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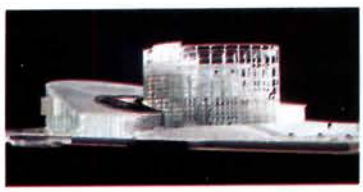
Europe's New Conflict

Efforts to abolish registration in Britain set an alarming precedent for European architects.

JOE DAY



TOP: Even the European Parliament faces a conflict over architecture. The legislative body recently moved into a glass behemoth in Brussels.
ABOVE: A more civic-minded building, designed by the French firm Architecture Studio, has been proposed for a site in Strasbourg. It may become the Parliament's permanent headquarters.

Behind the gleaming, well-composed facades of the new European architecture featured in this issue lurks an upheaval in Europe's construction industry. Like their American counterparts, architects in the European Community are coping with a recession, stiff competition from related construction specialists, and diminishing professional stature. Most alarming is the current movement in Britain to abolish architects' registration altogether.

Last year, in the spirit of deregulation, the British government commissioned a review of its Architects Registration Acts. The review recommended scrapping the Architects Registration Council of the U.K. (ARCUK). If the ARCUK were abolished, the term "architect" would no longer be a title protected by law, and architects would share the same nonregistered status of structural engineers, cost estimators, and other construction industry professionals. Instead of being "registered" with the ARCUK after passing a professional practice examination, architects would only be "chartered" as members of the Royal Institute of British Architects (RIBA). This proposal is akin to abolishing the National Council of Architectural Registration Boards in this country. The elimination of an independent registration body would undermine the credibility of the profession.

In other countries, such as Spain and Germany, efforts are underway to abolish fee scales set by architects; in Sweden, architects face competition from construction managers, who increasingly run large projects; and throughout Europe, the multinational contractor is becoming a more dominant force within the construction industry.

Opposing these trends, the General Assembly of the Architects' Council of Europe (ACE), a group comprising all of the professional institutes in the European Community, such as the RIBA, voted in May to protest Britain's deregistration attempts. The council is now investigating the establishment of a single registration body for all architects in Europe and is studying uniform standards for educational requirements and professional conduct. The ACE must take a more proactive approach to protecting the interests of architects in Europe.

Given the ominous developments in Britain and elsewhere, European architects are organizing to pool their resources and promote their business interests through grass-roots networks. Designers International, for example, was established two years ago and now comprises nine firms, ranging in size from 12 to 200 architects, with practices in London, Brussels, Copenhagen, Amsterdam, Lisbon, Madrid, Stockholm, Dusseldorf, and Paris. But more must be done.

American architects should be aware of these European efforts in the face of the current skirmishes on their own professional front. In addition to increasing practices such as design/build, the expertise of U.S. architects is not only being undercut by related disciplines but by professions outside the field as well. For example, Jerome Filer, president of AIA Florida, reports that a group of Florida attorneys has been lobbying for three years to pass laws that prohibit architects from presenting their own projects in public hearings on zoning and large-scale developments, thus reducing the role of architects to that of consultants or paralegals.

The AIA must work with local organizations to prevent such action in other states and monitor the potentially damaging developments abroad. The battles in Europe should serve as a warning signal of what could happen at home.

Deborah K. Dietsch

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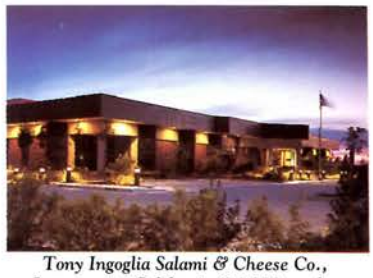

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Letters

Preserving the Salk

Robert Venturi and Denise Scott Brown make a good argument against the unfortunate addition to Louis Kahn's Salk Institute (July 1993, pages 41-45). But I must take issue with their expansion of these thoughts into a homily on American urbanism. The unending avenue does not have an infinite horizon, but a diminishing one. And the human need for closure is universal and is part of all cities and neighborhoods. Cities and their component neighborhoods should be civilized by a park or a view, and there are many design tools that can help us achieve this civilization: The terminated vista is one of them.

I would not describe Venturi and Scott Brown's "eternal frontier" of our post-war suburban growth as nonhierarchical and an expression of American democracy. It is, in fact, the expression of corporate economic interests, which have no stake in the communities in which they develop and hence produce the same formulaic boredom from one end of the country to the other.

When this suburban growth happens, the creative entrepreneurship of each community vanishes—as does the open space that should be America's birthright. This is the unsentimentalized essence of what Americans call "sprawl."

To use one's intellectual gifts to make some sort of American ideal out of this mess is disreputable. We should be seeking a vision of responsible planning and community development for city and suburb.

Richard Bono, AIA
Richard Bono & Associates
York, Pennsylvania

Dr. Brian Henderson's remarks on the Salk Institute are not an appropriate justification for an addition to a building of the institute's stature. Architects and preservation groups have never questioned the Salk Institute's need to grow; however, the stature of the Salk Institute should not give it license to disfigure an American cultural landmark.

At our meeting in June 1993, Dr. Jonas Salk showed me two Kahn drawings that are being used to justify the addition. One was an early master plan that preceded the development of the entry sequence, and the other was a rough sketch of a small pavilion in the grove. It is preposterous to link these two drawings with the current proposed scheme and then say that the institute's expansion is historically based.

The issue at stake is that the addition will have an adverse effect on the architectural integrity of Kahn's masterpiece. And while it is true that the institute sought and heard opinions from groups for more than two years, your article never mentions that many of the country's leading architects met with Salk officials over that period, and for the most part, their comments were ignored. The great Modern buildings in our country are totally exposed to alterations. Our preservation laws must be modified at once to better protect not just those buildings that are old, but also those that are masterpieces.

Stuart Emmons, AIA
Louis I. Kahn Preservation Group
Los Angeles, California

Events

September 10
Deadline for Intellex, a competition sponsored by the Intelligent Buildings Institute Foundation. Contact: (202) 457-1988.

September 11-12
Society of Architectural Administrators 1993 Eastern Shore Conference in Uniondale, New York. Contact: Stacey Maniatis, (516) 243-5005.

September 11-15
The 1993 Bureau International du Beton Manufacture Congress in Washington, D.C., sponsored by the National Precast Concrete Association. Contact: (317) 571-9500.

September 15-October 16
Berlin: Designing a Capital for the 21st Century, an exhibition at the German Cultural Center in New York. Contact: (212) 439-8700.

September 18-19
An exhibit and sale of drawings and prints by renowned architects at the Southern California Institute of Architecture. Contact: (310) 305-1474.

September 22-23
Capital Design Week and Specifix, an annual symposium on residential and contract design at the Washington Design Center. Contact: (202) 479-4227.

October 1-3
The Society of Architectural Administrators 1993 Western Shore Conference in San Diego, California. Contact: (516) 243-5005.

October 7-10
Leadership Influence, the 1993 AIA Western Mountain Regional Conference in Tempe, Arizona. Contact: (602) 252-4200.

October 7-11
National Organization of Minority Architects 23rd annual conference in New York City. Contact: Cynthia Coe, (703) 788-0338.

October 8-November 5
Second annual exhibition by the Metropolitan Forum of Young Architects in Washington, D.C. Contact: (202) 333-2310.

October 19-21
1993 Architecture, Engineering, and Construction Exposition held at the New York Coliseum. Contact: Peter Yakalis, (609) 987-9400.

October 21-23
Urban Waterfronts, an annual international conference held in Washington, D.C. Contact: The Waterfront Center, (202) 337-0356.

October 27-28
Home Sweet Office, hosted by the International Facilities Management Association at the International Design Center in New York. Contact: (718) 937-7474.

October 27-29
Annual conference of the Metal Construction Association in Dallas. Contact: (617) 965-0055.

October 29
Registration deadline for Design: Contributing to the Quality of Healthcare, sponsored by the National Symposium on Healthcare Design. Contact: (510) 370-0345.

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News

Architects Help in Flood Recovery

Architects in the flood-stricken Midwest have joined relief efforts after the month-long deluge, in which 50 people died and 70,000 lost their homes or businesses. Damage estimates reached $12 billion in a flooded region stretching from the Dakotas to the American Basin, where the Illinois and Missouri rivers converge with the Mississippi near St. Louis, Missouri.

In mid-July, flood waters from the Raccoon and Des Moines rivers overran downtown Des Moines and knocked out water supplies for 11 days. The AIA chapter in Iowa was trying to work with the state's disaster-relief office and the Federal Emergency Management Agency (FEMA), assigning volunteer architects to inspect damaged buildings for safety, but was getting no response from the federal officials.

"We are a good example of needing to get a disaster plan in place," admits Suzanne Schwengels, executive director of AIA Iowa. "We thought it would never happen here." Local architects are cooperating with Des Moines city officials to tally commercial property damage and are working with homebuilders to assess residential losses.

At Iowa State University in Ames, Professor of Architecture Robert Findlay, who directs the student practice group Iowa Community Design, arranged with FEMA to supply student expertise in rebuilding flooded communities. Findlay's community-assistance teams will fan out to help resituate displaced residents, using a regional approach. Relocation aid will be backed up by architecture, landscape, and planning services, Findlay says.

The St. Louis AIA chapter is also offering support for building inspection and reconstruction, according to a local plan developed for earthquakes, says Katherine Hoester, executive director of AIA St. Louis. "We're developing a workshop to certify volunteer architects," Hoester explains. The St. Louis AIA chapter will then make volunteers' names available to relief officials.

Despite concerns over liability, individual firms in the Midwest are also helping in the recovery efforts. In St. Louis, employees of Hellmuth, Obata & Kassabaum (HOK) were given a paid day off to work in a shelter for residents evacuated in south St. Louis upon the threat of unstable propane tanks, according to HOK Public Relations Director Dana Collins. HOK also set up donation banks for the Salvation Army and the American Red Cross.

SAM FENTRESS

ST. LOUIS: Mississippi submerges Gateway Arch grounds and much of Eads Bridge.

TOM EBENHOH

STE. GENEVIEVE: Sandbags helped to save 1770 Bolduc House and its fence.

Most major buildings in St. Louis remained safe behind a 52-foot flood wall, but the flood's magnitude could be observed in the water creeping up to the collar of Eads Bridge, an 1874 engineering landmark, and the steps to Eero Saarinen's Gateway Arch.

Fifty miles downstream, the 1770s French settlement of Ste. Genevieve faced down the threat to its historic buildings, among the oldest in the former Louisiana Purchase. The town's creole houses, including the Bolduc House and the poteaux-en-terre Amoureaux House, both from 1770—with an original Norman-truss roof—barely escaped destruction behind sandbags. Ste. Genevieve, which has flown French, Spanish, and American flags during its history, comprises "the finest examples of French architecture in the U.S. today," explains local preservationist Odile Stewart Mecker. "But it's like a ghost town," Mecker observed during the evacuation at the flood's peak. "The flags are not flying."—*Bradford McKee*

For more information on flood recovery, call Jan Johnson or Pete McCall at the AIA for a three-page advisory on assessing water damage: (202) 626-7300.

INSPECTION BOOTHS: Fabric canopies.

MAIN ENTRANCE: Tensile fabric canopies over lobby are supported atop pylons and uplighted to present nighttime oasis.

CALEXICO STATION: Dworksy's limestone and concrete building.

MAIN BUILDING: Customs (left) and immigration (right) are separated by tented lobby.

New Ports of Entry on U.S.-Mexico Border

Spurred by growing numbers of both legal and illegal immigrants and the pending North American Free Trade Agreement, the U.S. General Services Administration (GSA) is undertaking a $364 million plan to beef up border security at 53 locations along the United States' 2,000-mile frontier with Mexico, stretching from San Ysidro, California, to Brownsville, Texas.

These border posts comprise shared quarters for officials of the U.S. Customs Service, the Immigration and Naturalization Service, the Drug Enforcement Administration, and the U.S. Department of Agriculture. Over the past decade, undocumented crossings, drug traffic, and commercial trade in the Southwestern United States have outstripped the government's ability to keep tabs on transnational activity. In response, the GSA intends to build, renovate, and expand dozens of border stations along the frontier between the U.S. and Mexico.

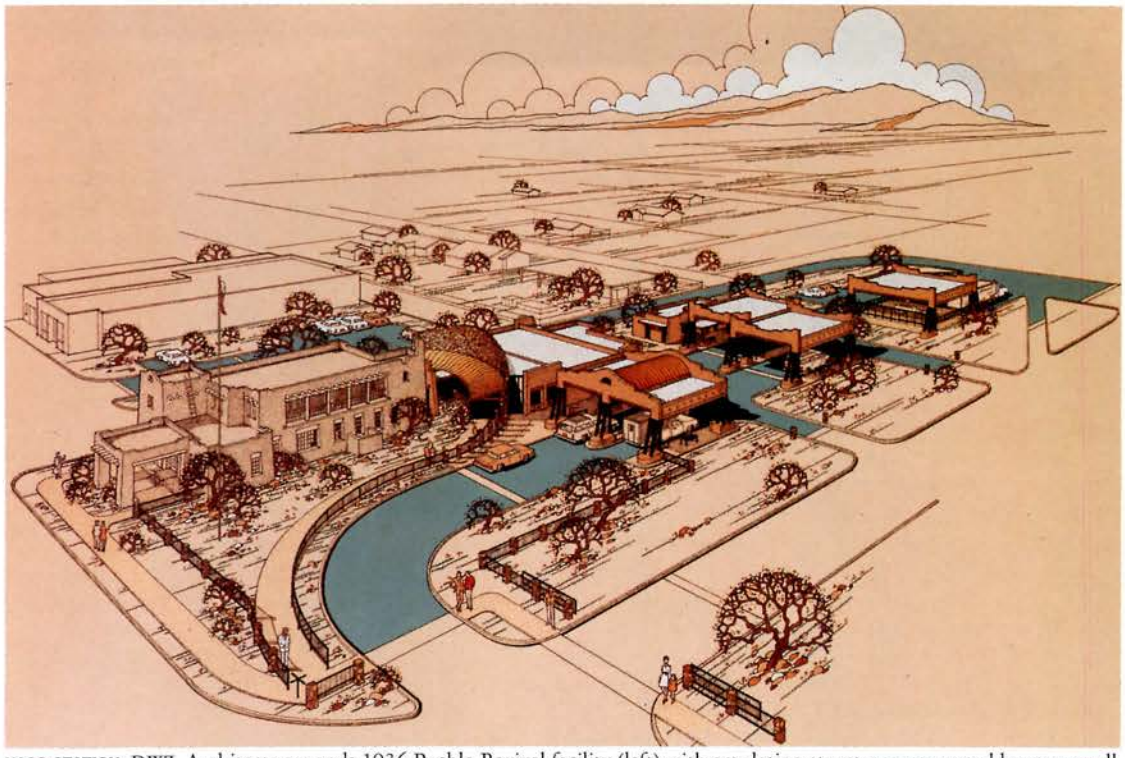
GSA's plan significantly expands 48 existing border inspection posts and calls for construction of 5 new stations by 1996. Dworsky Associates has master-planned a new port of entry in Calexico, California; DWL Architects of Phoenix has designed a new station at Naco, Arizona; Marmon Mok of San Antonio is designing a crossing at Pharr, Texas; Jones & Kell of San Antonio with The Rio Group in Austin completed design of a Los Indios, Texas, station; and Ford Powell Carson of San Antonio is working with Dworsky Associates on a new station in Brownsville.

Through these designs, the government intends to present a new face along the Mexico line—to depart from the dour, pre-war concrete slabs, for instance, that northbound travelers have passed through between Calexico, California, and Mexicali in Baja California since 1931. Buildings with a fresher attitude could offer a tonic to the militarized atmosphere of the border and even inspire goodwill among travelers in either direction, explains Tim Arnade, border projects coordinator for the GSA. The first step is to move border traffic away from congested urban settings like Calexico, Arnade says. Once that's done, the next step is to build stations that look more like thoughtful college campuses and less like chilling checkpoints.

Calexico's old border station is being replaced by Dworsky Associates' master plan for a virtually self-sufficient oasis on 83 acres located six miles east of Calexico. The barren site lies at the southern end of the Colorado Desert and is currently devoid of utilities, potable water, and sewage and storm drains.

"It's remote from existing urban areas," notes R. Michael Walden, project designer and principal at Dworsky. "People assumed we would have expanded the port in Calexico, but there is no room."

Dworsky's $55 million border station—planned to double in size if necessary—will present a desert-borne profile when completed in 1995. The station will comprise five low buildings of concrete and Kasota limestone, 12 lanes and booths for passenger vehicles, and 100 commercial truck docks. The docks will likely process up to 800 trucks per day at the outset, many requiring inspection of exotic or hazardous cargo. Travelers and their goods will either be released by guards to pro-



NACO STATION: DWL Architects expands 1936 Pueblo Revival facility (left) with emulating structures, separated by stone wall.

INSPECTION BOOTHS: Copper-roofed canopies incorporate stepped parapets and battered columns of historic structure.

ceed northward, or "referred" to the search, interview, and holding rooms of federal authorities on this site.

Predictably, the government has set ironclad specifications for the design of all of the border stations. Driven by security issues, the stations must conform to a standard layout of customs inspections and immigration review areas. "The functional layout of the buildings is mostly GSA-driven," explains Robert Newsom, project director and principal of Dworsky Associates.

Dworsky, however, elevated the design of the Calexico station by roofing the main building and adjacent inspection booths with tensile structures of Teflon-coated glass-fiber fabric, which resembles canvas. The roof's pyramidal forms are intended to echo the desert dunes. The glass-fiber fabric will be stretched flat atop the space frame of the secondary inspection building, as well as around the pinwheel-shaped commercial import building, daylighting their interiors. The tent-shaped roofs also resolve air-quality concerns. Their tensile geometry circulates air by convection, drawing carbon monoxide up and away from people who are working beneath them.

Outside, a north-south axis through the main building will be defined by 28-foot-high pylons; three pylons march southward through the pedestrian plaza, and another two dozen proceed in the opposite direction, "demarcating the way north," says Newsom. The pylons, which will be uplighted at night, lend a vertical dimension to the site, which is extremely flat. To bolster the nocturnal image of Calexico station, the tent structures will be uplighted as well to glow in the desert like an oasis of light.

Another notable border station design, by DWL Architects + Planners of Phoenix, will expand the existing port of entry at Naco, Arizona, at a price of $3.3 million. The original station at Naco was established in 1902. A 1936 Pueblo Revival inspection building on the site was listed on the National Register of Historic Places in 1991; DWL's copper-roofed canopies over inspection lanes emulate the older building with stepped parapets, battered columns, expressed lintels, and deeply recessed windows. A gently sloping wall of natural stone will be situated between the old and new structures to provide a connection.

DWL's Naco station, like Dworsky's Calexico port of entry, is designed to expand. Officials at Naco are expecting to process 24,000 vehicles a month upon the station's completion in 1994.

Details

Fox & Fowle Architects and **Richard Gluckman Architects** of New York and **En-Chuan Liu** of Shanghai are designing a 570,000-square-foot Finance Center for the Industrial and Commercial Bank of China in Shanghai. **Burt Hill Kosar Rittelmann Associates** of Pittsburgh is redesigning four floors of Savior's Hospital in Moscow. **Haines Lundberg Waehler** of New York is designing the 48-floor Asia Pacific Commercial Center in Haikou, China. **John Portman & Associates** of Atlanta is master-planning a $1.3 billion, mixed-use development in Hangzhou, China. **Cesar Pelli & Associates** and Houston-based **Watkins Carter Hamilton** are designing a master plan for Lutheran General HealthSystem in Chicago; Pelli and **van Dijk, Pace Westlake & Partners** of Cleveland were selected to design the new health-sciences center for the Cleveland Clinic Foundation. **Jane Thompson** and **Benjamin Wood** have opened **Thompson & Wood Architects and Planners** in Cambridge, Massachusetts, following the retirement of partner Benjamin Thompson. **NBBJ** has been awarded the commission to restore Seattle's historic Paramount Theater. **Skidmore, Owings & Merrill** has been selected by George Mason University as master-planner of GMU's campus in Arlington, Virginia, and as architect of the university's new law school building. **Hardy Holzman Pfeiffer Associates** of New York has designed the new American Indian wing at the New York State Historical Association's Fenimore House in Cooperstown. **Centerbrook Architects** of Essex, Connecticut, has been commissioned to design the Quinnipac College School of Law in Hamden, Connecticut. **JPJ Architects** is preparing a campus master plan for Southwest Texas State University in San Marcos. **Cooper Robertson & Partners** of New York is developing a master plan for the downtown St. Louis riverfront. **Richard Friedson** of the **Visions Studio** in Solana Beach, California, has been named architectural director of **Sasaki Associates** in Boston. **Mitchell/Giurgola Architects** has been selected to design a 90,000-square-foot health-sciences complex for the Brooklyn campus of Long Island University.

Scheme for New Berlin Government Center Awaits Final Approval

FIRST PRIZE: Schultes/Frank model.

The Spreebogen International Competition for a new government center in Berlin represents the largest competition ever held in Germany and the most important urban planning competition of the late 20th century. The competition called for designing 5 million square feet of new government buildings, including the federal chancellery, the parliament and its related facilities, and the federal council. It drew 835 entries from 54 countries, including 93 submissions from American firms.

The judging for the international competition extended from last November, when a 50-member pre-jury analyzed the entries, to February, when the jury selected 8 prize winners and 14 honorable mentions.

First-prize choice was the scheme by Berlin architect Axel Schultes with his associate Charlotte Frank; second prize was awarded to Miroslav Volf of Saarbrucken, Germany; and the competition's third prize went to the team of Nick Gartenmann, Mark Werren, and Andreas Johri of Bern, Switzerland.

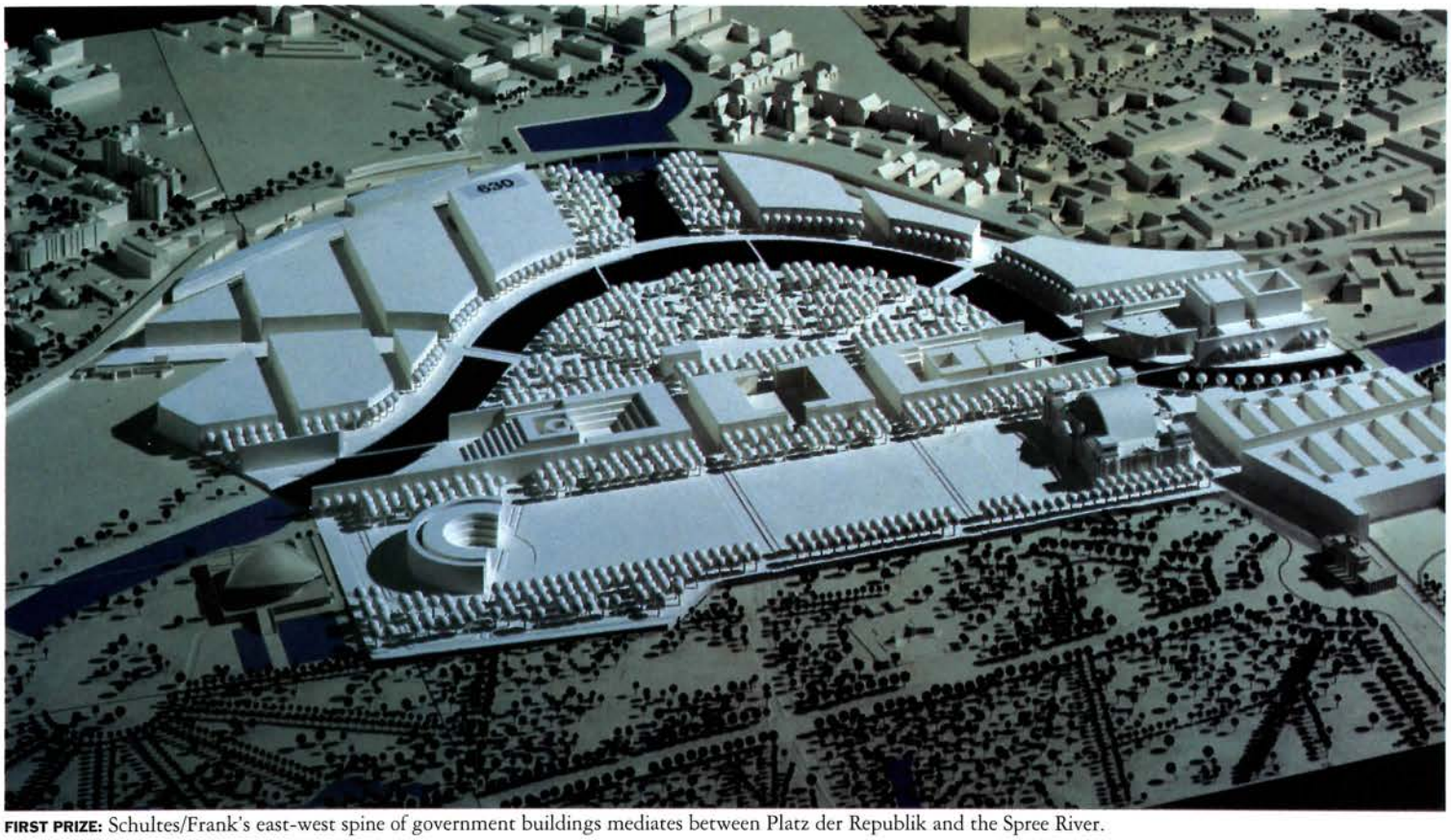
A small group of Bonn politicians were displeased with the initial results, and with Chancellor Kohl's support, they commissioned a revision stage for the first-, second-, and fourth-prize winners. Based on a written critique of each of these schemes, the three groups were asked to present revised proposals. The jury reconvened in June to confirm its decision to accept the relatively restrained Schultes/Frank scheme as the first prize.

With the exception of a few inspired entries, overall, the jury was disappointed with the submissions. The lack of innovative solutions might be symptomatic of the times, but upon further reflection, other factors seemed to be at play.

The program, which took the form of a 200-page book, was indeed impressive. Complete with maps, charts, photographs, and historical information in three languages, the book spelled out detailed programmatic requirements for the site's 5 million square feet. The challenge of the competition was to generate a scheme that was both general enough to withstand the evolution of a lengthy development process and specific enough to address the detailed aspects of the various government buildings.

Few architects were able to successfully mediate between these two extremes; most erred on the side of architecture rather than planning. This point might also be taken to illustrate the difficulty that many American architects encountered when developing a clear planning strategy. In the United States, planning issues are often subjugated to architectural concerns: In Germany, this is not the case. As a result, only one honorable mention was awarded to an American firm, Morphosis.

The comprehensive program also reflected a conservative approach to the planning of a new, state-of-the-art government center for Berlin. There was no mention of the technological revolution, which has dramatically altered life in the late 20th century and how, for example, computer, video, and telecommunications systems might influence programmatic and spatial relationships.



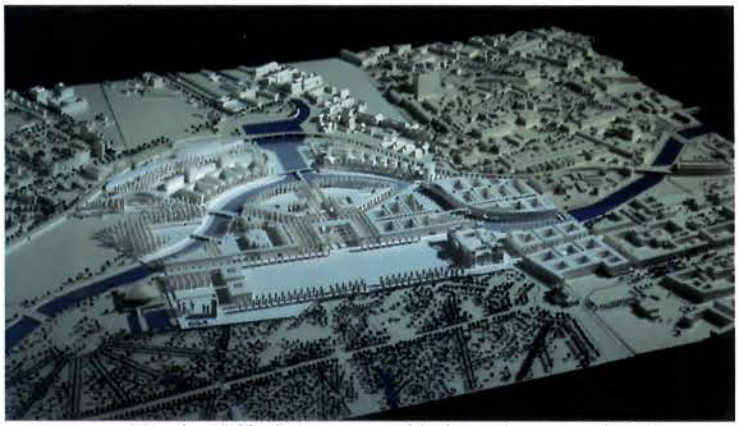
FIRST PRIZE: Schultes/Frank's east-west spine of government buildings mediates between Platz der Republik and the Spree River.

Another difficult aspect of this competition was the complexity of the site. The Spreebogen spans 140 acres adjacent to the existing Reichstag building, northwest of the Brandenburg gate, at the bend in the Spree River. Without having visited the site, it was impossible for foreign architects to grasp the scale and idiosyncratic nature of this area.

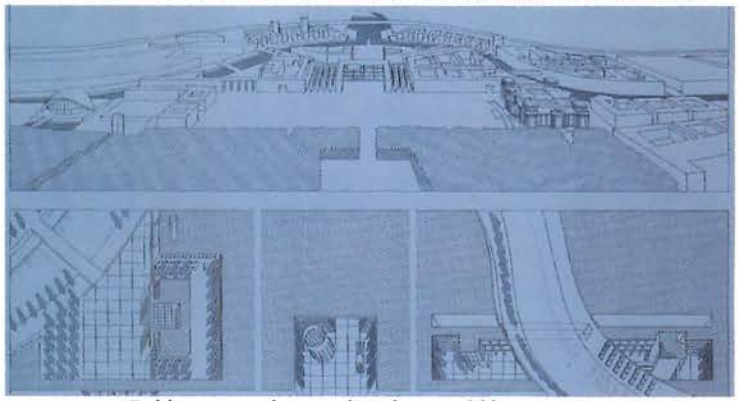
In addition, the site is charged with historical meaning, from the days of the Weimar Republic and the megalomaniacal plans of Hitler to its present condition, with the lone Reichstag casting its shadow over a vast empty plain. Therefore, it is not surprising that the design competition was won by Berliner Axel Schultes and his associate Charlotte Frank. Not only is Schultes a prominent German architect, but he had also won second prize in an earlier competition held on this site several years ago.

The last consideration, and the most important, was the issue of image. What should a new government center for unified Germany look like? How should it work, and what spirit should it convey? The program was silent about this delicate subject. The participants were required to infuse their own meaning into their proposals. The jury discussed this issue at length and was unable to articulate a consensus about the ideal spirit of the competition. In fact, the jury was clear about what it did not want, but not about what it wanted. As it turned out, many entrants simply ignored this challenge, leaving their entries dry and devoid of empathy. Others served up commentary on the nature of the competition, the most extreme example being that of an underground maze, poking fun at the meaning of government.

Given the complexity of this problem, it was all the more refreshing to discover the elegant scheme by Schultes/Frank, which won the first prize. Designed as a linear strip of buildings and public spaces, the scheme stretches east to west, beginning at the Freidreichstrasse station in the urban center of Berlin, and cuts across the site all the way to the



SECOND PRIZE: Miroslav Volf's design restores block typology around Reichstag.



SECOND PRIZE: Public spaces relate to Platz der Republik.

northeast district of Moabiter Werder. By establishing this east-west link, the center is tied back to the urban fabric of the city. The linear arrangement of the winning scheme, sited north of the Platz der Republik, respects the historical setting without celebrating it. The height of the government buildings is set at the standard Berlin height of 22 meters, and the width of Schultes' plan is established by the dimension of a single courtyard building, thus retaining a clear linear plan.

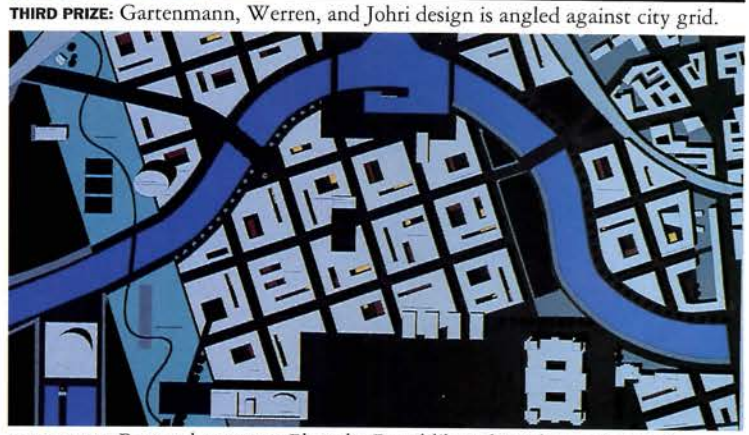
Schultes' proposed federal chancellery is located on the western half of the site, but placed to relate to Platz der Republik along with its counterparts, the parliament to the east, and the federal council to the west. In the center of the development, a public forum mediates between the monumental space of the historic plaza and the garden adjacent to the Spree River to the north.

Berlin is a "green" city, though much of its landscape is undistinguished. Schultes/Frank's thin, minimalist composition exposes the existing natural landscape by cutting straight through it. The buildings of Berlin's new government center bridge the river several times, allowing access to the Spree. An allee of trees north and south of the complex provides pedestrian access back to the city center and to the Freidrichstrasse train station. The other major pedestrian link is to the Tiergarten, the most important park in Berlin.

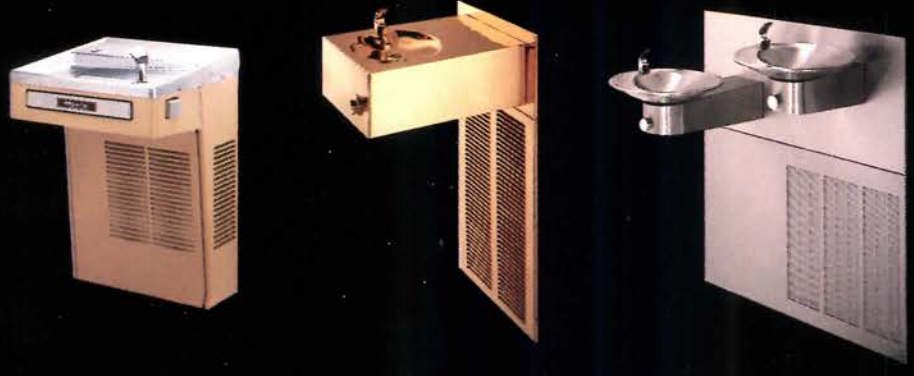
Following the decision of the revision stage jury in June, the German Parliament must now approve the scheme by Schultes and Frank this fall. The planning and building process is expected to last several years. The administrative buildings will be designed first, along with the renovation of the Reichstag building by British architect Norman Foster. But given Germany's current recession and the $100 billion yearly costs of unification, the new government center may not be built until the next century.—*Karen Van Lengen*

Karen Van Lengen, an architect based in New York, served on the Spreebogen jury. In 1989, Van Lengen won the competition to design the Amerika Gedenkbibliothek, a 150,000-square-foot addition to the existing Berlin Public Library.

THIRD PRIZE: Gartenmann, Werren, and Johri design is angled against city grid.



THIRD PRIZE: Proposal preserves Platz der Republik and Reichstag (bottom).



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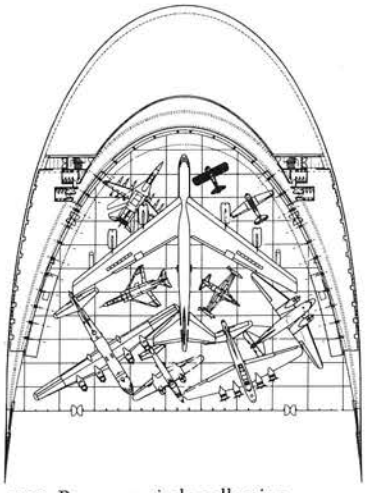
Foster Designs U.S. Air Museum

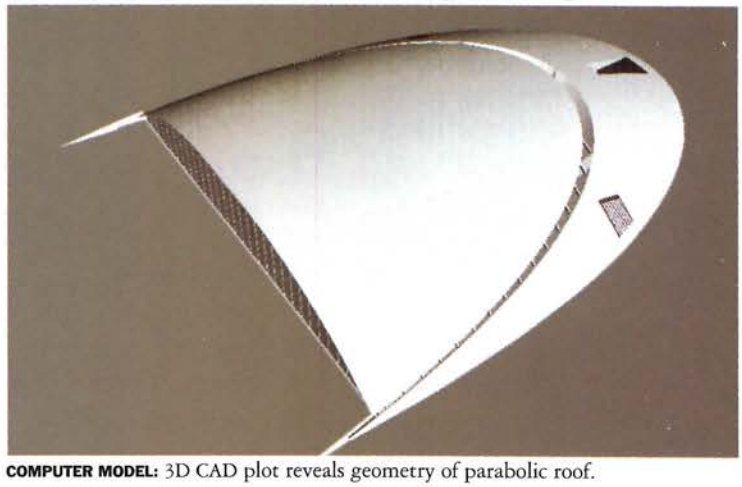
A 1.4-acre site on a former air base in Duxford, England, will become the new home of the American Air Museum, designed by British architect Norman Foster to house the museum's vintage American warplanes. The new building will protect the aircraft—currently displayed outdoors—from the elements, under a parabolic concrete roof that echoes the silhouettes of nearby hangars.

Visitors will enter the building at eye-level with the cockpit of a B-52 fighter. Ramps will lead down into a 47,000-square-foot exhibition space filled with American aircraft dating from World War I through the Persian Gulf War. The aircraft will be displayed both on the ground floor and suspended from the roof. The exhibition space will be daylit by a 60-foot-high glazed wall. Aircraft will be protected from ultraviolet radiation through a thin protective film layered between the panes of glass. Construction is scheduled to begin as soon as the $10.8 million budget is secured.—*Raul Barreneche*

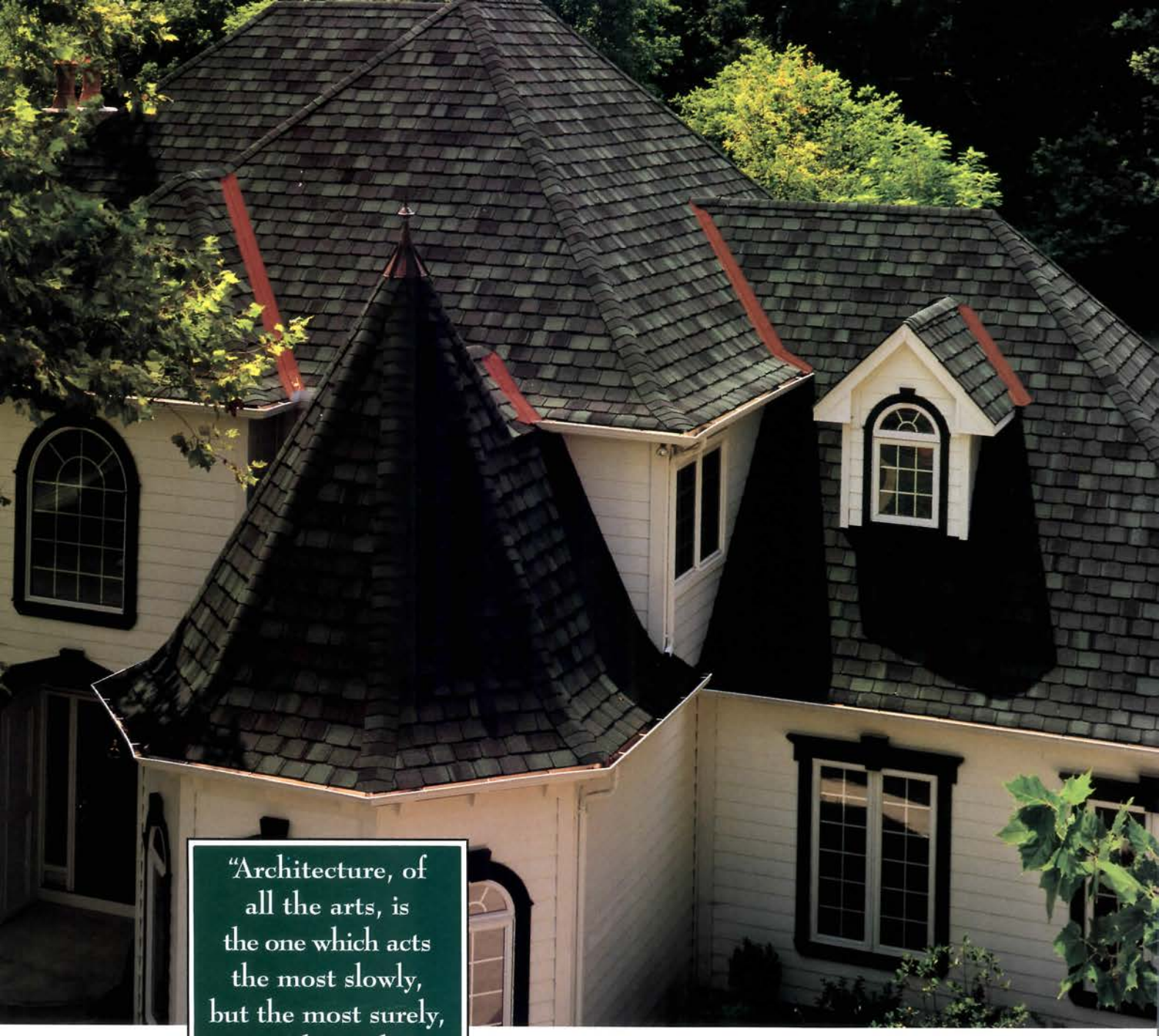


PLAN: Ramps encircle collection.

HANGARLIKE MUSEUM: Aircraft will be visible through 60-foot-high wall.



COMPUTER MODEL: 3D CAD plot reveals geometry of parabolic roof.



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—Ernest Dimnet

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Philadelphia Unveils New Convention Center

Convention centers have become a profitable revenue resort for cash-strapped cities. By 1994, 15.2 million square feet of convention space will have been built since 1988, according to industry experts. Sixteen new centers are under construction in the U.S. from Providence, Rhode Island, to Coachella, California, to Kingsport, Tennessee. As part of this trend, Philadelphia christened its new $523 million Pennsylvania Convention Center on June 26. Despite its vast size, the 1.4 million-square-foot complex is a sterling example of anticipatory urban design.

Architects Thompson Ventulett Stainback & Associates (TVS) of Atlanta, with the Vitetta Group and Kelly/Maiello Architects & Planners of Philadelphia, eschewed a site on the margins of downtown Philadelphia. Instead, they inserted the two-block building in the heart of the city—adjacent to Chinatown and only one block from William Penn's perch atop City Hall.

Next door, the Victorian Reading Terminal and its Renaissance headhouse are currently undergoing renovation and are scheduled for completion by March 1994. A footbridge spanning Arch Street will connect the convention center to the terminal, which will house meeting spaces and a ballroom.

The center's limestone, brick, and granite exterior gives back what it gains from the streetscape, concealing five football fields worth of exhibit space in a shell lined with human-sized windows on the first level, locally derived bay windows on the second, and rhythmic ridge roofs on top.—*B.M.*

BRIAN GASSEL PHOTOS

SOUTHWEST CORNER: Bay windows and ridge roofs fit into streetscape.

CONCOURSE: Steel tracery, daylighting.

CONCOURSE: Arcade, decorative carpet.

