ARCHITECTURE

JANUARY 1991

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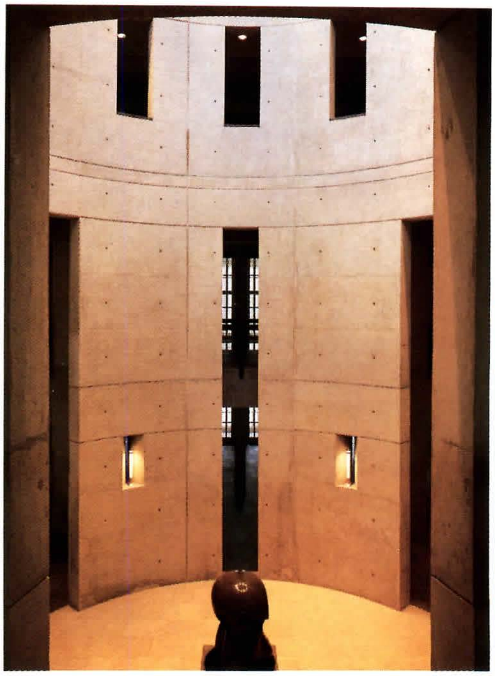

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College of Agriculture and Life Sciences Building, Cornell University, Ithaca, New York (page 38), designed by Gwathmey Siegel & Associates. Photograph by Timothy Hursley/The Arkansas Office

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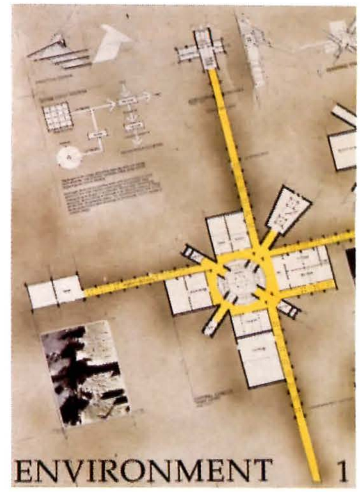
Thin stone veneers
Barrier-free design
Coping with staff changes
Graphic cards and computer monitors



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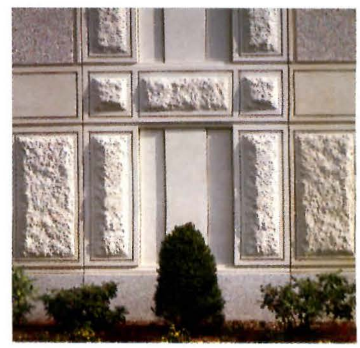
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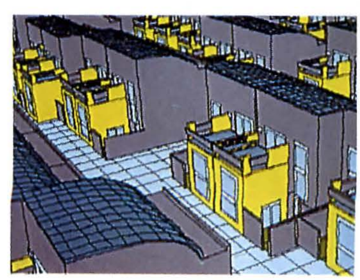
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a 20-in.-wide span between ribs. The panels are attached to plywood deck at slopes of 6:12 and 12:12. Because of the steep angles, some 180,000 sq ft of material will be used by the time the second phase of the project is completed. Downspouts were also produced from prepainted Galvalume sheet and were rollformed on the job.

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EDITOR'S PAGE

Changes for the New Year

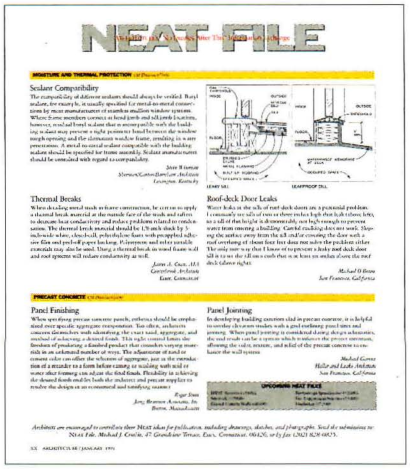
SINCE BEING APPOINTED EDITOR-IN-CHIEF JUST OVER A YEAR AGO, I HAVE SPOKEN to many AIA component chapters around the country about the changes in ARCHITECTURE. To make the magazine more reflective of your accomplishments and interests, we have upgraded our form and content over the past year by expanding editorial coverage of design, technology, and practice with new graphics, new types of articles, more drawings, and project credits. It is our goal to be the leading journal of American architecture, devoting more pages to American designs built here and abroad than our competitors.

This month, we introduce several more changes. The most obvious is a new page size, scaled from 9 by 12 inches to 9 by 10 7/8 inches. The slightly smaller format will give us more control over our graphic quality—our choice of printers was previously limited by special equipment needed to produce the larger format—and will enhance our advanced desktop computer production system. In addition, we have refined our typography to define the separate sections of the magazine more clearly and make articles easier to read. Many of you have written to us pointing out the environmental detriment of our mailing methods, so we have become more ecology-minded and abandoned the plastic bag that wraps the magazine every month.

TECHNOLOGY & PRACTICE INFO

Educating Architects About the Environment

Steel Update



NEAT FILE

In broader terms, we will focus on the environment in our Technology & Practice annual, published in May. Other socially conscious concerns of the 1990s will be addressed in upcoming issues: health care and housing (July); the role of minorities and women in architecture (April, October); and suburbs and edge cities (December). In covering these topics, we hope to discover more firms in America's heartland and reveal architects who haven't been published before.

We have also introduced new departments and expanded regular columns. In our Technology & Practice section, we report the latest practical information in the field with a page called Technology & Practice Info (top left). It contains newsy articles on materials, building codes, technical conferences, and practice-oriented developments. At the back of the magazine, we have improved the NEAT—"No Excuses After This"—File (bottom left), in which architects from around the country share their advice on topics ranging from fees and contracts to materials and details. Instead of limiting the NEAT page to one idea from one architect, we now offer several topics to reflect many architects' experiences and drawings.

As the latest steps in our continuing evolution, the changes introduced in this issue are intended to provide you with a more lively, informative, and useful journal. We are eager to hear your reactions. Send us a fax: (202) 828-0825. ■

—DEBORAH K. DIETSCH

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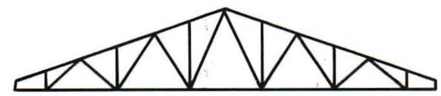

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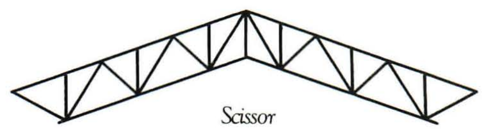

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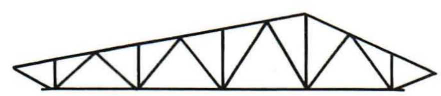

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LETTERS & EVENTS

Chicago high rises

I was glad to read in your article on Two Prudential Plaza and 311 South Wacker Drive (October, page 85) that Chicago is still a leader in building technology. Since the inception of the highrise in Chicago, the outward appearance of buildings has always reflected the technology employed.

William LeBaron Jenney's Leiter Building and Louis Sullivan's Carson Pirie Scott store are prime examples. The Federal Building and IBM Tower of Ludwig Mies van der Rohe are examples of the integration of many technologies into a logical, efficient high-rise form. The tube structures of Fazlur Khan and Myron Goldsmith in the John Hancock Tower and Sears Tower pushed the high-rise concept to new limits.

It is unfortunate that the two buildings which you highlighted in Chicago as continuing this leading edge of high-rise technology do not outwardly reflect these facts. As stated in the article, the design squeezed the engineers' available solutions. These buildings are designed from the outside in instead of from the inside out. They will stay in our view because of their height, not because we want to see them, for a long, long time.

Robert M. Lau, Architect
Chicago, Illinois

Insulting Modern legacies

Your article "Renewing Our Modern Legacy" (November, page 66) is a blatant insult to the profession, and particularly to some of the great Modernists today. To speak of Johansen's Mummer's Theatre as a "Tinker-Toy-like assemblage" when it was obviously the first of the creative Modern works, is historically illiterate.

It is also amazing to note, in the case of Belluschi's splendid Baltimore IBM building, that it is somehow being improved by SOM when it is obviously not. And in both cases, although the original architects are very much alive, the author simply does not mention that clients should hire the original architects of the building to renovate their own buildings, as is ethical and traditional. Perhaps Johansen and Belluschi have not engaged the best marketing firm and have therefore lost out to yuppiedom.

Richard W. Snibbe, FAIA Emeritus
New York, New York

Landmark unplugged

The article on the Wheeler School Library Addition (July, 1990, page 78) misrepresented certain aspects of the project. The article states that "the site chosen between an existing classroom building and a privately owned house was formerly a hole in the courtyard's fabric," and that the new library addition "plugged a hole" in the streetscape.

In point of fact, the site on which the addition was constructed was formerly occupied by an 1859 Italianate house listed on the National Register of Historic Places which was demolished specifically to create the "hole" which the new building has "plugged."

As the architectural preservation movement evolves, I think it is necessary to both acknowledge the merits of good new buildings and to be honest about the unfortunate loss of good old ones.

Martha L. Werenfels
Providence, Rhode Island

Election fallout

I recently received a flyer from the Washington D.C./AIA asking me to support Harvey Gantt, FAIA, in his bid for the North Carolina Senate because he is "one of us." I was taken aback with the fact that the AIA would not only endorse this man, but solicit financial support for him just because he is "one of us." It is this "good 'ol boy" philosophy that is one of the biggest problems in politics today. Let's face it, most architects can't even manage their own projects or offices efficiently, much less the country.

Ted Prince, AIA
Silver Spring, Maryland

Corrections

The photograph of the rampart at the Canadian Center for Architecture (December, 1990, page 63, second from top) should have been credited to Alain Laforest.

In the NEAT file about baluster spacing (October, 1990, page 140), the statistic concerning fatal falls should have read: "Of the total falls, less than 1/100 of 1 percent resulted in death (mostly from higher falls)."

For the 3M Austin Center (August, 1990, page 90) Jane Stansfield was project director for phase two an Jim McGregor was design director for phases one and two.

January 15-March 5: "New Frontiers of American Architecture," a series of eight lectures by American architects working abroad. Held in Washington, D.C., moderated by Deborah K. Dietsch, Editor-in-Chief, ARCHITECTURE, and co-sponsored by the Smithsonian Resident Associate Program, ARCHITECTURE Magazine, and the Steelcase Design Partnership. Contact: Harriet McNamee, Smithsonian Institution (202) 357-3030.

January 18-21: "Builders Do It Better," the annual convention of the National Association of Home Builders, in Atlanta. Contact: NAHB (202) 822-0420.

January 31-February 14: Weekly symposiums "Re-Searches in Architecture," sponsored by the NYC/AIA. Contact: (212) 838-9670.

February 6-7: AIA Liability Seminars held in Columbia, South Carolina, and San Francisco. Contact: Chris Clark, AIA (202) 626-7537.

February 6-May 21: "The Grand Louvre: Entering a New Century," an exhibition at The Octagon, Washington, D.C., organized by the American Architectural Foundation. Contact Lynne Lewicki, AIA (202) 626-7467.

February 10-April 14: An exhibition of Frank Lloyd Wright's decorative designs at the Museum of Pennsylvania Academy of Fine Arts in Philadelphia. Contact: (215) 972-7600.

February 15: Entry deadline for the DuPont "Antron" Design Award Competition for commercial interiors (with separate categories for professionals and students). Contact: Kevin Irland (212) 614-4305.

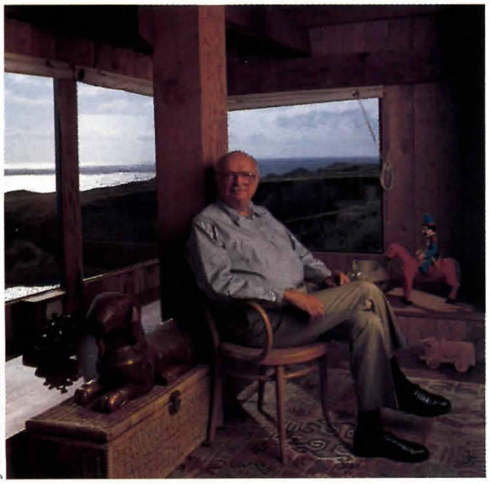
February 21-23: Meeting of the AIA's committee on Architecture for Justice, in New Orleans. Contact: Michael Cohn, AIA (202) 626-7366.

February 22-23: "How We Build: Place, Time, and Architecture," a conference at the University of Virginia in Charlottesville. Contact: UVA School of Architecture (804) 924-4304.

February 23-26: Meeting of the AIA's Historic Resources Committee, in Washington, D.C. Contact: Chris Gribbs, AIA (202) 626-7589.

Charles Moore Wins Gold Medal

ON DECEMBER 7, 1990, THE AIA BOARD OF DIRECTORS VOTED TO AWARD CHARLES W. MOORE its highest honor, the Gold Medal. Moore profoundly influenced the course of architecture during the past three decades, beginning with his small house in Orinda, California (1962), Sea Ranch (1965), and Kresge College at the University of California at Santa Cruz (1965-1974). Through his teaching, writings, and practice, Moore captured the imagination of a generation of architects by drawing from vernacular sources and infusing the architectural mainstream with wit and humor. In making the announcement, AIA President C. James Lawler said, "Moore is an educator and architect of distinction who has consistently displayed his devotion to meeting and exceeding the needs of his clients and of society at large."



JOHN BLAUSTEIN

Moore shown at home (above) at his own Sea Ranch house, designed in 1969.

Born in Benton Harbor, Michigan, in 1925, Moore graduated from the University of Michigan and worked for several firms in the San Francisco area before receiving his doctorate from Princeton University in 1957. Moore has founded or co-founded more than seven architectural firms in Connecticut, California, and Texas, and continues to maintain associations with many of them. His individual and collective designs have won more than 30 major awards, including five AIA honor awards, most recently for Tegel Harbor Housing (1989); Hood Museum of Art (1987); and St. Matthew's Church (1984).

Moore has taught nearly continuously for the last 40 years at 10 schools, including Princeton and Yale (where he was dean for five years), UC Berkeley (where he was chairman for six years), UCLA, and now at the University of Texas at Austin, where he holds the O'Neil Ford Chair in Architecture. The ACSA/AIA recognized his achievements in education by awarding Moore its Topaz Medallion in 1989. In addition, Moore has co-authored more than seven books, including *The Place of Houses*; *Body, Memory and Architecture*; and *The Poetics of Gardens*.

Greatly influenced by Louis Kahn, Moore has retained a respect for the past and a deep appreciation of the uniqueness of the places where he is asked to build. Through participatory design and teamwork, the 49th recipient of the Gold Medal continues to create architecture more pluralistic than many of his Postmodern contemporaries. —LYNN NESMITH

TIMOTHY HURSLEY PHOTOS

Moore's First Church of Christ Science (above) was recently completed in Glendale, California.

A·I·A BRIEFS

Major copyright legislation supported by the AIA preventing the construction of unauthorized "copycat" buildings was passed by the U.S. House of Representatives October 27, and is expected to be signed by President Bush this year. The legislation prevents the unauthorized construction of buildings from an architect's plans and drawings, regardless of how they have been obtained. The present law prohibits the illegal copying of drawings and plans, but does not prevent the unauthorized construction of a building from those plans, nor does it prevent the construction of "copycat" buildings. The legislation was prompted by a growing number of lawsuits over copyright infringement. In a well-documented case in New York, for example, a judge ruled that a set of plans illegally obtained in order to duplicate a house had to be impounded, *but construction* of the replicated house could continue as long as the designs embodied in architectural plans were not secured by patents. A report issued last year at the request of the AIA from the U.S. Copyright Office of the Library of Congress detailed the inadequacy of existing copyright laws protecting the work of architects, and recommended that Congress enact additional safeguards. The new copyright legislation was sponsored by Rep. Robert W. Kastenmeier (D-Wisconsin) and attached to a much larger piece of judciary legislation entitled the Improvements Act of 1990 (H.R. 5316). Kastenmeier's measure enables architects to take legal action against the unauthorized use of their designs, and, where warrented, seek an injunction or obtain a court order to halt construction of, demolish, or seize the plans for an infringing building. Under the pending legislation, building owners will be *able to make changes in their buildings* without seeking authorization from the copyright owner.

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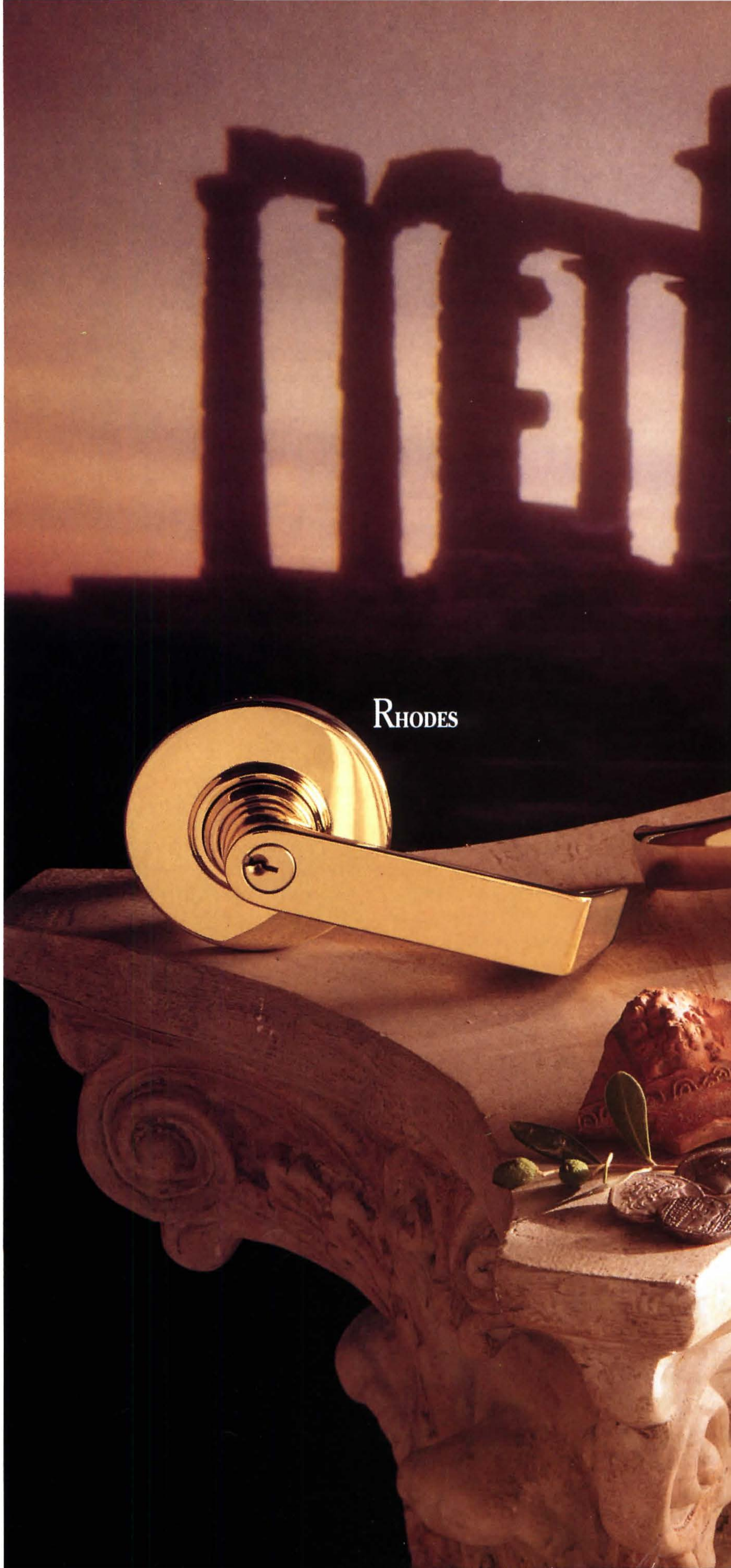

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DETAILS

Architect and energy consultant Dick Swett, AIA, a Democrat from Concord, New Hampshire, was elected to the U.S. House of Representatives November 6. He was the only architect elected to Congress in the last election.

Fernau + Hartman Architects, Berkeley, won a competition to design the Napa Valley Regional Museum and Cultural Center, a $6 million, 35,000-square-foot building that will focus on the history of the winemaking area.

Michael Graves Architect, Princeton, New Jersey, is designing a $33 million, 180,000-square-foot Science and Engineering Graduate Research Building on the campus of the University of Cincinnati, Graves's alma mater.

Arthur Erickson Architects' Vancouver office has designed Harbor Steps, a terraced water garden and park (left) that will be the centerpiece of a four-block revitalization development in Seattle. The park will provide the major pedestrian access between the downtown business district and the public waterfront. Its focal point will be University Plaza, located at the midpoint of the stair's 52-foot vertical rise.

Leidenfrost & Horowitz & Associates, Glendale, California, with Frank Israel Associates, Beverly Hills, is designing a 96,000-square-foot Southern Regional Library for UCLA.

Three finalists were selected to participate in a design competition for a 436,000-square-foot Central Library in Denver. The competitors are: Michael Graves Architect teamed with the Klipp Partnership, Denver Colorado; Robert A.M. Stern Architects with the Urban Design Group of Denver; and Denver-based firm Hoover Berg Desmond. Final presentations will be made March 4.

Los Angeles Modernism in New York

"ONLY-IN-LOS-ANGELES" WAS THE MESSAGE. Or was it "not-only-in-Los-Angeles?" Is the city of angels unique or staple American, Balkanized or regionally cohesive, slipping into the Pacific or rising to the Atlantic's cultural crest? The "anything goes" city sought to answer these questions and define itself at a recent New York symposium, "The Modernist Impulse in the Landscape of Invention: Los Angeles Architecture 1920-1990." Needless to say, it failed. Needless to say, the failure was often more interesting than conventional successes.

Some 300 conferees assembled in November at Cooper Union for a two-day discussion of Modernism's origins, evolution, and legacy in Los Angeles, sponsored by the Cooper-Hewitt Museum. British-born professor Kenneth Frampton of Columbia, a self-described "pathologically Eastern person," set the stage for the fabricated landscape that grew beyond the restraints of mass transit and Spanish Colonial courtyards to become the sprawl city that defines decentralized America. The work of the historic Modernist heroes of Los Angeles—Neutra, Schindler, and Gill—dominated subsequent speeches and slides.

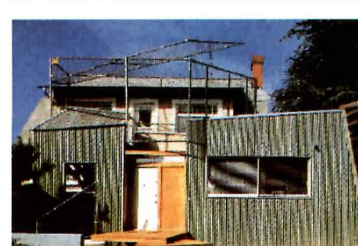
But the justification of the conference for New Yorkers, with their provincial fascination for other cities, was clearly Frank Gehry. "The Force of 2 G: Gill's and Gehry's Hold on California Architecture" was the title of a presentation by Kurt W. Forster, director of the Getty Center. "Los Angeles: Low Art and Uncomfortable Modernism, from R.M. Schindler to Frank O. Gehry," was historian David Gebhard's. "Modernism's Legacy to the Late 20th Century" offered a conversation with Gehry, followed by critic Aaron Betsky's "The Third Scene: A Survey of New Architectural Work in Los Angeles," again underscoring the Gehry school.

If Gehry was the crown prince, Los Angeles was the kingdom for all Modern architecture, speakers insisted. The immigrant European Modernists who laid the foundation for a new architecture—and Gehry, who advanced an "architecture of moving parts"—could only have succeeded in Southern California. The mechanical, natural, and spatial aspects of the region; the assembly of "people who are more mentally footloose," in Gebhard's words, helped produce a place that was *sui generis*. The artificial, the impromptu, the land-creating characteristics were vital to both the early designers and the recent ones, according to critic Aaron Betsky's closing view of the latest work of such architects as Morphosis, Frank Israel, Eric Owen Moss, and their younger peers.

Not so, critic Michael Sorkin demurred. Los Angeles is "impoverished in terms of summary," he observed, describing his futile search for a postcard that would be an icon of the city as a whole.

Still, if the debate lingered, it failed to dismay most of the Southern Californiaphiles. The obeisance to Los Angeles from New York's high stylists was clear and pleasing to the city's devotees. "Had history been less cruel and forced, the 1920s and the California School would have constituted and been recognized as the dominant wing of Modernism," claimed Gebhard.

TIM STREET PORTER



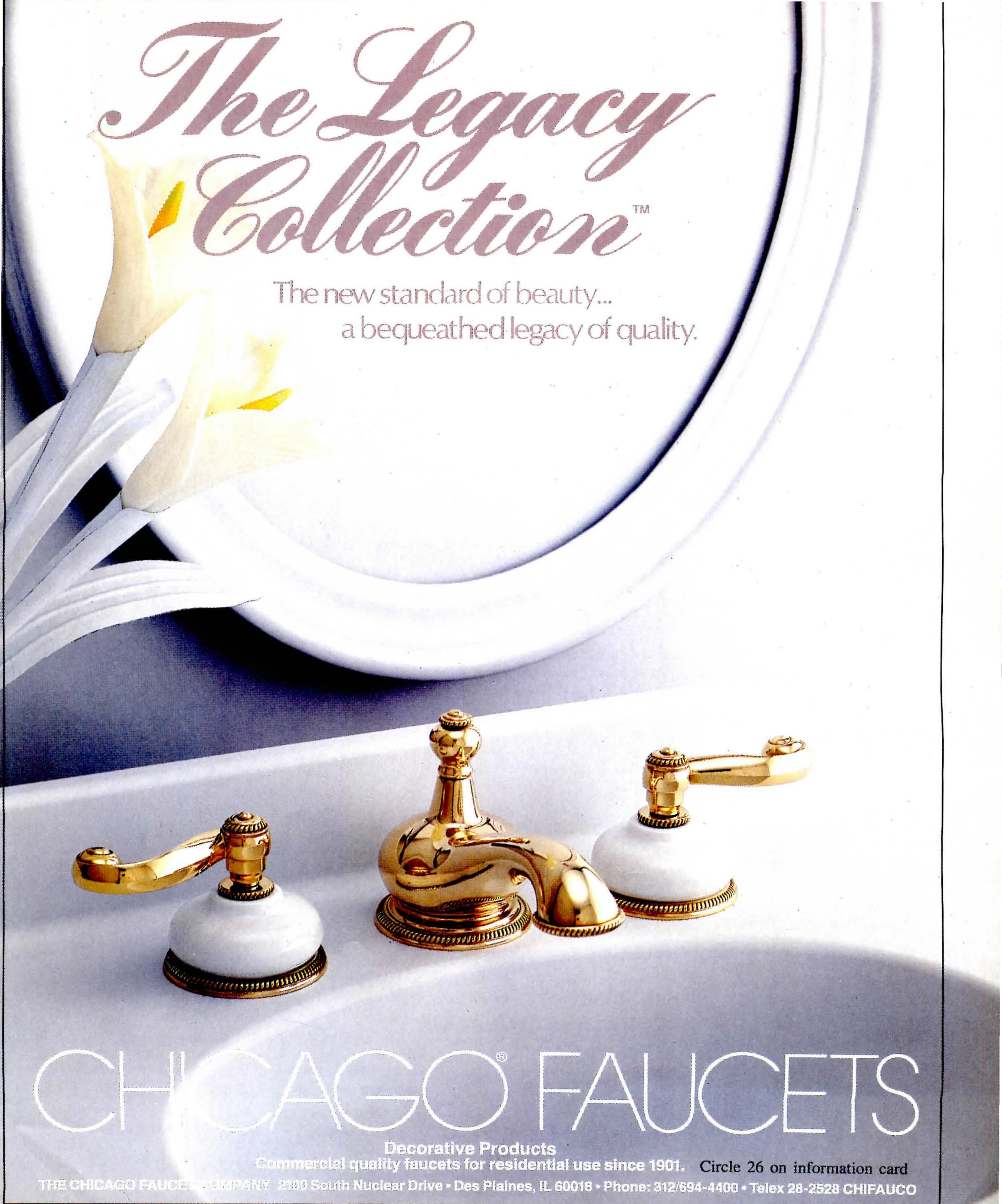
TIM STREET PORTER

A pair of Modernist icons from the City of Angels: Rudolf Schindler's Howe house of 1925 (top) and Frank Gehry's own house (above), designed in 1979.

So what if the conferees ignored air, water, and traffic problems with sublime lack of topicality? By placing Los Angeles and Modernism in the mainstream of academic context, by stationing Gehry and his heirs in the lecture circuit of style-conscious signature design, the Big Apple certified these former latecomers as early-comers. And if such deference also suggests that this landscape of invention, for all its vaunted flux, is aging into self-conscious historicism, that irony was lost on most parties.

—JANE HOLTZ KAY

Jane Holtz Kay is architecture critic for The Nation.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NEWS

Housing Charette for Women in Need

"HOPE FOR HOUSING BY DESIGN," A DAY-long charette held in November for the benefit of homeless women and children in New York City, drew upon architecture students, professors, practitioners, and specialists in homelessness. The charette was sponsored by the New York Chapter/AIA and Women In Need (WIN), a nonprofit agency that operates residences for homeless women and children. Held at the Knoll International showroom in SoHo, the charette's aim was to develop practical models for housing that can be applied to future WIN shelters.

The five charette teams designed a 15-unit, permanent shelter for a site in the Bronx. Each team was made up of an assortment of students from architecture schools around the city. The charette team leaders were architectural practitioners and counselors and design specialists who have worked with the homeless. Among the team leaders were Conrad Levenson of Levenson Meltzer Architects, Lionel C. McIntyre of the Harlem Urban Development Corporation, Laurie Hawkinson of Smith-Miller + Hawkinson, and William Pedersen of Kohn Pedersen Fox. A few days prior to the charette, the design teams visited the site and a WIN shelter, where they interviewed a number of women residents about their needs.

CHUCK CHOI

During the eight-hour charette sponsored by NYC/AIA and Women in Need (above), five design teams led by practitioners from around New York City met to design a permanent shelter in the Bronx for homeless women and children.

The eight-hour charette concluded with each team presenting its solution, which ran the gamut from atrium schemes to individualized units behind brownstone facades. The charette and client interviews were videotaped by New York University's School of Continuing Education Department of Film, Video, and Broadcasting in preparation for a documentary on homeless women and children, and the New York Chapter/AIA Housing Committee's attempt to address these issues, according to Elizabeth Thompson, AIA, co-chair of the committee. The documentary will be available for sale or rental in March to interested parties, and will help to raise funds for future WIN activities.

—MICHAEL J. CROSBIE

Through Streets Broad and Narrow

THE DRAMATIC GROWTH IN THE NUMBER of Philadelphia's street vendors led a local nonprofit organization to cosponsor a competition for the design of vendor stands. The Foundation for Architecture, along with the city's Department of Licenses and Inspections, held the Vendor Design Competition last spring to design various types of carts that would set the standard for sidewalk vending.

The organization was prompted by concern for the deterioration of Philadelphia's downtown streets and sidewalks, which have become increasingly hectic and congested by vendors hawking their wares—from 1,170 vendors operating in 1975 to 4,881 in 1990. The competition is timely in that it could influence the adoption of a now-pending vendor ordinance drafted in September, 1989. The legislation, due to be voted upon during this session of the state legislature, will affect the management, location, and design of stands and carts along downtown streets. Sandra Gartz of the Foundation is optimistic that the ordinance will be passed, and says her organization is committed to seeing it through because the vendor stands affect visitors' perception of the city.

JEROME LUKOWICZ PHOTOS

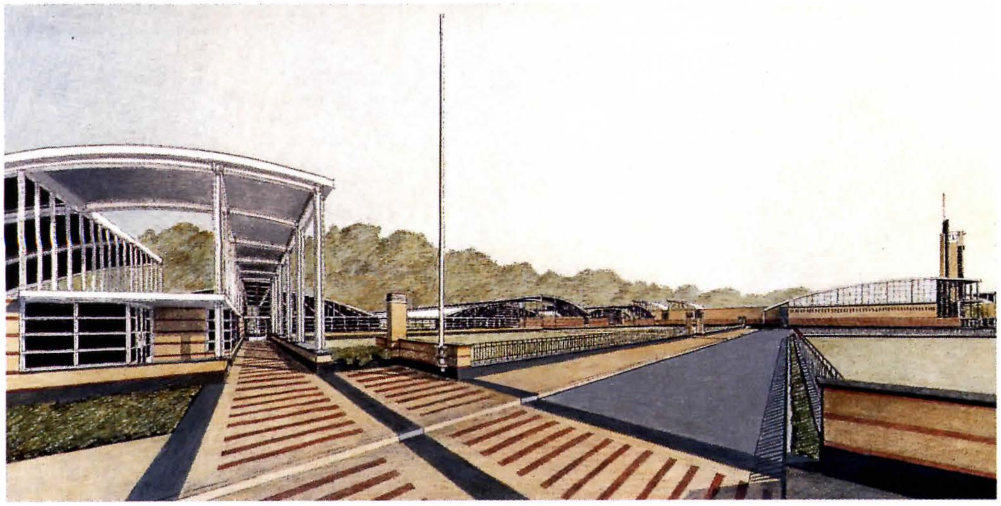
Food carts (left) meet health codes and size requirements; Blackney Hayes Architects' cart with standard components (right).

Stands for merchandise, flowers and produce, and embellished food carts were entered. Of the 29 entries, the first and second prizes were awarded to local architecture firms, and the third prize to Christopher Mitchell, an architecture student at the University of Pennsylvania. John Hayes, Kevin Blackney, and Jennifer Crawford of Blackney Hayes Architects, Philadelphia, won the competition with their designs, which are being constructed as prototypes, and will be on public display once finished. Blackney Hayes's solution was to create a rolling street rack, to which standard components can be added as needed by individual vendors, and which can be easily folded and transported. For embellishing existing food carts, Blackney Hayes proposed a standard cart frame and interior layout that responds to cart-size and health-code issues, with an exterior that can be individualized by the vendor.

Since the competition was so successful, says Gartz, the Foundation for Architecture may sponsor another for designing the exteriors of new food carts. For more information, contact the Foundation for Architecture, One Penn Center at Suburban Station, Philadelphia, Pennsylvania, 19103. ■

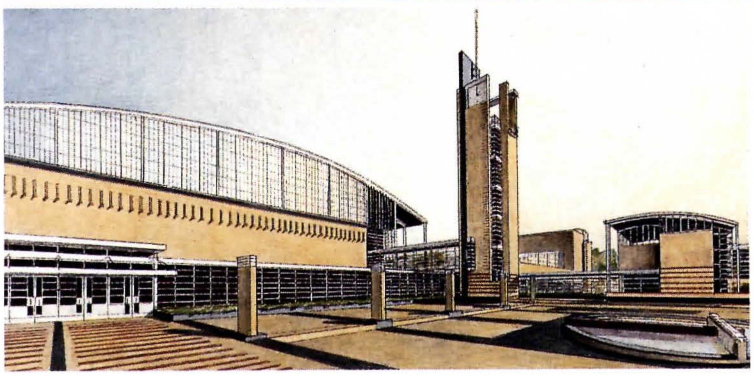
—AMY GRAY LIGHT

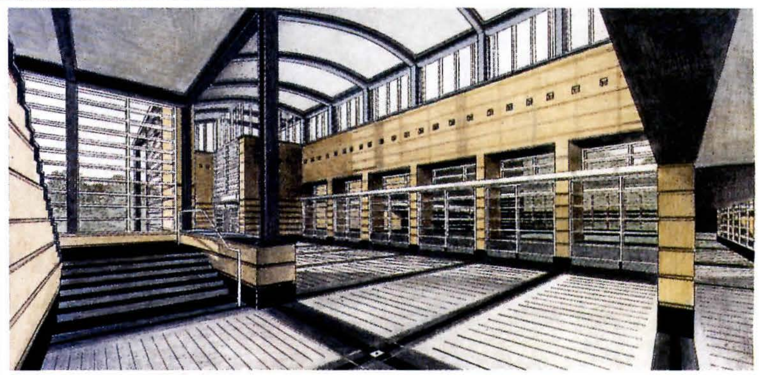
Modern Education

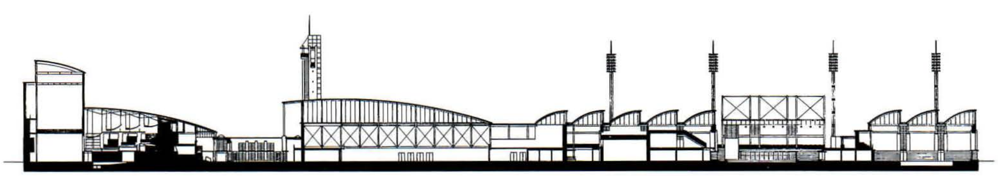


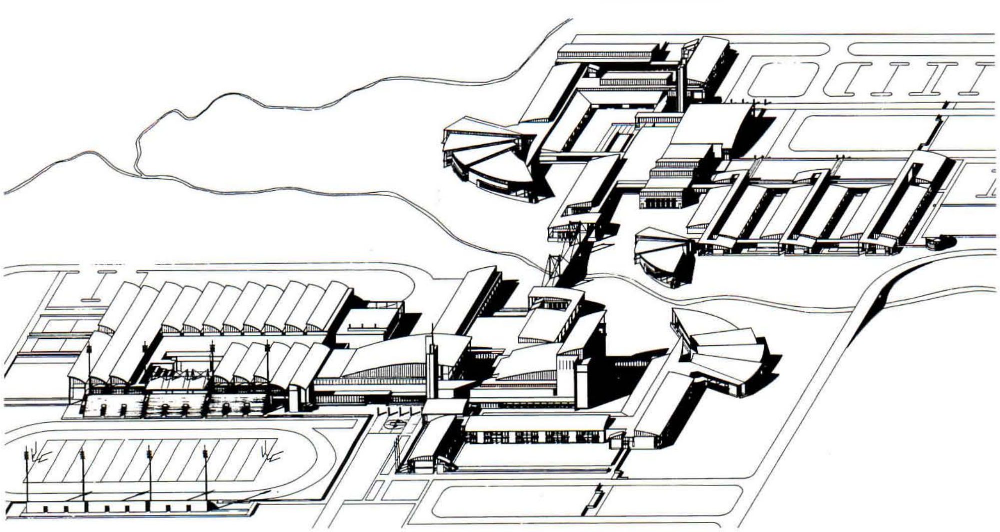
Perry Community Education Village
Perry, Ohio
Burgess & Niple Limited
and Perkins & Will, Architects

RALPH JOHNSON, DESIGN PRINCIPAL OF PERkins & Will, designed a campus that marries the idea of a village with the complex programmatic needs of contemporary education. The 160-acre campus, located 30 miles east of Cleveland near Lake Erie, is a highly ordered composition of formal elements, arranged according to the site's topography. The village will include schools for 4,500 students—kindergarten through 12th grade—and a gymnasium/community fitness center. Grouped around courtyards (top left), the elementary and middle schools occupy one side of Red Mill Creek opposite the high school and fitness center (axonometric, bottom).







