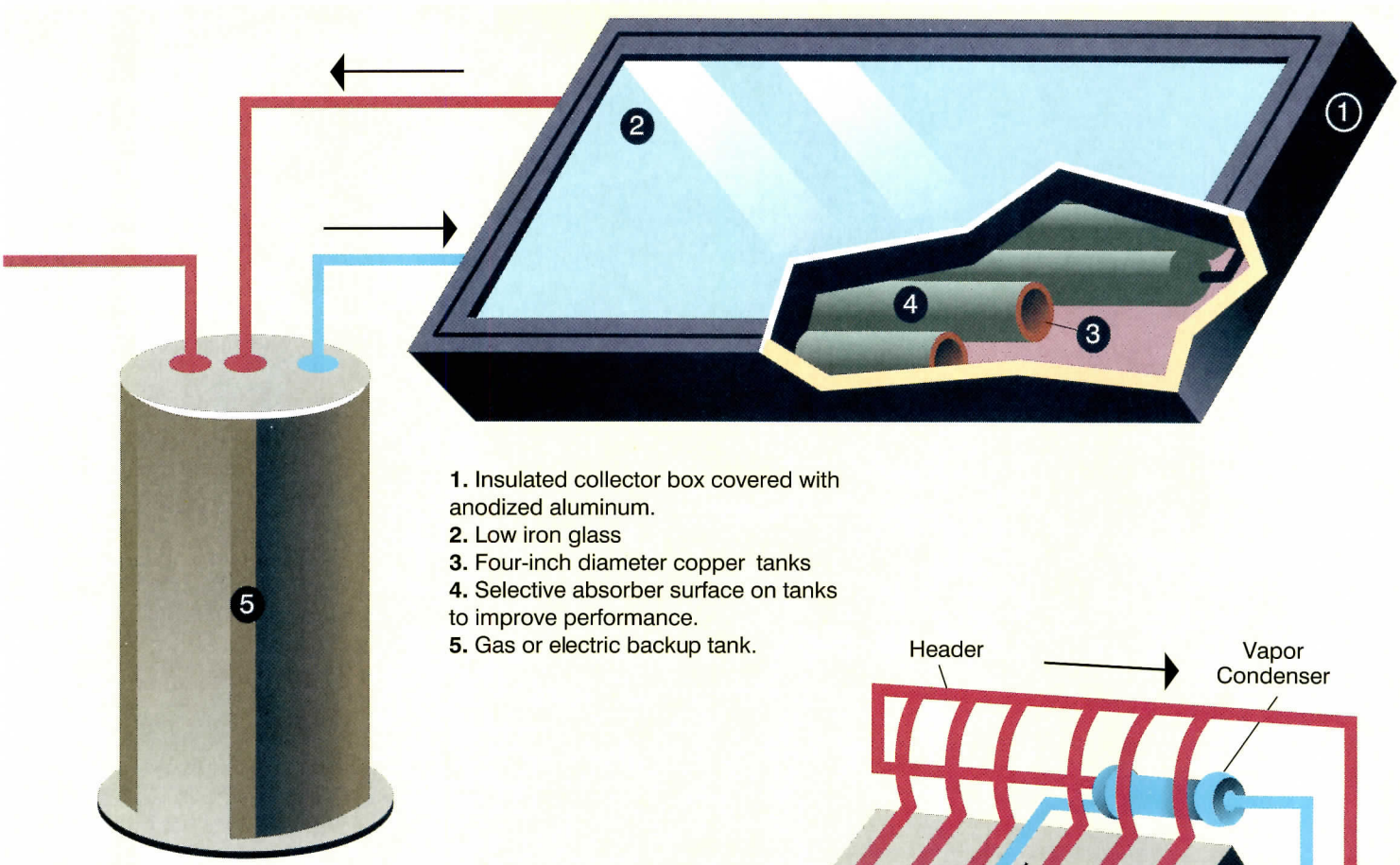


Solar water heating

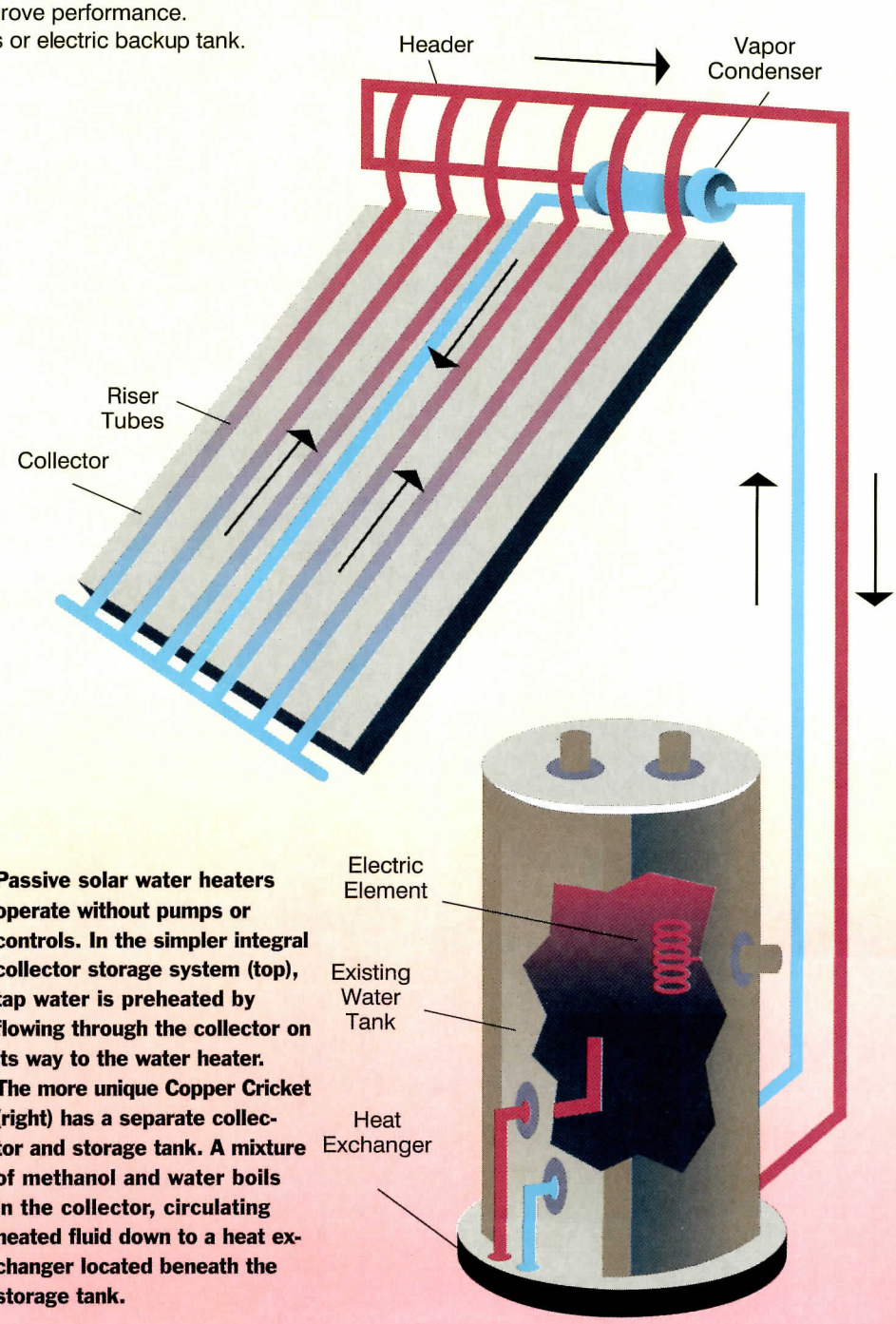
THE SOLAR WATER HEATING INDUSTRY flourished in the late 1970s and early '80s with as many as 260 manufacturers and 12 million square feet of solar collectors produced each year. Unfortunately, the industry was then propped up by artificial market forces—principally solar tax credits, which expired in 1985. Falling energy prices during the last decade contributed to a decline in the industry, and total production today is less than 1.5 million square feet of collectors per year. These are produced by only two dozen manufacturers, five or six of which produce the vast majority of collectors.

That downward trend is reversing, however, with moderate growth in the industry during the last year or two, and anticipated further growth over the next few years. Residential systems currently account for the bulk of solar hot water system installations, although commercial applications such as laundromats, restaurants, and motels should ultimately provide additional markets.

The technology used to heat water with solar energy has evolved considerably since the last energy crisis. Most solar water heaters are now simpler, more reliable, and less expensive than they were in the mid-'80s. Today, "drainback" solar water heaters are the most common systems on the market. When a solar collector warms up, a pump ac-



1. Insulated collector box covered with anodized aluminum.
2. Low iron glass
3. Four-inch diameter copper tanks
4. Selective absorber surface on tanks to improve performance.
5. Gas or electric backup tank.

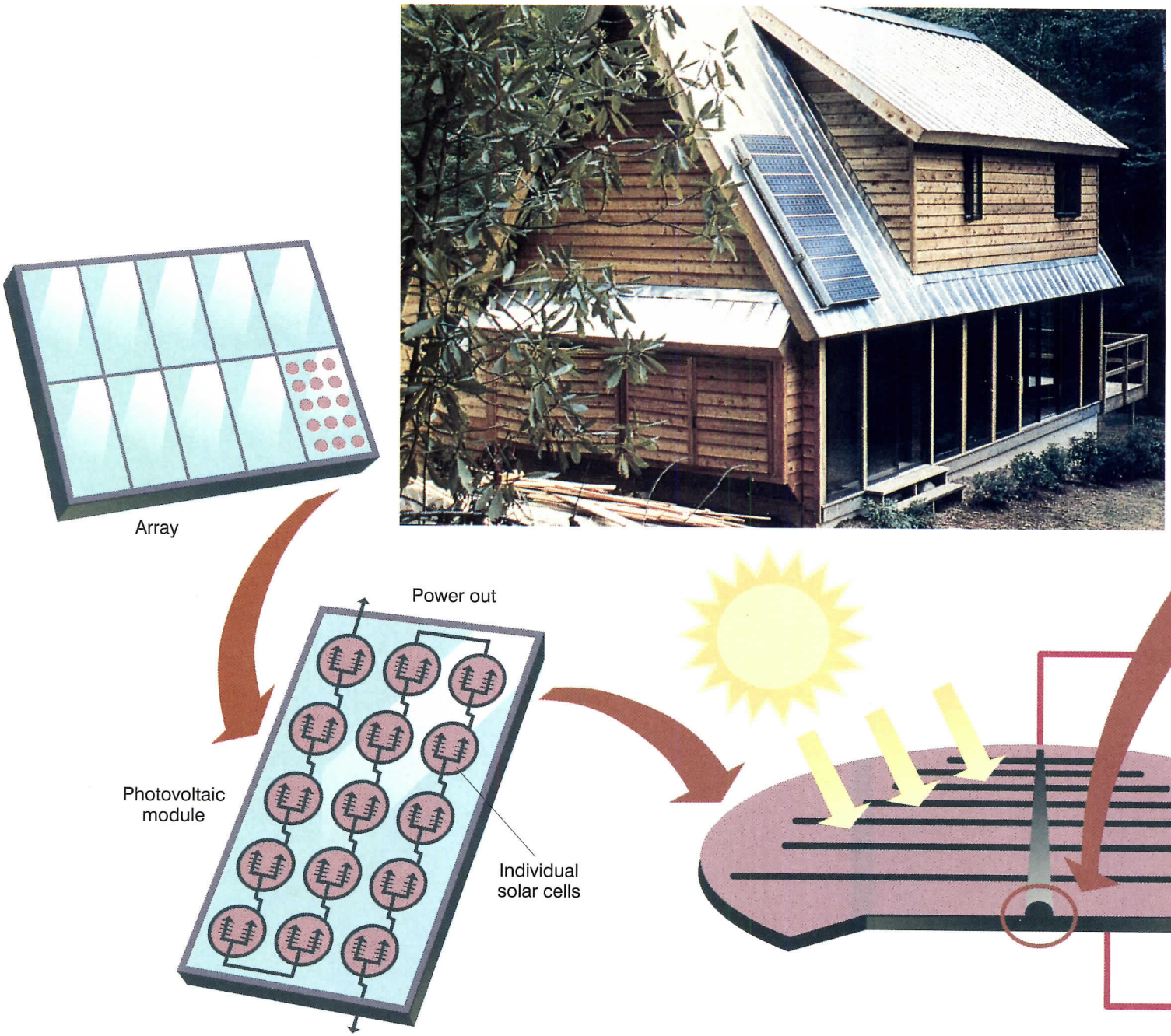


Passive solar water heaters operate without pumps or controls. In the simpler integral collector storage system (top), tap water is preheated by flowing through the collector on its way to the water heater. The more unique Copper Cricket (right) has a separate collector and storage tank. A mixture of methanol and water boils in the collector, circulating heated fluid down to a heat exchanger located beneath the storage tank.

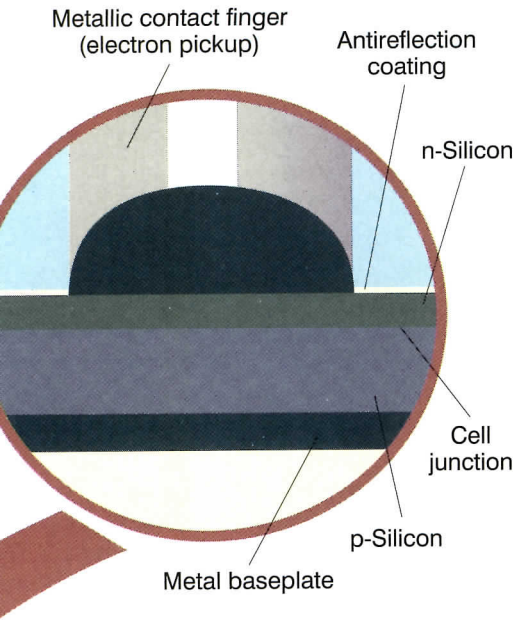
tivates to circulate water from a small drainback tank through the collector. When the collector cools down, the pump shuts off and all the water in the collector drains back down to the tank. In this way, the same water always circulates through the system, minimizing corrosion of piping and pumps. In colder parts of the country, propylene glycol antifreeze is added to the water to minimize risk of freezing. Potable water from the large (conventional) storage tank circulates through a heat exchanger in the drainback tank where it is heated.

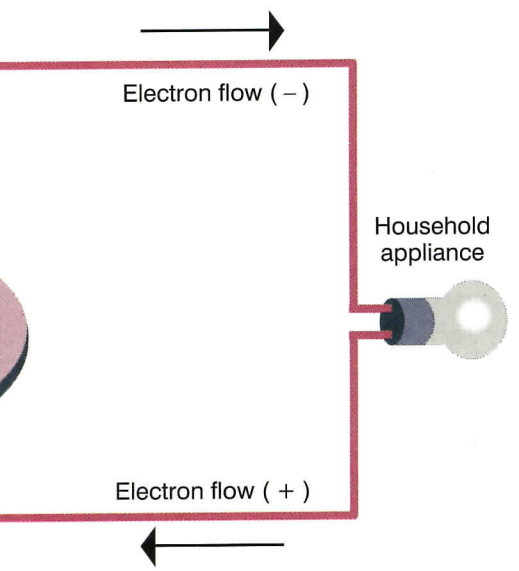
A Canadian company, Thermo Dynamics, has taken the drainback idea a step further. The company's Solar Boiler system incorporates a fairly standard flat-plate collector and attractively designed drainback tank, but flexible nylon pipes are employed instead of the standard copper piping to simplify connections and reduce cost. In fact, the system can often be installed in just a few hours at a total cost as low as $2,500.

In warmer parts of the country, simpler "integral collector storage" or "batch" solar water heaters are often used. These systems feature direct in-line water heaters with potable water flowing through the collector. Pumps and controls are not required, and freeze protection, when necessary, is provided by the water's mass and by the insulated enclosure and glazing. Integral collector storage



A photovoltaic array (top left) consists of a collection of PV modules, which are made up of individual cells (above). In each cell, photons of light cause electrons to jump across a cell barrier, producing an imbalance in the electric charge. A current is produced when the electrons flow back to equalize the charge of the cell. A small roof-mounted photovoltaic array is capable of powering a remote mountain home (top). A larger array in Arizona (left) is strung on cables out of view *from the house*. This system includes twelve 2-volt batteries (facing page, bottom), each weighing 180 pounds and housed in a sunken concrete bunker for safety. Batteries, inverter, backup generator, and all controls are located in a separate equipment storage room. Because PV cells do not contain any moving parts and do not release emissions into the environment, photovoltaic energy is frequently considered an ideal type of renewable energy.

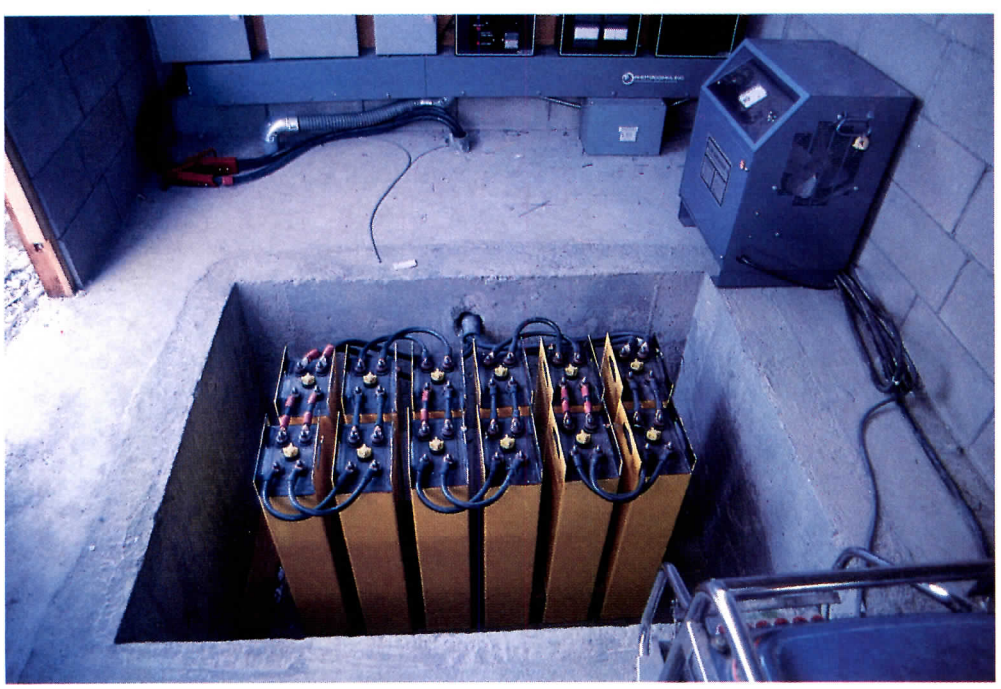




systems, like most solar water heaters, are generally used as preheaters for standard water heaters. Some designs feature a stainless steel tank in the collector and others incorporate large-diameter copper pipes. To improve performance, tanks or pipes are covered with a black chrome "selective surface" to improve collection performance, since the surface has very high absorption and very low emissivity.