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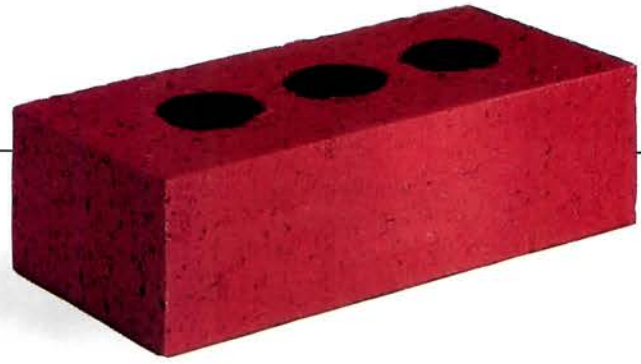

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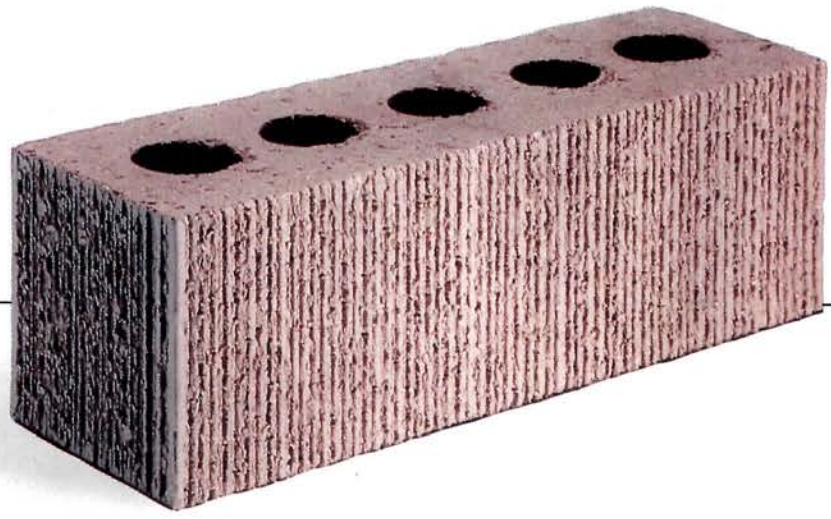

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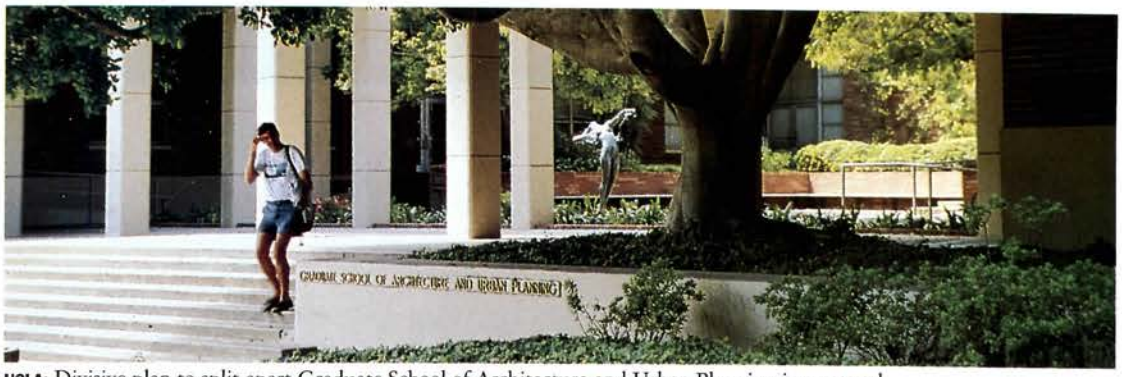

UCLA: Divisive plan to split apart Graduate School of Architecture and Urban Planning is proposed.

UCLA Architecture School to Reorganize

Under proposed cost-cutting measures, intended to save $8 million a year, the University of California, Los Angeles (UCLA) is considering "disestablishing" its Graduate School of Architecture and Urban Planning next year. The UCLA administration is proposing to split the school into two separate entities: Architecture would become a department of the School of Fine Arts, and urban planning would become part of a new School of Public Policy. Master's degree programs in both of these areas, however, would remain intact.

This development follows the demise of the architecture school at the University of California, San Diego (ARCHITECTURE, June 1993, page 24), which will close at year's end, owing to a lack of funds.

At financially troubled UCLA, faculty reaction is mixed toward the reorganization plan, unveiled by Chancellor Charles E. Young in June. Critics fault Young and Executive Vice Chancellor Andrea L. Rich for not involving the architecture school earlier in their restructuring plans. Rich defended the move, contending that if the architecture and planning programs were maintained under expected budget cuts, they would emerge "severely weakened."

Richard Weinstein, dean of UCLA's Graduate School of Architecture and Urban Planning, remains optimistic despite the possible split. Weinstein points out that the school's more important development is the arrival of new design faculty—noted architects Mark Mack, Thom Mayne, and Craig Hodgetts. Anthony Vidler will be joining UCLA as the new chair of the Art History Department and will be developing a joint program with architecture in history, theory, and criticism.

John Friedman, longtime director of UCLA's urban planning program, however, opposes the plan to split up the two areas. "Architecture and urban planning have a history of 25 years together here, and we are about to launch a program for students to work simultaneously on master's degrees in both," Friedman asserts. "The chancellor has been dreaming about a School of Public Policy, but it's the wrong place for urban planning."—*Dirk Sutro*

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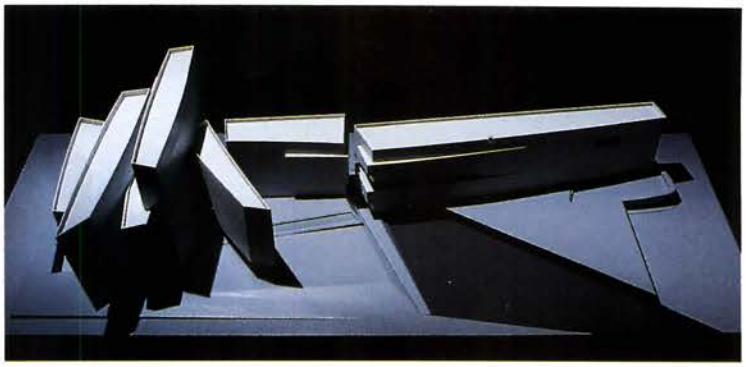
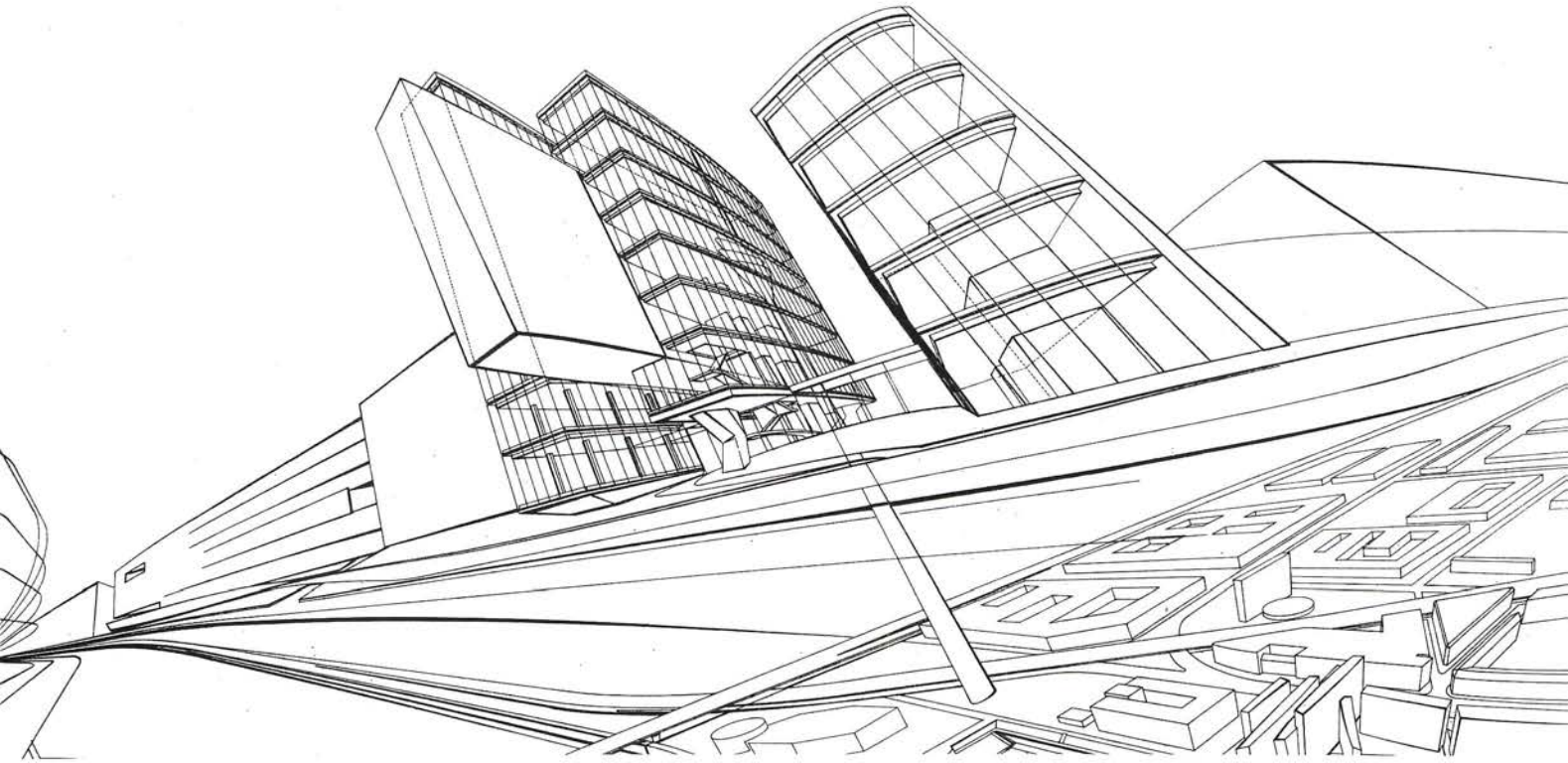
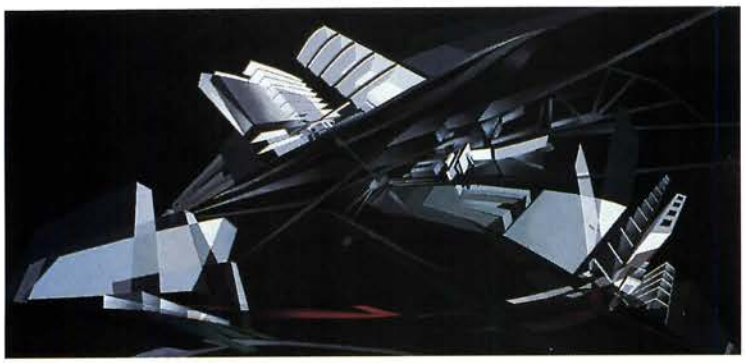






Art and Media Center
Dusseldorf, Germany
Zaha Hadid, Architect

Iraqi-born architect Zaha Hadid is the latest of several architectural luminaries, including Peter Eisenman (ARCHITECTURE, July 1993, page 39), to design a building in Dusseldorf's revitalized harbor area—the city's "creative mile," where numerous artists and film, radio, and television studios have relocated.

Hadid's scheme for the German developer Kunst- und Medienzentrum Reinhafen is a 34,000-square-meter complex comprising both office and studio space for an advertising agency and other creative businesses; restaurants; and cultural and leisure facilities, including a 320-seat cinema located below ground.

The site of the dynamic complex is a parcel of city-owned land situated between an access road and the Rhine River, along which Hadid has created a large, open public plaza—described by the architect as an "artificially modulated landscape." An enormous triangular, metal plinth projects into the site from the river, slicing through a 90-meter-long slab of offices and studios. The street facade of the slab will be crafted of poured-in-place concrete, scored with linear incisions, to protect the plaza from traffic noise.

The advertising agency offices will be housed in a cluster of five towers, interconnected to form a single building. The volumes will be clad in a floor-to-floor, triple-glazed curtain wall which allows the floor slabs to be seen from the exterior.

The lobby is designed as a minimalist glass box surrounded by large, triangular transfer piers, offering views from the street to the Rhine. From the lobby, visitors will ascend a grand staircase that perforates the exposed concrete floor slabs.—*Raul Barreneche*

On the Boards

SITE PLAN: Academic core at bottom.

National University of Science and Technology
Bulawayo, Zimbabwe
Davis, Brody & Associates with Tibbalds Monro and Mwamuka, Mercuri, Architects

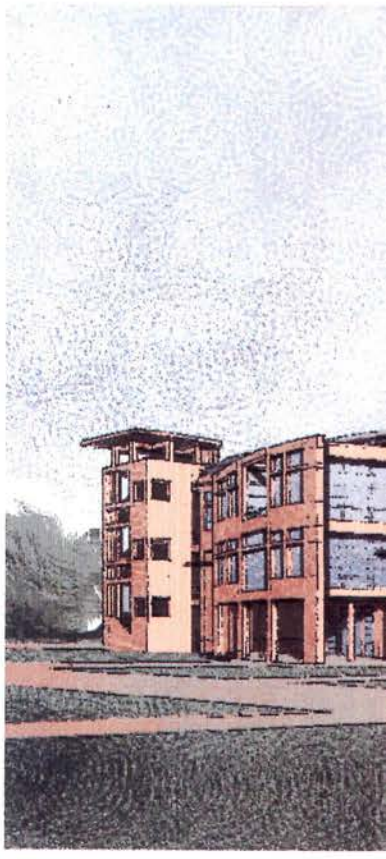
Davis, Brody & Associates has joined an international venture to design the new National University of Science and Technology in Bulawayo, Zimbabwe. The New York firm is collaborating with Mwamuka, Mercuri Associates, selected in a university-sponsored international design competition, and London architect Tibbalds Monro to develop a master plan and building designs for the 495-acre university campus.

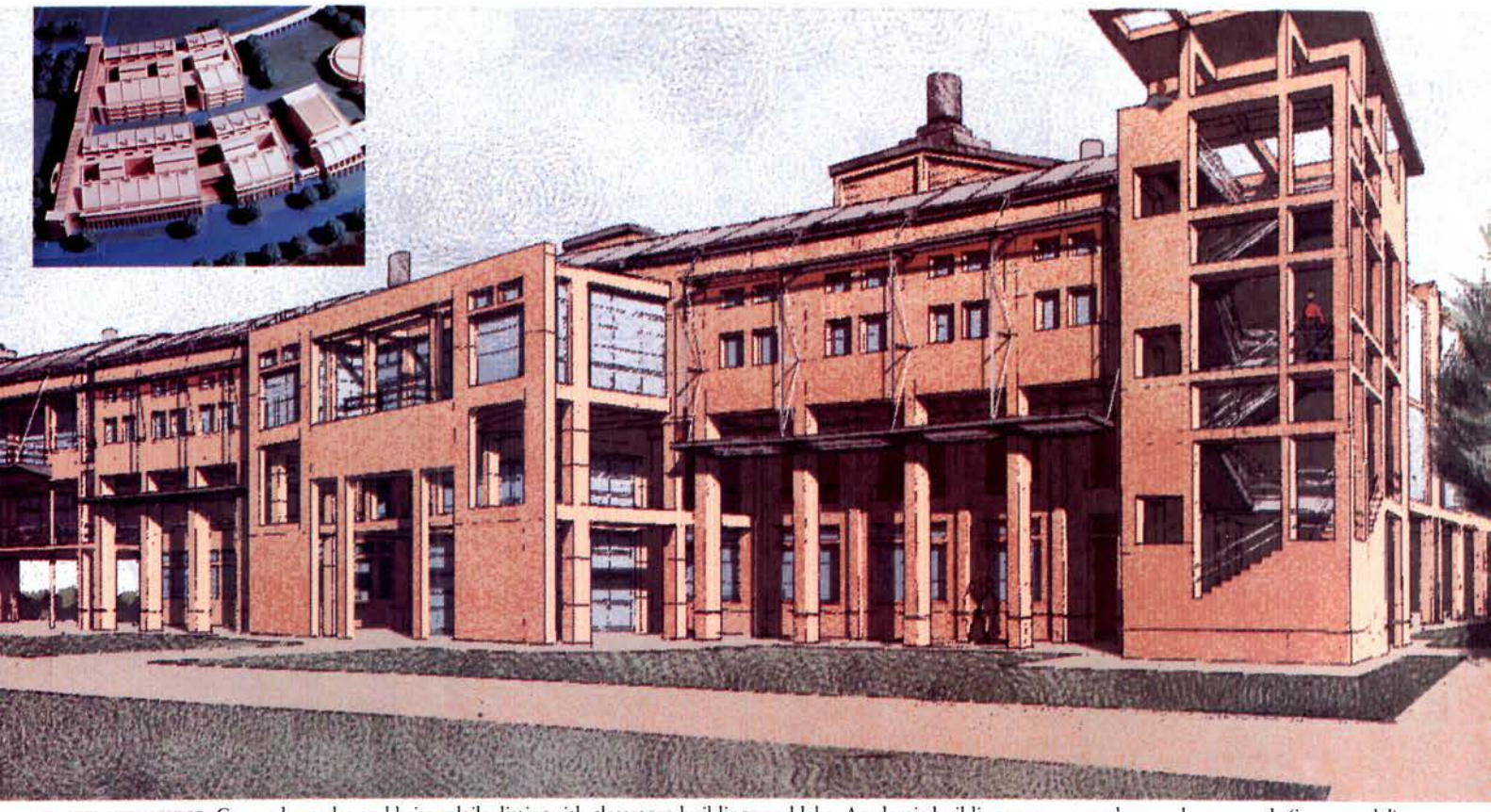
The architects created a radial plan with two local centers—a core of academic buildings to the south, and student housing and recreation facilities to the north—connected by vehicular, pedestrian, and bicycle paths. Courtyards, gardens, and playing fields will facilitate natural ventilation of buildings and provide land for future growth.

Davis, Brody developed design guidelines for the campus to encourage small-scale buildings of up to four stories, with a maximum length of 60 meters. Rather than stylistically imitate the local buildings, Davis, Brody recalls Zimbabwe's vernacular through this scale, climatic response, and materials. The brick-clad concrete buildings will be articulated with stone bases and precast concrete sun-shading devices. Covered arcades, which will protect pedestrians from the tropical heat and sun, will be combined with natural ventilation to cool the buildings.

Local artists well-versed in the stoneworking tradition of the region will craft sculptures and paving patterns throughout the campus. The effort is intended to support local resources and economies, and lend an authentic African air to the technologically modern campus.

Implementation of the master plan will be phased, allowing for facilities to expand in response to the expected growth in student enrollment. Construction of the administration buildings is scheduled to begin this month; construction is slated to begin next spring on the science and faculty buildings.—*R.B.*





UPDATED VERNACULAR: Covered arcades and brise soleils distinguish classroom buildings and labs. Academic buildings are arranged around courtyards (inset model).

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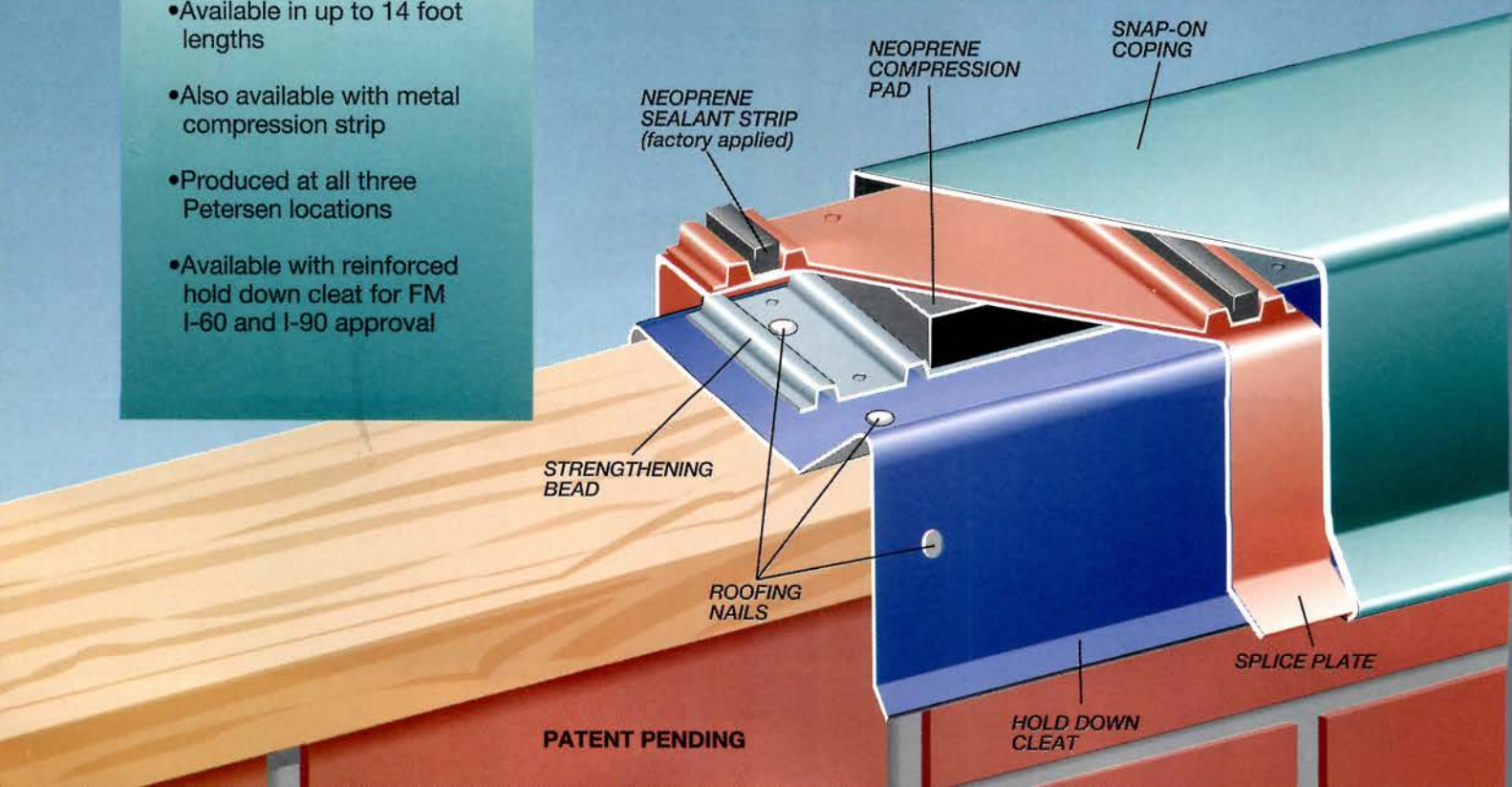

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PRAGUE INFILL: Gehry's twin towers.

Nationale-Nederlanden Building
Prague, Czechoslovakia
Frank O. Gehry & Associates

Los Angeles architect Frank Gehry has been commissioned by the Dutch insurance company Nationale-Nederlanden to design an $8.5 million office building in Prague. The building is located on a small infill site along the Vltava River (above) that was accidentally bombed by Allied planes in 1942 and never rebuilt. Gehry's project is the first building to be constructed in Prague's historic center since the "Velvet Revolution" in 1989.

The 55,000-square-foot building will comprise ground-floor retail space and six stories of offices, crowned by a 5-star rooftop restaurant. The main facade, constructed of poured-in-place concrete with plaster finishing, is divided by horizontal striations that graduate to an irregular wave pattern, and are overlaid with staggered windows. A pair of towers—a solid, tapered cylindrical volume matching the riverfront facade, and a transparent, twisted form sheathed in glass—punctuate the corner of the site. The towers are recessed from the main facade to create a small entrance plaza.

Gehry's design, inspired in part by surrounding Art Nouveau structures, has sparked much controversy over its contextual response, but Czech Republic President Vaclav Havel, who lives in an adjacent apartment building, supports the scheme. Controversy over Prague's new buildings promises to continue: Visionary French architect Jean Nouvel has been commissioned by Nationale-Nederlanden to design a much larger commercial complex on a site across the Vltava River. Construction of Gehry's project is scheduled to begin in January and be completed by mid-1995. —*R.B.*

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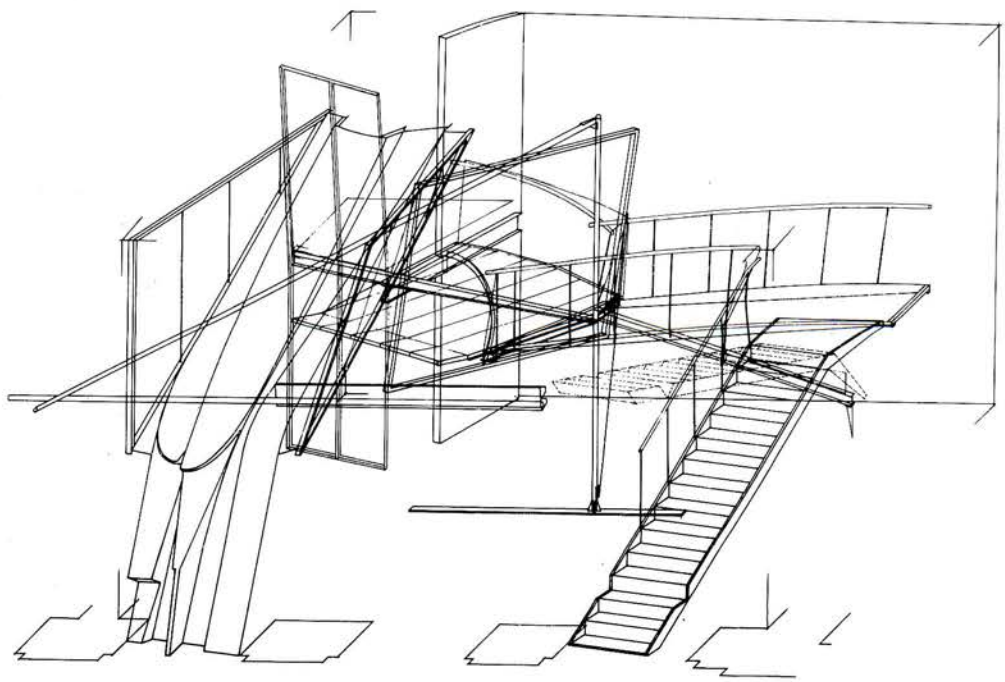
Back to the Futurism

Deconstructivism is no more than nostalgia for the early 20th-century avant-garde.

The now-fashionable idiom of diagonal intersections, glass shards, and asymmetrical unbalance is compromising the practice of architecture at the expense of our public realm. This architecture is intellectually fueled by a pure symbolic essence that purports to reflect our times. Though it would be unfair to lump all the buildings and architects of contemporary angst, pain, and turmoil into the single category of Deconstructivism, the term is in widespread use, and we can easily recognize the duck when it appears in a full-color magazine spread. I do not, however, employ the "D-word" here with a broad brush to include all buildings and projects with a similar quack; rather, I refer to those architects who maintain that the new architecture ineluctably and irrevocably manifests the Zeitgeist. I argue that Deconstructivism is no more "in step" with our time than any other current ideology.

Deconstructivism supplants Postmodern historicism with an architecture allegedly grounded in the specific realities of today. It is hyper-Modern and, as such, has pulled off a terminology coup that parallels an earlier one by proponents of the International Style in the 1920s and '30s, who made architects like Auguste Perret, Paul Cret, Gio Ponti, Peter Behrens, Willem Dudok, and Eliel Saarinen seem as if they were not Modern enough. Like their interwar counterparts, Deconstructivist architects have usurped the term "Modern," in this case to describe the work of architects who favor multiple diagonals, tilt-out walls, and plan rotations. Deconstructivists overtly reject tradition, at least in theory, and might well argue that the exclusion of anything traditional and rational is exactly what makes their architecture so unique and unprecedented. These claims, however, echo those of the Futurists. Deconstructivism, like Futurism, is nihilistic; it takes an essentially passive and uncritical role toward the excesses of urban squalor and technological pollution and, worse, accepts



AXONOMETRIC: Coop Himmelblau's Studio Baumann, Vienna.

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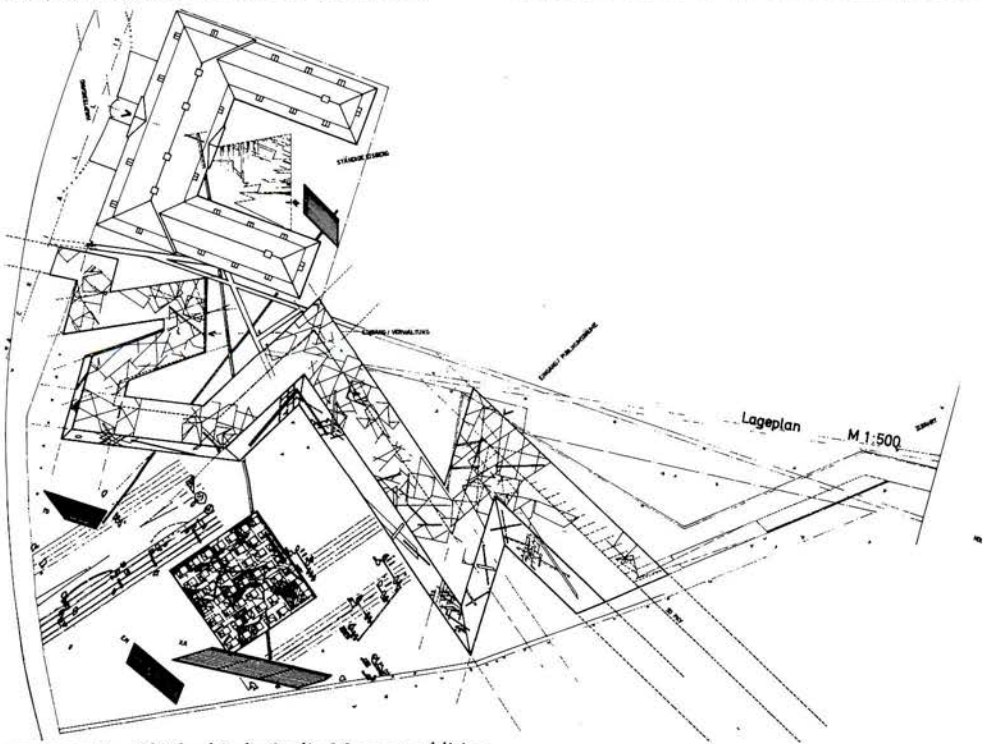
virtually anything that industrial development and science fiction toss in our path.

If noted German sociologist and economist Max Weber's brilliant concept of the three pure forms of legitimate political authority—the rational, the traditional, and the charismatic—could be related to architecture, surely the contemporary avant-garde would embrace only the charismatic. This anti-rational, anti-traditional agenda is manifested in numerous design studio projects and methodologies within academe.

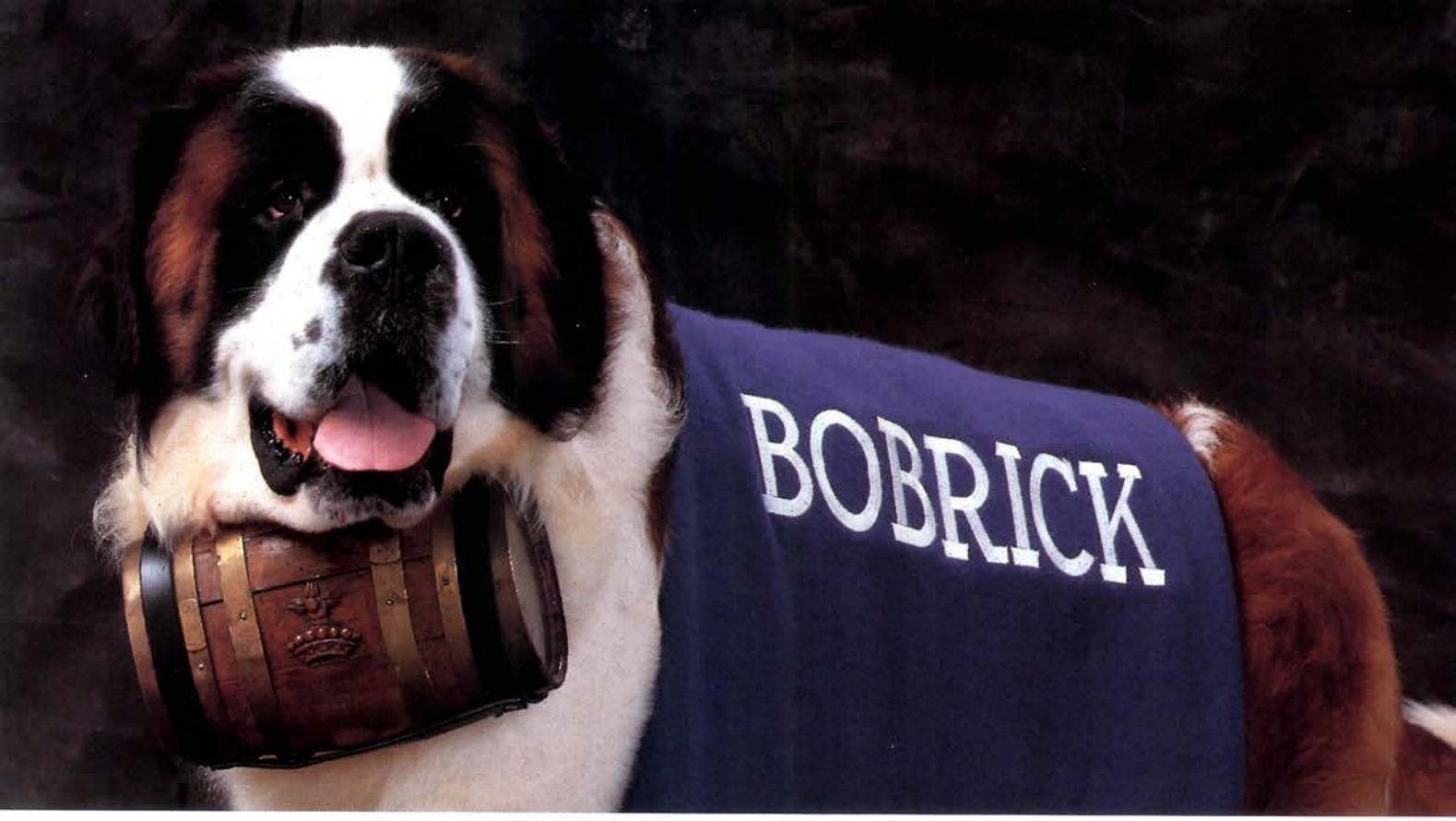
One of the more popular methods is for students to make three-dimensional "conceptual" models of architectural ideas deriving from fantasies about, for instance, literary or filmic themes, or the Los Angeles freeway system. In the past, students built abstract models to portray real spaces and buildings; today, they employ copper, brass, wire mesh, wire glass, and a number of other materials to form "meta-models" that adumbrate "ideas." Figuration portrays abstraction: Brass in the model doesn't mean brass in the building; it just makes a shiny model.

The self-proclaimed avant-garde within the academy envies the playwrights, novelists, filmmakers, and performance artists who evoke the uncertainties, chaos, and atomization of contemporary life, just as artists from Velasquez to Brecht to Godard have done; artists who mirror the brighter side of contemporary life are dismissed as saccharine and sentimental. It is difficult to imagine, however, that Brecht would have wanted his house to convey what his plays did. Compared to literature, film, and theater, architecture portrays angst poorly and cheaply: A disintegrating masonry wall, a distorted and rotated frame, and an unfathomable zigzag mass are anemic and trivial when compared to the themes of alienation in the novels of Günter Grass, the films of Werner Herzog, or the plays of Samuel Beckett. Ironically, architectural representations of angst-ridden realities are pretty in a way that driftwood is pretty; such images are extraordinarily picturesque and directly accessible to a generation raised on television, *Star Wars*-style special effects, and abstract art. In a society inured to shock and jaded by an overload of stimuli, such projects do not shock; they do not test our assumptions or our sensibilities; they do not question our "norms" and our bourgeois lives; they merely titillate. Futurism and Dada are a part of history: Their revival is the ultimate in sentimentality.

Judging by the similarities of decorative excess, both Postmodernism and Deconstructivism share a common ornamental point of origin and differ merely in the source material of their appliqué. Despite all the talk of an ongoing technological revolution, they are both scenographic rather than tectonic endeavors. Futurism, too, was predicated on scenography, as well as charisma. The Deconstructivists, however, share the tectonic ideal with some mainstream Modernists that buildings should not be "veneered." Cladding hides the "truth" of the construction process.



SITE PLAN: Daniel Libeskind's Berlin Museum addition.



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Circle 68 on information card

Yet for most buildings in most climates, covering the skeleton is as normal and as important as covering the frame of an automobile, an airplane, or a motorcycle.

Projects in schools of architecture make Deconstructivism appear to be constructed with the most advanced technology; proponents argue that such technology is "the way we build today." Actually, at the level of detail these projects are presented, they would be extremely expensive, hand-crafted buildings, more like the Space Shuttle than the latest robot-built automobile. In reality, the way we build today is not all that different from 100 or 400 years ago, or even how the Romans built: strong, cheap, and plentiful materials underneath; durable, fancy, and expensive materials outside. Whatever the relationship may be between old and new construction methods and materials, the exigencies of the construction industry bear little relationship to the forms of Deconstructivism, no more than they generated the Futurist visions of Sant'Elia and Chiattone.

The difficulties and problems caused by Modernism are urban rather than stylistic in character. Architects, therefore, must move beyond an emphasis on details and cladding. While some of the theory of the past 20 years has focused on the urban scale, little of that theory has been put into practice; Deconstructivism, as an extension of Postmodernism, is an almost wholly stylistic movement, completely ignorant of how to create good cities through architecture.

One of the best examples was achieved by the Amsterdam School in the 1930s, when Dutch architects planned and executed a modern city that still continues to function beautifully, six decades later, throughout 60 years of technological changes.

There is good news, however, for mainstream architects who are put off by the avant-garde's lack of social agenda, disdain for tradition, lack of order, and self-proclaimed absence of rationality. Like pure sodium when it's exposed to the air, pure charisma in architecture has a short life span before it literally burns up; or else it combines with other elements (like sodium with chlorine) and becomes something as innocuous as table salt, something that gives a little more flavor to an already established recipe.—*Thomas L. Schumacher*

Thomas L. Schumacher is a professor of architecture at the University of Maryland and author of Surface and Symbol, Giuseppe Terragni and the Architecture of Italian Rationalism *(1991).*

ARCHITECTURE

EUROPEAN Architecture

With expressionistic and high-tech bravura, architects help to build a unified Europe.

This month we present new buildings by some of the most skillful architects in England, France, Germany, The Netherlands, Iceland, Italy, and Spain. As a single portfolio, these projects manifest the realities of a unified Europe: They share faith in the continuing power of Modernism as a tectontic ideal and demonstrate how to build in old cities, without resorting to impoverished abstractions of historic precedent. The most poignant example is Norman Foster's museum in Nîmes, which reinterprets and transforms the masonry heft of the ancient Maison Carrée across the street into a thin, skeletal steel frame. Jean Nouvel's addition to the Lyons Opera House makes a similarly bold contrast, in this case with a crystalline barrel vault that emerges from the Neo-Classical shell of the 1831 structure.

As magazine editors seduced by the curious other world depicted in Zaha Hadid's paintings, we are no less compelled by the London-based architect's first freestanding building, the Vitra Fire Station in Weil am Rhein, Germany, featured on this month's cover. Though Hadid's long-anticipated transition from paper to architecture has been fraught with skepticism, at last the startling clarity of her work can be experienced concretely in three dimensions.

Vitra Fire Station
Weil am Rhein, Germany
Zaha Hadid, Architect

ABOVE LEFT: Three "beams," designed in forced perspective, house an exercise room, meeting room, and baths.
FACING PAGE, TOP: Cantilevered concrete canopy rests on a stand of columns to mark entry to fire station.
FACING PAGE, BOTTOM: Long, glazed wall of exercise room leads to garage.

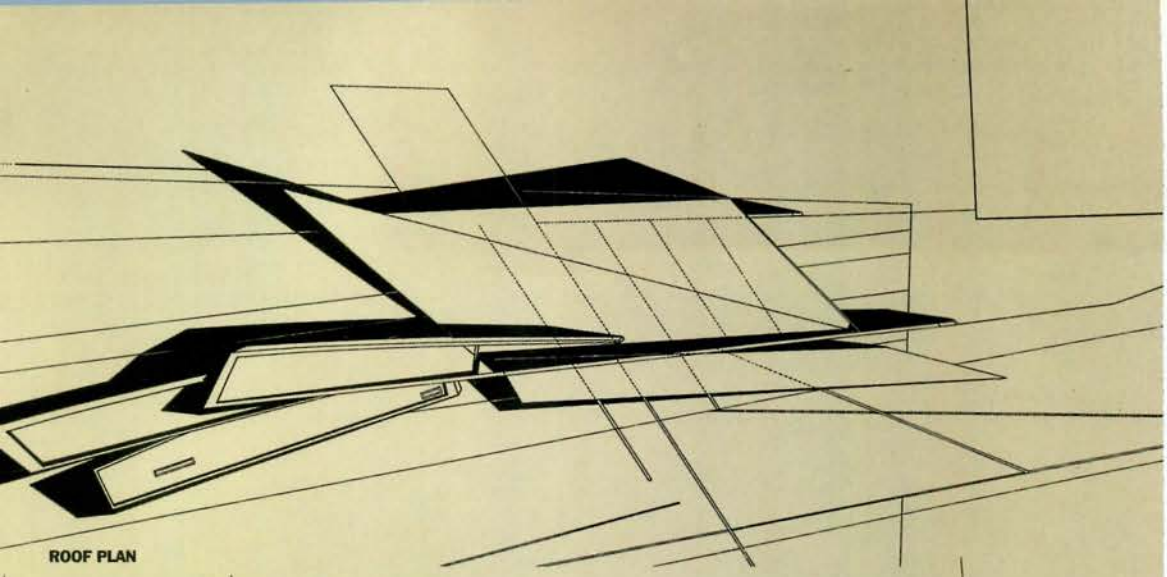
Zaha Hadid

Those who doubt the feasibility of Zaha Hadid's eruptive visions, known only through paintings and small-scale interiors, might treat themselves to the next jet to Basel. The structure the architecture world has awaited since Hadid won the Hong Kong Peak competition in 1983 has been built. On the corner of a furniture factory, her five-truck fire station commands its site through powerful illusions conjured by masterful sleights of forced perspective. Hadid has raised ceilings, curved and tilted walls, and flared volumes to freeze motion in concrete: This building tricks the eye and body into feeling sensations of Einsteinian speed.

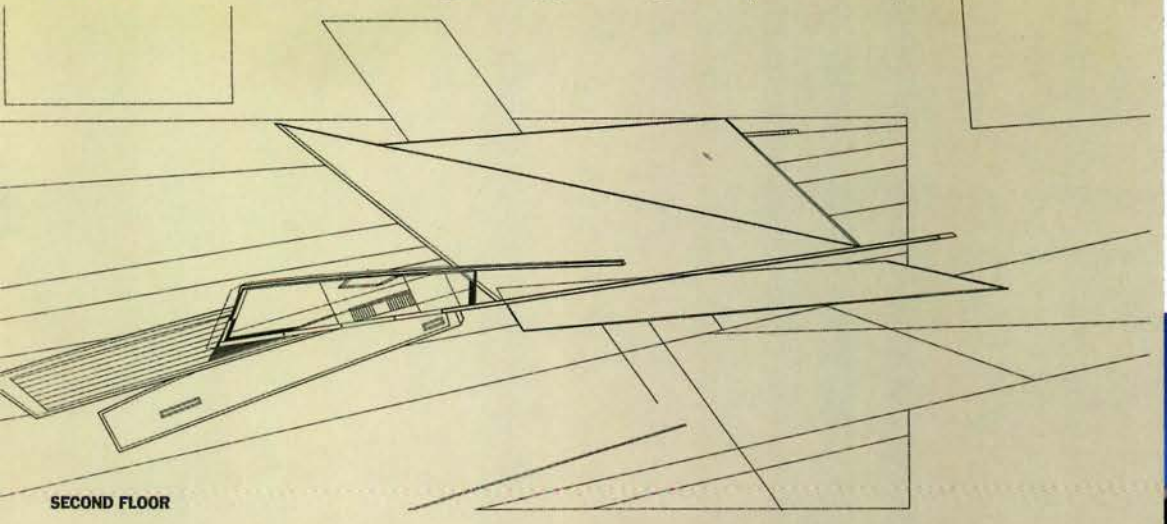
The great French musician and teacher Nadia Boulanger often told her students to think of Chopin's musical phrases as long rubber bands that had to be stretched and stretched until finally hooked on distant pegs. At the Vitra furniture factory outside Basel, Hadid resorted to similar phraseology, pulling long, concrete walls so tautly that she stretches matter until the structure enters what seem to be distortions of warp speed.