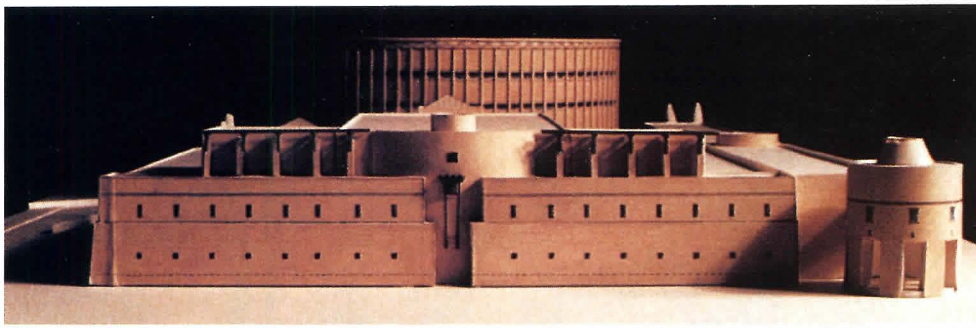


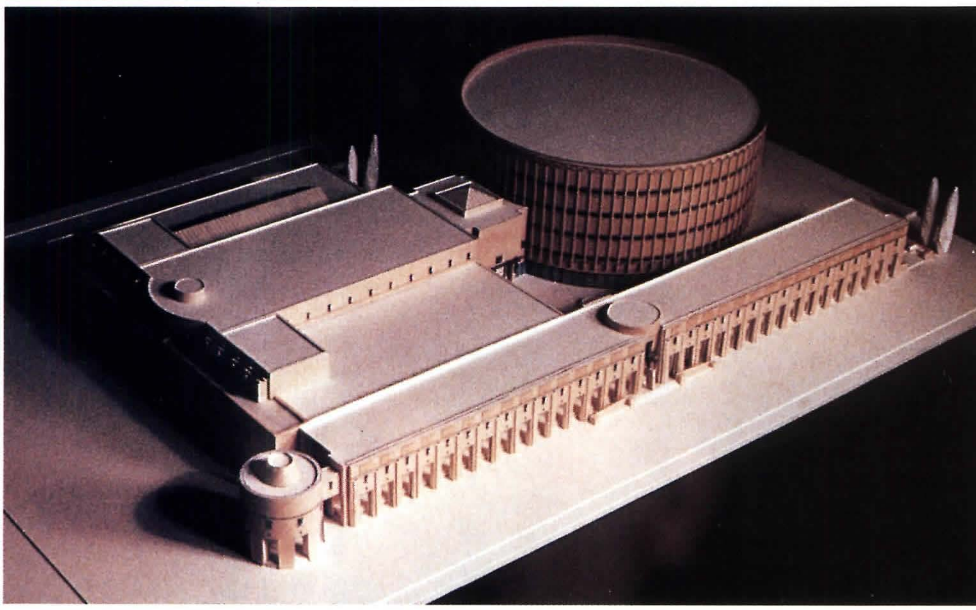
Each building element is designed for a specific use: teaching loft, assembly hall, circulation, support space. In section (left), the formal assembly halls feature long, vaulted roofs; informal assembly halls are framed by repeating clerestories. In addition to these repeated forms, Johnson designed solitary elements, such as a clock tower signalling the main entrance and a bridge spanning the creek. The architect based his "kit-of-parts" on Modernist precedents such as buildings by Alvar Aalto and Willem Dudok, as well as a Midwestern industrial vernacular.

The sprawling complex is unified by a strict adherence to a clearly defined inventory of building elements and consistent materials throughout: steel, black granite, sand-colored and ironspot brick, and white-painted aluminum (above left). Interiors, bathed in natural light from clerestories and skylights (above right), employ the same palette. The 714,000-square-foot project is scheduled for completion in 1998.

Additions to Arizona State University

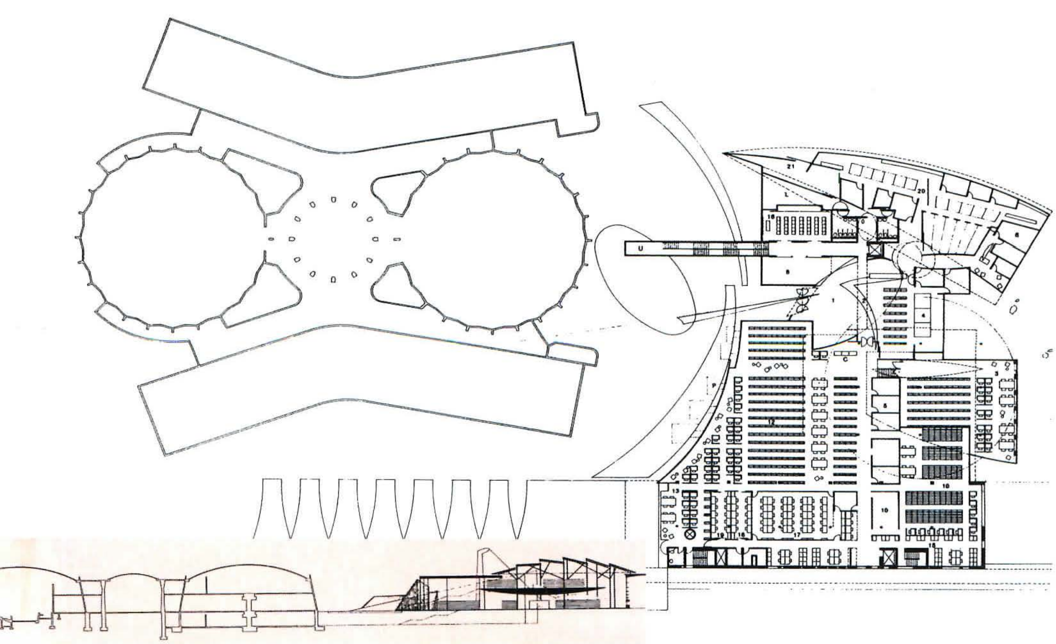
Music Building Expansion
DWL/The Mathes Group, Architects
Dennis, Clark & Associates, Design Consultants





A SHADY LOGGIA AT THE ENTRANCE TO THE campus will mark this addition to the university's music building, designed by DWL/The Mathes Group, with Dennis, Clark & Associates consulting on design. The new 80,000-square-foot structure joins an ensemble of noted ASU buildings: Frank Lloyd Wright's Gammage Center, the Fine Arts Center designed by Antoine Predock, and the Music Building by the Taliesin Fellowship. The architects describe these existing buildings as "objectlike," and their addition provides a counterpoint. The contextual composition of the music building will define the streets that adjoin it (top right), mark their intersection, and define an edge to the plaza in front of the Fine Arts Center (right).

Entrance to the new complex will be gained through the loggia at its center, which opens to a paved courtyard. On the other side of the courtyard, a double-height lobby will join the original building to the addition, which contains halls for organ and choral music. Exterior materials will be stucco and brick in a shade of desert rose to accompany neighboring buildings. Construction is scheduled for completion in the fall of 1991.

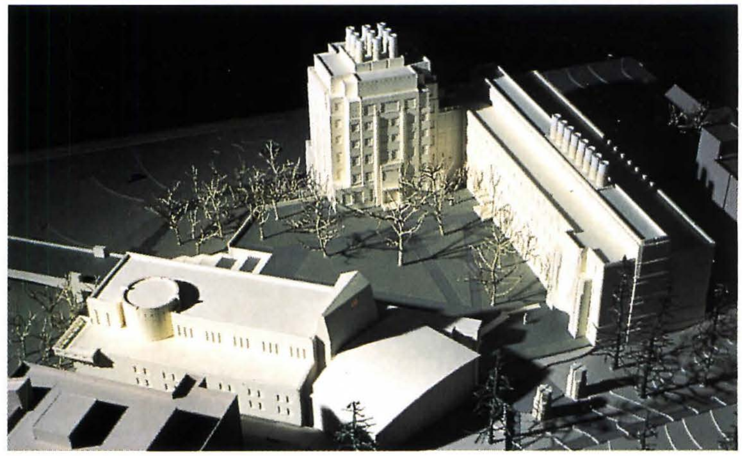


College of Law Library Expansion
Scogin Elam and Bray, Architects

AN EXPANSION OF THE LAW LIBRARY AT Arizona State University will be distinguished by bold forms (right in site plan) in contrast to the existing law school, housed in Armstrong Hall. The new library will be connected to Armstrong by an underground tunnel, which will be illuminated primarily by skylights. Above ground, the addition will be separated from the existing building by an oasislike plaza, according to the architects, which will provide a shaded, poolside sitting area under a vine-covered arbor. The library's lobby and circulation desk will face the plaza, and will be marked by a tall lantern to collect north light. Exterior materials will consist of copper-clad asphalt shingles, stucco, clay tile, concrete, and stone. Construction on the project is scheduled to be completed in early 1992.

University of Washington

IN 1988, THE UNIVERSITY OF WASHINGTON began devising a master plan to develop and upgrade its Seattle campus. In an effort to compete with other major universities, the school is devoted to improving academic facilities while preserving the campus's relationship with surrounding neighborhoods and its stunning natural setting. The 1991-2001 General Physical Development Plan, developed with guidance from the University Architectural Commission (which includes Robert Frasca, James Freed, Peter Walker, and Norman Pfeiffer), calls for constructing 41 buildings and additions to expand existing facilities by 2.2 million square feet. It is also aimed at improving transportation systems and preserving the existing fabric of historic architecture and open spaces on campus. Although still undergoing public review and revision, final action on the plan is expected this spring. As one facet of the plan, three buildings currently under development (right) will provide state-of-the-art science facilities.



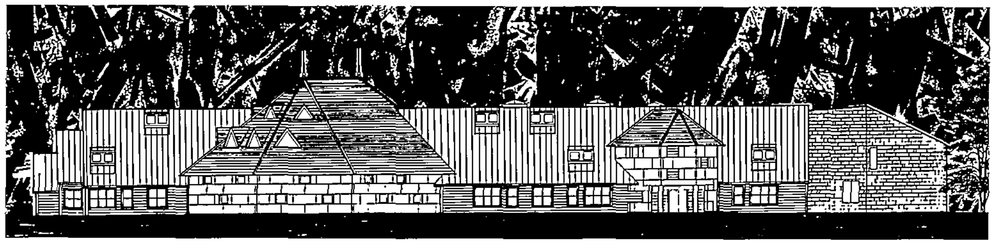
Science facilities planned for the University of Washington's Seattle campus include (clockwise from above): MBT Associates' Biomedical Sciences Research Building; Moore Ruble Yudell's Chemistry Building; and the Physics/Astronomy Building designed by Cesar Pelli and Associates.

Seward Hedges Elementary School
Chicago, Illinois
Ross Barney Jankowski

THE PROGRAM FOR THIS 550-STUDENT PUBLIC SCHOOL called for fitting a 55,000-square-foot elementary school into a neighborhood of largely Hispanic immigrant families on Chicago's Near Southwest Side (right). The architects oriented the school's activities away from adjacent commercial buildings by inserting an open space and playground to the west of the front facade, where the building faces a row of houses, permitting visual supervision from the residences. Set behind a lawn, a three-story block of classrooms is fronted by a pyramid-inside-a-decorated-box which defines the entrance, and is extended by a gymnasium and cafeteria clad in diaper-patterned brick (below). Completion of the project is scheduled for 1992. ■

ON THE BOARDS

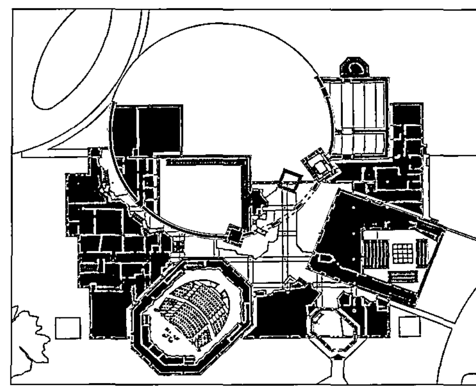
Mastering the Fine Arts

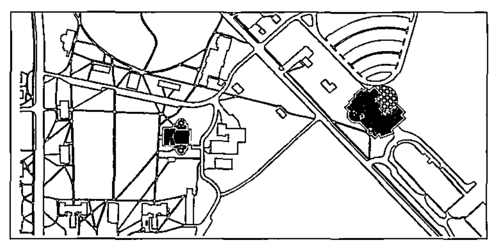


Fine Arts Center
Middlebury College
Middlebury, Vermont
Hardy Holzman Pfeiffer Associates

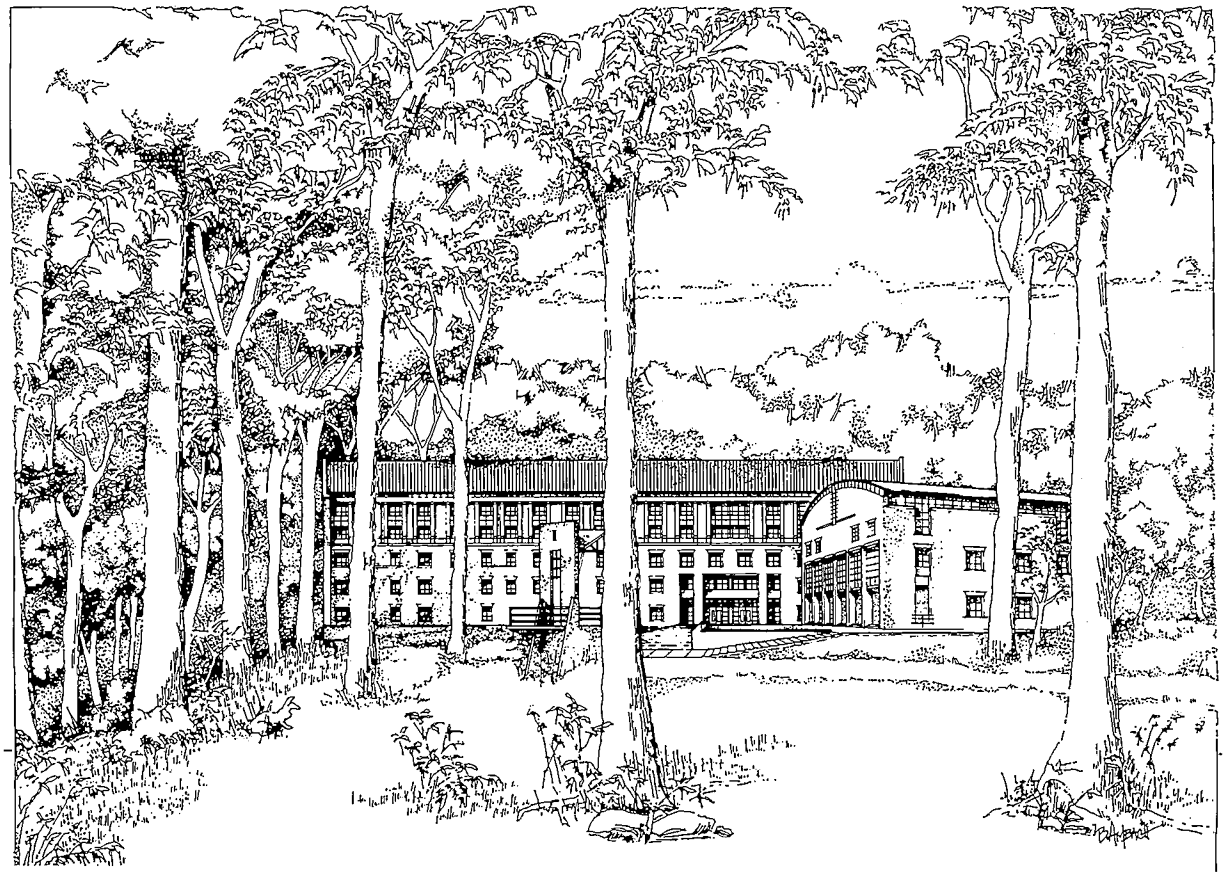
HARDY HOLZMAN PFEIFFER'S 1987 MASTER plan for Middlebury College did not try to iron out the inconsistencies stemming from the 200-year-old school's six previous master plans. Rather, the architects diligently studied the history of the campus and simply responded to immediate needs with contextual buildings. After exhaustive consultation with groups of faculty, students, and administrators, a two-phase plan was adopted focusing on improved facilities for the arts, student activities, and administration. The first phase, now under construction, consists of a new Fine Arts Center and the adaptation of a 1912 gymnasium into a Student Activities Center. The second phase will involve the renovation of five buildings.

The Fine Arts Center represents Middlebury's effort to strengthen the arts in its curriculum. Hence, HHPA's building will house a wide range of musical, dramatic, dance, and other activities: a 400-seat concert hall, two theaters, art galleries, rehearsal and teaching spaces, and a music library. Partner Malcolm Holzman designed the 100,000-square-foot complex as a group of discrete pavilions (one devoted to each fine art department), which will be constructed of load-bearing, split-faced granite, clapboard, and copper roofs.





Middlebury's 100,000-square-foot Fine Arts Center (elevations, top) will present a granite and clapboard face to the campus that sympathizes with the existing New England character. It includes an octagonal theater (bottom elevation) and a dance studio opening onto a semicircular courtyard, which is articulated inside the building (far right in site plan). A second part of the HHPA master plan is the 45,000-square-foot Student Activities Center (left in site plan). Both projects will be completed later this year.



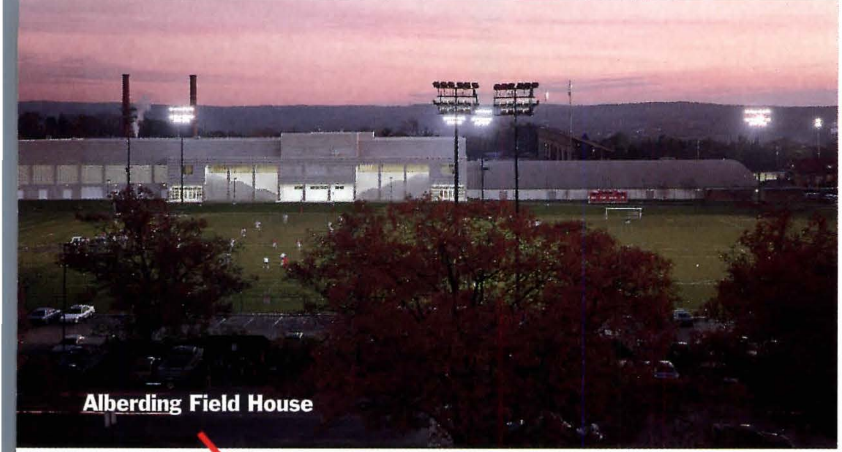
Academic Excellence

DESIGNING FOR THE IVORY TOWERS OF ACADEME PRESENTS ARCHITECTS WITH difficult, sometimes contradictory, problems. Often planned to occupy cherished open spaces, new buildings are charged with enlivening these formal quads. While students and professors demand contextual architecture—usually among vaunted older buildings—campus planners see the need for contemporary structures that incorporate new technologies. University administrators, looking toward the future, want architects to fit new buildings into long-range plans, or create master plans to fix the problems of previously unplanned expansion. Says Charles Gwathmey, whose three structures for Cornell University illustrate the balance between design individualism and campus subordination, "New buildings must play a role with all the buildings before them, and all the buildings that will happen after them, making the campus a better place."

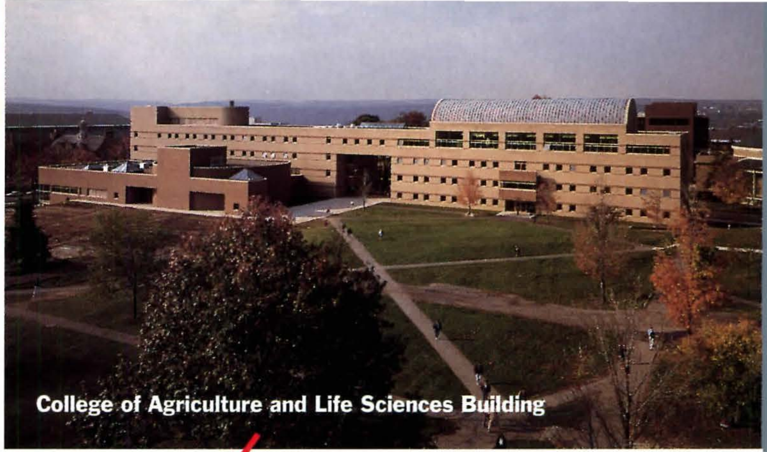
Today, with declining enrollment indicated for the 1990s, college administrators are eager to improve their facilities to attract students, and buildings for the sciences are particularly important. At the Johns Hopkins University, a center for physics and astronomy is one example (this page), and Gwathmey Siegel's trio for Cornell includes the College of Agriculture and Life Sciences Building and an engineering school. Syracuse University's new science and technology building is the first evidence of a new master plan for the upstate New York institution.

Planning for the future of higher-learning environments is indeed critical, because elementary school enrollment is up. Our portfolio of five schools around the country shows how architects have broken out of the typical 1950s brick-box mold to design buildings that reflect the character, climate, and history of their surroundings. ■

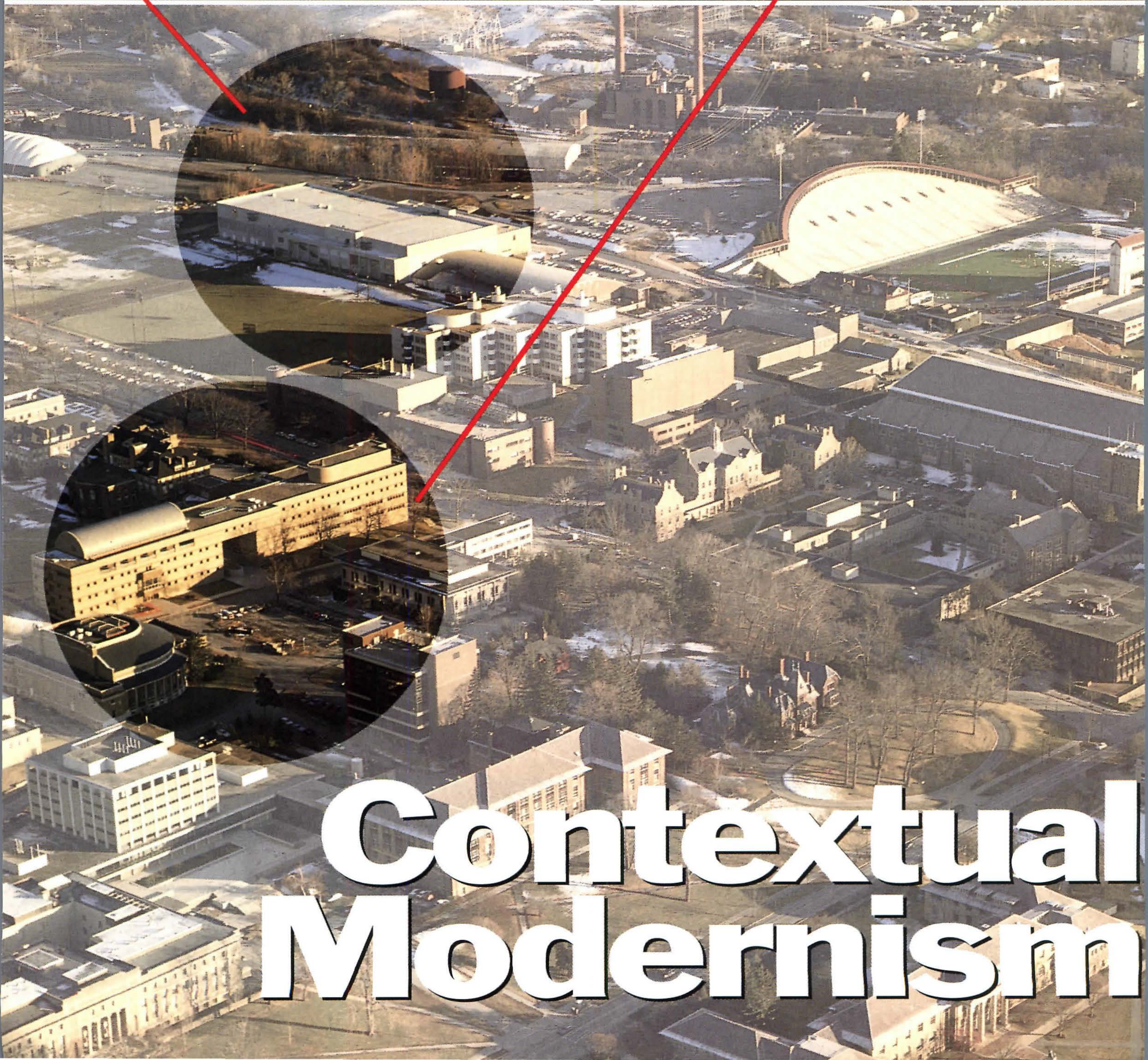
FRITZ READ



Alberding Field House

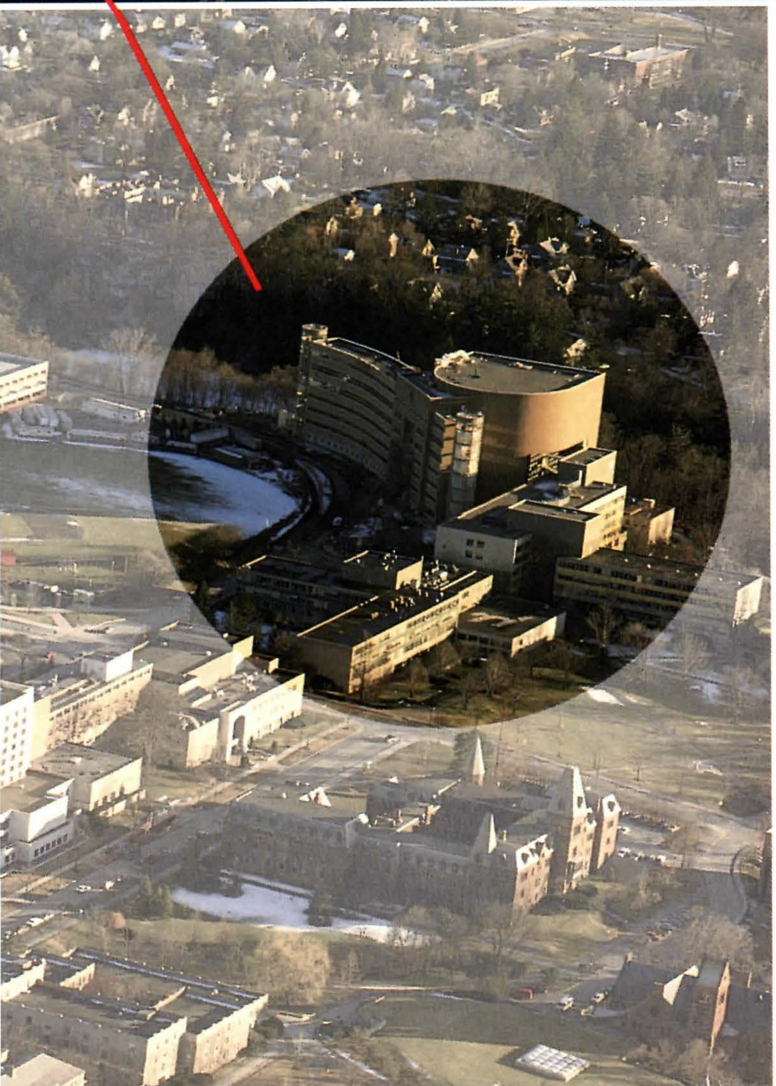


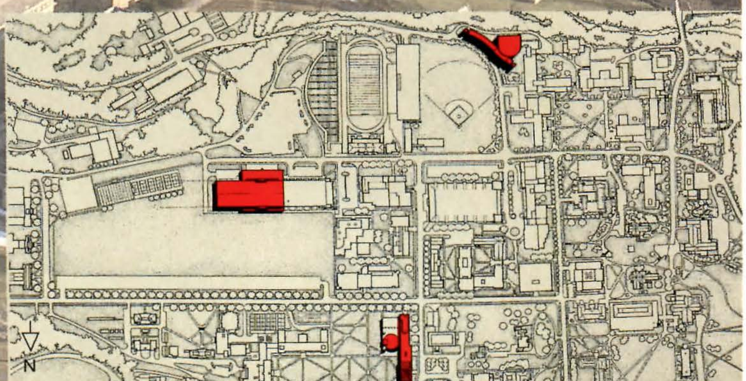
College of Agriculture and Life Sciences Building



Contextual Modernism

TIMOTHY HURLEY PHOTOS





GLEN HITCHCOX

THE MARRIAGE OF TRADITIONAL CAMPUS PLANNING AND MODERN architecture has not always been a happy one. As American colleges and universities grew following World War II, the Modernist structures that appeared alongside their Beaux-Arts neighbors accommodated expansion needs and allowed architects to try out new design vocabularies. But they often worked against the sense of place, or "academical village" as envisioned by Thomas Jefferson, that traditional campus planners strove to foster. The whole was not necessarily greater than the sum of its parts. Three new buildings at Cornell University designed by Gwathmey Siegel & Associates Architects represent an effort to make Modern interventions that not only meet the needs of particular academic users, but also help repair and unify an older ivy-covered campus left disjointed by recent piecemeal planning.

An academic and administration building for Cornell's agriculture college, a "theory center" for the engineering college, and a multipurpose field house gave architects Charles Gwathmey and Robert Siegel a chance to explore their evolving Modernist esthetic; essays in Cubist abstraction that have become richer and more complex than the Long Island houses for which they first gained prominence. But what makes Gwathmey Siegel's Cornell trio particularly noteworthy is that in each case, the architects went beyond the exigencies of the program and designed site-specific buildings that attempt to organize, clarify, and enrich the campus of which they are a part. "From the 1950s to the 1970s, public architecture lost its edge and became simply accommodating and space-enclosing," asserts Gwathmey. Adds Siegel, "You don't have to be either subversive or contextual—you can really be both. The great pleasure for us was the feeling that each individual project was on its own terms individualistic and very strong, but an integral part of the campus."

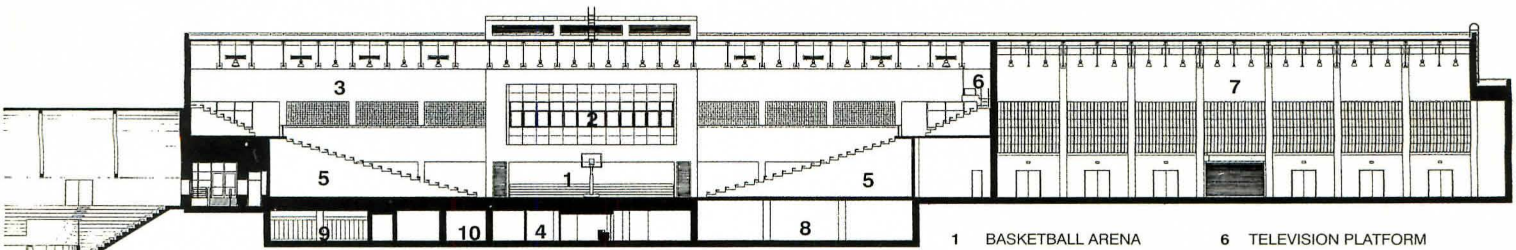
Though they stake out different areas of campus, all three buildings have common traits: Each is larger in scale than any of the buildings around it. Each extends the architectural traditions of Cornell, a campus known for its towers, its gates, its framed views of Cayuga Lake. Above all, each reconciles issues that are larger than its specific program, by reconstituting the model of the quadrangle, defining edges of the campus, and introducing the idea of gateways. By addressing these larger issues, the architects encourage what they call "harmonious growth," setting a new master planning standard.

Construction of any buildings that take up precious open space on a campus can be a wrenching experience, and Gwathmey Siegel's were not free of controversy. Early plans for the theory center set off a bitter town-gown debate over the need for construction close to Ithaca's sacred Cascadilla Gorge. The agriculture school project involved demolition of the first state-funded agriculture building on campus, and some members of Cornell's hard-to-please architecture faculty have expressed dismay over the size and appearance of the new four-story building.

But sparking debate is part of the architectural process. If Cornell's latest additions underscore anything about campus-making, it is the architects' strong belief that traditional campuses can be expanded—and strengthened spatially—with original yet compatible Modern buildings that look forward, not back. "Architects create art," Gwathmey says, "not by reestablishing the established, but through invention and interrogation. Modern architecture forces us to believe, at the moment of our most confrontational doubts, that the discovery process is more important, and eternally more satisfying, than the security of the known." ■

—EDWARD GUNTS

Edward Gunts is the architecture critic of the Baltimore Sun.



1 BASKETBALL ARENA
2 MEETING ROOM
3 GALLERY
4 OFFICE
5 TELESCOPING SEATS
6 TELEVISION PLATFORM
7 PRACTICE ROOM (CAGE)
8 FENCING ROOM
9 GENERAL LOCKERS
10 SHOWERS

SECTION LOOKING NORTH

Howard Alberding Field House

THE ALBERDING FIELD HOUSE IS THE CENTERpiece of an expansion program for Cornell's athletic department, and Gwathmey Siegel used it not only to add new sports facilities but also to define the athletic fields as a separate precinct on campus. Located on a site that runs parallel to the southern edge of the varsity practice fields, the 180,000-square-foot field house is linked to a 1950s-era ice hockey rink that is now entered through its new neighbor.

The field house comprises two major volumes under a single, long-span steel roof: a basketball arena; and the "cage," a flexible training facility for sports ranging from baseball and football to field hockey, soccer, and lacrosse, that is flanked by a 130-by-38-foot climbing wall simulating 92 different levels of rock-climbing.

All of these spaces are arranged in a linear fashion parallel to the practice fields, and access is provided by circulation spines on either side of the field house. To reduce the building's apparent scale, the architects placed ancillary functions in two lower "porch" structures north and south of the arena. Both of these elements utilize a two-story arcade to provide cover for pedestrians, mediate the mass, and impart a strong architectural image. Below entry level are positioned fencing, weight training, and equipment rooms as well as lockers and shower facilities. The building is dramatically lighted at night. To frame even more of the practice fields, the architects developed expansion plans that call for a natatorium to be constructed to the east of the field house.

TIMOTHY HURSLEY (AND FACING PAGE, TOP)

The field house is entered through a multistory "porch" (facing page, top). New spaces include a climbing wall (facing page, bottom left) and a basketball arena that seats up to 5,000 on pull-out bleachers (facing page, bottom right). A skylit corridor at entry level (top right) links various spaces and a triangular bay overhangs the entrance (right, center) illuminating a staircase (bottom right).

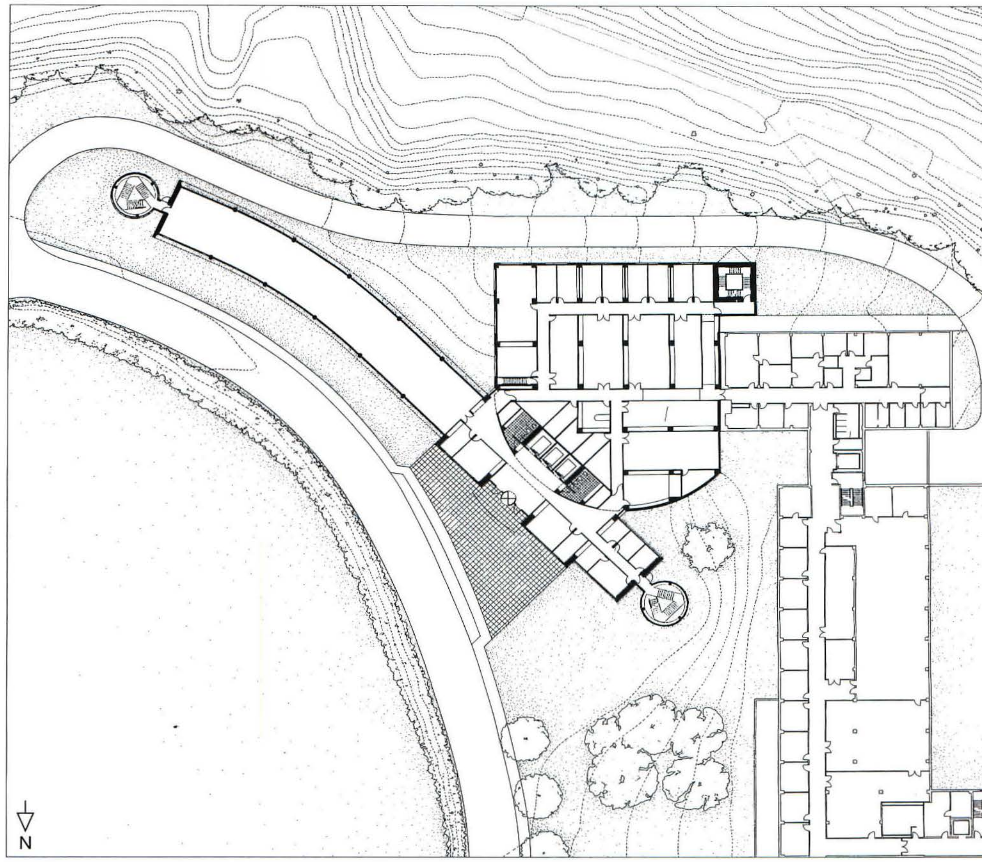
ARCHITECT: Gwathmey Siegel & Associates—Peter Guggenheimer (associate-in-charge); Ron Ellis (project architect); E.J. Frishman, Ming Leung, Jay Levy, Jeffrey Murphy, Guy Oliver, Joan Pierpoline, Tom Savory, Joseph Tanney, Gary Shoemaker, Rick Velsor (project team)
LANDSCAPE ARCHITECT: Gaudy-Hadley Associates
ENGINEERS: Severud Associates (structural); John L. Altieri (mechanical)
CONTRACTOR: William H. Lane, Inc.
PHOTOGRAPHER: Jeff Goldberg/Esto, except as noted

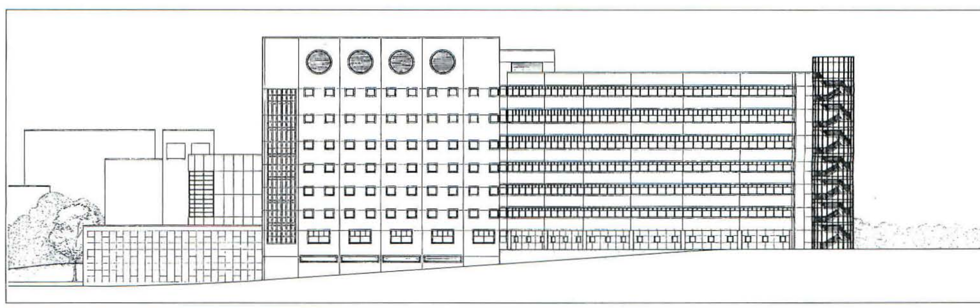
Center for Theory and Simulation in Science and Engineering

THE SEVEN-STORY THEORY CENTER IS THE most site-specific, most articulated, and most abstract of Gwathmey Siegel's three Cornell buildings. Housing a pair of supercomputers, laboratories, and research offices, it is also the most constricted on its site, pushed to the edge of Ithaca's dramatic Cascadilla Gorge. Like the other Gwathmey Siegel buildings, the Theory Center provides clues for further campus expansion—in this case for the engineering quad, a haphazard collection of mid-rise buildings dating from the 1950s, and a part of campus for which Gwathmey Siegel has designed a 20-year master plan.

The 211,000-square-foot center is organized into two elements: a 300-foot-long, gently curving office building, and a larger cylindrical drum that houses high-tech computer rooms and column-free laboratories. The point where the office "bar" intersects with the lab "block" forms the entrance and service core, including meeting rooms and a fifth-level sky lobby and reception area for the supercomputing group.

