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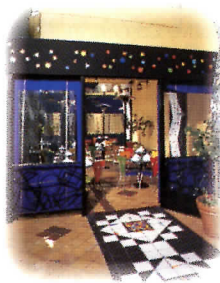
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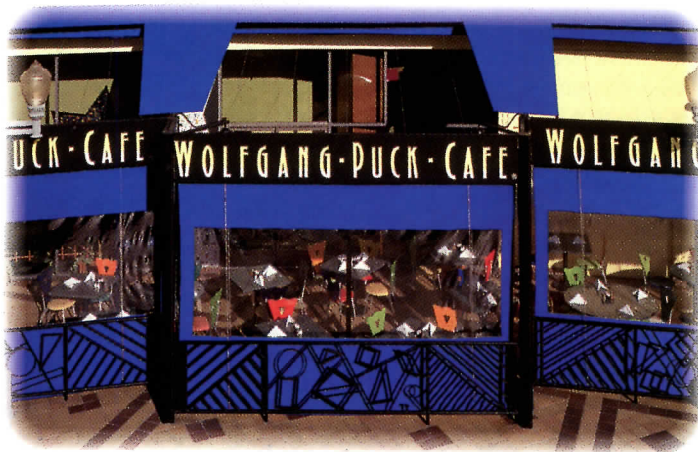
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CIRCLE 11 ON INQUIRY CARD

CIRCLE 12 ON INQUIRY CARD

SPEAK OUT Those who plan the cities of the 21st century should throw out the old urban guidelines and try a new set.

BY CARL PUCCI

Carl Pucci is a founder and principal of the New York City architecture firm BumpZoid. This article is adapted from the O Zone Manifest O (New York City), prepared by Team Zoid (Carl Pucci, Sebastian Pugliese, Luigi Fiorentino, Carlos Arnaiz, James V. Righter, and Mark Righter).

New York, like many large cities, seems intent on abandoning its birthrights by ceding control of its natural resources, its planning abilities, its singularity, and the very air we breathe in favor of short-term interests and dubious accounting.

Natural resources are seen merely as development opportunities (e.g., seaport malls). The city is seen only as a workplace for corporate interests. Public planning has deteriorated into continuous zoning negotiation. Our cities swap one piece of public property for the short-term maintenance of another. Construction is subject to hundreds of district restrictions, yet there is no official advocate for public areas, new parks, or unbuilt spaces. Public improvements are somehow required to generate self-support, while the direct benefits to the private sector are ignored. There is no vision of a city of vital neighborhoods and coordinated regional development of resources, and no stomach for making land-use decisions that might inconvenience private interests.

It is time to change the process. In New York, some had high hopes that the Canadian Centre for Architecture idea competition for an underused part of Manhattan [August, page 53] would not be a beauty contest of star architects and individual creations. Unfortunately, the organizers missed an opportunity to address urgent urban issues. We propose that all involved in planning the cities of the next century use a new set of urban guidelines:

Increase the void amid density. Our cities need more open

space and must redirect their energies to public priorities. Manufacturing zones are under pressure to be rezoned for residential and commercial development. Among planners, housing supporters, and developers, we have no advocates for public open space. Open-space zoning must become an essential ingredient of rezoning. The void is not an open plaza among office buildings; it is the vital lung and heart of a neighborhood.

Natural resources are public resources. Natural resources, be they waterfronts, scenic vistas, parklands, or cultural heritage sites, must be vigorously protected and used as public amenities. Large public recreation areas for both active and passive use must be developed via regional coordination and be available within walking distance of all neighborhoods. They must be supported by public funds, and they must be dependent on retail and corporate interests.

Infrastructure first, buildings second. Public rights-of-way must take precedence over private property. Pedestrian rights-of-way must take precedence over vehicular traffic. Public transportation is to be immediately available to every area and connect directly to regional transportation. The distribution of the civic network of medical, education, social, and cultural programs needs to be equitable throughout the city. Local facilities (clinics, grade schools, social services, recycling centers) should be required in every neighborhood. The systems need to be accessible and governed at the

neighborhood level, while coordinated regionally.

Flexibility takes precedence over specificity. Throw out the zoning codes, and replace them with simple performance criteria. Essentially, citizens should be able to do as they please as long as they don't subject others to obnoxious noise, odors, or inconvenience. Buildings should be hybrids capable of supporting multiple uses. They may take any style or shape as long as they respect a few urban civilities, like the primacy of the street grid, the neighborhood context, and the need to share air and daylight.

Respect the past and anticipate the future. We need to know the past and respect it—not glorify it. We need not tie ourselves to land-use policies that no longer represent public interests. Our work should anticipate the future. Plan as if each building may be part of a new city some day, somehow.

Our cities deserve more: more public spaces; more light and air; more convenience; more collisions of culture, use, and history; and more delight. We demand it. ■

Contributions: *If you would like to express your opinion in this column, please send submissions by mail (with a disk) to Speak Out, Architectural Record, Two Penn Plaza, New York, N.Y. 10121; by fax to 212/904-4256; or by E-mail by visiting www.architecturalrecord.com and clicking on Mentors. Essays must not exceed 700 words. The editors reserve the right to edit for space and clarity. Where substantial editing occurs, the author will receive text approval.*



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force, a shrinking middle class, an aging population, increased immigration, and a decline in the formation of households will have an impact on how and where we live and work.