The results are not Classical proportions and Euclidean geometries, but attenuated and tapered forms that deliver the thrill of high-speed travel without the rocket. Details and joints disappear to heighten the illusion of speed; the eye cruises the dynamic shapes without stumbling on bolts, struts, and mechanical protrusions. At night, the building comes alive when ceiling planes, detached from wall planes, appear to float.

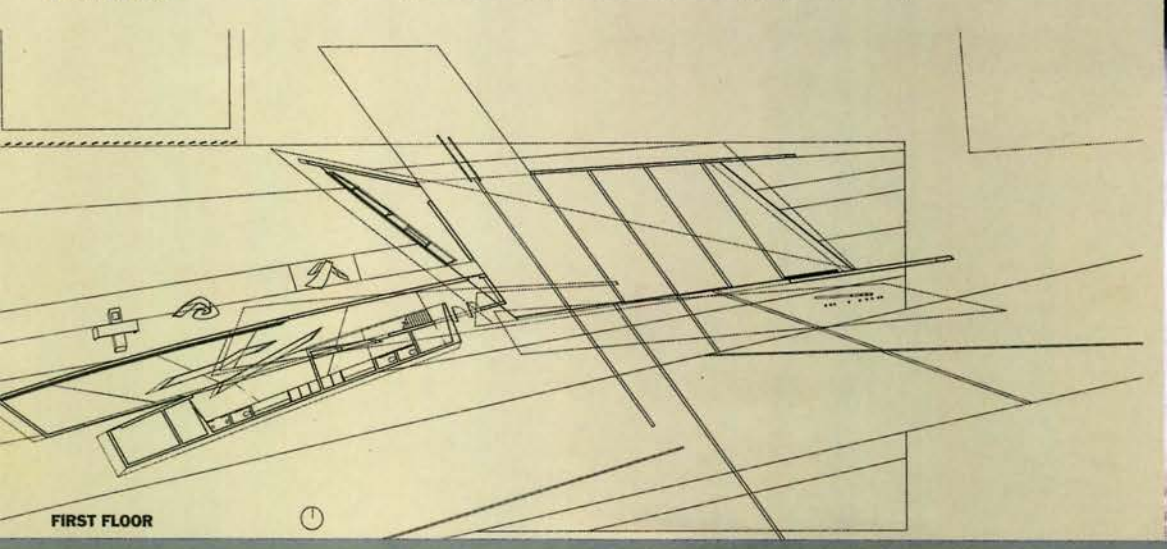
The beauty and power of the structure should not obscure its role as an urbanizing agent on the site. What is conspicuously absent from an otherwise enlightened factory campus—with buildings by Frank Gehry, Tadao Ando, Alvaro Siza, and Nicholas Grimshaw—is an urban plan and strategy larger than the sum of the space left over by big, boxy structures. Hadid has conceived the building as a set of walls, open to the entire factory, that can be occupied by many uses.



ROOF PLAN



SECOND FLOOR



FIRST FLOOR

FACING PAGE: Walls lean and bend, as if responding to a magnetic force.
PLANS: "Beams" on first floor (bottom) contain locker rooms and exercise room; meeting room is housed on second floor (center). Roof plan (top) reveals intersecting geometries.
BELOW LEFT: Folded roof covers five-truck garage and rests on one of the concrete walls that generate scheme.
BOTTOM: View from exercise room, with wall of metal lockers (right), reveals an outdoor court (left).

On the first floor, an exercise area doubles as a room for lectures and meetings; the second floor serves as a canteen or meeting room adjacent to an expansive terrace.

Hadid designed the building as an extension of land-division patterns from local fields, which cross lines emanating from nearby railroad tracks: Their crossing seems to precipitate a Brownian tracery of layered walls with screening and space-defining functions in which activities are nested. Walls are punctured, tilted, and broken according to functional requirements. A force field, the building carves a corridor through the site, creating a spatial event that pivots the campus.

The ground for Hadid is not simply a visual plinth for a piece of sculpture, but an occasion to forge an urban strategy. Although some of the walls of her original design, regrettably, were not built, the open, fragmentary nature of the building constitutes an energy field for organizing the rest of the site. Such walls could be extended anywhere on the site, even penetrating existing buildings. They suggest an urbanism that could dynamize Vitra's monofunctional grounds.

The power of the fire station projects beyond the boundary of the building and beyond Vitra as a presence in architecture's intellectual landscape. The building may refer to Soviet Avant-Garde architecture, but the design supercedes its sources to become a stunning original. It brings to mind such succinct Modernist statements as Mies's Barcelona pavilion, Le Corbusier's Citrohan house, and Gehry's house in Santa Monica.

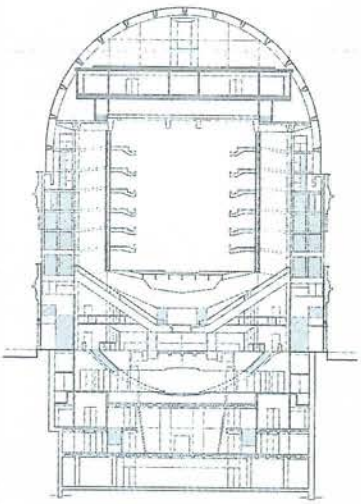
The Vitra fire station is all the more remarkable because it is Hadid's first freestanding building, and like Venus springing from the shell, its concept and execution form a complete vision. Its beauty overwhelms initial impressions, so its long-term stature may be difficult to assess. But beneath the fearless asymmetries of this incendiary pavilion lie a literate intelligence, rigorous logic, and spirited civic impulse. *—Joseph Giovannini*

FACING PAGE AND BELOW: Meeting room, or canteen, on second floor of fire station leads to long outdoor terrace and opens to a rooftop view through a louvered window (below).
RIGHT: Wall of lockers separates windowed corridor (left) from changing rooms and bathrooms. Recessed lighting underscores geometric conflicts.
BOTTOM: Corridor to exercise room and changing areas leads to staircase to meeting room and terrace above.

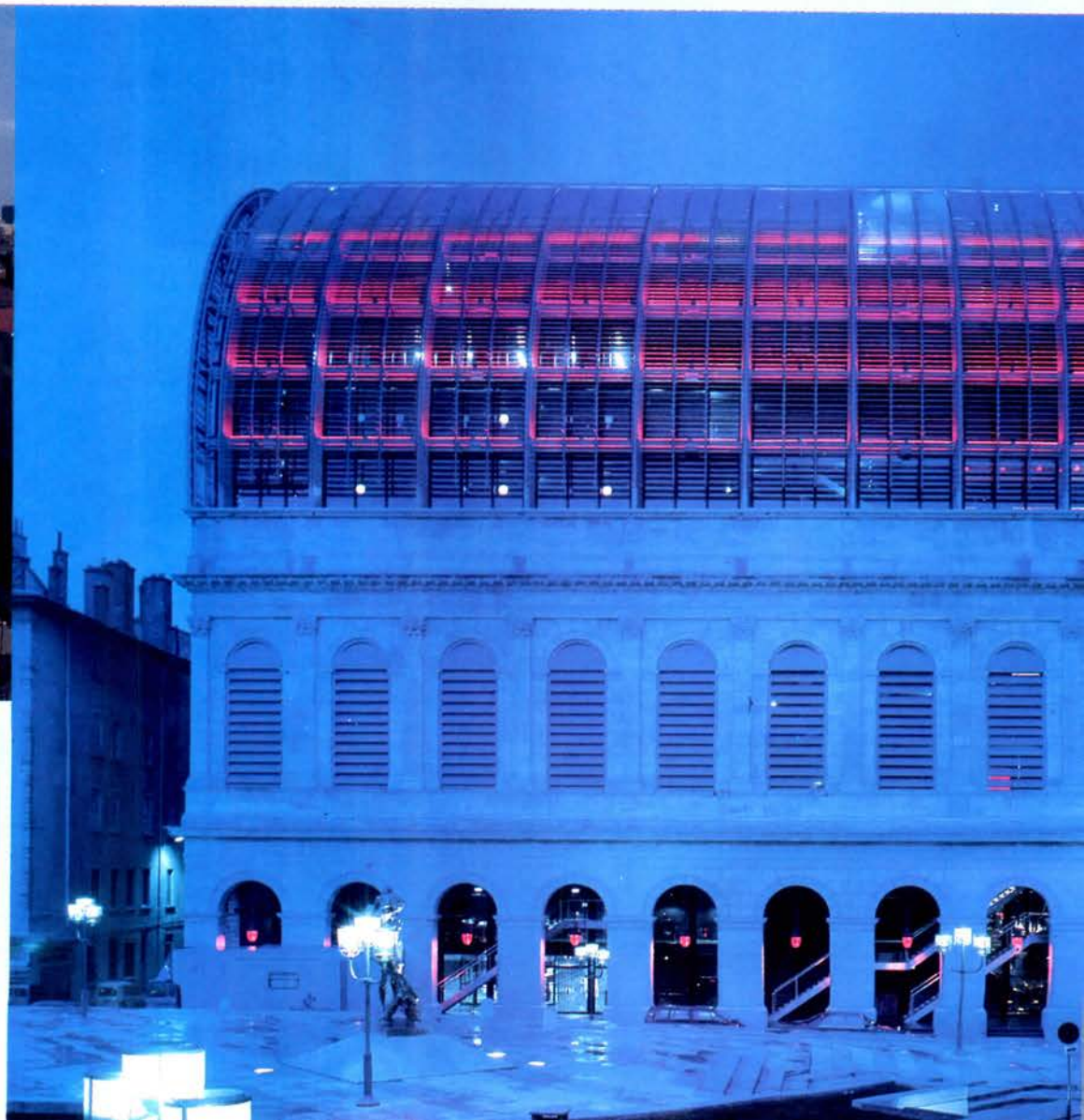
PAUL WARCHOL PHOTOS

Lyons Opera House
Lyons, France
Jean Nouvel,
Emmanuel Cattani & Associates

JEAN Nouvel



EAST-WEST SECTION



SECTION: Seven-level concert hall is suspended above entry foyers. Offices and studios are located under vault.
ABOVE: 1831 opera house is surmounted by Nouvel's vaulted addition.
RIGHT: North elevation reveals translucent glass barrel vault at night.
FACING PAGE, TOP: Acoustic deflectors hang from ballet studio under vault.
FACING PAGE, BOTTOM LEFT: Balconies within concert hall are intensely spotlit.
FACING PAGE, *BOTTOM RIGHT:* *Restored* 1831 salon leads to orchestra level.

The new opera house in Lyons presents a smiling face to the outside world, but harbors a heart of darkness. Situated across from François Mansart's ornate city hall, the arcaded, warm sandstone facades of the historic 1831 opera house have been skillfully preserved by Parisian architect Jean Nouvel, who won a 1986 competition to expand the old building.

But while a clever vertical parti shows respect for the building's history and its site, two new darkened theaters inserted within the landmark induce physiological discomfort and confusion for visitors.

Nouvel's intentions were laudatory: to expand the historic building to twice its size by excavating a full six stories below the Classical volume, crowning it with a barrel-vaulted glass addition. From a three-story lobby, opera-goers either ascend to a 1,300-seat, horseshoe-shaped theater or descend to a 200-seat theater-in-the-round. Positioned above the large theater, within the addition, are theater administrative offices, dressing rooms, and dance studios under the vault.

Despite the building's glassy top, once past its skin, opera patrons are plunged into blackness. Through doors that evoke submarine decompression chambers, a black granite floor disappears into the black interior, creating a sense of vertigo. Stumbling into the lobby, visitors are greeted by demonical points of light that produce disorienting reflections from the polished black floor. Ascending to the large theater, opera-goers experience relief in the restored salon, only to approach the balconies through red-satin vestibules that evoke bordellos.

In the main house, with its black-stained wood floor and walls, discomfort appears to have been the theme. Mounted in tubes along the back of each row of hard, unstaggered seats are tiny, fiber-optic spotlights that blind opera-goers. A gold stage curtain, lit by two giant spotlights, provides just enough illumination to avoid accidents.

Nouvel, 48, who burst onto the French architectural scene in 1987 with his high-tech, stainless steel Arab Institute in Paris, contends that he has exalted the "luxuriousness" of the opera houses through "different textures of black." The traditional opera is indeed luxurious, but in the murk of Nouvel's interiors, all possibility of a shared group experience is replaced by the anomie of watching television in a darkened room.

Although the Lyons opera's theatrical purpose has been subverted by its sinister artistic conception, the building is acoustically successful and a marvel of stagecraft. Whether or not the opera-going experience it presents is worth it, a grand historic building has been rejuvenated, and Nouvel's monumental structure will doubtless carry on the role of its progenitor, invigorating Lyons for the century to come. *—Barbara Shortt*

Barbara Shortt is an architect and freelance writer based in Paris and New York.

PAUL RAFTERY/ARCAID PHOTOS

Radhus
Reykjavik, Iceland
Studio Granda, Architect

STUDIO GRANDA

Radhus, Reykjavík's new city hall, is a product of Iceland's sublime landscape and a new urban vision. The concrete building protrudes into an inland lake called Tjörnin, excavating the ground behind to form a shallow, protected pool within the city. Surprisingly light-filled, the two wings, housing ceremonial rooms and administrative offices, interweave with public circulation. Interiors open up to views of sky, water, and such abstractions of Icelandic habitat as a mossy wall leading from pool to lake.

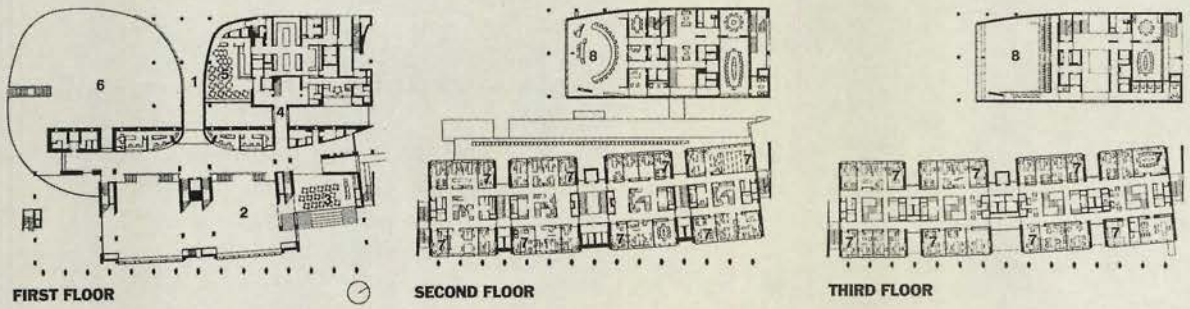
From the lake, 15 columns rise up on the west side to screen four glazed modules under an overarching metal roof. Above the cavernous ground floor, these modules form the offices of city government departments. The council chamber within the neighboring volume faces north to the pool; at night its rear wall of glass becomes a bright lantern toward the city. In this competition-winning realization by the local firm Studio Granda, the openness of democracy is intrinsically linked to the transparency of Modernism. Citizens not only see into the building but can promenade through it late into the evening.

Radhus ties into Reykjavík's pedestrian fabric through a network of public paths. A bridge takes visitors across the lake to an interior spine of indigenous basalt and watery light. Parking beneath Radhus, motorists ascend into the internal precinct to connect with the Tjörnin walkway and the formal poolside entrance. Offices are then reached by orthogonal stairwells lit by oval skylights.

Granda partners Steve Christer and Margrét Hardardottir spent five years completing the Radhus. The building's crisp, well-informed Modernity is a result of the architects' education at London's Architectural Association, but, more importantly, represents a decision by the city of Reykjavík to prove itself a progressive entity. *—Raymund Ryan*

Raymund Ryan is an architect and writer based in Dublin, Ireland.

1 ENTRANCE
2 CONFERENCE ROOM
3 CAFÉ
4 BRIDGE
5 CAFETERIA
6 MANMADE LAKE
7 OFFICE
8 COUNCIL CHAMBER



FIRST FLOOR SECOND FLOOR THIRD FLOOR

DENNIS GILBERT/ARCAID PHOTOS

FACING PAGE: Reykjavík's city hall, extending into lake, comprises two wings separated by channel of water. **TOP:** Council chamber seats 15 members. Floor and table are fabricated of jatoba, a Brazilian hardwood. **PLANS:** Council chamber and conference rooms are located in east wing. West wing houses two floors of offices. **LEFT:** Chamber lobby is finished in sandstone walls and basalt floors. **ABOVE:** Employee canteen features paneled walls and porthole windows.

Portfolio of two buildings
Nicholas Grimshaw & Partners

Nicholas GRIMSHAW

Nicholas Grimshaw sees himself in the mainstream of contemporary British architecture, belying his reputation for technologically experimental, innovative design. For Grimshaw, being mainstream means continuing the 19th-century engineering tradition typified by Joseph Paxton's Crystal Palace and Isambard Kingdom Brunel's bridges, railways, and ships. With colleagues Norman Foster, Richard Rogers, and Michael Hopkins, Grimshaw views himself as a true inheritor of this tradition.

Grimshaw formed Nicholas Grimshaw & Partners in 1980 after a split with partner Terry Farrell. Initially, Grimshaw's practice comprised industrial and large-scale projects such as sports halls, but in the mid-1980s, the firm diversified. Commissions included a printing plant for the *Financial Times* and a store for the Sainsbury supermarket chain.

The architect avoided the massive speculative building boom of the late 1980s, and his practice has continued to prosper during the 1990s, while other firms are shedding staff. Much of this work, such as the British Pavilion at last year's Expo '92 in Seville and the Waterloo International Terminal for the channel tunnel trains (pages 82-83), is high profile.

Architecture is a combination of innovation and pragmatism, according to Grimshaw. He tries to establish the constraints of any particular project—from site conditions to the client's budget—as objectively as possible and relishes developing a program with the client. In the *Financial Times* printworks and the *Western Morning News* building (these pages), for instance, the practical needs of laying out a printing press not only determined the plan, but suggested an esthetic, including glass walls enclosing the presses. Function serves as a cue for visual expression.

Grimshaw selects materials based on their esthetic and constructional logic and usually employs steel, glass, and plastics. Structural components are reduced to a minimum and often appear to be stretched like a bowstring,

FACING PAGE: Offices and printing presses are visible through glass wall, which wraps around the north, east, and south sides of building.
FACING PAGE, BOTTOM: Curving outward to reduce glare, glass panels are fixed by custom brackets and supported by steel columns, fins, and rods.
LEFT: Cut into the hillside, building is separated from parking by a "moat" and entered via a bridge.
BELOW: Nautical esthetics are encompassed in masts and cables.

JD RED/JOHN FECK PHOTOS

implying a caged dynamism within the buildings. Crafted junctions between the elements reinforce this impression; given the irregular shapes of Grimshaw's structures, it is not surprising that many must be specially developed and designed within the office.

The 54-year-old architect cites his more catholic attitude to materials to qualify the affinity between his designs and the work of Norman Foster and Richard Rogers. During the 1960s and '70s, Foster and Rogers pioneered strict ideology based on new construction and material technology. Being five or six years their junior, Grimshaw did not feel bound by the same urge to prove the near universal suitability of, for instance, hanging assembly, glazed walls, or superplastic aluminum alloys. Instead, the architect concentrates on the particular way the esthetic might be applied to specific programs.

By the late 1970s, Foster and Rogers were established enough to persuade clients such as Lloyd's of London and the Hong Kong Bank to spend huge sums of money on their new buildings, while Grimshaw, whose practice was just starting, was constrained by the reductivist values of low-cost sports halls and industrial buildings. Through careful but restrained detailing and an imaginative approach to structure, buildings such as the Oxford Ice Rink (1983) contrast with the elaborate appearance of Rogers' Lloyd's of London headquarters. If Rogers and Foster proved that an esthetic of new materials and construction was technically feasible, then Grimshaw showed how it could be simplified for less glamorous commissions.

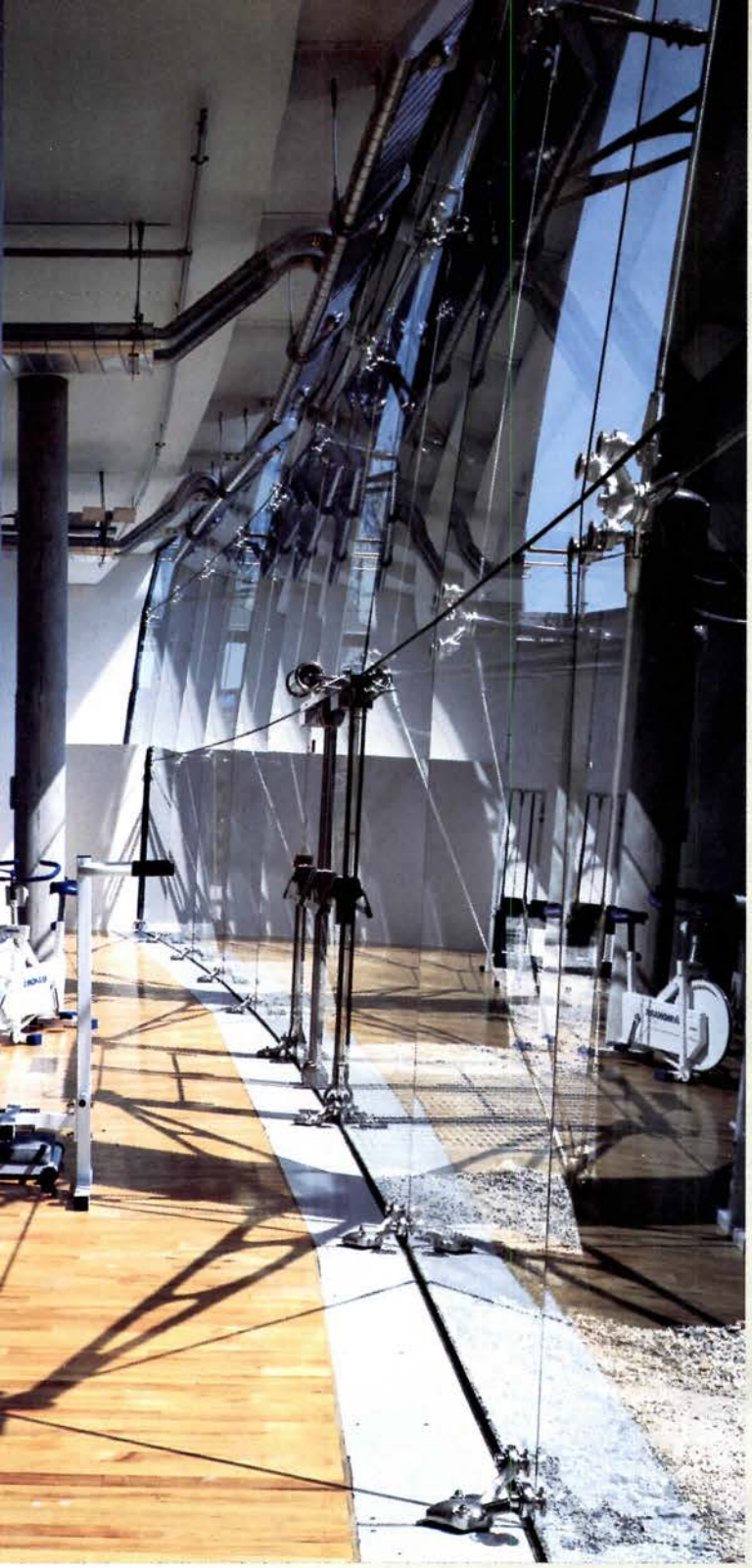
Whether spectators see trains, offices, or printing presses, a transparent wall revealing internal activities is a familiar Grimshaw theme, particularly developed at Waterloo and in the *Western Morning News* headquarters. These projects also break new ground for Grimshaw's office: They enclose the firm's first major interiors. Both have a hard, almost industrial esthetic: Waterloo because of the volume of people who will use it, the newspaper office because half the building houses genuinely industrial processes, and because Grimshaw was keen to demonstrate that offices do not need to conform to the prescriptions of typical speculative norms. At Waterloo terminal, much ingenuity was employed to enhance passenger flow, minimizing expensive devices such as escalators.

Western Morning News is a tribute to private patronage and to the vision of a major employer in a depressed provincial city. Waterloo International Terminal is inevitably a higher profile project and possibly the last major railway monument before British Rail is privatized. Waterloo terminal, together with the satellite and piers at Heathrow Airport, and the British Pavilion at last year's Expo in Seville, push Nicholas Grimshaw into the international league of Richard Rogers and Norman Foster. —*Jeremy Melvin*

Jeremy Melvin is a London-based writer.

RIGHT: Skylit stair links offices and facilitates casual meetings.
BELOW: In perimeter offices, exposed steel beams support metal decking.
BOTTOM: Printing presses are exposed and visible to exterior.
FACING PAGE: Exterior brackets, fins, and rods support the glass panels and cast intricate shadows.
PLANS: Offices are located in the eastern half (right), while presses are in the western section (left) of building.

DAVID CHURCHILL/ARCAID PHOTOS



JO REID/JOHN PECK

Western Morning News Headquarters
Plymouth, England

In 1588, Plymouth was the setting of Sir Francis Drake's legendary game of bowls, which he insisted on completing before turning his attention to the Spanish Armada. A generation later, the city was the Pilgrims' last landfall before America. Modern Plymouth, however, does not match the romance of its past. Virtually nothing of the historic city remains. As a naval base, it was heavily bombed during Wold War II, and postwar reconstruction was crude and brutal. Now it faces the further difficulties posed to all military bases at the end of the Cold War.

As an important city in the west of England, however, Plymouth is the logical base for a major regional newspaper company, publisher of the *Western Morning News* and *Evening Herald*, which is proud of its local commitment. Since the 1930s, the papers had been housed in a Neo-Georgian building in the city center—one of the few to survive wartime bombing raids. When the company won the contract to print 100,000 copies of the *Daily Mail*, a major national newspaper, it had the means and incentive to move to a new building, and an opportunity to improve Plymouth's drab image.

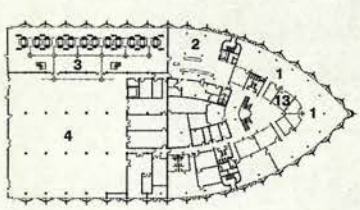
In this regard, Grimshaw's new headquarters for the *Western Morning News* is spectacularly successful. Situated in a business park on the city fringe, its outwardly curving columns create an unmistakable landmark. Its imagery, however, is not entirely clear. Many observers have noted the shiplike appearance and interpret this as a reference to Plymouth's nautical history, but Grimshaw himself describes the building as a grasshopper. The design, as ever for Grimshaw, proceeds from an imaginative interpretation of the client's needs and a wish to make the paper's internal activities visible from the exterior. Considering the fact that its 450 employees work in shifts around the clock on various editions, the new headquarters building serves as backdrop to an almost continual spectacle.

Grimshaw describes the *Western Morning News* headquarters as a very complete building, as it contains editorial and sales departments of both papers, management offices, and printing presses under one roof. The architect organized the eastern triangular tip of the building with three concentric office zones—a central atrium, easily visible from the entrance and used for informal meetings; an inner ring of enclosed offices for executives, editors, and meetings; and an outer ring with views across open country for the editorial and advertising departments. In a Grimshaw flourish, the building reverses the typical office configuration to place the more dynamic activities near the perimeter. The newspaper company's printing presses are situated in the building's western half.

The external wall is entirely glazed, supported by tusklike columns, delicate horizontal fins, and brackets on the outside. From the inside, the wall is almost completely smooth. As a transparent membrane, it is successful—in one sense, too successful, because sunlight has caused high levels of glare, despite the outward curving form that was intended to act as solar shading.

Ironically, canvas now hangs from the windows, until custom-designed blinds are completed. The draped canvas conceals a triangular space created where the curved wall peels away from the upper floors. Although this area might be an inevitable product of the wall's curve, it could only be constructed using many specially cut and irregularly shaped glass sheets. Here, perhaps, the wish for spectacle has outstripped a command of practical construction. However, Plymouth is certainly richer for it.

1 ACCOUNTING
2 RESTAURANT
3 PAPER REEL ROOM
4 PAPER STORAGE
5 ENTRANCE
6 RECEPTION
7 EDITORIAL
8 PLATE MAKING
9 PHOTOGRAPHIC
10 DISTRIBUTION
11 PRESS HALL
12 ADVERTISING
13 OFFICE
14 ATRIUM
15 MECHANICAL



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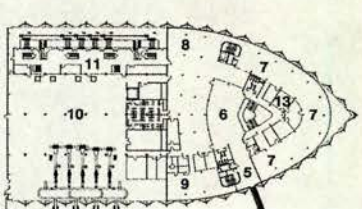

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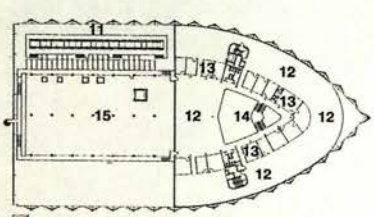
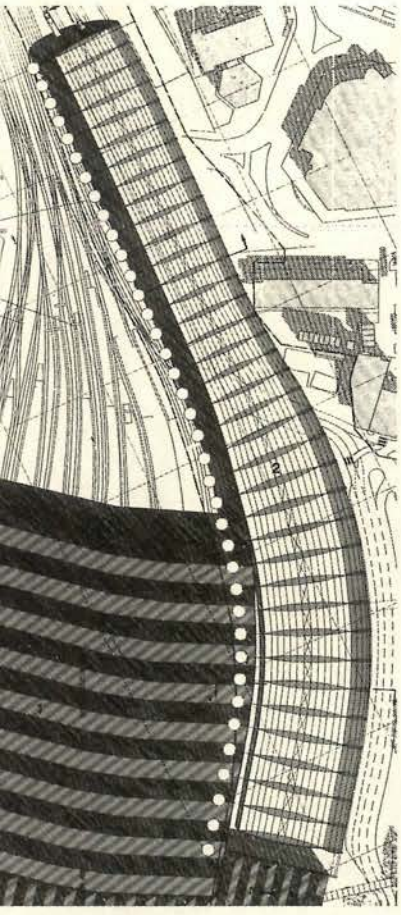


THIRD FLOOR

Waterloo International Terminal
London, England



ROOF PLAN

1 EXISTING STATION ROOF
2 ADDITION ROOF

Waterloo International Terminal's distinctive steel and glass roof evokes the great era of railway architecture. Like the 19th-century London stations of Paddington, King's Cross, and St. Pancras, the terminal was designed to bring the glamour and excitement of the trains' destinations—Paris, Brussels, and beyond—into the prosaic process of buying a ticket and boarding a train. Completed on schedule in May, it will be fully operational when the channel tunnel rail link, for which it will be the first London terminal, opens next year.

As a port of entry into the United Kingdom, the new terminal must incorporate international-passenger-handling facilities similar to those of a medium-sized airport. Customs and security checkpoints, separation of incoming and outgoing travelers, and shops are all accommodated below the platform level. Where an airport is usually built on an open suburban site, however, the Waterloo terminal is located on a tight, awkwardly shaped parcel adjacent to the existing station on the south bank of the Thames.

The Waterloo terminal offered a literal opportunity for Grimshaw to demonstrate how to make architecture out of the stark engineering forms required for railways. Brunel and the architect Matthew Digby Wyatt relied purely on applied decoration for the iron shed at Paddington in the 1850s, but when St. Pancras was built the following decade, no attempt was made to combine architecture and engineering. A huge Gothic Revival hotel shielded sensitive eyes from the rude but impressive engineering of the great iron shed behind.

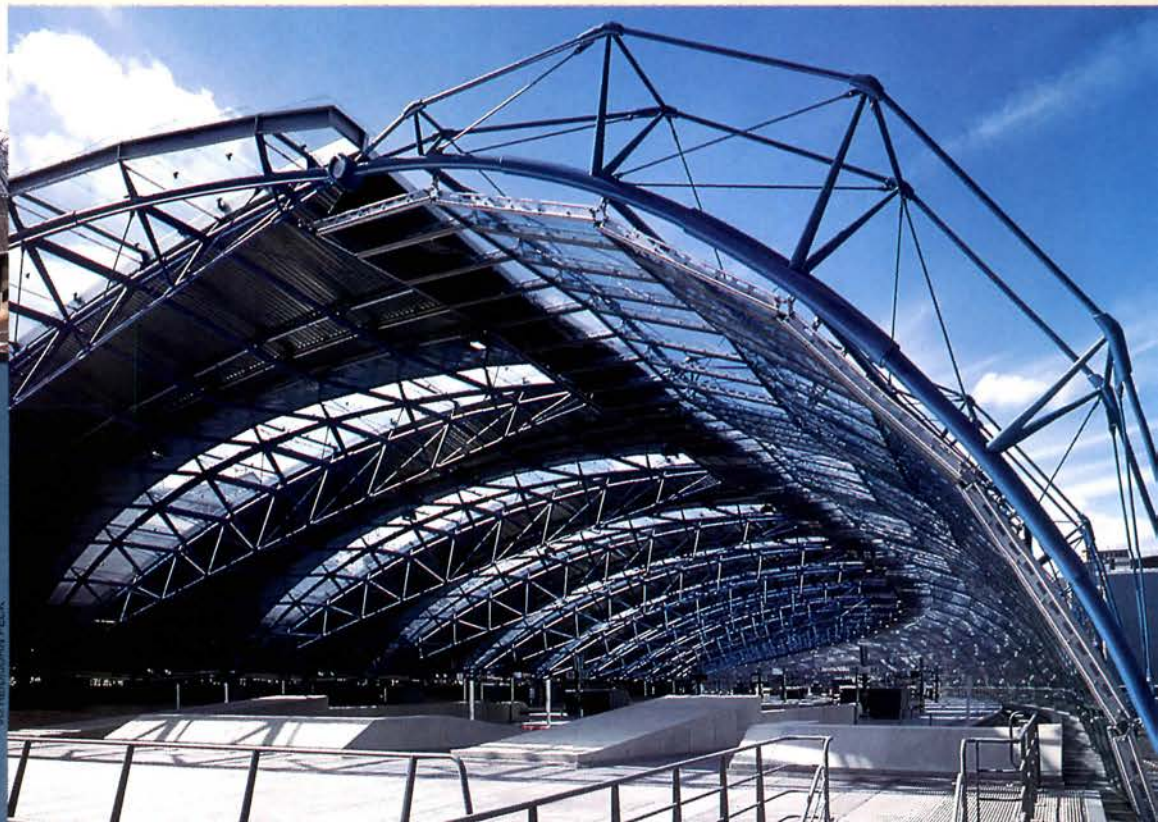
Grimshaw's Waterloo terminal is designed to be looked at and to provide a backdrop for sleek trains. The design of the roof, the outcome of close collaboration between Grimshaw and structural engineer YRM/Anthony Hunt Associates, exploits its shape and complexity to exude delicacy and finesse. A series of asymmetrically arched steel trusses stretch about a quarter mile along the curving and narrowing track. The structure snakes into the distance, bending to block the view from one end to the other and creating a continually changing view from the platforms.

Cost and visual coherence demanded that each truss be constructed from a family of common elements. To provide for trusses of differing span, the main compression members are telescopic, becoming larger in diameter toward the middle. Connecting pieces are tapered, both for ease of repair, and to smoothly join the slender tension rods. Here, the collaboration of architecture and engineering, esthetic and pragmatic, becomes explicit.

A number of constraints helped to define the design. The site boundaries were fixed by the extent of British Rail-owned land, and the plan was dictated by the form of the five international service platforms. British Rail wanted a strong landmark and, for security, decided to roof over the platforms; a clear span was a logical choice. The width varies from 35 to 50 meters, and it was easier to provide structural support at the edge than in the middle. The steeper side of the roof gives enough clearance for a train to run close to it, while the shallower slope acts as a roof over one of the platforms.

The building presents a distinct front and back. The lines of tension and compression cross from inside to out at the point where tensile and compressive forces intersect. So the tension rods under the shallower slope articulate the underside of what would otherwise be a large expanse of roof. Outside, the rods frame the spectacle of trains entering and leaving the station through a glazed wall, visible to passengers arriving at the main road entrance.

If Waterloo terminal is the synthesis the Victorians were trying to achieve in their railway stations, it is not surprising they did not succeed. Ultimately, Grimshaw's design relies on 20th-century technology—the 400-meter-long, curving terminal would not have been possible without extensive computer analysis of structural solutions. Through this late-20th-century medium, architecture and engineering are fused.



PLAN: Terminal occupies tapering site on west side of Waterloo Station.
RIGHT: Bending moments of asymmetrical trusses are reversed at point of contraflecture, where tension members pass from the inside (left) to the outside (right) of the building.
ABOVE: Combining tension and compression, the asymmetrical arch explicitly expresses lines of force.

JO REID/JOHN PECK

RICHARD BRYANT/ARCAID

ABOVE: Western half of platform canopy comprises hanging glass panels stiffened with glass fins to eliminate structural mullions and bracing.
LEFT: Waterloo International Terminal stretches 400 meters from east to west.

National Academy of Dance
Marseilles, France
Roland Simounet, Architect

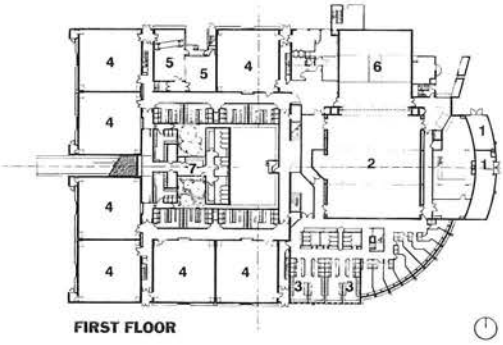
Roland SIMOUNET

Under the constant sun of Marseilles, a low, white building reminiscent of a small Arab village sits in a verdant park. Offering views of Le Corbusier's Unité d'Habitation to the north, the National Academy of Dance combines a dance school for gifted children with the home of the Roland Petit Dance Company. With great economy of means, Parisian architect Roland Simounet has created an unpretentious and serenely introspective environment, a kind of monastery devoted to the worship of dance.

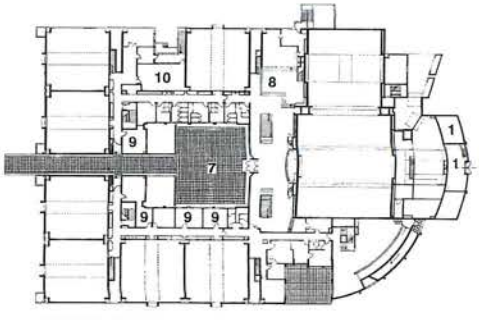
The parti of the three-story building is a squared doughnut, with a two-level courtyard ringed by concentric layers of offices and administrative spaces; dressing rooms; and dance studios along the perimeter.

Arranged on an east-west axis, the plan curves along its eastern corner, creating an apsidal effect. Visitors enter the dance academy at the courtyard on level two, where a lobby and cafeteria give way to dance studios. Offices occupy a set-back third level.

1 ENTRANCE
2 GRAND STUDIO
3 DRESSING ROOM
4 BALLET SCHOOL STUDIO
5 MUSIC STUDIO
6 RECEPTION ROOM
7 COURTYARD
8 CAFETERIA
9 ADMINISTRATION
10 CONFERENCE ROOM



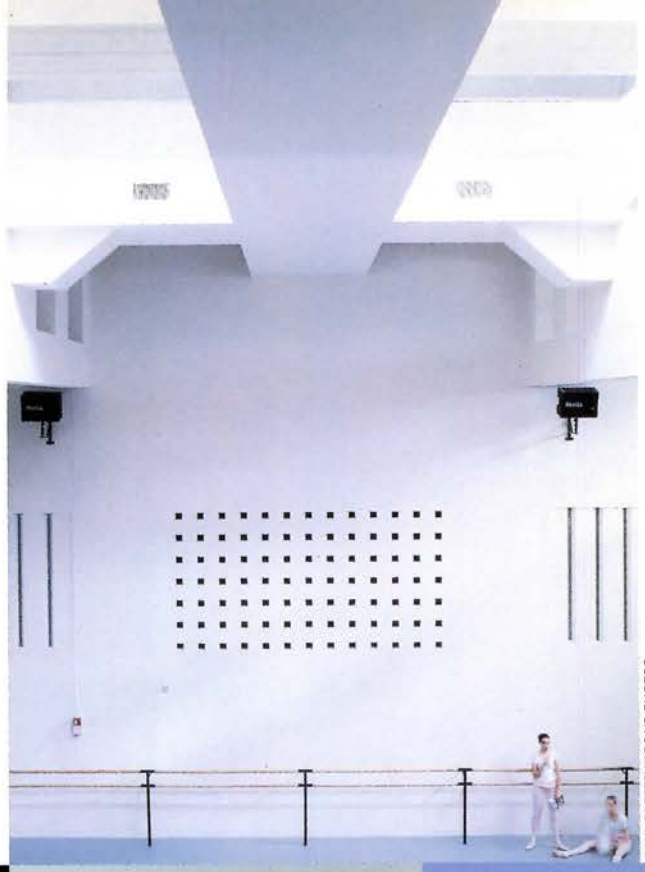
FIRST FLOOR



SECOND FLOOR

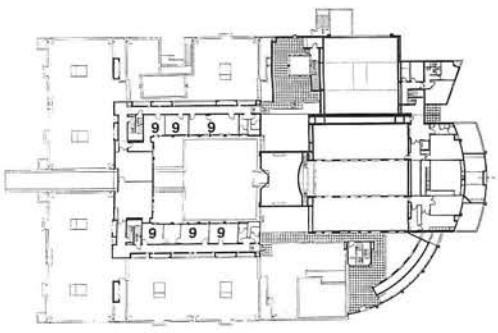
Simounet's great strength is his delicate manipulation of light. The dance academy's poured-in-place concrete facades are fractured with height variations, reveals, and overhangs, allowing light to produce a shadow play of volumes. The esthetic of light and geometry is continued within the building. Walls of the dance studios are imprinted with geometric patterns, reminiscent of Arabic motifs, or broken with setbacks, creating their own dance of light and shadow. Light enters each of the dance studios through a high, T-shaped window; an overhang blocks direct sunlight and reflects indirect light into the interior.