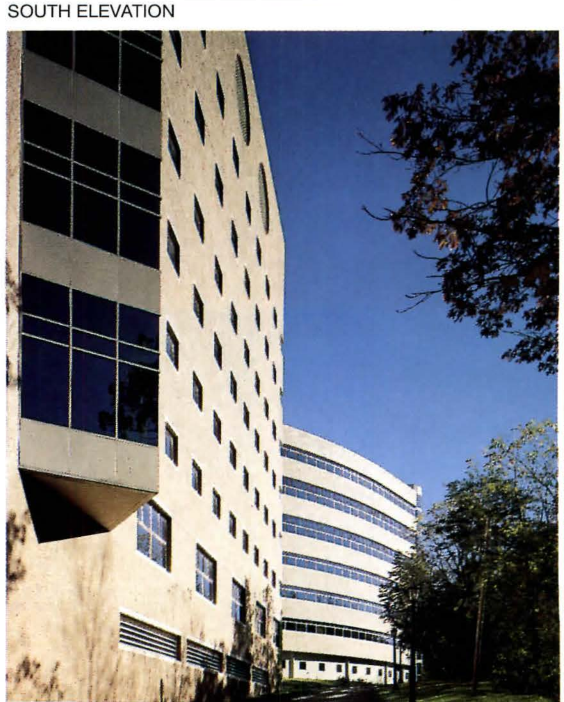
The curve of the Theory Center follows the contours of Campus Road and frames Hoy Field, where generations of Cornellians have played baseball. The largest building on the engineering campus, the complex is connected to two older buildings on the quad by an elevated pedestrian walkway and underground tunnel. Its colors were borrowed from the ag quad, rather than from the metal-panelled buildings nearby, and its composition and imagery are intended to suggest a strategy for future additions.



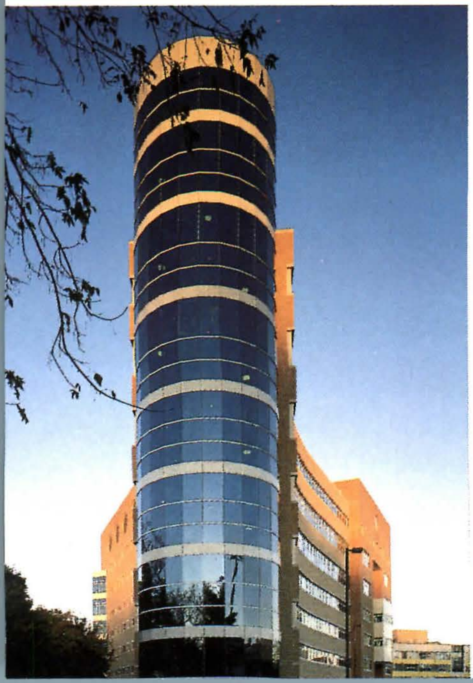


SOUTH ELEVATION

South elevation (right above and bottom) is broken into various components, so the center presents a less monolithic face to Cascadilla Gorge. As seen from the main campus (facing page, top), the building closely follows the curves of Campus Road (site plan) presenting a narrow silhouette that becomes fuller as one moves closer. Glass-enclosed stair towers (facing page, bottom) echo towers elsewhere on campus.



ARCHITECT: Gwathmey Siegel & Associates—Thomas Levering (associate-in-charge); Paul Bordman (project architect); David Biagi, Ron Ellis, Joseph Tanney (job captains); Gerry Gendreau, Greg Karn, Dirk Kramer, Thomas Savory, Malka van Bemmelen (project team)
LANDSCAPE ARCHITECT: Gaudy-Hadley Associates
ENGINEERS: Severud Associates (structural); Jaros, Baum & Bolles (mechanical and electrical)
CONSTRUCTION MANAGER: Turner Construction Co.
PHOTOGRAPHER: *Timothy Hursley*

New York State College of Agriculture and Life Sciences Academic and Administration Building

FOUNDED IN 1865, CORNELL HAS BOTH AN endowed campus, with four privately funded undergraduate colleges, and a statutory campus, part of the State University of New York system. Although it technically frames the western end of the "ag quad," part of the state campus, Gwathmey Siegel's four-story, 140,000-square-foot academic and administration building straddles the dividing line where Cornell's state campus meets its endowed campus. An open arch punctuating the volume symbolizes the extent to which students from either campus are free to take courses on the other—and how Cornell has evolved into one university. The three-story opening also makes the 444-foot-long building appear less of a wall and more of a giant portal, providing access from one part of the campus to another.

The archway divides the buildings into two wings: Roberts Hall, an administration building that encloses the quad, which was never before closed-in; and Kennedy Hall, a classroom and faculty-office building whose south end faces a major intersection. Kennedy also contains a 600-seat lecture auditorium and a 400-seat dining hall, designed as sculptural objects against the otherwise linear building. Roberts also frames Bailey Plaza, a parking area directly in front of Cornell's largest auditorium, and defines it as a new urban space on campus.

One of the building's most unusual features is the organization of the landscape architecture program, with studios located in a dramatic barrel-vaulted room. The studios actually occupy the fourth floor of Roberts Hall, but access is possible only from Kennedy Hall, through the "bridge" that frames the opening. The arrangement is just one of the confusing aspects of the archway, which also provides no direct access to the offices in Roberts Hall. Faculty members and students must walk out of the north end of Kennedy, underneath the arch, and around to the center entrance of Roberts, even though the wings are connected.

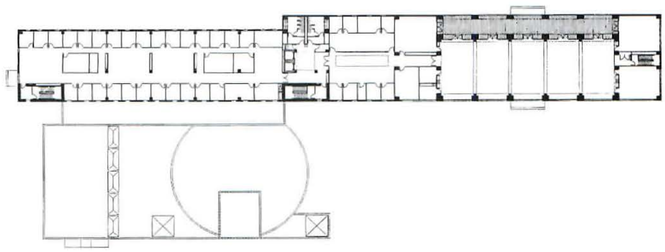
However, by boldly closing the west end of the quad, the architects achieved a new relationship between it and the rest of Cornell's campus. As part of their plan, for example, they suggested that Bailey Plaza be landscaped as a forecourt to Bailey Auditorium. They also left room for the next major intervention, a future building on the quad just east of Kennedy Hall. ■

TIMOTHY HURSLEY (AND FACING PAGE, BOTTOM)

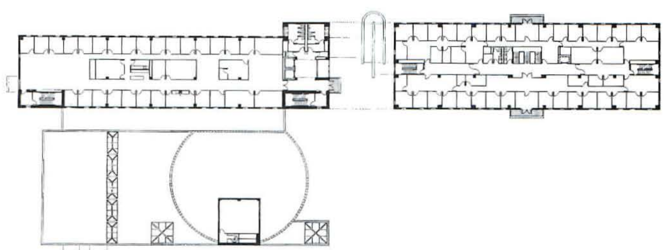
The open arch south of Roberts Hall (facing page top, and above, left and right) serves as a portal from the endowed campus to the state campus. Roberts is connected by a fourth-level bridge to Kennedy Hall, with its 400-seat dining facility facing a major roadway that winds through the campus (top and facing page, bottom). Exterior materials include three shades of brick that modulate the facades and echo the palette of neighboring buildings. Windows are framed in teak on the exterior and mahogany on the interior, with cast stone sills and copings. The barrel-vaulted roof is constructed of standing-seam, lead-coated copper.

ARCHITECT: Gwathmey Siegel & Associates—Thomas Levering (associate-in-charge); Ron Ellis, Daniel Rowen (project architects); Paul Cha, Tom Demetrion, Peter Guggenheimer, Joan Jasper, Jim Jorgensen, Tom Lekometros, Jay Levy, Ming Leung, Neil Troiano, Wolfram Wohr (project team)
LANDSCAPE ARCHITECT: The Office of Pat DeBellis
ENGINEERS: Severud Associates (structural); Kallen & Lemelson (mechanical)
CONSULTANTS: Skolodz and Associates (kitchen); Peter George Associates (acoustics)
CONTRACTOR: Streeter Construction Company
PHOTOGRAPHER: Jeff Goldberg/Esto, except as noted

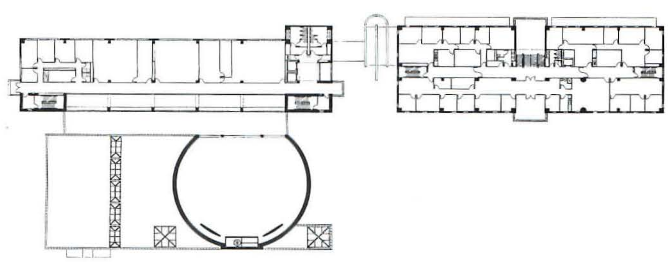
As might be expected from Gwathmey Siegel, detailing of interior spaces in the academic and administration building is precise and well-executed, and finishes are of higher quality than in most other state buildings at Cornell. The high-ceiling dining hall (top right) has south-facing windows, extensive mahogany trim, and custom light fixtures. A stair landing just above the west entrance to the administration building (below right) serves as a lounge, half a level down from the dean's office. Beneath the building's barrel-vaulted roof is the landscape architecture program's fourth-floor drafting studio (facing page and top section, bottom right)—a major new space on the Cornell campus. A west-facing terrace off the studio offers sweeping views of the campus and valley below, and an oculus, placed off-center, lines up with the building's circulation system.



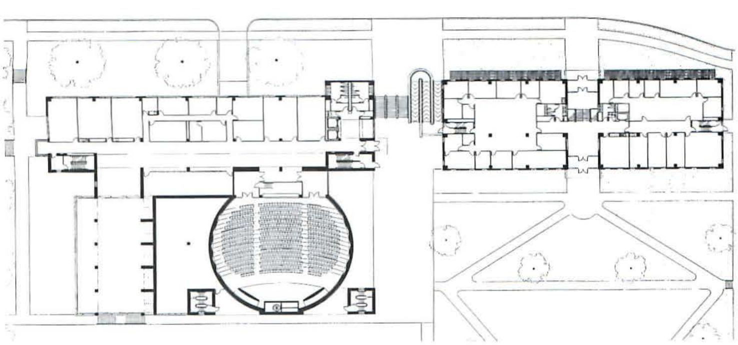
FOURTH LEVEL



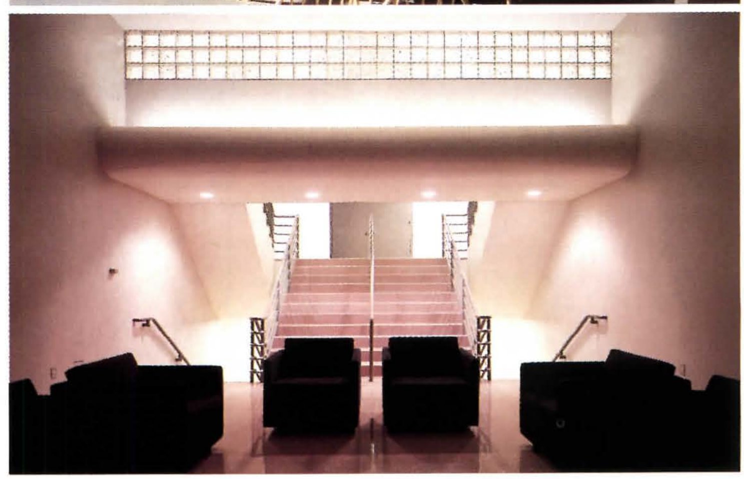
THIRD LEVEL

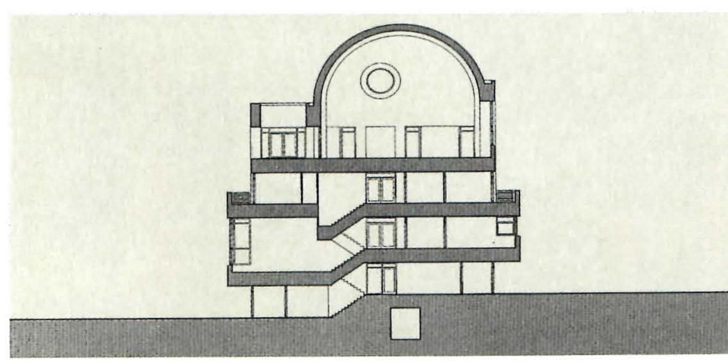


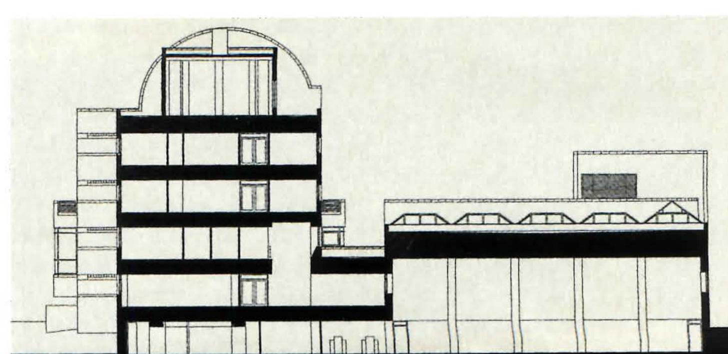
SECOND LEVEL



QUADRANGLE LEVEL







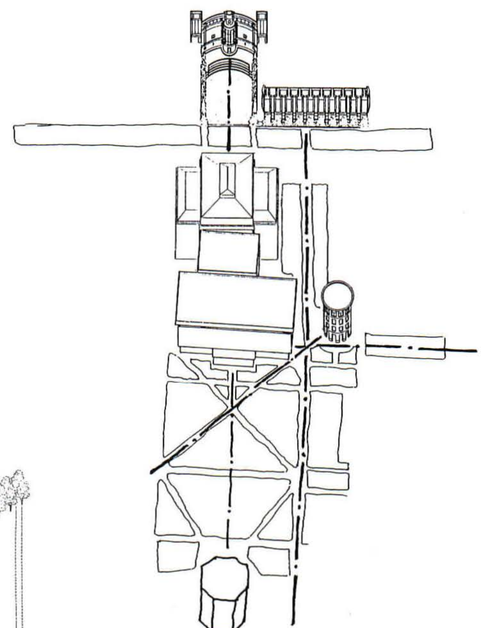
Science and Technology Building; Shaffer Art Building
Syracuse University, Syracuse, New York
The Kling-Lindquist Partnership
Koetter, Kim & Associates
with Dennis, Clark & Associates

Art and Science

THE ARCHITECTS OF LONG-RANGE CAMPUS plans rarely have a hand in designing the buildings that will populate their grand schemes. Koetter, Kim & Associates and consulting architect Dennis, Clark & Associates, however, were not only engaged by Syracuse University to complete a master plan for expanding the campus east of the university's main quadrangle, but to design a pair of buildings within their scheme. The first phase of this new campus, a science and technology building, now sets the stage for future development, which will comprise more than a half-million square feet of new science facilities and covered parking for more than 350 cars.

Master planners Fred Koetter and Michael Dennis have a long history of collaboration: they were roommates at Cornell University, practiced architecture together from 1970 to 1977, and have since continued to critique one another's ideas. Koetter and Dennis share an interest in the ways in which new buildings and existing urban fragments can be stitched together, and how the resulting ensemble can allude to its own future expansion. The architects' plan for Syracuse reflects their fascination with axiality and spatial connections by studying campus patterns and identifying sites for future buildings.

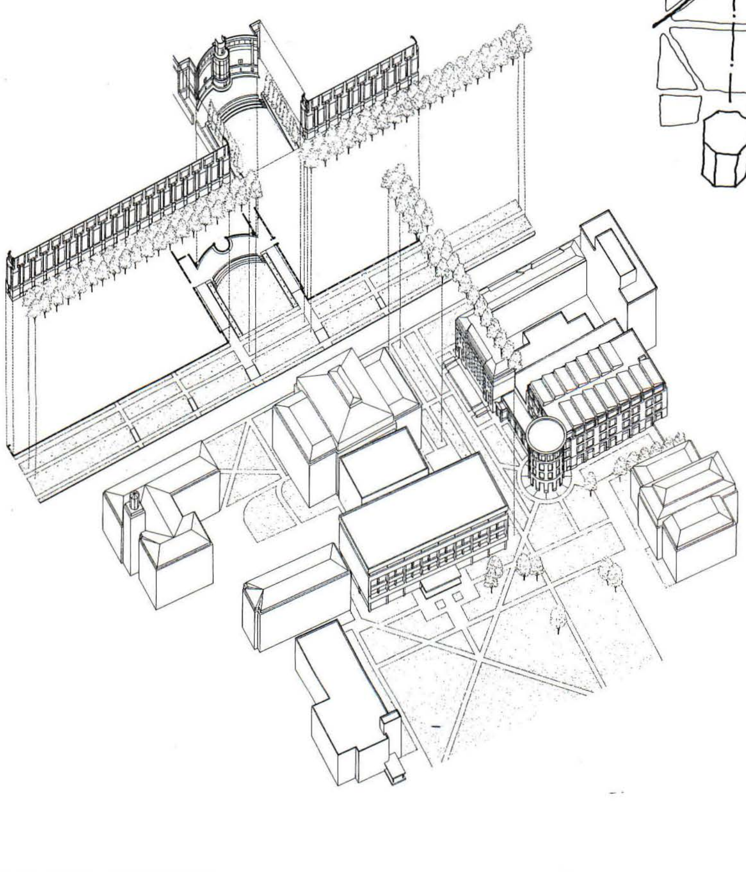
One such site proved pivotal in integrating the master plan with the older campus and remedying a poorly defined corner of the quad. It is located at the convergence of two visual axes: one diagonally across the quad from the university's main building to the northwest, and another along the quad's southern edge, which terminates at a new science and technology building. Koetter chose this site for Syracuse's new Shaffer Art Building, which he also designed in association with Dennis, Clark and Associates.

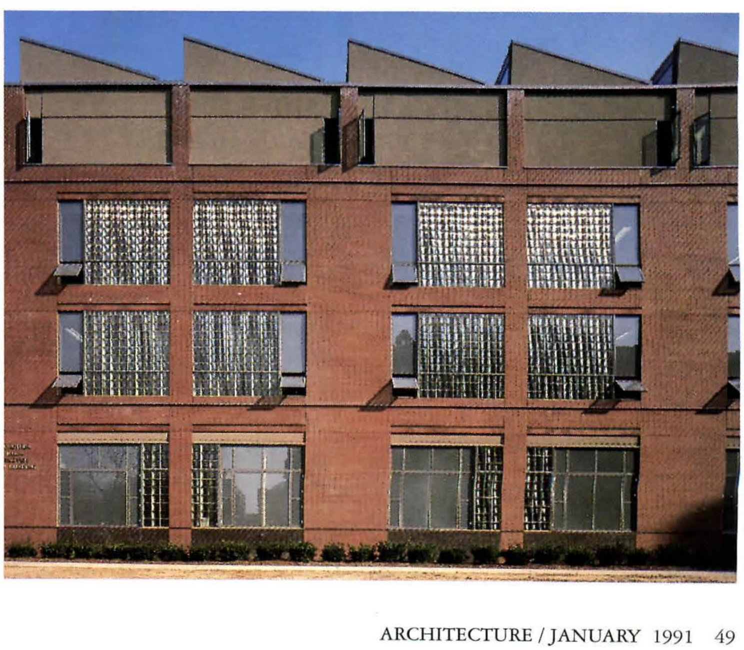


Shaffer is a solid, gutsy presence at the quad's corner, distinguished by a brick and concrete cylinder that marks its entrance and houses studios on the upper three stories. This tower, with its open metal cornice, is immediately grasped from across the quad, and it turns the corner gracefully to introduce the science technology building just across the street. The art building's west profile is cut into a saw-tooth outline against the sky, and its glass-block fenestration diffuses western light, while the north face's glassy first floor displays the new quarters for the Lowe Art Gallery. It's a tough building inside, with exposed concrete and mechanical systems that make it perfect for the ad hoc nature of artistic creation and ready-made for undergraduate Bohemians-in-training.

The science and technology building responds to another order all together. As the first building on the new east campus, Koetter intended it to set the stage for further expansion. While the Kling-Lindquist Partnership was responsible for the building's plan and interior arrangement, Koetter and Dennis designed the exterior to reinforce the

With its glass block and sawtooth profile (below) the Shaffer Art Building (facing page) establishes a powerful new presence on Syracuse University's main quad. The building's corner cylinder acts as a hinge in connecting the old campus to the new (drawings, left).





ANDREW BORDWIN PHOTOS (THESE PAGES)

Appearing as two structures (left), the science and technology building is actually a single unit with two programs linked by a common lobby space. The wall of the chemistry wing effectively stops a long axis from the old quad (plans below), while the curved wall sets up a dialogue with early 20th-century Neoclassical buildings across the street. The curved facade (facing page, top left) incorporates concrete banding that relates to nearby ornamental facades (facing page, top right), while the wall of the chemistry department wing (facing page, bottom left and right) reflects the rigid distribution of *identical laboratory* spaces. Future development should frame the new courtyard and continue the building wall along the west side.

ideas behind the master plan. The building serves two occupants: a university/industry collaboration in computer science research and chemistry laboratories. Behind the long, repetitive wall of the building that stretches along College Place are four floors of chemistry labs, cellular in nature. The building's north wing, marked by a grand, curved facade, houses the computer-related spaces. The two blocks are joined in the middle by a common lobby.

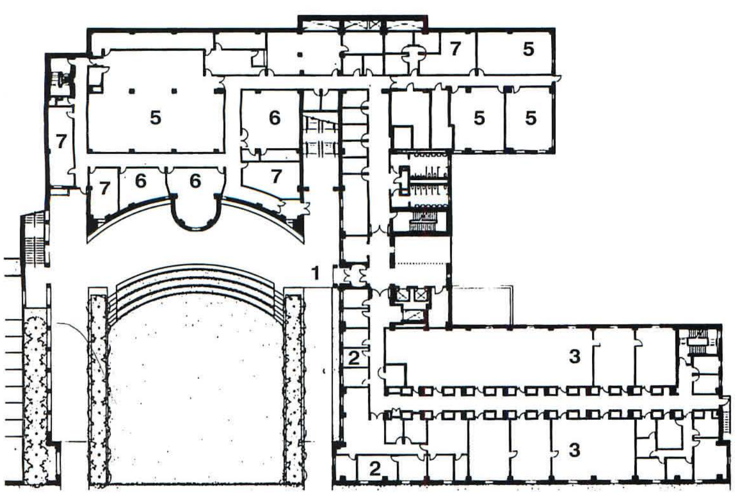
The College Place facade manages to terminate the tree-lined promenade along the old quad's south side, which slips past the new art building and lands dead on axis with the building's sensitively placed smokestack. The computer wing steps back to make room for a courtyard, placed directly on axis with the imposing facade of Slocum Hall, home to Syracuse's architecture school, across the street. The stripped-down vocabulary of the curved facade appears too severe, its scale overblown in pursuit of an empty monumentality, and its projecting glass-fronted bay sends the wrong signals of "building entry," which is actually tucked into the south side of the courtyard. Two-tone brick and moldings, however, do send the right message of camaraderie with their Neoclassical neighbors across the street. And the courtyard is apparently well used, particularly by the architecture school, which occasionally conducts classes there.

The science and technology building is also sensitive to the established traffic patterns that existed before its construction. It sits between the main campus to the west and student housing to the east, with a full-floor height of grade change. A passageway between the computer and chemistry wings allows students to pass through the building without actually entering it. Walkways on the building's south and north ends also allow pedestrian movement across the site to proceed unimpeded. ■

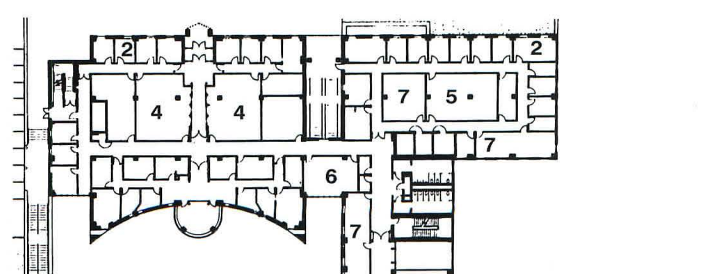
—Michael J. Crosbie

SYRACUSE UNIVERSITY SCIENCE AND TECHNOLOGY CENTER
SYRACUSE, NEW YORK

ARCHITECTS: The Kling-Lindquist Partnership, Inc., Philadelphia, Pennsylvania—Charles E. Bailey, AIA (project director/principal-in-charge); Robert G. Morrison (project manager); Eugent J. Sawka, AIA (project architect); E. Mitchell Swann (mechanical services engineer); Frank I. Klusek (electrical engineer); James H. Day (instrumentation engineer)
ASSOCIATE ARCHITECTS: Koetter, Kim & Associates with Dennis, Clark & Associates, Consultants, Boston, Massachusetts—Fred Koetter, Michael Dennis (partners in charge of design); Myles Katz (project architect); Erik Thorkildsen, William Loftus, Frank Chirico (design team)
CIVIL ENGINEERS: Bryand Associates P.C.
ACOUSTICAL CONSULTANT: Shen Milsom & Wilke Inc.
LANDSCAPE ARCHITECT: Marian S. Tompkins
CONSTRUCTION MANAGER: Huber, Hunt & Nichols, Inc.
PHOTOGRAPHY: Jeff Goldberg/Esto, except as noted



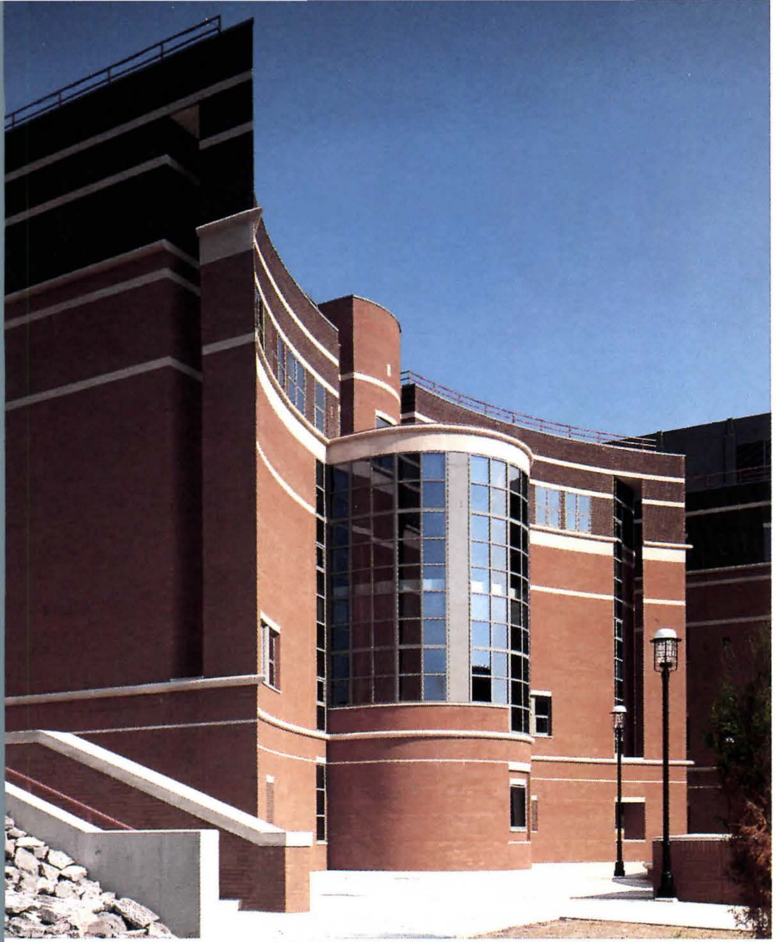
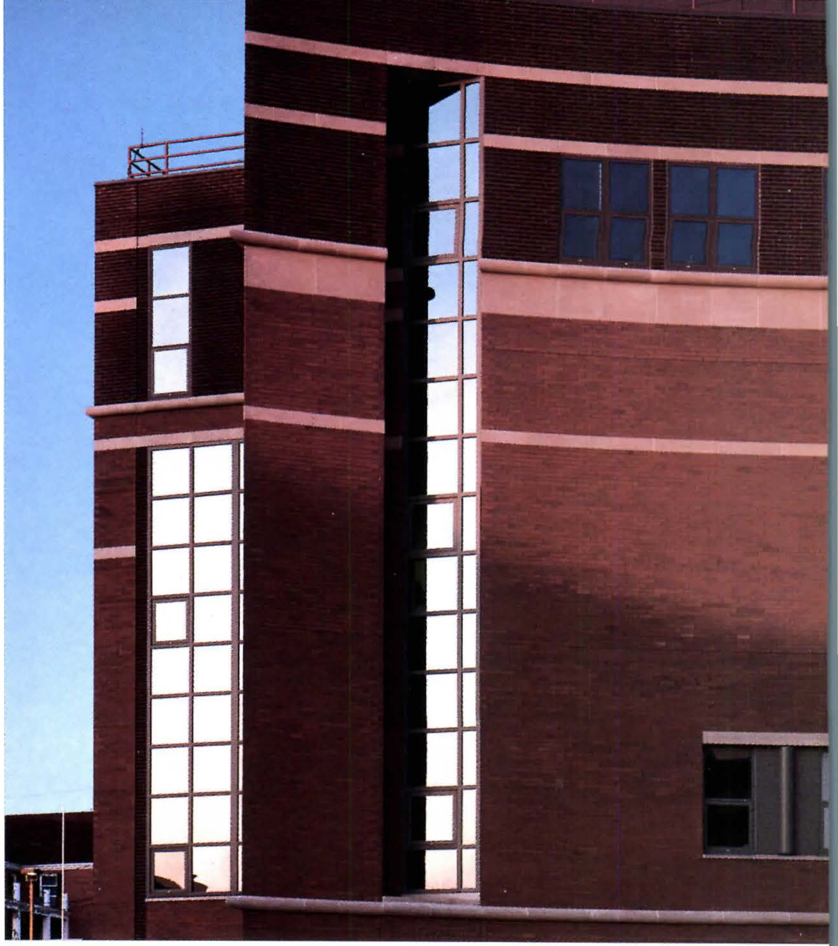
FIRST FLOOR



1 MAIN ENTRANCE
2 FACULTY OFFICES
3 WET/DRY CHEMISTRY LABS
4 PRODUCT/EQUIPMENT DISPLAY
5 COMPUTER LABS
6 CLASSROOM
7 STUDENT AND RESEARCH AREA
8 CONFERENCE ROOM

SECOND FLOOR

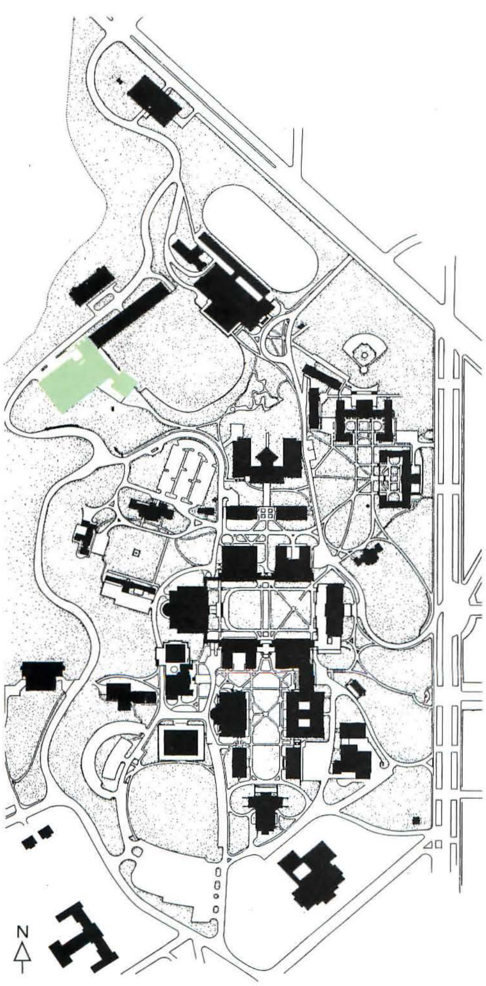
N

Bloomberg Center for Physics and Astronomy
The Johns Hopkins University
Baltimore, Maryland
Ayers Saint Gross, Architects

Exploration of Space

J. BROUGH SCHAMP



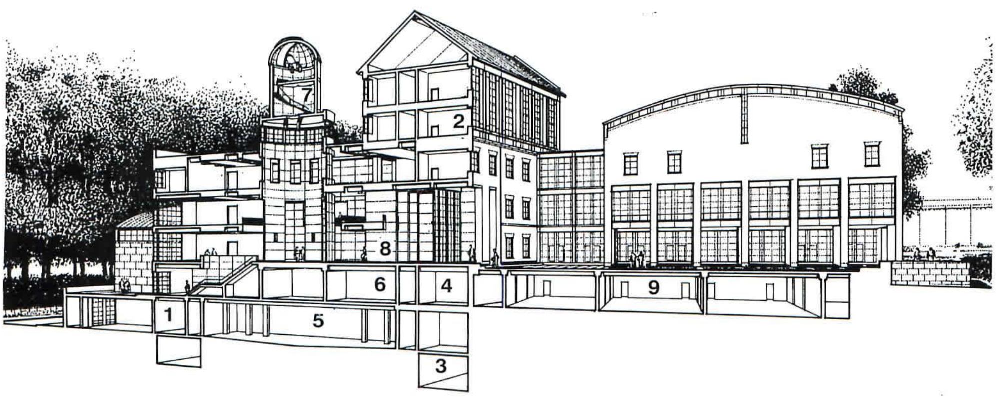
FOR OVER 36 YEARS, THE CAMPUS OF JOHNS Hopkins University has served as the design laboratory for Ayers Saint Gross. The Baltimore firm and its predecessor, Meyer Ayers Saint Stewart, has shared an ongoing relationship with the university since 1954, beginning with its competition-winning scheme for the Neo-Georgian Shriver Hall. A decade later, the architects completed a respectful Modernist library in the vein of Eliel Saarinen's museum and library at Cranbrook, as well as an athletic facility completed in 1965, and an administration building in 1971. Appropriately, the firm's most sophisticated project to date, the Bloomberg Center for Physics and Astronomy, is a facility for scientists on the forefront of research. And like their counterparts in the esoteric world of physics and astronomy who assemble seemingly random facts into cohesive scientific theory, Ayers Saint Gross has brought together disparate forms to create a building even greater than the sum of its parts.

At 240,000 square feet, the Bloomberg Center is the largest building on Hopkins's Homewood campus. Yet by breaking the mass into gabled and vaulted components, the architects created a complex composition that respects the Georgian campus without sacrificing a uniquely contemporary identity. Located on a wooded parcel on the outer fringe of the university's traditional quadrangle, the science center rides along the crest of a hill, presenting an asymmetrical facade that appears to get smaller as one approaches.

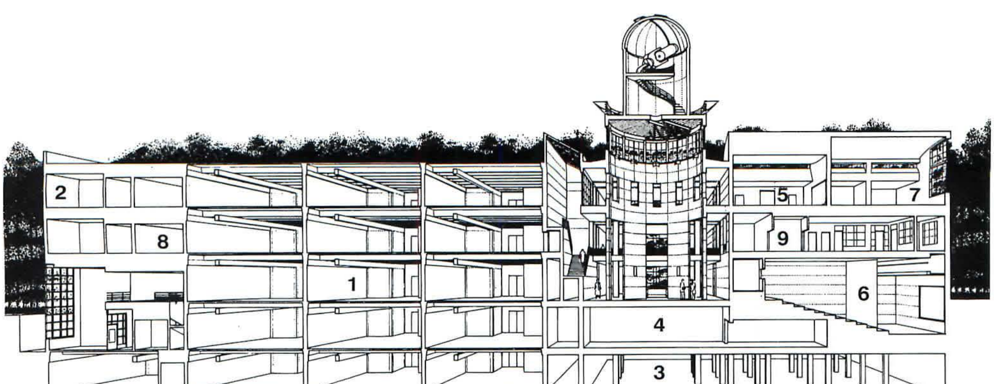
Responding to the irregular site and the school's request to differentiate teaching and research functions, the architects housed a collection of relatively independent uses in a series of interrelated forms. The largest mass contains laboratories; a long, narrow, gabled component houses offices for researchers; and a vaulted brick wing contains classrooms and student labs. The Center includes a 330-seat auditorium on the main entrance level (see page 96).

Constructed of materials familiar to the Hopkins campus, the red brick ensemble is set atop a granite base accented with limestone details. The architects responded to the five-story height of the surrounding academic buildings by setting two of Bloomberg's

The Bloomberg Center is located on the northeast fringe (green in site plan, left), adjacent to the Hubble Telescope Institute (top left). The building steps down to meet San Martin Drive (below), while the front elevation faces south to embrace its wooded site (facing page, top). The building's true mass is revealed only from a distant view of the north elevation (facing page, bottom).



1	TEACHING LABORATORY	4	COMPUTER ROOM	7	OBSERVATORY
2	FACULTY OFFICE	5	MECHANICAL ROOM	8	ENTRY
3	MECHANICAL TUNNEL	6	TERMINAL ROOM	9	SHIPPING/RECEIVING



1	RESEARCH LABORATORY	4	COMPUTER ROOM	7	READING ROOM
2	FACULTY OFFICE	5	CONFERENCE ROOM	8	LABORATORY SUPPORT
3	MECHANICAL ROOM	6	AUDITORIUM	9	ADMINISTRATIVE OFFICES

seven floors below grade. Where the sloping site and building step down to meet San Martin Drive, the architects reduced the height to five stories and articulated this northwestern facade with a low-scaled, L-shaped extension and a vaulted laboratory bay clad in limestone. The architects used stone and concrete pavings inside and out, and clad the roof with uncoated copper treated with acid to create a patina that contrasts with the brick.