Another passive system, and the most unusual of any solar water heater on the market, is the Copper Cricket, manufactured by the Sage Advance Corporation of Eugene, Oregon. Unlike integral collector storage systems, the Copper Cricket separates a collector from a storage tank, so that the storage tank can be insulated for improved performance. The system works on a geyser pumping principle. Sunlight striking the collector heats a low-boiling-point mixture of water and methyl alcohol in copper tubes. The fluid boils and the bubbles push hot fluid to the top of the collector. Gravity pulls the hot fluid down to a heat exchanger under the storage tank. Heat is then transferred from the heat exchanger to the storage tank by simple thermosiphoning. The cooled heat-transfer fluid in the heat exchanger is finally pushed back up through the return pipes into the collector, completing the loop. Excess steam produced from the process is condensed back into liquid by a vapor condenser to improve efficiency and keep pressure low. The entire system functions passively: sunlight boiling the fluid in the collector serves as the controller. The passive cycling only begins when the collector heats up enough, and it stops when the sun goes down.

So far, Copper Cricket sales are low—about 500 units since the company began production in 1987—but units in the field are performing very well, according to Dr. Eldon Haines, vice president for research and development, who invented the system. During the big freeze throughout the eastern U.S. in December, 1989, not a single unit failed. Word of the system's success is getting around, and the company is gearing up an assembly facility with the capacity to produce 1,000 systems each month. Because of Copper Cricket's simplicity, its total cost is quite low: about $2,000 for a ready-to-install kit. If the systems in operation continue working well, it may be difficult for conventional pumped solar water heaters to compete.



Photovoltaic energy

THE CONCEPT EMPLOYED TO PRODUCE PHOtovoltaic (PV) energy is in many ways the ideal energy source. Photovoltaic cells convert sunlight into electricity without moving parts to wear out or emissions to pollute the environment. Their principle component is silicon, which is refined from sand. Most PV cells are highly stable; functioning day-in and day-out, summer and winter, for decades. Many experts foresee a day when photovoltaics will supply the bulk of our energy needs, with PV systems on rooftops throughout the country. Cost has been the primary impediment to widespread use of photovoltaics, but that too has been changing. The PV industry has experienced steady, healthy growth of 20 to 30 percent per year for the past four years, and was not significantly affected by loss of energy-related tax credits as was the solar hot water industry.

Photovoltaics are already being applied to a wide range of building types across the country. As costs dropped over the past 15 years, more and more applications opened up. In the late '50s and early '60s, only NASA could afford the $1,000 per watt cost of photovoltaics. When prices dropped to $100 per watt by the early '70s, photovoltaics became cost-competitive for powering a few remote communications stations. At $10 per watt by 1980, photovoltaics became the power system of choice for a wide range of applications, including navigational signal buoys, irrigation and water pumping systems, outdoor lighting systems, and remote homes without ready access to power lines. Today, photovoltaic costs are as low as $4 per watt. At that price, the use of photovoltaics in commercial buildings is still limited to a few systems installed in highway rest areas, park and wildlife sanctuary buildings, and offices of environmental organizations. However, when photovoltaic module costs drop to around $1 dollar per watt (which would produce electricity at a cost of 10¢ per kilowatt-hour) photovoltaics will begin to compete successfully with grid power in buildings.

The apparent simplicity of a photovoltaic cell, which sits in the sunlight and produces an electric current, conceals its complexity on an atomic level. Photons of light activate

electrons located in the photovoltaic cell. The electrons are attracted to one side of the cell and repelled from the other, causing them to jump across a barrier separating the two sides. The electron flow across this one-way barrier, or junction, results in an imbalance in the charge of the cell. By connecting the two sides of the cell with a wire, the electrons can flow back to equalize the charge.

The photovoltaic cells are produced in a variety of types. The most common—and the mainstay of the industry—is the crystalline silicon cell. A large crystal is sliced into thin wafers that are treated to produce electron-rich and electron-poor sides. The wafers are then fitted with metal contacts on the front and back to pick up and dissipate electric current. Silicon crystal photovoltaic modules typically offer efficiencies in the 11 to 12 percent range.

Residential applications

WHEN A HOUSE IS MORE THAN A QUARTER-mile from power lines, the cost of bringing power to the site can be extremely high—as much as $20 per foot, or $26,000 for a quarter-mile. Thousands of homeowners in such remote areas have chosen instead to invest in a photovoltaic system. If conservation is practiced, a $15,000- to $25,000-PV power system can fulfill all electrical requirements, and, if the need for electricity grows, the system is easily expanded.

Although each photovoltaic cell produces a very small current, by wiring many cells together into a module, and connecting more than one module together into an array, substantial amounts of DC energy can be produced. That current can be used to charge batteries or power an electric load, such as a motor, or passed onto an inverter which converts the DC current into AC so that standard home appliances can be used. If the PV system is connected to the electric grid (which is less common), batteries are not required; all of the electricity is converted into AC, and excess power can be fed directly into the electric grid.

Most residential PV power systems consist of a photovoltaic array, a battery bank (to store electricity for use at night and during cloudy periods), and the necessary controls, lightning protection, and wiring. When the photovoltaic modules are not installed directly on the roof, they are often mounted on tracking pedestals that follow the sun across the sky for optimal positioning.

Designing a remote home with a photovoltaic power system involves a lot more than simply integrating a photovoltaic array into a south-facing roof. The system's large battery bank and DC wiring make safety concerns paramount. Fully charged batteries release highly flammable hydrogen gas, requiring special safety considerations when designing housing for battery banks. Low-voltage DC wiring systems (12 to 48 volts) common with PV systems have very high amperage current, so heavy-gauge wiring and heavy-duty switches are imperative. To keep a photovoltaic system affordable, considerable attention should also be given to reducing conventional electric loads, such as implementing non-electric water heating and space heating, either gas or very high efficiency electric refrigerators, and natural daylighting supplemented by high-efficiency artificial lighting. In designing a photovoltaic system, architects should work with an experienced photovoltaic system designer and/or an electrician who has worked extensively with DC wiring.

Further research

EVEN AT THE CURRENT RATE OF $4 PER WATT, electricity produced by photovoltaic systems is too expensive to become the main source of energy except for those in remote locations. However a number of other photovoltaic technologies are being developed in an effort to reduce production costs. Amorphous silicon offers the benefit of very rapid production of cells in a continuous-roll process at a much lower cost, but the efficiency is considerably lower (3 to 4 percent), and long-term stability is a problem. Some companies are experimenting with multiple layers of amorphous silicon to boost efficiency, while other companies are experimenting with exotic materials such as cadmium-telluride and copper indium diselenide instead of silicon.

While research of photovoltaic technology continues to advance, the largest companies are moving ahead with production of crystalline silicon photovoltaic cells. The world's largest photovoltaic manufacturer, Siemens Solar (previously Arco Solar), has just announced plans to double its production capacity with a new plant in Washington State. The second-largest producer, Solarex, has expanded production several times in the last few years. And a new entrant in the photovoltaic industry, Armech Solar Power, is completing what it claims will be the largest photovoltaic production plant in the world selling modules at a cost of between $3.00 and $3.80 per watt by mid-1991.

Since the 1980s when renewable energy budgets dropped each year and interest in renewable energy technologies was at a minimum, public opinion, at least, appears to be turning around. Polls conducted by *USA Today* in 1988 and by Harris in 1989 have shown that Americans currently consider solar energy the preferred energy source. This year saw the first increase in recommended funding levels for renewables by the administration since the '70s. While the government can certainly do a lot more, mistakes that were made during the 1970s should be avoided, such as the solar tax credits that opened the door to fraud by get-rich-quick companies. It will take a multi-pronged approach, including a strong federal policy that supports the development of renewables; continued improvements in efficiency, performance, and cost of equipment; and more incentives for home-owners, builders, architects, and others to try new technologies. ■

—ALEX WILSON

Alex Wilson is a technical writer based in Brattleboro, Vermont.

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A Higher Standard

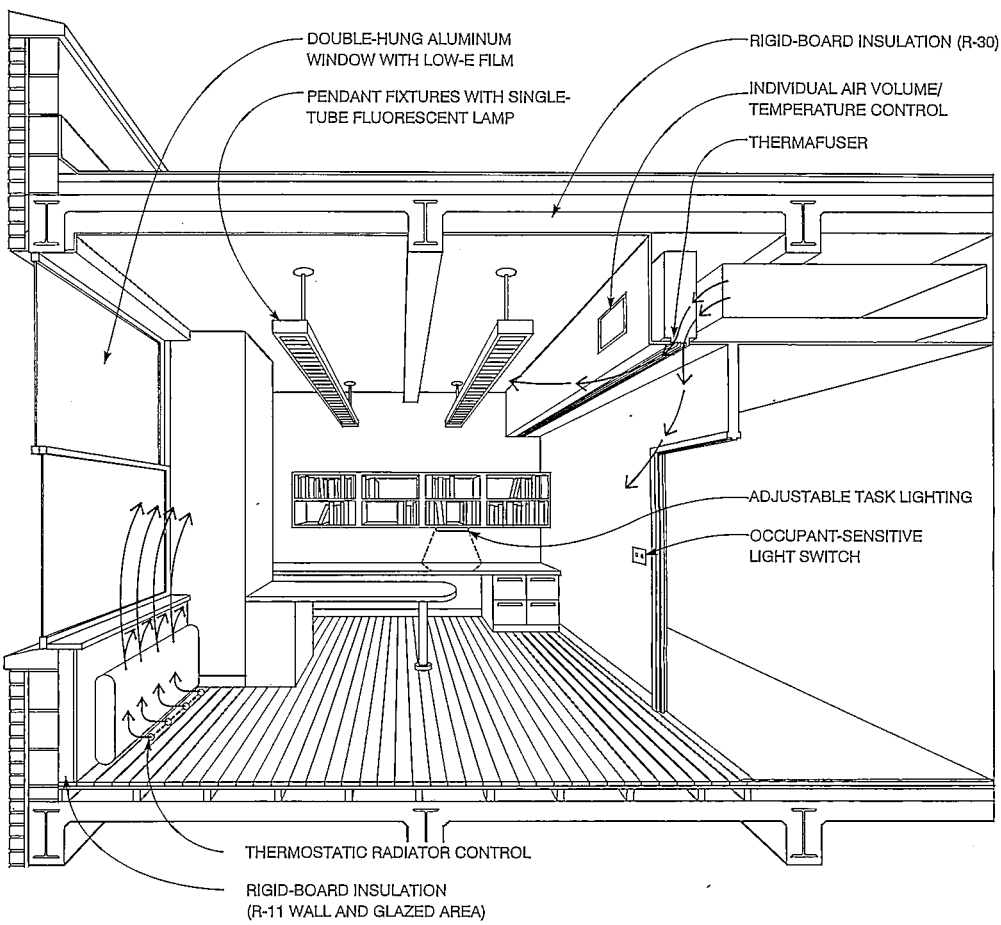
BUILDING SYSTEMS:
ENERGY CONSERVATION

A new standard for the energy efficiency of commercial buildings considers improvements in technologies.

THE ENERGY REQUIRED FOR HEATING, COOLing, lighting, and servicing commercial buildings can now be reduced by as much as 40 percent without reducing equipment performance or occupancy comfort, according to research conducted by the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) in conjunction with the U.S. Department of Energy (DOE). Recognizing the increased efficiency of building components since its 1980 standard was published, the agency has upgraded the existing standard, which has been the basis for model energy codes currently in effect for all 50 states. The updated version, ASHRAE Standard 90.1-1989, establishes minimum energy efficiency requirements for newly constructed commercial buildings. The new standard was initiated by the DOE, which recently adopted it for all proposed non-residential federal buildings.

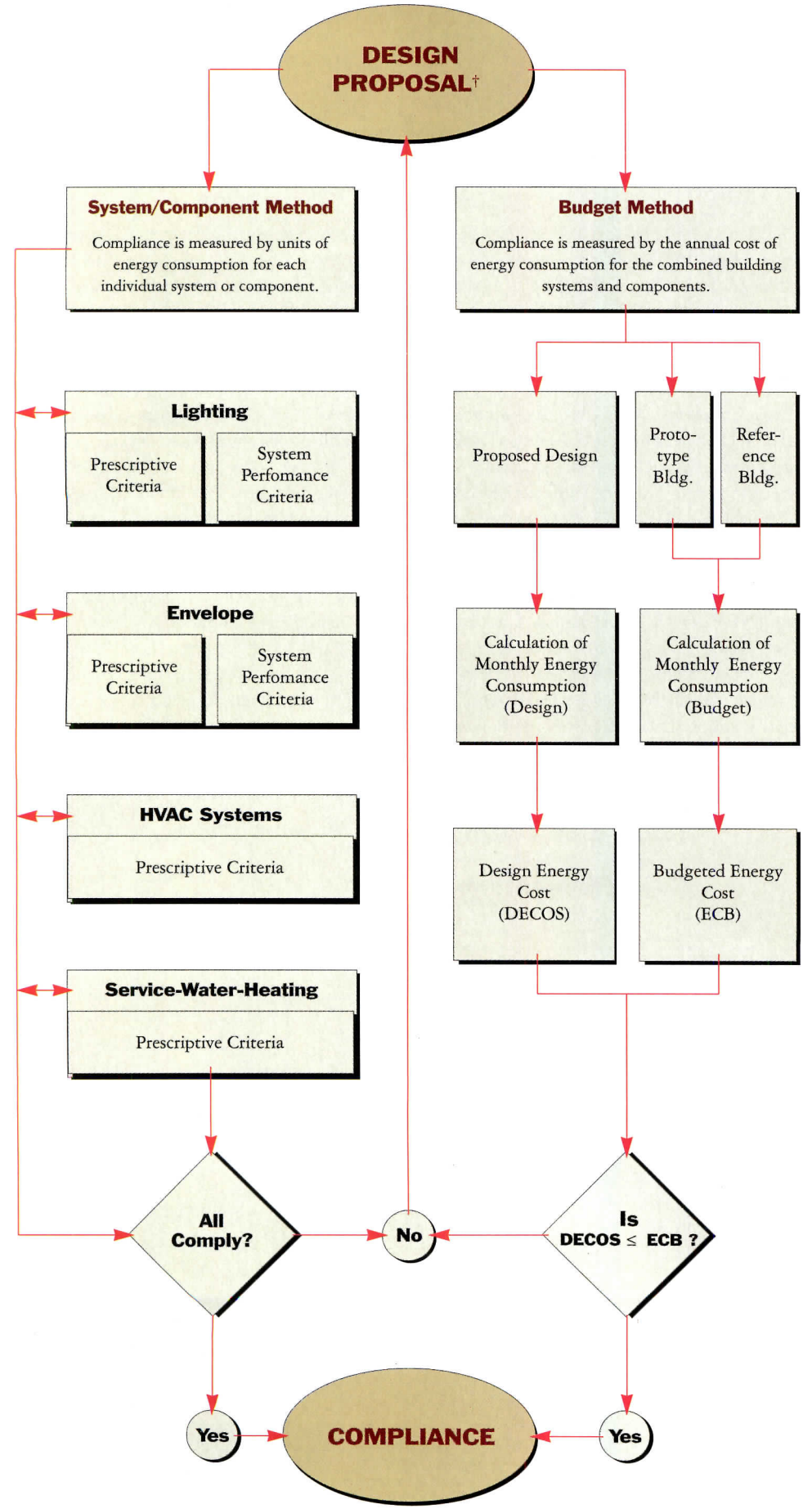
In addition to recognizing advances in equipment performance, evaluation of potential energy consumption under the new standard allows an architect and an engineer to consider the dynamics that exist among the various components of a proposed building. As an alternative to the more limited prescriptive method of the previous standard, ASHRAE 90.1 offers two new compliance paths: a performance-based "system/component method;" or a building-energy-cost "budget" method. "Our standard has finally caught up with building technology. Although it is more stringent, achieving compliance is more flexible," explains Tom Wutka, chairman of the ASHRAE committee that created the standard.

Regardless of the compliance method chosen, the standard is aimed at evaluating a building's envelope, lighting, HVAC, and service-water-heating systems. The difference between the two methods lies in the tradeoffs allowed between systems in the same



The techniques employed by Croxton Collaborative to design the Natural Resources Defense Council headquarters (right), with mechanical and electrical engineering consulting by Flack and Kurtz, illustrate how an office building can be energy-efficient through readily available products. Low-emissivity insulated glazings, which vary in gradation according to their orientation, allow skylights and windows to take full advantage of natural light while limiting thermal losses (further aided by increasing insulation in the walls and ceiling). Coupled with occupancy sensors, efficient fluorescent fixtures and ballasts, and task lighting to cut ambient lighting requirements, electric lighting power consumption levels were reduced to .55 watts per square foot, 75 percent below the 2.2 watts deemed "energy-efficient" by the state of New York's energy code. To conserve heating- and cooling-energy consumption, individual thermostats for radiators and individually controlled air-volume diffusers are provided. Typical of most office buildings, the headquarters requires year-round cooling. An economizer system, integrated with a cooling tower, limits mechanical refrigeration by incorporating outdoor air when temperatures reach 55 degrees Fahrenheit or below.

METHODS OF COMPLYING WITH ASHRAE STANDARD 90.1



† To comply with Standard 90.1, *these* components must be evaluated: electric power; lighting; other systems/equipment; envelope; HVAC system and equipment; service-water-heating; energy management.

building. The units of measurement for energy consumption also differ among methods. Instead of meeting criteria for each system as required for the system/component method, the budget method allows for unlimited trade-offs between various systems. Energy consumption is defined by cost, allowing different energy types to be measured by a common value. Only one figure must be met to achieve compliance. The annual cost of estimated energy consumption for a proposed structure is compared against a model annual budget derived from a prototype or reference building (one with characteristics similar to the proposed design), defined in the standard. This system was created to encourage innovative energy-saving designs and equipment, such as those that employ passive-solar techniques.