Simounet, 65, born and educated in French Algeria, is best known for his 1985 renovation of a 17th-century Paris mansion into the Picasso Museum. The National Academy of Dance, grounded in the vernacular of his native Algeria, defies stylistic chic, not only in its forms, but in its simplicity. As a result, the complex achieves a timeless architecture that can speak to all people. *—Barbara Shortt*



PAUL RAFTERY/ARCAID PHOTOS

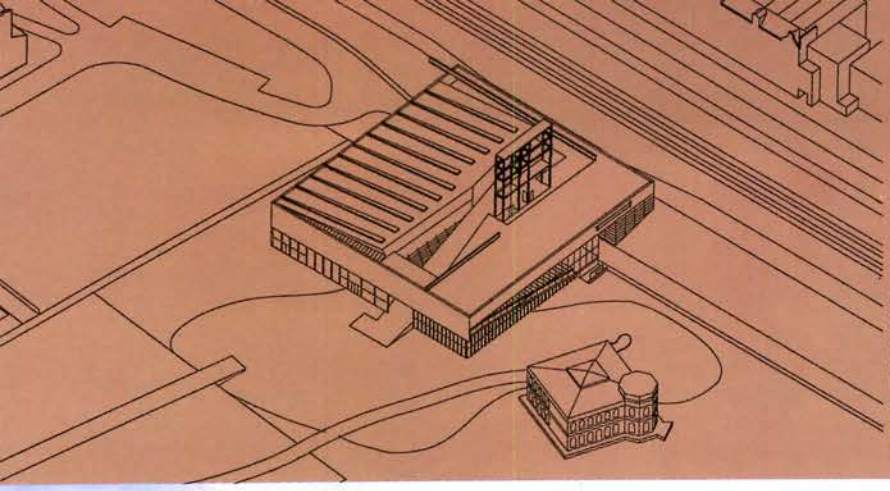
FACING PAGE: Concrete volumes of dance academy resemble Arab village. **PLANS:** On first level (left), studios surround service core; second level (center) features courtyard; third floor (right) reveals offices and roof terraces. **ABOVE AND BELOW:** Ballet studio features indirect lighting and punctured walls. **RIGHT:** Apsidal wall at southeast is divided into light-breaking surfaces. **LOWER RIGHT:** Entry ramp passes under arch to courtyard of dance academy.



THIRD FLOOR

Kunsthal
Rotterdam, Netherlands
Office for Metropolitan Architecture

REM Koolhaas



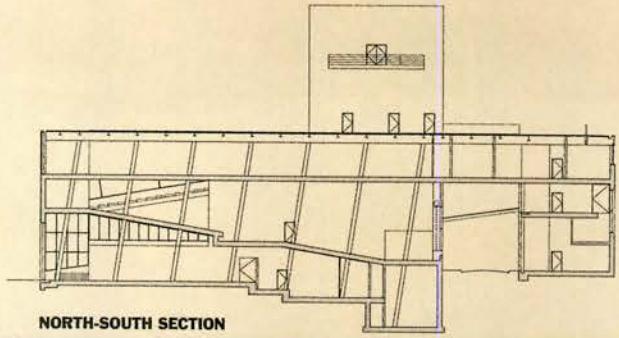
HANS WERLEMANN PHOTOS

FACING PAGE: Night view of principal facade reveals mixed-use section with auditorium and restaurant (left) next to a street passage under entrance ramp. Seminar room and work space (right) support top floor galleries and offices.
SITE AXONOMETRIC: Concrete ramp from street to park passes through Kunsthal to divide building into galleries (left) and service spaces (right).
BELOW: Floating Miesian roof and plinth is spiked by a vertical wall supporting Kunsthal's marquis.

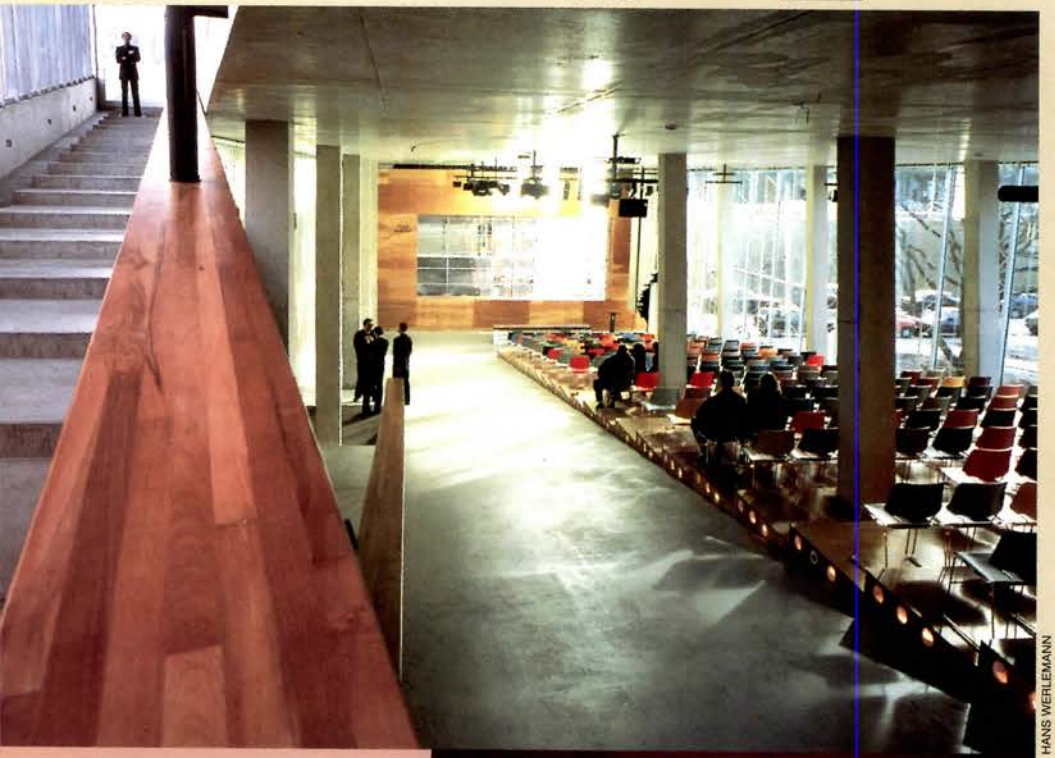
Upon first glance, the Kunsthal in Rotterdam seems a correct exercise in a Miesian vocabulary, discreetly punked. Designed by Rem Koolhaas with project leader Fuminori Hoshino, the footprint for this 39,000-square-foot building for temporary art exhibitions is a nearly perfect square, and its lean steel structure recalls Mies's National Gallery in Berlin. But the simplicity and clarity of what appears to be a Miesian box prove deceptive. A concrete ramp passes over a service street and angles down through the building to a park at the rear, cutting the Kunsthal into four unequal parts. What seems to be a simple, rectangular plan emerges as both a bridge and a gateway: Mies's National Gallery mixed with Le Corbusier's ramped Carpenter Center.

Halfway down the ramp on the left, the entrance to the Kunsthal opens to an auditorium with a vast floor that inclines in the opposite direction. The entrance occurs at the fulcrum where outside and inside ramps kiss and shear. Visitors take, of course, the route of least resistance inside and walk down the slope on a path that leads to one of the two main exhibition halls. At the back of the hall, they travel up another ramp to a second gallery directly above and realize they are walking on a Möbius strip through the building. Unlike Mies's stratified gallery, the continuously turning promenade equalizes both floors, so that the lower level does not merely serve as a podium for the upper. The architects' scissor section of ramps undercuts the clarity of the building and produces a counterintuitive journey. With several reversals of direction and slope eluding easy understanding, the interior unfolds more as an experience than as an imaginable object or geometry. Says Koolhaas, "It unfolds by stealth."

Koolhaas doesn't break or explode the building envelope, but prefers, with minimal means, to deliberately make the Miesian box almost unknowable. From the street, the Kunsthal appears to be a simple, one-story



NORTH-SOUTH SECTION



HANS WERLEMANN

DENNIS GILBERT/ARCAID

SECTION: Leaning columns are perpendicular to slope of auditorium floor. **ABOVE:** Auditorium is situated to east of ramped corridor. Stairs (left) lead to third-floor galleries and offices. **RIGHT:** A grid of leaning columns frames auditorium of Kunsthal.

exhibition pavilion; but the western facade overlooking a plaza reveals a three-story, Z-shaped section with a restaurant-café at plaza level, a large auditorium above, and galleries and offices in a third-story bar that spans to the front of the building, where it rests on a glass podium housing a seminar room above a workshop. The service roadway intersects and urbanizes the section, and the billboard tower punctuates the Cartesian composition with a vertical axis and a Pop banner. With dining, theater, traffic, seminars, and galleries all on view, the building's gregarious programming reads like a terrarium. The architects have invented a building that acts like the social condensers of the Soviet Avant-Garde and the one-building archipelagoes in what Koolhaas calls Manhattan's culture of congestion.

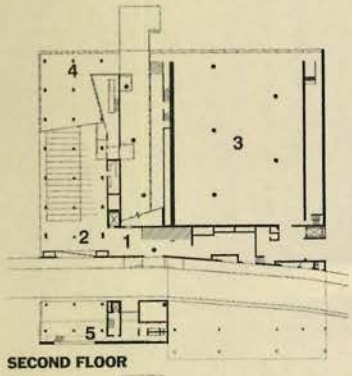
The architects engineered this seemingly simple pavilion with three autonomous structural systems, including the leaning columns of the auditorium. They also installed several lighting systems—loops of neon lights in the restaurant and irregularly placed fluorescents in the first-floor hall. A richness results from the multiplicity of building systems. The variegated lighting alone reveals that the Kunsthal is not conceived as a universal Miesian space, but particularized by the nature of each function and its placement within the building.

Spatially complex and experientially intriguing, the Kunsthal is a brilliant synopsis of Koolhaas's original observations about conjuring vitality in a building and a city, and stirring one into the other. An architect's architect who eschews formalist design, Koolhaas urbanizes his buildings by diversifying program and stressing experience over composition. The Kunsthal is more somatic than retinal, understood more through the body than the eye. Its success helps confirm Koolhaas's thoughts about the richness of urban congestion, strategies of architectural and urban layering, and his continuing confidence in the century's tradition of Modernism. Notes the Dutch architect: "I thought there was life in the box yet." —*Joseph Giovannini*

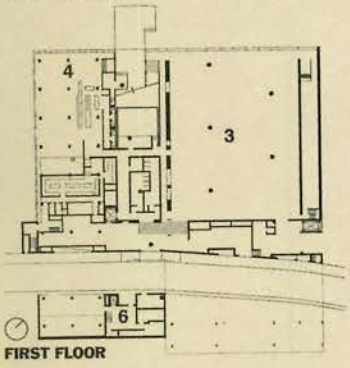
DENNIS GILBERT/ARCAID

HANS WERLEMANN

FAR LEFT AND BELOW: Koolhaas designed a steel floor grate to separate side exhibition spaces of the two main galleries, veiling one from the other.
LEFT: Lighting in gallery on the park level is irregularly spaced; columns are laminated with trunks of trees.
PLANS: Circulation separates public functions (left) from galleries (right).



SECOND FLOOR



FIRST FLOOR

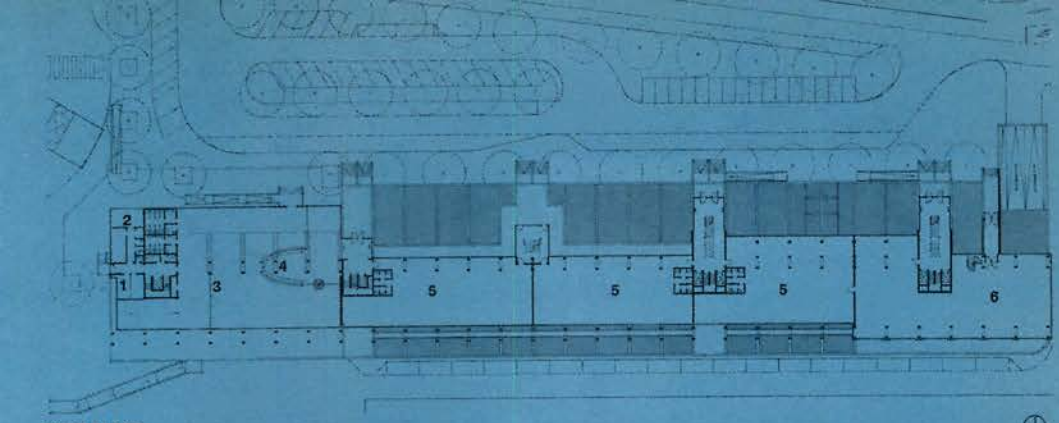
1 ENTRANCE HALL
2 AUDITORIUM
3 GALLERY
4 RESTAURANT
5 VIP ROOM
6 OFFICE

HANS WERLEMANN

Hamburg Ferry Terminal
Hamburg, Germany
me di um & William Alsop, Architects

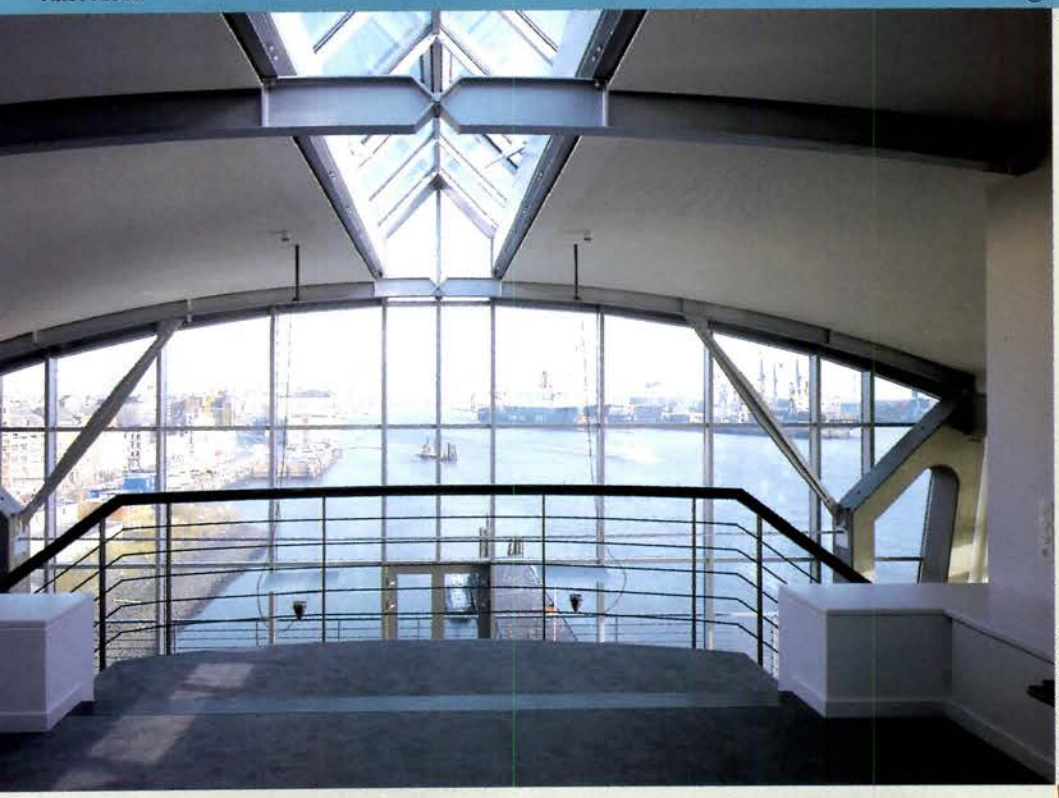
me di um & ALSOP

ABOVE: Appearing like a ship on land, the new ferry terminal brings life to Hamburg's once derelict port district.
RIGHT: Two floors of speculative office space are supported by a precast concrete frame that was manufactured in Denmark and then assembled on site with steel framing bolted in place.
FACING PAGE, LEFT: Exposed pylon-supported structural frame surrounds a dramatic view from top-floor offices.
FACING PAGE, RIGHT: Walkway along south facade is supported by steel girders and nautical-themed tie bars.

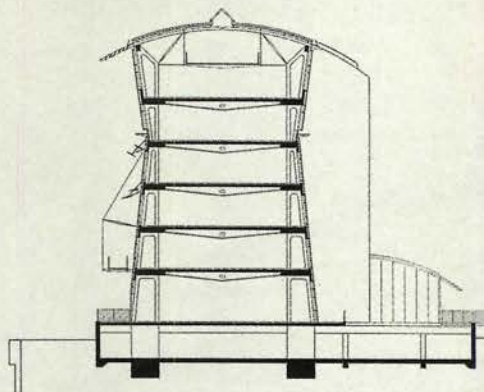


1 CUSTOMS
2 POLICE
3 WAITING HALL
4 TICKET COUNTER
5 OFFICE
6 RESTAURANT

FIRST FLOOR



KLAUS FRAHM PHOTOS



NORTH-SOUTH SECTION

Although severely damaged in the war, by the late 1950s, Hamburg had resumed its role as a vital trading link. In the early 1970s, heavy shipping moved further down the Elbe River, and Hamburg's port underwent a difficult transformation to light industry. In the 1980s, the derelict seaport was skillfully transformed with a mixture of housing, service-sector industry, and tourist attractions. Now, Hamburg is one of northern Germany's most livable cities, and a new generation of architects has emerged, rendering the city's longstanding maritime tradition in 1990s technology.

The harbor's architectural potential is exemplified by the ferry terminal designed by local architects me di um and London-based William Alsop. The building is a terminus for Hamburg's small ferry fleet, which connects Germany and England; it also serves as a port for North Sea cruise ships. Topped by two floors of speculative office space, the terminal invigorates the port with its dramatic building massing, welcoming transparency, and an innovative structural system reminiscent of Hamburg's shipbuilding past.

Horizontally organized to resemble the ferries and cruise ships that dock alongside the building, the main spaces of the terminal stretch along a two-story gallery on the ground floor. From the northeast corner entrance, passengers proceed through passport and customs controls in the waiting hall. The structural system of the building, developed with engineer Ove Arup & Partners, is based on a series of concrete and steel frames that recall the surrounding industrial architecture.

Me di um Architects emerged in the 1980s as one of Hamburg's strongest new firms. With William Alsop, me di um won the 1989 competition for the new ferry terminal, which marks the beginning of new life for the dilapidated port district. —*Casey Mathewson*

Casey Mathewson is a practicing architect living in Berlin.

Gerona Court House
Gerona, Spain
Esteve Bonell & Josep Maria Gil

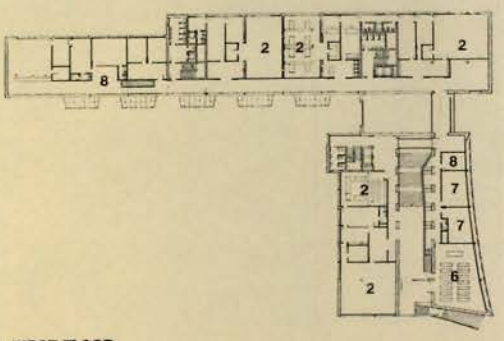
BONELL &GIL

BELOW: Ribbon windows and eyebrows on limestone facade reveal building's roots in early Modernism. Glass-enclosed booths are simple bay windows.
RIGHT: L-shaped building plan defines edge of paved courtyard.
FACING PAGE, TOP: Sweeping glass wall of main facade nods to Neoclassical post office (right). Monumental stair on end wall leads to wedding hall.
PLANS: Shared entry hall separates administration and courtroom wings.

Esteve Bonell and Josep Maria Gil's court house in Gerona is a study in accommodation. Resolutely Modern, the building responds in proportion and scale to an adjacent Neoclassical post office. Appropriately monumental in profile, the building crouches low to the ground to preserve views toward a cathedral and landmark church in the city quarter nearby. And its arrangement of discrete parts resolves challenges of the site, which is bordered by two streets, an elevated railway, and a public square built over an underground parking garage.

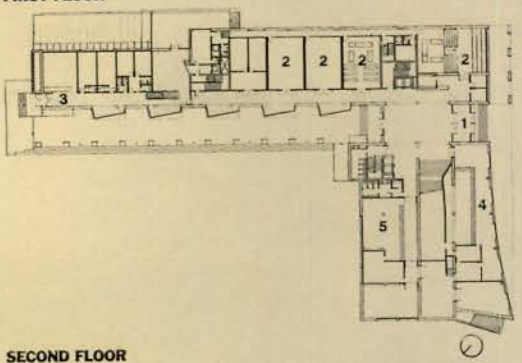
The building's L-shaped plan groups courtrooms and administrative functions in two wings that parallel the streets. The principal facade, a sweeping glass curve, faces south toward Calle Ramon Folch and picks up—through its height, massing, and subtle cornice line—the visual cues established by the adjacent post office and a colonnade along neighboring Independence Plaza. At ground level, a gray limestone portico differentiates the building's wings and announces the entrance. Contained in the main body of the building are attorneys' offices, clerical functions, and hearing rooms—as well as a wedding hall that can be entered directly from outside. The west wing is organized around a four-story-tall central corridor whose cool, rational design is warmed by wood-paneled walls. A great staircase punctuates the void to emphasize the civic nature of this space.

The east wing contains courts and meeting chambers. Here, internal circulation faces the square; spaces requiring direct public access are placed next to the street. The two wings of the building meet at an entrance vestibule, a glass-faced hall rising the full height of the building. Inside, the diversity of public and private spaces forced the architects to clarify circulation and provide a logical grouping of activities. Bonell and Gil have designed a building that fosters an ease of understanding for newcomers, while reaffirming its nobility of purpose.—*Vernon Mays*



1 ENTRANCE
2 COURT ROOM
3 LAW LIBRARY
4 CIVIL REGISTRY
5 GENERAL REGISTRY
6 WEDDING HALL
7 ATTORNEY'S CHAMBERS
8 COURT POLICE

FIRST FLOOR

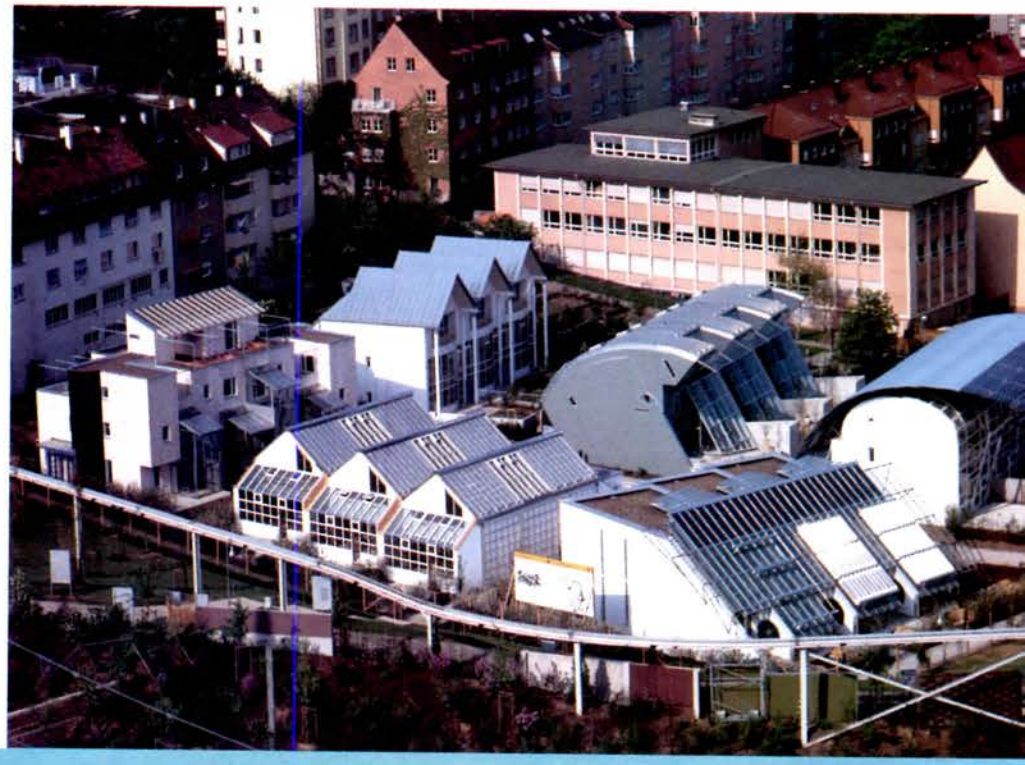


SECOND FLOOR

FERRAN FREIXA PHOTOS

Living Expo 2000
Stuttgart, Germany

STUTT



RIGHT: Site A, the northern parcel of the housing exhibition, was built with six three- to four-unit townhouses exhibiting a variety of forms that range from traditional to organic.
FACING PAGE: Site B's multistory apartment buildings direct their south-facing glass facades, enclosing vertical circulation and greenhouses, toward a heavily trafficked railroad.
PLANS: The two Stuttgart developments form a link in a U-shaped chain of parks, bridges, and housing that constitutes the 1993 International Garden Exhibition.

Mies van der Rohe's mandate to the 16 Europeans commissioned for the 1927 Weissenhof Settlement in Stuttgart, Germany, called for flat roofs and white exteriors, but the architects were otherwise free to design as they pleased. Even with so few stylistic constraints, the now-famous housing development on a hill above the German provincial capital was designed as a showpiece for the virtues of Modern functionalism, and the architects selected were largely Mies's Berlin cronies who reliably reproduced the International Style, proving its virtues for humanity. "I have the presumptuous idea of inviting all the architects of the artistic left, which I believe would be an unheard-of success as an exhibition strategy," Mies explained to a local official.

It was not a political imperative but an environmental one that drove the planners of Stuttgart's Living Expo 2000, an experimental housing exhibition designed by 13 European architects from 11 nations. The residential development accompanies the 1993 International Garden Exhibition (IGA), a horticultural fete that spurs housing construction in a different European capital each decade. Stuttgart's enlightened officials, determined to discourage urban flight from the city of 600,000, saw it as an excuse to provide public housing and showcase state-of-the-art energy-saving designs in the process.

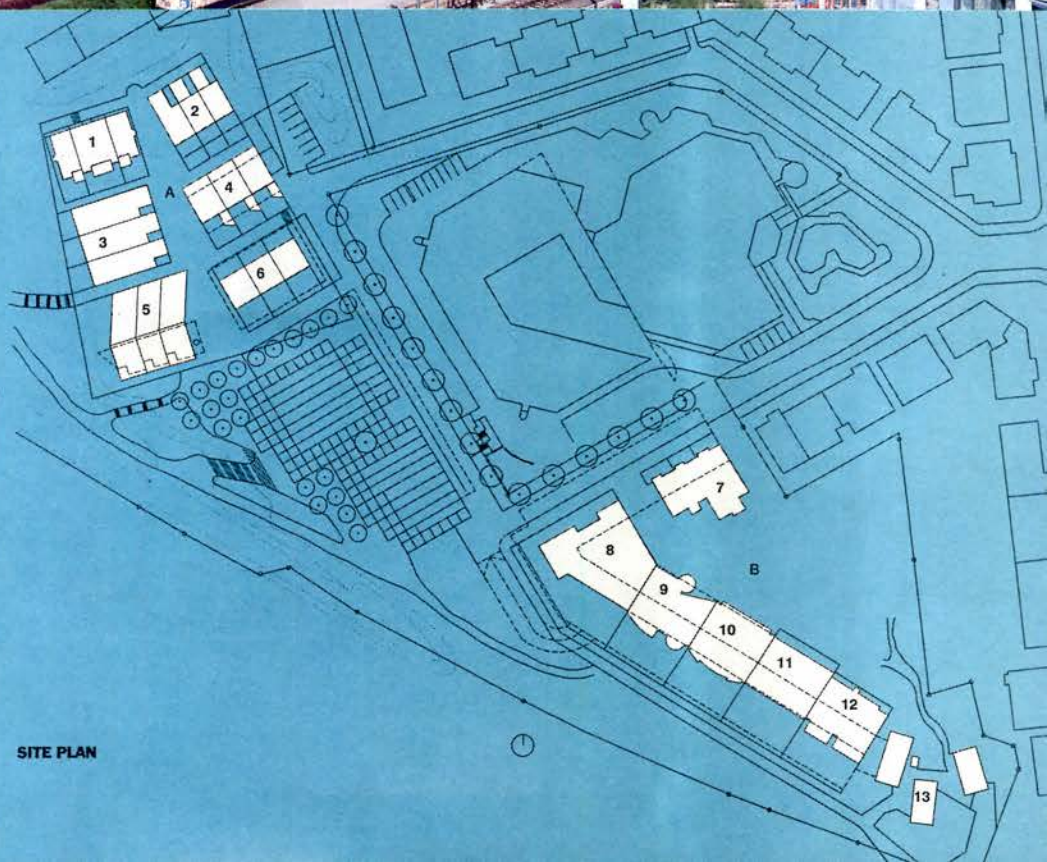
Located on a triangle of land near a commuter rail line, the site includes existing high-rise apartments and office buildings. In 1988, the city invited 27 international firms to submit housing schemes for two sites, one for apartment buildings and one for single-family townhouses. The jury was composed of Stuttgart's building officials; four local developers who would eventually build the housing; and the local architectural firm of Bidlingmaier, Egenhofer, Dübbers, overall planners. Thirteen winners, including three German firms, were selected. Because IGA's theme is "Nature in the City," criteria included innovative energy conservation, solar heating, and gray-water recycling. Schemes that included "green" elements—whether in the form of courtyards or greenhouses, were sought, as were those that reflected flexible social arrangements. Housing units designed for an extended family, or apartment buildings with common interior play areas were chosen over more conventional models.

Stuttgart straddles the Neckar River in southwest Germany, and has long been home to Daimler-Benz, IBM, and other manufacturing giants. Prosperous despite the recession that has settled over Germany since reunification, the region's industry and a growing service and communications sector attracts young home-buyers. Planners originally hoped to provide low-cost housing in the city, but the innovative structures that emerged from the competition proved costly to build. The townhouses in particular have emerged as high-price housing, and some of their innovative spirit has been dampened by

GART HOUSING

their construction costs. Nevertheless, the majority of the 103 apartments and 6 of the 19 townhouses of Stuttgart's Expo housing have been rented or sold, which attests to the lively architecture the competition generated. In fact, it is an architecture very different from what would have satisfied Mies. "Compared with Weissenhof," notes planner Hans Egenhofer, "this housing is very pluralistic."

Unlike the uncompromising determinism that influenced the Modernism of 1927, the housing developed for Stuttgart's Living Expo 2000 does not portray a common theme nor a particular contemporary style, but rather a surprising collection of inventive forms, unusual mechanisms for introducing daylight, and an attention to the sound-dampening, air-freshening qualities of vegetation. "It wouldn't have been fair to choose only those architects whose style fits together," Egenhofer reasons. "We wanted to include all sorts of architecture—this housing is, after all, an exhibition." —*Heidi Landecker*



SITE PLAN

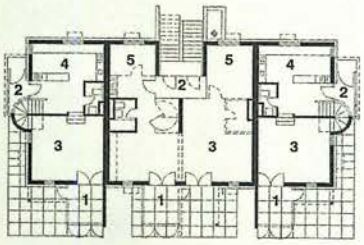
SITE A

As Stuttgart burgeoned in the last half of the 20th century, housing developments of little architectural merit pushed the city's borders ever farther from the Neckar Valley. Hoping to refresh its 66-year-old reputation for cogent planning and progressive architecture while simultaneously housing its citizens and attracting tourists to the International Garden Exhibition, city officials envisioned Living Expo 2000, a development that would create an additional 120 dwellings. Local architects Bidlingmaier, Egenhofer, Dübbers, planners of the overall project, designated two neglected areas near the city's northwest train station as sites for an international housing competition.

Site A, the northernmost of the two, comprises six buildings that contain three or four single-family units each, for a total of 19 dwellings. As proscribed by the planners, the dwellings range from 85 to 130 square meters (915 to 1,400 square feet). They are rendered in a variety of imaginative styles—from a traditional yet assertive stretch of pitch-roofed, glass-fronted townhouses by Britain's ECD Partnership to a barrel-roofed building by Karla Szyszkowitz-Kowalski and Michael Szyszkowitz of Austria that appears to have been left behind by the setmakers of a fantasy film about the future. "We left the interpretation of the term 'experimental' to the architects," confides Klaus Gruetzner, assistant to Stuttgart's deputy mayor for planning, and what results is an eclectic mix of photovoltaic panels, passive solar heating, flexible floor plans, and unfettered forms.

The innovative designs of the Expo townhouses add to their cost: At between 750,000 and 1.4 million deutsche marks ($429,000 to $800,000), only 6 of the 19 units are occupied or have been purchased. Gruetzner anticipates that 40,000 more housing units will be needed over the next two decades. Perhaps Stuttgart's next phase of housing construction will experiment with how to build residences that are not only energy-efficient but affordable as well. —*H.L.*

1 GREENHOUSE
2 ENTRANCE
3 LIVING ROOM
4 KITCHEN
5 BEDROOM



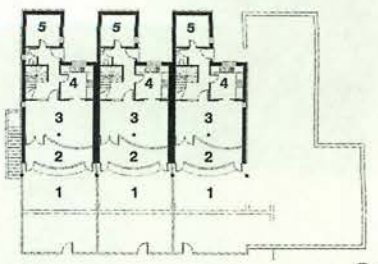
FIRST FLOOR

Building 1
Elzbieta Muszynska, Krystof Muszynski, Lech Baranski with Bidlingmaier, Egenhofer, Dübbers

These simple, wood townhouses on the northwest corner of the site are the result of a design collaboration between Bidlingmaier, Egenhofer, Dübbers, local planners of Living Expo 2000, and a three-person Polish firm from Lódz, Stuttgart's sister city. Circular stairs that are housed in round black-painted steel stair towers at the building's east and west ends provide access to the four dwellings, which consist of two-story end units that bracket two stacked apartments in the center. Like the architecture, the energy-conservation measures are simple: passive solar heating via south-facing greenhouses that provide a buffer against noise from the nearby rail line.

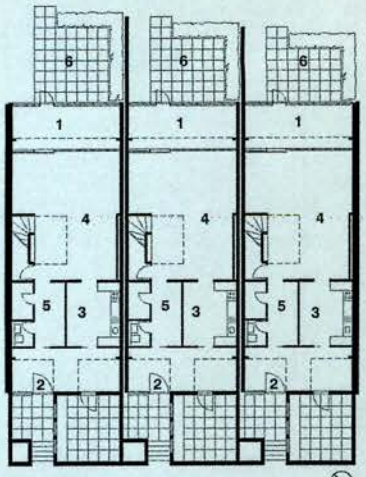
Building 2
The ECD Partnership

The London-based design firm ECD Partnership selected the gabled facade, a traditional style for Baden-Württemberg, the German state of which Stuttgart is the capital. A bowed south-facing window modernizes the residential trio and creates a curved balcony on the second story of the building. The greenhouse inside the bay window also functions as an economical energy-saver. Depending on weather conditions, ventilation ports either bring warm air from the greenhouse into the units, or expel it. The air-conditioning system is designed to take advantage of warm-air updrafts and requires no additional mechanical support.



FIRST FLOOR

1 COURTYARD
2 GREENHOUSE
3 LIVING/DINING
4 KITCHEN
5 UTILITY ROOM



FIRST FLOOR

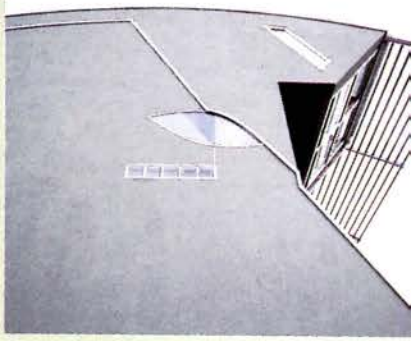
1 GREENHOUSE
2 ENTRANCE
3 KITCHEN
4 LIVING/DINING
5 VESTIBULE
6 COURTYARD

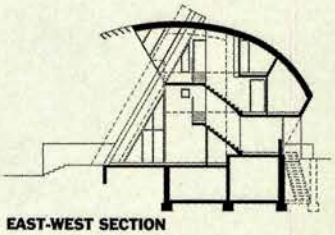
Building 3
Johannes Gunnarshaug

Glass-roofed houses arranged in a row from north to south break with convention on Site A, where the other five townhouse ensembles are grouped from east to west. The three-unit rowhouses are constructed in stucco-finished concrete. Norwegian architect Johannes Gunnarshaug had hoped to incorporate more wood in the design of the 150-square-meter units, but was limited by German fire-safety guidelines. Gunnarshaug, a specialist in energy conservation, brought daylight in through the building's east and west ends and added a greenhouse buffer at the east-facing entry. A conventional heating system is supported by active and passive solar strategies, with a stone slab floor for heat storage. Double-glazed, low-e glass boosts insulation and shading.

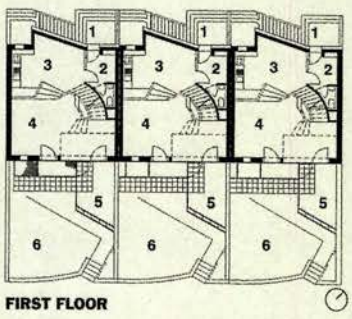
Building 4
Karla Szyszkowitz-Kowalski
Michael Szyszkowitz

A steeply curved, barrel-vaulted zinc roof distinguishes a three-unit townhouse by Graf, Austria-based Karla Szyszkowitz-Kowalski and Michael Szyszkowitz, a husband-and-wife partnership that heads a 25-person firm. Occupants enter through a south-facing courtyard under a brise soleil, through a sloping glass wall, to the first-floor living room and kitchen. Ascending a curved stair, they approach two floors of skylit bedrooms tucked under the curved roof. A third-story bedroom cantilevers over the courtyard, and a second-story bedroom affords its occupant an eye-shaped window on the rest of the experimental complex. The eye, the sweeping roof, and the curved stair are "for fun," explains Karla Szyszkowitz-Kowalski, but the concrete, glass, and steel units are also warmed by efficient solar heating. Warmth from the sun is collected by the greenhouse windows, then forced down a chimney in the center of the complex to a black granite storage panel beneath the floor. This arrangement provides for about 15 percent of each unit's heat; a traditional gas-fueled hot-water system provides the rest.





EAST-WEST SECTION



FIRST FLOOR

1 ENTRANCE
2 VESTIBULE
3 KITCHEN/DINING
4 LIVING ROOM
5 GREENHOUSE
6 COURTYARD

Building 5
HHS Architects

These Kassel, Germany-based architects created a three-bedroom townhouse that manufactures electricity through its architectural design. Incorporating new German photovoltaic (PV) panels, in which light is concentrated via holography to minimize the number of panels required, the architects crafted a long, sloping glass roof. In Germany, the utility "buys" the power created by photovoltaics, and residents are charged for electricity they use minus the wattage they generate on site.

A wedge-shaped foyer leads to a living/dining area at the front of each unit, where sliding glass doors open to a greenhouse. One bedroom and bath are located in the rear of the insulated brick building; two more bedrooms are positioned in a loft above the main living area.

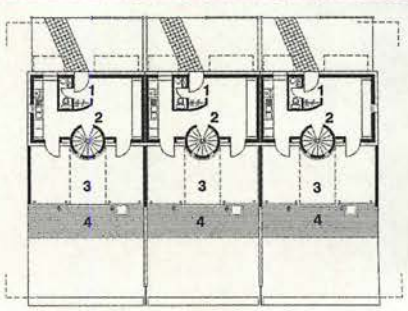
FIRST FLOOR

1 COURTYARD
2 GREENHOUSE
3 LIVING/DINING
4 KITCHEN
5 VESTIBULE
6 BEDROOM

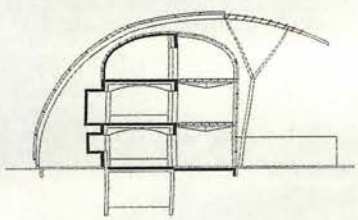
Building 6
Jourda & Perraudin

Shielded by a cantilevered, umbrella-like steel roof, the three-unit complex on the eastern corner of the site comprises a main house and attached greenhouse. The three-story main house, which offers about 70 square meters of living space at the rear of each unit, is the only part of the structure that can be comfortably occupied throughout the year. It is set back from the greenhouse and divided into a living room/kitchen on the first floor, and three bedrooms in the two stories above. In warm weather, the living/kitchen area opens to the greenhouse, which is of equal size to the south. While this scheme may work well in southern France, where Jourda & Perraudin practice, Stuttgarters must make do with 50 percent of the available *living space for several* months out of the year.

1 ENTRANCE
2 KITCHEN/DINING
3 GREENHOUSE
4 TERRACE



FIRST FLOOR



EAST-WEST SECTION

SITE B

The plan that won the Stuttgart firm Bidlingmaier, Egenhofer, Dübbers the title of overall planners of the IGA's housing focused on a farmer's market in the center of public housing. Although that scheme did not survive, the firm's bulwark of seven apartment buildings adjacent to a railroad embankment now completes a triangle with existing structures, some of which were built as early as 1910. The midrises enclose a triangular courtyard, the site of the would-be farmer's market, which contains a playground instead. Rent for the 103 moderately priced apartments is subsidized by the city at a cost of 15 million marks per year.

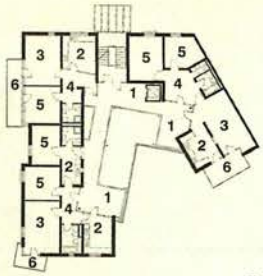
The site, abutting a noisy commuter railway, presented the architects with a double challenge: how to design for energy efficiency when the warmest, south-facing elevation was also the noisiest. The solution is a greenhouse on the southern facade that performs the dual function of providing solar warmth in winter while creating a vegetation-filled buffer against railway noise all year long.

Michael Alder, whose Basel, Switzerland-based office designed Building 12, relates that many of the apartment buildings on this site experiment more with flexible living arrangements than with technological energy-savers such as photovoltaic panels. The floor plans of his scheme, for example, can be altered according to occupants' needs.

Even though the competition organizers specifically sought to create an internationally designed complex, some of the foreign influences initially were resisted. The openness of Delft-based Mecanoo's glass tower exposes occupants' living quarters in a manner natural to the forthright Dutch but less appealing to more private Germans. Michael Alder's Italian-style courtyards, where residents can park their bicycles, were at first considered too messy. Several architects complained that they would have liked to have incorporated more wood—especially valuable for energy-efficiency—but were prevented by German fire-safety restrictions. —*H.L.*

Building 8
Tegnestuen Vandkunsten

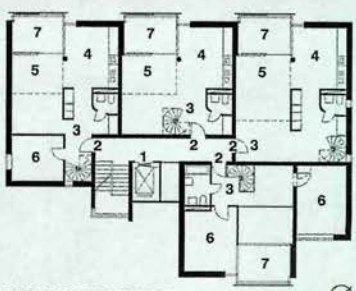
Though striking in its design, social interaction generated this scheme by the 22-year-old Copenhagen firm of Tegnestuen Vandkunsten. The architect had intended to incorporate both active and passive solar heating in the design, including a rooftop greenhouse, but budget constraints eliminated most of the environmental features. Instead, the architect chose to explore issues of both private and communal living. A glass-enclosed community room on each floor provides access to individual units, while encouraging interaction among occupants. This communal area also insulates the individual apartments from outside noise. Access into the units from this communal area is through more open living and kitchen areas. The architect placed the bedrooms along the perimeter of the building.



TYPICAL FLOOR PLAN

1 COMMON ROOM
2 KITCHEN
3 LIVING ROOM
4 VESTIBULE
5 BEDROOM
6 BALCONY

1 ELEVATOR LOBBY
2 ENTRANCE
3 VESTIBULE
4 KITCHEN/DINING
5 LIVING ROOM
6 BEDROOM
7 GREENHOUSE



TYPICAL FLOOR PLAN

Building 7
Gullichsen Kairamo Vormala

The only building in Site B that does not face the railroad embankment is Helsinki-based Gullichsen Kairamo Vormala's six-story structure, which houses 15 apartments. Constructed of insulating brick clad in stucco, the building comprises maisonettes with two-story living rooms and includes a spiral stair for vertical circulation within each dwelling. Sliding glass doors in the living rooms give way to greenhouse-porches that overlook adjacent Störzbachstrasse. Glass block clads the bases of the greenhouses and the internal fire stair, and low-e glass brings light into the elevator lobbies. Kristian Gullichsen, who has been building award-winning projects throughout Europe for three decades, points out that the original scheme included a number of energy-saving features that ultimately proved too expensive.