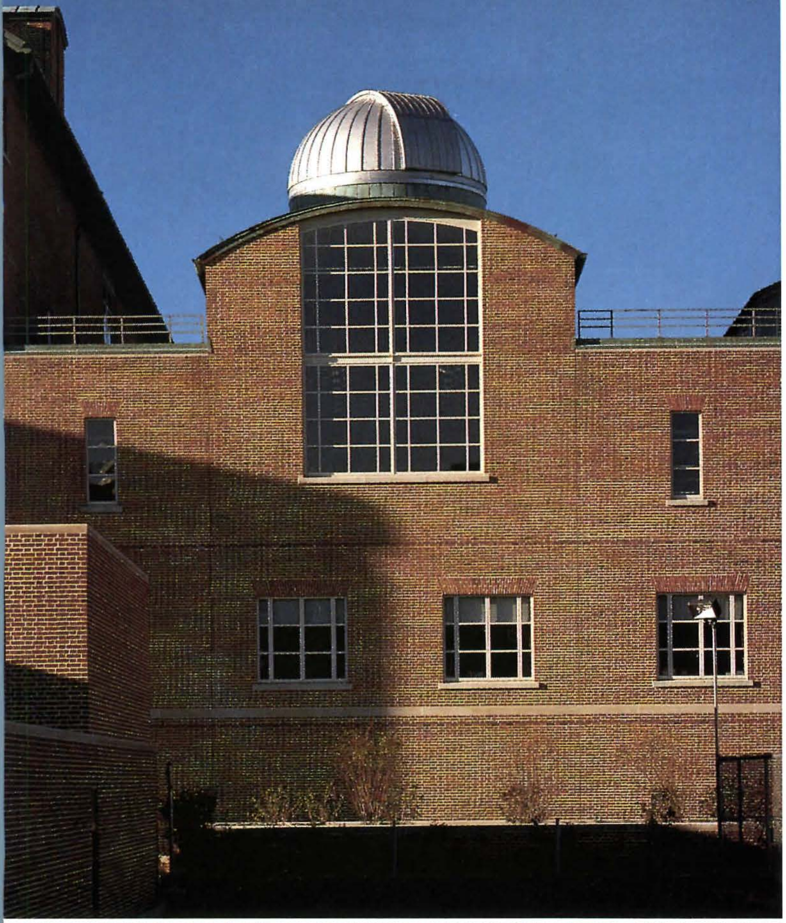
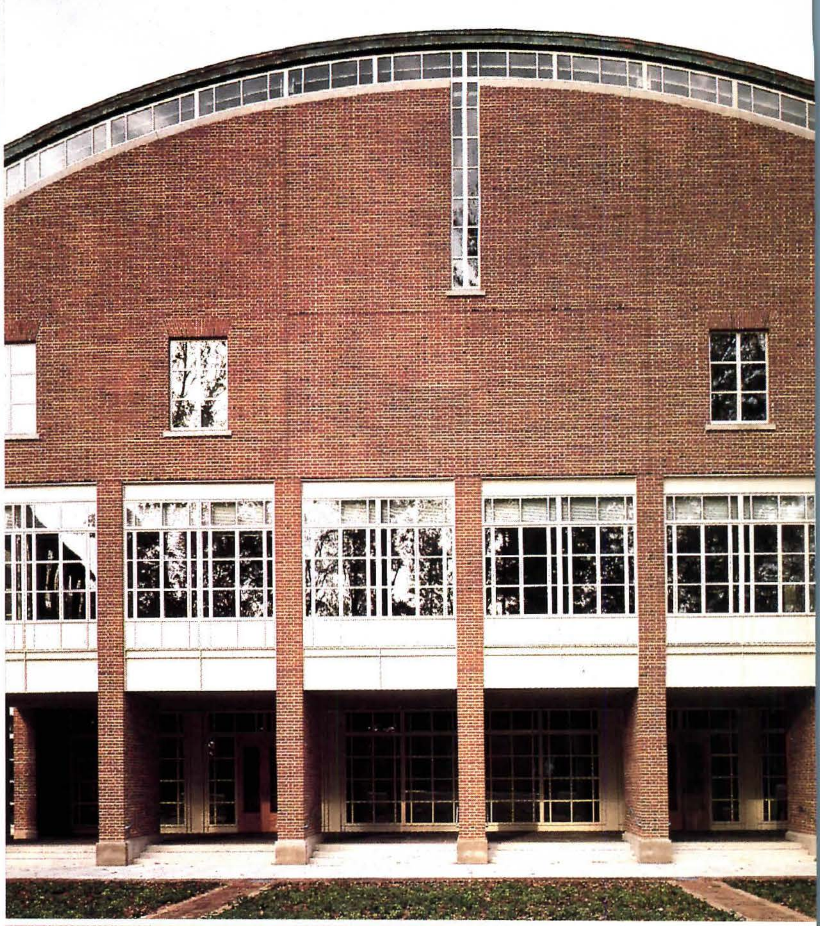
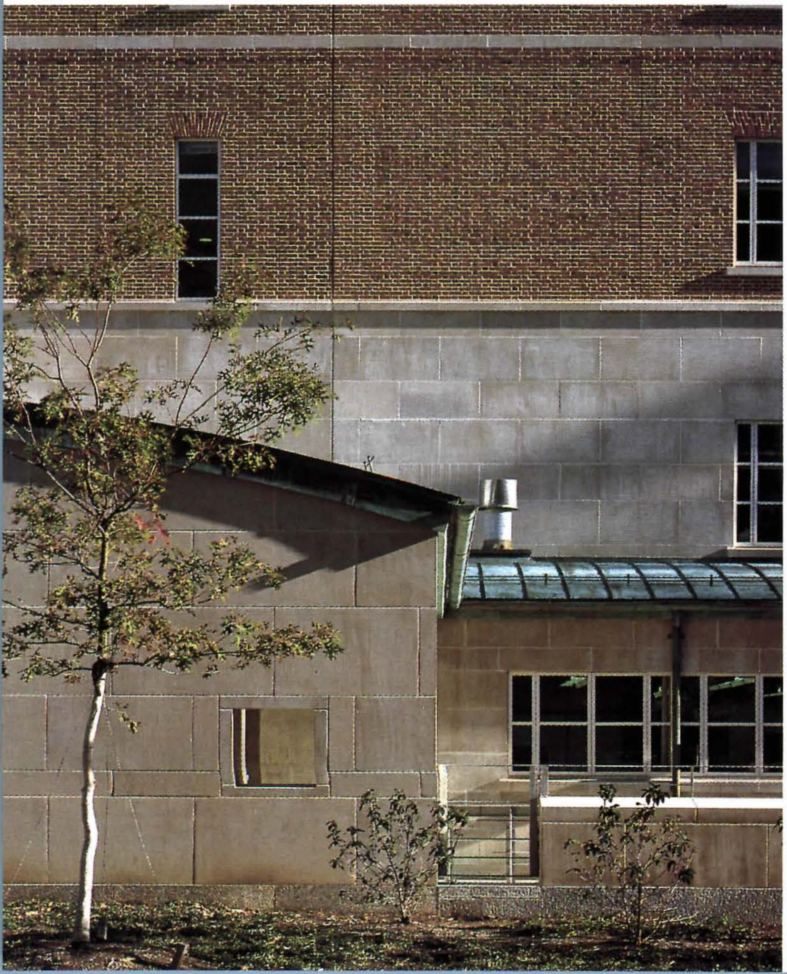
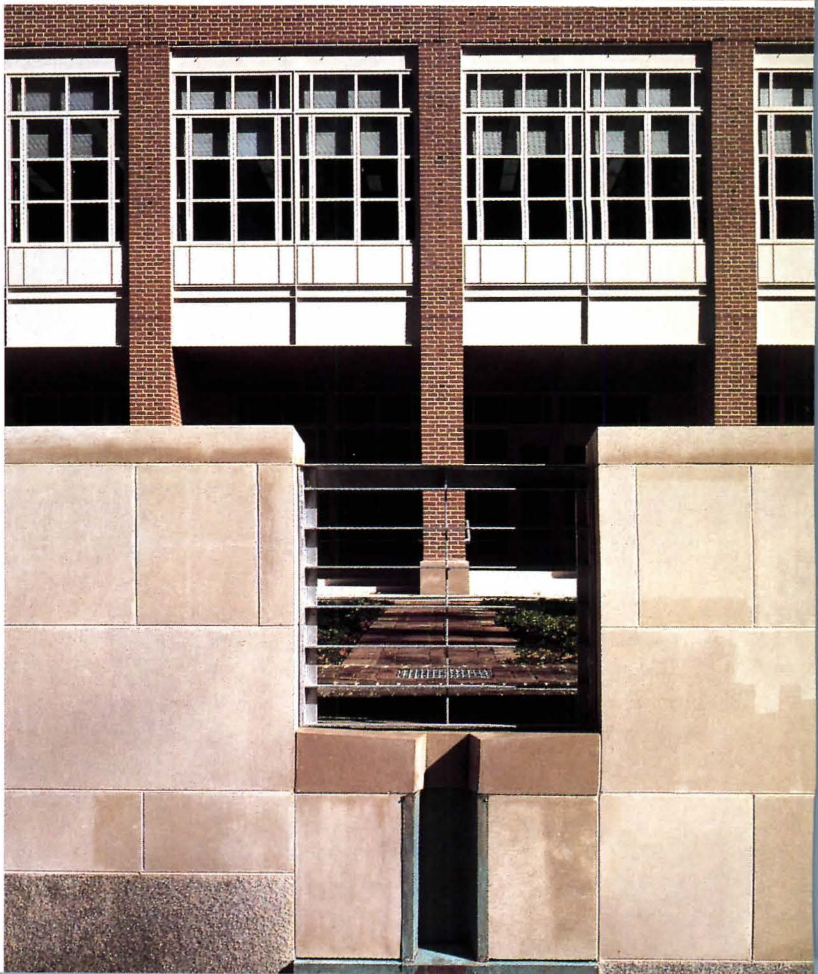
Inside the research laboratories, Ayers Saint Gross designed a fully interdependent system of mechanical and structural support. Within the building, paired concrete piers form an arrangement of six shafts that carry all mechanical and electrical services from a tunnel system to each of the 32 labs. From the shafts, services are distributed within the labs along a plenum formed between the overhead structure, maintaining a visible system of distribution.

Although the bulk of the building is devoted to utilitarian laboratories and offices, the Bloomberg Center has its share of serendipitous public and private spaces. Constantly playing on contrasts, the architects took advantage of the two-story north-facing vaulted form of the main wing and inserted a double-height window to create a grand reading room. For a conference room, they significantly reduced the scale of the adjacent reading room by curving the ceiling downward to dip below a continuous band of clerestory windows.

The Center's various functions and converging forms are unified by a four-story, concrete rotunda crowned with an observatory. Rising up through the main wing, the stark cylindrical form becomes more defined on each successive level. The elegantly sculpted void is an effective point of reference, but, more importantly, it is a device that bespeaks the care and skill with which the Bloomberg Center is designed and crafted. ■

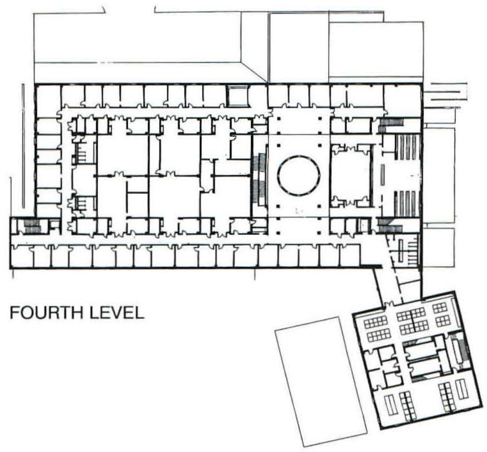
—LYNN NESMITH

Teaching and research wings are angled to surrounded a common landscaped courtyard (above left) while maintaining separate entrances for each function. A double-height reading room is tucked within the smaller vault of the north facade (facing page, top left). A limestone wall (facing page, bottom right) defines a landscaped forecourt for the large vaulted teaching component (facing page, top right). Another limestone wall screens service areas at the rear of the site (facing page, bottom left).

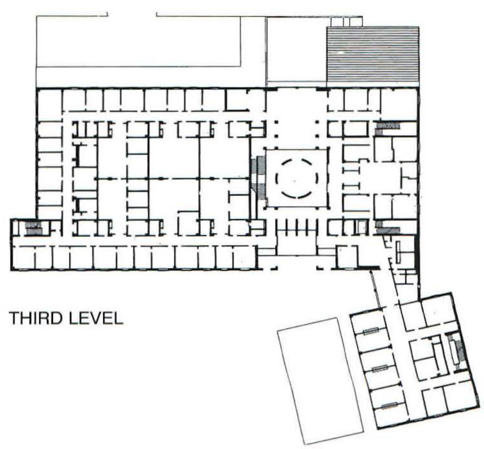





BLOOMBERG CENTER FOR PHYSICS AND ASTRONOMY
THE JOHNS HOPKINS UNIVERSITY
BALTIMORE, MARYLAND

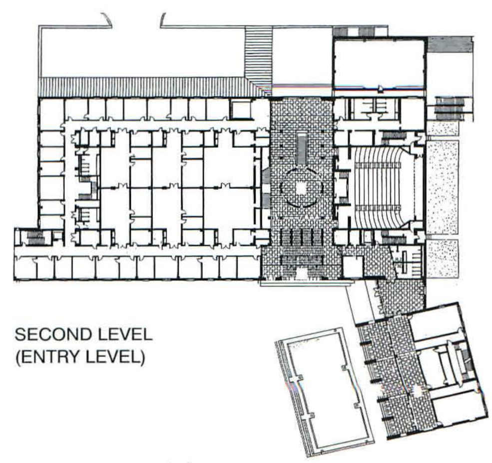
ARCHITECTS: Ayers Saint Gross, Baltimore, Maryland—Adam Gross (principal-in-charge); Fritz Read (project architect); Leigh Anne Jones, Michael Irwin, Barbara Ambach, Bill Shafer, George Shannon, Bill Grabowski, James Read, Joanne Gosser, Steve Longo (design team)
LANDSCAPE ARCHITECTS: Wallace, Roberts & Todd
ENGINEERS: Whitney, Bailey, Cox & Magnani (structural and civil); E. A. Mueller (mechanical and electrical)
CONSULTANTS: Jerry Kugler Associates (lighting); Cavanaugh-Tocci (acoustical)
CONSTRUCTION MANAGEMENT: Whiting-Turner
PHOTOGRAPHER: Richard Mandelkorn, except as noted



FOURTH LEVEL

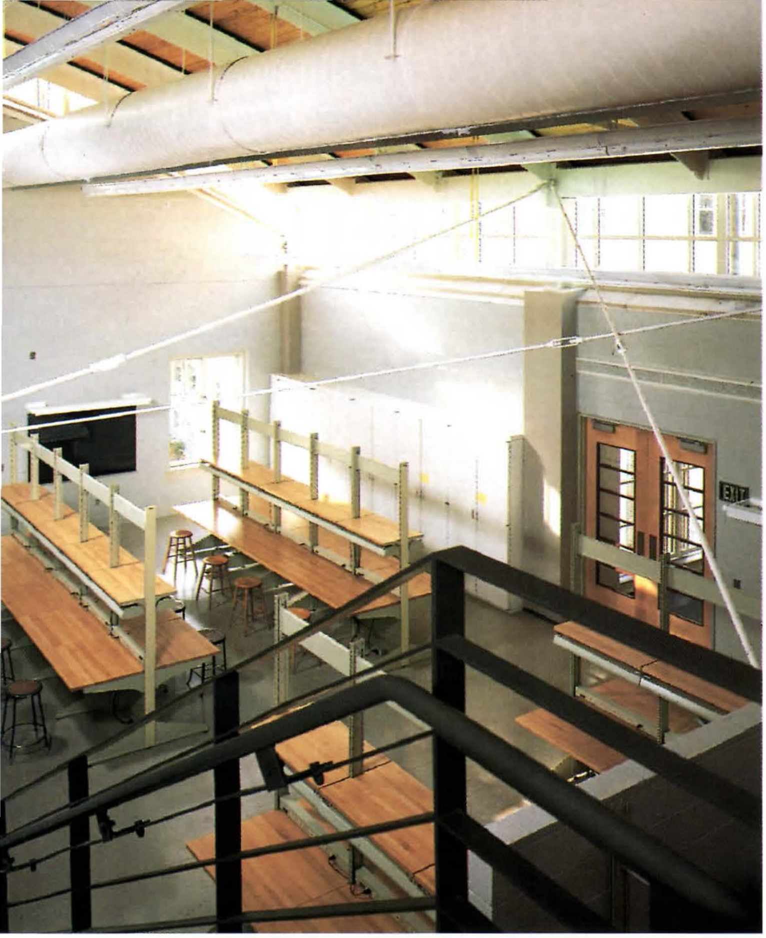


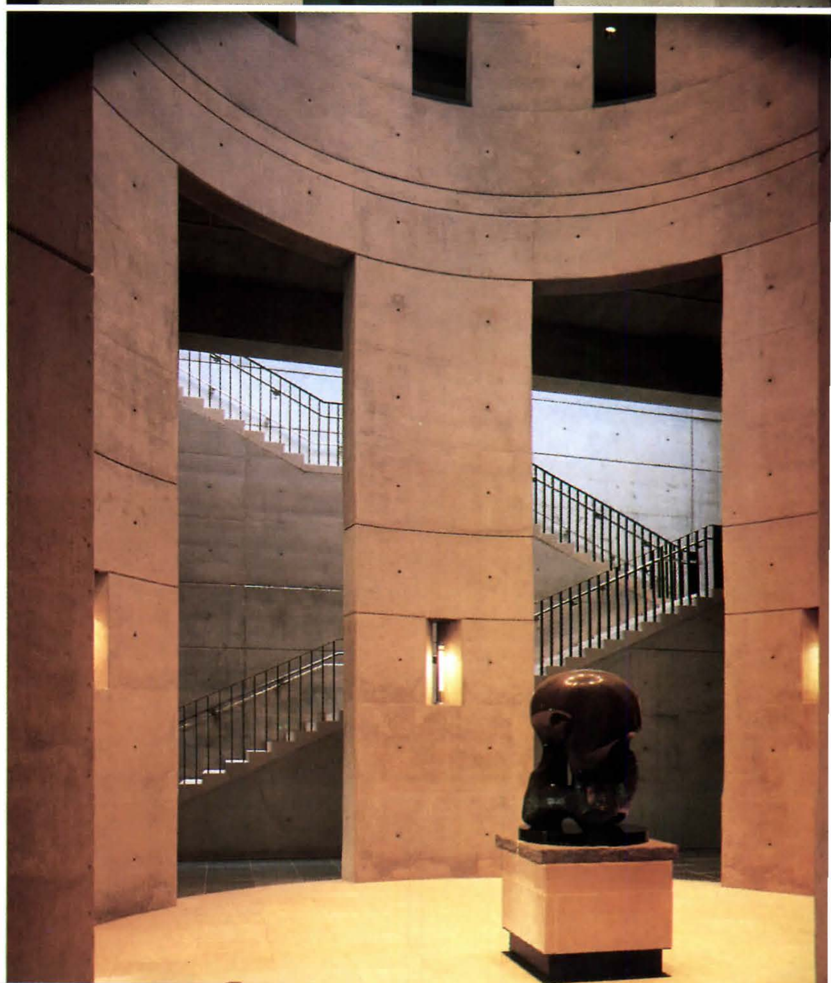
THIRD LEVEL



SECOND LEVEL
(ENTRY LEVEL)

On the fourth floor, the rotunda is expressed as a concrete drum, surrounded by an elegant public space that the architects affectionately call "Tadao Ando's living room" (top). A concrete stairway connects lower-level laboratories with the main entrance (above). The concrete walls of the rotunda (facing page, top right) are capped with a bowed steel truss that will eventually support a telescope in the observatory. A *grand stairway rises* along the north wall of the laboratory wing to the third and fourth floors (facing page, bottom right). The building is approached through a sequence of open and closed spaces, with the entrance foyer defined by rows of piers arranged off axis (facing page, bottom left). The main lab occupies the top floor of a barrel-vaulted pavilion (facing page, top left). The three floors (plans, right) reveal the complex layering of spaces.


EXIT



Islands of Learning

FOR BETTER OR WORSE, CROW ISLAND SCHOOL, WHICH opened in 1940 in Winnetka, Illinois, spawned hundreds of Modern, flat-roofed schools across the country—the kind many of us attended in the 1950s and '60s. Designed by Eliel and Eero Saarinen and the fledgling firm Perkins, Wheeler, and Will (now Perkins & Will), the low, window-banded brick elementary school was an architectural maverick in its day; its predecessors in the 1920s and '30s were rectangular three- and four-story brick boxes. Crow Island's positive effect was to shake architects out of building monumental fortresses of education and into designing lower, more child-oriented structures. In 1956, an architecture publication cited Crow Island as one of the 100 most influential buildings of the century, and in the grouping of most significant academic buildings, Crow Island was head of the class.

However, much of what makes Crow Island so special is its details—walls panelled in ponderosa pine; ceramic sculptures by the younger Saarinen's wife, Lily—and its pleasing proportions. Such subtleties were seldom replicated in buildings for less affluent school systems, which couldn't afford a famous architect on their design teams.

In the 1970s, schools began closing as enrollment declined, and architects turned their creative strengths to other projects. It wasn't until the late 1980s, when the children of the baby boomers became school age, that designing schools regained momentum. Recently, a survey of educational achievement among developed nations ranked American students only 10th, prompting President Bush to call for Americans to be "first in the world" in math and science by the year 2000. Furthermore, an investigation into the condition of public schools by the Educational Writers Association indicates that half of all schools in the country were built in the '50s and '60s, and 21 percent are more than 50 years old. These challenges have given the design and construction of American schools a new sense of urgency.

Whereas Modernism promulgated a resemblance among schools, today's architectural eclecticism promotes differences. Of the five schools featured on the following pages, not one is built of red brick. An Arizona school reflects a trend toward a campus plan, where separate buildings are connected by covered walkways. A school located in the Little Haiti section of Miami represents the pressing need to serve more than children: Toussaint Louverture's night courses in reading, English, and citizenship are attended by 600 adults. Private schools in rural Pennsylvania and Chicago reflect an emerging dissatisfaction with public institutions. No longer the province of the elite, these "independent schools" as they are now known, are increasingly attended by the children of two-wage-earner, professional families who seek more personal instruction for their children.

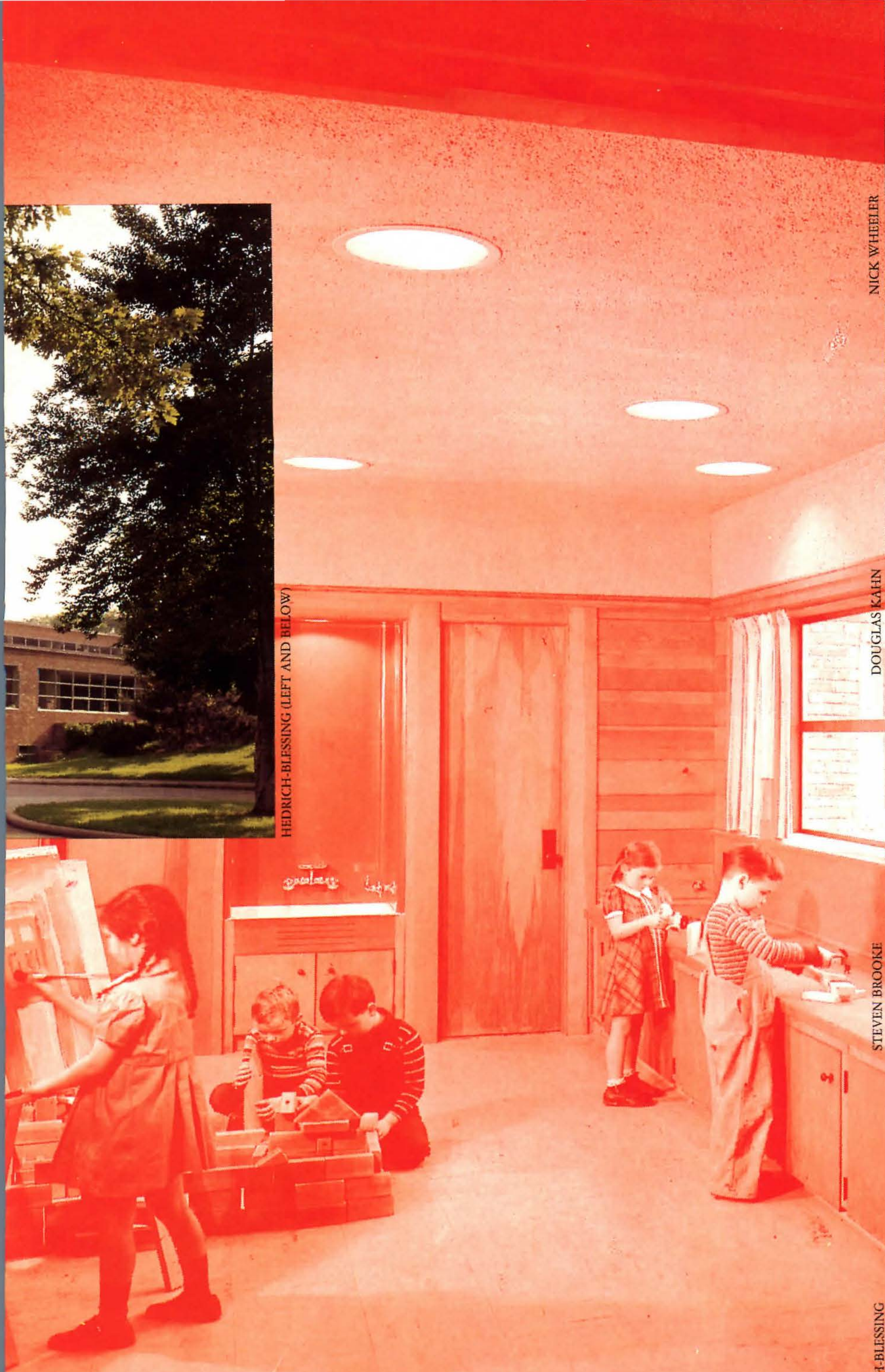
All the schools on the following pages also indicate a new regionalism in their architecture. The Arizona school, for example, houses its story-telling corner in" a "reading kiva," while in rural Massachusetts, the same function is served by a "silo." Boston architect Earl Flansburgh, an experienced designer of schools, says this newfound sensitivity to place is occurring because architects learned something from Modern schools like Crow Island, albeit inadvertently. "In our desire to have buildings in Boston, Chicago, and Dallas all look alike, we tended to forget that the sun is different, the climate is different, and the architectural traditions are different in all those parts of the country." Today, Flansburgh concludes, "we are reflecting the unique cultural, climatic, and social demands of where we are."

A sense of these demands came to light at an unusual conference of educators and architects last fall, sponsored by Crow Island School and Perkins & Will, held in celebration of Crow Island's 50th anniversary. In three days of discussions and presentations, such issues as "what is a school?" "who should design schools?" and "does environment affect learning?" were penetrated. At one point, following a presentation on Eero Saarinen, when conferees were all perched on his child-sized benches in Crow Island's auditorium, an architecture professor pointed out that 13 million poor children in this country may never have the advantage of attending such marvelous schools.

Fortunately, there can indeed be architecturally splendid schools in poor neighborhoods, as our featured Miami school makes clear. But consider: When Bernard Zyscovich was hired by Dade County to design the new school, it was a victory for the Haitian community, where it was desperately needed. But the county's program called for a building to house a maximum of 900 students; two years after it opened, its population is 1,234. (Toussaint Louverture's principal says the county's demographers overlooked the fact that single-family houses in the community are occupied by more than one family.) Aware of federal programs that make extra teachers available in low socio-economic areas, Zyscovich designed partitions so that classrooms of 30 could be separated into groups of 15 pupils per teacher. In practice, however, the smaller spaces house as many as 27.

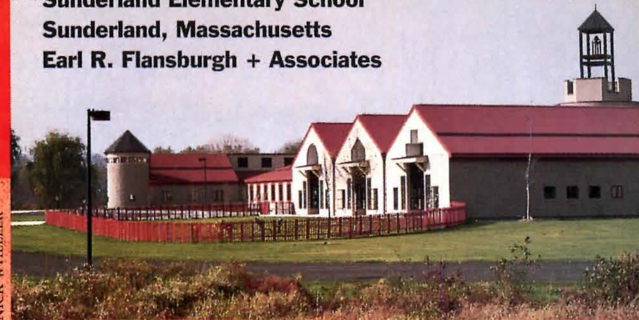
Toussaint Louverture's students love their school, but the architect wishes it had been tailored to fit the size of its population. If American students are ever to be "first in the world," it will take more than architecture to answer the President's challenge.

—HEIDI LANDECKER



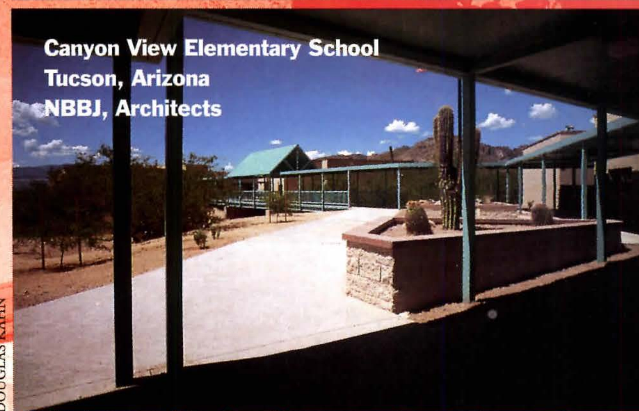
HEDRICH-BLESSING (LEFT AND BELOW)

Crow Island School, with its famous off-center clock (facing page), was designed by Eero Saarinen and Perkins, Wheeler, and Will. The school opened in 1940 and still serves 355 students in grades kindergarten through five. Crow Island featured ponderosa pine interiors, ample windows, child-height furniture and shelving, and spaces to accommodate new philosophies of unstructured learning (above) that were advocated by Winnetka's progressive school superintendant. Today's schools reflect regional diversity (right, top to bottom): silos and barns reference a rural Massachusetts location; open circulation patterns and rough materials defer to the Arizona desert; tropical colors and open-air corridors offer respite from the Florida sun; a suburban Chicago school incorporates elements from nearby Crow Island; and a suburban Pittsburgh private school revives rural Western Pennsylvania themes.



Sunderland Elementary School
Sunderland, Massachusetts
Earl R. Flansburgh + Associates

NICK WHEELER

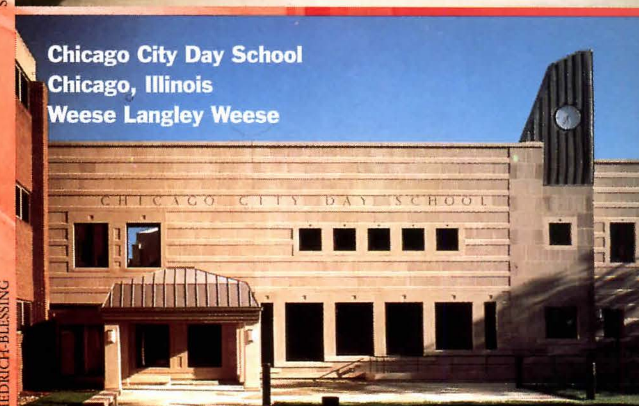


Canyon View Elementary School
Tucson, Arizona
NBBJ, Architects

DOUGLAS KAHN

Toussaint Louverture School
Miami, Florida
Zyscovich, Inc., Architects

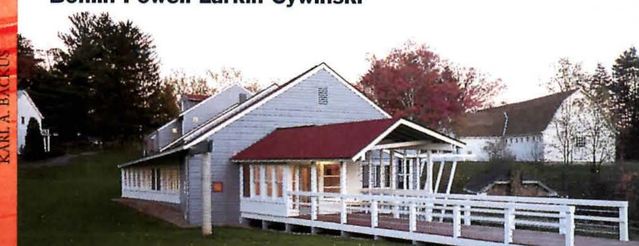
STEVEN BROOKE



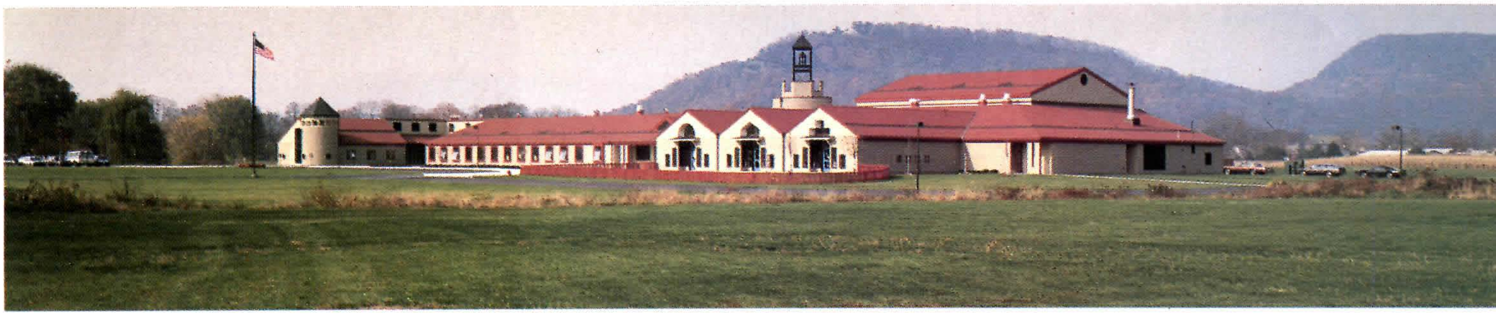
Chicago City Day School
Chicago, Illinois
Weese Langley Weese

HEDRICH-BLESSING

Winchester Thurston North Hills Campus
Hampton Township, Pennsylvania
Bohlin Powell Larkin Cywinski



KARL A. BACKUS



Sunderland Elementary School
Sunderland, Massachusetts
Earl R. Flansburgh + Associates

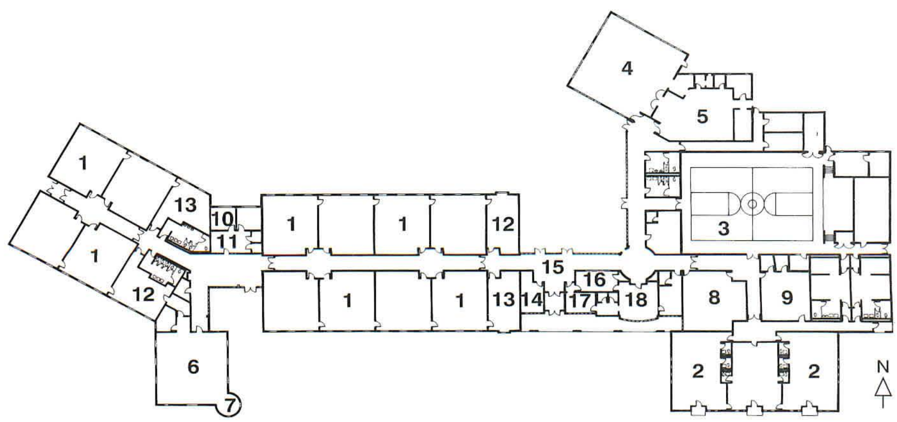
Barn Raising

IN SUNDERLAND, A SMALL TOWN IN THE Connecticut River valley of western Massachusetts, Earl R. Flansburgh + Associates metaphorically treated this 41,500-square-foot public elementary school as a microcosm of the rural community. Sunderland's 5,000 residents required more than a primary school for 350 students; they also needed a community center for town meetings and other civic events.

Flansburgh, an experienced architect of schools throughout New England, placed a bell tower over perpendicular corridors that symbolize the town's main intersection; classrooms, library, and gymnasium are grouped along a "Main Street." The school's clapboard buildings reflect the agrarian forms of rural New England, echoing 19th-century tobacco sheds. The library is housed in a barnlike building, complete with a silo, which contains raised levels of seating and is used as a storytelling center.

Three kindergarten classrooms are prominently located at the front of the building, accessible via their own driveway. Believing that the connection between home and school is important for this age group, the architect designed the classrooms to resemble little houses. The clock tower screens the large volume of the gym, preserving an overall sense of small scale. Facing due south, the front of the school takes advantage of sunlight, with the entrance illuminated when children arrive each morning.

NICK WHEELER, WHEELER PHOTOGRAPHICS PHOTOS



1 CLASSROOMS
2 KINDERGARTEN
3 GYM
4 CAFETERIA
5 KITCHEN
6 LIBRARY
7 STORYTELLING
8 ART
9 MUSIC
10 OFFICE
11 GUIDANCE
12 READING
13 SPECIAL EDUCATION
14 PLANNING
15 LOBBY
16 CONFERENCE
17 PRINCIPAL
18 MAIN OFFICE

Sunderland school's one-story building is clad in clapboard siding and shingle roofs (facing page, top and bottom). A play area for kindergarten students is protected by a fence (top). Cupola admits light into the cafeteria (above center), and a "silo" creates a storytelling area (above right).

ARCHITECTS: Earl R. Flansburgh + Associates Inc., Boston, Massachusetts—Earl R. Flansburgh (principal); David S. Soleau (principal-in-charge); Alan S. Ross (senior associate-in-charge); Roger Cannon (project manager); Jeffrey Fleming (project architect); Mark Kopchell (landscape architecture)
ENGINEERS: Chaloff/Barnes, Inc. (stuctural); TMP Consulting Engineers (mechanical); Lottero & Mason Associates (electical)



Canyon View Elementary School
Tucson, Arizona
NBBJ, Architects

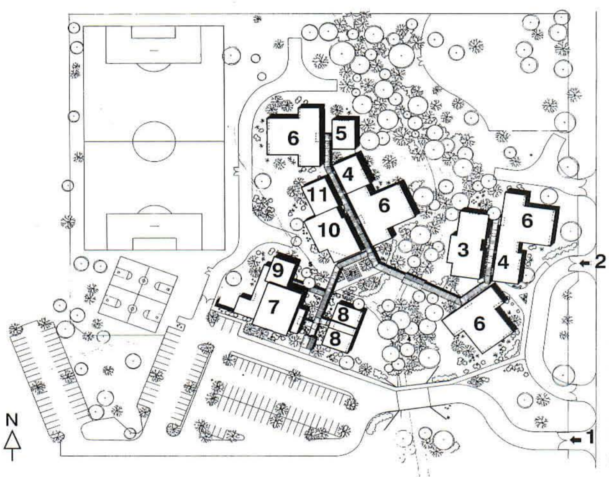
Desert Bloom

THE DESIGN OF THIS 54,160-SQUARE-FOOT school, located near Sabino Canyon National Monument, was heavily influenced by its site, which straddles an arroyo in a rugged desert region outside Tucson. These cactus-covered foothills northeast of the city have given rise to low-density development over the last decade, encouraging the Catalina Foothills School District to build a new school for the community.

The school's three groups of buildings are situated along the edges of the arroyo, where summer rainfall spawns a verdant collection of desert plants. The architects sought to fit the buildings into the land, and also capture dramatic views of saguaro cactus, paloverde, and other vegetation. Low buildings are constructed of concrete block with brick coping, and are painted to blend with desert colors. The ravine is spanned by a colorful pedestrian bridge, one component of a system of covered outdoor corridors that link all classrooms and facilities. Painted window trim accentuates classrooms, the library, and the "multipurpose room," which is also used as as a gym, auditorium, and cafeteria.

In the library, a large window takes in the Catalina Mountains to the north. Windows in a depressed, semicircular reading "kiva," where carpeted stairs serve as seating, provide a more intimate view directly into the arroyo. The library contains a classroom-sized conference room, a large reading room, and stack space.

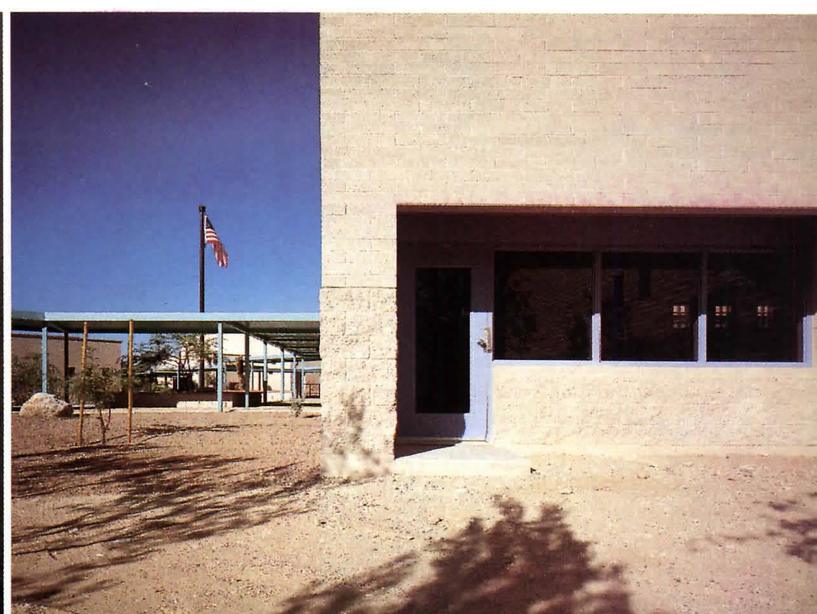
DOUGLAS KAHN PHOTOS



1 SITE ENTRY
2 BUS ENTRY
3 LIBRARY
4 SPECIAL EDUCATION
5 ART
6 CLASSROOMS
7 MULTIPURPOSE
8 KINDERGARTEN
9 MUSIC
10 ADMINISTRATION
11 COMPUTER

ARCHITECTS: NBBJ, Tucson, Arizona—James L. Larson (principal-in-charge); James A. Gresham (principal-in-charge of design); Dave Diebold (project manager); Bonnie Bridges (project architect); Nick Hayslett, Bill Gideon (design team)

The design of the Canyon View Elementary School was driven in part by a desire to focus students' attention on its dramatic desert site in the foothills of Arizona's Catalina Mountains (above). Large windows in the auditorium/play area give way to saguaro fields. Wainscot is constructed of split-face concrete block, and upper walls are ordinary concrete block painted to blend with the desert (facing page, top). Main entrance is marked by a canopy of painted steel (facing page, bottom left), while a similar canopy shelters the main pedestrian walkway that bridges the arroyo (facing page, bottom right). Steel columns support painted galvanized sheet metal canopies (bottom left). All classrooms have access to the desert (bottom right) as well as to the walkway system.