Compliance for the system/component method, on the other hand, requires meeting prescriptive criteria for a building's HVAC and service-water-heating systems. In this method, trade-offs are allowed only for daylighting within the evaluation of the lighting and envelope systems.

Without reducing illumination levels, energy consumption can be reduced by limiting the duration and intensity of artificial lighting. For the first time, the ASHRAE standard requires automatic lighting controls. Installing programmable timers or occupancy (motion) sensors to turn lights on and off is one method of fulfilling the requirement. The new standard also encourages the installation of daylighting sensors or photocells. In conjunction with skylights and perimeter glazing, these devices can adjust illumination to changing natural light conditions or automatically switch artificial lighting on and off. Ambient lighting with low-watt fluorescent fixtures and higher efficiency electric ballasts, in conjunction with reduced general illumination levels supplemented by task lighting, are also methods required by the new ASHRAE standard to reduce energy consumption.

The new standard now reflects the benefits of natural light, illustrating advances in insulated glazing, which blocks heat radiation while admitting visible light in warmer climates, and low-emissivity coatings and films, which limit heat loss in colder climates (ARCHITECTURE, August 1990, page 95). By reducing artificial light, the resulting savings in energy costs can offset the increased heating and cooling loads created by thermal transfer through a glazed area. In addition to reducing the energy required for electrical lighting systems, the reduction in heat generated by artificial lighting can decrease mechanical cooling requirements.

To further decrease the amount of energy necessary to supply heating and cooling, HVAC systems have become increasingly ef-

ficient in adjusting output to building load requirements and taking advantage of existing hot and cold air. Variable-air-volume (VAV) systems are an advance over HVAC equipment, and will help a proposed building achieve compliance with the new standard. Previously, HVAC equipment provided only fixed-temperature cold air from a central supply, and when cooling loads were less than maximum, systems were limited to reheating conditioned air or mixing heated air at individual terminal boxes to meet the needs of a particular zone. Instead of changing the temperature of supply air, VAV systems adjust the amount of air flow at each terminal by individual dampers, or by altering fan speeds to satisfy separate conditions.

An increasingly popular technology is direct digital control (DDC), which provides computerized monitoring of the central system. These controls can also be extended to individual terminals for even more precise and quicker response to changing temperature requirements. Direct digital controls are now frequently being applied in combination with VAV systems for the dual benefit of limiting wasteful reheating and faster adjustments to specific load conditions.

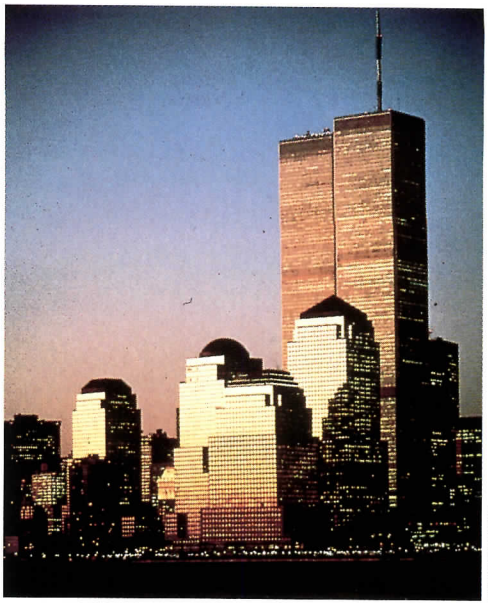
For further energy conservation, water or air-economizer systems can be incorporated by a ducting arrangement to allow outside air supply to reduce mechanical refrigeration requirements. Water economizers cool air by evaporated water from condensation. For cooler climates, heat-recovery systems can draw heat from internal sources such as lighting and computers, and recirculate it along perimeter zones.

Perimeter systems, independent of central HVAC systems (such as baseboard heaters or radiators) must now be controlled by space thermostats with at least one zone for each building orientation. Outside air controls are no longer allowed, since relying on exterior temperature conditions can cause the perimeter system to conflict with loads created internally. To meet the current standard prescriptive criteria, most HVAC systems must now incorporate economizers and variable-air-volume components.

Regional climate, building orientation, external shading, daylighting, and separate internal and building envelope heating and cooling loads are additional factors considered by both ASHRAE compliance methods that were not addressed in the previous standard. The new procedure requires separate calculations for evaluating an envelope and related portions of the building within 15 feet of the external walls, for eight compass directions (or every 45 degrees). Compliance for the remainder of the internal loads is determined independent of building orientation. Although equations can still be calculated by hand, DOS-based software was created by ASHRAE to determine compliance due to the complexity and number of calculations now required by the new standard. In addition to easing the evaluation process, ASHRAE standard committee members believe the software has proven to be a valuable educational tool for architects and engineers during the review process, to measure the effect of building envelope design modifications on energy efficiency.

The new compliance methods offer architects more flexibility in designing buildings to meet the new ASHRAE standard for energy efficiency in buildings. Although specification of energy-conserving equipment and materials may initially result in increased costs when compared with conventional systems, such expenses are more than returned through reduced energy costs over the life cycle of the structure. It is therefore the architects' challenge to convince clients that the new ASHRAE guidelines will create cost-effective buildings that are both environmentally sensitive and comfortable. ■

—MARC S. HARRIMAN



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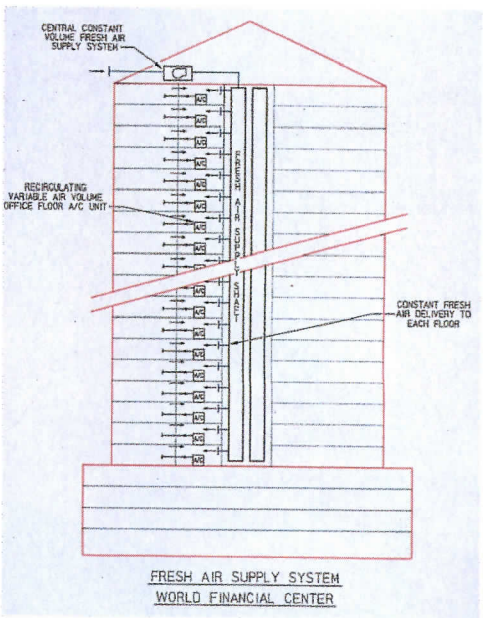
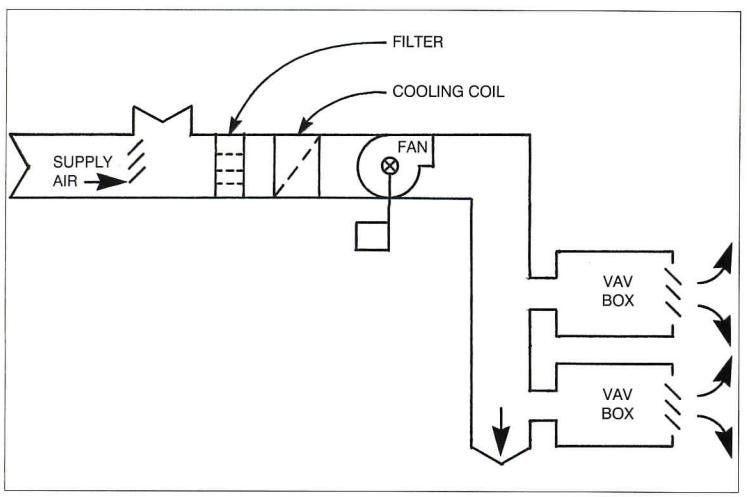
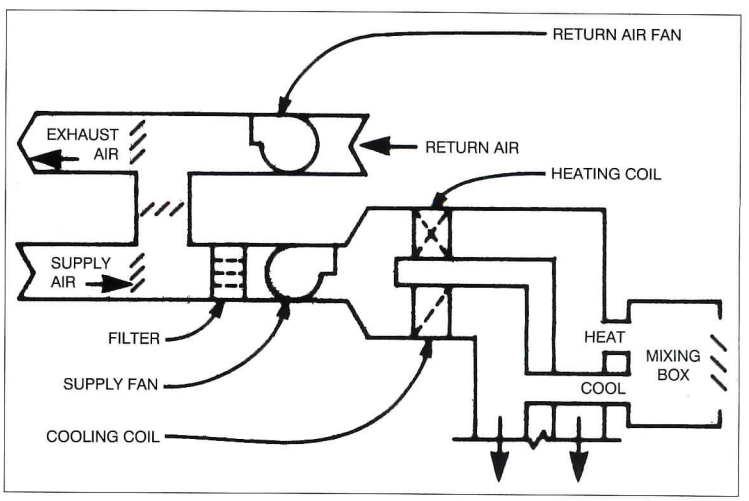


Variable-air-volume (VAV) systems, which are now commonly installed in commercial buildings such as the World Financial Center in New York City (top), adjust the amount of air supplied to separate zones (above).





Mechanical systems with VAV capabilities (above left) are frequently made more efficient by computerized monitoring with direct digital controls at the terminal box. This method quickens an HVAC system's response to changing conditions and eliminates the wasteful reheating or mixing of heated and conditioned air necessary to meet partial loads in a dual-duct arrangement (above right).

We borrowed one o
from some very

Reclaimed Resources

BUILDING SYSTEMS:
RECYCLING WASTEWATER

Designing environmentally sensitive buildings requires plumbing systems that conserve and reuse water.

WES THOMPSON

The Wells Fargo Building (above) was the first dual-plumbed high-rise structure in Irvine, California. Its plumbing system keeps the drinking water supply separate from reclaimed wastewater, which is used as flushwater. Meanwhile, researchers at Southwest Texas State University in San Marcos are investigating methods of distributing graywater from residence halls into campus cooling towers and landscape irrigation systems (right). A storage system and graywater treatment site need to be introduced to create a closed cycle for the university, releasing only blackwater to the city sewer.

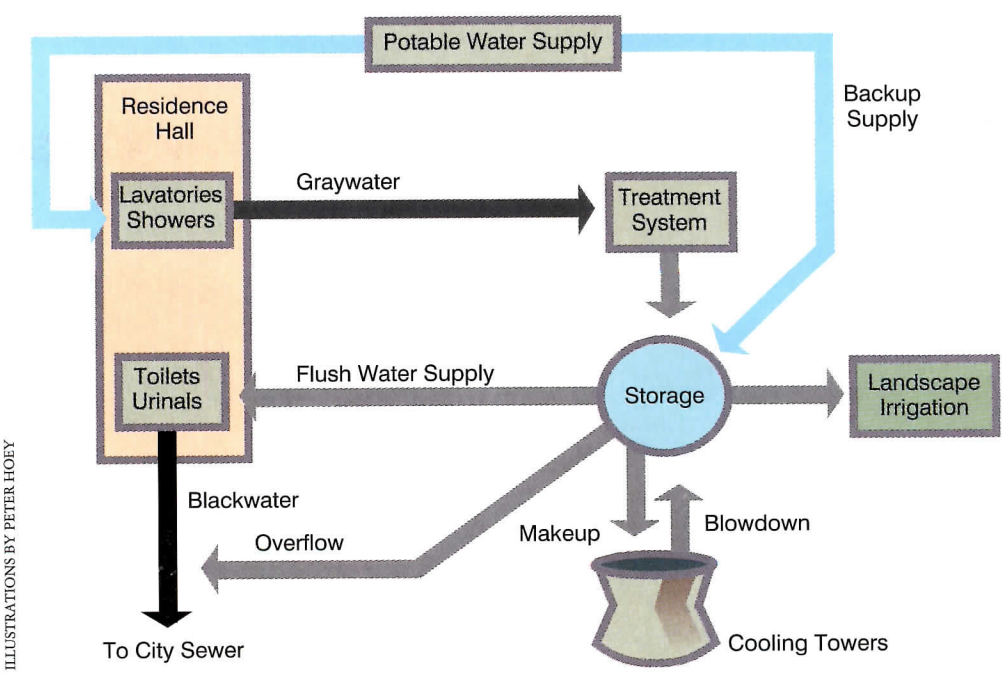
THE WATER THAT NO LONGER EMERGES from dry West Texas soil to form Comanche Springs was one of several failings that cost rancher and businessman Clayton Williams the November gubernatorial election. Williams skated past other near disasters in his campaign to beat Democrat Ann Richards, but tripped on personal tax questions, a string of verbal gaffes, and the destruction of this spring-fed oasis. Comanche Springs was run dry by Williams's father in 1962, after he had tapped it for years to irrigate thousands of acres of otherwise marginal farm and ranch land. In the process, Clayton, Sr., built a fortune but withdrew so much water that he left a dry hole where tourists, West Texans, and Native Americans before them once flocked for relief. Clayton, Jr., saw the springs return in 1986, but resumed the pumping of 30 million gallons of water daily to 12,000 acres of land, and the flow ceased again. Asked by a writer for *Texas Monthly* if he would consider reducing irrigation to save the springs, Williams replied, "It's my land, and I have the right to use the water."

But the days of water as an unlimited and infinitely self-renewing resource are over. Slowly in some areas, rapidly in others, water is vanishing, becoming a negotiable currency of not only political fortunes, but land development and building construction. Today, in dense urban areas and environmentally fragile rural locations, water is the architect's latest design challenge.

Water conservation in this country has long been neglected. "An American may use 100 gallons of water in the course of a day," points out William McDonough, whose New York-based firm specializes in environmentally concerned design. "A Bedouin gets by on less than a liter." The cost of those 100 gallons to the ecosystem mounts daily, even if the cost to the user is very little. People who live and work in the Southwest and many other arid locales face a dwindling water supply.

In response, architects in several states have been enjoined by city and state governments and water-regulatory bodies to design diverse building types whose environmental impact is lessened by water conservation. Just like opening a tap to fill a glass with water, conservation is simple: architects must find ways to use less water, and to reuse what water is needed.

For three decades, the master-planned city of Irvine, California, has led the nation as a proving ground for conservation practice and governmental regulation. In 1961, when the Irvine Ranch Water District (IRWD) was formed, only 300 people lived on the 76,000



ILLUSTRATIONS BY PETER HOEY

acres of Orange County that would be transformed by the Irvine Company into today's city of 100,000. IRWD imports more than 90 percent of its fresh water, relying on the 250-mile-long Colorado River Aqueduct and the Sacramento and San Joaquin rivers 450 miles away, in addition to a local well field.

Beginning in 1963, and stepping up more aggressively in recent years, the district has reduced its water load with a wastewater reclamation program. The Michelson Water Reclamation Plant collects and treats 10 to 12 million gallons of the community's wastewater daily. Nearly all of the reclaimed water is currently used for agricultural and landscape irrigation, accounting for 15 percent of the district's total water consumption. Thanks to reclamation, sewer service charges have been reduced 36.5 percent in six years.

Soon, the reclaimed water will also be used for flush water in the city's high-rise buildings. For office buildings, where up to 90 percent of water use can be attributed to toilet flushing, wastewater recycling can dramatically increase the available potable, or drinking-quality, water supply. Already seven new high-rise buildings (defined by IRWD as taller than two stories) comply with district rules enacted last year, requiring such structures to accommodate reclaimed water. Regulations are evolving on a "case-by-case basis," says Tom Holleman, an IRWD engineer. "We are trying to develop general criteria."

Paul Thometz of Langdon Wilson Architecture and Planning in Irvine was project architect for the first dual-plumbed high-rise, the 16-story Wells Fargo Bank Building downtown. Once the city's reclamation supply lines reach the site, reclaimed water will circulate through a network of pipes that serves only toilets and urinals and remains strictly segregated from the potable plumbing system. As with any innovation, says Thometz, many "snags" had to be resolved. Nearly half the tower's copper piping had been installed, he says, when the local health department told architects that a purple PVC pipe should have been used for circulating the reclaimed water, so that a plumber installing a potable branch some years hence would not accidentally tap into the reclaimed supply. Thometz and the agencies involved reached a compromise: workers wrapped all reuse pipes with purple tape and clearly labeled their use.

Inspectors found potentially dangerous cross-connections between the two plumbing systems, too, which were quickly corrected. Although Irvine's reclaimed water is treated extensively, to the point that it is indistinguishable by sight or smell from potable water and unlikely to pose a health hazard, separation is mandatory. Maintaining separation, say regulatory officials, guards against the worst imaginable errors by plumbers or building users. Many local health departments further require that pressure be greater in a potable water supply line than in a reclaimed system, so that the unlikely accidental cross-connection will result in potable, rather than reclaimed, overflow.