Building 9
LOG iD

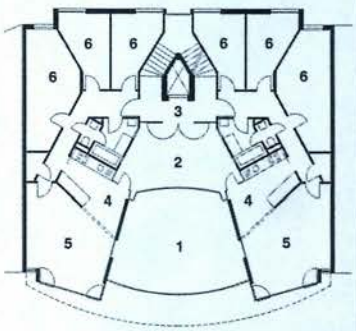
Glass towers that house subtropical plants, an inner courtyard, and a rooftop garden punctuate a steel and concrete apartment building designed by Tübingen-based LOG iD, a firm with a reputation for inventive architecture with solar technology. The building comprises an east and west wing housing 10 apartments arranged in a variety of shapes and sizes; a tower at the rear accommodates two small split-level apartments. Many of the units incorporate sliding glass doors that offer access to the indoor courtyard and greenhouses within the glass towers. Carefully selected plants within the building provide shade, purify the air, and moderate internal temperature. The greenhouses and courtyard do not require heating in winter.

TYPICAL FLOOR PLAN

1 ELEVATOR LOBBY
2 VESTIBULE
3 LIVING ROOM
4 KITCHEN/DINING
5 GREENHOUSE
6 BALCONY
7 BEDROOM

Building 10
Bengt Warne, Jo Glässel
Warne Naturhus

A large central atrium, open to the street and surrounded by 13 apartments, distinguishes the complex designed by Stockholm-based Bengt Warne and Berliner Jo Glässel, who head the practice Warne Naturhus. Warne and Glässel, both experienced in ecological architecture, created a sun-filled winter garden in the atrium, which serves as both a temperature moderator and communal, year-round living space. Insulated, double-paned glass prevents heat loss through the atrium and glass facades. The irregularly shaped atrium creates oddly shaped spaces in the individual apartments, where few walls meet at right angles.



TYPICAL FLOOR PLAN

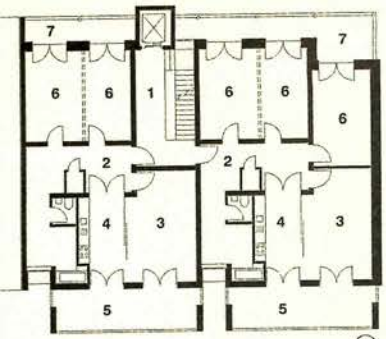
1 ATRIUM
2 GREENHOUSE
3 VESTIBULE
4 KITCHEN/DINING
5 LIVING ROOM
6 BEDROOM

Building 11
Design Group Stahr
Institute of Architecture

For an architecture professor at an institute in Weimar in the former East Germany, noise reduction was a primary consideration in designing a 12-apartment midrise facing Stuttgart's railroad embankment. Gardens on both the north and south sides of the building act as a buffer zone for apartments on the first and second floors, with trees and other vegetation intended to form a natural protective wall. Greenhouses and balconies on the middle two stories screen the apartments on the south-facing, railway side of the building. The top two floors of the midrise apartment building face an atrium, separated by a glass wall from the noise of passing automobiles and trains.

TYPICAL FLOOR PLAN

1 ELEVATOR LOBBY
2 ATRIUM
3 VESTIBULE
4 BEDROOM



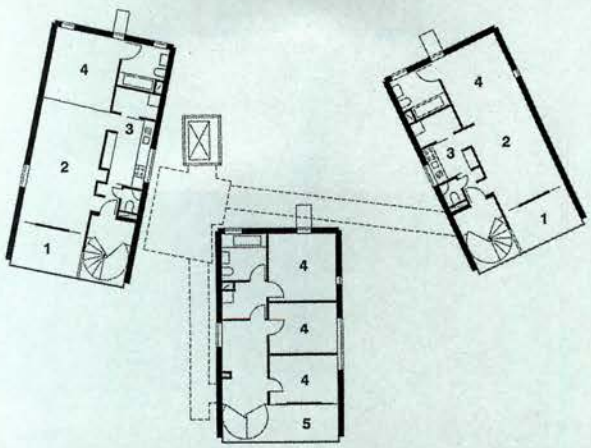
TYPICAL FLOOR PLAN

1 ELEVATOR LOBBY
2 VESTIBULE
3 LIVING ROOM
4 KITCHEN
5 GREENHOUSE
6 BEDROOM
7 BALCONY

ANDREAS KELLER/AV STUDIOS PHOTOS

Building 12
Michael Alder

With moveable partitions, apartments designed by Swiss architect Michael Alder can be transformed from one- to two-bedroom suites, depending upon the needs of occupants. Sliding doors also divide kitchen and living room, so residents can create an open plan or a separate kitchen. Each unit has north- and south-facing balconies with double glass doors, and stairs and bathrooms are naturally lit. Alder's scheme called for 50-centimeter-thick walls for insulation, constructed of a newly developed German brick that encloses air spaces for better insulation. Walled courtyards at the entrances reveal the Italian influence in Alder's work.



TYPICAL FLOOR PLAN

1 GREENHOUSE
2 LIVING ROOM
3 KITCHEN/DINING
4 BEDROOM
5 ATRIUM

Building 13
Mecanoo

This cluster of three slim towers by Mecanoo, a 35-person Dutch office in practice since 1984, provides flexible apartment arrangements that include attachable units for individuals or larger groups. The stairs are positioned so that two stacked apartments can be joined to form a spacious maisonette. In response to environmental concerns, large glazed porches face south to buffer noise from nearby train tracks. The north walls of each apartment tower are covered in zinc sheeting and playfully articulated by slotted windows on the east and west facades. The individual towers are connected by bridges, and the composition is punctuated by a single, glass-enclosed exterior elevator. The resulting design is an updated version of Miesian esthetics, infused with a social and environmental conscience.

Linate Airport
Milan, Italy
Aldo Rossi, Studio di Architettura

ALDO ROSSI

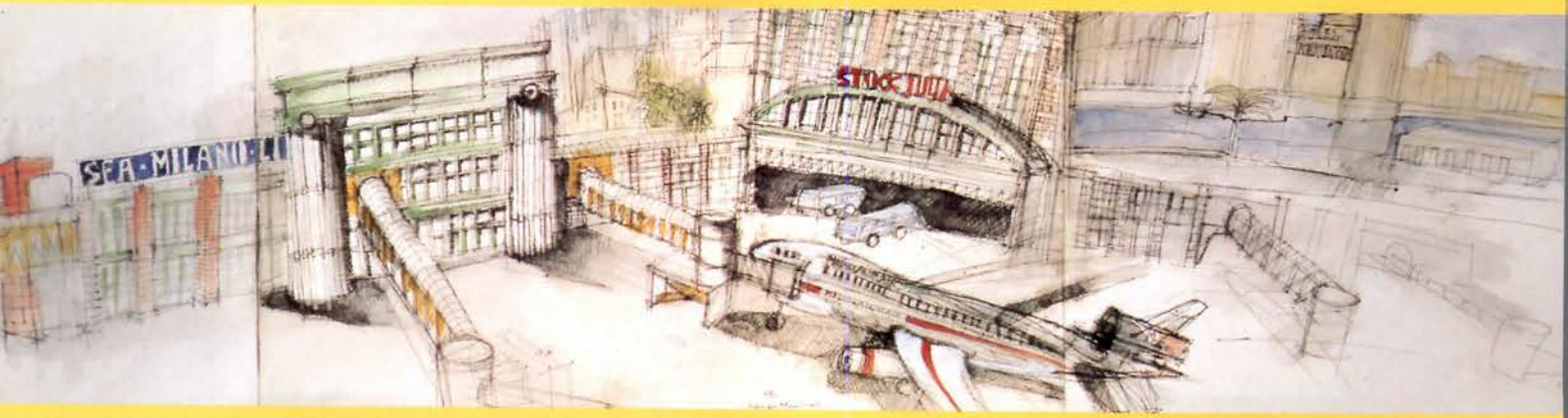
The recent modernization and expansion of Milan's Linate Airport, the city's main terminal for domestic and intra-European flights, opened new territory for Aldo Rossi. The commission required a structure ever-changing in spatial organization, technological evolution, and everyday use. Furthermore, Rossi reasoned, an airport is the modern-day gateway to a city—the first, and perhaps lasting, image of that city.

And so Rossi designed two gates, one for flights that originate in Italy and another for planes arriving from elsewhere in Europe. To avoid interruptions in service, the new addition was conceived as a wraparound and built without closing the existing terminal. Grafted to the side of the old terminal and facing the runways and disembarkation areas, the addition incorporates a new restaurant, baggage claim area, and arrival/departure gates.

Linate Airport's most prominent volume is the departure waiting area, illuminated by an expansive grid of glass framed by two 12-foot-diameter columns and a large steel truss. Projecting from the center of the grid and other second-floor locations are new bright-yellow bridges that lead directly to airplanes. Yellow was selected for its visibility in the frequently foggy conditions at the airport. In addition, the stucco facades of buildings in Milan are yellow, explains one Rossi associate.

For the national arrivals "gateway," Rossi constructed two muscular towers of granite, mined from nearby Lago Maggiori, which support a steel canopy painted in the architect's signature green. The second "gateway" for international arrivals comprises a low steel canopy resting on eight simple columns, "elements of a long colonnade," notes Rossi. He likens the airport to a symbol of the city's progress and a stimulus to further growth. As such, Rossi sought to capture the essence of Milan in his design for the airport. Likewise, in the vein of all Rossi's work, Linate strives to interpret yesterday and today in a conglomerate image.

—Vernon Mays

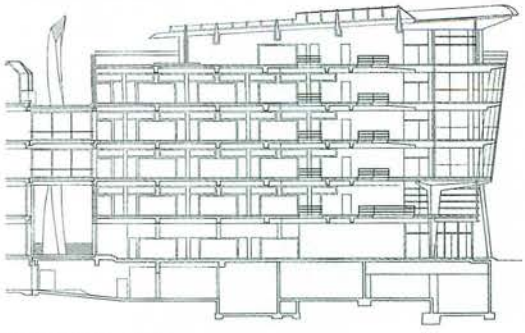


FACING PAGE: Sketch by Aldo Rossi reveals expansive column-framed glass grid of departure waiting area.
RIGHT: New bridges funnel departing passengers directly to planes.
BELOW: Broad steel canopy signifies the international arrivals entrance. Bright yellow portals frame service entrances to baggage handling area.
BOTTOM: Towers constructed of local granite anchor steel canopy over the national arrivals entrance.

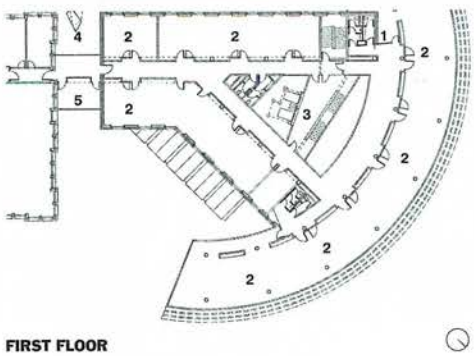
STEFANO TOPUNTOLI PHOTOS

Ost-West-Hof
Hamburg, Germany
MRL Architects

MRL Architects



WEST-EAST SECTION



FIRST FLOOR

1 ENTRANCE
2 OFFICE
3 ATRIUM
4 EXHIBITION AREA
5 CONFERENCE ROOM

MICHAEL WARTMANN PHOTOS

FACING PAGE: Offices are cantilevered from brick-clad volume.
PLAN AND SECTION: Six-story building's glazed offices overlook atrium.
LEFT: Pedestrians are led around the curved hull into a quiet sidestreet.
BELOW: Atrium is punctuated by open ductwork and exposed steel-framed staircases and elevators.
BOTTOM: Tinted south-facing windows allow maximum transparency. Tiebacks at top of window mullions project glass wall away from ceilings and floor plates.

Located on Ost-West Strasse, a major traffic arterial slashed through Hamburg's historic core in the 1950s, a new six-story office building, Ost-West-Hof, now sets the tone for development in the heart of the city. Although civic buildings and Germany's major publishing houses are located along the boulevard, no real sense of urbanity has developed; both public spaces and buildings lack appropriate human scale. Ost-West Strasse forms an almost unsurpassable pedestrian barrier between an affluent neighborhood and Hamburg's port district.

MRL Architects' dramatically curved glass and steel structure dominates the tough streetscape. The pervading concept of the building is transparency—between exterior and interior, and from one office to another. The offices, located in a ship's-hull-like frontispiece that cantilevers over the busy traffic below, are oriented around a central atrium with balconies that permit views into bordering suites. Low-emissivity glass on the south-facing facade controls heat gain and screens offices from direct sunlight. The building leads pedestrians around its curved "hull" and into a side street to the port district.

Once inside the atrium, an exhibition space creates an informal, communicative atmosphere for the surrounding offices. Transoms above office doors and cabinets admit more natural light. In addition to a bank on the first floor, the building houses a variety of import-export firms.

MRL Architects, founded by Yugoslavia-born Mirjana Markovic, is working on five schools for the city of Hamburg and has opened a new office in Berlin. The growing firm's work is based upon the German Modernist tradition of transparency. "We wanted a congenial building that would bring together a variety of workers," explains Markovic, "so we created glass offices with views into a central atrium. The glass walls also create a dimension of movement and dynamism in the center of town." —*Casey Mathewson*

Portfolio of three buildings
Norman Foster and Partners

NORMAN FOSTER

There was a time when Norman Foster's architecture could be confidently categorized as British High Tech. His preferred materials were metal and glass; his plans were simple and flexible; and his imagery bowed to 19th-century railway stations, palm houses, and exhibition halls, and American precursors like the Eames house. A Foster-designed building usually resembled a high-quality industrial shed. The basic idea was that architecture was a branch of engineering; that the design of a building ought to be no different from the design of any other product of 20th-century industrial culture, like an airplane or a spaceship. Foster's buildings were conceived as bolt-together assemblages of factory-made components.

Paradoxically, to convey the message that High Tech buildings were purely functional industrial products, structural rhetoric had to be employed. In the late '70s and early '80s, High Tech architects like Foster, Richard Rogers, Nicholas Grimshaw, and Michael Hopkins developed the habit of putting the steel frame on the outside of the building and painting it a primary color. In the Foster oeuvre, the best example of this is the elaborate tension structure of the Renault Auto Parts Distribution Center (1982), painted bright yellow. There may be some justification for this expression in a single-story warehouse, but in the Hong Kong Bank high rise (1985), the frame had to be fireproofed, which ruled out exposing the steel. Nevertheless, the bank's frame is displayed and emphasized, its metallic quality preserved by a complicated aluminum casing system.

But the late 1980s were a turning point for the British High Tech style. Confidence in the beneficial effects of industrial technology was starting to wane, and the rhetoric began to ring hollow. Foster's subsequent buildings and projects display a new chasteness. Century Tower in Tokyo (1991) is often thought of as "son of Hong Kong Bank," and there are similarities: the distinction between served and servant elements; the towers rising to different heights; the full-height atrium; and, yes, an exposed frame. But the Tokyo tower displays a new economy and simplicity. Its austerity seems to owe more to traditional Japanese architecture than to Western heavy engineering.

Even in a ground-hugging building like the Stansted Airport terminal (1991), the umbrella roof is quietly efficient rather than flamboyantly expressive. The treelike frames that support the roof are miracles of minimalist structure, but the lightness of the space impresses most. In the 1990s, space and light have become more important in Foster's work than structure and surface.

Foster's preference for the "kit-of-parts" principle has also become less insistent. In the Independent Television News (ITN) headquarters in London (1990), the architect settles for a concrete structure rather than steel. This is a workaday building of utter simplicity, but its dramatic internal spaces and clean external forms are powerful enough for the headquarters building to feature prominently in the titles of ITN's news broadcasts.

Foster's own headquarters (1990) on the south bank of the Thames River is similarly plain and simple but spatially impressive. The main design studio is a single, high room with a glass wall facing the river and a row of freestanding columns to give it perspective. The long, straight staircase in the entrance hall hints at what the other monumental Foster building, the Carrée d'Art in Nîmes (these pages), might have been like had the materials not reverted from stone to metal and glass during the design process.

Does Foster's new emphasis on space and light, his acceptance of more traditional materials, and his tendency toward monumentality mean he has abandoned his original mission? Not at all, for Foster's architecture has a new mission. Faith in technology must now solve different problems—such as pollution and diminishing global resources. Energy conservation is a new Foster theme, and Duisburg Microtechnology Park (pages 112-113) starts a new phase in Foster's development. Its maturity may well be reached in the proposed headquarters for Commerzbank in Frankfurt, a naturally ventilated tower, with landscaped conservatories stacked at regular intervals. Foster's message for the 1990s is that nature and technology can coexist in harmony. —*Colin Davies*

Colin Davies is author of High Tech Architecture *(Rizzoli, New York, 1988).*

PAUL RAFTERY/ARCAID

FACING PAGE: Foster's glass and steel cultural center echoes proportions of Maison Carrée, one of the oldest surviving Roman temples. Louvers protruding from roofline shield skylights. **LEFT:** From a desolate parking lot, Foster created a new plaza in the heart of Nîmes, flanked by the east-facing portico of his 17,500-square-meter center.

PAUL RAFTERY/ARCAID

Carrée d'Art
Nimes, France

When the first scheme for a combined art gallery and library in the Provençal city of Nîmes was published in 1984, it seemed that Norman Foster's architecture was about to take a radical new turn. At the time, his buildings were still being categorized as High Tech, with all the inventiveness, informality, and openness to change that the label implied. But here was a proposal for a building whose chief characteristic seemed to be monumentality.

The Mediatheque, as it was then called, had a templelike exterior and a high central courtyard filled with flights of stone steps rising between solid masonry walls. The stimulus for this new monumentality was obviously the proximity of a Roman temple known as the Maison Carrée. The presence of this venerable representative of the Classical tradition just across the square in the center of the old town encouraged Foster to relax his uncompromisingly forward-looking stance. He was now obliged to engage with the past, increasing his architectural repertoire to include the more traditional virtues of solidity and permanence.

Although Foster was moving away from High Tech, the Carrée d'Art, as the Nîmes building is now called, has turned out to be less monumental than originally intended. It retains its resemblance to a temple, with a full-width, full-height portico in the form of a flat, louvered canopy facing the square; and its atrium is still filled by grand staircases. But the massive stone walls have been replaced by an exposed concrete frame with lightweight infill, and the staircases support glass treads with open risers on white-painted steel carriages.

The Carrée d'Art is an iceberg of a building. Five of its nine stories, housing a library, extend below ground. Galleries occupy the upper

PAUL RAFTERY/ARCAID

RICHARD BRYANT/ARCAID

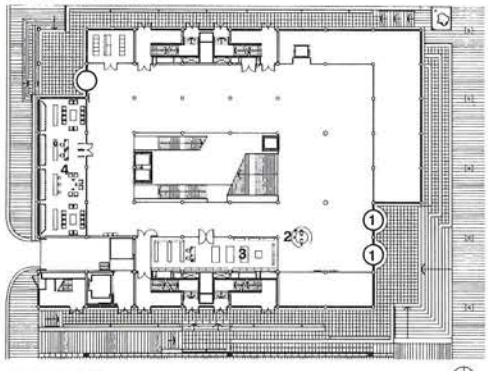
ABOVE: Cévennes limestone steps rise from plaza to entrance, shaded by a louvered canopy on steel colonnade.
RIGHT: Italian limestone floor and aluminum louvers distinguish lobby and reception area, where cultural center's simple concrete frame is revealed.
FAR RIGHT: In top-floor galleries, housing Nîmes' Museum of Contemporary Art, skylights are fitted with external metal louvers and internal diffusers.

floors, where they benefit from natural lighting. Top-floor galleries are lit by skylights in metal-clad pyramidal roofs shaded by horizontal banks of external louvers, visible above the "cornice" line.

Service spaces around the perimeter are screened by milky glass walls infilling an exposed concrete frame. Most of the interiors focus on the atrium, which has an industrial, rather than a monumental, quality. The purpose of the glass staircases becomes clear in descent to the lower levels. Daylight transforms what would otherwise have been a gloomy pit into a magical grotto. It is like standing under a waterfall.

The atrium is the main event of the interior, but not the only delightful space. For example, from an open restaurant terrace tucked under the canopy, visitors can view the roofs of the old town, the activities in the public square below, and, of course, the perfect Classical proportions of the Maison Carrée.

EAST-WEST SECTION



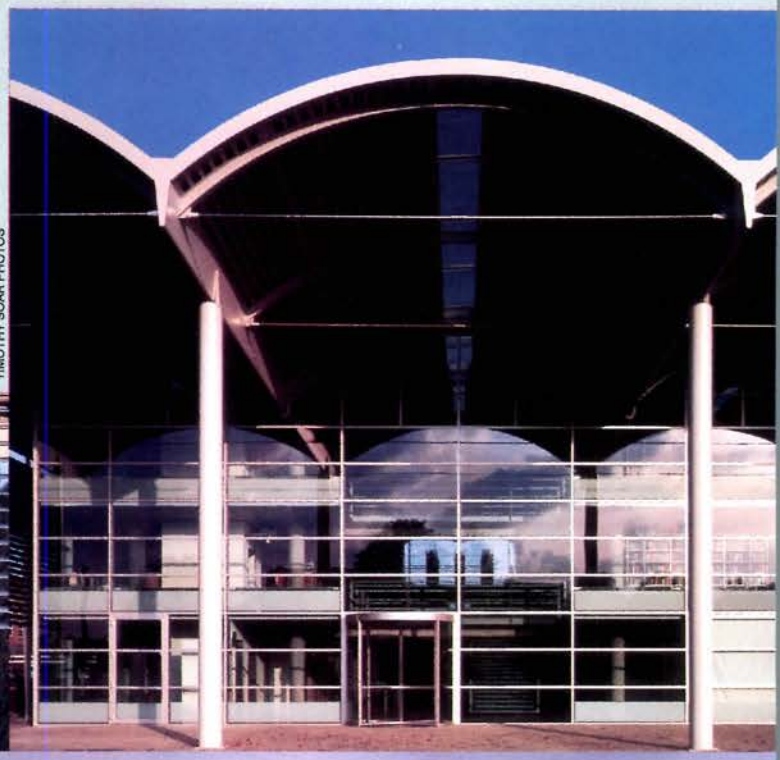
1 ENTRANCE
2 INFORMATION
3 BOOKSHOP
4 LIBRARY

FIRST FLOOR

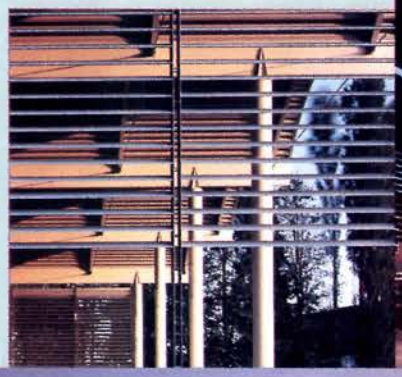
PAUL RAFTERY/ARCAID

PAUL RAFTERY/ARCAID

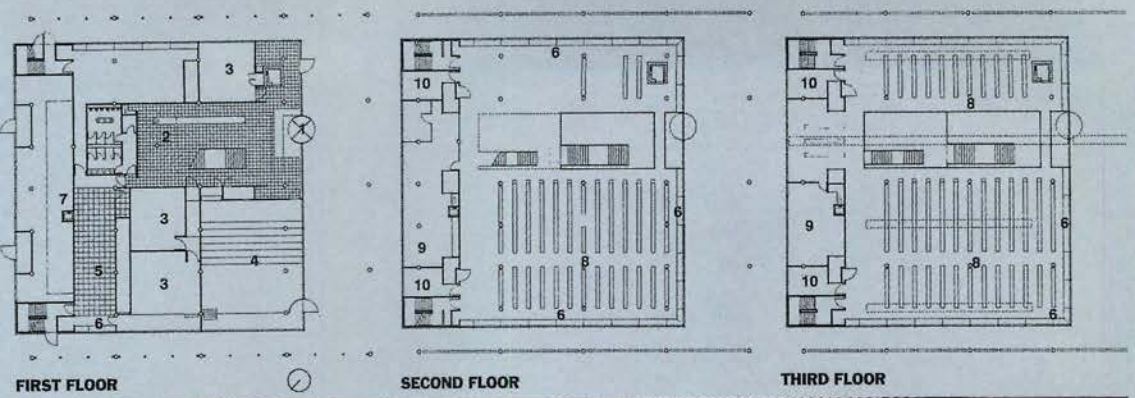
SECTION: To align the art center's roof with the Maison Carrée, Foster located five of the Carrée d'Art's nine stories underground, to house a library.
PLAN: Foster responded to his assignment of revitalizing the city by creating a plaza surrounding the center.
ABOVE: Central atrium brings light into the third-floor gallery and reception level. Fabric ceiling diffuses daylight.
LEFT: Daylight cascades down a sandblasted glass stair that reaches two stories below ground, into the library.



TIMOTHY SOAR PHOTOS



RIGHT: Silver-anodized aluminum louvers screen sunlight and embrace southeast-facing portico.
FAR RIGHT: Barrel-vaulted metal decking curves over trusses supported by V-shaped beams on slender concrete columns.
BELOW: Identical vaults create portico; southwest and northeast elevations are shielded by overhanging roof.



1 ENTRANCE
2 COFFEE BAR
3 SEMINAR ROOM
4 LECTURE HALL
5 ARCHIVES
6 STUDY CARREL
7 MECHANICAL
8 STACKS
9 OFFICE
10 MEETING ROOM

DENNIS GILBERT/ARCAID

PLANS: The library is essentially a three-story box comprising four bays, one devoted to circulation.
LEFT: Glass insert within barrel vault over entrance creates an atrium above glass staircase, a Foster signature.
BELOW: Each of the four roof bays is punctured by a continuous longitudinal skylight with artificial lights suspended beneath. Perforated aluminum reflector filters sunlight within atrium.

Cranfield Library
Cranfield, England

In many ways, the new library at Cranfield Institute of Technology has all the typical Foster features: a flexible plan; a simple umbrella roof; a central atrium containing a staircase; and an elegant, lightweight structure. It is typical also in its radical approach to a familiar building type. Most modern libraries are heavy, inward-looking buildings designed for quiet, solitary study.

By contrast, Cranfield is enclosed by glass walls, shaded by generous roof overhangs and vertical screens of metal louvers. Instead of the usual, introverted study carrels, a fully data-serviced workbench extends right around the perimeter so that students are always aware of the external environment. Daylight is controlled, but not excluded. Shaded linear skylights on the roof create a bright and cheerful interior.

Externally, the composition is basically a three-story box, yet its elements combine in a relaxed, informal way. Despite the templelike form, there is no rigid symmetry: Atrium, staircase, and main entrance are shifted off center. Neither is there any attempt to give architectural expression to the different uses within the building. Book stacks, study areas, seminar rooms, and offices are all accommodated by the abstract plan. Even the mechanical plant at the rear of the building is incorporated into the main volume, with nothing more than metal louvers in the walls to mark its presence. Similarly, though the roof serves as a portico at the front, an external shading device at the sides, and a source of top light for the atrium in the center, its form is undifferentiated. Four identical barrel vaults of metal decking curve over trusses supported by slender, V-shaped beams on concrete columns.

Detailing is simple and direct. From the glass-tread staircase to the unplastered, mortarless blockwork partitions, all is lucid and legible, with every component and junction considered and resolved. The junction between side walls and roof is a good example. The curtain wall simply butts up to the underside of the barrel vault, and the horizontal bows of the trusses pass through the glass.

But such details are not as effortless as they may seem. They depend on a rigorous problem-solving procedure that requires the specialized knowledge of consultants, contractors, and manufacturers, as well as the architect's own experience. This collaborative creative process has been developed over many years and has become second nature to all of the designers in the Foster office. In fact, Cranfield was designed by one of Foster's senior partners, Kenneth Shuttleworth, but that does not make it any less a Foster building.

LEFT: Striking profile of the seven-story, lens-shaped Business Promotion Center stands at the entrance to Duisburg's Microtechnology Park.
BELOW: Windows comprise perforated, computer-controlled metal blinds sandwiched between an outer glass membrane and an inner wall of thermally insulated, double-glazed panels. Building is air-conditioned by a water-based chilled ceiling system.

Duisburg Microtechnology Park
Neudorf, Germany

For more than a century, Germany's coal- and steel-based industry was concentrated in the Ruhr Valley. That industry is now in decline. As part of a restructuring strategy for the whole region, a public-private partnership in the city of Duisburg initiated a project for a Microtechnology Park to encourage the development of new high-tech industries.

Norman Foster was commissioned to prepare a master plan for a site in the residential district of Neudorf, near the city center and university. Of the plan's three main components—the Business Promotion Center at the site's entrance; the Telematic Forum, providing communication services; and the Microelectronic Center, providing 40,000 square meters of office space—the first two are now complete.

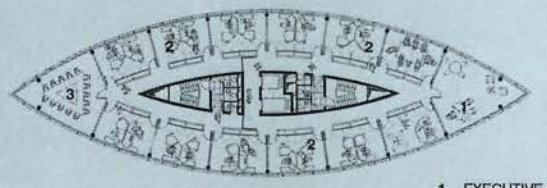
The Business Promotion Center, a seven-story, glass-clad building with a lens-shaped plan and a curved roof, sets the architectural and environmental standards for the entire Microtechnology Park. The center's simple but striking profile signals the presence of the development and symbolizes the confident optimism of the new industrial strategy. But it is more than just a formal symbol. Like the industries it is designed to promote, the center is high tech and environmentally friendly.

At first, its sealed, all-glass facades seem to indicate a standard air-conditioned interior. The exterior walls, however, are complex environmental filters, with perforated, computer-controlled metal blinds between an outer glass membrane and an inner wall of operable, thermally insulated, double-glazed panels.

Natural ventilation through open windows was rejected because of air pollution. The building is air-conditioned, but in an unconventional way. Temperature is controlled by water-based systems, including a chilled ceiling system developed by the architect with project manager Kaiser Bautechnik. Energy from a gas-fired power station combines with roof-mounted solar collectors and photovoltaic cells. Heat from these sources is chilled by absorption cooling machines. The internal environment is monitored and balanced by an electronic management system with a control panel in each room.

The Telematic Forum also has a simple profile: a five-story cylinder with a sloping roof. Internally, however, the cylinder is hollow; cellular offices and open galleries surround a central atrium. The well of this atrium is a conference room.

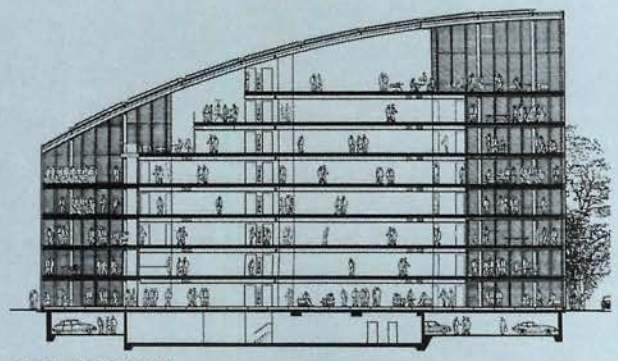
These buildings have an importance far beyond the city of Duisburg as prototypes for a new breed of energy-efficient buildings to supercede the gas-guzzling groundscrapers of the 1980s.



1 EXECUTIVE OFFICE
2 OFFICE
3 CONFERENCE ROOM

TYPICAL FLOOR

TOP: Top three levels of Business Promotion Center overlook fifth-floor conference room.
ABOVE: Top-floor office is tucked beneath highest point of roof.
PLAN: Lens-shaped footprint takes advantage of narrow site and maximizes perimeter to individual offices.
SECTION: Curved roof responds to daylight and shadow angles and respects height of adjacent structures.



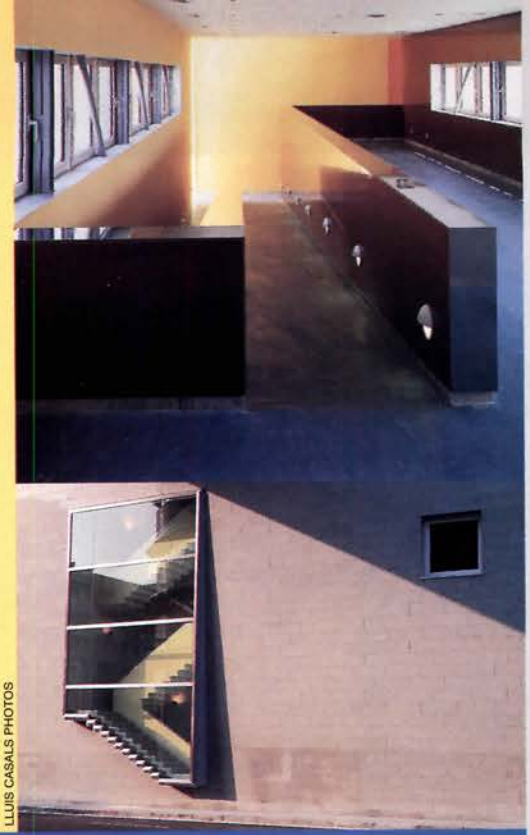
EAST-WEST SECTION

Central Telephone Exchange
Barcelona, Spain
Jaume Bach & Gabriel Mora, Architects

BACH & MORA

LEFT: Ribbon windows and bands of light emphasize the elliptical form of administrative wing at night.
ABOVE: Public entrance is sheltered within elliptical wing; continuous windows illuminate reception area.

TOP RIGHT: Bridge's ramps facilitate communication between buildings; observation deck offers views to sea.
CENTER RIGHT: Technical wing's stairwell projects from canted stone facade.
BELOW: Two-part building is one of four new landmarks at major intersections in the Olympic Village.
PLANS: Buildings withdraw from street edge at ground level to give openness to sidewalk; fourth floor of technical wing connects via ramps to two floors of elliptical office building.



LLUIS CASALS PHOTOS

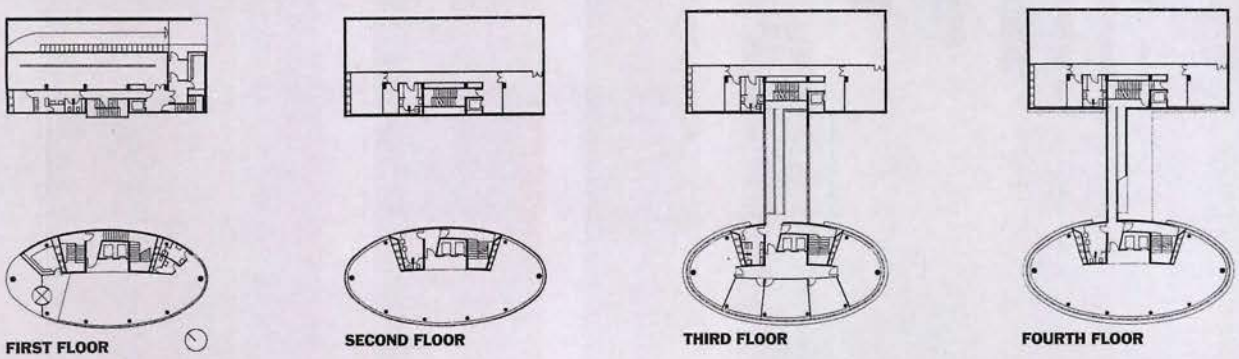
Designated as a landmark in Barcelona's urban fabric, Jaume Bach and Gabriel Mora's telephone exchange building came with the promise of special status. One of four buildings in Oriol Bohigas' Olympic Village master plan, the telephone building both denotes a major intersection and creates a gateway by spanning a side street where it meets a commercial boulevard, Calle Joan d'Austria.

Bach and Mora are masters at distilling building programs into their essential parts. The telephone exchange building's formal composition relies on the interplay of a rectangle and an ellipse. Here, the architects have forsaken literal symmetry for a more fragile formal balance, creating a tension between the prismatic block containing the station's automated equipment and the sensuous cylinder housing administrative offices.

Granite cladding imbues the technical wing with a fortresslike character, typified by rough, chiseled surfaces on all but the southwest facade, which is polished smooth to reflect the Mediterranean sun. There, a projecting two-story-tall window transforms an interior stair into an element of immense visual power. This window is made more prominent by the canted wall of the technology block, which tilts over the sidewalk.

In contrast, the six-story oval tower across the street gradually pulls away from the street edge. The tower, marked by corrugated aluminum cladding and bands of ribbon windows with perforated metal eyebrows, houses the company's administrative functions. Its elliptical footprint is broken only by the recessed northwest-facing entrance.

Linking the two buildings at the third and fourth floors is a horizontal wedge that straddles the side street. Inside, connecting ramps and a great room offer views of the sea. As a diamond in the rough of new housing blocks that now constitute post-Olympics Barcelona, the telephone exchange is a compelling demonstration that infrastructure buildings needn't be dreary. *—Vernon Mays*



Art and Exhibition Hall
Bonn, Germany
Gustav Peichl, Architect

GuStav PEICHL

Germany's new Art and Exhibition Hall in the affluent suburbs of Bonn is a toy fortress, a refined citadel of tectonic delights. Its political ambition is to host and stimulate developments in art and science in Germany's temporary capital, a minimetropolis seldom associated with the avant-garde. In reaction to Bonn's small-town reputation, the local and federal governments have instigated a major program to construct a series of cultural containers. Commissioned for the nationally funded hall is the Viennese architect Gustav Peichl, a designer whose architecture synthesizes glistening technology with arcadian landscapes.

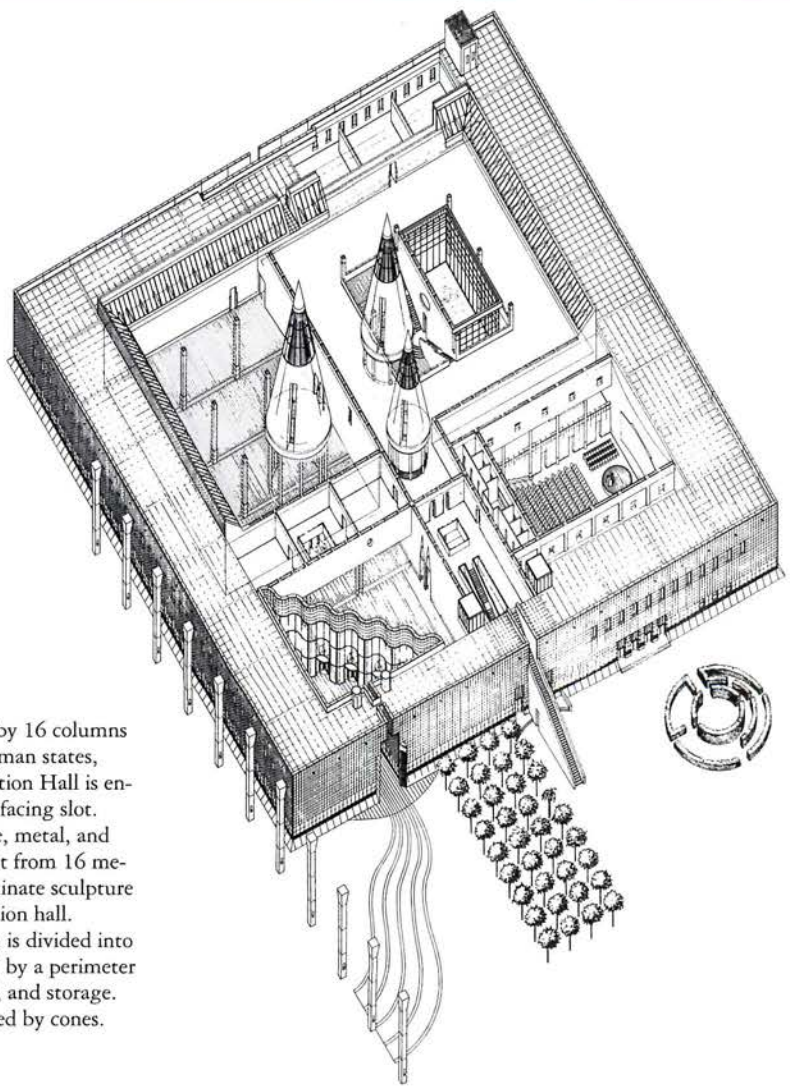
The exhibition hall sits within Bonn's southern fringe, near the Rhine and Günther Behnisch's recently completed parliament building. Peichl shares his plot on a tree-lined thoroughfare with the new Bonn Art Museum, designed by Axel Schultes; the new hall faces that museum across a narrow plaza marked by an arbor and some topiary diversions. On all four sides, the exhibition hall presents immaculately tailored sandstone facades with autonomous rows of punched windows. The pinstripes of polished granite inlay over a chamfered base alert observers to Peichl's particular finesse with details.

To direct the visitor with elaborate architectural maneuvers is not something this building really needs to do. Stalking the sidewalk alongside the Art and Exhibition Hall and plaza is a taut troupe of 16 rusty pylons, representing each of reunified Germany's constituent states. And above the plinth of the hall, the roofline is punctured by three tile-clad cones. Luminous and sharp, these willfully exotic lanterns light the galleries beneath and at night serve as beacons in the neighborhood. Symbolizing the three arts of painting, sculpture, and architecture, they become the graphic icon of the project.

Visitors enter the building through a vertical gap in the massive perimeter, a crevice in which hangs a shining torpedo of a light-

GUSTAV PEICHL

RICHARD BRYANT/ARCAID



FACING PAGE: Screened by 16 columns that represent the German states, Bonn's Art and Exhibition Hall is entered through a north-facing slot.
TOP RIGHT: Cones of tile, metal, and glass, ranging in height from 16 meters to 25 meters, dominate sculpture lawn on roof of exhibition hall.
AXONOMETRIC: Museum is divided into quadrants, surrounded by a perimeter zone of offices, studios, and storage. Galleries are illuminated by cones.

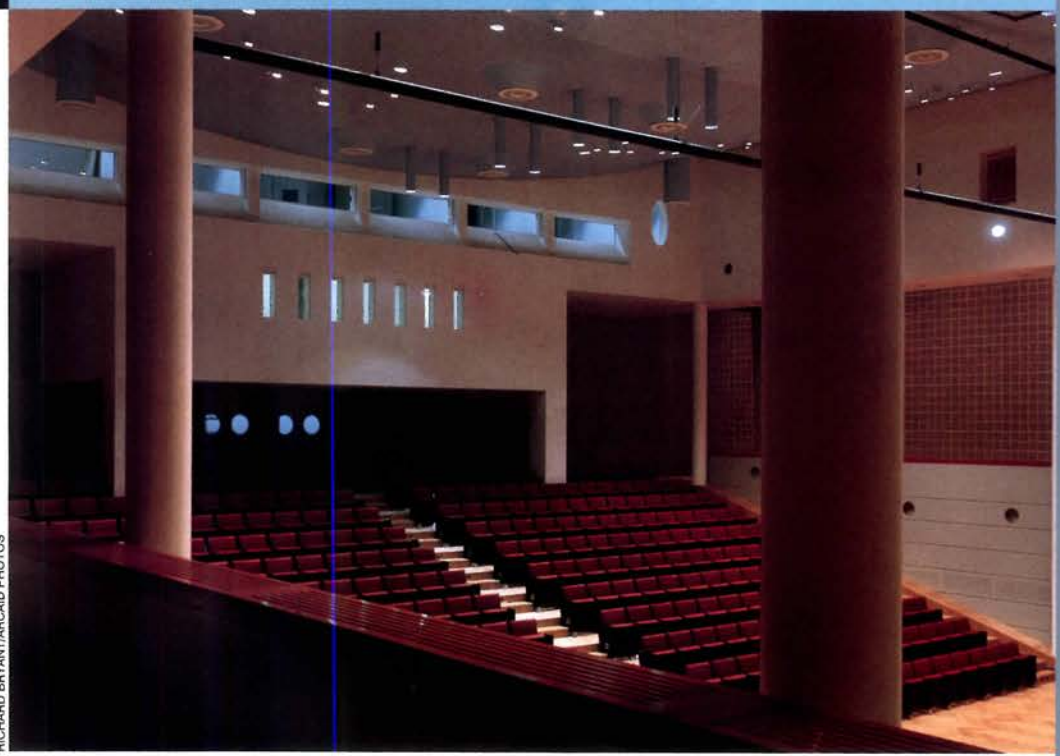
ing fixture. With its placement of architectural components and ornament, this threshold is thoroughly Viennese, a clear signal of Peichl's origins. Inside the gap, the visitor encounters an open, triangular forecourt, framed on its long side by undulating glass and, above, by mechanical vents that are carefully presented as high-tech talismans. The foyer is a small marketplace of information and sales kiosks, with a group of sharp metal extrusions leading to the gallery circuit.