Toussaint Louverture Elementary School
Miami, Florida
Zyscovich, Inc., Architects

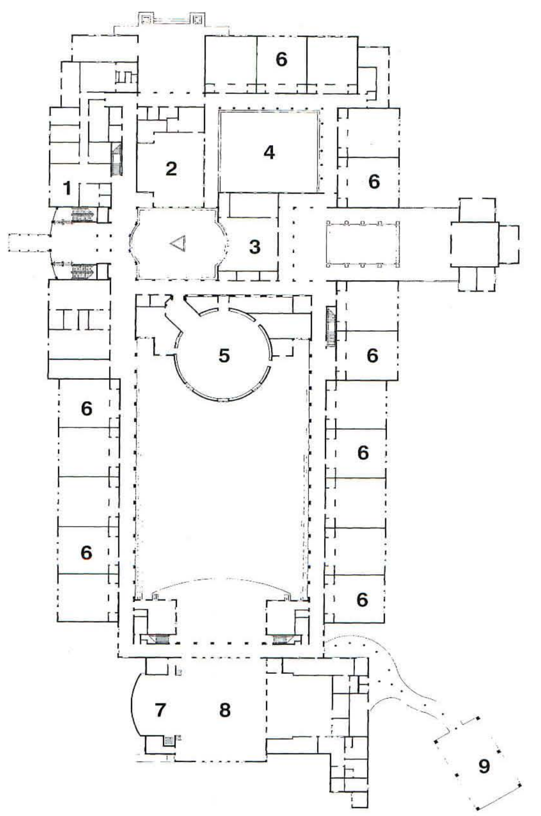
KARL A. BACKUS PHOTOS

Urban Education

NORTH CENTRAL MIAMI WAS A LARGELY FORgotten inner-city neighborhood 10 years ago, when Haitian immigrants reclaimed the low stucco houses and shops, decorating them with bright colors and signage. The population grew so rapidly that by 1985, Little Haiti needed a school. Bernard Zyscovich, who grew up in Miami and is familiar with its neighborhoods, visited the community frequently. He discovered a strong cultural identity and intense community ties; he accommodated these qualities in a 79,000-square-foot building that stresses light, color, and access to the outdoors.

Toussaint Louverture hugs four courtyards, inspired by Miami's single-courtyard schools of the 1930s, and all classrooms open onto them, linked by open-air corridors. Because the Dade County Public School's strict program failed to provide an auditorium large enough to hold the student body, Zyscovich (whose firm was Zyscovich & Grafton until 1986) created a great courtyard, cleverly adding a concrete stage. After visiting other schools with crowded classrooms divided by blackboards, Zyscovich designed movable soundproof partitions. County officials thought the architect had disobeyed their guidelines, because Toussaint Louverture, with its courtyards and open corridors, feels more spacious than other city schools.

In educational parlance, Toussaint Louverture is a "special-needs" school, which means it serves a community where illiteracy, poverty, and overcrowding are the norm. Into this intricate mix of urban problems, Zyscovich injected a Caribbean palette. Accenting the building's simple forms and openings, the hues are a brilliant amenity, making the school feel larger than it is. Like the outdoor corridors and courtyards, they educate county officials on what a cheerful place an urban school can be.



FIRST FLOOR PLAN

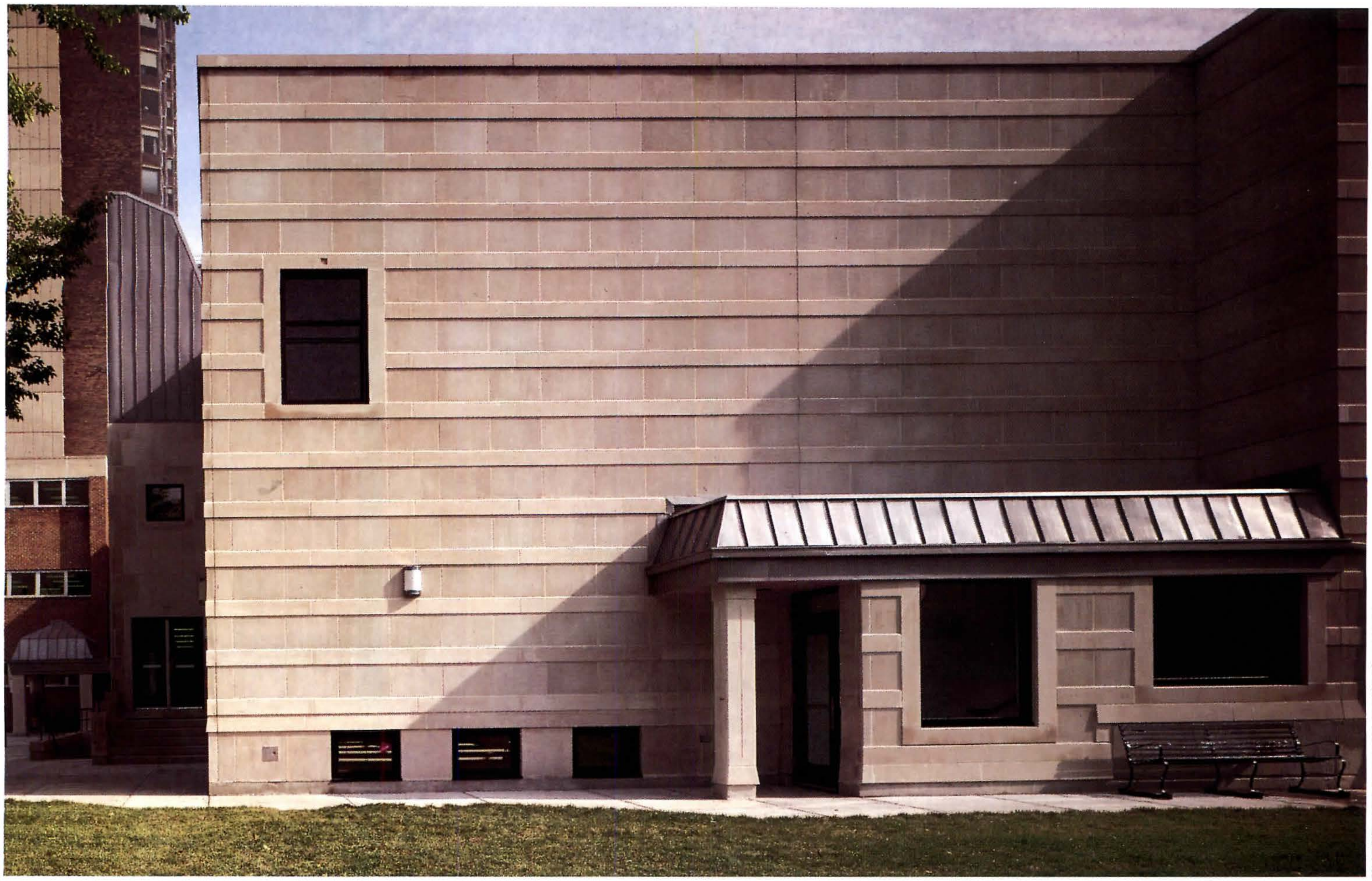
A pattern of four windows (top) repeats throughout the school, where classrooms open onto courtyards (above and facing page, center left). Largest courtyard has concrete stage, and balconies are enclosed by perforated aluminum railings (facing page, top). Kindergarten area has a separate entrance (facing page, center right), play shed shelters playground (facing page, bottom left), and library is housed in a round volume (facing page, bottom right).

ARCHITECTS: Zyscovich, Inc., Miami, Florida—Bernard Zyscovich (principal-in-charge); Joe Murguido, Eve Cater, Thorn Grafton, Dawn Hetzer, Mike Steffens, Christopher Ruck (project team)

1 ADMINISTRATION
2 MUSIC
3 ART
4 KINDERGARTEN COURT
5 LIBRARY
6 CLASSROOMS
7 STAGE
8 DINING ROOM
9 PHYSICAL EDUCATION SHELTER







JIM HEDRICH, HEDRICH-BLESSING PHOTOS

Chicago City Day School
Chicago, Illinois
Weese Langley Weese, Architects

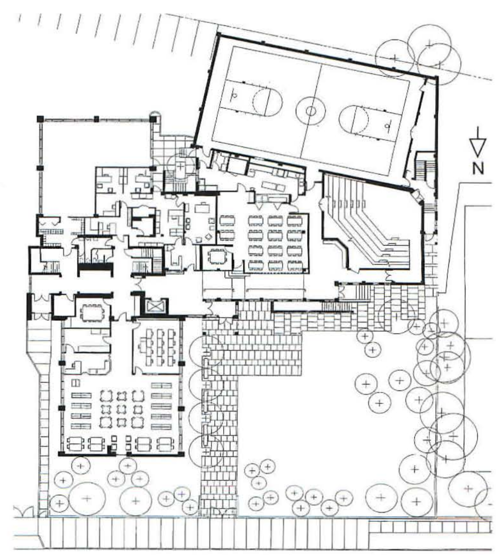
Local Precedent

ADDING A 22,800-SQUARE-FOOT WING TO A Chicago private school for grades kindergarten through eight, Weese Langley Weese began with the notion that such an institution should be dignified but not overwhelming. Located in one of Chicago's wealthier residential neighborhoods, the school's triangular urban site required that the new addition be placed close to the rear property line, both to maximize play areas and blend into the residential community.

The architects were required to double the space for the school's 200 students by adding onto an undistinguished 1960s building. To do so, they made several visits to Crow Island, Eero and Eliel Saarinen's influential school in a Chicago suburb. "We didn't consciously say we needed a clock tower because Crow Island has one," says Ben Weese, explaining that he sought to give the low structure a vertical element. Nevertheless, the inspiration is clear.

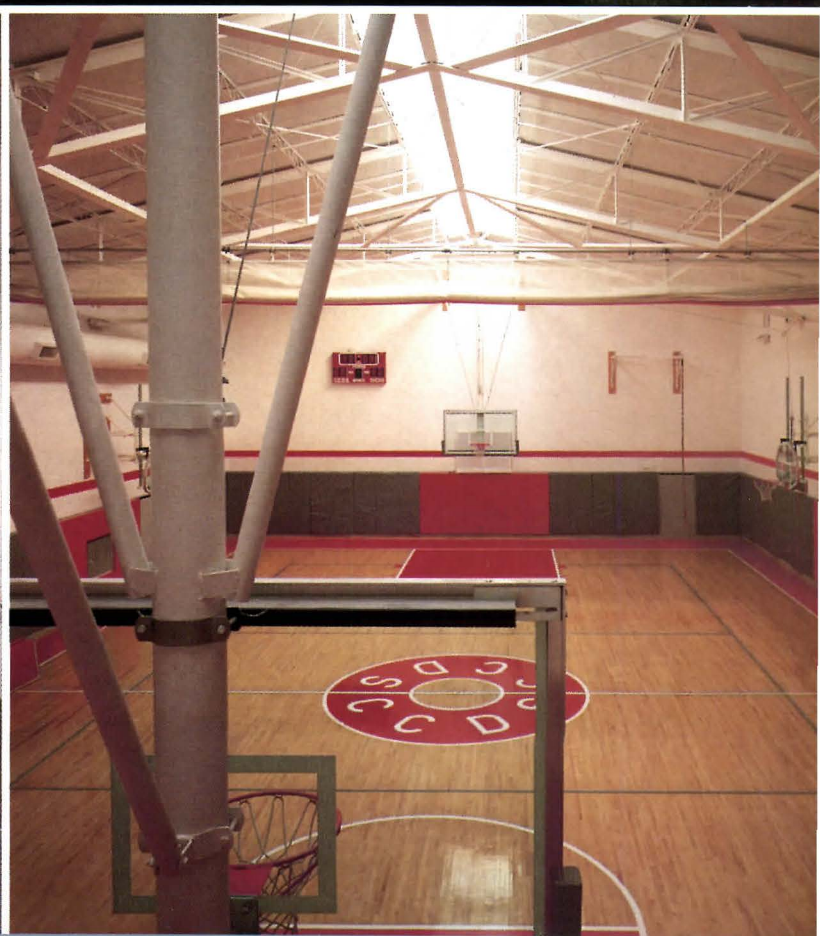
To enliven the addition's north-facing facade, the architects studied the masonry facades of H.H. Richardson's Marshall Field Wholesale Store (destroyed in 1931) and the existing Glessner House. Child-height windows bring natural light into corridors on both floors of the addition. On the second story, one window permits a vista directly through the building from outdoors. Technical functions, such as joining floors in old and new buildings and avoiding ground water on this site in the Lincoln Park neighborhood near Lake Michigan, also drove the design for the gymnasium, auditorium, labs, and dining facilities that comprise the new wing.

ARCHITECTS: Ben Weese, Cynthia Weese (principals); Stephen Christien (project architect)
INTERIORS: Joann Lang Interiors



In facades of Indiana limestone (top), windows are placed low at child scale, and the clock tower is sheathed in turncoated stainless steel, which weathers to gray (facing page, top). Ramps facilitate access for students with disabilities (facing page, bottom left), and a skylight along the roofline provides natural light for the gym (facing page, bottom right).


CHICAGO CITY DAY SCHOOL


CCDS

Winchester Thurston North Hills Campus
Hampton Township, Pennsylvania
Bohlin Powell Larkin Cywinski

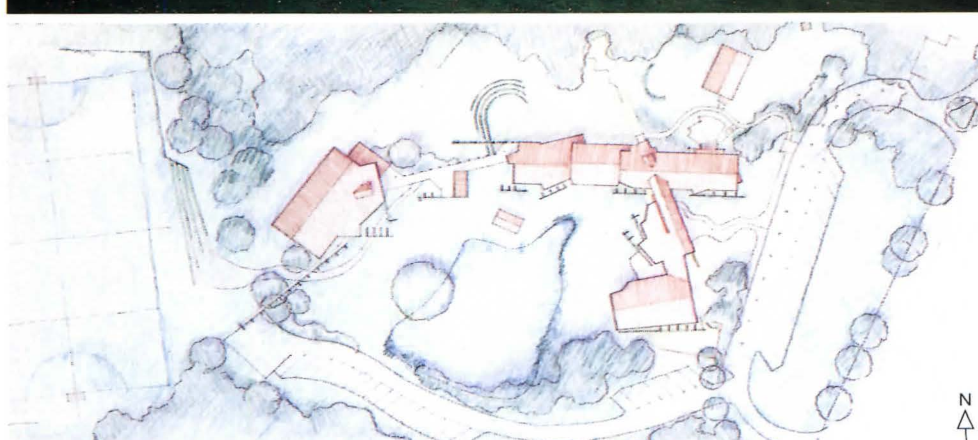
Rural Fragments

WHEN PITTSBURGH'S OLDEST PRIVATE GIRLS' school decided to open a co-ed facility in the city's northern suburbs, a seven-acre farm, *complete with a pond*, was chosen as the perfect site for the new campus. The original intention was to renovate an existing barn for the small student population (110 pupils in grades kindergarten through fifth), but Bohlin Powell Larkin Cywinski soon found the 19th-century barn beset with structural problems. The task of the architects was clear: to provide agrarian-style yet residential architecture on a sloping site, transfer the emotions of the clients from the barn to the new building, create a master plan for phased construction that would grow with the student population, and avoid the pond—all while maintaining the ambience of a country day school.

The architects' first building, which includes seven classrooms, has succeeded wonderfully in these endeavors. The 240-foot-long, low-slung building begins at an entrance drive and snakes down a grade change of nearly 30 feet, incorporating fragmented references to rural prototypes along the way. The building was completed in two stages, and its lower wing was occupied last fall.

The pond, a dubious amenity for an elementary school, guided the architects' placement of access and views. All doors lead children away from temptation, while all windows in the recently completed wing, which reaches toward the future gymnasium building, afford water views. Details exhibit an understanding of childhood whims and interests. Outside the classrooms for the youngest students are a birdhouse and squirrel feeder, railings are animated in form, and square punched windows located at child height are everywhere. ■

KARL A. BACKUS PHOTOS

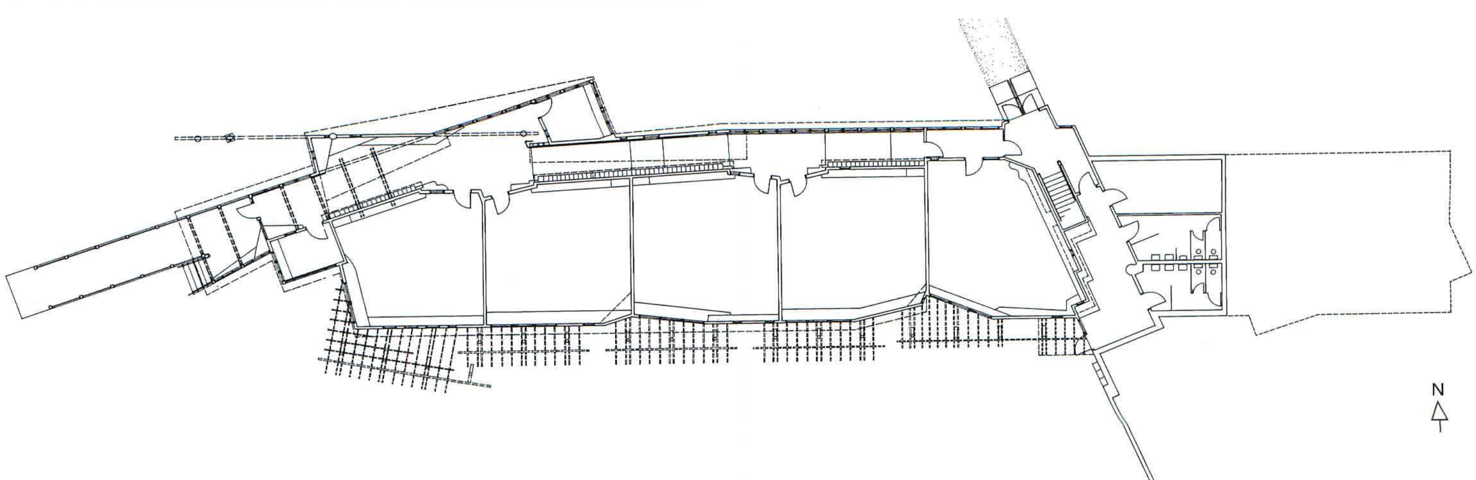


Entrance to the school (top right) is enlivened by porches, a trellis, a measuring stick, and a flagpole. Rear entrance (facing page, top) echoes the front. Rows of farmhouse-style windows (center right) light the corridor along classrooms for older students, which have views of the pond and existing warming shed (facing page, bottom). Two more phases, to include a separate gymnasium and an arts center, are planned to complete the campus by 1994 (site plan).


Corridor (left) links classrooms for third to fifth grades with those for lower grades, which are located on the upper story with music room and offices. A stair angled across the east-west orientation of the linear building (plan below and facing page, bottom right) will shortcut the approach to the future south wing. Small tutorial rooms are located on either side of the daylit corridor (facing page, top left), equipped with benches for story hour or private reading (facing page, top right). The library (facing page, bottom left) animates the entrance lobby, where exposed trusses offer lessons in building construction.

WINCHESTER THURSTON
NORTH HILLS CAMPUS
HAMPTON TOWNSHIP, PENNSYLVANIA

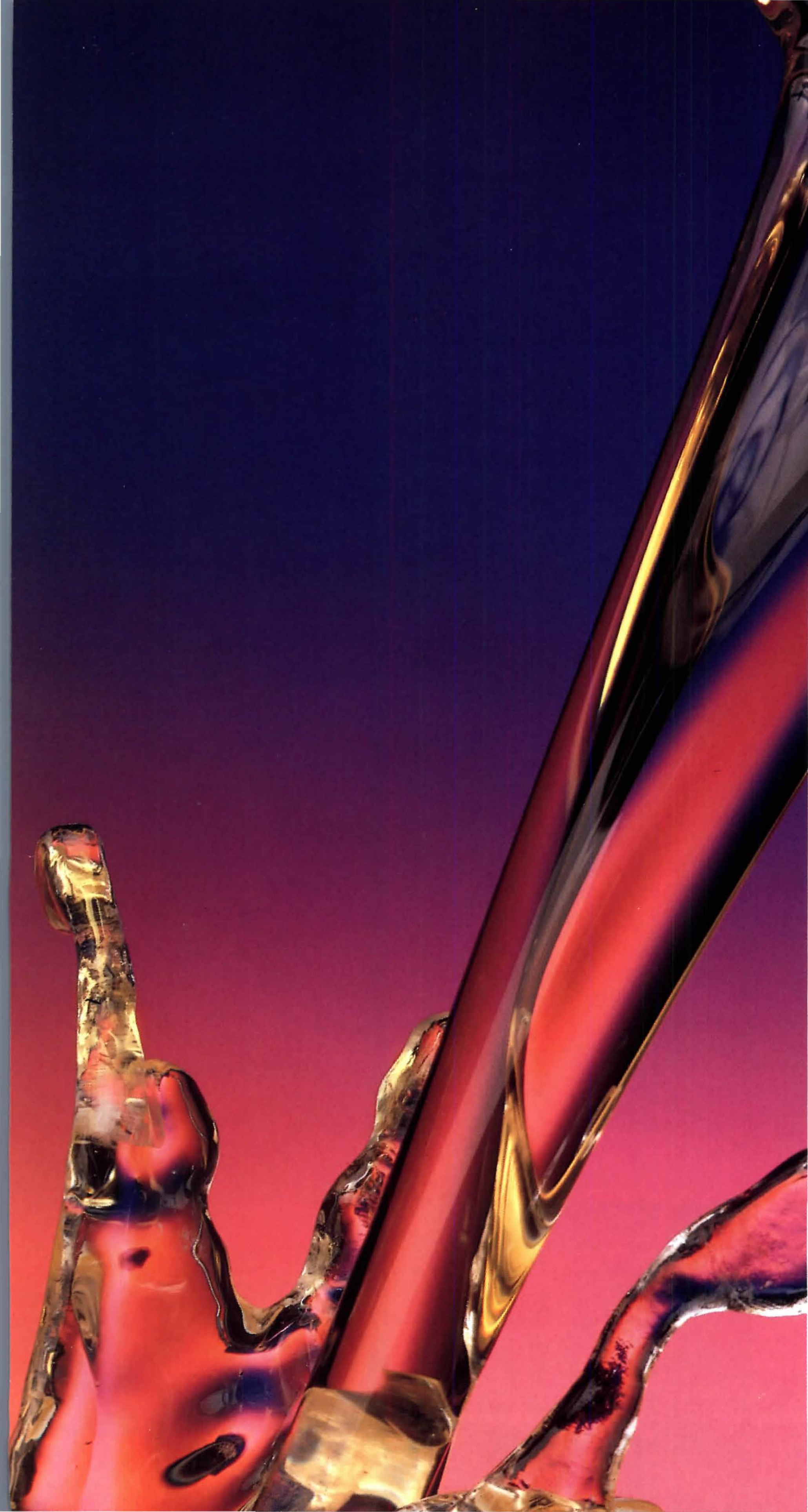
ARCHITECTS: Bohlin Powell Larkin Cywinski, Pittsburgh, Pennsylvania— Peter Q. Bohlin (principal, design); Jon C. Jackson (principal-in-charge); C. Roxanne Sherbeck (project manager); Karl A. Backus, Lisa M. Hayes, Rebecca L. Boles (project team)




EXIT



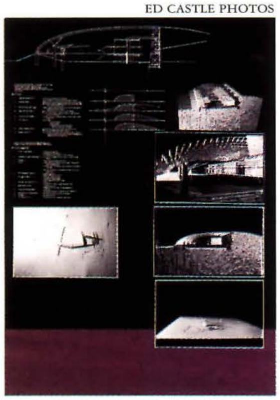
EXIT

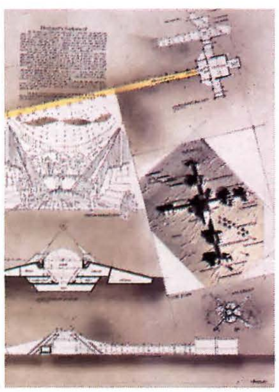


Educating Architects About the Environment

DURING THE PAST SEVERAL YEARS, PUBLIC opinion concerning the environment has shifted dramatically toward conservation. With increased public awareness, the challenge facing architects is to respond with environmentally sensitive designs. Two recent AIA-sponsored events—a symposium and a student design competition—addressed these concerns.

ED CASTLE PHOTOS





AIA symposium

THE SYMPOSIUM ENTITLED "Crossroads: Architects and The Environment" was held in mid-November in Washington, D.C., highlighting the recent formation of AIA's Committee on the Environment. Amory Lovins, a renowned environmentalist and founder of the Rocky Mountain Institute, began the proceedings on a practical note. He revealed that energy-conserving technologies make simple economic sense while reducing dependencies on natural resources.

Dennis E. Eckart (D-Ohio), a member of the U.S. House of Representatives Energy and Commerce Committee, predicted the passage of tougher laws concerning recycling, air quality, energy conservation, and waste cleanup in 1991. That is bad news indeed for private industry, according to speaker Harold J. Corbett, senior vice president of the Monsanto Corporation. The environmental benefits of stricter pollution controls on product manufacturers, he asserts, fail to merit their expense.

The proceedings began and concluded with a discussion of the goals of AIA's Committee on the Environment, which include the creation of the Environmental Resource Guide (ERG). Working in cooperation with the Environmental Protection Agency, the guide will be organized into 16 categories standardized by the Construction Specifiers Institute (CSI). Intended as a reference manual for building construction and design professionals, products will be analyzed as to their life-cycle impact on the environment, including the energy they consume and the waste they produce.

Speaker Amory Lovins (below) enlightened architects about energy conservation at an AIA symposium. Winning entries to the environmental design competition (above).

Student competition

EDUCATING FUTURE ARCHITECTS about environmental issues was the focus of a national student competition entitled Environment 1, sponsored by the American Institute of Architecture Students and the National Science Foundation. Reviewing 167 submissions from 71 universities nationwide, a jury chaired by Joseph Esherick, FAIA, convened in early November. The goal was to design a facility for scientific research of the south polar region by incorporating available technologies to minimize environmental impact, while meeting physical and psychological client needs. Alternative energy sources and consideration of waste-management methods were also encouraged. John D. Major and Peter Dorsey of the University of Houston designed the winning entry (top), and second place was awarded to Joel Smith and Sacha Schwartzkopf (above) of the University of Arizona. ■

—MARC S. HARRIMAN

Steel Update

Judged on the merits of technical efficiency and esthetics, nine steel-framed buildings were chosen as winners in the 1990 Architectural Awards for Excellence competition sponsored by the American Institute of Steel Construction (AISC). The winning architects and projects are: Perry Dean Rogers & Partners, Wm. M. Bristol Jr. Pool, Hamilton College, Clinton, New York (below); Murphy/Jahn, One Liberty Plaza, Philadelphia, and the United Terminal Complex, Chicago; Anthony Belluschi Architects, The Galleria at Erieview, Cleveland; SOM/Chicago, Arlington International Racecourse, Arlington Heights, Illinois; SOM/San Francisco, 388 Market Street, San Francisco; The Mathes Group, Electro-Coal Transfer Corporation, Davant, Louisiana; Ueland and Junker, Market Street Headhouses, Philadelphia; and Cesar Pelli & Associates, the Pacific Design Center Expansion, West Hollywood, California.

RICHARD MANDELKORN

Revised specifications affecting lightweight steel framing members are expected to be issued this month by the American Iron and Steel Institute. For additional information and to obtain a copy of the revised specifications, contact: AISI (202) 452-7100.

A new Steel Structures Technology Center was formed in August, 1990, to provide technical training seminars for professionals involved in the design and construction of steel-framed buildings. Contact: (313) 344-2910.

The Steel Joist Institute is making additional copies of its *50-Year Steel Joist Digest* available, which compiles specifications and load tables of steel joists manufactured between 1928 and 1978. Contact: (314) 241-1200.

Hurd InSol-8.™ The biggest news i

The new Hurd InSol-8™ window outperforms any other residential window. It's the only window that insulates to R8 center of glass—R5.5* total unit—and blocks over 99% of the sun's harmful UV rays.

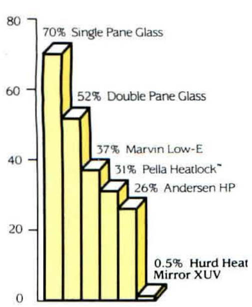
Design freedom without drawbacks.

You don't have to design around the drawbacks of conventional windows anymore. Now you can spec all the windows you want—virtually anywhere you want—without compromising comfort or energy efficiency.

InSol-8 windows are designed to control solar energy without limiting natural light—for any exposure, in any climate.

Heat Mirror XUV™ provides more fading protection than Andersen HP, Pella Heatlock™ and Marvin Low-E windows combined.

InSol-8 windows help protect against fading damage to draperies, furnishings and artwork by blocking over 99% of the sun's invisible UV radiation—without tinting the view.



Ultraviolet Transmission Comparison

InSol-8 windows transmit 50 times less UV radiation than ordinary "low-E" and more than 100 times less than double pane glass.

All calculations based on center of glass values for 1" Hurd InSol-8 windows with the Superglass System® with Heat Mirror™ Film. All data were calculated using WINDOW 3.1 Computer Program and standard ASHRAE winter conditions of 0° (F) outdoor and 70° (F) indoor temperatures with a 15 mph outside wind.

*Total unit R value of 5.5 is for commercial size units; 4.6 for residential size units.

Breaking the Mold

Architects design precast concrete forms that promote innovative applications of the material.

AS A FINISH MATERIAL, PRECAST CONCRETE is growing in sophistication. Architects are discovering its benefits in creating customized elements of increasing complexity and intricacy of detail. Consistency of colors and finishes is easily maintained, since quality control occurs at the manufacturing plant and the final product can be inspected before assembly. Unlike standard industrial shapes for a structural system, precast concrete as a finish material requires unique molds for each building. The ability to achieve custom-designed forms in concrete, therefore, is countered by the manufacturing process required for a precast cladding, which is most economical when repeating a single form.

Architectural expression in precast, however, is not restricted to the number of its individual parts. A combination of techniques is available to the architect for articulating various components, while limiting the number of separate molds required of the precaster to produce the desired results. A calculated design can incorporate a shape cast from a single mold that can be rotated, to provide multiple alternative applications, or flipped to form a mirror image. The concrete casting process also lends itself to simulating the character of other construction materials, such as stone, by replicating textures from mold impressions and varying the proportions and types of sand, aggregate, and pigments in the concrete mix. Surface finish treatments can be altered by varying sandblasting, waterwashing, or acid etching to create alternatives to identical elements that would otherwise appear repetitious.

Some design principles, however, are universal when detailing with precast. Due to the casting process, edges and joints demand particular attention to detailing. Although an architect should consider methods of construction when detailing with any material, the final form of a precast element is uniquely affected by the actual manufacturing process necessary to create its shape. As a building material requiring formwork, consideration should be given to how a precast concrete piece is molded. Providing a positive draft—slope of the concrete edges relative to the direction in which the concrete element is withdrawn from the mold—allows molds to remain intact for reuse instead of being disassembled and reconstructed for each casting. Mitered corners prove difficult to cast, and

Construction of SOM's Aurora Justice Center illustrates how a mold for a precast element is constructed (inset, far left) and how formwork influences a panel's shape. Transportation and erection of a panel (inset, second from left to far right), also determine the articulation of an exterior.

RON JOHNSON

their sharp edges can be easily damaged during transportation or construction. A chamfered edge, or "quirk," reduces this risk and also provides greater alignment tolerances between panels set adjacent to one another.

Thought must also be given to panel dimensions, which are limited by the ability to transport and erect them. Panel sizes, if not integral to the design, can lead to unexpected joint lines, which detract from esthetic intentions. Grooved recesses in the precast concrete surface, or reglets, can be designed to create false joints incorporated into a facade, producing a system of rustication that serves an architectural purpose rather than a purely utilitarian joint configuration. The following pages illustrate how teams of architects, engineers, and precasters have considered the process from form to finish and expanded the limits of the precast envelope.

—MARC S. HARRIMAN

Aurora Municipal Justice Center
Aurora, Colorado
Skidmore Owings and Merrill/Washington, D.C.

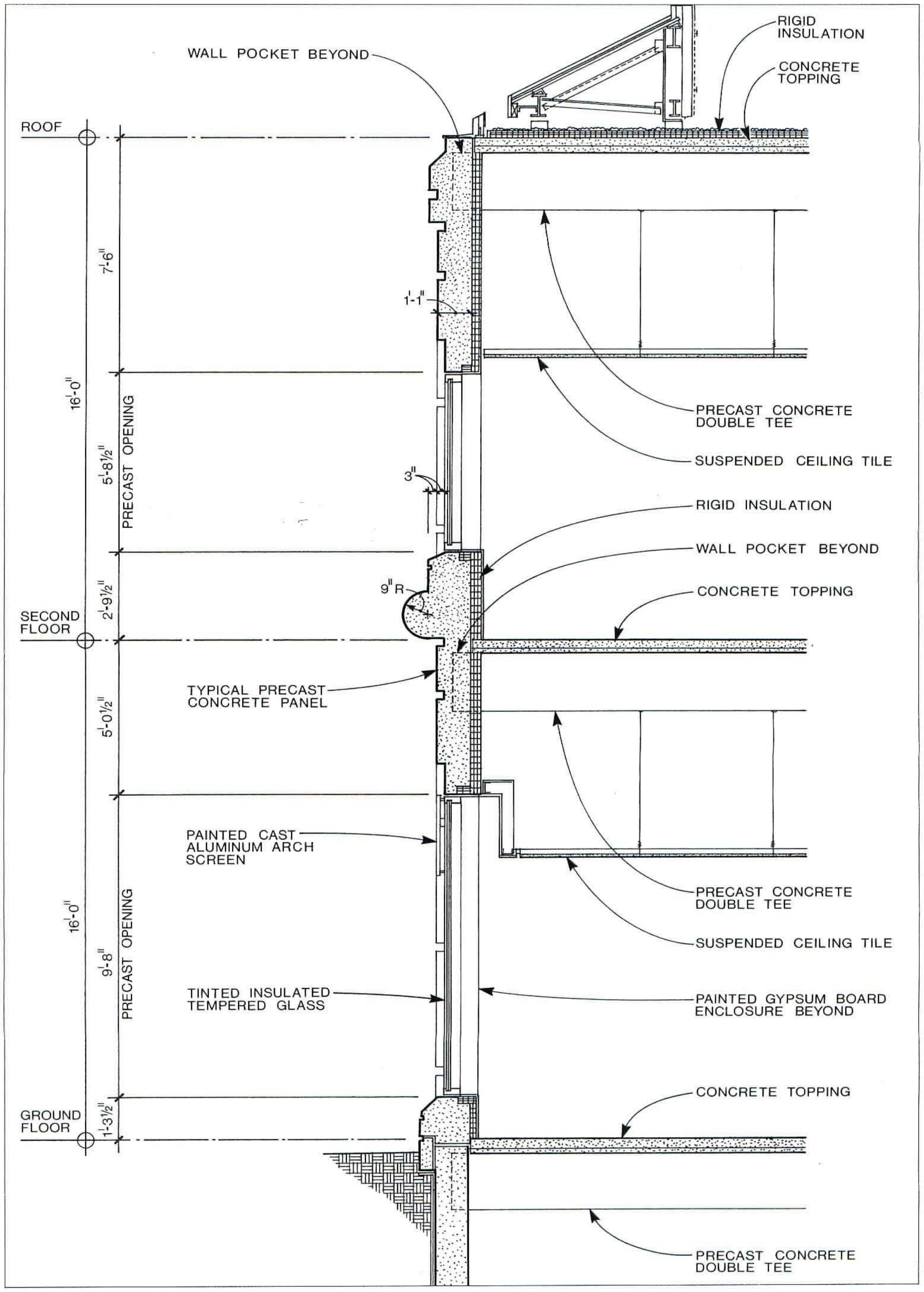
IN DESIGNING A NEW COURTHOUSE, DETENTION center, and a renovated police headquarters for the city of Aurora, SOM symbolically alludes to the Greek goddess of the sunrise in sunburst-patterned metal ornaments located in the openings of the courthouse's precast panel exterior. The architects also emphasize the play of light on the building's facades with beveled reveals, up to 10 inches wide, which vertically score the centerline of each paneled bay. "I couldn't believe the width of the rustication when drawing the elevations, but it works with the scale of the building," says project architect Kenneth Wiseman.

The architectural expression of the building's precast envelope (top right) is also related to its structural function. Double-tee floor slabs are supported by pockets in two-story, loadbearing, structural precast walls (section at right). The thickest portions of the wall form pilasters that flank either side of shallower, inset openings.

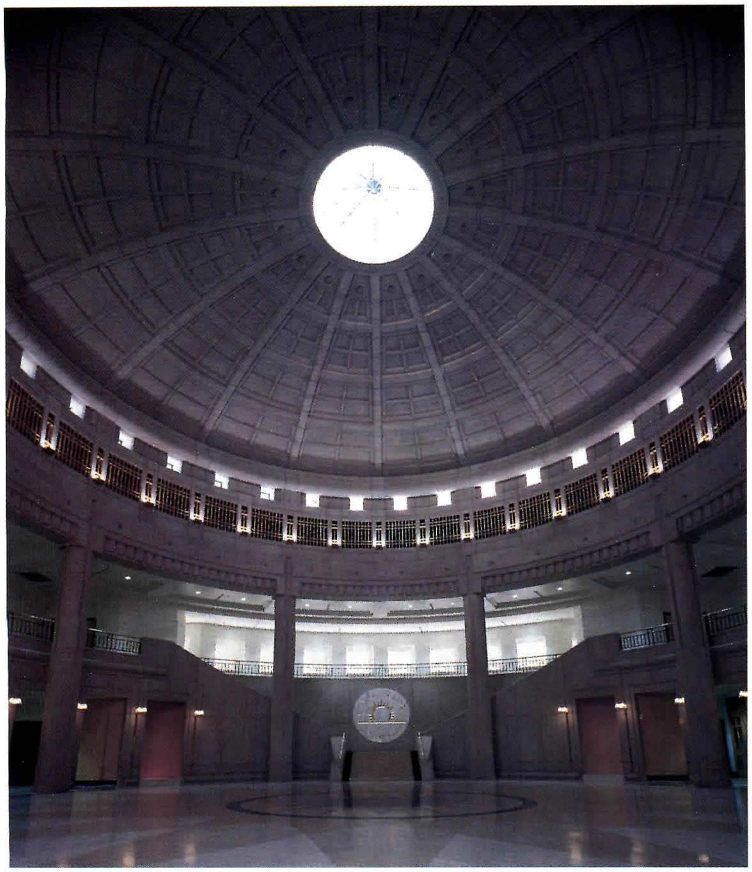
The focal point of the center, however, is a 72-foot-diameter dome crowning the central rotunda of the courthouse, which organizes circulation and terminates the main east-west axis. Morning sun illuminates the rotunda from an oculus and clerestory (facing page, top left). In examining methods and materials for constructing the dome, Wiseman explains, "Precast seemed like the logical choice for constructing the dome, but when the manufacturers looked for similar solutions, they discovered it was without precedent." Thus, the Aurora Justice Center boasts the first precast dome in the United States. Constructed of 16 double-curved, wedged-shaped pieces (facing page, top right and sections), the dome is supported by a precast compression ring and a cast-in-place tension ring at its base, which rests on eight precast columns (facing page, top center).