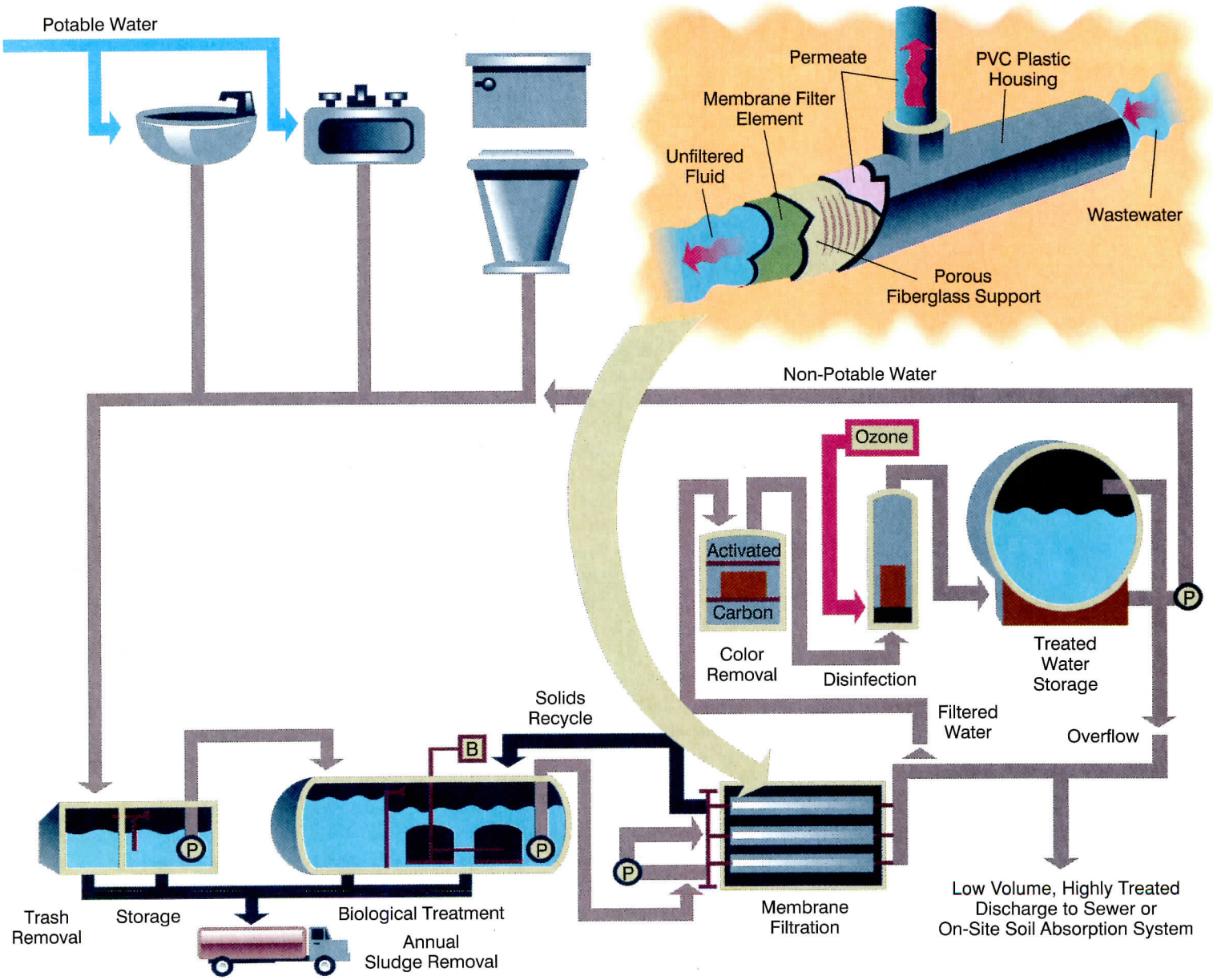
Despite concerns and difficulties, Irvine Ranch Water District officials claim that the conservation provided by reclaimed water makes it integral to the district's efforts. The high-rise program will also benefit developers. To offset the cost of extra plumbing work during construction, the water district waives its high-rise water surcharge, which averages $20,000 per building. In addition, reclaimed water is billed at 46 cents per hundred cubic feet, compared with 53 cents for drinking water.

At Southwest Texas State University in San Marcos, researchers with the Edwards Aquifer Research and Data Center have embarked on a long-term project that, like the Irvine Ranch Water District's reclamation

518 Business Park (below) was planned in an undeveloped area near Princeton, New Jersey, where stringent discharge requirements would have severely limited the size of the complex. The incorporation of a Cycle-Let system (bottom left) and water-conserving toilet fixtures, according to the manufacturer, reduced the building's water use and discharge by 95 percent over a conventional plumbing system.

Developed by Thetford Systems in Ann Arbor, Michigan, the Cycle-Let system has been installed in over 70 buildings nationwide since 1979. In operation, the system collects all wastewater from a building's normal plumbing system and passes it through a series of processes that purifies the water for reuse (facing page). The wastewater is first stored and solids are removed in a pretreatment tank. The pretreatment stage regulates the filtering sequence by spreading five days' worth of discharge over a full weekly cycle. Following that process, paired air-deprived and air-rich bacterial treatment stages denitrify the effluent to reduce organic matter and form bicarbonates, and subsequently renitrify it to convert ammonia and organic nitrogen into nitrates.

Porous membrane filters (bottom and facing page, inset) screen out the nitrates and other harmful solids, but allow harmless solids in the water, such as salt, to pass through. Before reintroduction to the toilet flush supply, the water passes through activated carbon to remove color and through ultraviolet light for disinfection. Having undergone treatment, the water meets national standards for bathing-water quality, say Thetford officials, and looks like drinking water.



program, would reduce a region's use of drinking water and, unlike Clayton Williams's enterprise near Comanche Springs, preserve the fragile San Marcos Springs.

The Edwards researchers have completed a preliminary campus-wide study of water use and discharge, working to identify a system for reuse of graywater—wastewater with little or no organic matter, usually derived from lavatories, showers, and washing equipment, but not from toilets. Instituting graywater reuse is necessary, according to the report, to respond to the 1980s population boom that has multiplied demand for drinking water from the San Marcos vicinity. Without graywater recycling, the report explains, a prolonged drought could cause the springs to cease, not only in the immediate San Marcos area, but in a seven-county region that depends on drinking water and irrigation from the porous-limestone Edwards Aquifer.

In their study of existing facilities, Edwards researchers compared water demands and releases over a two-year period. They found that the water use and discharge of the university's dormitories, cooling towers, and landscape irrigation system could be combined, with the addition of graywater treatment, to create a recycling loop recharged solely by the dormitories' potable water supply. As envisioned in the report, the system's potable water would first enter the residence halls. Toilet and urinal flush water—blackwater—would be expelled to the city sewer, while graywater from lavatories, laundries, and showers would be carried to a treatment system. After sufficient treatment to ensure that contact with the graywater would not impose health risks, the recycled water would be pumped to a storage tank for dispersal back to the dormitories as flush water, and to the landscape-irrigation system and cooling towers on campus. After being exhausted in the cooling towers, the graywater could be returned to storage or treatment for further reuse within the university.

Researchers view the report's promising findings as the first step toward a demonstration project, if funding can be secured. Until then, they suggest, conservation could begin with the installation of low-volume toilets (1.5 to 3 gallons of water per flush, instead of 5 to 7 gallons) in new buildings and reuse of water in future development.

Recognizing that their suggestions will not be inexpensive to carry out, the researchers argue: "The university has a role in society which transcends its microeconomic interests. Many of the actions suggested in this report, while perhaps not 'cost effective'...lend themselves to being demonstrated as a matter of interest because they are relevant to the needs of society." By showing graywater reuse to be workable, the researchers say, the university could ease regulatory resistance to future applications, especially those of the private sector.

While work in San Marcos is still formative, Thetford Systems of Ann Arbor, Michigan, has established itself in the manufacture and operation of wastewater recycling systems with a unit called Cycle-Let. Installed in 70 structures over the last 10 years, Cycle-Let collects wastewater within a building,

Continued on page 102

Living Machines Offer Alternative Treatment Methods

Three mixed-use developments proposed by New York architect William McDonough may push the application of water conservation into new territory, while bringing urban building systems back to a more symbiotic relationship with the environment. These 6- to 9-million-square-foot schemes designed for sites in California, New York, and Warsaw, Poland, will combine housing, hotel, and office space while inflicting minimal damage to the environment.

McDonough has proposed low-energy transportation systems for each project, emphasizing bicycle travel and light-rail transit, as well as built-in recycling accommodations for glass, aluminum, and newspapers. An alternative water treatment "machine" has also been proposed to cut down the imposing waste discharge.

Developed by John Todd and Nancy Jack Todd, cofounders in 1980 of the ecological research group Ocean Arks International in Falmouth, Massachusetts, these "living machines" are treatment facilities assembled from a system of organisms rather than from conventional equipment.

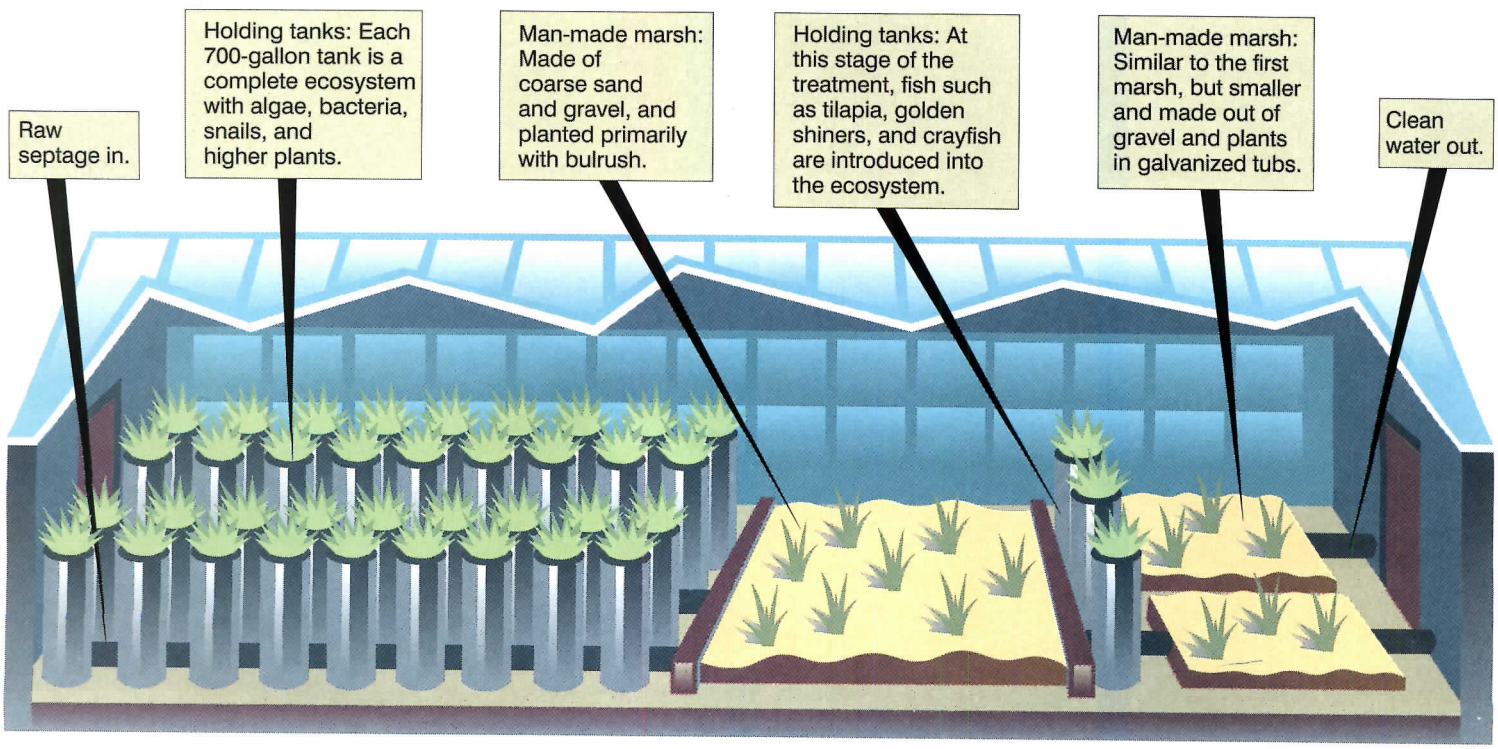
One such facility, an "ecological digester" operating in John Todd's office, eliminates pulp and paper wastes biologically. Waste feeds into two sunlight-bathed fiberglass cylinders that are filled with a microcosm of minerals and microorganisms, as well as species of mollusks, crayfish, and a variety of fish from around the world. The various small organisms feed on the waste and are eaten in turn by the larger animals. Through trial and error, the Todds were able to balance the system so that it sustains itself.

A second Ocean Arks micro-ecosystem, a sewage treatment facility in Providence, Rhode Island, serves as a prototype for applications such as those proposed by McDonough. Four parallel treatment systems, each comprising 14 stages, separate raw sewage from clear-water discharge. The progressive ecosystems in each chain, utilizing many of the same organisms of the small-scale office digester and a much broader collection of plant life, adapt to varying conditions such as the strength of the waste stream and the light level. This process of "self design" among the organisms remains dynamic and can vary greatly from one stage to another.

Like any mechanical system, living machines can be damaged by external shocks. Unlike traditional machines, however, these microorganisms can "repair" themselves from such stresses as overloading or light deprivation with a reseeding of necessary plants and animals.

Understandably, the Todds are passionately committed to the environment. "Nature is invisible to many people in our culture," John Todd says. "It is my hope that the esthetic and emotional feeling that living machines can generate will yet carry the day."

Achieving meaningful waste reduction with so logical and natural a solution depends on clients' willingness to accept the added initial cost of incorporating living machines and other conservation mechanisms into buildings. "Surprisingly, the development community has been very supportive," says McDonough. "In our presentations, the ideas have been well received, which leaves us very encouraged."



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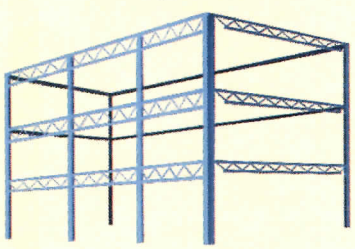

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Circle 69 on information card

Wastewater treatment *from page 99*
treats it, and returns it for reuse in toilets and urinals. John Irwin, a Thetford vice president, says as much as 95 percent of the water demand has been eliminated in the schools, office parks, shopping centers, and a variety of other buildings that have installed the Cycle-Let system.

Thetford's process is effective, but it is also complex and expensive. In a typical system, wastewater from lavatories, toilets, and urinals is collected and passed through several treatment steps before reintroduction to a flush supply. Water first enters a pre-treatment tank, where inorganic solids are removed and organic solids are allowed to liquefy. Pre-treatment provides a temporary storage, too, to allow an office building's five-day load, for instance, to be handled over a more efficient seven-day cycle.

Wastewater is pumped from pre-treatment to a biological treatment tank, where it is initially denitrified in an anoxic phase. Denitrification reduces the water's organic content and raises its alkalinity by forming bicarbonates, which help control the pH of the system. In the next, aerobic, stage a second group of microorganisms is placed in an air-rich environment to further reduce organic matter and convert ammonia and organic nitrogen from raw wastewater into nitrates.

The effluent is pumped from the biological tank to a series of membrane filters. With their microporous structure, membrane filters separate high-molecular-weight suspended solids, including bacteria, from those of low molecular weight, such as salt. The membrane system, says Irwin, is not as susceptible to changing water conditions as is a conventional clarifier. Membranes are also unaffected, he says, by any settling of suspended solids. Following membrane filtration, the water is filtered through activated carbon to remove any remaining color, and then passed through ultraviolet light for disinfection. Clear and odorless, the water finally awaits pumping into toilets and urinals.

Although the conservation benefits of Cycle-Let are evident, Irwin admits that major obstacles to recycling wastewater remain, such as lengthy variance procedures under current regulatory codes. No national standard for recycled water quality has been established, although states such as California, Arizona, Texas, and Florida have adopted formal regulations. Plumbing codes remain largely unclear as to where non-potable water may be used. The fear of cross-connections between drinkable and recycled water also nags health officials. Nevertheless, Irwin maintains, "Treated wastewater has a quality considerably better than U.S. Public Health bathing-water standards."

Only two or three decades ago, pleas for water reuse would have been met with reassurances that the extra money need not be spent because "there will always be enough water to go around." In a handful of small Texas towns that sit over the Edwards Aquifer, those voices can still be heard. A group of South Texas landowners, ranchers, and farmers remain entrenched in a three-year battle against state and water-district officials who say pumping restrictions are needed to preserve the aquifer. Like defeated candidate Clayton Williams, they argue that the water is theirs to exploit. In Irvine, San Marcos, and other areas with fragile water resources, however, the debate has given way to significant studies by researchers, public officials, and architects on systems, regulations, and buildings that make better use of every precious drop. ■

—Ray Don Tilley

Ray Don Tilley is publications director of Texas Architect.

Drawing from Logic

PRACTICE:
WORKING DRAWINGS

An AIA-sponsored organizational system ensures consistency and clarity of construction documents.

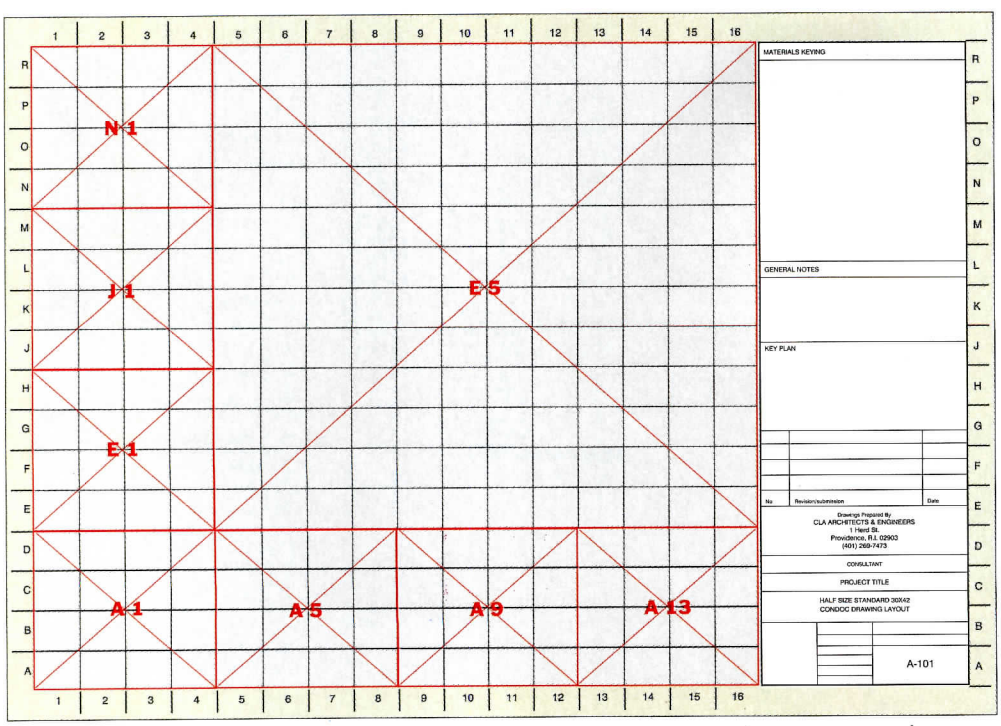
OBSERVING A DEMONSTRATION OF CONDOC for the first time, one can't help but wonder why this well-organized approach to working drawings wasn't developed any earlier. The methodology applies to documents generated by hand or by CADD, and, to further simplify production, a software package tailored to ConDoc has recently become available to AutoCad users (see page 112).