Peichl organized the Art and Exhibition Hall into quadrants divided by smaller chambers in which one encounters objects. Through a stylized portico into the main gallery, visitors approach the undercroft of the largest of the three cones, a tempietto of columns flooded with light. In the next quadrant, to the southwest, is another tempietto straddling a mezzanine over the exhibition space. Stairs spill down against a secluded atrium, an introducer of light diagonally opposite the entrance court.

The fourth sector, in the northwest corner, is called the Forum, an expensively fitted box for conferences and performances. In its foyer, a narrow staircase ascends directly to the bottom of the smallest cone, positioning visitors at almost the exact center of Peichl's play. The galleries of the Art and Exhibition Hall afford a certain degree of curatorial flexibility, as they are surrounded by a thick perimeter zone that is subdivided into offices, storage, and studios, allowing those small rooms secondary access and daylight.

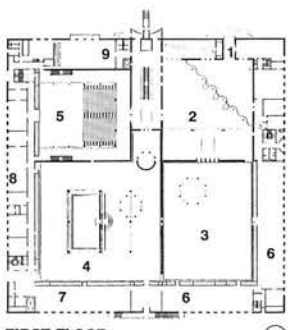
Guided to this orthogonal solution by an inherited master plan, Peichl exploited the existing situation by creating an ornate sculpture garden on the roof. From the plaza, a staircase of code-defying severity is usually crowded with visitors to the terrace, with its exquisitely detailed, conical skylights and whimsical sculpture. Although inaccessible from the galleries, on a sunny day, this surreal landscape of plants and cones is the most popular attraction in town. *—Raymund Ryan*

ABOVE: Cones and undulating glass wall of reception foyer glow at night.
RIGHT: Forum theater seats 500.
PLANS: Galleries and Forum are ringed by smaller rooms for administration, storage, and services.

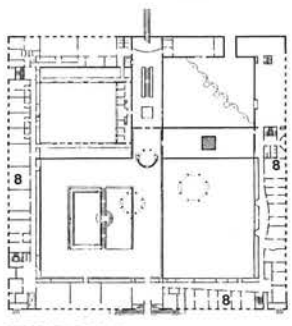


RICHARD BRYANT/ARCAID PHOTOS

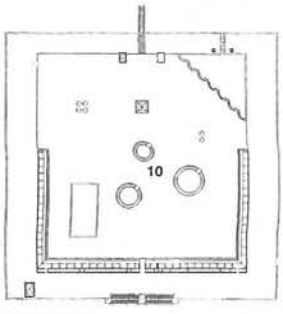
1 ENTRANCE
2 FOYER
3 GREAT HALL
4 ATRIUM HALL
5 FORUM THEATER
6 GALLERY
7 EXHIBIT PREPARATION
8 OFFICE
9 RESTAURANT
10 ROOF GARDEN



FIRST FLOOR



SECOND FLOOR



ROOF PLAN

ABOVE: Cone-topped tempietto is located in the southeast gallery.
LEFT: At top of stairs from foyer, red vaulted exhibition room is Peichl's homage to Viennese tradition.

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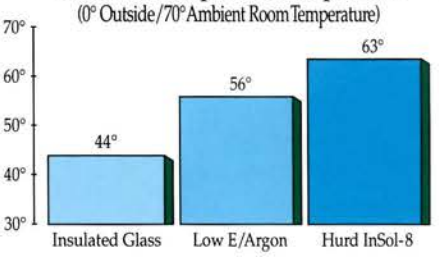

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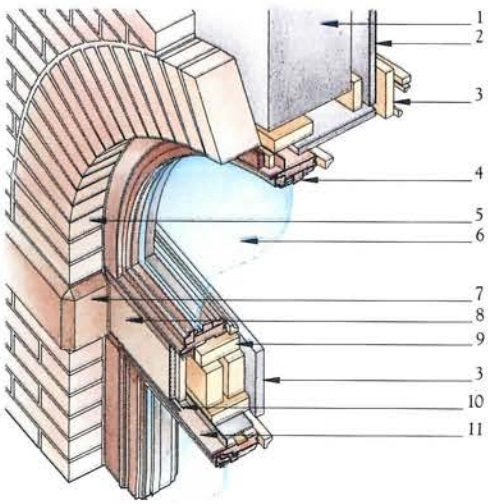

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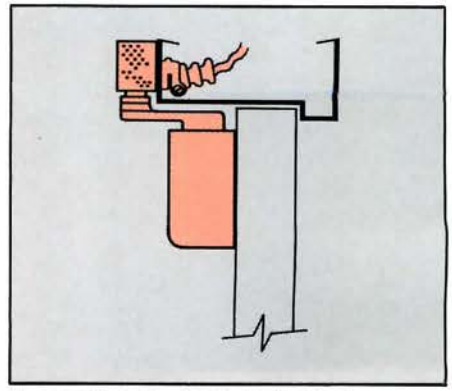

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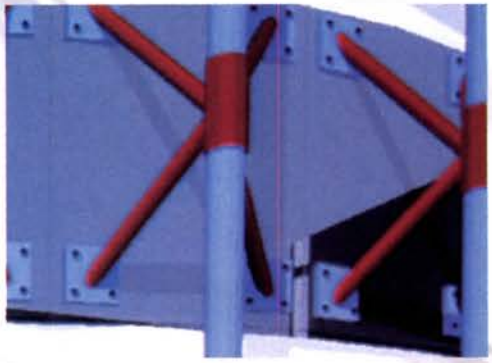
Technology & Practice

Our Technology & Practice section this month addresses international design from the perspective of the American practitioner. Drawing on his experience in the Far East and on current projects in Madrid, Frankfurt, and Zurich, architect William Alisse investigates the strategies and achievements of U.S. firms in three of the most competitive international markets—Germany, Japan, and Mexico. San Francisco lawyer and member of the AIA's growing Committee on International Practice Kenneth Natkin explains the legal ramifications of working abroad, emphasizing the financial precautions that U.S. architects should consider before undertaking foreign projects.

Five schools of architecture—New Jersey Institute of Technology, University of Southern California, Mississippi State, University of Oregon, and Texas A&M—have shifted studio work from drafting board to computer. As a result, instructors and students have discovered new dimensions of interactive instruction.

Pioneered abroad, new tensile cladding systems of glass, stainless steel, and composite materials defy the standard limits of span and transparency. Especially given this issue's emphasis on trade between nations, it seems appropriate that the structural systems in our cladding update were modeled after sailboat hulls and rigging developed for transcontinental races.



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White House and U.S. Department of Energy seek architects' green expertise.

Workshop Focuses on Energy Design Tools

A conference on energy and environmental design resources sponsored by the AIA and the Association of Collegiate Schools of Architecture (ACSA) was held recently in Washington, D.C., to chart high-tech advances in energy monitoring for the Department of Energy (DOE).

Organized by Deane Evans and Jane Willeboordse of the AIA/ACSA Council for Architectural Research, the Energy Design Tools Workshop brought together architects, computer programmers, builders, researchers, utility executives, and government officials to discuss computer software for analyzing the energy efficiency of buildings. Over the past 15 years, the DOE has developed the computer programs DOE-1 and DOE-2 to establish guidelines for thermal- and light-efficient buildings. These guidelines have become construction industry standards, but not without controversy and competition from the free market.

The difference between private and public sector investment in energy technology is sizable. The utilities industry will spend $3 billion to $5 billion this year on U.S. energy production, while the DOE has allocated only $2 million for research in energy-saving technologies.

The two-day workshop addressed such issues as thermal-efficiency design analysis and ecological impact forecasting. Michael Totten, senior associate for policy at the International Institute for Energy Conservation, argued that energy costs and environmental conservation must be seen in the same light: The World Bank expects to spend $3 trillion per decade on utilities in developing countries, creating international infrastructures that could devastate regional ecologies and economies without accurately forecasting their environmental toll.

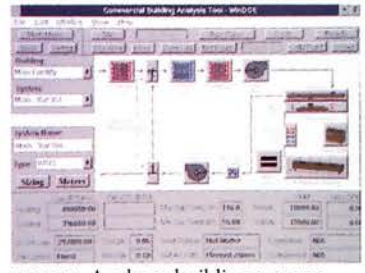
Current energy-related software is limited by lack of a common format. For example, few of the thermal-efficiency and lighting tools that professor Murray Milne and his students at the University of California, Los Angeles (UCLA), have developed could be cross-accessed by engineers and architects at Ove Arup & Partners, where similar programs are developed in-house to meet the needs of a particular building. This lack of integration is due primarily to the incompatibility between different CAD programs and between CAD and utility-analysis programs.

Although AutoCAD was praised for its open-endedness by Loren Abraham, advanced design research manager at Andersen Corporation, he lamented that many CAD systems neither communicate with AutoCAD nor with the systems being developed for building and environment analysis. As noted at the conference, ease of use and CAD interface are prerequisites for marketing software.

Participant Stephen Selkowitz is working at the Lawrence Berkeley Laboratories in Berkeley, California, to reintegrate DOE-2. Selkowitz oversees development of both WinDOE, an upgrade of DOE-2 for PC/Windows, and Energy Design Advisor, a simplified, CAD-ready version of the DOE programs for smaller architectural firms (ARCHITECTURE, June 1993, pages 125-127). He explained that as the DOE's funding decreased over the past decade, ease-of-use investment in new software was the first area to be cut; remaining funds were focused on energy analysis complexities.

After 12 years of less than enthusiastic support at the federal level, the Building Systems Division of the DOE, led by Louis V. Divone, associate deputy assistant secretary of building technologies, will turn the recommendations of this workshop, and a second, more policy-related workshop planned for October, into sound energy directives for the Clinton administration.—*Joe Day*

WHITE HOUSE: AIA volunteers devise plan to improve environmental quality.



WIN-DOE: Analyzes building systems.

DOE'S RADIANCE: Models lighting.

AIA Plans to "Green" the White House

In a long tradition of service to the White House, the AIA convened 80 architects and environmentalists in the nation's capital in July who have volunteered to undertake a "greening" of the White House. Over a two-day session, the group devised plans to transform the Executive Mansion into a "symbol" of a clean environment, in response to President Bill Clinton's Earth Day pledge.

Architects and building experts from across the nation worked in teams on such issues as improving the building envelope, air quality, interior fixtures, and recycling. Participants included Amory B. Lovins, vice president of the Rocky Mountain Institute; architect Randolph Croxton of New York; and Omi Walden, CEO of Advanced Photovoltaic Systems in New Jersey.

Kirk Gastinger, chairman of the AIA's Committee on The Environment, says the purpose of the meeting was to "develop pro bono strategies and criteria for design." The White House's Office on Environmental Policy is steering the "greening" process internally.

Meanwhile, Hillary Rodham Clinton's staff is coordinating a $400,000, privately funded redecoration of the White House by Little Rock designer Kaki Hockersmith, independent of the AIA's efforts. The AIA's "greening" plan will begin in October.—*Bradford McKee*

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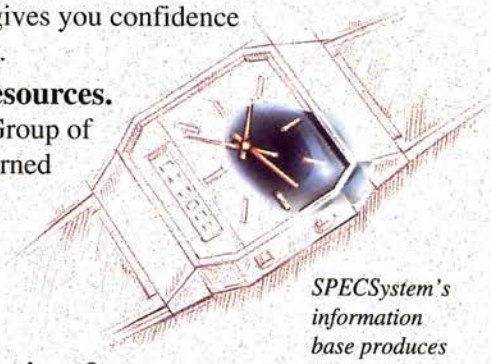

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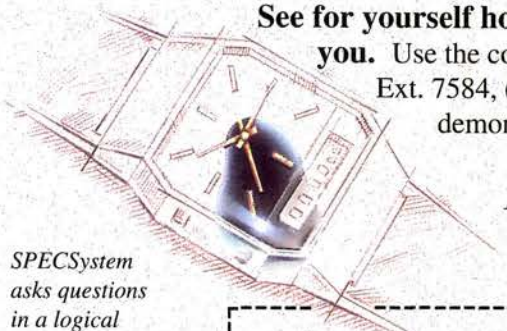

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Working Abroad

Undertaking foreign projects requires American architects to consider local cultures and building techniques.

ABOVE LEFT AND RIGHT: A 1.6 million-square-foot, multi-use complex outside of Tokyo by Franklin D. Israel Design Associates is an example of urban-scale redevelopment in Japan.

American architects today are discovering a host of building opportunities beyond their native borders and are bravely taking the plunge into foreign seas. But along with the distinguished cachet of building in cosmopolitan Barcelona and exotic Malaysia comes the need to assimilate formidable disparities, both cultural and professional. Success abroad involves financial risks, long-term planning, and personal sacrifice, as continuous travel takes its toll on architects and their families. Nevertheless, U.S. firms are expanding client bases and reporting increases in annual earnings from foreign projects, as development abroad continues to draw practices eager to escape the recession at home.

Growing foreign markets

Many nations offer opportunities that favor importing American design talent. The Far East is predicting substantial growth in Indonesia; Malaysia; Hong Kong; Thailand; Korea; Japan; and, especially, Taiwan, which is in the midst of an ambitious five-year development plan. In the Middle East, Kuwait is rebuilding, and development in Egypt is strong. Latin America is showing promising signs of economic recovery and political stability in Mexico, Chile, and Argentina.

Europe is somewhat more complicated to assess. Germany and Britain are struggling with recessions of their own, while opportunities in Spain and France have declined since the heyday of the Olympics, Expo '92, and EuroDisney. Eastern Europe and the former Soviet Union have tremendous construction needs, particularly in housing, but their troubled economics deter committed investors, often resulting in unrealized, "rainbow" projects. Hungary, considered a very promising market, has recently suggested limiting the influx of foreign architects to ensure that their own designers are not left out of future growth. This limitation could become a trend in a continent already concerned with rising unemployment and an overabundance of architects.

Seeking common ground

American firms will do better to seek out local architecture practices whose design approaches, quality standards, and work methodologies mirror their own. These professional relationships are proving to be mutually beneficial exchanges and, as in the example of JSK Perkins and Will International in Germany, sometimes lead to permanent joint-venture offices. Securing foreign licenses generally proves to be a more arduous alternative, although it can be successful: RTKL Associates was recently honored to be among those foreign firms registered by the Japanese Regional Construction Bureau.

The issue that U.S. architects debate most hotly is whether to establish full-service offices abroad. Kohn Pedersen Fox Associates favors limiting foreign expansion as long as collaborative professional relationships are enough to successfully advance international projects. Other firms, like Hellmuth, Obata & Kassabaum, maintain that a foreign presence is the best way to serve distant clients and respond to potential markets. Practices like Richard Meier and Partners voice concern over maintaining a design philosophy amidst the growing autonomy of distant offices. These firms' joint conclusion: The cost of opening a foreign office is exceedingly high. Such debate on essential strategies is further fueled by widespread disparities among the international construction industries. To illustrate these differences, we examine American architects' experiences in Mexico, Japan, and Germany.—*William E. Alisse*

William E. Alisse is the Director of International Projects for the Phillips Janson Group Architects.

Mexico

American firms succeed in Mexico by adapting U.S. methods to fit local materials.

RIGHT: Tower will complete Parque Fundidora, a 550-room hotel in Monterrey, Mexico, by Arquitectonica.
FACING PAGE, TOP LEFT: The Urbano Alameda, a 275,000-square-foot office and retail complex in Mexico City by RTKL Associates, capitalizes on local building technologies.
FACING PAGE, TOP RIGHT: La Strada, a 40-building complex in Mexico City scheduled to be completed in 1995 by Kaplan McLaughlin Diaz, comprises 130,000 square feet of office and street-level retail along a public paseo.
FACING PAGE, BELOW LEFT AND RIGHT: Centro Commercial Santa Fe, a new 1 million-square-foot retail center in Mexico City, will inaugurate HOK's new offices in the capital, the firm's fifth international satellite.

American architects tread gingerly in unstable Latin American markets, but renegotiated debts and increased automation in Chile, Venezuela, and especially Mexico are attracting development and reconstruction.

Ratification of the North American Free Trade Agreement (NAFTA) in its present form would allow most North American companies to expand freely across the borders. The AIA and NCARB and their Mexican and Canadian counterparts have been preparing for NAFTA's passage since 1991 by hosting a series of conferences to discuss the potential for trilateral professional accreditation.

Even without NAFTA, our Mexican neighbor is currently in the midst of substantial construction development, reflecting an expanding economy. For American architects, success in Mexico could lead to future opportunities within the largely unventured Latin American market.

Mexico has a rich tradition of native building materials utilized and scaled in ways unfamiliar to most outsiders. Mexico's wide variety of granite, marble, terrazzo, masonry, and ceramic tile products, often in rough-textured finishes and dazzling color palettes, continue to be widely used and a source of inspiration for both local and foreign architects. The quality of workmanship does vary in Mexico, but lower labor costs allow masonry and other labor-intensive crafts to flourish. Finish plaster and mortar work, while declining elsewhere in the world, is considered particularly well executed in Mexico.

Such traditional building practices can offer surprising advantages. Wimberly Allison Tong and Goo of Honolulu took advantage of local 6- to 12-inch-thick masonry and stucco partitioning to enhance acoustics in a 2,700-acre resort in Nayarit.

The major challenge facing American architects working in Mexico may well arise from attempts to deviate from established Mexican construction norms. Until recently, reinforced concrete framing was generally employed due to the high cost of developing a local structural steel industry. Deviation from such building and material standards usually requires importing foreign labor as well as products, and although Mexico poses none of the trading restrictions limiting importation in Japan, Mexican projects that are dependent on imported materials generally prove to be lengthy, more expensive, and subsequently unattractive to clients.

The apparent trend is not to deviate, but instead to adapt to local practices. This pragmatic approach was adopted by Askew Nixon Ferguson & Wolfe to meet the schedule for their Federal Express City Distribution Station in Mexico City, a typical example of the growing market for 20,000- to 40,000-square-foot fast-track projects American companies are generating in Mexico. In this warehouse renovation, block masonry and plaster construction replaced standard gypsum board partitioning, which is virtually unused south of the border.

Armando Gallardo of RTKL's Dallas office further stresses that cultivating personal relationships is an essential aspect of working with Mexican colleagues: "I found myself dining with one client's extended family after signing a contract."

It's too early to assess how American architects are faring in Mexico, because the architectural market remains relatively young, with few participants from the United States. But with many earthquake-damaged cities undergoing reconstruction and hotels and commercial buildings rising throughout the nation, more and more opportunities are predicted, adding to Mexico's promising prospects.

Germany

Germany's high quality of workmanship offers American architects opportunities to showcase design talents.

RIGHT AND FACING PAGE, TOP RIGHT: Kohn Pedersen Fox's London office is responsible for a 900,000-square-foot, mixed-use development in Frankfurt.
FACING PAGE, TOP LEFT: One of Murphy/Jahn's German projects is a 236,000-square-foot office complex for an insurance company in Mannheim.
FACING PAGE, BELOW LEFT AND RIGHT: Perkins and Will's 2.6 million-square-foot, mixed-use development in Berlin just won design approval. The firm's German joint-venture office moved from Frankfurt to Berlin last year.

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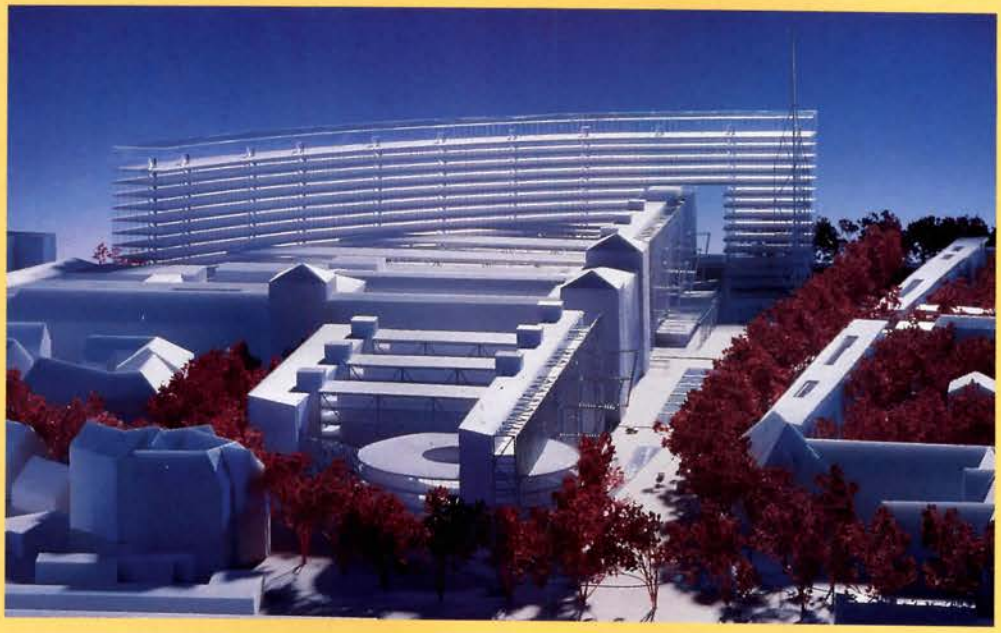
DENNIS GILBERT ARCAID



American architects marketing in newly unified Germany are discovering a notably active construction industry despite the pressures of a national recession. While modernizing its eastern half, Germany's highly skilled work force also stands poised to help rebuild the vast array of emerging Eastern European nations. Germany clearly offers an important market, particularly for infrastructure development in the east. Yet even with its modern industry and progressive culture, Germany is prone to unique regional construction practices that essentially prevent uniformity in the building industry from taking root across Europe. Typical of Germany are the competitions that determine the fate of commissions and an authoritative system of confusing building codes that American architects find frustrating.

German building officials, in response to local public concern over environmental issues, scrutinize construction projects to ensure compliance with guidelines for energy conservation, natural light, and noise control that exceed American standards. For example, Richard Meier and Partners' Daimler-Benz AG Research Center in Ulm standardized central fire-corridor planning in its upper levels to provide natural light to all interior spaces, as per German natural light requirements, which typically give rise to narrower building forms and interior courtyards.

Interior construction in Germany is meticulously checked by the authorities for fire safety compliance. Local guidelines limit the use of nonrated timber and glass products and base most partitioning on 90-minute fire-rated construction.

Nevertheless, building in Germany is a solid opportunity to showcase American design talent abroad because German construction standards mirror American-quality workmanship and precision more than anywhere else in Europe. Moreover, American architects soon discover that viable technical alternatives often surface in local building practice.

Richard Meier and Partners, who won its first European commission in Germany in 1979, recently adopted one such alternative for the Daimler-Benz AG Research Center in Ulm. The project's exterior metal panel cladding was installed with a local open-jointing method in lieu of the surface-sealed procedure common in America. By sealing at the plane of the concrete backing, a preferred esthetic effect was achieved.

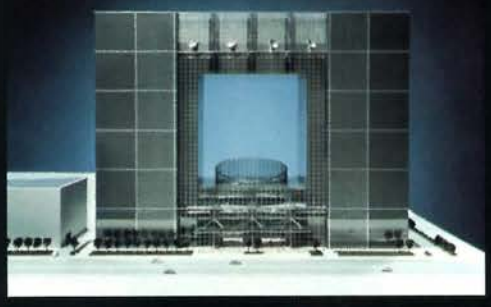
Building materials familiar to American architects are utilized widely in Germany, and specialist products such as elevators, lighting systems, stonework, and metal cladding are particularly well executed. Material selection, however, is strongly influenced by German fire safety criteria. Pallas-Stuttgart, Murphy/Jahn's new office project in a former industrial sector of Stuttgart, responds to local guidelines by utilizing thick, fireproof glazing with heavy framing, as well as structural concrete construction in lieu of steel. Sprayed fireproofing is not permitted in Germany, virtually eliminating the use of structural steel, which otherwise is too costly to fireproof.

The German economy has become less robust in recent times due to the financial strains imposed by reunification, as well as the effects of shrinking markets all over the world. For architects, this recession translates into a decline in commercial construction, although housing and urban development in eastern Germany continue to grow. Nevertheless, because the local building restrictions are so challenging, Germany serves as an ideal training ground for American architects seeking future opportunities throughout the European continent.

Japan

Setback restrictions, seismic requirements, and detailed programs challenge American architects working in Japan.

RIGHT: Nakazato Corporate Headquarters in Tokyo is one of the first commercial projects undertaken by Kaplan McLaughlin Diaz in Japan.
FACING PAGE, TOP AND BELOW LEFT: Kaplan McLaughlin Diaz collaborated with Daiken Sekkei of Nagoya, Japan, to design the International Design Center in Nagoya, which is scheduled to be completed in 1996.
FACING PAGE, TOP RIGHT: HOK's Telecom Center will provide Tokyo with a 1 million-square-foot telecommunications facility when completed in 1994.
FACING PAGE, BELOW RIGHT: In 1997, HOK's Sendai International Airport, a 400,000-square-foot terminal and operations center, will open Japan's Tohoku region to international travel.



After two decades of phenomenal economic growth, Japan has finally opened the doors to Western architects. New trade agreements have helped pave the way for American architects, particularly singled out for their experience in designing coastal developments, retirement communities, and housing projects.

For years *sogo-seikkei seido*, the local allowable setback, bulk, and floor-area-ratio restrictions have been so literally observed in Japan that many building profiles resemble setback diagrams. Nevertheless, these restrictions allow for negotiating bonus space. Kaplan McLaughlin Diaz's (KMD's) elegant Royal Washington Hotel in Hiroshima, for example, achieved additional floors through the provision of an outdoor garden area and a pass-through link between two streets.

Impressive construction methods have evolved in response to Japan's challenging seismic requirements, as evidenced by HOK's Tokyo Telecom Center, a mammoth telecommunications office and equipment building. One of its most striking features will be the one-story-high, waffle-slab-like grid foundation, designed to resist seismic forces within the landfill surround.

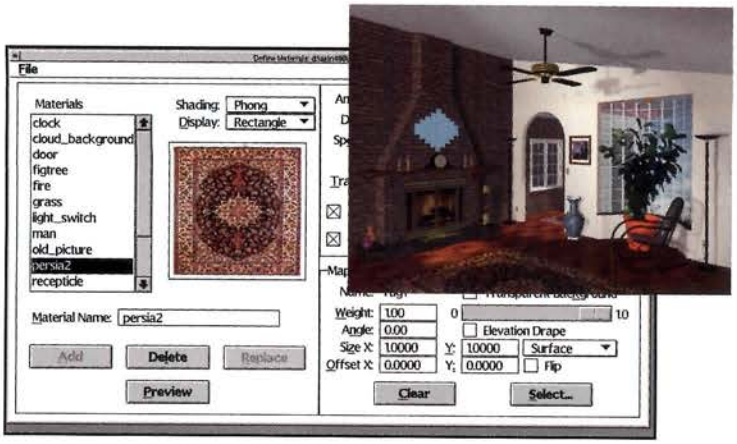
Success at the initial design phase is critical in Japan, but can be difficult for Americans because of tremendous cultural differences. Practically every aspect of business etiquette differs from that in the West, further complicating a design process that U.S. architects generally judge to be slow and philosophical.

During the planning stage, Americans may be surprised to find that the preferred .8-meter module floor-planning grid is based on the traditional Japanese tatami floor-mat dimensions. Similarly, the term *tsubo*, a uniquely Japanese unit of measure approximately equal to 48 square feet, is frequently utilized in lieu of square meters. Another dimensional difference is found in the varying floor-to-floor heights acceptable in Japan, which tend to be lower than in America and may give rise to unexpected additional stories in high-rise construction.

Mixed-use buildings are common in Japan, requiring American architects to confront detailed and all-encompassing Japanese project programs. KPF's Nagoya Station Building features asymmetrical towers that symbolize Nagoya's prominence as a transportation gateway city. The project includes a typically Japanese mixed-use program integrating a train station, office, hotel, department store, museum, and public restaurant within well over 4 million square feet of high-rise and subterranean space.

The secret to a successful project in Japan may lie in the creative knack that collaborating Japanese and American teams are showing in response to technical criteria. For instance, KMD, which recently opened a second Japanese branch office in Nagoya (the firm's Tokyo branch opened in 1991), responded to local setback restrictions by sculpting the roof of the Royal Washington Hotel—to suggest a Samurai helmet.

Unfortunately, Japan's recession, while not as serious as in the West, has slowed down the building industry. As in Germany, commercial construction has declined while infrastructure development continues. Experts are anticipating a strong recovery, however, with a new building boom emerging by 1995.



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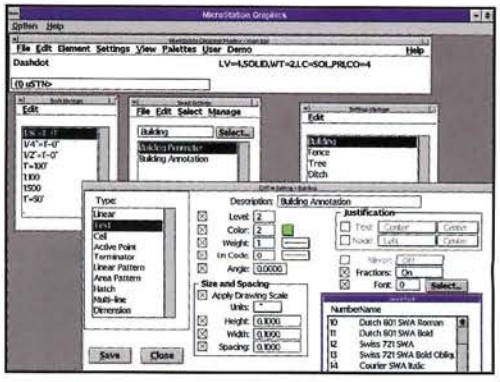

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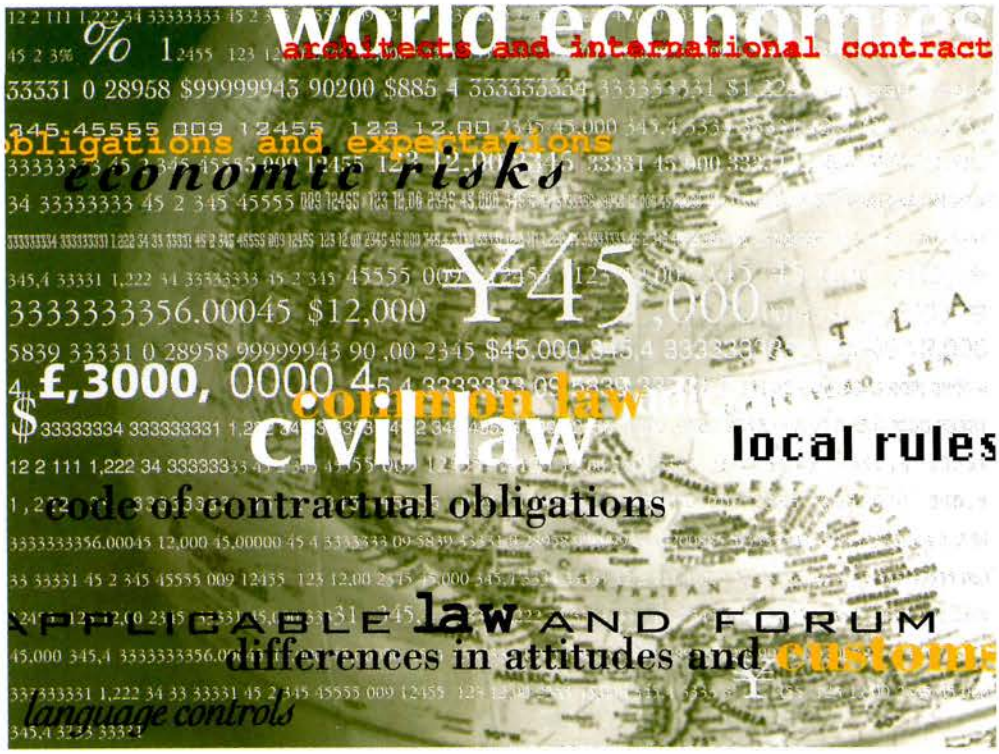
Negotiating International Contracts

American architects must carefully consider the legal and economic implications of working abroad.



As the world's economies become more interdependent, American architects are increasingly seeking new opportunities to export their expertise. International projects entail a number of issues that are unique to international contracts.

Contracts serve to define the obligations and expectations of parties and to allocate the risks accordingly. Certain contract provisions and terms common in the United States may be offensive or unacceptable in another culture. Services seen as customary in one country may be considered extraordinary in another. Similarly, words and phrases may be culturally susceptible to different interpretations. Thus, in undertaking work abroad, American architects must develop a cultural understanding and appreciation of the foreign country to be sensitive to its differences in attitudes and customs, and to appreciate its business and legal environments.

Consider law and forum

An architect negotiating an agreement to provide professional services for a foreign client must immediately confront an important choice regarding the law which will govern the contract and the forum in which disputes will be adjudicated.

The 1987 AIA edition of the standard B-141 contract states that the agreement shall be governed by the laws of the principal place of business of the architect. Obviously, such a provision may not be acceptable to a foreign client; similarly, a provision specifying the law of the place of a project or the law of the place of the business of the client may be equally objectionable to the architect. Before agreeing to such a provision, an architect should become familiar with the legal system and local regulations of the country in which the architect plans to provide services.

The choice of law involves a variety of other important legal and statutory matters such as lien rights, statutes of limitations, employment relations, the possibility of arbitration, and regulation of business activity. The choice of language of the contract is significant, since international construction projects are often negotiated and implemented in more than one language. Ideally, the contract should be written so that one language controls the meaning of the contract. Often, however, contracts stipulate that both languages control the meaning, presenting an increased risk of a dispute arising out of disparate translations and interpretations.

Throughout most of the world, there are two main systems of law: civil and common. A common law system applies generally in the United States, the United Kingdom, and some countries of the Far East. But in the majority of countries, including France, Spain, Germany, and most of South America, a civil law system applies. In those nations applying civil law, the law is highly and intricately codified, and judicial determinations are controlled accordingly. In contrast, the courts in countries applying common law are guided by judicial precedent.

world economies

judicial precedent civil law

Foreign business practices

Just as the legal systems, laws, regulations, and codes vary among countries, so, too, does the design and construction process. Consequently, methods of design and standards of construction affect the role of the architect, the services expected, and the relationship of the architect to other participants in the design and construction process. In contrast to the familiar U.S. tripartite process involving owner, contractor, and architect, France, for example, is characterized by a bipartite arrangement involving only a contractor and owner, who employs an architect solely as an agent to produce designs. Contractually, the architect has few, if any, responsibilities for coordinating the work of the contractor or supervising the contractor's work.

Procurement methods for public and private clients significantly differ around the world. Whether traditional, design-build, turnkey, or build-operate-transfer, each method influences the role of the architect.

It is imperative that architects carefully define their role and tailor that role in accordance with project delivery methods as well as with the expectations of the client. The American architect is commonly called upon by foreign clients to provide design expertise, with services limited to schematic design and design development phases, although this role is beginning to change. In any circumstances, the scope of the work must be precisely delineated in the contract. The distinction between basic and additional services is important, especially in fixed-fee contracts, as foreign clients often expect all design services to be included in the fixed fee.

It is also common for American firms to partner with local architectural and/or consulting firms. Such an association involves numerous professional practice issues such as registration and licensing. These relationships should be addressed contractually; the role of each member of the design and construction team should be carefully identified.

An international construction contract can also be affected by U.S. law. The legitimacy of payments made to someone in authority, a common request in some countries, may be questioned and considered in violation of the Foreign Corrupt Practices Act. Payment terms and fee schedules should comply with all applicable law, foreign and domestic.

A common complaint of American architects practicing abroad is not getting paid for services performed. Dealing successfully with this economic risk is closely associated with the currency, method of payment, and schedule of payment for services rendered; all must be delineated clearly in the contract.

Hedging against currency fluctuations is complex and extremely risky. Because of this uncertainty, most firms choose to be compensated in U.S. dollars, and the contract should so stipulate. If payment is to be made in a foreign currency, the contract might address the issue of currency fluctuations by fixing the rate of exchange; risk (and benefit) is then assumed by the architect's client.

Architects can contractually help to ensure payment through several methods, including obtaining a large retainer (recommended minimum of two months' projected fees) to be credited against the last invoice. Another method is to establish a fixed schedule of monthly payments, for a specified amount, not necessarily related to the work performed, but assuring regular payments.

Letters of credit

While not as familiar to architects, letters of credit, everyday instruments of payment in international commerce, are another method of ensuring payment of fees for a foreign project. The letter of credit is basically an undertaking by a bank on behalf of its customer, whereby the bank promises the architect will receive payment if the architect performs in accordance with certain stipulated conditions. Basically, a letter of credit substitutes the credit of the bank for that of the client. An irrevocable letter of credit is most common, as it can not be cancelled without the consent of the parties and the issuing bank.

Letters of credit typically deal in tangible items, covering shipment of equipment or products. Because architects provide a service, care should be given to specifying the conditions obligating the bank to make payment. For example, the letter of credit can call for a minimum number of documents; a statement attesting to the completion of the architect's performance authenticated by a third party; or simply conditioned upon the shipment of drawings or an agreement with the client that the statement of project completion is acceptable evidence to the bank. Progress payments are permissible, providing evidence can be supplied that certain phases of the project have been fulfilled during the life of the letter of credit.

A standby letter of credit is basically an undertaking by a bank to pay the architect upon project completion, but with the additional advantage of requiring only that the architect submit a statement attesting that the work has been completed.

Other contract provisions can also help. The right to stop work in the event of nonpayment is a wise contractual provision. Carefully drafted, such a contractual provision can be a powerful inducement for payment, particularly accompanied by the architect's right to withhold work in the event of nonpayment. Similarly, properly drafted ownership of documents and copyright provisions can be of value to assure payment.

Tax ramifications

The tax ramifications of international practice can be extremely complex; every country has a different set of tax laws. U.S. treatment of export revenues earned by an American company can differ depending on its Internal Revenue Service (IRS) classification. American companies with revenues from joint ventures with a foreign company might face higher tax rates, as might U.S. companies that set up foreign subsidiaries, since foreign subsidiaries of U.S. companies can be taxed by both the host country and the IRS.

According to a recent survey, the United States' effective tax rate on foreign income is significantly higher than that of other countries. Combined with the tax surcharges some foreign countries may apply to funds earned in their countries, overall tax rates may be even higher, making it clear that companies in the United States must carefully plan to control international tax bills.

These tax laws underscore the necessity of seeking qualified tax advice to be certain that contract provisions affecting both domestic and foreign tax treatment are wisely addressed. Such considerations may determine the selection of the legal entity through which a firm enters into an international contract. Tax advantages may inure to the benefit of a joint venture with a local partner, say, as opposed to equity ownership of a foreign entity; or give tax advantages only to entities in which foreign equity ownership does not exceed a certain percentage.

The tax laws of different countries may not only exact income taxes, but business and personal taxes, and value-added taxes, which may be imposed on the architect's firm, services provided, drawings prepared, and employees providing services. Such taxes should be identified and, if possible, passed on to the client through contract provisions.

While some countries (in Latin American and the Middle East, for example) do not permit arbitration of disputes between private parties and governments, international arbitration is gaining popularity and is the preferred method of resolving international construction disputes. Because such disputes, more often than not, involve numerous parties, a contract should specify whether other parties can be compelled or permitted to join in the formal arbitration proceedings.

Dispute resolution

Parties choosing to arbitrate should select the arbitration forum and designate the arbitration institution. Several options may be considered regarding authority of the arbitrator and the hearing procedure. Parties should specify whether their case is to be heard before a single arbitrator or a panel of arbitrators. Nationality of the arbitrator may be designated. So, too, may the place of hearing to provide for the convenience of the parties. Neutral locations, such as London for European projects and Hong Kong for Asian projects, are often selected for such proceedings. Choice of language should be specified and, if necessary, translation services required.

Mediation is an alternative method of dispute resolution, although, unlike arbitration, mediation is not legally binding. Somewhat more formal and structured, conciliation is similar to mediation; the conciliator typically takes a more active role in investigating the dispute and proposing solutions, as opposed to the mediator, who hears the facts presented by the parties. Conciliation is used in China and other Pacific Rim countries.

Submission of disputes to a review board established before the project commences is another alternative. Typically, each party selects one member and the third is chosen by the two. Nonbinding recommendations are made by the review board. An advantage of this type of resolution is that disputes are addressed promptly as they are identified.

For architects working abroad, the cultural, political, economic, tax, and legal aspects of the foreign country must be researched and understood before wise contract decisions can be made, and counseling on these matters is advised. To meet the growing interest from U.S. firms, the AIA's International Practice Committee has published guidelines and checklists that thoroughly clarify the process. Though the legal dimensions of designing abroad require close attention, the rewards of building internationally can be worth the risks.—*Kenneth H. Natkin*

Kenneth H. Natkin, AIA, is a senior partner of the San Francisco-based law firm of Natkin Weisbach Higginbotham and a member of the AIA International Practice Committee.

For further reading

Overview:
International Practice Checklist (AIA, 1993)
Resource Guide for Practice in Foreign Markets (AIA, 1993)

Choice of venue:
Survey of International Arbitration Sites (American Arbitration Society, New York, 1986)

Business abroad:
Global Architecture: New Markets, New Opportunities (AIA, 1992)
International Trends in World Markets (AIA, 1991)

International risks:
International Design and Practice: Europe, Challenges and Opportunities for the 90s (AIA, 1991)

Disputes and resolutions:
Getting Paid: Strategies to Insure Payment in Foreign Markets (AIA, 1993)

The AIA-developed guidelines for working abroad are available from: 9 Jay Gould Court, P.O. Box 753, Waldorf, Maryland 20604. Contact: 800/365-ARCH or 800/678-7102.