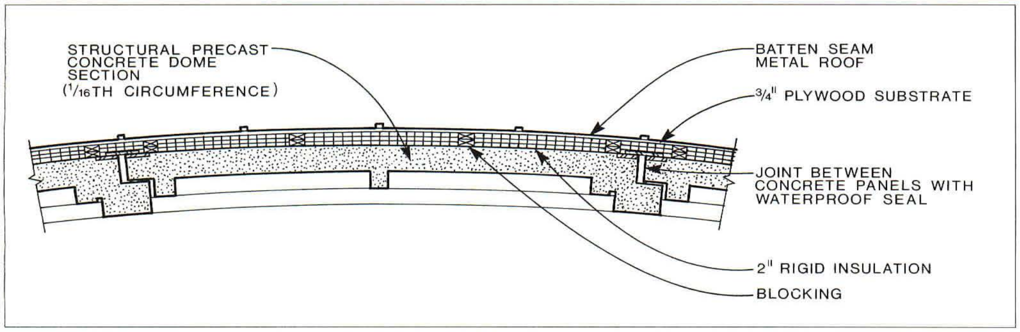
"The number of segments worked both in terms of construction and appearance," notes Jerome Rasgus, SOM associate partner and structural engineer for the project. The panels were sequentially placed opposite one another (facing page, center right) to provide stability during erection. To mask the joint where pieces overlap, a reveal was formed along the edge of the rib opposite the connecting seam (facing page, center section). The Precast/Prestressed Concrete Institute noted SOM's precise detailing by awarding the justice center a winner in its 1990 Professional Design Awards Competition.

JON MILLER, HEDRICH-BLESSING

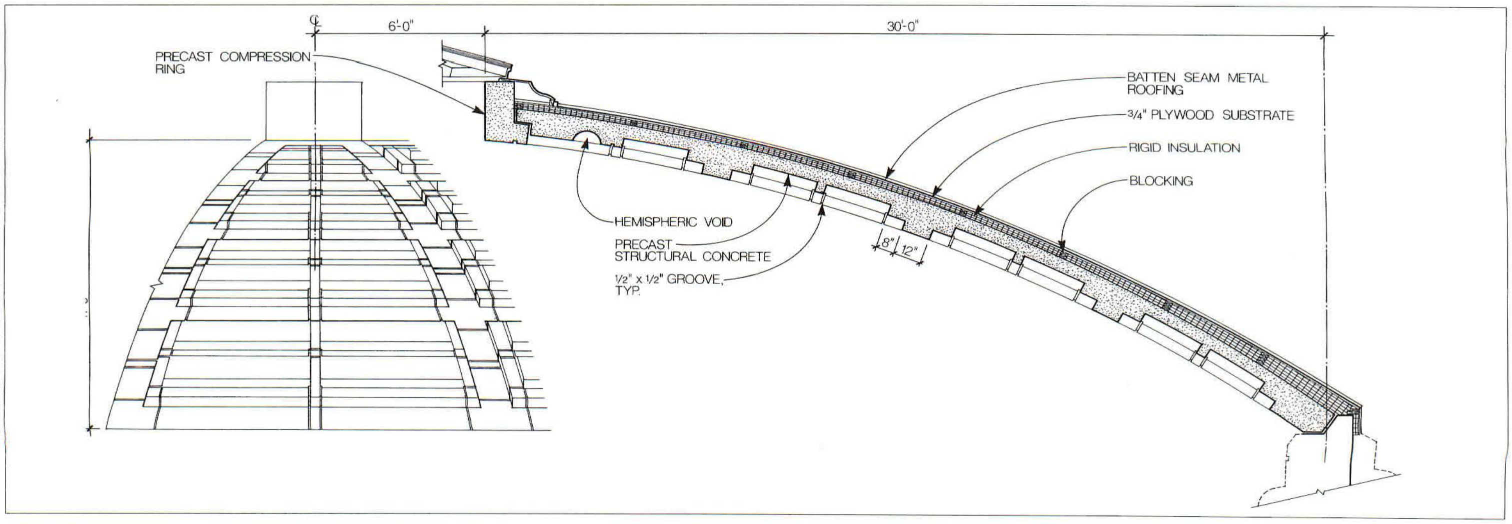


WALL SECTION





DOME PANEL SECTION



DOME PANEL ELEVATION AND SECTION

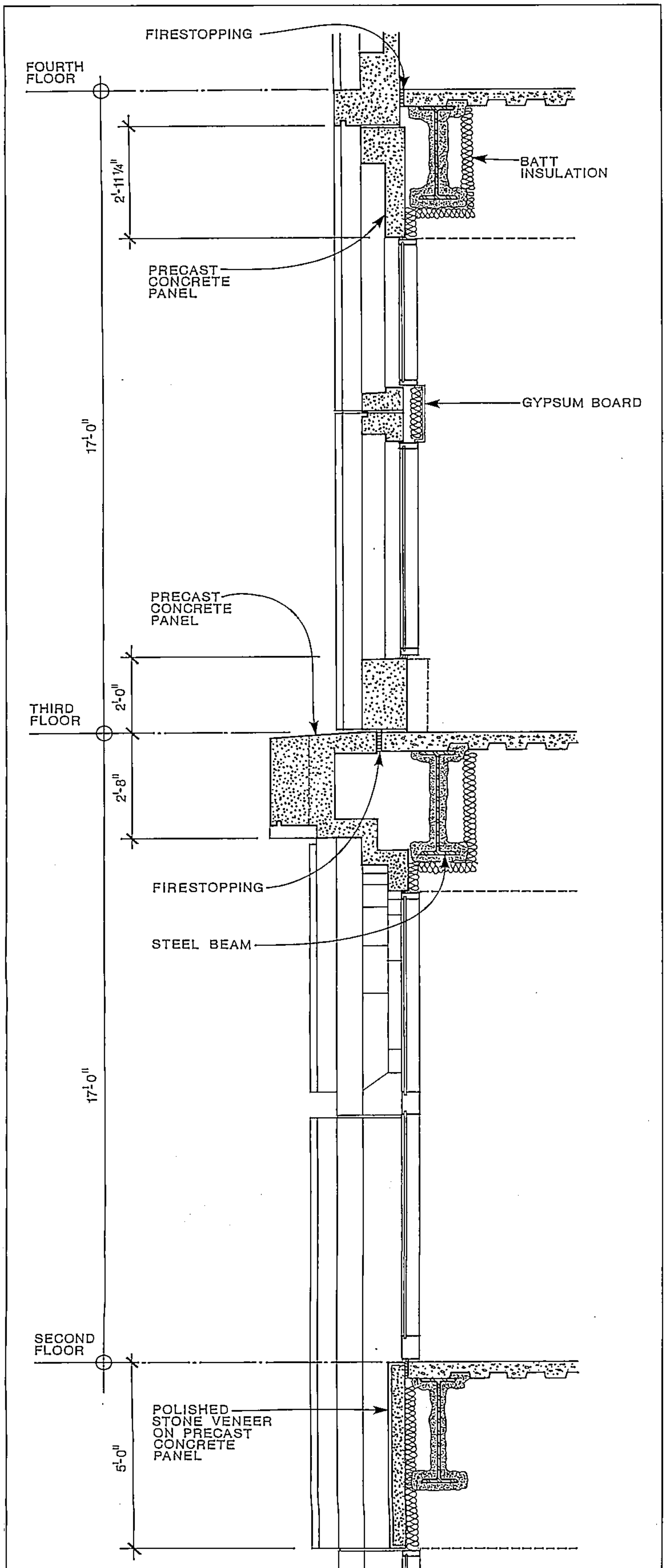
55 Stockton
San Francisco, California
Heller & Leake Architects

TURNING A CORNER OF UNION SQUARE IN downtown San Francicso, 55 Stockton is designed to be contextual, responding to the ornate terra-cotta facades of its neighbors. The new mixed-use building relates to the character and scale of its surroundings with a *highly articulated facade* (right) composed of sandblasted white precast panels that recall the forms of late 19th-century cast-iron commercial structures.

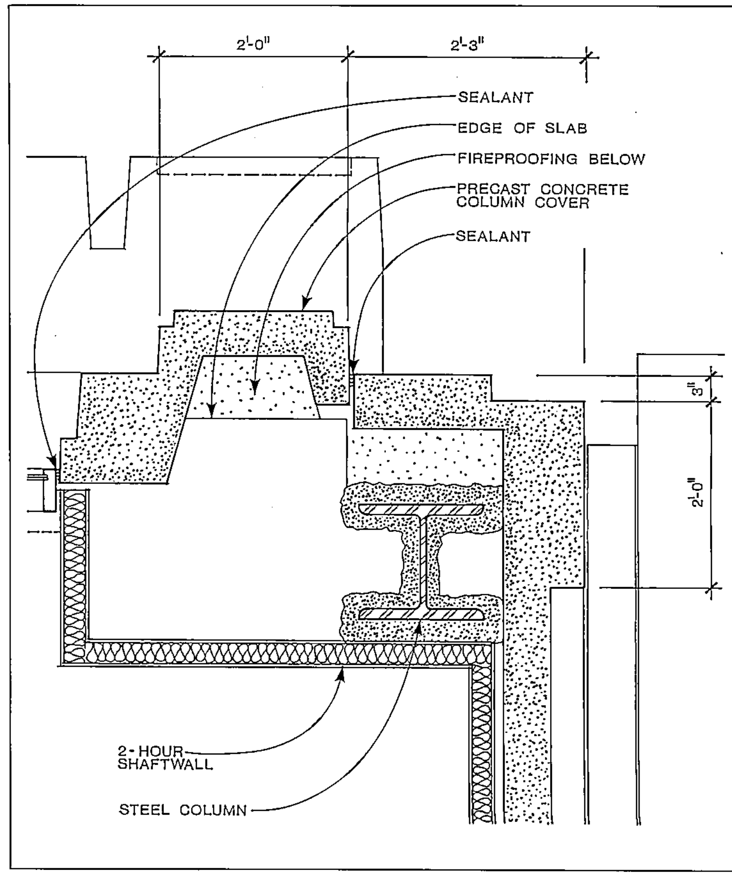
The building's location in a historic district required that the architects comply with a local ordinance stipulating that 1 percent of construction costs be applied to public art. When shop owners rejected Heller & Leake's idea of banners on the grounds that they would block storefront displays, the architects filled receptacles originally designed for flagpoles (located between the second and third floors) with precast figures that complement the deeply sculpted facade (bottom right). In addition to serving as decorative elements, the medallions provide separations between horizontal moldings. This arrangement allows for necessary construction tolerances in aligning individually cast pieces to form a continuous curve. Precast column covers (facing page, bottom right) serve a similar function. Arched panels over the top floor window heads were molded as one piece and then cut at their centerlines for ease of transportation and erection.

"The prominence of a grid of joint lines on a previous project taught us a lot about precast," explains project architect Michael Garcia. "With flat or simple facades, the grid can enhance the architecture, but can be a detriment to esthetic intentions of a highly ornamented facade if panel sizes are not carefully considered." To prevent joints from dominating the facade, the architects designed precast elements to intersect along column edges (facing page, top right), floor lines, and window mullions (facing page, wall section). In addition to accommodating cladding expansion and contraction, the typical 3/4-inch joint spacing was chosen to comply with seismic codes. The cladding is attached to a structural frame with push-pull connections, in which a rod is threaded through an enlarged hole in a clip, allowing vertical adjustment. This joint and mechanical fastening system proved valuable in providing enough ductility for the cladding of 55 Stockton to withstand the October 1989 earthquake without harm.

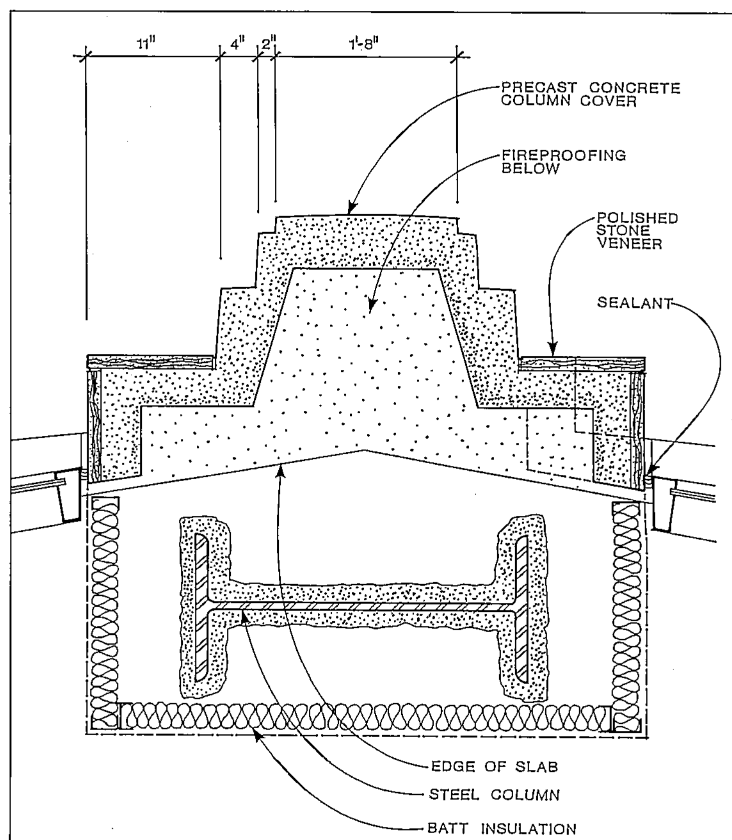
DOUGLAS SYMES



WALL SECTION



CORNER DETAIL



COLUMN DETAIL

The Atrium
Newton, Massachusetts
Jung/Brannen Associates, Inc.

COMPRISING 70 STORES AND RESTAURANTS on four levels, the Atrium is designed as an upscale shopping center in a Boston suburb. However, in its bay windows and Classically inspired elements (right), the building is reminiscent of the traditional architecture characteristic of downtown Boston. The Atrium's precast concrete envelope extends to the limits of a tight, triangular site and becomes increasingly refined in texture as it rises from a rusticated base. Three types of precast panels were designed to create roughcut, smooth, and sandblasted finishes (bottom right).

White precast concrete was specified, produced from a cement and sand mixture containing mica. The building's retail image is reflected on the exterior by partially exposing the mica to create a sparkle in the sunlight. As project architect Roger Stein points out, stainage of the exterior light-colored concrete was a concern due to emissions from heavy traffic on the adjacent highway. However, the architects did not want to apply a sealant, which can darken or yellow the concrete. Carefully selected locations for drip edges were cast (facing page, top right detail) to prevent streaking on vertical surfaces and inset half-columns below (facing page, top left). Achieving a completely exposed half-round column (facing page, bottom left) proved difficult to produce, so the architects developed one-inch-wide reglets on either side of the columns (facing page, bottom right), in order to ease the cast pieces from the mold during the manufacturing process.

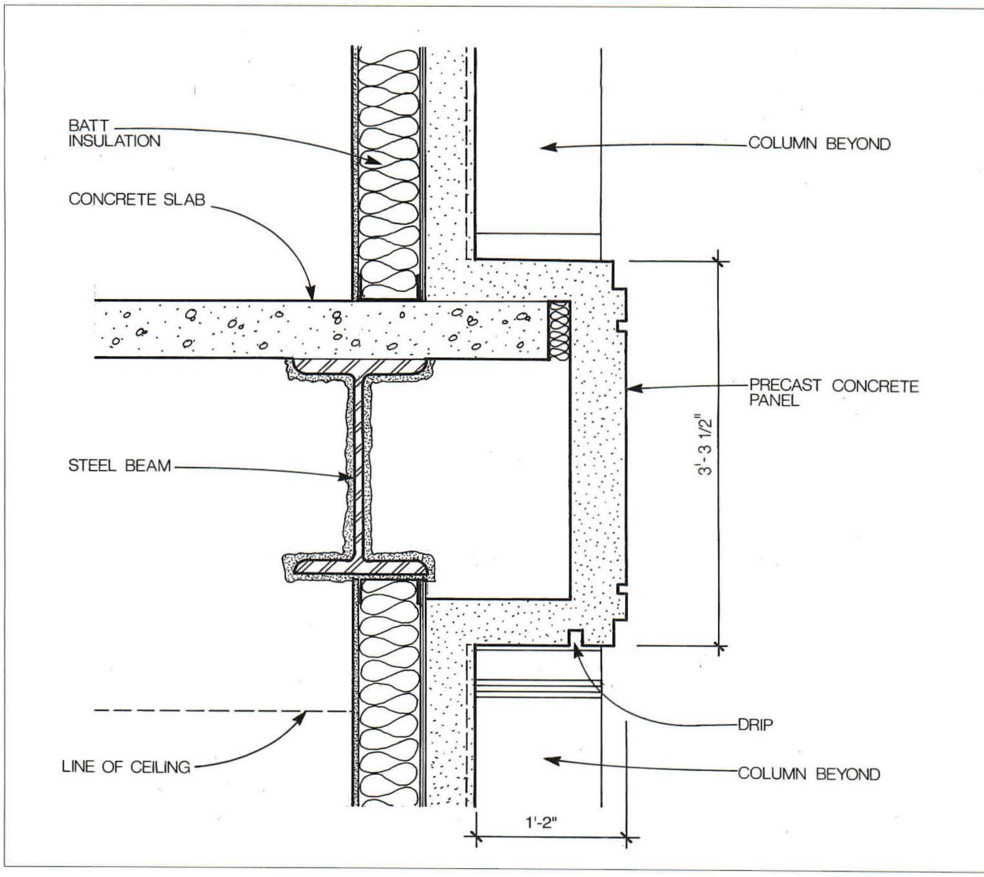
From the initial design, principal in charge of design Tom Dolle envisioned a granite-textured finish for the rusticated base, but discovered an exposed aggregate could not achieve the desired results. To simulate granite, the architects specified rubber molds cast from rough-cut granite blocks to line the concrete forms and produce the required granular surface texture. Project director Gary Davis explains that working with the precasters, the architects maximized the variety of granite-simulated panel sizes with a minimum of labor and materials by altering the dimensions of the rusticated panels to coincide with the molding sequence. The smaller, rusticated pieces were proportioned to require only one cut from the six original blocks that served as molds for the larger panel forms. This arrangement produced a total of 11 separate panel sizes. ■

JAMES G. SHANLEY

RICHARD MANDELKORN

RICHARD MANDELKORN

RICHARD MANDELKORN



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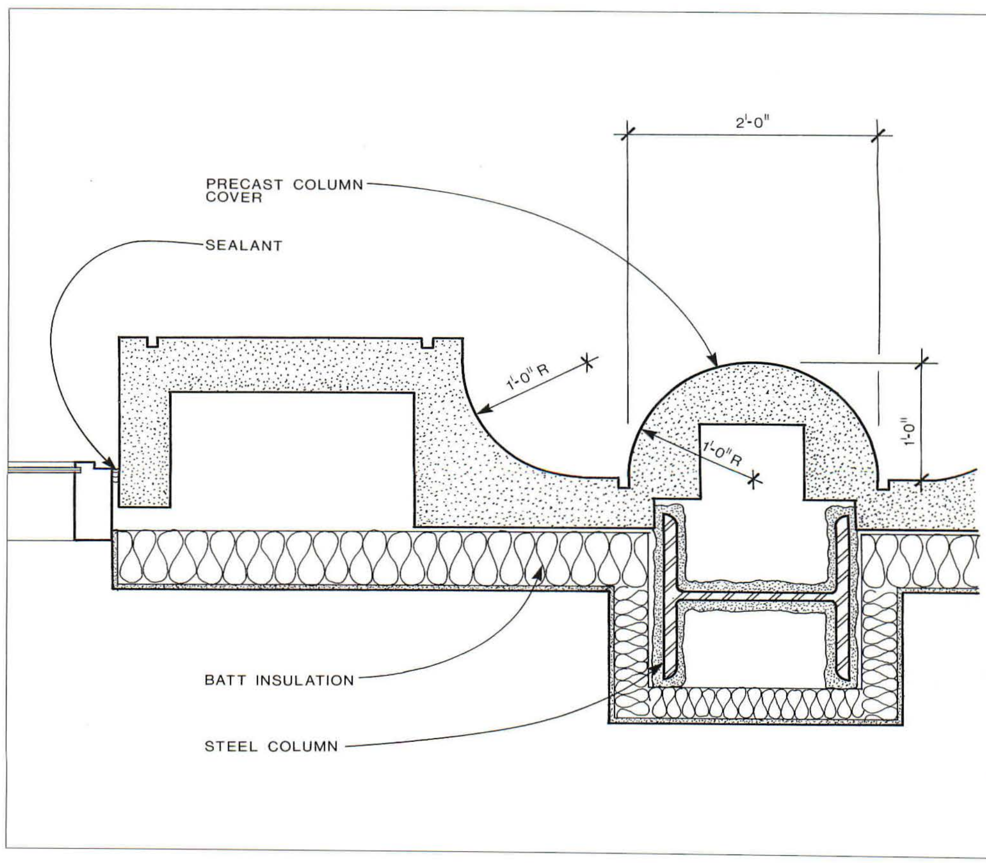


PANEL DETAIL

Managing Rapid Change

An AIA-sponsored roundtable assesses the economic downturn and offers advice for future stability.

LATE LAST SUMMER AS STORM CLOUDS BEGAN gathering on the economic horizon, the AIA launched Managing Rapid Change, a program to help architects track the construction market and prepare for a precipitous drop in the number of new buildings.

Although the current economy continues reshaping itself, its overall direction is fairly clear. Speculative overbuilding in the 1980s has left a 19.5 percent national office vacancy rate and an oversupply of condominiums and expensive single homes. Meanwhile, other construction has been stalled by the savings and loan industry crisis, the federal deficit, and the extreme fragility of the U.S. financial system in general.

A further damper on construction is the government's effort to regulate lending through the Financial Institutions Reform, Recovery, and Enforcement Act of 1989 (FIRREA), which narrowly limits loans to individual borrowers. Aggravating the economy's frailty are fears of inflation, white-collar unemployment in a faltering service- and information-based economy, and sinking consumer confidence.

The first step of the Managing Rapid Change program was to survey the perceptions of some 3,000 AIA board members, committee members, and members of the Society of Architectural Administrators. "These are involved, knowledgeable practitioners, who already have their eyes above the drawing boards," in the words of Richard Hobbs, director of Managing Rapid Change and group vice president of the AIA's Professional Excellence Division. The survey respondents tend to view the future with unusual optimism. On the whole, they indicate that their firms will be growing in size from 1990 to 1993, just as most reported growth from 1987 to 1990. They perceive the greatest market weakness in the Northeast, the greatest potential strength in the Southwest.

Eighty percent of those surveyed are private practitioners, 3 percent are employed by the government, and 9 percent by corporations. Forty-one percent are from the East, 21 percent from the West, 10 percent from the Southwest, 23 percent from the north central states, and 5 percent from the south central states. Just over half report that their work is regionally-based, 25 percent regard themselves as local practitioners, 14 percent as national, and 8 percent as international.

In an effort to interpret the questionnaire responses and add an outside perspective, Managing Rapid Change last September convened a roundtable of design clients and bankers in Washington, D.C. The participants were Michael Fitzgerald, vice president and director of implementation and strategy for the Pacific Institute in Seattle; Kermit Baker, Director of Cahners Economics in Newton, Massachusetts; Thomas Hoppin, President of the Century National Bank, Washington, D.C.; Hugh Knox, Assistant Director for Regional Economics of the Bureau of Economic Analysis, U.S. Department of Commerce; Alton Penz, vice president for research of the Building Owners and Managers Association; William Sinclair, Chairman and CEO of the Washington Federal Savings Bank; Heather Kurent, senior associate with the Institute for Alternative Futures, Washington, D.C.; David Stahl, executive director of the Urban Land Institute, Washington, D.C.; and Duncan Sutherland, chief technical officer of Fitch Richardson-Smith in Worthington, Ohio.

"When calculating the expertise for services you can make available to your clients, include consultants and potential partnerships in your thinking."

Duncan B. Sutherland, Jr.,
Associate Vice President
Fitch RichardsonSmith

The roundtable participants agree with Penz that "growth overall may be slow, but there is activity throughout the economy." They also concur, in Kurent's words, that the "rules have changed." The economy, according to Baker, is not likely to reverse until 1992, when construction levels may come close to 1989 levels. In 1992, housing is expected to lead a modest recovery of construction markets, as commercial building begins rebounding and housing further expands in 1993. Says banker Sinclair, "This economy is not going to hell in a handbasket. There is some good news out there. The U.S. economy is still three times the size of Japan's."

The AIA roundtable's advice to architects is clear: Get your firm's financial house in order, analyze your skills and the marketplace for them, and recognize potential new markets.

Banker Hoppin suggests that firms should get themselves financially stable before approaching lending institutions. Because bankers are "renting money," Hoppin explains, an architecture practice must prove a

PETER HOEY

reliable source of repayment and a financial backup if lightning strikes. In his experience, design firms stretch themselves too thin, allowing their expenses—primarily composed of staff salaries—to overreach their proven revenues. "They borrow to cover shortfalls and dig themselves in deeper until they end up going under or merging," says Hoppin. He urges architecture firms to seek help from a CPA or other business counselor.

"Opportunities are out there in pockets, just as there are pockets to be avoided. Architects have to increase their efforts to search for work."

Alton Penz
Vice President for Research
Building Owners and
Management Association

How does a firm become more businesslike? Duncan Sutherland, of the broad-based design firm Fitch Richardson-Smith in Worthington, Ohio, stresses that architects have transferable skills and "need to overcome the idea that they are only designers." Since the industrial revolution, he notes, "we have followed a pattern of dividing things into small parts. What's needed in government and corporate America are people to oversee the big picture, and architects are trained for that." He views architecture's charge as "broader than buildings" and advises practitioners to ask themselves, "What problems can we be solving to broaden our market base?" In Sutherland's view, the challenges architects face now are endemic to the profession, rather than merely a result of hard times.

While urging designers to broaden their purview, Sutherland also encourages them to "think in terms of building a business around their skills." This is doubly important at a time of increased competition.

David E. Stahl, executive director of the Urban Land Institute, warns, for instance, that venturing into the developer's realm is becoming easier, but only because developers are "going out of business right and left." He adds, "We all have to change our conceptions as to where opportunities lie." Paradoxically, according to the best advice, architecture firms should "stick to their knitting" even while expanding their base. According to Managing Rapid Change Director Richard Hobbs's summary, firms need to streamline their operations yet boost both marketing efforts and services. For many firms, this may mean eliminating mid-level staff and assigning principals to do the marketing.

Hobbs adds that because flexibility is key, small firms are increasingly combining their expertise to compete with big practices while large firms are "breaking themselves down into smaller units," following the advice of social forecaster Alvin Toffler. In his new book, *Powershift*, Toffler writes, "An economy of small, interacting firms forming themselves into temporary mosaics is more adaptive and ultimately more productive than one built around a few rigid monoliths."

As banker Hoppin comments, architects can concentrate on "snapshots of negativity, but those images belie the fact that opportunities abound." What promising markets can architects anticipate? And in what cities and regions are they likely to be found? According to Hugh Knox, assistant director for regional economics of the Bureau of Economic Analysis at the U.S. Commerce Department, the Pacific Northwest, the Carolinas, Florida, and California will grow in the foreseeable future. The Great Plains, Southwest, and Rocky Mountain regions are seeing a "turnaround growth trend."

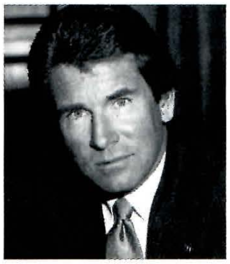
Knox further predicts that Nevada and Arizona will experience the fastest growth rates in total personal income, jobs, and population between now and the year 2000, and California will account for one of every six new jobs. By the year 2000, four states—California, New York, Texas, and Florida—are projected to account for one-third of the nation's total personal income.

Of the largest metropolitan areas in the U.S., West Palm Beach, Phoenix, Orlando, Riverside, San Diego, Sacramento, and Tampa will boast the fastest economic growth to the year 2000, according to the U.S. Commerce Department's Bureau of Economic Analysis. Other areas that are projected to grow well above the national average include Anaheim, Fort Lauderdale, Atlanta, Seattle, Jacksonville, and Oakland.

According to Kermit Baker of Cahners Economics, the top nonresidential construction markets in 1991 are likely to be, in descending order: Los Angeles; Riverside/San Bernardino, California; Chicago; Minneapolis; Atlanta; San Diego; Seattle; Oakland, California; and Anaheim, California.

While the Northeastern states, Michigan, and the District of Columbia are on the cutting edge of recession, in such Rust Belt states as Ohio and Indiana, construction employment was actually higher this August than last, according to the Department of Commerce. And with the dollar falling in relation both to the yen and the deutsch mark, forecasters see exports—and, consequently, manufacturing plants—gaining ground and providing a potential source of work for American architects.

The roundtable participants further point out that, as in every recession, building restorations and interior design will be major architectural markets. Says Penz of the Building Owners Managers Association, "Renovations have to improve client productivity, and architects need to be able to demonstrate that to potential clients." He adds that opportunities will come in creating physical space that performs. The recently passed Americans with Disabilities Act will embrace a burgeoning population of fragile older citizens as well as the disabled young, and "life learning is a developing trend providing opportunity," according to Heather Kurent of the Institute for Alternative Futures.



"This economy is not going to hell in a handbasket. There is some good news out there. The U.S. economy is still three times the size of Japan's."

William Sinclair
Chairman and Chief
Executive Officer,
Washington Federal
Savings Bank

Land-use planning will probably become an important issue as volatility in the Middle East forces the U.S. to stop its fuel binge, adds Fitzgerald of the Pacific Institute. Institutional building, which constituted 40 percent of the nonresidential 1989 market, according to Baker of Cahners Economics, will provide the bulk of new construction. Most notably, schools are expanding in response to increased birthrates since the 1970s, while existing educational buildings need refurbishing to accommodate new technologies and ways of teaching.

Another growing market,

concludes the roundtable, is affordable housing, for which financial lending is encouraged by the Financial Institutions Reform, Recovery, and Enforcement Act. "We're so out of sync between the need for affordable housing and the greed that has created our problems," says Kurent. She concludes, "One thing this slowdown may do is adjust real need and supply."

In summarizing the roundtable's findings, and adding his own conclusions, Fitzgerald stresses that architects need realistic, aggressive strategies for working within a changed economy. They cannot afford to placidly wait for clients to knock on their doors. In the 1990s, successful market strategies will concentrate on "developing opportunities rather than chasing existing markets," Fitzgerald adds. He emphasizes that pockets of rapid growth still exist. The principal task for firms, he maintains, is to identify how a given trend will create market demand and to capitalize on it by acquiring the needed skills and knowledge. "This will change the way architects do business," says Fitzgerald.

Three days after the Washington, D.C., roundtable, both Fitzgerald and Hobbs participated in a workshop at the Nebraska Design Conference in Omaha. A local panel translated their findings into regional terms, describing economic conditions as "positive" but soon likely to feel the effects of tightened banking regulations.

A second workshop, "Managing Change and Changing Management," took place last October in Madison, Wisconsin. Hobbs again presented the Washington roundtable's findings and learned how some Wisconsin firms were coping with the economic slowdown. To his surprise, many local practices have acquired international work, and he discovered a pattern beginning to emerge as small firms combine their talents in order to provide broader services.

A summary of findings from the September roundtable and the two workshops is being disseminated through the AIA's practice information network, which members can call at (202) 626-7364. Summaries are also being distributed to key committee members, and their responses and comments will shape Managing Rapid Changes's future course.

"We want to find out how much of Managing Rapid Change is useful to them so that we can decide directions to pursue now," says Laurie Anderson, AIA's Director of Publications. The point of the new AIA program, concludes Hobbs, is to remain flexible and assess member needs as we go along." ■

—ANDREA OPPENHEIMER DEAN

Markets for the Future

BARRY LEPATNER, PRESIDENT OF LEPATner, Block, Pawa & Rivelis, a New York-based legal and management consulting group that works with architects, offers the following list of promising, primarily institutional, markets for new construction:

■ Buildings such as museums and cultural centers for a cultural arts explosion. LePatner quotes John Naisbitt's contention, stated in his book *Megatrends 2000*, that "during the 1990s, the arts will gradually replace sports as society's primary leisure activity." According to the Association of Art Museum Directors, 92 American museums undertook construction projects costing $5 million or more between 1977 and 1988. And museums will be expanding their art holdings—and therefore their need for space—as a result of Congress' recent reinstatement of tax deductions for art gifts to nonprofit institutions. According to LePatner, "Museum and cultural-center design and construction will provide extraordinary opportunities in the years ahead."

"Thanks to Congress' recent reinstatement of tax deductions for art gifts to nonprofit institutions, museum and cultural-center design will provide extraordinary opportunities for architects for years to come."

Barry LePatner
President
LePatner, Block, Pawa & Rivelis, Architectural Consultants

■ In order to contain medical costs, outpatient treatments such as chemotherapy will be increasingly moved to satellite and freestanding outpatient facilities.

LePatner contends that this market is already growing 20 percent annually and will further expand as the population ages and new treatment techniques are developed.

■ The pharmaceutical industry will continue to be profitable through the next decade, as research and development grows in the constant search for new treatments. The industry will demand new laboratories, distribution centers, warehouses, and offices.

■ Regional telephone companies and telecommunications will continue to expand and move into new technologies. Cellular phone sales alone increased by 60 percent in 1989, says LePatner, and the industry will need laboratory space for research and office space for headquarters and distribution.

■ With major advances in fiber optics, "smart" buildings will proliferate and will be networked with each other, linking their occupants electronically. In Tokyo, for example, Mitsubishi real estate has already created an area of 32 buildings that are connected by fiber optics.

■ Manufacturers of such consumer staples as soups and soaps will prosper. "They need warehouses, distribution centers, laboratories, and office buildings," explains LePatner.

■ Prison and correctional facilities will expand.

■ The number of mid-priced restaurants and restaurant chains will grow as pricey eateries falter.

■ Toy and book stores are expanding, especially overseas. In part because books are a cheap form of entertainment, 20,000-30,000-square-foot megastores have been opening across the country. The industry will not only require new retail space, but also warehouse and distribution facilities.

■ The electronics and educational software industries are thriving and will continue to grow as the "thirty-something" generation reaches its peak earning power. Electronics will require more spaces for research, retail, marketing and so forth.

■ The energy industry is prospering, and the 1990s will require both new buildings for fuel companies and energy retrofitting for older, sealed, and wasteful buildings.

■ "Environmental engineering will be the linchpin of the green decade of the '90s," maintains LePatner. Solid-, toxic-, and hazardous-waste management and clean-air scrubbing systems are becoming multimillion dollar industries.

Sound Effects

Acousticians employ precision and intuition in designing academic auditoriums.

IN THE ENGINEERING OF LARGE EDUCATIONAL auditoriums and concert halls, acousticians perform like seasoned aircraft pilots. Shunning precise instrumentation, they fly by intuition and experience, trusting their grasp of the medium and innate sense of geometry. To some acousticians, their discipline is more art than science. As a result, the lecture halls and music theaters they create reveal human sensibilities that no computer could have produced alone.

This section explores four acoustically sensitive but divergent educational settings: a concert theater, two multipurpose auditoriums, and one classic lecture hall. The technical issues in each project are similar, but the approaches are vastly different.

Acoustical consultants must consider the total volume of the space, expressed in relation to the number of seats planned. They also study reverberation time, which is the average period between the generation of a sound and its arrival at a seat. These are precise measurements, although the optimum figures vary in each case depending upon the particular music or sound being presented.

Acousticians look at coefficients of absorption for the various finish surfaces being used in a room. The noise-reduction coefficient (NRC) scale ranges from 0 for "hard" materials, which reflect all of the sound bounced off them, to 1 for "soft" materials, which absorb all sound. A second measure, the articulation loss of consonants (AL_{cons}), describes the ratio between direct and reverberant sound. In most auditoriums, an AL_{cons} of 15 percent or less is desirable.

Bill Cavanaugh of Cavanaugh-Tocci, acoustical consultants for the auditorium at Johns Hopkins' Bloomberg Center for Physics and Astronomy, emphasizes that scale models (at 1/2-inch to 1-foot) are essential to develop and test design modifications. Modeling for the Bloomberg Center's Schafler Auditorium centered on a Plexiglas-backed perforated metal canopy. Using an electrical spark source and tiny microphones in the model, acousticians determined that the canopy would greatly enhance "early arriving" (first 40 to 50 milliseconds after direct sound) reflections for listeners.

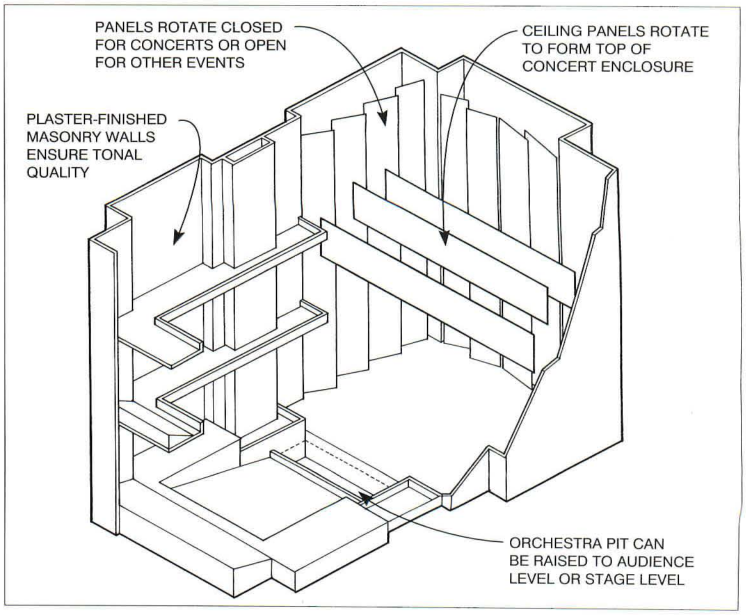
Artec Consultants, designers of sensitive but flexible theaters across the country, adhere to a few overriding rules during design and leave much of the fine-tuning to post-construction phases. "We don't really pay attention to coefficients of absorption," says acoustician David Kahn. "We employ two basic surfaces: hard and soft. They pretty much either reflect sound or they don't."

According to Don Roberts of Booziotis & Company in Dallas, the late David Neblin, principal of Variable Acoustics in Fort Worth, drew on 30 years experience with acoustical trial and error in shaping and finishing Booziotis's lecture hall at the University of Texas at Austin. "The calculations Neblin did, if any," maintains Roberts, "were few."

Handled by experienced acoustical teams with an intuitive understanding of successful features, the four projects shown on the following pages share beautiful design and subtle, but effective, acoustical shaping.

—RAY DON TILLEY

The volume of Austin Peay State University's 513-seat Concert Theatre (below) is shaped by numerous acoustical devices. Pockets hidden in side and rear balconies contain velour curtains that absorb sound when extended. Otherwise, balconies reflect sound. Ten 47-foot tall, one-ton oak doors form a reflective shell in combination with the floor and can be adjusted easily for particular performances (bottom right). Plaster ceiling panels can be opened for absorption, or rotated closed for reflection.