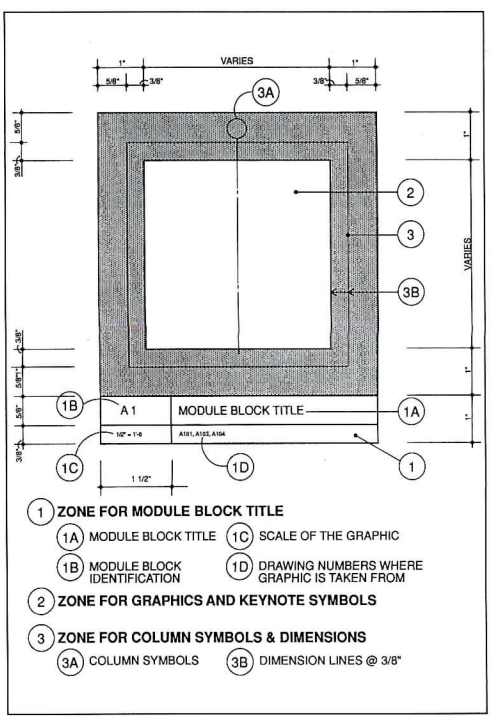
Every practicing architect can appreciate the difficulties of assembling a clearly organized and consistent set of construction documents. The larger the project, the more complicated the task. For some firms, every set of drawings becomes a design project in itself— where should the title go? how much space should be left between drawing and dimension string? how should details be numbered? The current production of contract drawings, whether by hand or by computer, is essentially not much different from 19th-century techniques. Explains James N. Freehof, AIA, codeveloper of ConDoc, "Though architects pride themselves in being innovative designers, relatively little progress has been made in how their work is done. While CADD vastly improves accuracy and uniformity, the organization of the material has not changed. The computer, like a pencil, is just another drafting tool—not a change in methodology."

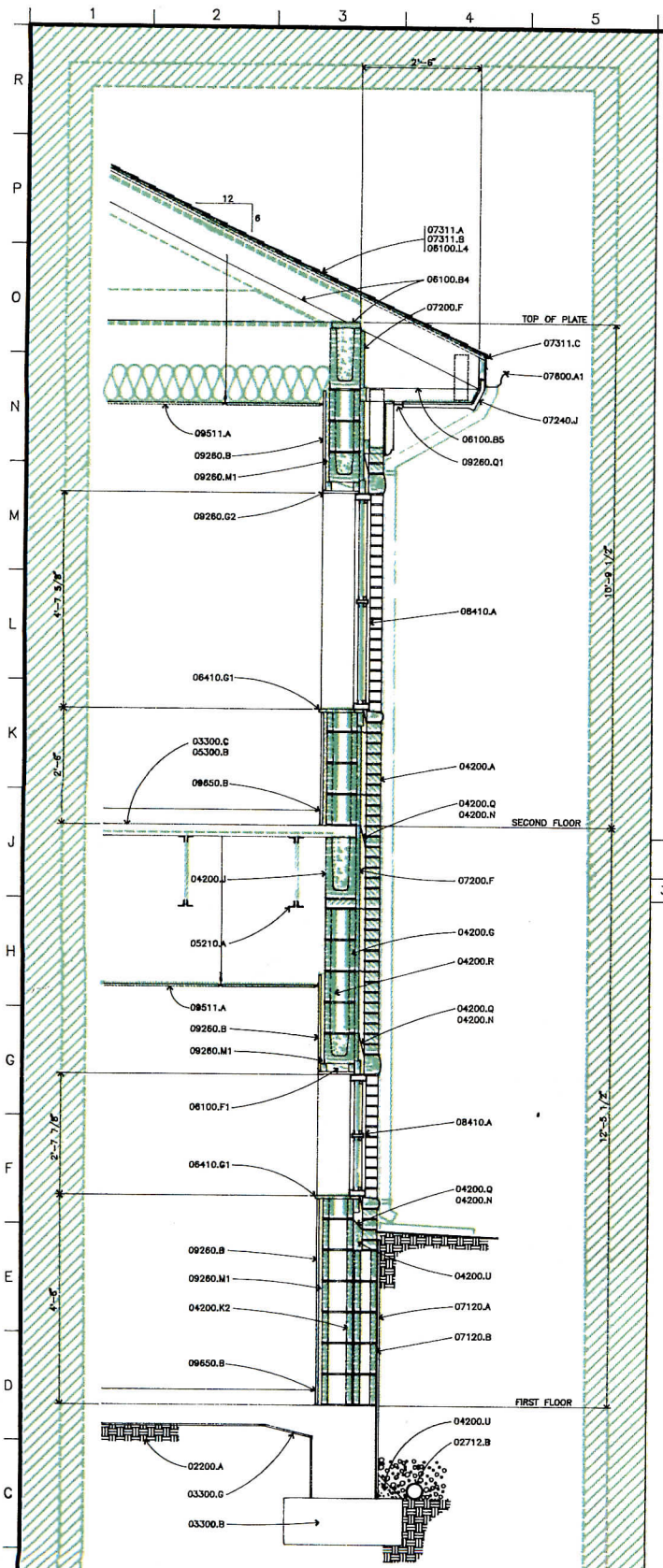
In marked contrast, the preparation of specifications has changed dramatically in recent years due to the introduction and national acceptance of the Construction Specification Institute's (CSI) 16 divisions of work, and its more specific five-digit Masterformat. This format provides a standardized framework for the writing of specifications, thereby simplifying the task and substantially improving communications among architects, consultants, contractors, and clients.

Frustrated with the lack of an industry standard for working drawings, Onkal K. (Duke) Guzey, AIA, of Daniel, Mann, Johnson & Mendenhall in Washington, D.C., took it upon himself in 1985 to research contract-drawing formats and discuss approaches with other professionals across the country. A year or so later he teamed up with Freehof, and the two formulated the methodology, given the name ConDoc in 1987. Since then, they have been conducting AIA-sponsored workshops across the country, teaching architects how to produce working drawings with a clarity, consistency, and organization that has eluded most of the profession.

Each module block (bottom right) consists of a center zone for drawings and text, a border with dimension strings, and a title block. The blocks are laid out on the final working drawing (below, red) with the help of a background grid. The final working drawing consists of Zone 1 for title block and legend information (white), Zone 2 for graphics (gray), and Zone 3 for perimeter margin (yellow).







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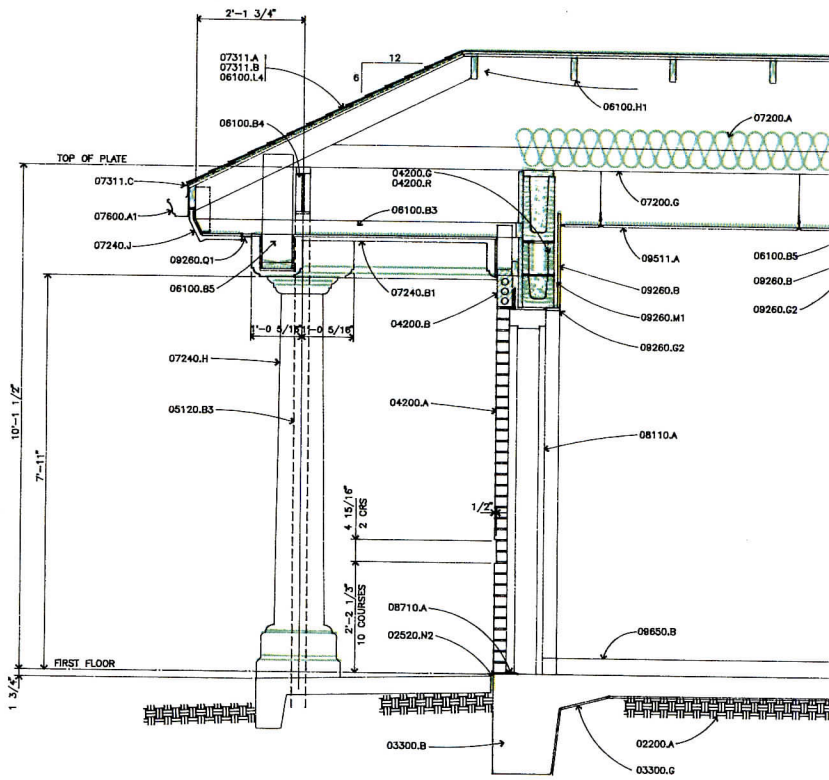

J6	ENTRY SECTION
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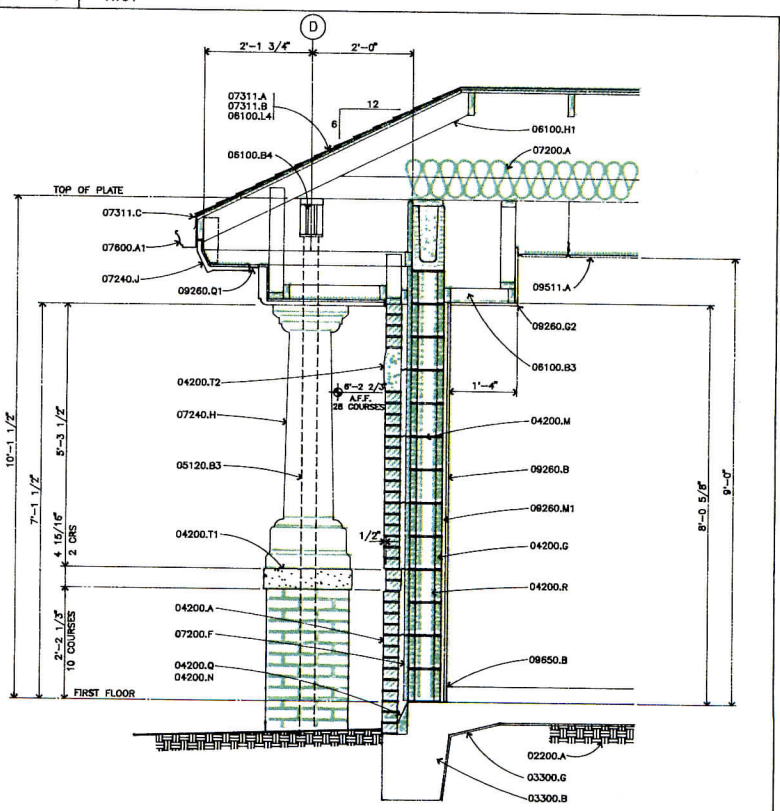

A6	WALL SECTION
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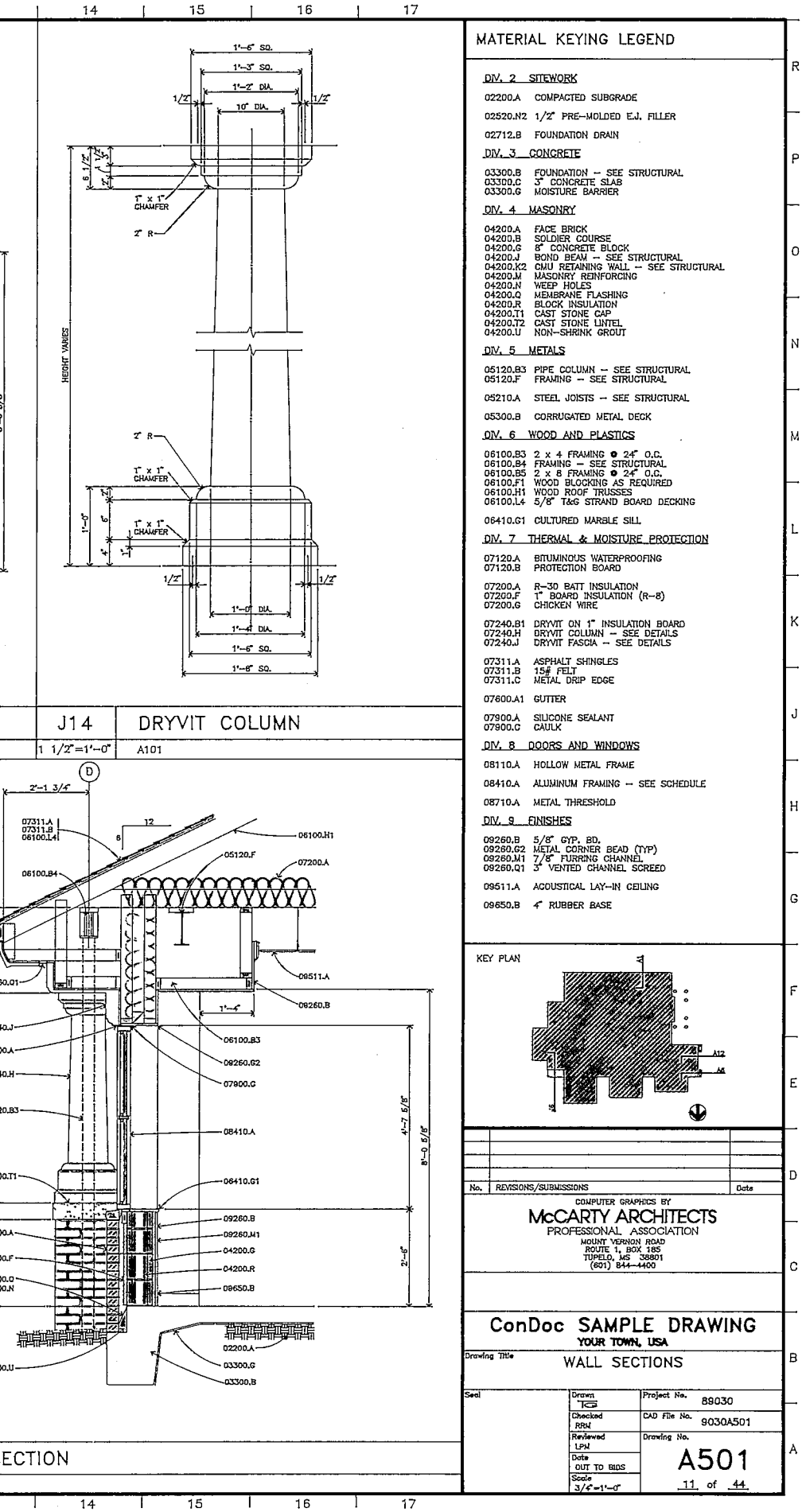


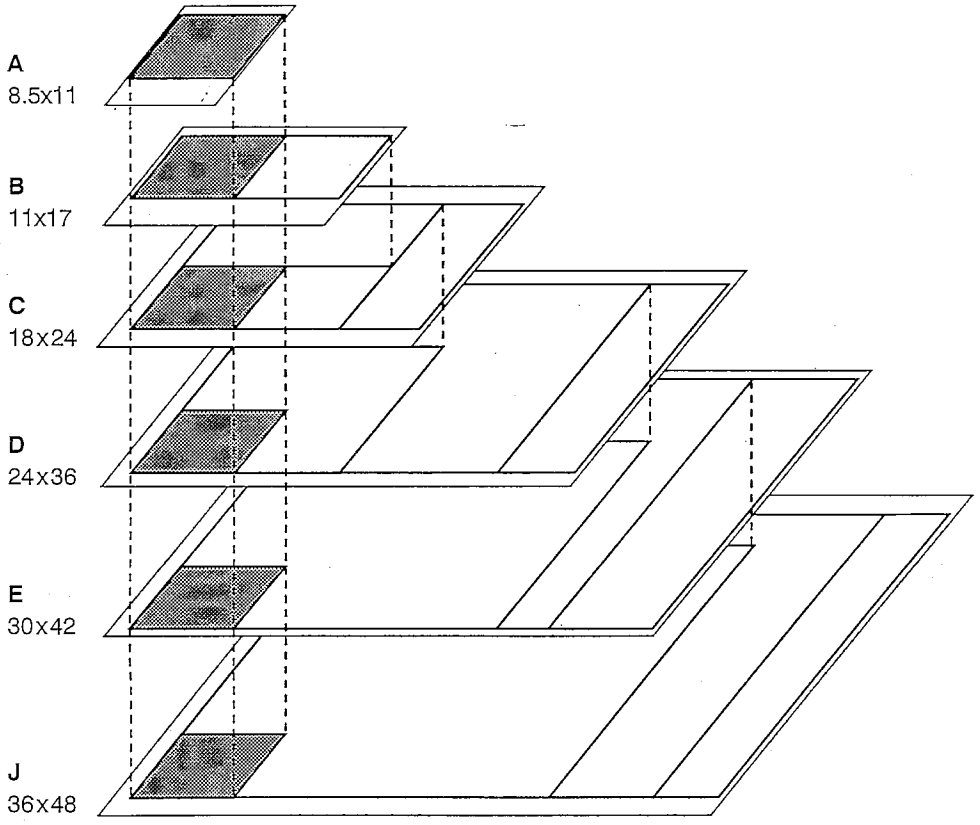
Guzey and Freehof are the first to admit that many of ConDoc's concepts are not new. The methodology largely synthesizes the most successful techniques applied by many design professionals. But, as a whole, the ConDoc package is unique. The authors stress that the methodology is a dynamic process: it has grown and developed, and will continue to do so as practitioners respond to its systematic approach with new ideas.

To begin with, ConDoc organizes drawings by major discipline: architectural, structural, mechanical, and so forth. Each discipline is then subdivided into group designations so that similar drawings are kept together. The architectural discipline, for example, consists of: 0) general information; 1) plans; 2) exterior elevations and transverse sections; 3) vertical circulation; 4) reflected ceiling plans and details; 5) exterior envelope details; and 6) interiors. Each group can contain up to 100 sheets, numbered 00 to 99. A drawing labeled A402 is the second sheet of the reflected-ceiling-plans-and-details group within the architectural discipline: the discipline prefix is "A," the group designation is "4," and the drawing number is "02." Besides making it easier to locate particular information, ConDoc's ordering system allows a new sheet to be inserted at a logical point within a pre-existing set.