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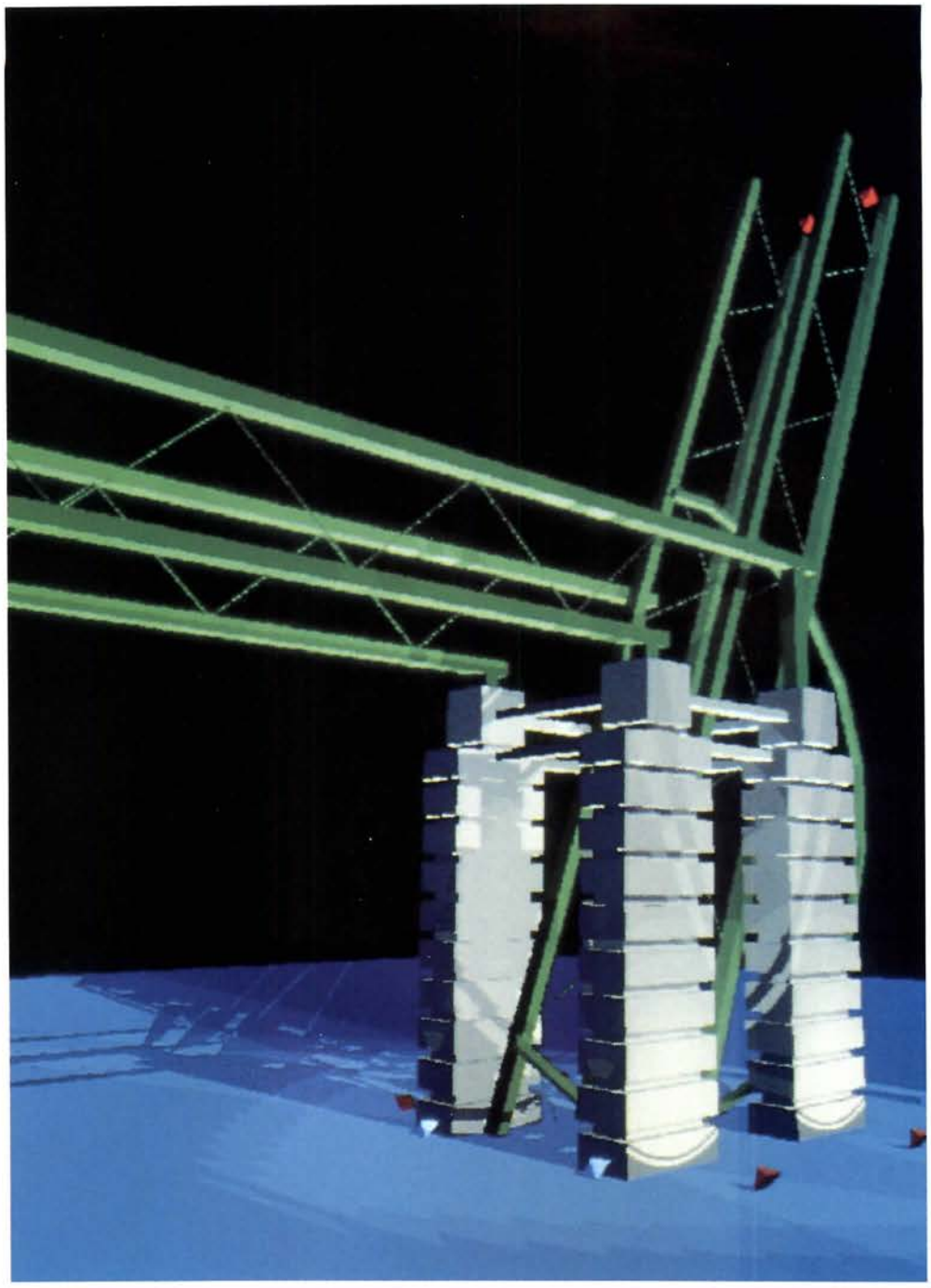
Geheber continued, "Although the roof design is very complex, we were confident we could make it work. We looked for a panel profile that had a narrow span, about 12″ wide or less, to fit the scale of the building."

After comparing a number of roofing systems, the architect found the answer. "We selected a roofing system manufactured by Metal Building Components, Inc. (MBCI). Specifically, their MBCI Craftsman SB12 Polar White panels fabricated from Bethlehem's 0.024″ prepainted Galvalume sheet. The panels are installed over 1/2″ plywood and a moisture barrier of 30-lb felt," stated Geheber.

He added, "With the moisture we have here, due to the ocean and the abundance of trees, materials such as wood and asphalt just wouldn't hold up. That's why the need for a corrosion-resistant material such as prepainted Galvalume sheet was so crucial." What's more, Bethlehem's stringent process control program ensures that prepainted

Computers Go to School

For students at five schools, computers are an integral part of the design process.



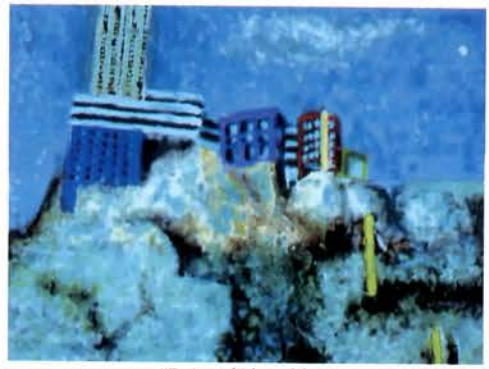
RIGHT: Texas A&M student Tom Pearson's CAD model of a gateway for the university's historic entrance.

Although much of an architecture student's education occurs in classrooms, the heart of the professional curriculum is the design studio. Students spend most of their time here, learning the skills and fundamental values they'll apply later in practice. In most schools, the studio setting has not changed for generations. Students continue to work at drawing boards amid a clutter of tracing paper and coffee cups; the instructor, master of the atelier, visits with the students at their desks to critique their drawings.

That traditional image is quickly disappearing, however. In more and more schools, paper is being replaced, at least in part, by computers. These terminals and workstations are not shared in a sterile, remote lab; they are personal tools on students' desks. Each school differs in how the equipment is selected and applied to design. But all of the schools encourage architecture students to push the limits of digital media in their design explorations and presentations.

The survey of five schools that follows shows that students now view computers as a design tool, not a drafting tool. Unlike many practitioners, these students assume that the technology will be an essential and integral part of the creative process and professional life.—*B.J. Novitski*

NJIT: Variety in 2D and 3D media.



3RD YEAR STUDIO: "Painted" hotel by Eric Trepkau.

3RD YEAR STUDIO: Hotel model by David Boyle.

3RD YEAR STUDIO: Hotel rendering by Santo Barraco.

3RD YEAR STUDIO: Bird's eye view by Sergio Chavarria.

New Jersey Institute of Technology

The New Jersey Institute of Technology (NJIT) is home to one of the most computer-intensive schools of architecture in the U.S. Since 1985, the curriculum has boasted computer-integrated design studios, and every freshman has received a tuition-funded personal computer. Beginning last year, the computer studio was required for all third-year students, and about 100 students worked all year virtually without traditional media. Professors Stephen Zdepski and Glenn Goldman orchestrated this infusion of technology and are working toward offering computer studios for all five years.

The students begin with basic exercises that teach them to apply "paint" and "model," while demonstrating the differences between traditional and electronic media. For example, students model historic buildings and then study them by manipulating color, scale, and proportion. Design exercises always begin with a real context, such as a scanned site photograph or a modeled urban environment. The students work primarily in 3D and only occasionally project 2D plans, sections, and elevations. To architects trained in the tradition of studying spatial organization in plan and elevation, this emphasis on 3D can be difficult. But those trained in computer technology prefer to design their projects in 3D views. "This is a new visual language that takes getting used to," points out NJIT's Zdepski. "It's only a problem for traditionally trained architects because we're in a temporary period of transition."

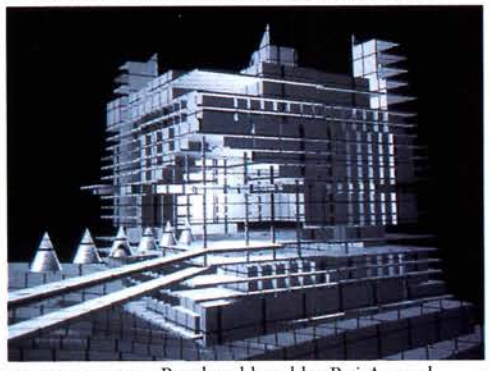
Whether students should learn to draw by hand before they learn to model on a computer is an ongoing debate among academics. Some argue that traditional skills are an important prerequisite for any design thinking. Goldman and Zdepski think that hand-eye coordination can be learned as well with electronic media as with drawing and that working with computer-generated perspectives actually improves drawing ability. In any case, until software succeeds in replicating the "fuzzy" sketching architects love to do on napkins, the need for paper and pencil will remain. But after a design moves from a sketchbook to an NJIT computer, there is rarely a move back to paper. "The design process is changing," notes Zdepski. "We no longer start with the abstract and wind up with the real only at the end." Because of the ever-present context in the computerized model, the evolving design portrays a reality unlike that seen in most student work.

NJIT graduate student Michael Hoon participated in two computer studios as an undergraduate. He designs almost exclusively on the computer now and finds that accurate site information provides essential guidance. But he hesitates to assert that the technology will bring about better buildings in the near future. "The translation between what's in

3RD YEAR STUDIO: Rendered model by Mark Duffy.

3RD YEAR STUDIO: Music school by John DaCruz.

3RD YEAR STUDIO: "Painted" model by Cliff Horner.



3RD YEAR STUDIO: Rendered hotel by Rui Amaral.

designers' minds and what they get onto paper," Hoon says, "is what the experienced architect does well and what the student is trying to learn. When the tools advance to where they aid that expression, we'll see the computer changing the final product."

In spite of shortcomings in the hardware and software, the benefits of CAD are indisputable, according to Goldman. Students can determine sooner whether their design direction is appropriate. Design skill becomes less dependent on drawing ability and more on the ability to generate and evaluate good ideas. Goldman observes, "Computers won't help someone think clearly, but they will help the clear thinker do a better job." Zdepski adds: "Students realize that human perception of space is not an abstraction. In creating a perspective, they don't have to worry about the mechanics of vanishing points, so they pay more attention to how inhabitants move, what catches their attention, and how they respond. Now we can discuss more issues than before, and that affects design."

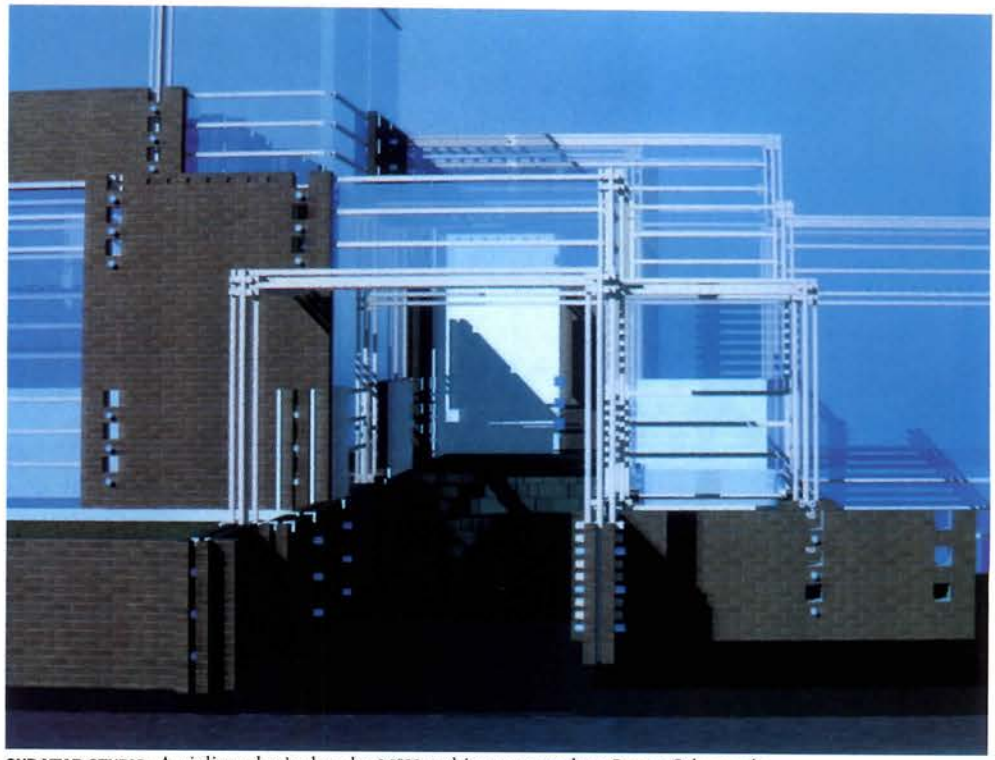
Last year, Clemson University professor Richard Norman visited NJIT and taught one of the computer studios. Although he had taught color theory with computers for years, he was new to 3D modeling in a studio setting. "As an outsider," Norman says, "I think the greatest strength of the NJIT students is that they maintain a focus on design rather than on technology. I've developed a world of respect for 3D modeling and the thought process it introduces. I'll miss being able to sit down with a student at a computer and view a building from any direction."

Norman suspects that technology will alter both the physical and psychological cultures of the traditional studio. "The discourse between two designers is changing into a ménage à trois," he says. When exchanging files and sharing technical skills, he has noticed, students increase their level of discourse. When properly channeled, that increased interaction enhances design dialogue. Norman notes: "The design studio of the future will be an entirely new sort of place. If we're aware of the impending change, we can direct its development in ways that are most beneficial to education and to practice."

As far as NJIT has advanced in exploiting electronic tools in the interest of design, the school still faces major obstacles—many of the same ones the profession confronts. Zdepski says: "Schools and practitioners aren't accustomed to these capital-intensive investments, but if we don't constantly upgrade our equipment, we'll be like an airline that doesn't upgrade: We'll be out of business because our clients will look elsewhere for these capabilities." Goldman concludes: "Movies and TV advertising have elevated society's visual literacy. Now, CAD and computer graphics can provide the architectural profession with a way to rise with that tide."

FRED FAULK

MSU: Designing on notebooks.



2ND YEAR STUDIO: A violinmaker's shop by MSU architecture student James Schumacher.

Mississippi State University

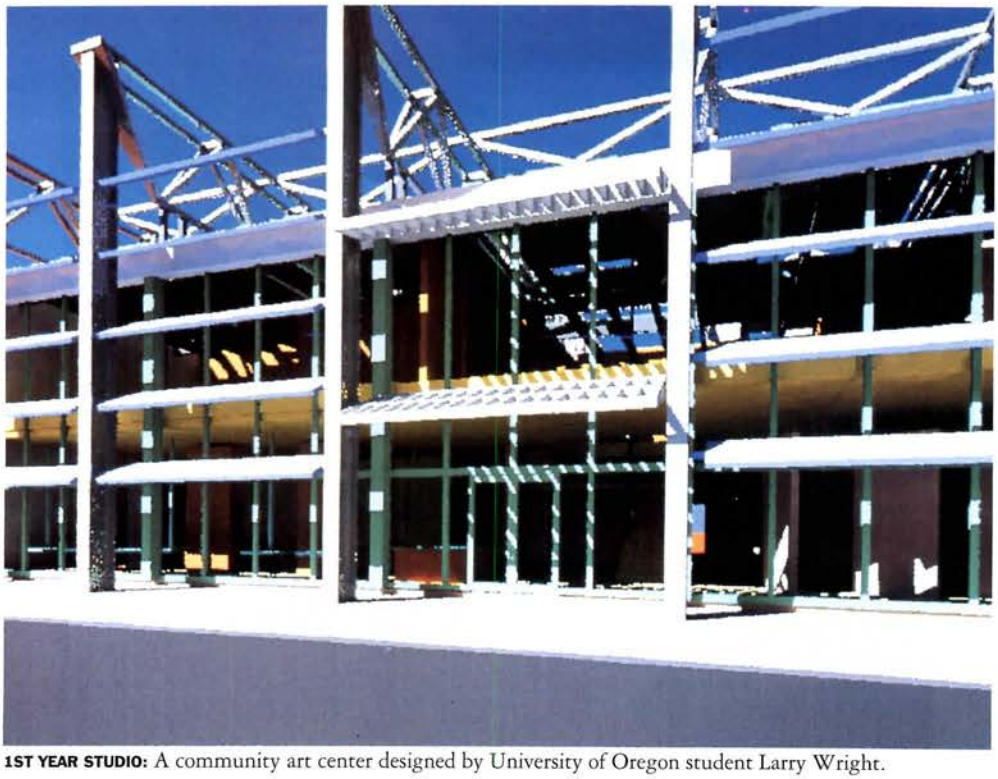
Sophomores at Mississippi State University (MSU) are called "digital nomads." Beginning last year, these MSU architecture students were required to buy notebook computers. They take them everywhere: to sketch historic buildings, to take notes in lectures, and to build electronic models in the design studio. "Docking stations" in the library give students access to school-supplied printers, plotters, and scanners. They also have access to Internet, an international network connecting universities and commercial information services.

Professor Michael Berk, who established the program, asserts that placing computers on studio desks reinforces the premise that technological tools are compatible with, indeed beneficial to, design education. He also believes 3D modeling capability has improved the quality of student design presentations. "Unlike the quick, abstract sketches they did in the past," he observes, "students now do careful perspectives with shade and shadow. They understand the quality of the spaces more." Plotted CAD perspectives are seldom the final presentation medium but are used as underlays for manual rendering. Each student is encouraged to find a comfortable balance of digital and traditional design tools. Although about 25 percent of the students have opted to buy color monitors to attach to their notebooks, Berk prefers monochrome displays. "Early in design," he explains, "students can be seduced by colorful images and neglect spatial qualities."

At the beginning of the school year, Berk and his colleagues gave the students a minimal introduction to computers, then asked that they learn the software on their own, as they will need to in the future. Students who picked up special skills have shared their expertise with others, extending the collective knowledge of the class and improving the group's camaraderie, notes Berk.

Michael Speck, a member of the pioneer class, was nicknamed the "Internet guru" because of his extensive explorations of that network. He found data on housing costs, climate, and demographics and explored the electronic version of the Avery Index for art and architecture publications. By the time he enters practice, Speck predicts, "gathering information from electronic databases will be commonplace, and the ability for professionals to exchange CAD files will radically change the way they work together."

The school pays little for maintenance or security because students are responsible for their own equipment. Surprisingly, Berk has heard no student protest about the expense. "They know that computers are a necessary reality in their chosen profession," he notes. "Their main concern is which machine to buy." MSU's strategy for automating a design curriculum on a low budget is a model that other schools should investigate.



1ST YEAR STUDIO: A community art center designed by University of Oregon student Larry Wright.

OREGON: Mixing Macs and paper.

University of Oregon

Unlike most schools, the University of Oregon offers most of its computer studio courses in the first year. Freshmen buy their own Macintosh computers and participate in a two-term sequence that ties 3D modeling with traditional media. The department provides lockable studios and printers, plotters, and scanners. Students are encouraged to move back and forth between media—to draw, build physical models, or create computer models—whatever seems most appropriate for the problem they are working on.

Begun six years ago, this format now applies to five studios, or about two-thirds of the incoming freshmen. First-year students were chosen because they require no "unlearning" to master new design methods and because they have four more years to refine their skills and share them with the school.

Professor Kevin Matthews has been instrumental in developing the studios and teaching an introductory skills course. He has also authored the 3D modeling software, DesignWorkshop. "When students learn to see and think three-dimensionally," he observes, "serious issues of form can be addressed even in the first year. And these computer models eliminate the situation in which the instructor and student are speaking similar words but internally referring to different mental models."

Professor Charles Rusch, who created the freshman computer studio concept at Oregon, encourages his students to work with manual methods until they have several schemes. Then the chosen alternative may be further developed on the computer. Even after a 3D model is under development, students build physical models, which show light qualities, textures, and materials. But the computer model offers advantages in helping students understand complex 3D forms.

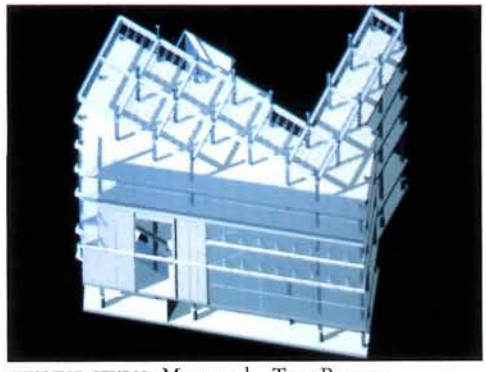
Mark Garber, a recent graduate who attended Rusch's first freshman computer studio six years ago, finds that the process of transforming a schematic idea into a 3D model facilitates detailed design development. "The computer helps make sure that issues are addressed," Garber says. "You've got to have all the parts, whereas it's easy to overlook things if you work only in plan."

"The benefit of designing with computers," Rusch notes, "is like the benefit of writing with computers. A word processor doesn't turn out better writers, but it turns out better writing because it's so easy to make changes. Computer-aided design may not produce better designers, but the technology will produce better buildings because architects will understand them better."

Matthews has seen proof that the electronic tools are being integrated successfully. He maintains: "We know they offer substantial benefits because outside reviewers no longer comment on the computer methods. Instead, they talk entirely about architecture."

TEXAS A&M: Focus on detail.

4TH YEAR STUDIO: Gateway by Hector Campbell.



4TH YEAR STUDIO: Museum by Tom Pearson.

5TH YEAR STUDIO: Museum by David Hisanaga.

4TH YEAR STUDIO: Museum detail by Sam Poland.

Texas A&M University

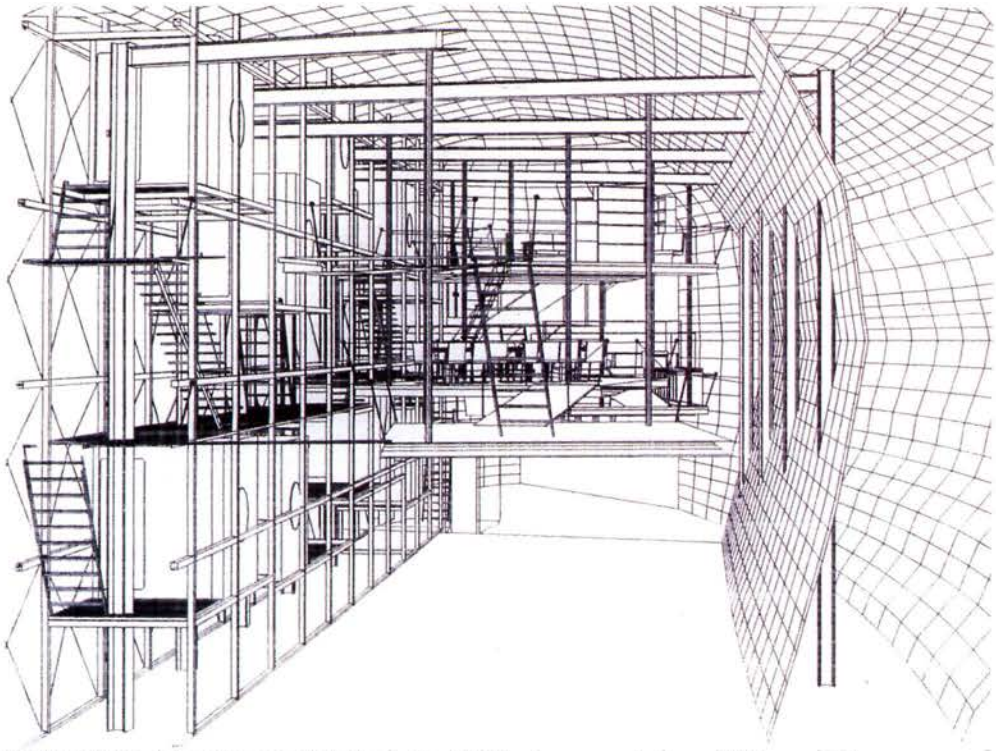
You'll find no drafting tables in the three computer-integrated studios in Texas A&M's College of Architecture. Instead, the large space is furnished with eight clusters of four workstations each. The fourth-year students who take this course each semester are encouraged to begin design ideas in sketchbooks but move to the computer as soon as they can. Many of them never look back.

The studios are equipped with Silicon Graphics Iris Indigo workstations running Alias Sonata modeling software, a more powerful combination than is typically found in architecture schools. The speed of modeling and rendering allows the students to experiment more with details and light. According to professor Valerian Miranda, who established the studio, the material detailing is an example of how the technology facilitates a more informed design process. "There's little doubt left in the minds of the students, or the instructors," Miranda observes, "exactly what that space or surface will communicate. By accurately representing materials, structure, light, and transparency, the students can analyze their design decisions more quickly and easily than with normal media."

CAD techniques are taught in several stages that increase in complexity as the semester progresses. First, students are taught to manipulate simple 3D elements and assemblies. No formal software instruction is provided; students are encouraged to explore on their own. Next, they study design features best seen in 2D, such as spatial organization in plan or facade composition in elevation. The third stage emphasizes design communication, and students manipulate color, texture, and light, often creating polished renderings and walk-through animations. Miranda notes, "Our emphasis is on the quality of the design solution. In that respect, there is no difference from a more traditional studio format."

The students have learned that the ability to visualize spaces enables them to challenge design ideas they've learned and have taken for granted. Recent graduate David Hisanaga cites an example: "Does a double-height space really look more important? When you can see a building in 3D, you can test these premises." Student Sam Poland emphasizes the importance of treating the image and its viewer with respect. "We've learned that designers who are only interested in image have the power to mislead. It's important that our generation emphasize value in the design, not in some image of the design."

At Texas A&M, the design studio is seen as the locus of the analysis and synthesis of ideas, techniques, and technologies. Now, concludes Miranda, "we can simulate design performance more accurately and predict the effects of the built environment more credibly. This is pushing the boundaries of what can be addressed in a design studio."



4TH YEAR STUDIO: Antarctic research station by Paul Geldbach won a prize in an AIAS competition.

USC: Pushing the boundaries of CAD.

University of Southern California

Ever since the School of Architecture at the University of Southern California (USC) began offering computer studios in the mid-1980s to fourth-year students, the demand for these courses has grown. Most students enter this studio with little computer experience, so the beginning of each term addresses computer fluency. Professors Douglas Noble and Karen Kensek believe this focus will change as competition for the course increases.

In this studio, computer media are tightly coordinated with traditional. DOS-compatible computers are housed in a lockable room, with drafting tables in an open studio next door. Macintosh computers are also used throughout the semester. Typically, students design on paper then enter the partially developed design into the computer. They refine it further in 3D, then project perspectives, apply traces over the plots, and continue designing with pencil and paper. This process continues until the students complete final presentation drawings, which may be hand-rendered with watercolor, air brush, or pastels. "The only way you can tell these perspectives are from a computer," asserts Kensek, "is that there are so many of them."

Recent graduate Corinne Shin finds her studio experience beneficial because the multiplatform training will help her in the job market and because of the positive attitude toward technology she acquired. "The computer allows you to study architecture in a different way," Shin says, "bringing more ideas, imagination, and creativity into the design. But it's still just a tool and will probably never completely replace sketching and modeling by hand." She concedes, however, that the succeeding class relies more on the computer than conventional media, enabling students to develop their designs in greater detail.

From teaching over the years, Noble has identified three kinds of students in the USC program. Pragmatists use the computer to produce more perspectives and better presentations. Enthusiasts use the computer for improving their designs. "And 'techno-opportunists,'" Noble explains, "push the envelope of what the programs can do and explore the computer as a design-generation tool."

He observes that visiting architects who are curious about the influence of computer technology on design are thinking more critically about their own design processes. In the past, Noble has paired computer-fluent students with notable practitioners for competition projects. The partnership requires the architects to explain their thinking so the students can get the ideas into the machine. "This teamwork teaches the student about that architect's design process, and it teaches the architect about the power of the technology," Noble says. "This approach has been very successful. I don't think there's a case where the designer didn't get converted."

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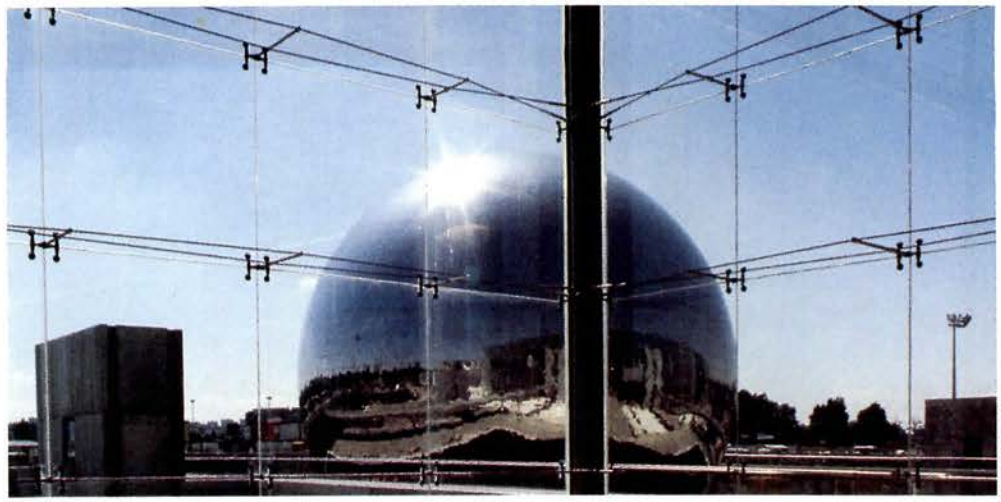
TECHNOLOGY BROUGHT TO LIGHT

Glass Under Tension

With minimal structure, tensile rods transform conventional curtain walls into transparent planes.



GUY NORDENSON

ABOVE RIGHT: Museum of Science and Technology at La Villette in Paris is an example of the transparency afforded by a tensile steel structure.

Hardware traditionally machined for racing yachts is now being architecturally applied to create curtain walls that are more transparent than conventional cladding. American architects are beginning to take advantage of slim, stainless steel rods and fittings to create tensile wall systems that can support more with less.

Such technology was first considered by Buckminster Fuller in the late 1940s and has been applied to many structures in Europe, especially in Britain and in France, over the past decade. One of the most significant glass-clad tension-supported buildings is the 1985 Museum of Science and Technology at La Villette in Paris (above), designed by Rice Francis Richie. Others known for their tension-supported glass-clad structures include Nicholas Grimshaw (pages 78-83, this issue) and Norman Foster (pages 106-113).

Reducing structure

Tensile systems reduce the size of structural members by replacing the lateral load-resisting structure of a curtain wall with an intricate network of rods that measure as little as 1/4 inch in diameter. Conventional curtain walls usually consist of aluminum mullions up to 18 inches deep and backer steel trusses comprised of bulky tubes and angles.

While both tension and compressive forces are resisted by a single member in conventional structures, tension members are designed only to resist tensile loading from a specific direction and are useless if thrown into compression. Wind forces on an exterior glazed wall, usually compensated for by a structural member located perpendicular to the wall, can be withstood by a pair of tension rods separated by compressive struts, one resisting inward forces and the other resisting outward forces. Tensile structures are usually built from rods, rather than cables, because rods are stronger and smaller in diameter. These rods consist of steel with a breaking strength of 200,000 pounds per square inch, about four times the strength of ordinary steel.

Advances in manufacturing

Tensile technology has also been advanced by the development of the computer tools needed to calculate the dynamic behavior of tensile structures, enabling engineers to correctly size the members. Nonlinear systems are especially challenging to design, because the tension elements are left slack and are tensioned only as needed to resist building movement. Tensile structural systems have also grown more sophisticated with the advent of computerized numerical-controlled manufacturing, which facilitates the production of a range of fittings with slight but essential variations, such as those required to create curved, glass-clad walls.

To achieve near total transparency, glass can be attached to the tensile system without mullions. In other applications, the glass is held in standard mullions or narrow channels that are fastened to structural members. Alternately, the glazing can be adhered to the tensile rods with structural silicone.

Tensile cladding systems have been slow to catch on in the U.S. until now because American architects have not been well acquainted with the technology. In addition, the high degree of customization required of many glazed tension structures has meant a high price. But projects such as the Medical Center Library at Vanderbilt University, with its hybrid tensile system (following page), and Pilkington and TriPyramid's standardized systems promise to break down cost barriers. Such developments will enable more architects to experiment with the lightness, delicacy, and transparency inherent in tensile cladding systems.—*Virginia Kent Dorris*

Medical Center Library
Vanderbilt University
Nashville, Tennessee
Davis, Brody & Associates

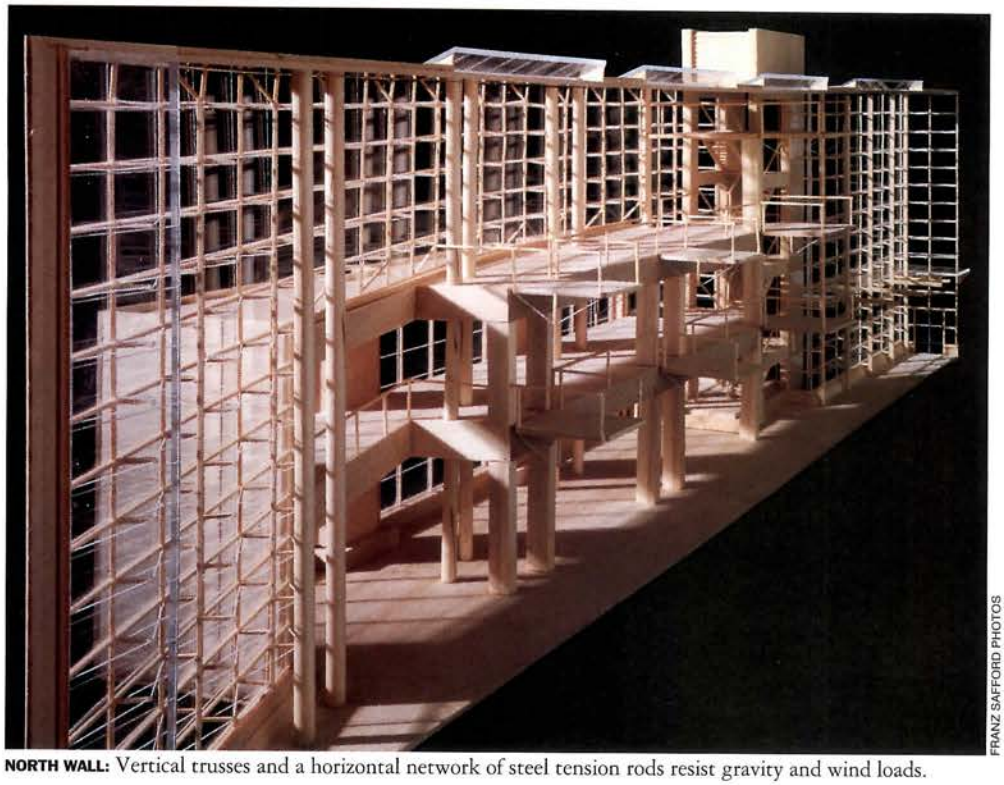
No commercially available curtain wall system could economically deliver the lightness and transparency envisioned for the north wall of a new medical school library at Vanderbilt University. So Davis, Brody & Associates created a hybrid tension and compression system to support the glass, keeping its cost to a minimum by employing as many standard components as possible.

Working with Venice, California-based curtain wall consultant Advanced Structures, the architect developed a 49-foot-high, curved wall of 1-inch-thick insulated transparent glass to enclose the reading rooms and circulation areas of the 86,000-square-foot, precast concrete library. The glass wall, which faces the small-scale, original buildings of the campus, was conceived as a lacy transparent veil between those buildings and the modern hospital structures to the south.

Gravity and lateral wind loads are resisted by a steel tension structure that incorporates vertical trusses spaced 14 feet on center. The outer chords comprise vertical, 2-by-4-inch painted steel tubes, while the inner chords consist of 2-inch-diameter steel pipe, with horizontal 2-inch-diameter steel struts factory-welded between them. Davis, Brody substituted 3/8-inch-diameter, high-strength, stainless steel X-bracing within the truss for a heavier single diagonal steel member that carries both tensile and compressive forces.

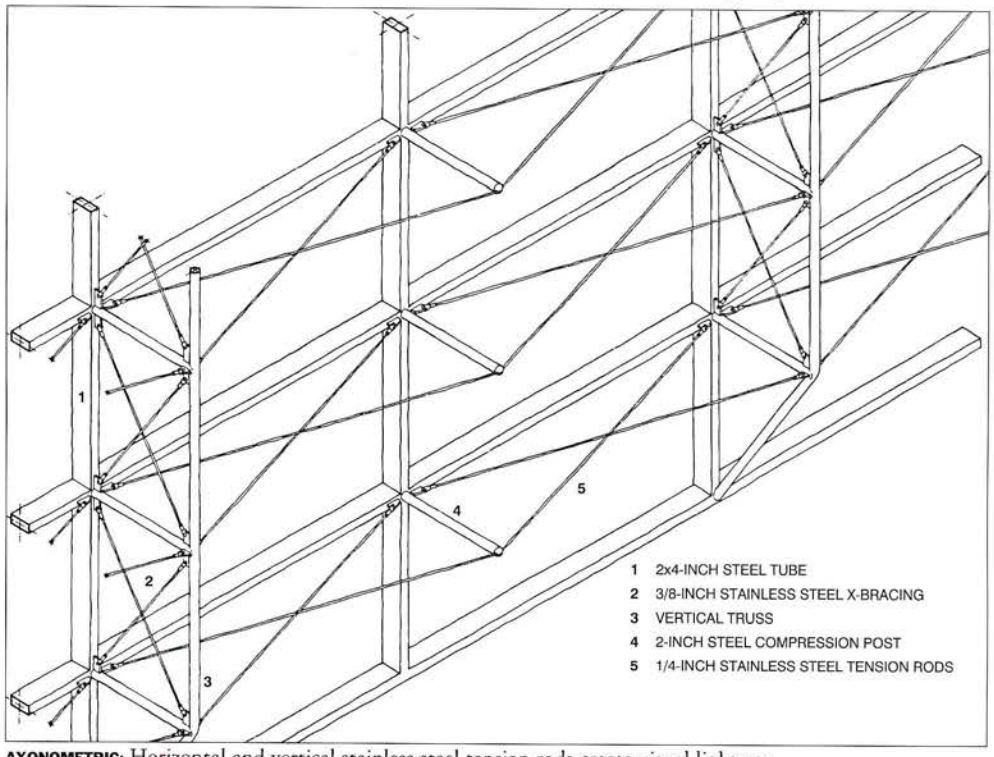
A horizontal network of 1/4-inch-diameter, stainless steel tension rods transfers lateral forces resulting from wind loading to the vertical trusses. Two units of X-bracing are created between each truss, supported at the center by a king post perpendicular to the glass plane. Vertical joints between the glass panels are filled with silicone, while exterior pressure caps create horizontal bands across the curved wall. The wall is fixed at the base and can expand vertically to accommodate thermal movements.

When the curtain wall is com pleted in late 1993, its stainless steel tension rods, designed by Concord, Massachusetts-based TriPyramid Structures, will be prestressed and adjusted to resist anticipated loads. The library, now underway, is expected to be completed early next year.



FRANZ SAFFORD PHOTOS

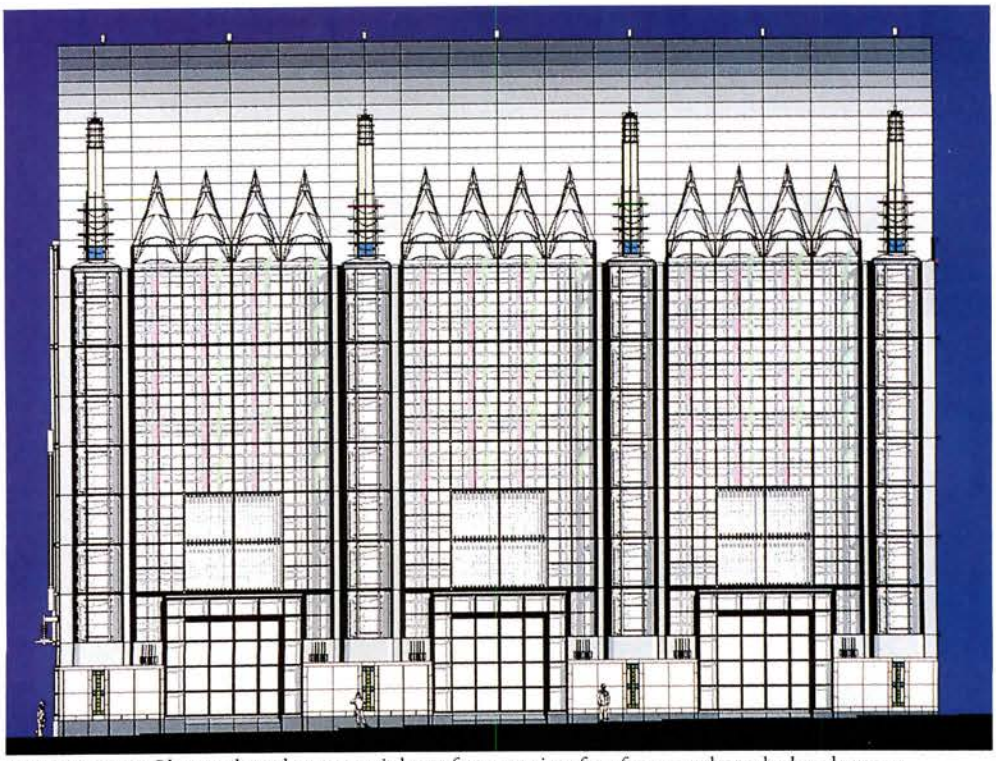
NORTH WALL: Vertical trusses and a horizontal network of steel tension rods resist gravity and wind loads.



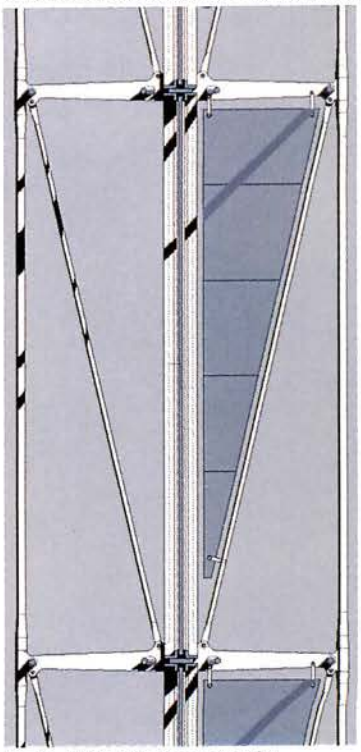
AXONOMETRIC: Horizontal and vertical stainless steel tension rods create visual lightness.

DETAIL: Stainless steel fittings connect rods and tubes.

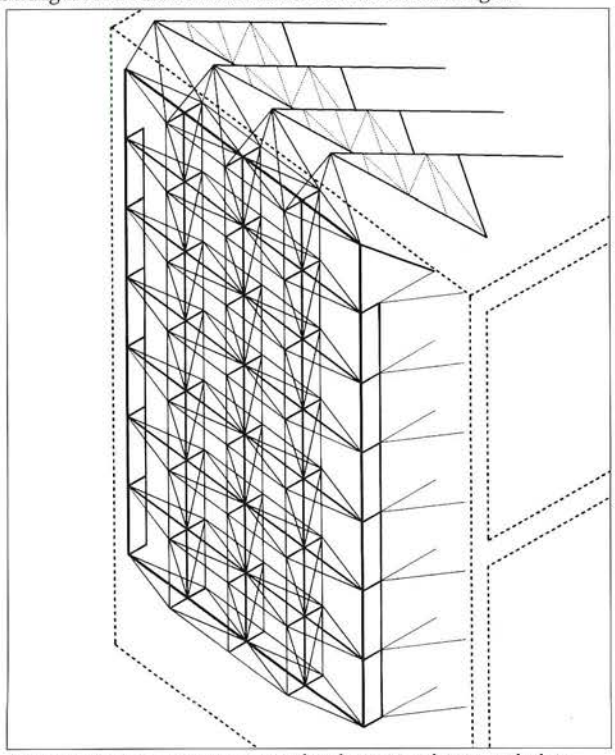
VERTICAL TRUSS: Tensile steel X-bracing.



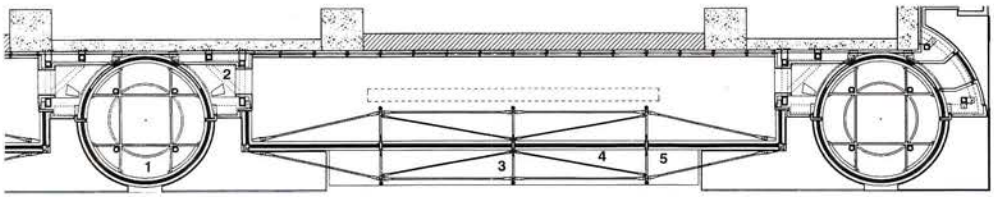
WEST ELEVATION: Glass-and-steel structure is hung from a series of roof-mounted tetrahedron hangers.



DETAIL: Dichroic glass triangles.



STRUCTURAL BAY: Trusses' center chords support laminated glass.