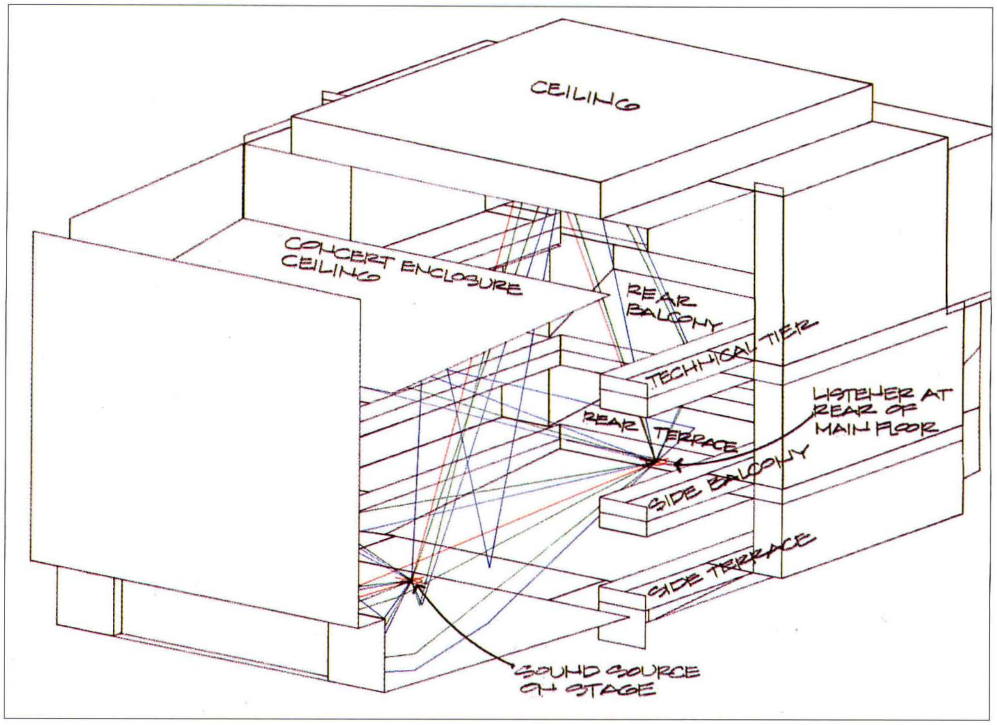


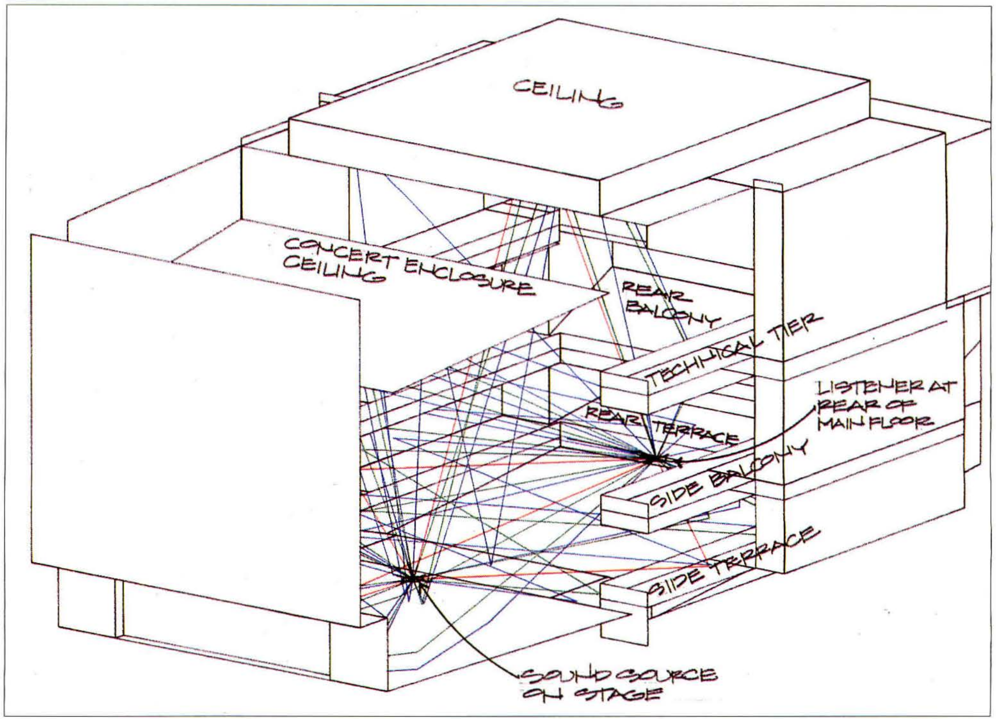
Concert Theatre
Music/Mass Communication Building
Austin Peay State University
Clark and Associates, Architects, and
Stacker-Cook Architects, A Joint Venture
Artec Consultants, Acoustical Consultants

DERIVED FROM HISTORIC EUROPEAN HALLS, the main concert theater of Austin Peay's new Music/Mass Communication Building in Clarksville, Tennessee, is the latest such performance space developed by Artec Consultants of New York. The firm is renowned for acoustical work in halls in Philadelphia, Toronto, and I.M. Pei and Partners' Morton H. Meyerson Symphony Center in Dallas (ARCHITECTURE, February, 1990, page 99). Unlike other spaces described in this section, the theater's acoustical design long preceded its architectural design. Artec supplied the architects with schematic interior sketches that identified preferred surfaces and spatial treatment for acoustics as well as sightlines for optimal viewing of the 3,125-square-foot stage.

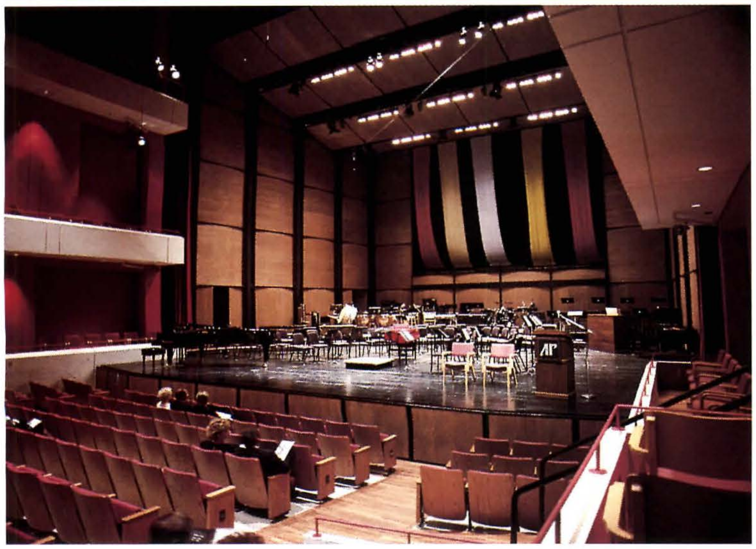
Like the Meyerson, Austin Peay's concert hall is of rectangular, shoebox proportions and fitted with flexible interior enclosure devices that enable the school to modify its shape to suit various types of performances. The theater is one of five separate, sound-isolated "buildings" that constitute the Music/Mass Communication Building. Projecting from the side walls of its structural shell are a terrace and two balconies with retractable curtains that can be pulled out to surround the main volume. "Extended, the curtains provide absorption and reduced reverberation, allowing us to adjust the 'liveness' in the room," explains Wolff.

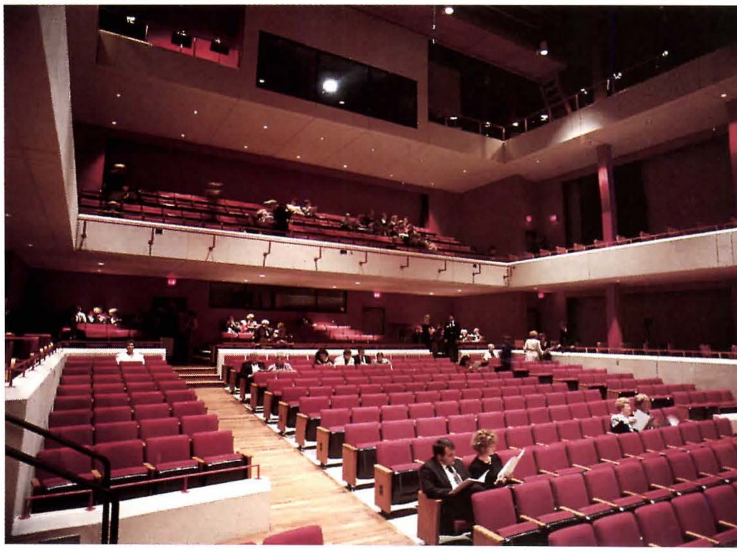
Ten hand-finished, 47-foot-tall oak "doors" (each weighing a ton) create the concert shell and can be easily moved to fit an ensemble of any size. Above the stage, three equally large, horizontally mounted plaster ceiling panels can be opened to allow music to escape and disperse upward, or be rotated to reflect music downward to the audience. The stage floor is finished in pine to accommodate dance, and it reflects sound along with the rest of the shell. Oak flooring is continued throughout the hall, and oak forms the frame for each of 513 seats. A hard-surfaced floor, says Wolff, is ideal in a strictly musical and performance setting. It projects low-frequency sounds (below 250 hertz) that are desired in most music, but filtered from speech. Other auditoriums in this article accommodate lectures, and thus feature *carpeted, absorptive floors.*





The Concert Theatre's reverberation time and "liveness" is controlled chiefly by a series of velour curtains. Fully extended (top), the curtains absorb all soundwaves, except those bounced off the remaining unaffected hard surfaces. With the curtains retracted into their pockets, sound waves are also reflected off side walls (above), offering the full sound of a complex, cathedral-like environment desirable for renaissance music. An oak floor in the seating area (facing page, top) provides reflection especially for low frequencies. Upholstery matches the absorption of a human body, so that the number of listeners does not affect sound quality. Adjustable ceiling panels, pine floor, and imposing oak acoustical doors form the concert shell (facing page, below left) which can be adjusted to accommodate divergent musical styles. Sound projected from the stage is reflected or absorbed by balconies (facing page, bottom right).





Norman I. Schafler Auditorium
Bloomberg Center for Physics and Astronomy
The Johns Hopkins University
Ayers Saint Gross, Architects
Cavanaugh-Tocci, Acoustical Consultants

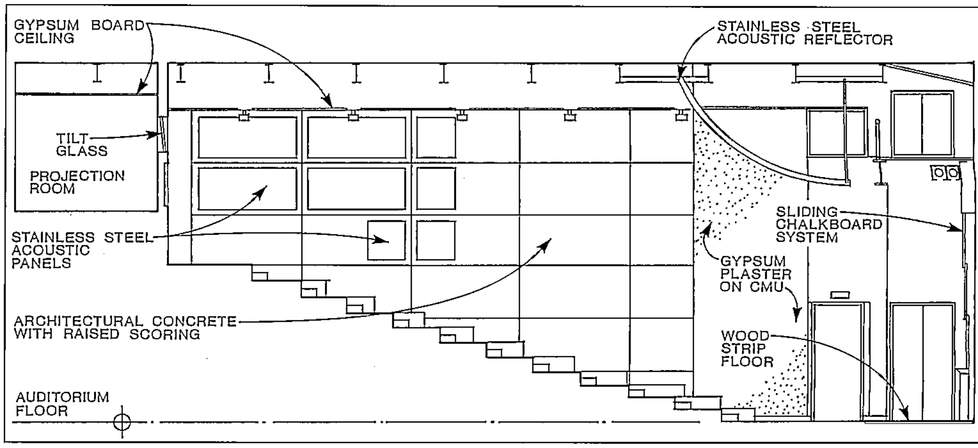
THE DESIGN OF JOHNS HOPKINS' NEW Physics and Astronomy auditorium in Baltimore, Maryland, solves what began as opposing esthetic and acoustical goals. In specifying perforated metal as a prominent finish in the room, particularly above the stage, Ayers Saint Gross of Baltimore created a highly sound-absorptive environment. Meanwhile, acoustical consultants Cavanaugh-Tocci were requested to create auditory conditions for unamplified voice presentations for as many as 330 students.

While the perforated metal worked well over recesses in the rear side walls, where it soaks up disturbing sound reflections, it did not aid speech projection at the front of the auditorium. Perched above the lectern, a mirrorlike series of five convex metal panels gives the visual impression of a reflector, but the material would have canceled out any amplification since soundwaves would pass through its perforations. To preserve the architects' formal intention, Cavanaugh-Tocci added a 1/8-inch clear Plexiglas backing, which was mounted flush to the metal. Despite minor "bubbling" away from the back surface after installation, the plastic provides exemplary sound reflection without changing the appearance of the metal baffle.

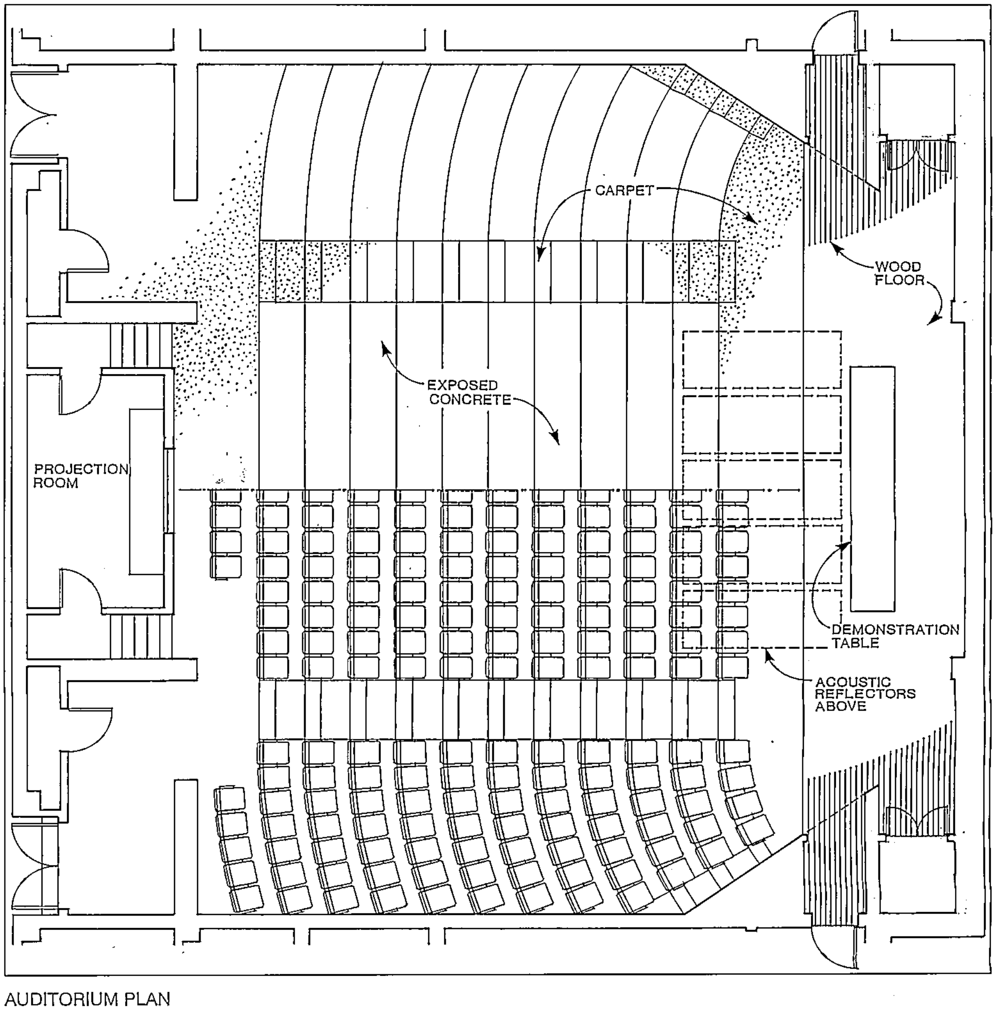
To enable students to see the chalkboard and hear lectures without amplification, the architects and engineers spread out seating side to side within a wide and proportionally shallow rectangular volume, so that all 330 students sit no farther than 60 feet from the stage. Beyond the aisles, chairs are angled to make viewing more comfortable.

One problem in this auditorium that is similar to the concert hall at Austin Peay is a need for acoustical isolation from adjacent spaces. Rather than competing with other recital halls, as at Austin Peay, this auditorium opens off a heavily trafficked public area that bisects the main structure. A pair of vestibules was inserted between the auditorium and the public corridor, their doorways shifted to opposite corners. Sound entering from the corridor is trapped in the simple baffles created by the vestibules, even when both sets of doors are open. In a research and teaching building fraught with demanding technical requirements, the new auditorium offers visual drama unspoiled by unobtrusive but crucial acoustical enhancements.

The Schafler Auditorium's shallow depth (section below, plan at bottom) caters to unaided speech by placing all 330 students within 60 feet of the stage. Perforated metal, a key design element, brings visual drama and acoustical challenge. When used to face a six-inch recess in the side walls (left in photo, facing page), the material offered an NRC rating of .80, which would have been far too absorptive for a lecture hall. Suspended above the lectern, the metal panels were flush-bonded to a 1/8-inch Plexiglas backing (detail, facing page bottom). The assembly matches the NRC rating of 0 for plaster and concrete finishes on side walls—even better than the stage floor and plaster ceiling (both rated at .05) for reflecting speech toward the audience.

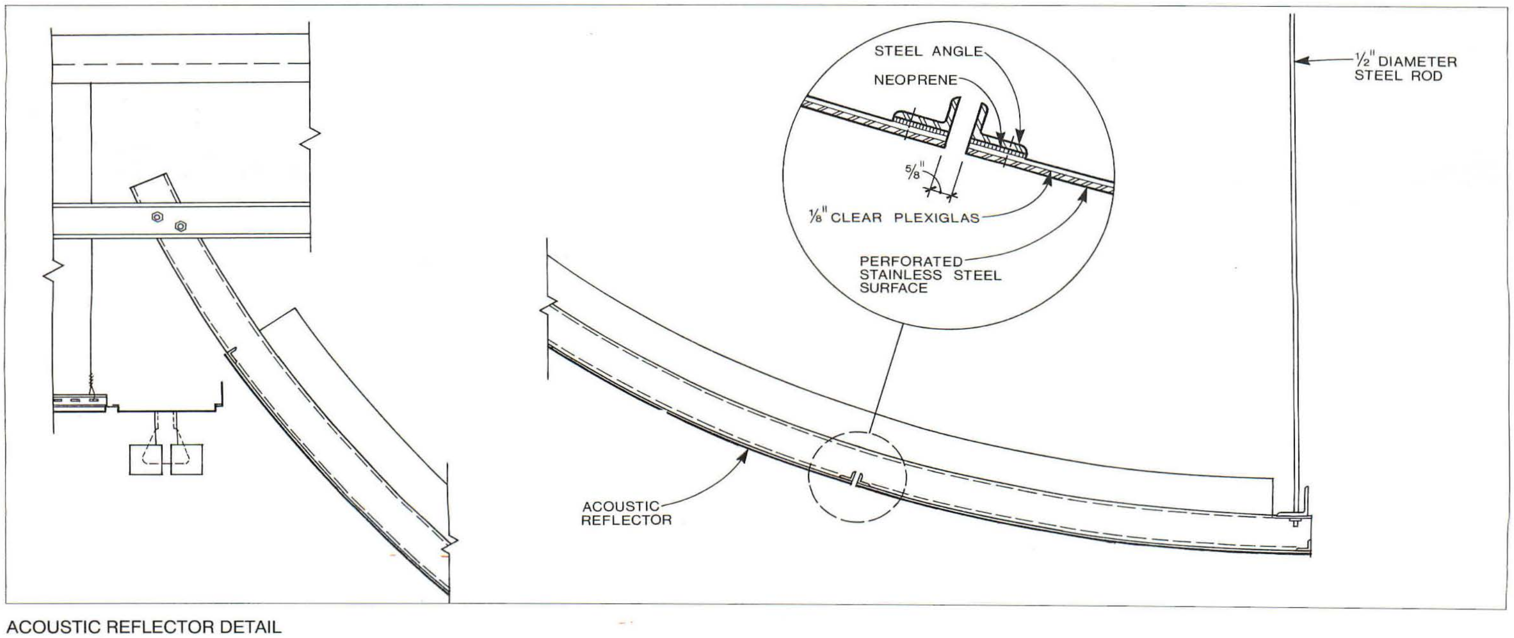


AUDITORIUM SECTION

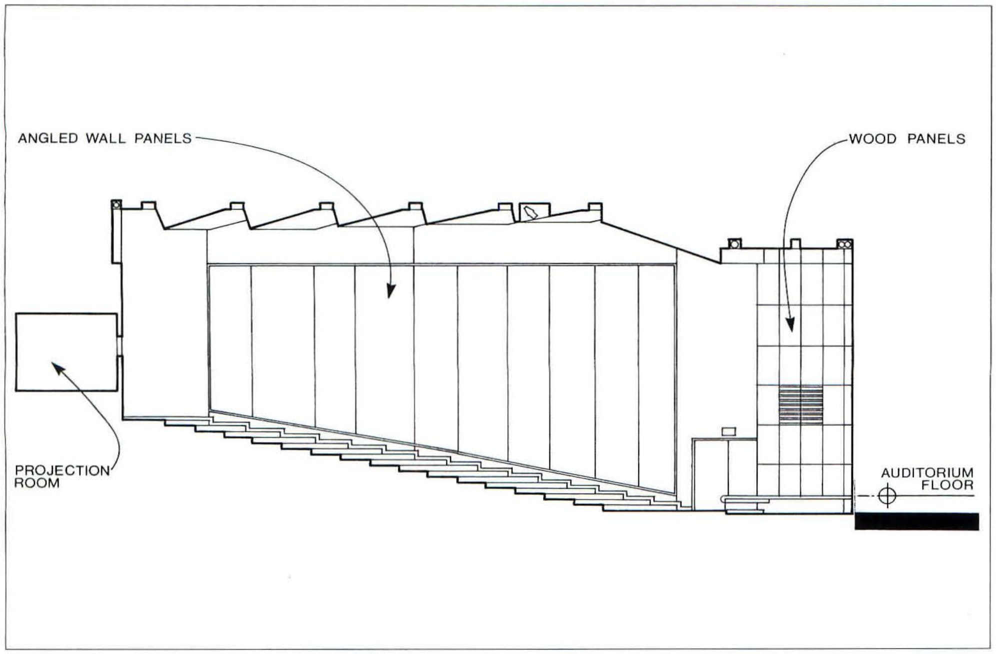


AUDITORIUM PLAN

RICHARD MANDELKORN

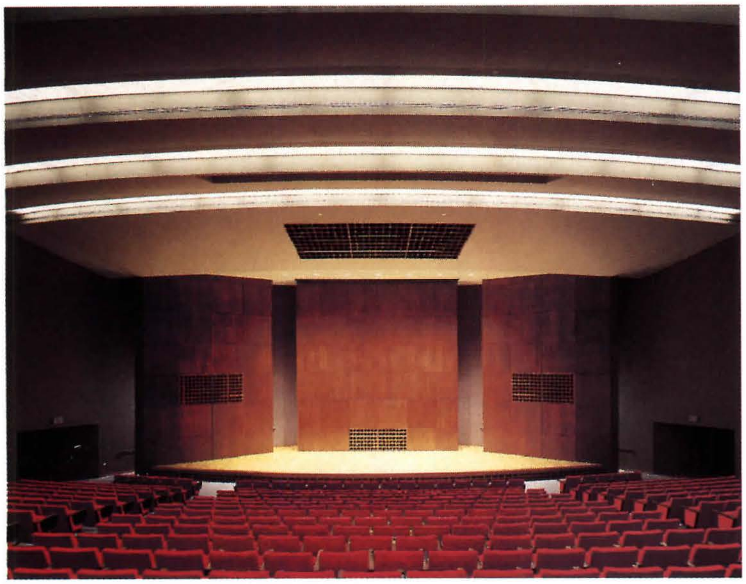


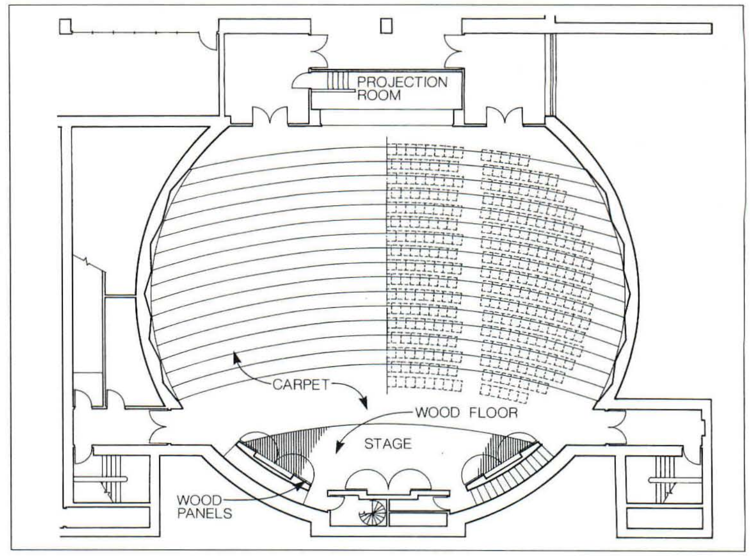
ACOUSTIC REFLECTOR DETAIL



AUDITORIUM SECTION

Acousticians for Cornell's Alumni Auditorium (above) turned a potentially cacophonous circular room into a soothing hall, while maintaining its circular theme (facing page, top right). Sound, usually speech but occasionally intimate music, emanates from the oak stage (facing page, top) directly toward the audience and toward a scooped gypsum-board ceiling that bounces the sound downward. V-shaped acoustical panels along the side walls, as well as carpeting and upholstered seating, absorb sounds at low frequencies and undesirable reflections. The hall's one-second reverberation time has opened up further use as a performance space for chamber music and choral ensembles. The room section (left) shows how speakers and lights are tucked from sight in the ceiling scoops. Toward the rear of the auditorium (facing page, middle and bottom: view to rear, elevation) absorptive side panels give way to hard-surfaced audiovisual enclosures and glass block.





AUDITORIUM PLAN

Alumni Auditorium
New York State College of Agriculture and Life Sciences Academic and Administration Building, Cornell University
Gwathmey Siegel & Associates Architects
Peter George Associates, Acoustical Consultants

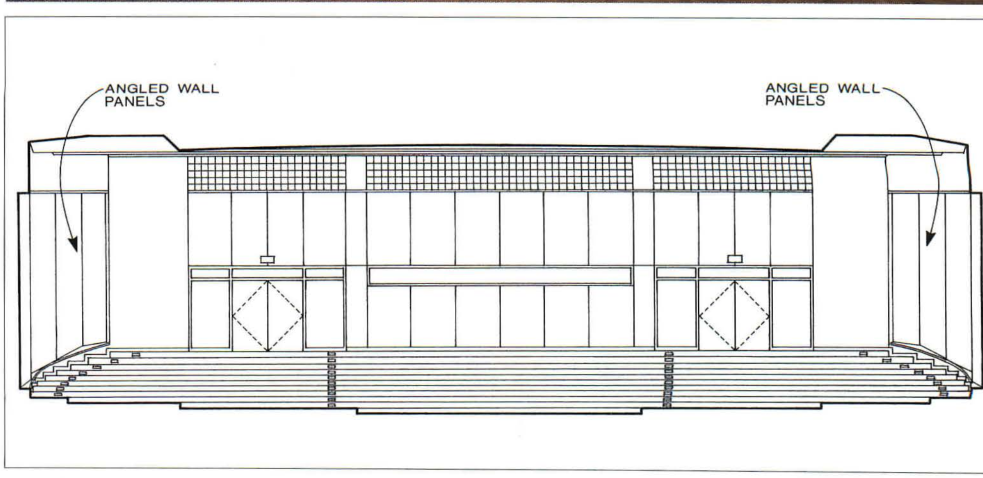
THE GREATEST ACOUSTICAL CHALLENGE OF Cornell's Agriculture and Life Sciences Building auditorium was its plan: a perfect circle. Determined by the architect and client before the acoustician's involvement, its pure form potentially created a "black hole" of sound at the center of the room.

"Our task was to maintain the room's circular form," says acoustician Peter George of Peter George Associates, "and yet ameliorate its inherent effects to some acoustical advantage." George's team settled on a system of V-shaped fiberglass wall panels, which have an NRC rating of 1.0. They create a subtly articulated wall plane that absorbs sound, especially among low frequencies.

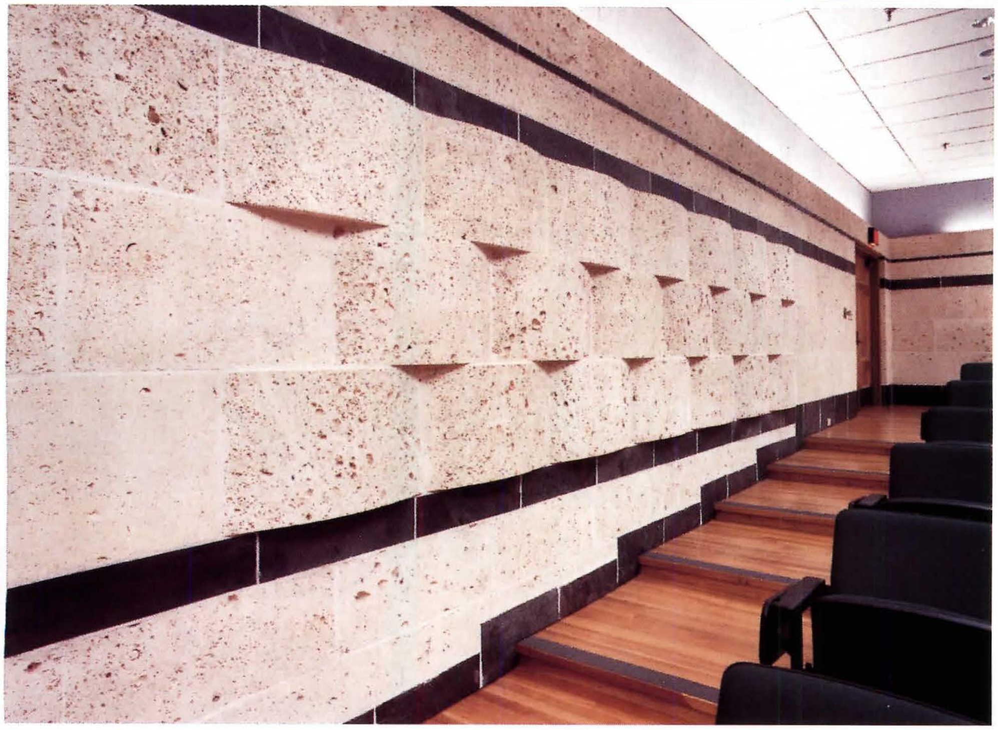
A wood-finished stage floor and floor-to-ceiling panels help project speech and music outward into the space, and against a stepped gypsum-board ceiling to reflect sound downward across the rear of the room to augment direct soundwaves. Given this configuration, the AL_{cons} level, acceptable if below 15 percent, has been measured at 5 percent, according to George.

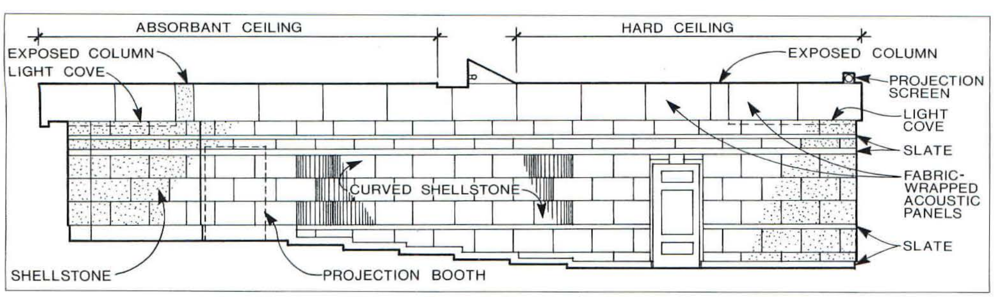
Since the project's completion, George's firm has been called upon to augment the original audiovisual system. This addition represents not a criticism but evidence of the hall's demand. Its one-second reverberation time has been found to work especially well for chamber orchestras.

JEFF GOLDBERG / ESTO PHOTOS



AUDITORIUM SECTION





LECTURE HALL SECTION

DANA NORMAN PHOTOS

School of Architecture Lecture Hall
Goldsmith Hall, University of Texas at Austin
Thomas & Booziotis Architects and
Chartier Newton & Associates, Architects
Variable Acoustics, Acoustical Consultant

BARELY HALF THE SIZE OF ANY OTHER PROject featured in this article, the lecture hall at the University of Texas at Austin employs more than its share of acoustical manipulations. Architect Bill Booziotis, FAIA, admits, "We really made a bigger thing out of a small space than we actually needed to."

The lecture hall is part of a recent $8.3-million addition and complete renovation for Goldsmith Hall by Thomas & Booziotis Architects and Chartier Newton & Associates (ARCHITECTURE, November, 1990, page 84). The range of materials and humane scale for this addition to the School of Architecture were appropriated from Paul Cret's 1933 Beaux-Arts Mediterranean original. The hall is used almost exclusively as a lecture classroom for as few as two dozen or as many as a several hundred students.

Like Schafler Auditorium at Johns Hopkins, the Goldsmith lecture hall is generally split into a reflective front end and absorptive rear. Behind the lectern is a slate chalkboard that combines with a white-oak floor and plaster-on-lath ceiling to reflect unaided speech outward. Limestone-veneer side walls supply some amplification, although their slightly absorptive, fossilized composition lessens the reflective quality of each plane.

In the back two-thirds of the room, absorption increases as the limestone assumes a pleasing ribbonlike pattern of convex panels. These staggered, bulging shapes baffle sound by widely dispersing reflected soundwaves. The fabric-wrapped, fiberglass-panel ceiling and back wall further aid in absorption. Seating is padded and upholstered to resemble the sound-dampening quality of a room full of students. It is placed on a gentle, stepped slope to increase visibility by raising students' heads above those in front of them.

The room's shape also contributes to its acoustical success. The architects departed from Beaux-Arts orthogonality by skewing all four walls a few degrees, so that no two planes are parallel. This shift eliminates any chance for reverberation, but since the skew is still relatively minimal, the visual distortion it causes is barely perceptible.

However inordinate the effort spent shaping its sound may have been, the lecture hall supplies its architecture-student inhabitants with a lesson in acoustics that they can experience first-hand. ■

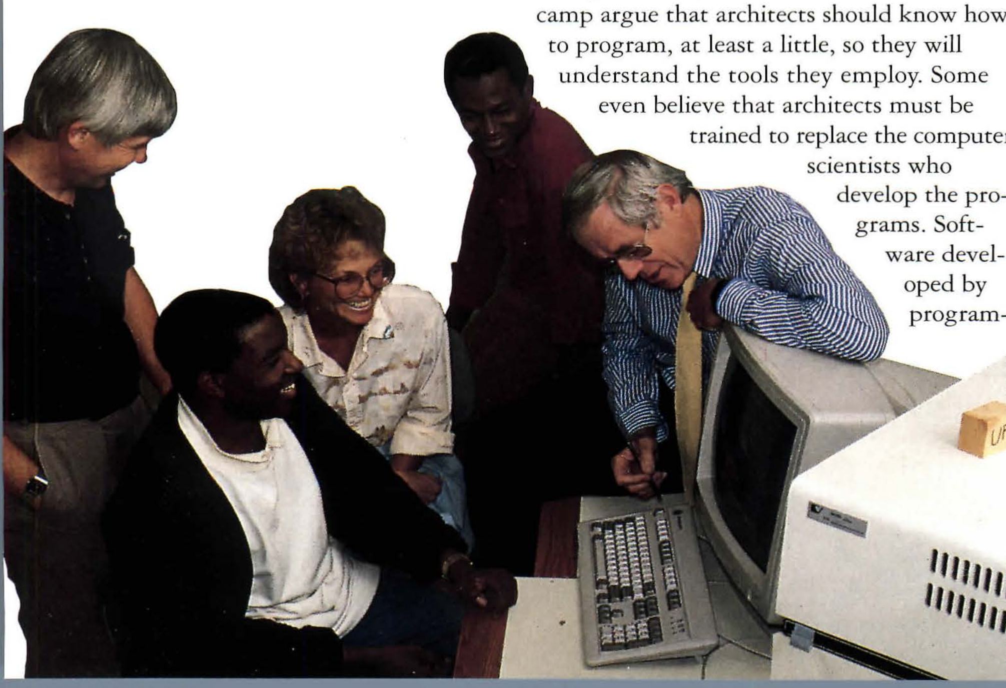
CAD Goes to College

A review of computer-aided design at four schools reveals how students employ the technology.

EVERY AUTUMN FOR THE LAST TEN YEARS, about 80 architecture professors gather for a meeting of ACADIA, the Association for Computer-Aided Design in Architecture. They discuss the problems, advances, and opportunities in teaching professional students about computers. Whether traditional design values are getting lost in the scramble to mechanize the profession, how the design process can be translated into rational hardware and software, and to what degree architects should be involved with the creation of the tools are the issues. Academics agree that computers will play a critical role in the future of the profession, but a debate rages about how architects should be trained to interact with these tools.

The opportunities for integrating computers in design have increased dramatically since ACADIA's beginnings in 1980. Computer technology has improved while its cost has gone down. Most students now insist on being taught basic computer literacy, but professors worry that if students are simply trained to operate a few software packages, they may be tempted to view drafting and accounting as the entirety of computers' role in the profession. Students may shortchange the computer's implication for design if they are unaware of the more imaginative possibilities of the technology.

UCLA professor of architecture Murray Milne (right) instructs students about energy efficiency with a program called SOLAR-5. Students input orientation, geometry, and sun shade configuration, and the program evaluates the building to determine its energy efficiency. The building's performance is then illustrated in a three-dimensional plot.



GARO ENJAIAN

Nearly every school of architecture now uses computers somewhere in its curriculum, and students tend to fall into two categories. Some students, as "tool users," apply sophisticated design software to their studio work, completing videos or high-resolution renderings. Others, as "tool builders," take computer programming to the cutting edge, creating programs that actually design. Educators in the tool-users' camp believe that architects should know how to apply technology to the traditional problems of the profession, such as design, production drawings, and technical evaluations. They teach students to use increasingly powerful commercial software to create models of buildings and perform sophisticated analyses on them. They believe the inner workings of computers should be left to the computer scientists.

By contrast, those in the tool-builders' camp argue that architects should know how to program, at least a little, so they will understand the tools they employ. Some even believe that architects must be trained to replace the computer scientists who develop the programs. Software developed by programmers who aren't architects has arguably been one of the greatest barriers for professionals using the software.

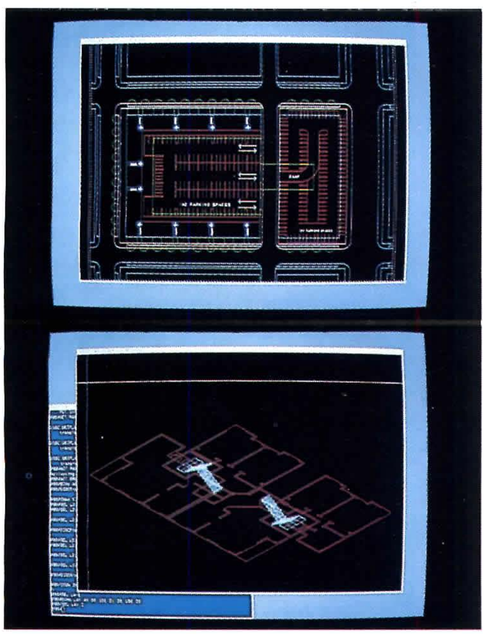
In recent years, a hybrid camp has also emerged, taking advantage of new programming "languages" that facilitate graphic output and are relatively easy to learn. With Macintosh's HyperTalk, students can develop their own animated hypermedia; with AutoLisp, they can customize AutoCad; and with Pascal, they can design and manipulate parametrically defined facades. These students learn programming not as a means to develop software others will use, but as a design medium in its own right.