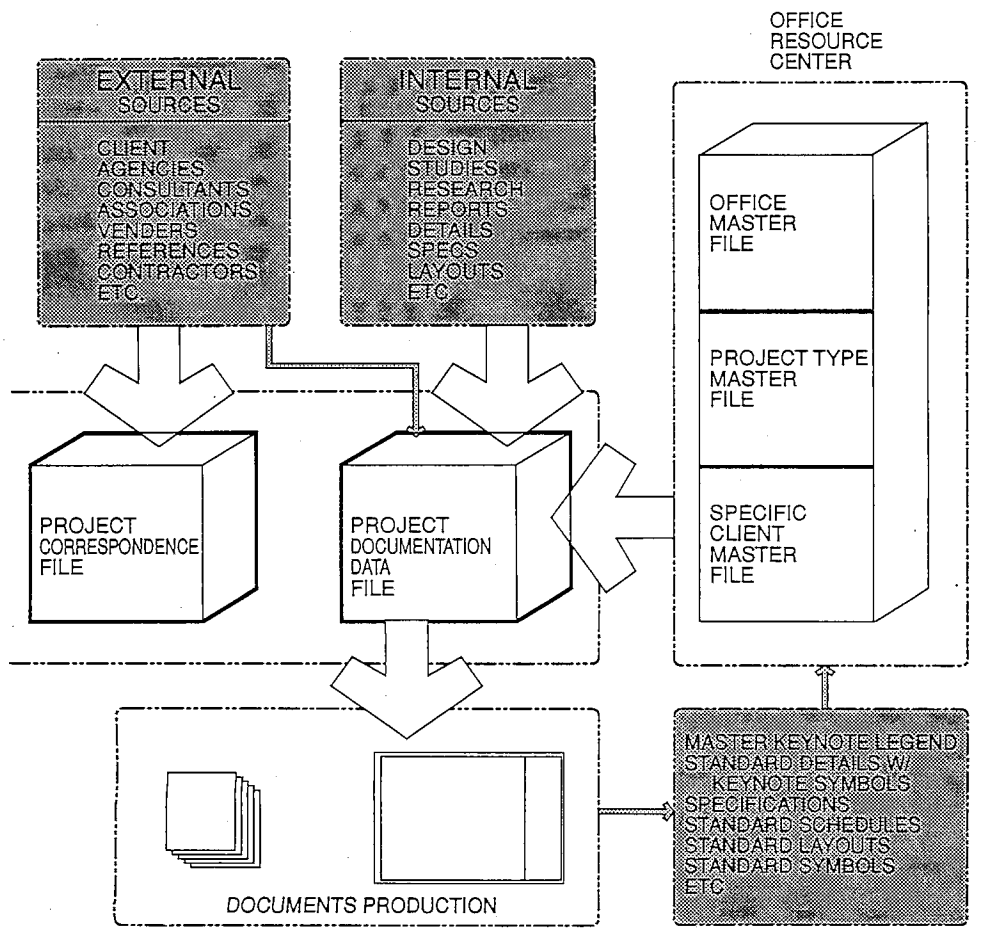
Sheets sized 18-by-24 inches and larger are divided into three zones. Zone 1, a vertical box located on the right-hand side of a drawing, contains the title block and legend information. Zone 2, the bulk of the drawing, is designated for graphics. Zone 3 is relegated to the perimeter margin. The graphic zone (2) is further subdivided by a grid into 2-inch-wide by 1.75-inch-high modules. This module becomes the basic unit for all drawings. A specific graphic detail will fit within a certain number of modules to form a module block, which consists of one or all of the modules on the sheet. The block has its own internal organization, which ensures that all drawings on the sheet are consistent.

Having established sheet and module formats, ConDoc assumes yet another level of standardization not only to ensure orderly drawings but, more significantly, to link drawings with project specifications. This

The CADD version of ConDoc automatically sets up the zones for legend and titles, graphics and text, and perimeter areas on a working drawing (left). The module blocks, which contain details, can vary in size. Once a block is placed on the sheet, the computer determines its label (A1, A6, J6, etc.) and records it in the appropriate box. The module border can be shaded for easier reading. Materials are labeled by alphanumeric keynotes. Their definitions are inserted by computer in the legend at the upper right corner.



ConDoc limits drawing sheets to specific dimensions that fit the underlying module (above), and which Guzey and Freehof found to be the most common among architects. The formats allow for the transfer of information from a small detail sketch to the final working drawing. This standardization will also encourage firms to maintain a file of accepted office details that can be reused on other jobs, thereby eliminating inconsistencies both within a given project and among all other projects designed by the firm.



connection is made through keynotes—alphanumeric symbols that define graphic material in lieu of standard, written notes. The keynotes, whose definitions appear in Zone 1 of each sheet, minimize the amount of lettering required on the page, reducing clutter.

For the keynote numbering system, ConDoc recommends an accepted specification format such as CSI's five-digit Masterformat. The alphanumeric keynote consists of two parts: a prefix, established by the format, and a suffix chosen by the architect. Face brick, for instance, could be labeled 04200.A, where the prefix 04200 is Masterformat's designation for unit masonry and the suffix "A" has been selected by the project architect for face brick.

A firm using ConDoc will develop a master list of keynotes that are deemed appropriate for the nature of its work. Only select personnel should be allowed to modify this list. A compilation of keynotes for a specific project will be based on the master list. A keynote editor—typically the project architect—monitors the project keynote symbols and definitions to ensure consistency among the drawings and specifications. Only the editor should modify the project keynote list. Each sheet has its own keynote legend, which can be modified by the individual designer based on the approved project keynote list. ConDoc also recommends maintaining a file, organized by keynotes, that contains further information on each material specified. This could include the manufacturer, availability, and cost.

Reactions to the ConDoc methodology have been quite positive. Those familiar with the approach cite not only the obvious advantages of efficiency and clarity, but more subtle improvements as well. Drew Dalton, project architect at the 600-person firm of Woolpert Consultants in Dayton, Ohio, finds that the linking of specifications to the drawings "forces the architect to make a lot more technical decisions" while designing. "The specifications develop along with the drawings, rather than being left to the last minute at the end of the project," he claims.

Daniel C. Richhart, AIA, also of Woolpert Consultants, has developed a master list of keynotes for his firm. "The project keynote list, which is continually refined and developed, lets you know what issues must be

The complexities of a building project necessitate an effective office filing system, especially in cases when staff may change over the duration of a project. The variety of information that a firm must track can be illustrated in a project data file flow chart (left). The ConDoc manual suggests how to organize these files. For instance, information regarding materials and methods should be indexed according to drawing keynotes.

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ConDoc on CADD

"We did not set out to market software," admits Leroy P. McCarty, Jr., AIA, principal of McCarty Architects in Tupelo, Mississippi. McCarty, who was alerted to ConDoc methodology through a workshop, encouraged his office to combine ConDoc with an existing AutoCad system. Encountering certain limitations, McCarty dedicated staff time at his 12-person firm to devise a computer program that could incorporate the ideas of ConDoc. McCarty teamed up with Guzey and Freehof to form GFM, Inc., which has produced a software package called ConDoc for CADD.

Although Version 1.0 was not released until three months ago, the basic program was demonstrated earlier this year at the AIA convention in Houston, the A/E/C Systems show in Atlanta, and the CSI convention in Chicago. A beta test version had been provided to selected firms for a trial run and a "prerelease" package was made available in July, 1990, for practitioners eager to get on line.

The software very closely follows the corresponding ConDoc methodology for working drawings. The sheets are formatted automatically into appropriate zones, and the computer asks questions through a dialogue box to fill in the standard title block. A grid, which is turned off during plotting, appears in the background to help place module blocks on the screen.

Module blocks are easily constructed by selecting the "CDModule" from the ConDoc menu and by clicking the pointer at the lower left-hand and upper right-hand corners of the desired location. The computer again prompts the user to provide the appropriate title block information for each module. The block's alphanumeric identification number is automatically determined and inserted next to its title. The user is given the option of shading the perimeter dimension zone of each module block so that the center graphics-and-text zone is more clearly defined.

ConDoc for CADD is accompanied by a starter set of keynote symbols and definitions based on Masterformat. This list can be modified or replaced to accommodate the office's specific needs. The keynotes can even be recoded according to a different format, as is sometimes required for certain jobs. Only the project architect should have "edit-access" to the project keynotes, so that the language and materials remain consistent throughout the design and construction process.

The user generates a drawing with AutoCad commands inside a ConDoc module block. Labeling begins by selecting the "CDSymbol" function from the ConDoc menu. The designer chooses the appropriate keynote from an on-screen scrolling display of the project keynote master list. The user can then place the symbol near the graphic image and draw the appropriate leader lines. The software will question any symbol that is not part of its master keynote list.

Once all materials are labeled, another ConDoc command, called "CDScan," compiles all keynote symbols on the current sheet and inserts the keynotes and their definitions beneath the material keying legend in the upper right corner. A printout of each sheet's keynotes provides a convenient outline for the development of the project's specifications.

Among the options included in ConDoc for CADD is a global edit feature. A design change that affects a particular material throughout the drawing can be made with a single command. If, for instance, the budget requires all gypsum board to be 1/2-inch thick rather than 5/8-inch thick, the user need only make the correction once. The global edit will remove the old keynote for 5/8-inch gypsum board and replace it with the new keynote for 1/2-inch in all locations. Reviewing notes is also made easier by a highlighting option that calls attention to a particular keynote throughout the drawing. An architect can easily highlight each item on the material keying legend to check that all keynotes have been correctly located.

While this software is tailored to ConDoc, it allows for variation. The user can modify the default options to fit a particular need. For instance, the material keying legend does not have to be located in the upper right-hand corner, but can be placed within the graphic. A firm that is accustomed to having its title block at the top right corner of the page instead of the bottom right, or needs more space for its name, can adjust the format accordingly.

The ConDoc program is currently supported by AutoCad, release 9 or above, on an IBM or compatible computer. It requires MS/DOS version 3.0 or above, and a minimum of 300 kilobytes of free storage space on a hard disk. Future versions for other systems, such as DataCADD, Arris, and Intergraph, are being considered.

ConDoc for CADD is available through the AIA Professional Systems Division (PSD). For further information, contact Cynthia Flynn, PSD Marketing Director, AIA, (202) 626-7446.

considered," explains Richhart. "It jogs your memory. Some decisions are made early, some are made later—but you are always reminded of them with this constant checklist that accompanies you from the beginning to the end of a job." And the master list ensures consistency between jobs. "For example," adds Dalton, "keynote 9200.J indicates 1/2-inch gypsum board on every job in our office."

Richhart acknowledges that it takes time to learn the process and the keynotes, but believes it is worth the effort. At the very beginning of a project, the architects at Woolpert make a point of informing everyone involved that they will be using a new drawing format. Explains Richhart, "We give a little course on ConDoc to our clients and ask if they have any problem with it—usually, they love it. The contractors like it because it eliminates lots of hunting for the specifications and information, like the manufacturer. We've had a good response from estimators as well. No one has turned it down or said they didn't like it."

An AIA-sponsored seminar entitled "A Special Executive Briefing for Architects and Design Professionals in Federal and State Governments on ConDoc" was held in Washington, D.C., in October for a number of governmental agencies involved in ongoing construction projects. One of the participants was Terrel Emmons, AIA, director of design support for the Office of Naval Facility Engineering Command, who is currently evaluating ConDoc's application to the Navy's procurement process. "Right now we have no single system to organize drawings," explains Emmons. "As architects move into CADD, which allows us to transfer information electronically from one location to another, we need a universal format."

Thomas R. Rutherford, assistant director of engineering and construction directorate, Office of the Secretary of Defense, strongly endorses the concept and system of ConDoc. "It's the first system I have seen in my 35 years of construction experience that formally, structurally, and finitely integrates specifications with drawings in a detailed way," he says. Rutherford is not only encouraging the U.S. Department of Defense to accept this methodology—as a member of the American National Standards Institute (ANSI) construction board, he will recommend ConDoc methodology as both a national and international standard. "We always have to think about international communication and trade. The future is in rebuilding internationally, in areas like Eastern Europe and Russia."

Global thinking aside, Rutherford captures succinctly most architects' and clients' reactions to ConDoc, "It is so simple, so logical—it's embarrassing that it wasn't developed years ago." ■

—NANCY B. SOLOMON

Platforms for Discussion

COMPUTERS:
EVALUATING SYSTEMS

Architects and consultants critique Macintosh and DOS performance for a variety of software applications.

TO FIND OUT WHETHER DOS OR MACINTOSH offers the more creative and productive environment for architectural practice, ARCHITECTURE initiated a comparative evaluation of the two computer platforms. In early September, we assembled two panels for the review: nine architects who use a DOS-based computer, and nine who use a Macintosh. Doubting that the zealots on either team would be persuaded to change systems on the spot, we also invited eight architects with little or no computing experience, but who said they plan to purchase either a Macintosh or DOS-based computer within the next year.

Each panel was organized into four teams covering the most widely-used applications: word processing and specifications, financial management and project management, desktop publishing and marketing, and CADD. Most teams had two members except for the CADD teams, which had four members from each computing platform. The teams took turns presenting their systems and approaches, revealing what they use and why. They were specifically instructed that the goal was not to win a debate, but to enlighten one another with the hope of reaching a consensus as to the benefits of DOS and Macintosh systems.

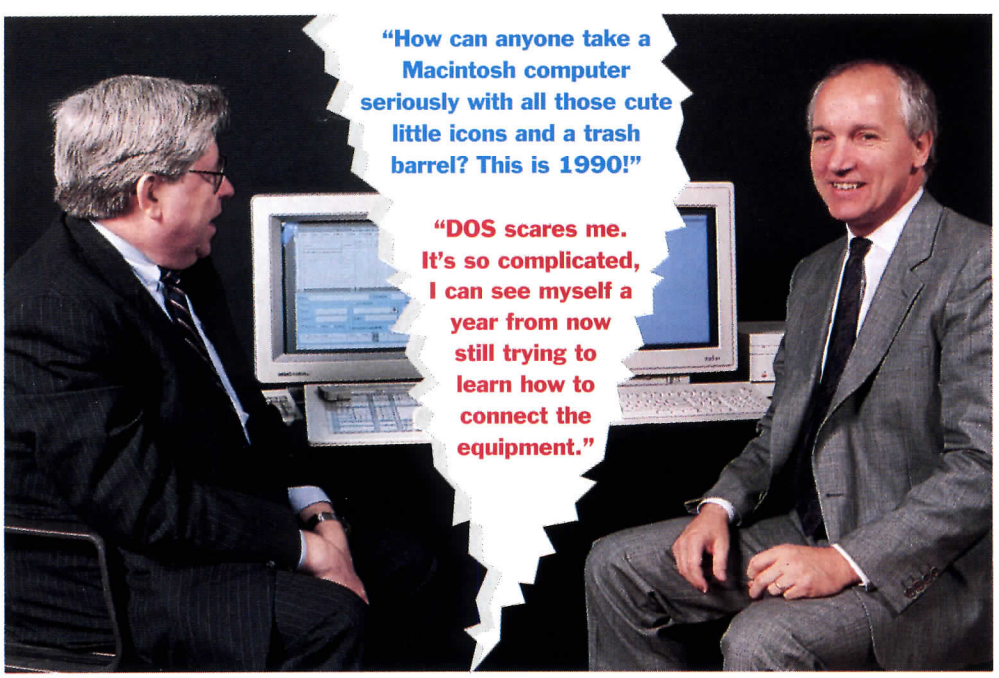
Among participants in the evaluation, the DOS advocates tended to be "power users" with specific needs. Their approach was more focused and more demanding of the computer in specialized areas. The Macintosh advocates, on the other hand, tended to be from smaller firms with more money than time to invest in the mechanics of setting up and operating a computer. Their approach was more broadly based, both in the range of programs and in the extent to which they were used within the firm.

The Macintosh, introduced in 1984 by Apple Computer, employs an operating system whose routines are generally transparent to the user. The current version is 6.0.5, and is supplied free by Apple with the purchase of every Macintosh computer. DOS, the acronym for disk-operating system, was developed jointly by Microsoft and IBM in 1981 to perform housekeeping chores on IBM and compatible computers. Dozens of manufacturers make DOS-based computers that compete with IBM's personal computer; only Apple produces the Macintosh and the operating system that runs it.

The Macintosh advantages considered most important among the evaluators were: ease of learning and use; consistent methodology across all programs; and the graphic nature of the system. Advantages of DOS-based computers include significantly lower cost, an open environment that can be tailored to fit specific needs, better developed software, a wider range of options in both hardware and software, and a much greater likelihood of finding employees, consultants, and clients with compatible systems.

Macintosh users, for their part, generally liked the graphic user interface presented by Windows 3.0, a new program developed by Microsoft for the DOS environment. The new program essentially creates a graphic "desktop" method of organization for the DOS environment, similar to the Macintosh interface that employs icons and executes commands with the "point-and-click" method. The Macintosh users praised examples of graphic designs created by several evaluators on DOS-based programs like Corel Draw, Micrographx Designer, PC Paintbrush, and DrawPerfect. "I was amazed at the graphic demonstrations by the DOS

DOS evaluator Walter Foran (below left) and Macintosh evaluator Richard Abrham (below right) assessed financial management software on their respective platforms. Although neither system was declared a winner, 26 evaluators offered passionate commentaries about their computer preferences (inset).



PHOTOGRAPHY BY WAYNE CABLE / CABLE STUDIOS

teams," says Louis Wasserman of Louis Wasserman + Associates. "The results are comparable to anything we can do on the Mac, although I wonder about how easy and accessible those tools are."

The evaluators generally felt that capabilities of the two competitors were converging rather than diverging—the Macintosh adding power and maturity and DOS developing graphic capabilities, especially with the introduction of Windows. But Windows is more than just another pretty interface; it adds superior memory management, multi-tasking, and dynamic data exchange to the DOS platform on which it runs. Ironically, the biggest criticism of Windows—the lack of software designed to run on it—is the same criticism that was leveled against the Macintosh just a few years ago.

One of the frustrations of working in the DOS environment has been its limit of 640,000 bytes of random-access memory (RAM). Programs larger than 640K must store and retrieve portions of their program and data from the hard disk, which makes the program run much slower than if it were working in RAM. Recently, DOS programs have begun breaking the 640K barrier with DOS extender software, which enables a program to use all memory available in the computer. But the Macintosh system has no artificial memory barriers, and does not present this type of problem. Thus, a virtually unlimited number of desk accessories, such as a calculator and notebook, are always obtainable by pulling down the Apple menu.

Most of the DOS programs for the session were run on a Hewlett-Packard Vectra 486/25 with 12 megabytes of memory and a 330 megabyte hard disk, Nanao 20-inch monitor, Kurta cordless digitizer, Hewlett-Packard bus mouse, and a choice of the Metheus 1228 graphic adapter, Nth Engine/550 display list adapter, and the Hewlett-Packard Intelligent Graphics Controller 20. Typical time required to configure a CADD program for this equipment ranged from three to eight hours.