WALL DETAIL

1 GLASS COLUMN
2 LIGHTING
3 STAINLESS STEEL TRUSS
4 GLASS
5 DICHROIC GLASS

Commonwealth Edison
Transmission/Distribution Center
Chicago, Illinois
Skidmore, Owings & Merrill

For an electric power substation in downtown Chicago, owner Commonwealth Edison created a civic structure and a gateway element for State Street. Skidmore, Owings & Merrill designed the concrete structure and took advantage of the blank canvas supplied by a solid concrete wall to create a transparent, marquislike glass-and-steel facade.

Design partner Adrian D. Smith and engineer Hal Iyengar developed a stainless steel tensile structure to deliver the thinnest framing possible for the glass. The 56-foot-high, west-facing window wall is divided into three bays by four, 6-foot-diameter glass columns, supported from within by steel rods.

Vertical and horizontal steel trusses comprise the structure for these bays, which provide 32-foot-wide clear spans at street level to move transformers in and out of the building. The compression elements feature a brushed finish while the tension rods are polished.

The substation's truss network supports 8-by-8-foot modules of laminated clear glass, visually divided into smaller panels by a stainless steel grid applied on the interior and exterior. The glass is held by channels welded to built-up stainless steel chords at the center of both vertical and horizontal trusses. The entire glass wall is hung from a series of roof-mounted, stainless steel tetrahedron hangers. These tentlike shapes, built up from triangular stainless steel plates, are tied back to the supporting concrete structure with steel tension bars. The vertical trusses transfer the window wall's gravity loads to the concrete structure through the hangers; lateral or wind loads will also be transferred to the concrete structure by the prestressed horizontal trusses through connections at both ends.

The glass wall will exhibit changing patterns of color throughout the day. Sunlight will strike triangular "sails" of dichroic glass that hang from the vertical trusses in the cavity between the two walls. A fritted pattern of dots will cover the inside surface of the window wall to reveal shadows and reflections from the triangles. Computerized lights, placed within the cavity, will also animate the glass facade at night.

Tokyo International Forum
Tokyo, Japan
Rafael Viñoly Architects

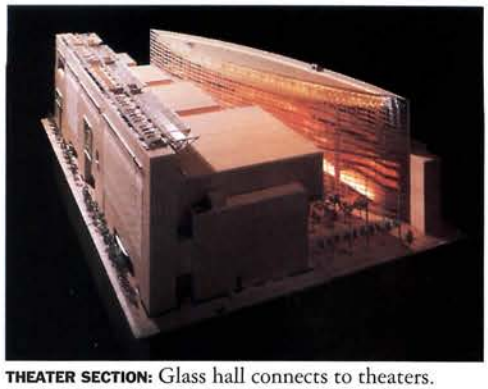
Highly transparent building cladding is being stretched to new heights in the 190-foot-high, 680-foot-long glass hall now being constructed as part of Tokyo's new performing arts and convention center. The lens-shaped structure is designed as the focal point and unifying element of the 6.7-acre complex known as the Tokyo International Forum. The members of the wall were designed to be as slender as possible to avoid casting a shadow on the site's interior plaza and garden.

Visual lightness was achieved by transforming structural members into functional elements, such as pedestrian bridges or ramps. Although the wall appears to hang from the roof structure, all gravity loads are brought to the foundation by relatively slim structural members. The structure was developed jointly by New York City-based Rafael Viñoly and Japanese structural engineer Kunio Wantanabe.

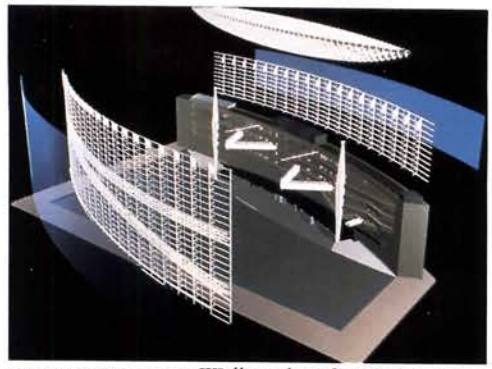
The wall's $8\frac{1}{2}$-by-$8\frac{1}{4}$-foot pieces of laminated transparent glass are supported by unitized aluminum frames that transfer both dead loads and lateral loads to 11-inch-deep steel beams located directly behind. Those beams transfer the loads to the 17-inch-deep front chords of 8-foot-wide vertical trusses located 35 feet apart. The unitized frame system allows individual panes to slide by almost 2 inches in response to wind or seismic loading conditions. The trusses are made more transparent by curved, double strands of vertical tension cable less than $1\frac{1}{2}$ inches in diameter. The cables that pass through horizontal steel compression struts help brace the wall.

Lateral bracing of the glass wall is also provided by a pedestrian ramp positioned within the truss that connects the plaza on the lower level to a restaurant and gallery above. Further lateral bracing is provided by several bridges that link the ramp on the glass wall to conference rooms contained within a rigid steel framing of columns and beams at the east side of the building. A second horizontal truss is located near the top of the glass wall and is tied across the hall with steel pipes to the more opaque structure on the east side. External bridges connect the glass wall with theaters across the plaza, but do not significantly support the wall.

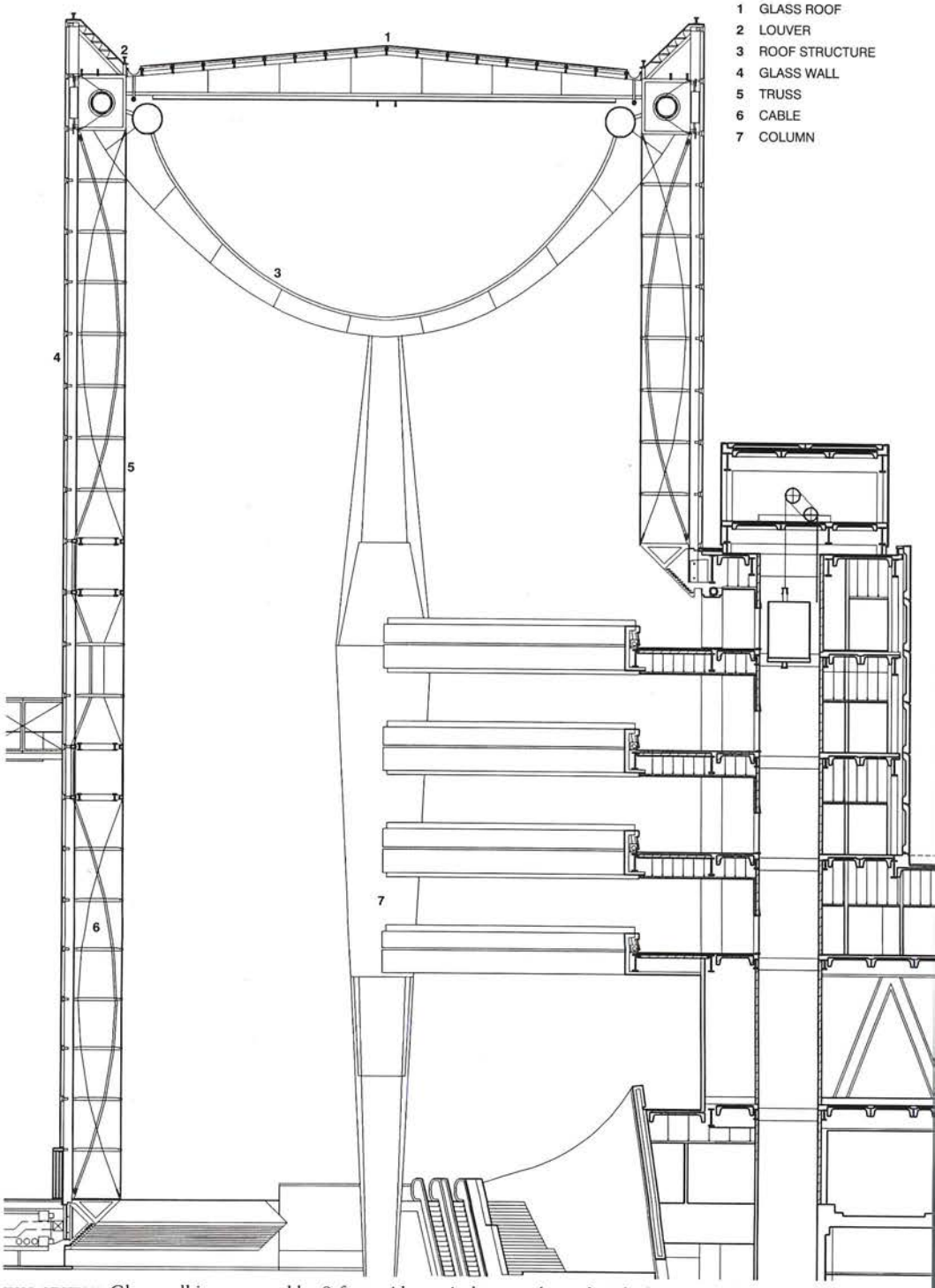
GLASS HALL: Ramps and bridges laterally brace 190-foot-high glass wall supported by cable-tensioned trusses.



THEATER SECTION: Glass hall connects to theaters.



EXPLODED STRUCTURE: Walls and roof are independent.



HALL SECTION: Glass wall is supported by 8-foot-wide vertical trusses braced with thin, curved tension cables.

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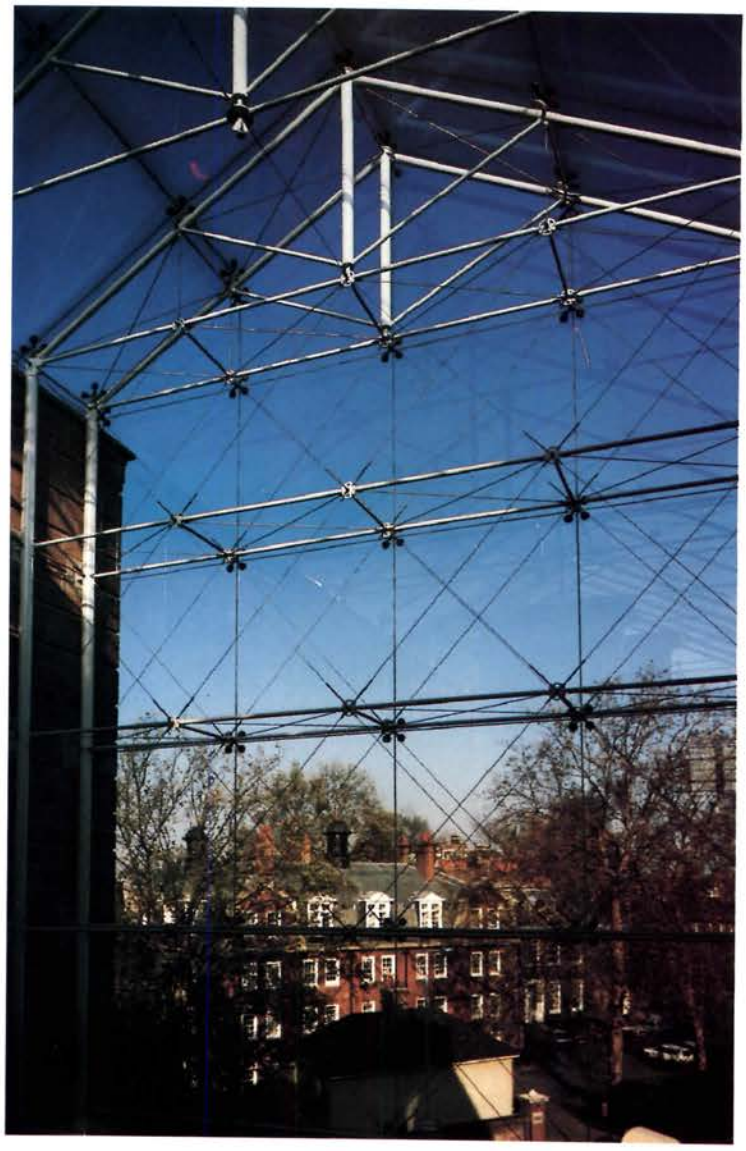

TOP: Kawneer's 1600 curtain wall is adaptable to curtain wall requirements for most low- and high-rise applications. The systems can accommodate various types of glazing or opaque infill panels, concealed ventilators, and doors. The 1600 line features shallow reveals on the mullions to simplify trim and interior closures. Optional vertical covers emphasize the mullions and create a projected appearance. Rectangular mullions with a flush profile accommodate 90 degree and splayed corner applications. The curtain wall system is also offered as an inside glaze and structural silicone glaze, with a concealed vent option. Alternate perimeter channel details simplify installation. The 1600 curtain wall system is available in several anodized finishes, such as clear, bronze, black, champagne, and burgundy.
Circle 401 on information card.

CENTER LEFT: Technical Glass Products offers FireLite, a clear, ceramic glazing that is wireless and fire-rated, and functions like wire glass. The 3/16-inch-thick glass can be installed in standard fire-rated frames. FireLite is certified by the Underwriters' Laboratory and Warnock Hersey International. Its fire rating ranges from 45 minutes in sizes to 3,325 square inches, to 60 minutes in sizes to 2,721 square inches, to 3 hours in sizes to 100 square inches, as approved by local fire codes. FireLite is available in sizes up to 36-by-96 inches and can be applied in fire-rated locations.
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BOTTOM LEFT: PPG Industries' Azurlite float glass is designed for solar control. It allows visible light to enter a building while keeping out infrared heat energy. The aqua-tinted glass measures 6 millimeters thick and offers 72 percent light transmittance and a 0.62 shading coefficient.
Circle 403 on information card.

ABOVE: Pilkington's Planar System of glazed tension structures employs an engineered countersunk hole-and-bolt combination to offer uninterrupted, flush glazing. The structural glazing system is flexible enough to accommodate a variety of design options, either for specific features or an entire building's skin. The company's Planar System is specially tempered and can incorporate a range of tinted, reflective, and laminated glasses in single- and double-glazed form.
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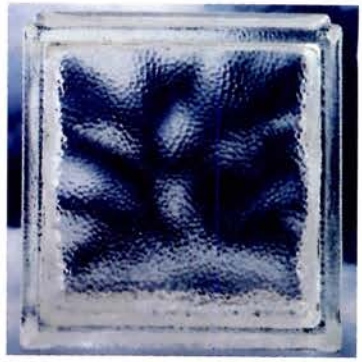
Metal wall panels
NAT Industries introduces Squareline (above), a new line of profiled metal wall panels that are installed using a concealed fastener system. Squareline provides a vertically ribbed appearance incorporating either 2-inch or 5-inch ribbing and standard 12-inch panel width and 1 1/2-inch depth. Panel width and rib spacing may be custom-specified. Squareline may be applied to exteriors, soffits, or fascias, as it is offered in 24- to 18-gauge steel or aluminum. The line may serve either as a single-skin application, or be integrated into a composite wall system.
Circle 405 on information card.

Argon-insulated windows
Andersen's casement windows offer high energy efficiency, while allowing maximum daylight to enter. The space between the panes is filled with argon gas for insulation. Andersen claims the system is 35 percent more energy efficient than conventional double-pane windows during winter months and 13 percent more effective than double panes in the summer. For warmer climates, Andersen produces its high-performance Sun glass.
Circle 406 on information card.

Structural glass block
Weck glass blocks from Glashaus are available in a variety of structural shapes for either exterior cladding applications or for interior partitions. The AllBend Block, curved at 22.5 degrees, allows formations of circles and curves with as tight as a 12-inch radius and is available in clear or distorted patterns. DoublEnd Blocks link open tops with open sides and allow creation of step-down designs. Right-angle Corner Blocks have bullnosed corners. Weck's blocks offer 45-minute fire ratings.
Circle 407 on information card.



Stippled glass block
Pittsburgh Corning (PC) introduces Cirrus (above), a new glass-block pattern named after the highest type of clouds. Cirrus incorporates PC's Decora pattern on its interior face, combined with a new stippled texture on the exterior to produce greater translucence while transmitting more daylight. Cirrus is available in 8-by-8-inch and 6-by-8-inch blocks, each measuring 3 1/8 inches thick. PC recommends Cirrus for a variety of partition and window applications. The block carries a sound transmission value of 31, an R-value of 1.75, and an impact strength of 40-50 inches per pound. The block meets the 1991 Uniform Building Code for nonstructural seismic design. PC's Cirrus glass block can be installed as a prefabricated unit, using either S or N type mortar mix, or PC's silicone system.
Circle 408 on information card.

Cedarlike siding
Georgia-Pacific introduces a new wood-grain vinyl siding called Cedar Lane. The line was developed from a patented color-fusion process in which color pigments are blended into the vinyl, rather than coated on the outside of the product, so the color lasts longer. The series is available in five profiles: double 4-inch and double 5-inch traditional lap siding; double 4-inch and double 5-inch Dutch lap siding with shadow lines; plus a double 5-inch vertical siding for specialty applications. Cedar Lane siding, which is also covered by Georgia-Pacific's lifetime limited warranty, is available in four wood-grain colors: oak, gray, brown, and redwood. The company soon will offer a new line of matching wood-grain accessories in conjunction with Cedar Lane.
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Panelized wall system

Eastern Exterior Wall Systems offers its prefabricated Cygnus wall system (above), a galvanized steel deck substrate supported by light-gauge steel-stud framing. Individual panels are anchored by horizontal clips welded to the building's frame. The system purportedly lightens the building's structure, and each panel arrives ready to install. The steel panels measure 12 inches square and are available in three colors. From design consultation to installation, Eastern Exterior Wall Systems promises complete responsibility for the exterior envelope.
Circle 410 on information card.

Vinyl siding

Symmetry from Wolverine Technologies, a vinyl siding available in 40-foot panel lengths, eliminates seams and overlaps typical of conventional 12-foot panels. The siding is installed with a patented slide-on clip system rather than a nail hem. Symmetry features a low-gloss finish resembling the look of freshly painted cedar and is available in white, off-white, silver, gray, and tan. The vinyl siding is compatible with a variety of architectural demands and requires little maintenance. The Symmetry line is backed by Wolverine Technologies' limited lifetime warranty, contingent upon proper installation.
Circle 411 on information card.

Accordion partition

Modernfold offers the Audio-Wall Guardian 60, a U.L.-classified fire door combining the safety of a fire-rated partition with the flexibility of an accordion wall. The Audio-Wall Guardian can span openings up to 50 feet long and 27 feet high, but weighs just 4 pounds per square foot. Steel trolleys and spacing chain are concealed in the installation.
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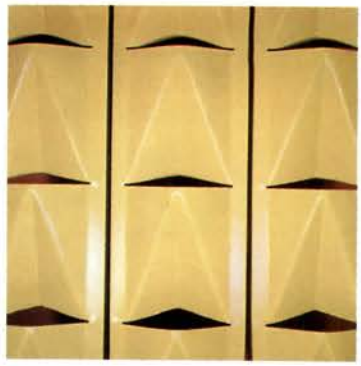

Screening systems

Construction Specialties' refacings, grilles, sun controls, and sightscreens (above) afford function and decoration in a broad range of situations. Medallion grilles are custom-fabricated from extruded aluminum in various configurations, such as round, square, or rectangular rosettes. Paralinear grilles may be specified in a variety of diamonds, triangles, or squares. Several patterns of Vert-a-cade provide sight screening in utility areas. Econoscreen offers low-cost installation and "maintenance-free" design. The company's Alumatex grille fastens in lengths up to 30 feet.
Circle 413 on information card.

Vinyl soffit

Rollex introduces new, heavy-duty vinyl soffit panels that are engineered to resist the sagging common to soffits. The Designer Collection 5-inch system is designed to hold its shape over long expanses, such as porch and carport ceilings, and the undersides of balconies, where thinner soffits sometimes droop. The 5-inch panels resemble two 5-inch-wide boards and measure 0.048 inches thick for rigidity. A deep, flat-bottomed groove between the two halves of the board profile adds strength to the soffit panel. Installation of the new soffit is speedier because of its interlocking panel edges that are easy to align and fasten together. The system also provides panel-to-panel locking to withstand high winds. Panels are available in solid or vented designs to meet ventilation requirements. Seven colors of soffit, including sand, gold, and pale blue, are offered to match or complement the company's siding. Rollex's vinyl soffit also can be applied as vertical siding. The material is sold in cartons of 20 12-foot panels, equalling 200 square feet.
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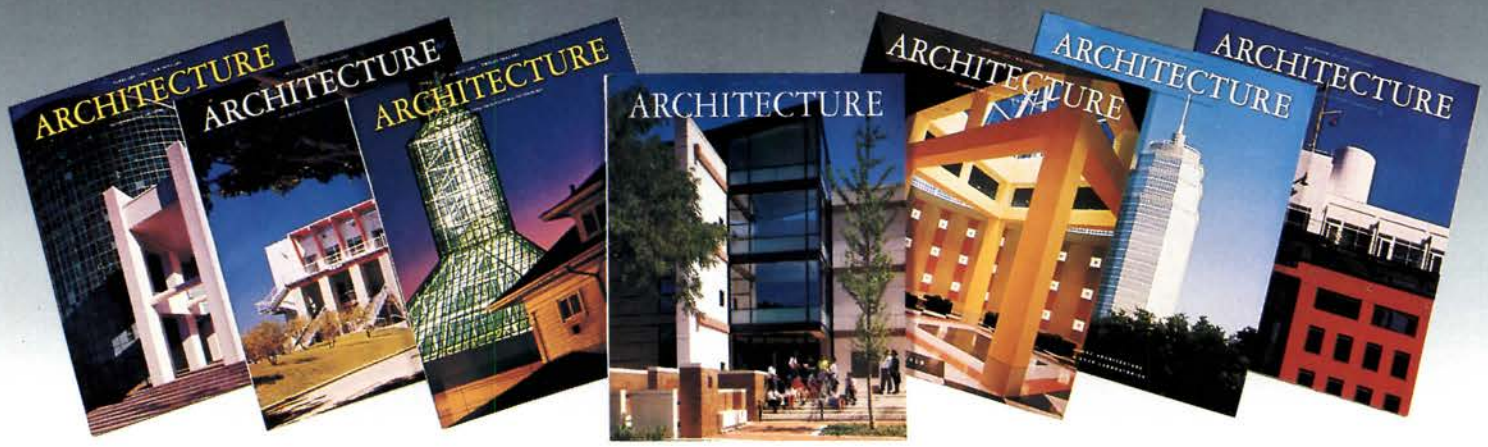

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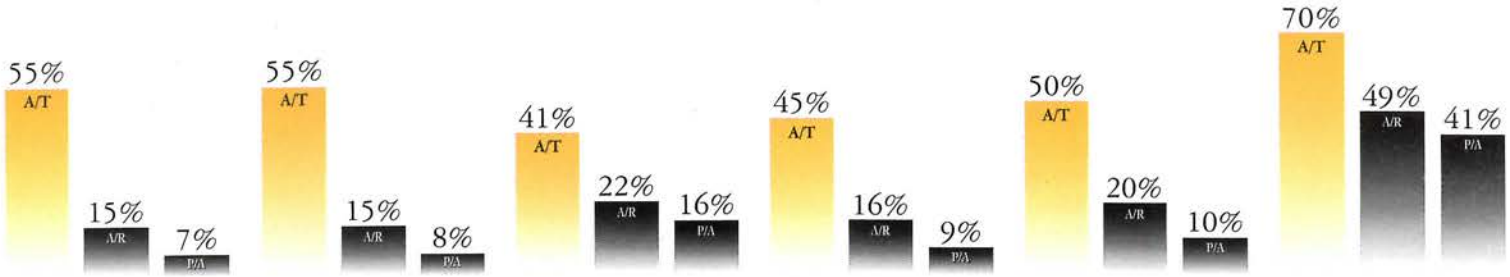

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ARCHITECT: Studio Granda—Steve Christer, Margrét Hardardóttir (principals); Jóhann Einarsson, Haraldur Helgason, Steinar Sigurdsson (design team)
ENGINEERS: Almenna Verkfrædistofan (structural/mechanical); Rafhönnun (electrical)
CONSULTANTS: J. Roger Preston & Partners (mechanical/electrical concept/coordination); Verkfrædistofan Önn, Tim Smith (acoustics); Mat (site supervision); Línuhönnun (concrete/waterproofing); Booth Muirie (roof cladding); Álstod, Fedhaus Fassaden & Fenster (curtain wall/windows)
GENERAL CONTRACTOR: Ístak
COST: $45.8 million
PHOTOGRAPHER: Dennis Gilbert/Arcaid

WESTERN MORNING NEWS
PLYMOUTH, ENGLAND

ARCHITECT: Nicholas Grimshaw & Partners, London—Nicholas Grimshaw (principal); Christopher Nash (project director); Lindy Atkin, Eoln Billings, Paul Grayshon, Andrew Hall, Duncan Jackson, Jonathan Leah, Nicola Macdonald, Christopher Nash, Julian Scanlan, Matthew Seabrook, Mike Waddington, Martin Wood (design team)
ENGINEERS: Ove Arup & Partners (structural); Cundall Johnston & Partners (mechanical)
CONSULTANT: Davis Langdon & Everest (cost estimating)
GENERAL CONTRACTOR: Bovis Construction
COST: $21.8 million
PHOTOGRAPHERS: Jo Reid/John Peck, except as noted

WATERLOO INTERNATIONAL TERMINAL
LONDON, ENGLAND

ARCHITECT: Nicholas Grimshaw & Partners—Nicholas Grimshaw (principal); Rowena Bate, Ingrid Bille, Conal Campbell, Garry Colligan, Geoff Crowe, Florian Eames, Alex Fergusson, Sarah Hare, Ursula Helnemann, Eric Jaffres, Doug Keys, David Kirkland, Chris Lee, Colin Leisk, Jan Mackie, Julian Maynard, Ulriche Selfutz, Neven Sidor, Will Stevens, George Stowell, Richard Walker, Andrew Whalley, Robert Wood, Sara Yabsley (design team); Paul Fear, Steve McGuckin (site office)
ENGINEERS: Cass Hayward & Partners,

Tony Gee & Partners (terminal viaduct); British Rail Network Civil Engineer (approaches viaduct); J. Roger Preston & Partners (mechanical/electrical)
CONSULTANTS: Ove Arup & Partners (fire); YRM/Anthony Hunt Associates (roofing/glazing); Lighting Design Partnership (lighting); Henrion Ludlow Schmidt (signage); Davis Langdon & Everest (cost estimating); Alexander Gibb & Partners (flow planning/external works); Montagu Evans (planning)
GENERAL CONTRACTOR: Bovis Construction
COST: $190 million
PHOTOGRAPHERS: Jo Reid/John Peck, except as noted

NATIONAL ACADEMY OF DANCE
MARSEILLES, FRANCE

ARCHITECT: Roland Simounet, Paris—Roland Simounet (principal); Eric Guerrier (associate architect)
ENGINEERS: Laupies (structural); Groupement d'Etudes et Conception (mechanical); CEGEF (electrical)
CONSULTANT: Val Conseil (acoustics)
GENERAL CONTRACTOR: Bruno Rostand
COST: $10 million
PHOTOGRAPHER: Paul Raftery/Arcaid

KUNSTHAL
ROTTERDAM, THE NETHERLANDS

ARCHITECT: Office for Metropolitan Architecture—Rem Koolhaas, Fuminori Hoshino (principals); Toni Adam, Isaac Batenburg, Leo van Immerzeel, Herman Jacobs, Jo Schippers, Ron Steiner (design team)
ENGINEER: Ove Arup & Partners; Gemmentewerken Rotterdam
CONSULTANTS: Petra Blaisse (roof garden/curtain wall); Centrum Bouwonderzoek, Tno-Tue (acoustics); Gunter Förg (restaurant); Rem Koolhaas, Yves Brunier, Petra Blaisse (museum park)
PHOTOGRAPHER: Hans Werlemann, except as noted

HAMBURG FERRY TERMINAL
HAMBURG, GERMANY

ARCHITECTS: me di um Architects, Hamburg; William Alsop Architects, London—Peter Wiesner, William Alsop (senior designers); Holger Jaedicke, Gabriela Langosch (project architects); Pierre-Andre Bohnet, James Brearley, Barbara Jentz-Koska, John McCarthy, Katrin Wolke (design team)
ENGINEERS: Ove Arup & Partners (structural); Sellhorn Engineers (structural/mechanical/project management)
CONSULTANTS: Hochtief (concrete); Magnus Müller (facades); Licht und Gestaltung (lighting)
GENERAL CONTRACTORS: Oskar Neilsen, Hojgaard & Schultz
COST: $19.3 million
PHOTOGRAPHER: Klaus Frahm

GERONA COURT HOUSE
GERONA, SPAIN

ARCHITECT: Bonell & Gil Architects, Barcelona—Esteve Bonell, Josep Maria Gil (principals); F. Kuhn, J. Llobet, T. Lussi, D. Mas, A. Mee (design team)
ENGINEERS: Brufau, Obiol, Moya y Asociados (structural); Enric Rego (mechanical); CIAT (electrical)
GENERAL CONTRACTOR: Cubiertas and Mzov
PHOTOGRAPHER: Ferran Freixa

LIVING EXPO 2000
STUTTGART, GERMANY

ARCHITECTS: Elzbieta Muszynska, Krysztof Muszynski, Lech Baranski, with Bidlingmaier, Egenhofer, Dübbers (Building 1); ECD Partnership (Building 2); Johannes Gunnarshaug (Building 3); Karla Szyszkowitz-Kowalski, Michael Szyszkowitz (Building 4); HHS Architects (Building 5); Jourda and Perraudin (Building 6); Gullichsen Kairamo Vormala (Building 7); Tegnestuen Vandkunsten (Building 8); LOG iD (Building 9); Warne Naturhus (Building 10); Entwurfsgruppe Stahr, Hochschule für Architecktur und Bauwesen (Building 11); Michael Alder (Building 12); Mecanoo (Building 13)
DEVELOPERS: Stuttgarter Wohnungs- und Städtebau-Gesellschaft; Landesentwicklungsgesellschaft Baden-Württemberg; Siedlungswerk gemeinnützige Gesellschaft für Wohnungs-und Städtebau und FLÜWO Bauen und Wohnen
PHOTOGRAPHER: Andreas Keller/av Studios

LINATE AIRPORT
MILAN, ITALY

ARCHITECT: Aldo Rossi, Studio di Architettura, Milan, Italy—Aldo Rossi (principal); Giovanni Da Pozzo (project architect); Marco Brandolisio, Michele Tadini (designers)
ASSOCIATE ARCHITECT: UNIPLAN, Milan-Virgilio Vercelloni (principal)
GENERAL CONTRACTOR: Fratelli Dioguardi
PHOTOGRAPHER: Stefano Topuntoli

OST-WEST-HOF
HAMBURG, GERMANY

ARCHITECT: MRL Architects, Hamburg—Mirjana Markovic (project manager); Bianca Hölscher, Beatrix Meyer, Darko Milocevic, Achim Niemann, Aleksander Ronai, Manfred Voss, Ilse Walter (design team)
ENGINEER: Sellhorn Engineers
CONSULTANTS: Dirling Memmert (facade); Dirling Andres (lighting)
COST: $9.6 million
PHOTOGRAPHER: Michael Wortmann

CARRÉE D'ART
NÎMES, FRANCE

ARCHITECT: Norman Foster and Partners, London—Norman Foster (principal); Ken Shuttleworth (project architect); Arthur Branthwaite, Sabiha Foster, Wendy Foster, Max Neal, Robin Partington, Tim Quick, Alex Reid, John Small (design team)
ENGINEERS: Ove Arup & Partners, OTH (structural); OTH (mechanical/electrical)
CONSULTANTS: Thorne Wheatley (cost estimating); Claude Engle (lighting); Commins (acoustics); Jolyon Drury Consultancy (maintenance systems); Casso Gaudin (fire/security); Algoe (project management)
CONTRACTORS: Merdionale de Travaux (concrete); Compagnie Francaise Entreprise Metallique (cladding); Le Ny (roofing); Sitraba (steelwork); Otis (elevators); GMG (stairs)
COST: $38.8 million
PHOTOGRAPHER: Paul Raftery/Arcaid, except as noted

CRANFIELD LIBRARY
CRANFIELD, ENGLAND

ARCHITECT: Norman Foster and Partners—Norman Foster (principal); Ken Shuttleworth (project architect); Sean Affleck, Nigel Greenhill, Robin Partington, Adele Pascal, Graham Phillips, Charles Rich, Tracey Stoute, Hugh Thomas, Rodney Uren (design team)
ENGINEERS: Ove Arup & Partners (structural); J. Roger Preston & Partners (mechanical/electrical)
CONSULTANTS: Davis Langdon & Everest (cost estimating); George Sexton Associates (lighting)
GENERAL CONTRACTOR: Taylor Woodrow Management Contracting
COST: $71.5 million
PHOTOGRAPHER: Timothy Soar, except as noted

DUISBURG MICROTECHNOLOGY PARK
NEUDORF, GERMANY

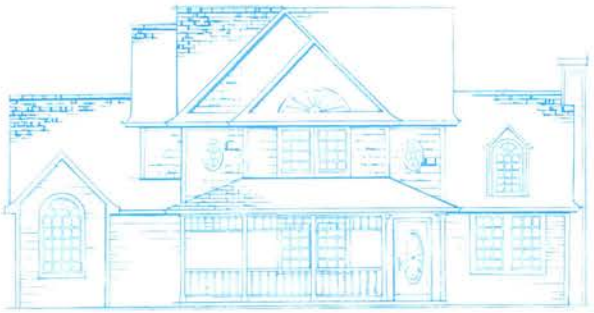
ARCHITECT: Norman Foster and Partners—Norman Foster (principal); Stefan Behling (project architect); Christopher Allercamp, Claudia Ayaz, Sandy Bailey, Mary Bowman, Mark Braun, Glennis Fan, Matteo Fantoni, Brian Frank, Georg Gewers, Helen Goodland, Serina Hijjas, Jutta Kimmerle, David Nelson, Thomas Kröger, Petra Latour, André Poiter, Achim Weinmann (design team)
ENGINEERS: Reinhold Meyer (structural); J. Roger Preston & Partners, Kaiser Bautechnik (mechanical/electrical)
CONSULTANTS: Kaiser Bautechnik (energy concept); ITA Ingenieurgesellschaft für technische Akustik (acoustics); Claude Engle (lighting)
GENERAL CONTRACTOR: Hochtief
COST: $7.3 million
PHOTOGRAPHER: Dennis Gilbert/Arcaid, except as noted

CENTRAL TELEPHONE EXCHANGE
BARCELONA, SPAIN

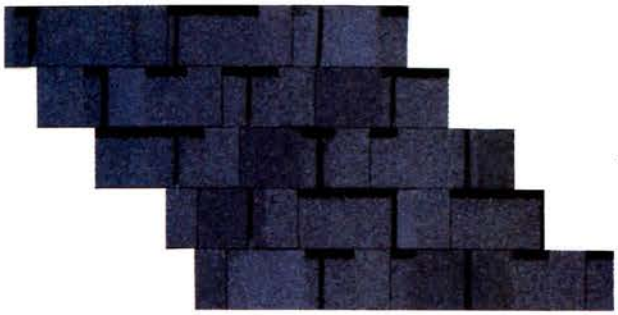
ARCHITECT: Bach & Mora Architects, Barcelona, Spain—Jaume Bach, Gabriel Mora (principals)
ASSOCIATE ARCHITECT: Joan Ardevol, Miquel Fibla
ENGINEERS: Brufau, Obiol, Moya & Associates (structural); J.G. Associates (installations)
CONSULTANTS: Josep Mª Domenech; Carles Folch; Manuel Parés
GENERAL CONTRACTOR: Dragados y Construcciones
PHOTOGRAPHER: Lluis Casals

ART AND EXHIBITION HALL
BONN, GERMANY

ARCHITECT: Gustav Peichl, Vienna, Austria—Gustav Peichl (principal); Martin Kohlbauer (project manager); Rudolf F. Weber, Jo Güth (design team)
LANDSCAPE ARCHITECT: E.L. Sommerlad and Giers
ENGINEERS: Stefan Polonyi + Partner (structural/mechanical); Lichtdesign-Ingenieurges, Robin Uber (electrical)
COST: $74.8 million
PHOTOGRAPHER: Richard Bryant/Arcaid, except as noted



THE PLAN



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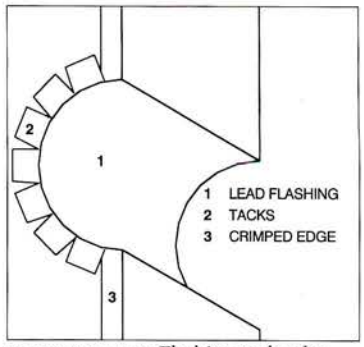
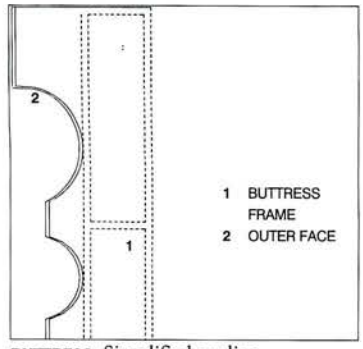
T&P Neat File

No excuses after this information exchange

FRIT: Pattern determines light.



BUTTRESS DETAIL: Flashing seals edge.



BUTTRESS: Simplified outline.

Glass and Glazing

CSI Section 08800

Fritted glass

In three recently completed projects, we have specified fritted glass to meet a variety of needs. Frit is a partially fused mixture of sand and flux (substances aiding in vitrification, such as borax) from which glass is made. Through a ceramic process, layers of powdered frit are applied to sheet glass, adding shade, pattern, and color to glazing systems.

By varying the density and pattern of the frit, the treatment may be tailored to different ranges of transparency. For the U.S. Holocaust Memorial Museum in Washington, D.C. (ARCHITECTURE, July 1993, pages 54-65), for example, we decided to inscribe the names of citizens, towns, and villages victimized in World War II on the glass sheathing of the bridges crossing the complex. We lightly fritted the lettering to be almost transparent, so that the names of the communities and individuals read clearly when one is close to the glass and as a totality as one moves away.

The Kirklin Clinic, at the University of Alabama in Birmingham, employs a denser fritted pattern to create translucent privacy between the exterior wall and interior perimeter spaces. The glass is screened with fritted lines that act like Venetian blinds, allowing views out of, but not into, certain workspaces.

In Los Angeles, our new convention center expansion incorporates exterior glazing with both a white frit and a neutral reflective coating on blue-green glass. This combination allows a single frit pattern to offer two different readings—teal green from the exterior and warm silver from the interior.

Michael D. Flynn, AIA
Pei Cobb Freed & Partners
New York City

Flexible Flashing

CSI Section 07650

Cupola buttresses

In 1938, a hurricane destroyed the cupola atop a three-story school built in 1854. Our client, a local newspaper company that had owned the building since 1952, was willing to rebuild the cupola from historical building documents, but only within a predetermined budget.

The roof could not support solid wood buttresses, so we investigated the options of duplicating the buttresses in lightweight fiberglass and laminated wood, but both were too costly. So we decided to create lighter weight, boxed buttresses. We first simplified the outline of the piers, then scroll-cut the silhouette from pairs of pressure-treated 2-by-12s, secured together by blocking.

To unify and protect the scrolled outer edge of the buttresses, we specified lead roll-flashing. The flashing was applied to the scroll-cut 2-by-12s, and bent, tacked, and crimped at the curves. Edges of the flashing were then tapered into the wood, so that the buttresses could be finished and painted. Viewed from the ground, the buttresses look like the monolithic originals.

Fred Vogt
Noyes Vogt Architects
Guilford, Connecticut

Project Coordination

CSI Section 01040

Wood and steel connections

I take issue with the Neat File written by Joerg Hensel (ARCHITECTURE, June 1993, page 136). Hensel points out that his client experienced problems with a steel beam installed in the joist space of a conventional wood floor and blocked solidly to the floor deck above.

When the floor joists shrank and the beam did not, the steel beam created a hump in the floor. Hensel blames the client's radiant heat system for causing unusually intense shrinkage of the floor joists.

Steel beams should never be installed in a conventional wood floor joist system with the top of the beam placed flush against the underside of the floor deck. Although the heating system may have exacerbated and accelerated the shrinkage, conventional wood joists will always shrink, due to loss of moisture after interior installation. I have inspected several such installations, involving steel beams and wood products with a low moisture content, such as laminated veneer lumber. The floor joists will reach their final size based on the relative humidity of the house, and this shrinkage will vary according to region, season, ventilation, as well as environmental control systems.

Hensel's recommended flush beam detail, in which a void is left between the beam and the floor deck above, could be an acceptable design. Unfortunately, this detail does not allow the beam to take any of the floor load. *Wood Frame House Construction*, published by the U.S. Department of Agriculture, has many common details and recommendations for various framing conditions. For example, some types of engineered floor joists can be installed with the beam blocked solidly to the floor deck above, because these joists do not shrink after installation.

Dave Huebner
Sheppard Engineering
Troy, Michigan

Architects are encouraged to contribute their practical suggestions about specifications and detailing, including drawings, for publication. Send submissions to:
ARCHITECTURE
1130 Connecticut Avenue, N.W.
Washington, D.C. 20036
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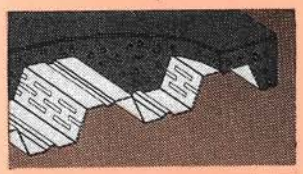
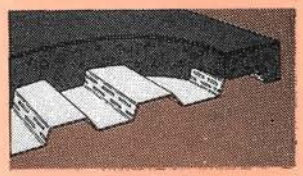
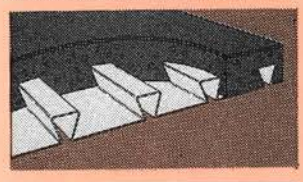
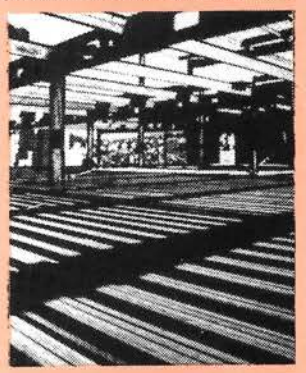
WHO WE ARE

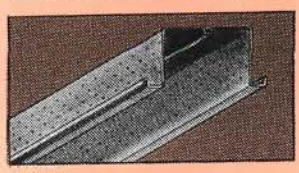
The Steel Deck Institute is comprised of manufacturers of steel floor and roof decks concerned with cold-formed steel products.

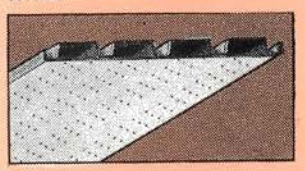


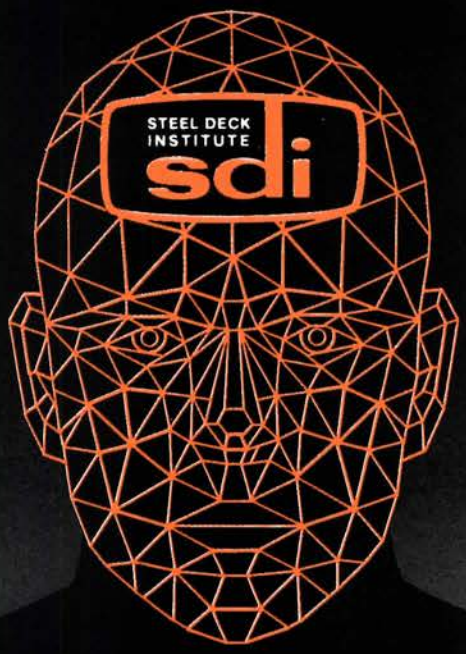












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