Probably no school manifests a simple separation between these points of view. At the four schools profiled in the following pages, as at most schools with a faculty serious about computers, students are presented with a variety of opportunities. By studying such diverse approaches to teaching the technology, the profession can develop some sense of how students are preparing for a professional partnership with computers.

Amid this diversity, one thing is certain: students are receiving an unprecedented exposure to technology. This has given them visualization capabilities that surpass even what was available one or two years ago. Computer technology has long promised to revolutionize the profession, and the technology might now be starting to fulfill that promise. Students are abandoning a generation of software that forms analogs to traditional activities, such as drafting and engineering calculations. Instead, they are exploring design in ways that are impossible in traditional media.

It's hard to draw firm conclusions about the state of CAD education in this country, except that it is highly varied, rapidly changing, and more concerned with design than production. To understand the diversity better, ACADIA is now conducting a survey of computer use in architecture schools. Available in late 1991, the survey promises to appear like a still image from a design video: a snapshot of a dynamic entity.

—B.J. Novitski



Three images (above) illustrate the design process for an urban housing project by graduate student Gregory Petroff. His model is an example of simultaneous multirepresentation of two and three dimensions. In a single model he can study the parking in plan (above center), the unit plans in axonometric drawings (top), and the entire project in perspective (above). Petroff approached the design as he would a noncomputer studio project, analyzing the site, developing a prototype, and gradually building up the complexity of the design.

University of California at Los Angeles Graduate School of Architecture and Urban Planning Los Angeles, California

UCLA HAS A HISTORY OF RESEARCH IN COMPUTER-aided design that began well before the advent of microcomputers in the 1980s. Even today, the school's computer curriculum is flavored by faculty research interests. Students work with professors on energy analysis, solid modeling, and interfaces between systems, rethinking the way architects can potentially apply the technology. Theoretical studies of shape grammars and the logic of formal languages by professors George Stiny, Terry Knight, and Lionel March promise to lead ultimately to methods of composition and design that may change the practice of architecture.

The prerequisite for all other computer classes is a Pascal programming course taught by Robin Liggett. Unlike students in computer science courses, architecture students learn about the similarities between the structure of a programming language and the structure of architectural form. Pascal's vocabulary and arithmetic operations, says Liggett, are like the elements and relationships in buildings. Repetition, variation, and logical structures are common to both programming and design. Liggett and several advanced students are currently working on an interface that will enable users to develop 3D AutoCad models on microcomputers and then send the models to the Silicon Graphics system for renderings and walk-throughs.

Professor Murray Milne conducts an advanced projects course in which students create software that provides some design aid. Some software analyzes climate to determine the most efficient energy-conservation measures. Users of the SOLAR-5 software input information about orientation, geometry, and sun shade configuration, and the computer evaluates a building's performance, illustrating it in a three-dimensional plot. By modifying the design until low energy consumption is achieved, students develop a sophisticated intuition that exceeds what they might learn from lectures or books. "If you did these energy studies by hand," says Milne, "after a while you'd convince yourself the building was just fine. But you can't fool the computer; it's merciless." Students come away with an energy-conserving design and, more importantly, a repertoire of energy design principles.

Professor Charles Eastman, an early pioneer in computer-aided design, teaches an introduction to computer-aided design in which students learn basic concepts of 2D and 3D representations. In conjunction with professor Jurg Lang, he also teaches a studio in which he encourages students to explore unconventional design strategies. Eastman is particularly interested in problems of multiple representations: how a single computer model can embody many kinds of information—geometric, structural, and legal. "The cost of doing a rendering or an energy analysis," he says, "has always been in translating the data and preparing it for analysis. Computer tools have only made a small impact on design because of the cost of doing multiple representations." One model that contained everything about the building would be far more valuable to architects.

Eastman guides students in a long-term research project to define a model for CAD systems that can support creativity and design integration. Most systems, he complains, are like a kit-of-parts, with rigidly defined relationships between the parts. The team is developing a language of relationships between form and function, allowing architects to design the database structure along with the building.

Although UCLA emphasizes the study of unconventional computer applications, most students emerge from the school with a basic competency in using the computer as a design tool. A few graduates may turn out to be the builders of the next generation of CAD systems.

Harvard University
Graduate School of Design
Cambridge, Massachusetts

AT HARVARD'S GRADUATE SCHOOL OF DEsign, computer-aided design is in the mainstream of the curriculum, an increasingly important aspect of education and professionalism. The faculty feels an obligation to educate a generation of knowledgeable professionals whose theoretical understanding of computer-aided design will enable them to learn and assess emerging technologies. All students in the core architecture program are required to take a fundamentals course in which they learn about drawing and modeling applications, computer programming, and concepts about how computers may affect their designs and professional lives. They are encouraged to use the computer in other courses, and some find opportunities for more advanced work in geometric modeling classes and computer studios.

Supporting this broad involvement is a sophisticated network connecting a variety of hardware that includes Sun and Silicon Graphics workstations, Macintosh II and IBM microcomputers, and state-of-the-art input and output devices such as color-slide scanners and digital-film recorders. With the help of a technical staff, the school has successfully integrated a variety of commercial hardware and software applications. The faculty doesn't have to worry about the faults and limitations of individual commercial software packages, because their collection includes many of the features designers need.

Faculty and students at Harvard are conscious of their leadership role in developing an intellectual attitude to computing within the profession. "We try to give students a foundation for approaching the subject," says William Mitchell, professor of architecture. Instead of simply teaching software, they focus on the advantages of various approaches and help students understand the knowledge inherent in the tools. "In a geometric modeler there are built-in assumptions about the forms you can represent and how you can manipulate them. We try to get students to understand what choices have been made and how that relates to architectural intentions."

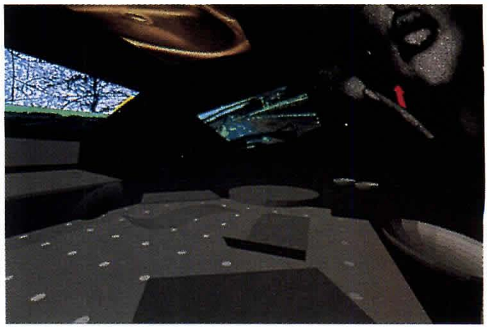
Harvard professors want to prepare students for a future that is radically different from current practice. At the same time, they wish to preserve the traditional values and images that motivate the profession. To accomplish this balance, they insist on a critical attitude that concentrates on an individual project, rather than on the design process or presentation media. They also encourage students to work with both digital and traditional media. Still, integrating computers into the practice of architecture is not a technical problem, according to professor Malcolm McCullough. "It's a cultural problem; it will take a generation to solve, or more if we don't educate this generation properly."

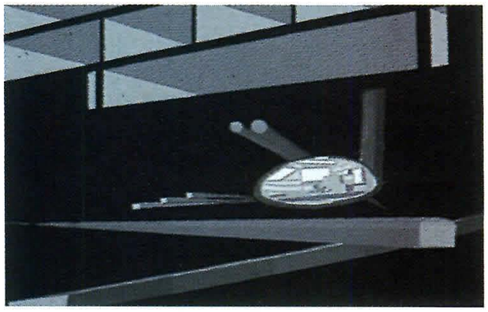
Students are impressed with the way the technology has influenced their design processes and their projects. When graduate student John Schneider modeled a building to conform to an irregular site, the resulting complicated interior geometry would have been difficult to draw with traditional media. Because he studied it in perspective on the computer, where he could see the space more often and more realistically, he was able to fine-tune the spaces through more formal iterations. Graduate student Natan Goore cautions that buildings designed with a computer may seem unfamiliar to architecture critics. Because he designs even initial ideas in perspective instead of in plan, section, and elevation, he believes his buildings are more responsive to human perceptions than to traditional rules of two-dimensional composition. "You become aware of how the opening sizes work in perspective, rather than in a flat elevation that demands that they line up in some way. I may end up with something that's not as graphically seductive as a traditionally designed building."

Now that the technology has offered new possibilities, Professor Mitchell has noticed subtle changes in the buildings his students design. "It used to be difficult to deal with architectural geometries that had large-radius arcs, because ordinary compasses weren't big enough. Now even the simplest drafting system can handle this easily. One of these days, architects are going to wake up to the fact that they can also design with splines and spline surfaces."

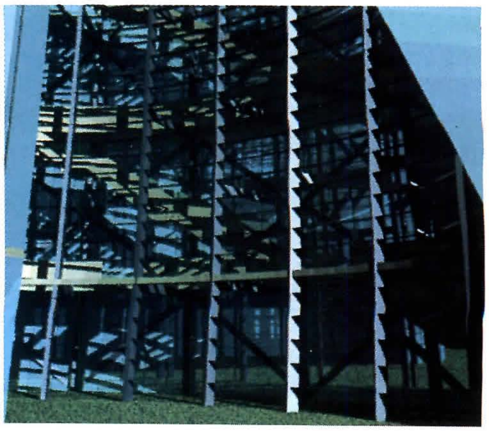
As students learn to evaluate nontraditional information, teachers and critics are undergoing an education, too. Mitchell believes that criticism plays a vital role in providing the theoretical framework, helping students make informed choices even when they enter uncharted territory. When bad design comes out of computer studios, he believes, it may be partly because critics are unable to draw on traditional ways of seeing the work.

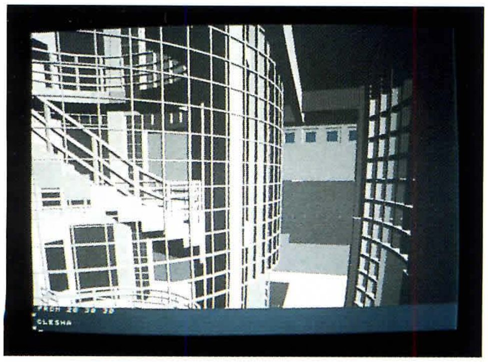
At the GSD, design is still of foremost importance. Students leave Harvard with a critical attitude toward computing; not accepting it blindly, but able to exploit it as a design tool whose primary benefits are manifested in the quality of buildings.

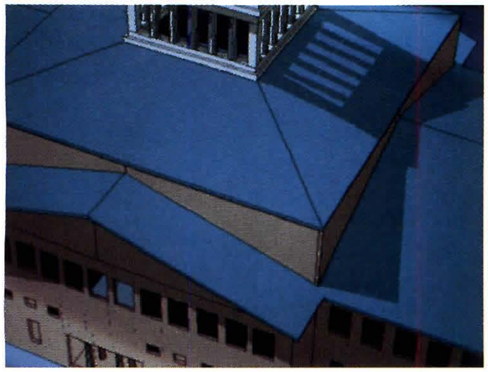




Graduate student Alejandro Zaera Polo designed an underground, "information-rich" house in AutoCad (above), with image sampling and distortion in PixelPaint Professional, and photomontage in Artisan. Harvard student Stephane Delaby modeled his proposal for a Bunker Hill Monument (below) using AutoCad. He ray-traced it with AES and added the digitized site foreground in Artisan (bottom).







Graduate student Amy Ladner created a model of a museum (top) for a graduate design project using the Prime/Medusa 9950 minicomputer. She probably would never have attempted to capture this view of a stair in a circular glass tower with traditional media. In a still from "Animated Houston...A Videotour" (second from top), the image in the foreground is a digitized photograph of the atrium of Houston's College of Architecture, designed by Philip Johnson and John Burgee. In the background is a bird's-eye view of the campus, modeled in AutoCad. The model and the video were the effort of many University of Houston students; this part of the sequence was designed by graduate student Minh Tran. Graduate students Paul Morin and Ramon Patino created a 3D model of their building (above) with Architrion, and Scott Korcz animated it with ArchiMovie. The image was created for "Access Houston," which was presented at the AIA convention last year.

University of Houston
College of Architecture
Houston, Texas

MORE THAN THE OTHER INSTITUTIONS PROfiled here, the College of Architecture at the University of Houston is typical of U.S. architecture schools in its approach to computer curriculum and facilities. Rather than establish a computer emphasis in this design-oriented school, the faculty integrates the computer into the existing curriculum. All computer coursework is optional, and a self-selected group of students takes courses in applications, computer-aided design, and CAD management. Students apply computer techniques to studio projects on their own initiative. Some learn the basics of programming through HyperCard scripting and AutoLisp customizing of AutoCad. (Those interested in more intensive programming instruction find it in the College of Technology.)

According to Professor Elizabeth Bollinger, students who choose to learn about computers move into more advanced positions in architectural firms than they normally would as entry-level designers. Armed with a knowledge of CAD management, these students can help offices get started with computers by recommending equipment, customizing systems, and establishing conventions. Even students who have had a minimum exposure to computers, Bollinger says, are entering computer-using firms with a greater "comfort level" than those with no computer experience. The college offers professional development courses and invites former students to teach about CAD in professional practice, maintaining a strong relationship with the architectural community.

For the 1990 AIA convention in Houston, for example, a group of students created "Access Houston," an interactive information system on Macintosh hypermedia. The system provided information about scheduling, exhibitors, and areas of architectural interest around the city. To increase the exhibit's audio and visual appeal, it also included music and animated 3D models of the College of Architecture building. The Macintoshes were placed in kiosks at several locations on the convention floor, inviting architects who had never touched a computer before to experiment with the technology in a nonthreatening environment. Another hypermedia project currently underway teaches structural principles by illustrating dynamically how loads deflect structural members.

One demonstration project is being carried out in collaboration with the government of Norway, which wants to preserve the integrity of the country's small villages, spread out over 1,200 miles. With Houston's assistance, a small Norwegian architectural firm is demonstrating how it can do business via electronic communication. Houston supports this effort by sharing electronic files during the school year and by sending a student intern during the summer.

An important solo "demonstration project" is being carried out by Brian Griffin, a quadriplegic freshman who keeps up with classmates by drawing and writing entirely on the computer. He was an accomplished artist before an accident left him with barely enough finger movement to manipulate a mouse. Now he is discovering that, although he is experiencing inevitable frustrations, some are not that different from the frustrations of other beginning architecture students. Professor Bollinger is inspired by his determination. "I see the computer as a tool that will make possible a professional future for this individual. He has an important statement to make about how our built environment works for people with disabilities."

One of the most impressive accomplishments last year was "Animated Houston...A Videotour." This 15-minute video was the product of a large team of students. They modeled their city and their campus on AutoCad, rendered the models with AutoShade, and then choreographed a series of fly-bys using Animator software. Digitized photographs of buildings were superimposed on the models, and electronic music accompanied the tour. The students were excited not only about the product, but also about the teamwork experience. The video received rave reviews at the AIA convention and at the International Economic Summit Conference, also held in Houston last summer.

One of the video creators is graduate student Jennifer Henrikson. Now in her last year, she is fascinated with the presentation tool she has mastered as a result of her work with 3D modeling and video. She uses animation as a means of describing design projects, showing how the parts fit together and how it feels to move through the spaces. "Computers are valuable in the design process," she says, "because you can quickly visualize the three-dimensional qualities of a space and see the way light reflects. You can get inside a space faster than if you were building a model." Grateful for the experience the University of Houston has provided, she anticipates incorporating the computer as both design and presentation tool in her future professional work.

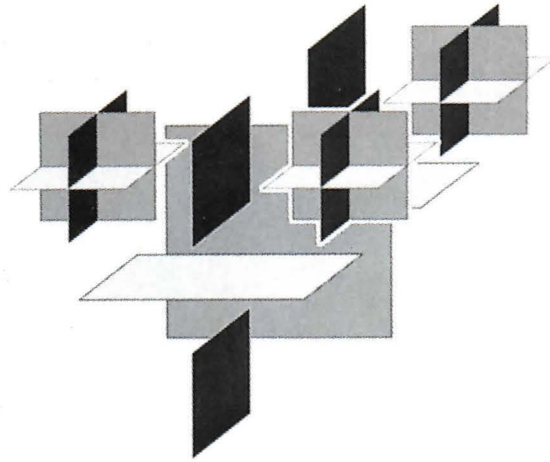
Carnegie-Mellon University
Department of Architecture
Pittsburgh, Pennsylvania

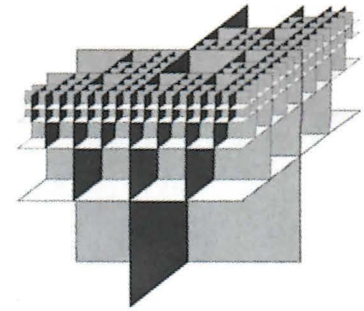
ALTHOUGH CARNEGIE-MELLON UNIVERSITY began as a craft-based technical school around the turn of the century, its architecture department has made a major commitment to computer-aided design since the late 1960s. Nine of the 24 full-time faculty members are involved in computer-related design or research. Students in the program learn about computer-aided design at several levels of sophistication. Undergraduates learn how conventional Macintosh software can model architecture in a variety of ways. Graduate students become proficient at research and software development in a two-year Master of Science program offered in conjunction with the departments of civil engineering and computer science. A doctoral program cultivates researchers and university professors. The department's computer facility includes a variety of hardware, from Apple and IBM microcomputers to Sun and Hewlett-Packard workstations. In addition to commercial software applications, the facility supports programming languages, mathematical analysis packages, and in-house solids modelers.

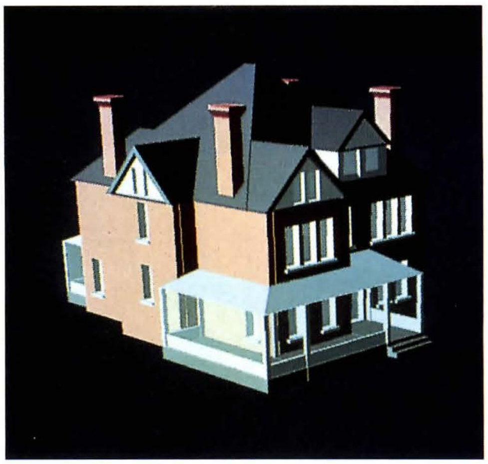
All freshmen take an introductory computer course coupled with a design studio. Taught by professors Paul Rosenblatt and Robert Woodbury, this course concentrates on conceptual issues and the underlying assumptions built into every application. Students learn to use the computer as a multipurpose modeling tool that they can integrate with their individual design processes. Undergraduates continue to use the computer as a tool in drawing and architectural analysis courses and in third- and fourth-year design studios.

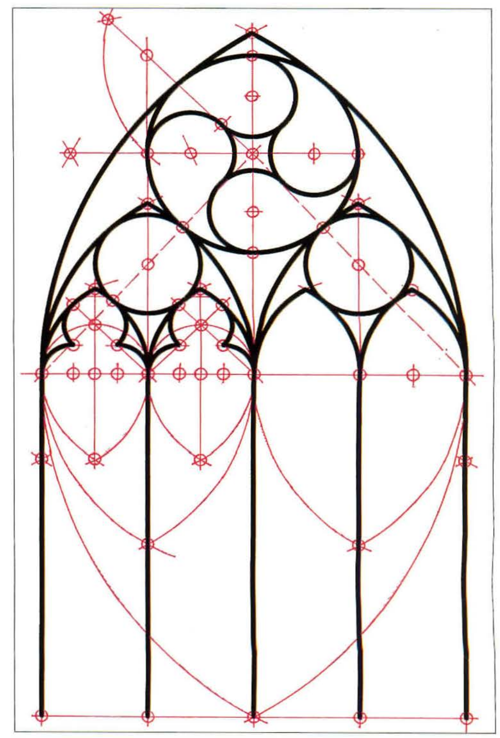
The graduate programs are highly technical in content. Students in the M.S. program take courses in mathematics, research methods, database management systems, expert systems, graphics programming, geometric modeling, design interfaces, design grammars, and software engineering. Then they integrate this training in a programming/research project.

What distinguishes Carnegie-Mellon from most other schools of architecture is the generative nature of the research and design work. As an example, doctoral student Christopher Carlson has been working with rules of spatial composition. He sees the architect as a "meta-designer" who designs the rules; then the rules generate the design. With his system, the user interactively creates and modifies graphic rules of composition. The resulting design teaches about the relationship between the rules and the designs they generate, helping designers develop an intuition about the formal consequences of the rules.









Professors Ulrich Flemming and Robert Woodbury carry out their research through the interdisciplinary Engineering Design Research Center, one of eight nationwide Centers for Excellence funded by the National Science Foundation. These researchers are interested in computers as a design medium capable of activities that would be impossible to achieve with traditional media. For example, Flemming develops formal grammars to analyze and generate designs. Following designer-specified rules and standards, his programs automatically generate designs for specialized uses. This is useful as a first step in a long-term research endeavor in which Flemming intends to exploit computer "intelligence" as an active participant in the service of architects.

It may be a few years before design-generative software is common in architectural offices. But when it arrives, the software will be in large part due to the explorations going on now at Carnegie-Mellon University. ■

With discoverForm, a program developed by graduate student Christopher Carlson, a designer draws a simple motif and specifies a rule for its replication. An abstract form (top right) was created by replicating a pattern of planes. The clones (top left) produce patterns that stimulate spatial exploration. Carlson's Grammatica software generalizes complex systems of rules that generate compositions. By studying and manipulating the rules that medieval masons used to construct Gothic traceries (above), he determines their design logic and archives the rules of the historic style. A Queen Anne house (above left) demonstrates doctoral student Jeff Heisserman's Genesis system, which generates solid models from formal grammars. A system user doesn't draw, but designs by selecting rules for building elements and their relationships.

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CONDITIONS FOR PARTICIPATION

A necessary condition for participation will be that primarily Italian marbles, granites, travertines or other stones have been used in the project, or, alternatively, that the stone materials used, even if non-italian in origin, should have been worked or supplied by italian firms. Clear proof of this must be provided. You are invited to share your best design work with other architects and the public by participating in the M.A.A. NORTH AMERICA (U.S.A. - CANADA) 1991.

SECTIONS

Section I: External facings (in private or public, residential and non-residential buildings).
Section II: Interior design (in private or public, residential and non-residential buildings).
Section III: Urban landscape (the layout and furnishing of urban areas or of service areas in residential zones).

PRIZES - COLLATERAL EVENTS

There will be three awards in all, one for each section, and each will be worth (Lit. 10.000.000). Should the award be given ex-aequo (max of two per section), the sum will be divided equally between the two winners (Lit. 5.000.000 each).
The Jury's decision will be communicated to the prize-winners who will have already declared their willingness to come personally to Italy to collect the Award at the official prizegiving ceremony, at the Organizing Company's expense.
The architects of the prizewinning projects will be asked to make detailed presentations of their projects. A Seminar will be structured for the purpose of explaining the design process and special features of the projects.

TIME SCHEDULE

Entry slips must arrive by January 31st 1991 at the Italian Trade Commission in New York or Los Angeles or Toronto. Submissions in binder must arrive no later than February 28th 1991 at the Italian Trade Commission in New York or Los Angeles or Toronto.

Jury meeting: 7-8 March 1991 - Carrara, Italy

Circle 62 on information card

For your participation:

✂ -

I am interested in receiving a total of N°______ binder/s in order to participate in section/s [I] [II] [III] (check appropriate box/es) of the "M.A.A. - NORTH AMERICA 1991" competition

Please print:

Name: ____________________

Firm name: ____________________

Address: ____________________

City __________ Zip __________ Country __________

Tel. __________ Fax __________ Telex __________

Fill in, detatch and mail to: "M.A.A. NORTH AMERICA (U.S.A. - CANADA) 1991" c/o Italian Trade Commission in:
New York - 499, Park Avenue - NEW YORK, N.Y. 10022 - Tel. 212/9801500 - Telefax 212/7581050 - Telex 423792-427803 ITCO UI
Los Angeles - 1801, Avenue of the Stars Suite 700 - LOS ANGELES 90067 - Tel. 213/8790950 - Telefax 213/2038335 - Telex 673394 ITALTRADE LSA
Toronto - 150, Bloor St. W. - Suite 505 - TORONTO ONT. M5S 2X9 - Tel. 416/9681413/4/5 - Telefax 416/9682971 - Telex 05267532

Official Prizegiving *Ceremony 28th May* 1991 during the presentation of the:

12° INTERNATIONAL MARBLE AND MACHINE FAIR CARRARA 29 MAY/2 JUNE 1991

Designer Carlo Billet

PRODUCTS

Design Curriculum

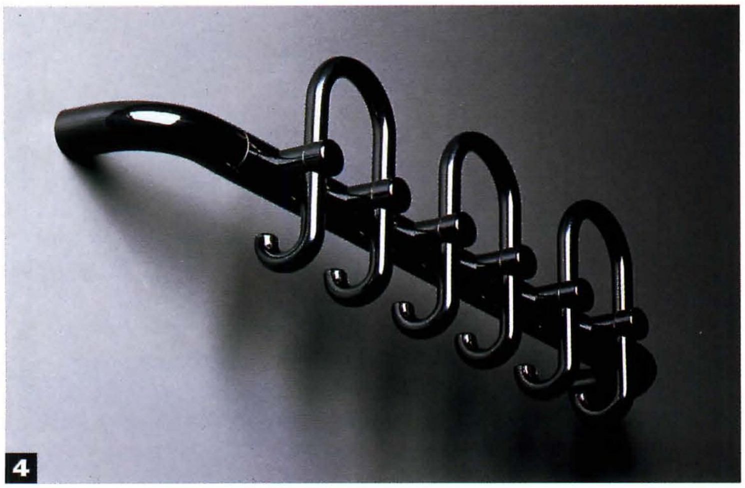
Learning facilities adapt to specialized education.

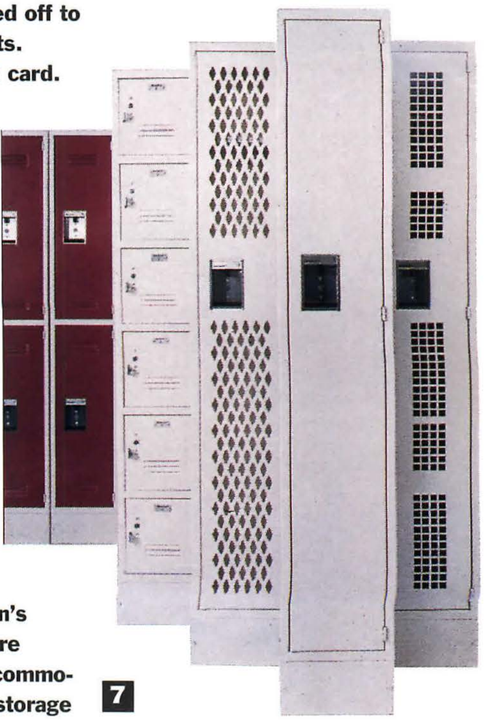
THE STEADILY AGING POPULATION IN THIS COUNTRY IS DEMANDING educational institutions that provide expanded community services. Many schools now remain open year-round or after-hours to offer special adult education courses or childcare. Frequently, childcare courses are also incorporated into the curriculum.

New educational philosophies are also affecting the way school environments are designed. By encouraging students to participate more actively in the learning process, school facilities must feature large, unencumbered classrooms that can be easily reconfigured to create diverse environments for a variety of functions.

To create these adaptable spaces, architects can now specify flexible design components such as retractable bleachers, desks that fold up into the ceiling when space is needed, movable shelving, partitioned walls, and adaptable HVAC, lighting, and communication systems.

—AMY GRAY LIGHT



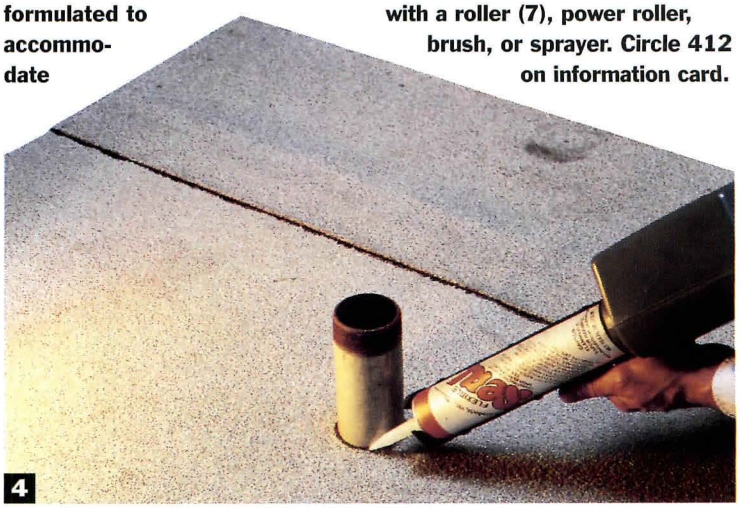


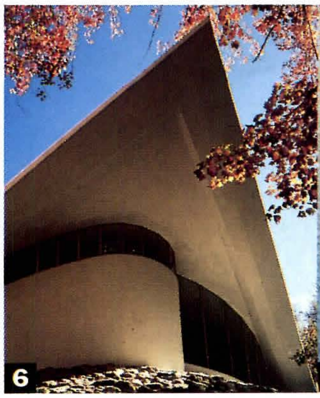
1. Vecta's Assisa chair, designed by architect Paolo Favaretto, can be stacked and ganged. Other options include an armed version, tablet arms, and bookracks. Circle 401 on information card.
2. The architecture firm Wittenberg, Delony & Davidson of Little Rock, Arkansas, specified products from the Hussey Seating Company for Arkansas State University's Convocation Center, reputedly the largest folding-seating installation in the country. Unlike most arenas, which combine fixed and folding seats, this facility contains all folding seats, providing maximum flexibility for all types of activities (3). Two levels can be curtained off to separate concurrent events. Circle 402 on information card.
4. The nylon cloakroom rail from Hewi, Inc. includes three stationary double hooks installed to face away from the user, protecting against accidental injury. The rails are available in 13 colors. Circle 403 on information card.
5. USG's movable walls are easily reconfigured to meet changing space-planning needs. Circle 404 on information card.
6. Spacesaver Corporation's mobile storage systems are custom designed, and accommodate a variety of existing storage components, including several shelving types. Circle 405 on information card.
7. Medart's lockers are designed to be tamper-proof and are offered in a range of models such as two-person, duplex units, and specialty styles. A variety of options such as mirrors, towel bars, and trays is also available. Circle 406 on information card.

Take Cover

Regulations affect sealants and coatings.

SINCE 1987, THE ENVIRONMENTAL PROTECTION AGENCY HAS PROposed stringent nationwide regulations affecting volatile organic compounds (VOCs) found in certain architectural paints and coatings. While no federal regulation currently defines VOCs, most states and municipalities are now passing their own regional regulations, dictating acceptable VOC levels in products based on air quality problems in each state. According to the EPA, VOCs contribute to ozone pollution, which can cause physiological problems, aggravating asthma and other pulmonary diseases. In addressing the subject of VOCs, Carroll Bennett, architectural marketing manager of Sherwin-Williams, maintains the impending environmental regulations will be responsible for the greatest changes in the industry over the next decade. According to a report issued last summer from the Sealant, Waterproofing & Restoration Institute, sealants and coatings will not only be affected by VOC regulations, but also by higher costs of materials and reduced availability. Sealant and coating manufacturers are now researching ways to produce products that comply with the federal government's regulations that restrict the manufacture, sale, use, and disposal of certain VOC-containing materials. —A.G.L.





1. GE Silicones' Silpruf sealant and SCS1200 structural sealant applied to the curtain wall of the Northwestern Atrium Center in Chicago helps protect the building from the elements. Circle 410 on information card.
2. Isposil, a silicone emulsion-based coating from Ispo, Inc., is highly water-vapor permeable and water-resistant. Circle 407 on information card.
3. Triarch Industries' Duroplex interior wall coating contains a chemical composition that resists mildew. Circle 408 on information card.
4. Flexible Seal elastomeric sealant is used for sealing small joints or cracks for a variety of surfaces. ac products Inc. Circle 411 on information card.
5. Tremco's Dymeric weatherproof sealant won't sag and is formulated to accommodate movement in building joints. Circle 409 on information card.
6. Dow Corning Corporation's Allguard 100 percent silicone, waterproof elastomeric coating is suggested for above-grade and masonry applications. The flexible coating can be applied with a roller (7), power roller, brush, or sprayer. Circle 412 on information card.

Bungalows, Camps and Mountain Houses
William P. Comstock
NEW *and Clarence E. Schermerhorn*
A resource guide for architects, historians, and homeowners on the bungalow style and its characteristic plan. 125 pp., R847, $19.95 pb. ($17.95 AIA members)

Fanlights: A Visual Architectural History
Text by Alexander Stuart Gray
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Everything you need to know about the history and restoration of fanlights (or overdoor) in Georgian homes. 160 pp., R846, $21.95 hardcover ($19.75 AIA members)

Sir Christopher Wren
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An annotated and well-illustrated catalog of surviving drawings for the design of St. Paul's Cathedral. 190 pp., R751, $39.95 cloth ($35.95 AIA members); R751P, $29.95 pb. ($26.95 AIA members)

Architectural Shades and Shadows
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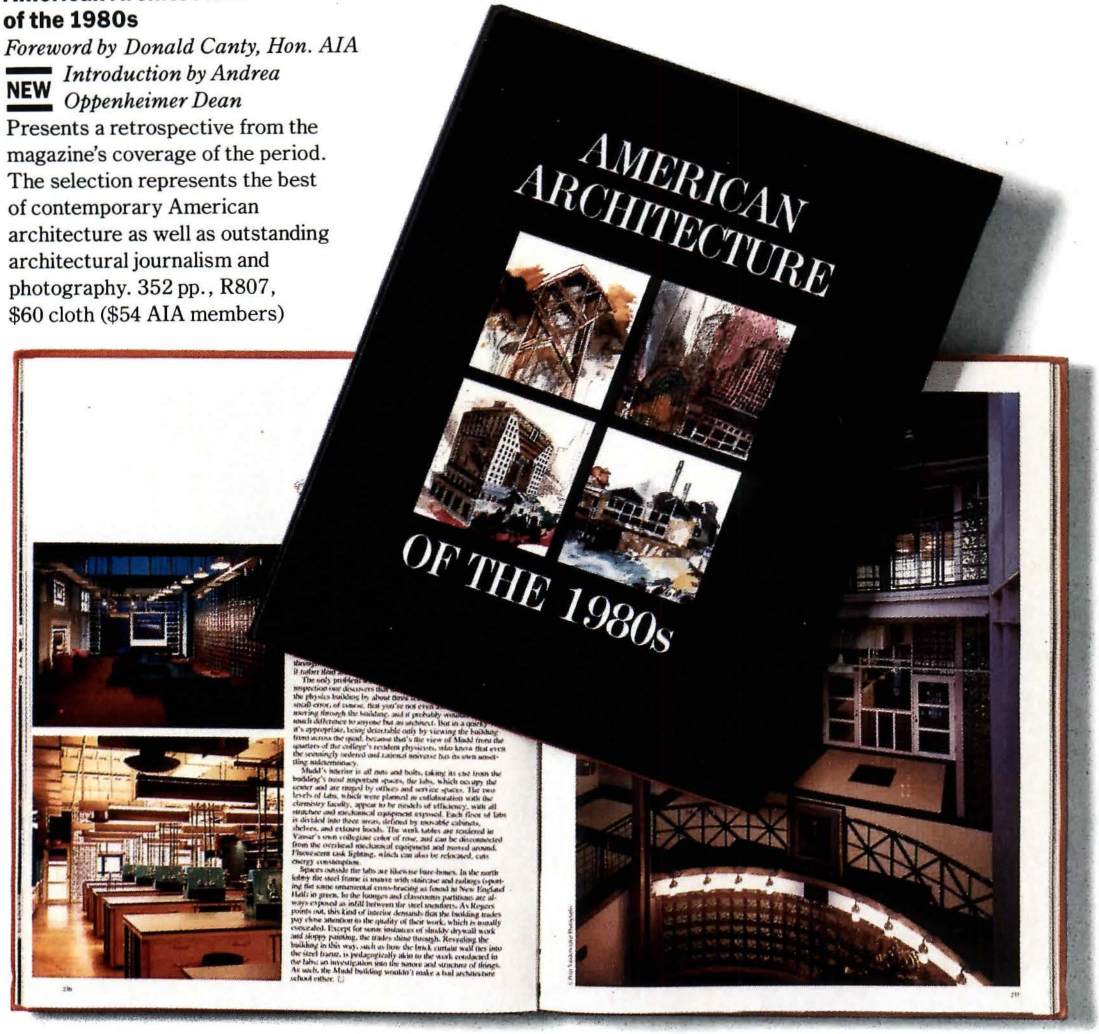
A complete course in the technique of shadow casting used by architecture professionals. 120 pp., R804, $32.95 cloth ($29.65 AIA members)

The Architecture of Gunnar Birkerts
Text by Kay Kaiser
A Pulitzer prize nominee explores a world-renowned architect's personal history, design philosophy, and building methodology. 252 pp., R803, $45 cloth ($40.50 AIA members); R803P, $30 pb. ($27 AIA members)

Human Resources Management for Design Professionals
NEW *Cynthia A. Woodward, AIA*
A guide to hiring and keeping talented people, for design firms of all sizes. 130 pp., R805, $24.95 pb. ($22.50 AIA members)

American Architecture of the 1980s
Foreword by Donald Canty, Hon. AIA
NEW *Introduction by Andrea Oppenheimer Dean*
Presents a retrospective from the magazine's coverage of the period. The selection represents the best of contemporary American architecture as well as outstanding architectural journalism and photography. 352 pp., R807, $60 cloth ($54 AIA members)



Hugh Newell Jacobsen, Architect
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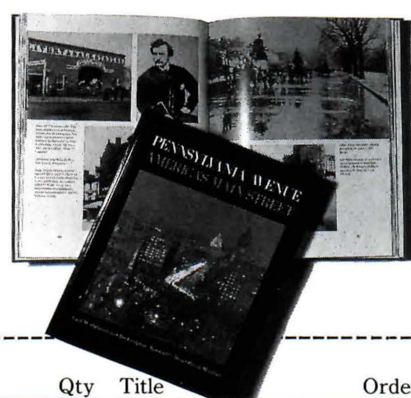
A volume brimming with the beauty and magnificence of great architecture brought to life by splendid photography. 352 pp., R719, $50 cloth ($45 AIA members); R719P, $35 paper ($31.50 AIA members)

THE**AIA**PRESS



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HVAC for schools

AMERICAN AIR FILTERS' FLOOR AND CEILING ventilators (above) are designed to handle the unique thermal loads of classrooms, using outside air for economical cooling, and deflecting the collected heat gain from students, overhead lights, and the sun. The self-contained units of the Herman Nelson Classmates line provide air conditioning, heating, and ventilation all in a single cabinet.

Circle 417 on information card.

Modular walls

THE TWINLINE MOVABLE WALL SYSTEM (above) by Transwall Corporation features acoustical qualities and accommodates wiring for power distribution, telecommunications, and data processing. Integral vertical and horizontal raceways allow easy electrical retrofits. The modular system is suggested for institutional projects such as schools, hospitals, and computer rooms.

Circle 418 on information card.

Locker up

PENCO METAL LOCKERS (ABOVE) ARE AVAILable in 17 colors and a variety of styles and accessories. Single-row lockers or double-row (back-to-back) construction are also available.

Circle 419 on information card. ■