The Macintosh programs were run on a Macintosh IIfx computer with eight megabytes of RAM, a 160-megabyte hard disk, an external 100-megabyte disk drive by SuperMac, Radius QuickCad display list adapter, and the Radius color display capable of showing 16 million colors. The typical time needed to install a CADD program on the Macintosh was 15 to 30 minutes.

In specific applications, the evaluators declared a tie in word processing (see comments, page 118), a clear victory for DOS in financial management (see comments, page 119), a decisive victory for Macintosh in desktop publishing, and an edge for DOS in CADD (see comments, right). Regarding the entire system, however, the evaluators

Computer-Aided Design and Drafting

DOS

Working in DOS offers architects a larger number of CADD programs with a greater level of sophistication. Programs for 2D, 3D, and rendering are available from not just a few vendors, but from many. While there might be one or two exceptions, the majority of CADD programs for the Macintosh remind me of where the DOS-based CADD programs were six years ago. Many Macintosh programs are still struggling with basic features like automatic door insertion, parallel line offsets, associative dimensioning, arrays and macros.

Walter J. Hainsfurther, AIA
Kurtz Associates

Having a large pool of architects and drafters who are capable of working on a good CADD program is important from a management standpoint. We take this for granted in the DOS environment.

If Cadvance were not available, we would be more likely to choose another DOS-based CADD program for our drafting needs rather than switch to the Macintosh. The variety and depth of the DOS-based options are too great to ignore.

Richard D. Hayes, AIA
Holabird & Root

A computer is only as good as the software that runs on it. Given its head start, DOS is in a stronger position for 2D drafting. Advanced features like stretch, undo stretch, and dynamic rotation are pretty much universal on DOS-based CADD programs, whereas some Apple products are still stumbling over basics like drawing walls with clean intersections.

Symbol and template libraries are critical for maximizing the productivity of any CADD program. In general, Macintosh programs exhibited only very basic libraries, templates, or macros. While 3D capabilities have advanced greatly in the DOS world, Apple's object-based system gives it an edge in 3D modeling and rendering.

Macintosh evaluators referred to DOS as complex and difficult to learn. I contend that four commands—change directory, directory, copy, and erase—are the only DOS commands needed to run any program. So the question of Mac versus DOS really boils down to a choice between an intuitive operating system based on a graphic approach and a "young" CADD product, or mastering DOS and choosing between some very complete CADD programs.

Edward W. Wenzler, AIA
William Wenzler and Associates

Macintosh

I remain convinced that the Macintosh offers some important advantages when working on CADD. The Mac is extremely simple to set up and operate—no technical expertise is needed. Most programs developed initially for the Mac are easy to learn, use, and remember. Ease of use means more people will use it.

Charles P. Barr, AIA
Winters Barr Truitt

Both platforms can perform simple drafting well, but serious computer-aided design on the Mac is still in its infancy. One point of distinction is that more of your consultants are likely to own DOS-based systems.

The generalized trade-off is that you can type commands in DOS faster than you can point and click a mouse on a Mac. However, forgetting how to execute a command under a graphic interface is nearly impossible, since finding it in a command list is easy and does not require a manual to verify that the syntax is exactly correct.

Richard E. Sipin, Architect
Chicago, Illinois

As each firm grows, it becomes necessary to modify the basic computer system and add more options. The Macintosh implements the "plug and play" metaphor the best. If an Ethernet card is needed, open the computer, plug the card into any open slot, close the cover, copy the software to the system, and restart the computer. There is no need to configure the board with special drivers, or make sure the card has the correct driver for your monitor, hard disk, or tape drive.

Gary R. Walo, AIA
Davis Associates Architects and Consultants

Most of us are able to accomplish the tasks at hand with either DOS or Macintosh computers. We agree that any computer is preferable to none, even if the entire system is junked within a few years.

Even DOS users agree that learning DOS requires more patience. It seemed that offices standardized on DOS had one or two "experts" to set things up, with the other staff learning specific applications such as CADD. The Macintosh system of opening new files, storing, and retrieving them from icons shown on the screen, is easily comprehensible to a novice. Once into an application, there is a consistency of format that does not exist in DOS.

Martha A. Bell, AIA
Martha Bell and Associates

were offered the hypothetical option of replacing their current equipment with the alternative system free of charge. One DOS evaluator, John H. Hanson, president of Stenbro Associates in Chicago, said he would replace his DOS-based computers with Macintoshes. The Macintosh line held firm, with no defections. Of the eight neutral architects, five opted for Macintosh and three for DOS. The margin of preference for Mac over DOS among the evaluators is remarkable, since estimates of the Macintosh market share has hovered around 20 percent.

Two other evaluators who use DOS-based computers, James C. Jankowski, AIA, of Ross Barney + Jankowski in Chicago, and Steven L. Glenn, AIA, of ECD Associates in Oak Park, Illinois, said they would buy both platforms in the future, because each performs different tasks well. However, after experimenting with Windows 3.0, Jankowski changed his mind and declared that he would not mix Macintosh and DOS-based computers. "With programs written for Windows, I will be able to do essentially everything that the Macintosh can do," he says.

One of the neutrals, Endre Ivan, a native of Hungary, likened the Macintosh to Hungarian, which is spoken by 10 million people, whereas DOS is like English, spoken by perhaps 800 million people. "English is much more difficult to learn, but once you know the language, you can do more with it," he says.

At least five manufacturers of CADD software offer two different versions of their programs that run on both Mac and DOS: Autocad; DynaPerspective; Generic CADD; MicroStation; and Versacad. Although all five programs were originally written to run on DOS-based computers, and subsequently ported to the Macintosh, the evaluators were unable to conclude that the DOS platform was preferable in all cases. They preferred Autocad and Generic CADD in their DOS versions, but DynaPerspective for the Macintosh. MicroStation was considered similar on both platforms, and the evaluators could not agree on which kind of computer ran Versacad best.

Mac user Martha Bell (right) and uncommitted evaluator Clifford Bender.

CADD Software: DOS vs. Mac

Anticipating that some architects will want both Macintosh and DOS-based computers in their offices, five CADD vendors have released versions that run on both platforms.

	DOS	Version	Circle No.	Mac	Version	Circle No.
Autocad 386	$3,300	10	440	$3,000	10	441
DynaPerspective	$995	2†	442	$995	2	443
Generic CADD	$395	5.0†	444	$595	1.0	445
MicroStation	$3,300	3.3	446	$3,300	3.5	447
Versacad/386	$3,495	5.4 Release 7	448	$2,395	3.0	449

† Scheduled to ship November 1, 1990

Autocad

AUTOCAD FOR DOS ENJOYS THE SUPPORT OF a large number of third-party vendors that provide display-list processing for faster pans and zooms, architectural templates, and numerous enhancements. Some of these products are just starting to be available on the Macintosh. As an example of how poorly the Macintosh version of Autocad has sold, the template manufacturer DCA estimates that no more than 3 percent of all its Autocad template sales are for use on Macintosh. Radius last summer introduced one of the first display list processing boards for the Macintosh for $1,495. The board increases the speed of Autocad on the Macintosh by 30 times, according to Radius, although the company warned against being too impressed with the improvement because it only brought the performance on a par with that of Autocad 386.

"Autocad is successful for one reason: third-party support," says David J. Engelke, AIA, of Potter Lawson Architects in Madison, Wisconsin. "The key is templates, both digitized and pull-down, that make Autocad specific to the user." He tried the architectural templates from ASG and DCA and liked them both. "Without these packages, Autocad is just a drawing program."

Although Engelke prefers Autocad/DOS to any other CAD program, he rejected the Macintosh version for its lack of third-party support and its high price. "Our office would rather buy more computers with less power than fewer computers with more power," he says. To Engelke, Autocad's superiority on DOS was representative of the reasons for DOS's overall superiority: more options were available at less cost.

Keith Anderson, AIA, and John I. Lottes, AIA, of the architectural firm Engberg Anderson in Milwaukee—both Macintosh zealots—were deeply disappointed with Autocad on the Macintosh. They criticized it as slow, not architectural, not at all Mac-like, and poorly supported. "The Macintosh version has some problems to resolve before it is to be considered a quality and productive CADD program for the Macintosh," claims Anderson. "If Autodesk truly wants to make a commitment to the Macintosh platform, it should redesign its software to support the Macintosh environment. Until this is accomplished, it will only be a DOS-based program that happens to run on the Mac."

DynaPerspective

DYNAPERSPECTIVE/DOS DOES NOT SUPPORT high-speed animation nor 24-bit antialiasing (full-color line smoothing), as the Macintosh version does. According to Bruce F. George, AIA, of Charles Vincent George Design Group in Naperville, Illinois, it is not a successful program. "I found it more difficult to use than any program I have evaluated," he says, criticizing its drawing and modeling tools. He disliked having to work in absolute rather than relative coordinates, and he found geometric functions such as measuring lines and locating centers of lines tedious or missing entirely. The Macintosh version, he says, was far ahead in both its user interface and its viewing capabilities.

David J. Johnson, AIA, of Eastlake Studios in Chicago, also prefers the Macintosh version of DynaPerspective and includes it in his firm's group of "core" programs. But he also agrees with George that input and editing tools are weak. Johnson finds ModelShop, which runs only on the Macintosh, a more useful program. "What DynaPerspective does well—manipulation of views, fly-bys, changing colors, and printing—I use 20 percent of the time," Johnson maintains. "What it does poorly, and what ModelShop does well—building and editing of objects— is what I use 80 percent of the time."

James W. Ziegler, AIA, with Holabird & Root in Chicago, prefers DynaPerspective, although he has used it less. However, Ziegler joins George and Johnson in complaining about input and editing tools, and notes that the program does not permit construction of L-shapes, or any polygon with an internal angle greater than 180 degrees.

Generic CADD

THE DOS VERSION OF GENERIC CADD INcludes a variety of batch files and macros to automate some routine drawing functions.

The Macintosh version has no built-in macro support, although Apple supplies a free macro utility with every Macintosh. Screen menus may be customized in the DOS version, but not on the Macintosh. Further, Generic Software offers a 3D module in DOS, but not for the Macintosh. On the other hand, the Macintosh version has a built-in utility to convert drawings to and from the DXF file format; the utility is optional at extra cost in DOS.

Generic Software adapted Generic CADD fully to the Macintosh environment. Indeed, it might have gone too far. Although drawings can be translated from one platform to another, the conversion is imperfect in areas such as line color and text. Generic Software has pledged a transparent conversion for its next product release.

All three evaluators who worked on Generic CADD liked it, but they could not agree on why. Steven L. Glenn describes it as a "2D production workhouse." He says its power rivals programs costing ten times more. "As a long-time user of the DOS version, the Mac version feels limiting," he says. "Features such as the two-letter keyboard commands are less intuitive, the pull-down windows seem to slow it down, and many capabilities found in the DOS version are just not available."

Chicago architect Peter H. Landon of Peter Landon Architects Ltd. is more interested in CADD for presentations, graphic imaging, and modeling than for construction documents. Thus he found the DOS version more useful because of its bridge to a 3D program from the same vendor. "Generic CADD allows a novice to produce sketches as well as accurate detailed drawings surprisingly quickly," Landon says. "By loading a simple 2D drawing into the 3D program and then extruding a few walls, we were able to produce an accurate perspective that was perfect as an underlay for a rendering." He notes that the excellent 2D file and layer management is missing on the 3D program, which means all information from the base drawing has to be written down or remembered.

"A simple program, such as Generic, is adequate for a small firm such as ours," Landon notes. "Because of the macro, menus, and file system of Generic/DOS, I would choose it over Generic/Mac."

The most enthusiastic presenter at the evaluation meeting was Chicago architect Gerald R. Haselhuhn of Arc-Assist. "I'm 55 years old and I never learned to type, but I do everything on my Macintosh," he explains. "Generic CADD has changed my whole approach to graphic programming."

Other evaluators shared his enthusiasm. Robert C. Robicsek, AIA, an Autocad evaluator and vice president of Environ Inc., rated Generic CADD the "best value" of the five

Word Processing

DOS

In the summer of 1982, I decided to start a practice, but I didn't have money for secretaries or employees, and I didn't know how to type. I decided a computer would allow me to correct my mistakes on correspondence and reports, so two months before I went into business I bought an IBM personal computer.

Eight years later, I am still teaching myself better ways to make our computers friendly for the staff. The limited capabilities and hostile environment of DOS have frustrated many potential users. Unless a user either takes the time to learn DOS and establish a system of managing files and starting programs, or hires someone to do that, each session with the computer can become a nightmare of frustration.

We have 10 computers, none of which is the same make and model as any other. Each has different memory sizes on cards made by a range of manufacturers; different graphics cards and monitors; and different input devices. I estimate that it takes an average of eight hours for us to make a major hardware or software change. Just upgrading our network software from Version 2.0a to Version 2.11 required seven hours before we asked for help. Twelve hours and $1,000 later, another problem surfaced, taking five more hours.

It will take a few more years for manufacturers of DOS-based equipment and software to agree on how to get along with one another. Windows 3.0 and the new extended industry standard architecture bus structure are a good beginning. Apple users think that Macintosh is the answer. And for someone just starting out on computers, the Apple environment is the easiest way to computerize. However, the Apple environment is both more expensive and slower, due to Apple's dependence on icons. Once mastered, DOS is quicker to respond to keyboard commands versus commands entered via a mouse. Text commands can be easier to understand than Apple's icons, because text can be more descriptive.

Apart from the difficulty of changing the system, we are very happy with the DOS environment. As long as DOS remains hostile and Apple's productivity remains below those of comparable DOS applications, we will have an advantage over our competitors who are not yet computerized. However the days of our advantage over other firms are numbered.

Charles R. Newman, AIA
Charles Newman and Associates Inc.

Macintosh

The formation of our firm in 1984 coincided with the release of the first Macintosh. We bought into the conceptual "fit" between the Mac's graphic orientation and our own. Besides, it was less expensive than the DOS competition and less frightening to operate—but also less useful.

The fact that the Mac was underpowered, incredibly slow, and supported by only a handful of applications didn't diminish our enthusiasm. Since then, Mac software has maintained the same look, feel, and command structure, allowing us to find our way easily between programs.

Our office uses MacWrite II by Claris and Microsoft Word for word processing. They serve our needs for proposals, correspondence, marketing, merge mail, project management, specifications, construction drawing notes, and schedules. Word processing was among the first applications developed for the Macintosh and it is among the best. Comparing word-processing programs, Mac and DOS platforms appear to match each other feature for feature. Some applications, such as Microsoft Word, are available on both platforms, making differences even harder to find.

Our employees are able to learn applications quickly and maintain their facility with programs they use only occasionally. If a user is intimidated by an application, it won't be used, regardless of its power.

Kenneth L. Behles, AIA
Behles & Behles

Several years ago, a client for an hourly-fee job complained that we didn't employ secretaries. I explained that we generate our own correspondence, proof it, print it, and put a stamp on it for a lot less than the $13-a-letter cost of a secretary.

We use MacWrite for specifications, promotion letters, job administration and, increasingly, for construction documentation. All the major specifications come in Mac versions. We can use the Macintosh Scrapbook to paste in graphic information or export text for further display in PageMaker. One technique is to use Archicad to generate a *design* and then paste it into a weekly memo form. Microsoft Word might have the edge in that it allows you to kern your text before pasting it into PageMaker.

Word processing on the Macintosh is easy for the novice, but using it only for word processing would be like stirring your coffee with a Mont Blanc pen.

Louis Wasserman, AIA
Louis Wasserman and Associates

programs in this report. MicroStation/DOS evaluator Ray C. Winter of the Austin Company agrees. "If I were starting a CADD system for an office that has no computers nor anyone with CADD knowledge, I would consider Generic CADD on DOS," he maintains.

MicroStation

MICROSTATION IS IDENTICAL ON BOTH PLATforms, except that the Macintosh version takes advantage of the Macintosh graphic interface. Intergraph plans to duplicate the appearance and operation of its Macintosh version when the next DOS version is released.

MicroStation generated the most interest of any program under evaluation. Almost every evaluator commented favorably on it, some in glowing terms. Robicsek describes it as the "best overall software" and accused Intergraph of deliberately underpricing it "just to make a major dent in the DOS market." He doubts that it was fair to compare it to the other programs considered in this evaluation.

Charles L. Leonard, senior architect at United Engineers & Constructors in Downers Grove, Illinois, and a member of the MicroStation/DOS evaluation team, says he prefers MicroStation on the Macintosh because it provides the power and seamless interface required for multiprogram data manipulation and high-quality presentations.

If an office already owns a Macintosh, Winter says he would recommend staying with that family of computers. "The only difference between MicroStation versions on DOS and Mac," he claims, "is that the DOS version has more third-party support." Both versions feature reference files that give MicroStation a unique advantage on networks, because a drawing can be manipulated simultaneously at more than one computer and one operator's changes appear immediately on another operator's screen.

Don M. Beasley of Don Beasley and Associates uses and prefers MicroStation on the Mac, but he notes that both platforms offer the advantage of seamless integration with high-end Intergraph workstations. Clients with Intergraph systems may prefer to work with architects that can produce compatible drawings. Beasley points out one flaw in the Macintosh implementation—the need to access a menu to lock and unlock the orthogonal control. Most Macintosh programs require only that the shift key be pressed.

According to Charles Grant Pedersen, AIA, of Charles Grant Pedersen and Associates in Hillside, Illinois, MicroStation was "the only program other than Versacad that I would recommend to an architect for serious consideration. I particularly like the multiple views available on the second screen, greatly facilitating the drawing process with minimum reliance on zooming in and out."

Financial Management

DOS

The current array of comprehensive financial management programs is in a ratio of something like 11 for DOS and one for the Macintosh (ARCHITECTURE, August, 1990, page 113). If you like to examine alternatives and choose a product that is best suited for your own operation, then the DOS platform wins hands down.

But financial management software is neither improved nor degraded by the operating system on which it runs—the menu-driven aspects of most financial management programs do not function better in either DOS or Macintosh environments.

Even if you have all-Macintosh hardware and you don't think that the one available program is for you, get an inexpensive DOS computer and use it only for financial management. This kind of software is usually used by one or two people in the typical firm. It is far more important to choose the accounting software that best relates to your firm's needs than to build the accounting system around the hardware.

Walter J. Foran, AIA
Gelick Foran Associates

The selection of a computer should be based on the software available to accomplish the tasks required. Managing an architecture firm effectively requires three functions: planning, accounting, and analysis. It is in the accounting leg of this cycle that the Mac is the weakest.

A fully integrated, project-based accounting system will pay for itself in the first year or two with accelerated cash flow, easier recognition of additional services, more effective fee negotiation, increased credibility with clients and financial institutions, and reduction of accounting fees.

The programs I use all run simultaneous under Windows 3.0 and are available at the click of my mouse. I feel strongly that Windows provides the DOS environment with an advantage over the Macintosh. Although Windows does not offer as smooth an interface as the Mac, it is as user friendly and has the critical advantage of allowing my non-DOS programs to run alongside my Windows programs.

Considering the quality of the tools available, DOS with Windows is the leading choice. Considering the cost of the tools—including computer, 120-megabyte hard disk, 1024 by 768 resolution color monitor, mouse, and laser printer—is less than $3,500, it may be the only choice.

James C. Jankowski, AIA
Ross Barney + Jankowsk

Macintosh

Although I recognize that there are many financial management programs for architects under DOS, and only Clerk of the Works under Macintosh, I am finding that this one program suits my needs well. I expect that its development under Macintosh traditions will provide superior tools for formatting and displaying my financial reports and invoices. The developers of financial management programs under DOS don't seem to care how their forms look, nor do they assume that their users care, or they would provide better tools to improve or customize the appearance.

Richard J. Abrham
RJA/Architects

Versacad

VERSACAD/DOS OFFERS FULL EDITING CAPAbilities in 3D, whereas 3D in the Macintosh version is intended primarily for visualization. On the other hand, the Macintosh version has HyperCard stacks for parametric design, drawing management, and routines for door and window insertion.

For Robert G. Bohlmann, AIA, of Turner Witt in Kankakee, Illinois, the DOS version was only slightly better. "If an office or individual already has DOS, stay with it," he advises. "Windows 3.0 and the cost savings make it a viable platform. If I were starting out, I'd give the Mac a hard look because the extra cost for hardware and software becomes negligible over three to five years."

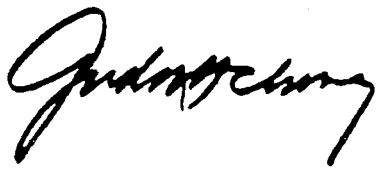
There was no doubt about the best platform for Daniel L. Weinheimer of Roula Associates. He claims the Versacad/Mac programmers have successfully integrated nearly all of the Macintosh features he has come to expect. "A first-time user will be able to navigate through the pull-down menus to execute the commands," he says. His primary criticism of Versacad/Mac is that each file must be viewed to be plotted. This process makes it easy to prepare a file for plotting the first time, but when many plots are needed, plotting becomes time-consuming. Moreover, Versacad has no file-referencing ability to use while plotting or working on a drawing file.

Overall, the evaluators agreed that the decision to purchase CADD or any other software should not be dependent on the platform alone. Instead, the decision to purchase a particular computer system should be made with an understanding of each system's capabilities and limitations. ■

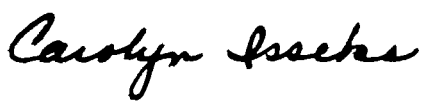
—OLIVER R. WITTE

"Carolyn's been wi

Gordon Chong is the owner of Gordon H. Chong + Associates, a 45-person architectural and engineering practice located in San Francisco, California. He is president of the San Francisco Chapter of the AIA for 1991, and has been a director of the California Council of the AIA and president of Asian American Architects and Engineers.



Carolyn Isseks is vice president of Dealey, Renton & Associates, an independent insurance agency based in Oakland, California. She has represented DPIC's unique insurance program of education and loss prevention services for over thirteen years. She is also a member of the Professional Liability Agents Network (PLAN), a nationwide group that specializes in serving the risk management needs of design professionals.



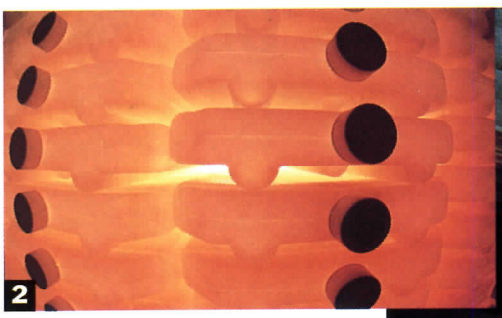
Carolyn and Gordon met in 1977. "I was new and he was new," she says, "and we sort of grew together." Perhaps all clients don't take advantage of Carolyn's brand of thorough service, but Gordon does. "He's cautious," she says. "He tends to call us before he starts a project or gets into certain areas. He might say, 'We're thinking about a joint venture with another firm. How will that impact our insurance?' Then our contract analyst and I work together to give him some advice on short and long-term consequences."

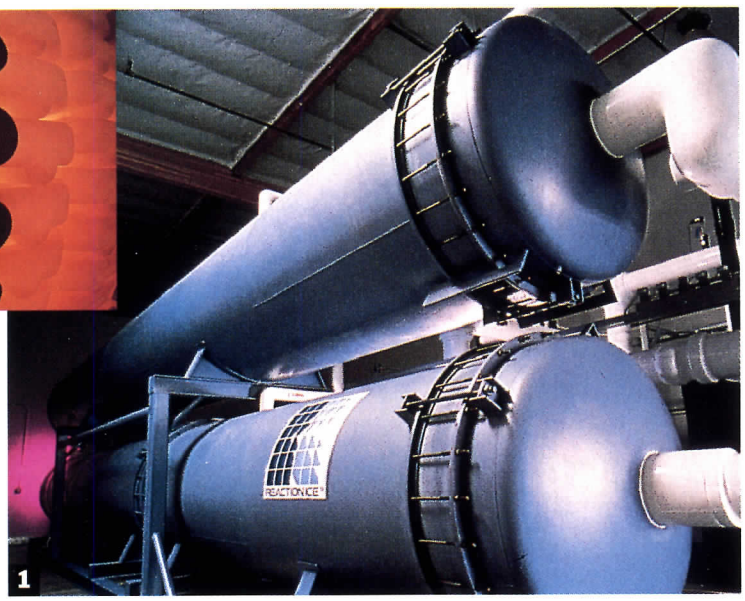
On the account management side, Carolyn doesn't just wait for the renewal quote to come in. She's on the phone with DPIC—dealing with the underwriters, pointing out her clients' strengths, negotiating for the terms she needs. And she's persuasive.

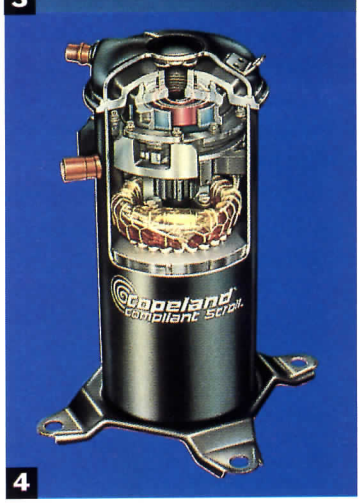
"I expect a high quality of service for *him*—I want to be as professional as Gordon is. He emphasizes high standards in serving his clients. And we feel the same way." Carolyn also works hard to keep Gordon H. Chong + Associates informed about the many premium reduction opportunities available from the DPIC program.

Carolyn has a master's degree in education and began her working life as a teacher. The teacher in her still comes out when she's conducting a workshop panel on liability issues for one of the Bay Area AIA chapters or a brownbag seminar for one of her clients. "I love to see the light bulb go on in someone's head," she says. "The 'oh, now I know what you're talking about.' I think that's what I like about this job: I'm always teaching and getting close to people who, I think, appreciate what I have to tell them. They all have the same interests—they want to better their practice in a professional way."

PRODUCTS





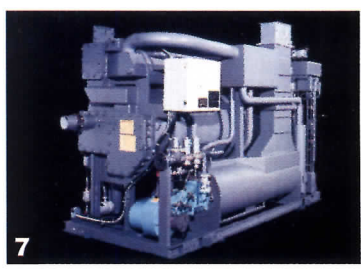


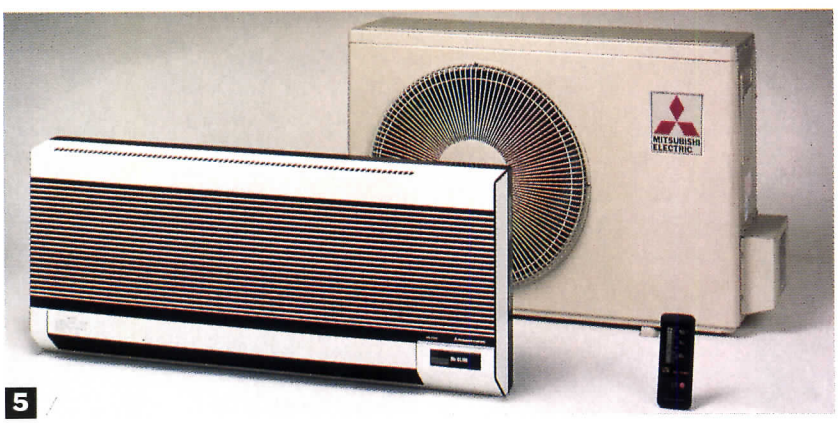
BLOWING HOT AND COLD

Manufacturers respond to environmental challenges.

WITH OIL PRICES ON THE RISE, PRODUCERS OF HVAC EQUIPMENT have turned their attention once again to energy conservation. New standards published by ASHRAE set minimum requirements for the energy-efficient design of new buildings (page 91), and provide guidelines for conserving nonrenewable energy resources in existing buildings. One of the most controversial issues facing HVAC manufacturers concerns chlorofluorocarbons (CFCs). Whether or not CFCs, used as refrigerants in air conditioners, actually contribute to the depletion of the ozone layer is still under debate. CFCs have long been considered acceptable refrigerants since they are neither toxic nor flammable, their condensation and evaporation temperatures are appropriate for cooling, and their energy expenditure is reasonable. But the controversy over their atmospheric impact is prompting manufacturers to look at alternatives to CFCs and toward the production of more environmentally sensitive equipment. DuPont, for example, is currently exploring alternatives to the compound that are less threatening to the environment. —AMY GRAY LIGHT

1. Thermal storage is taking off in the HVAC industry. Carrier Corporation's encapsulated ice storage system incorporates ice lens units (2) in storage modules. Circle 401 on information card.
3. Copeland, a subsidiary of Emerson Electric, introduces a scroll compressor heat pump that requires fewer parts. The scroll's two spiral-shaped members provide a continuous flow of gas to the system, requiring fewer components and saving space (4). Circle 402 on information card.
5. The MS-MSH series of heat pumps and air conditioners features a variety of LCD wireless remote controllers. Mitsubishi Electronics America Inc. Circle 403 on information card.
6. Johnson Controls' Metasys fully integrated facilities-management program controls HVAC, lighting, fire, and access-control systems. Circle 404 on information card.
7. Trane Company's direct-fired absorption chiller reflects a growing market for gas-fired cooling. Circle 405 on information card.





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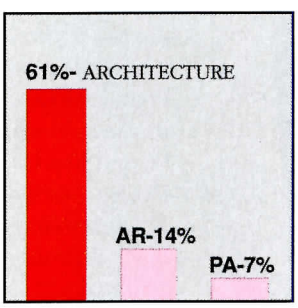

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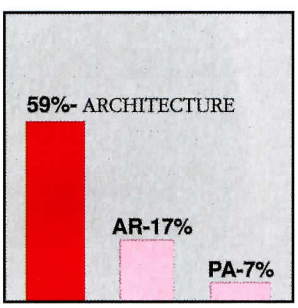

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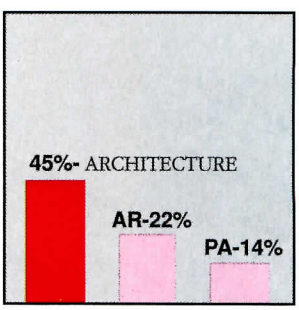

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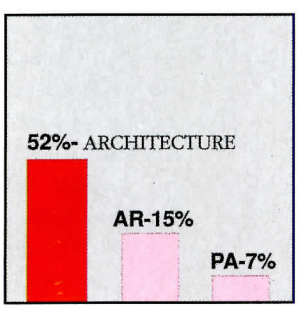

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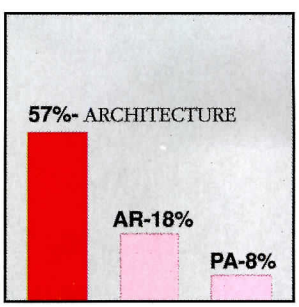

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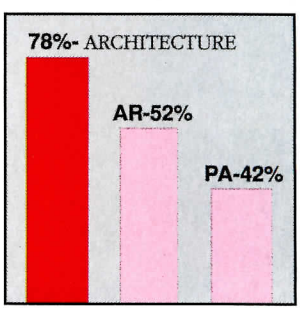

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POLISHING THE APPLE

Highlights from Designer's Saturday.

A CONTINENTAL FLAIR IS ON THE RISE, AND UNLIKE MOST TRAJECtories, its brilliance is not destined to fade quietly away. Twenty thousand design professionals witnessed its impact during Designer's Saturday in New York City, October 11-13, where the international theme of the show was evident in everything from product design to panel discussions. Paired with Japanese and European influence in furniture design is the resurgence of curvilinear metal in seating, recalling the dynamic forms of the 1930s. Today's shapes differ from their precedents by being both physically and visually lighter, a result of new technologies, materials, and manufacturing processes that allow for greater experimentation by both foreign and domestic architects and designers. Extruded metal so light it appears transparent, and molded plastic so supple it imprints the form of the human body on its surface, were a few examples demonstrated at the fall preview. Design practicality is also surging to the forefront, as characterized by furniture that folds, stores when not in use, and is modestly priced. —A.G.L.


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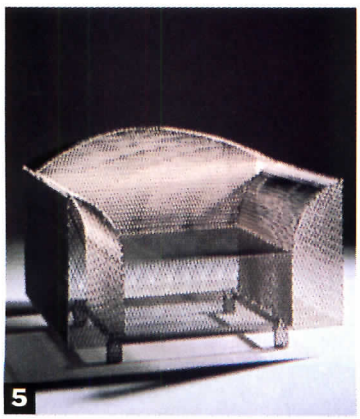
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6


7

1. KI's Perry chair, designed by Charles O. Perry, features a pivoting back (2), achieved by hanging the seat from the frame and counterbalancing the tilting pressure of the upper back with a sitter's weight, prompting the architect-designer to bill it as his first kinetic sculpture. Circle 411 on information card.
3. Glenn Polinsky's Balerafon chair for Brueton Industries is designed with uninterrupted arches that protrude at the arms and curve sharply at the feet. Circle 412 on information card.
4. Perry King and Santiago Miranda named their reasonably priced N chair after the sweeping lines of Napoleon's hat, which the chair's frame and back resemble. Atelier International. Circle 413 on information card.
5. How High the Moon, a chair designed by Shiro Kuramata for Vitra Edition, a component of Vitra International, helps launch the Edition pieces in the U.S. market. Vitra Edition promotes unusual applications of materials and technology. Circle 414 on information card.
6. Douglas Ball's Lounge Seating incorporates a discrete table that extends from the outside of the sofa. Atelier International. Circle 415 on information card.
7. Spanish designer Oscar Tusquets is inspired by Moorish influences, as reflected by his sofa for ICF, appropriately named the Ali-baba. Circle 416 on information card.

Monaghan *from page 54*

on the site) to take the place of Wright's "Golden Beacon," a tower designed in 1956 for Chicago's Gold Coast, which Monaghan wanted to build but eventually scrapped because of its impracticality. Construction is about to commence on a house by Birkerts for Monaghan's wife, Marge, on Drummond Island. "It's kind of an unruly organic creature," as Birkerts describes it. "Mrs. Monaghan said, 'I'm sick of Frank Lloyd Wright, don't give me anything like it.' She loves it."

Birkerts takes credit for loosening Monaghan's grip on Wright and opening him up to the work of other architects. "Domino's Top 30 Architects" is the best evidence of Birkerts' influence. For the past three years, a jury convened annually by Monaghan and his architectural advisors has drawn up a list of whom it considers the 30 best architects currently practicing in the world. Among those on this year's list are Edward Larrabee Barnes, Hugh Jacobsen, Kohn Pedersen Fox, Cesar Pelli, Antoine Predock, Robert A.M. Stern, William Turnbull, and Moshe Safdie.

Making the list entitles an architect to be considered for a commission in Monaghan's rival to Columbus, Indiana: The Settlement, a 700-acre housing development not far from Domino's Farms. Monaghan's own house is under construction there, while Mockbee Coker Architects completes construction documents for a house for another family member nearby. Approximately 150 lots will be offered for sale, ranging from $350,000 to $1.5 million. Lot owners must choose an architect from Domino's Top 30 list. Beams Monaghan, "I want to create a showplace of great residential architecture."

There is no question that, when it comes to architecture, Monaghan qualifies for the title "patron," although he was taken aback when Boston architect Peter Forbes, a visiting critic at Michigan, informed Monaghan that he is considered one of this country's top architectural patrons. Monaghan does not fit the typical mold of the architectural patron, who builds in grand fashion primarily to satisfy his own ego. The pizza king impresses architects and non-architects alike with his modesty, Midwestern naivete, and passion for architecture.

Monaghan hunches over the drawing board with the likes of Gunnar Birkerts and Fay Jones partly in consolation for not pursuing a career in architecture. And he rewards those who have. "He loves architecture, is a very good designer himself, and thinks architects ought to be adequately paid," says Charles Moore, who has worked on a string of projects for Monaghan. "He's such fun to sit down and figure things out with because the boyhood dreamer, the kid in the orphanage, is always present." ■

—MICHAEL J. CROSBIE

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1A. Title of Publication	1B. PUBLICATION NO.	2. Date of Filing
ARCHITECTURE, Incorporating Architectural Technology	0 0 9 – 8 8 0	10/1/90
3. Frequency of Issue	3A. No. of Issues Published Annually	3B. Annual Subscription Price
Monthly	12	$39.00

4. Complete Mailing Address of Known Office of Publication *(Street, City, County, State and ZIP + 4 Code) (Not printers)*
1515 Broadway, New York, NY 10036

5. Complete Mailing Address of the Headquarters of General Business Offices of the Publisher *(Not printer)*
994 Old Eagle School Rd. - Suite 1010, Wayne, PA 19087

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—A.G.L.

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