Green essentials

Worsening environmental conditions, spurred by increased population densities, deforestation, global warming, and fossil fuels, will create a sense of urgency. Concerns about air and water pollution, solid-waste reduction, prevention of ocean dumping, control of toxic wastes, depletion of the ozone layer, and the preservation of coastlines will play a role in architecture and planning. The built environment consumes nearly half of all energy used in the world, so energy conservation through building design will intensify. The era of using fossil fuels as the primary energy source is ending; society will make a historic energy transition that will have a profound impact on architecture.

Redefining roles

Architects will face a continued erosion of their status as “master builders” and must contend with challenges from nontraditional competitors and losing their role as the leader of the design and building processes. Much more specialization will occur throughout the profession, and architectural education must adapt accordingly. Just as specialization has taken over the medical profession, architects will be trained to handle specific aspects of the profession, such as a particular building type or the technical aspects of the design process. For architecture firms—large or small—to be competitive, they must find a “service niche” and search for ways to be useful far beyond the traditional design services offered today. Many firms will create opportunities in predesign services, construction and economic planning, program management, facility management, real estate, and perhaps even financing.

The demands of clients for increased quality and perfection will lead to elaborate quality-control systems. Documents will be produced by enhanced, interactive “expert systems,” which will solve problems using a computer model of human reasoning. Expert systems will thoroughly analyze, review, and check construction documents for accuracy, conflicts, completeness, and constructibility.

Embrace the changes

Firms looking to succeed in the 21st century should heed management guru Peter Drucker, who said, “It is all the more important for an existing business to commit itself to the systematic abandonment of yesterday if it wants to be able to create tomorrow.”

Because architecture is the most public of the arts and plays an important role in molding the lives of citizens, it is vital that the architectural profession respond energetically to the forces of change

and meet the critical test of producing designs that serve people and society with sensitivity and compassion. It’s one thing to create new structures and rebuild our urban centers, but if our design work doesn’t inspire people and consider their needs, desires, and aspirations, it will surely fail.

The ultimate goal for all of us in architecture is to take action and adapt to change, assume broader responsibilities, reverse negative trends, and become better prepared to create an enhanced built environment to serve the ever-evolving needs of humankind. ■

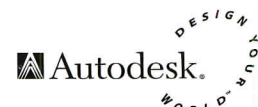
Questions: *If you have comments about your career, professional ethics, the law, or any other facet of architecture, design, and construction, send submissions: by mail to Mentors, Architectural Record, Two Penn Plaza, Ninth Floor, New York, N.Y. 10121; fax 212/904-4256; or by E-mail to rivy@mcgraw-hill.com. Submissions may be edited for space and clarity.*



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CIRCLE 15 ON INQUIRY CARD

PULSE RECORD readers were asked: In an era of prosperity, have architects abandoned social responsibility?

No. Many architects donate their services and time to worthy causes. Sadly, however, these generous acts are rarely covered by the media.

—Elmer Chase
Montpelier, Vt.

More answers to: Have architectural fees kept pace with the increasing costs of personnel and technology?

No. The adage “there are no small jobs, just small fees” is representative of the condition faced by many practitioners. Client expectations of services and demands for time and attention often result in fees that are barely adequate, let alone profitable. Many firms feel charging fees at an hourly rate will overcome the problem. This approach, in lieu of the fixed fee for clearly defined services, creates limited profitability and minimizes the incentive to be efficient and succinct.

—Judson A. Kline, AIA
Herschman Architects Inc.
Cleveland

More answers to: Should architects be more political?

Yes. I am for more political involvement from everyone, but against more political involvement from special interest groups (like the AIA). I am a member of the AIA and I am very opinionated politically. However, I feel people should organize for political reform based on their ideology, not their profession.

—Kevin M. Harper, AIA
Director of Marketing
TheDesignNetwork.com
Tustin, Calif.

Yes. Although I am not an architect (I have a master’s degree in urban design), I believe architects must be more involved in the political process. Most architects are keen observers of the urban form and have plenty of insight to offer.

However, too many architects spend too much time on the drawing board (or CAD station) and not enough time involving themselves in key political decisions that affect the construction industry. After all, wasn’t Thomas Jefferson a trained architect?

—John Gracey
Construction News Reporter
F. W. Dodge
Vancouver, British Columbia

Yes. I think that it is normal to be politically active and to participate in our future and in the decisions of politicians.

I am an architect and was state deputy of Amazonas in Brazil. I made the decision to participate in the political process. I think it’s the right decision.

—Miguel Capobiango
Manaus, Amazonas, Brazil

Yes. Without doubt, we should be not only more political but also more proactive. If we continue to allow ourselves to be engaged only after all the key decisions are made, our profession’s loss of influence and respect will continue to slide. We must take the stance—and be able to back it up—that we are the source for knowledge and creative solutions. For our knowledge to be of real use, it must be part of the up-front planning, not

just the cosmetic appearance factor added at the end.

—Ronald M. Reim, AIA
Executive Vice President
Oculus Inc.
St. Louis

Yes. The phrasing of the question makes one think that architects aren’t involved in any political decision making because they haven’t been invited to participate. Architects should be able to voice an opinion, but their opinions are often ignored until a point where what they say makes little difference. The endorsement of candidate(s) usually involves macro-oriented justification of “why” more often than “how,” leading me to believe that architects themselves may not want to be involved in the first place.

—Marc Bertolino
Project Designer
HOK Sport
Kansas City, Mo.

Yes. For architects to sit on the sidelines deprives the community of a great resource concerning human development and accomplishment. Being involved is a privilege many have and certainly will die for. We should provide leadership in the one place where it is sorely needed, politics.

—Douglas E. Helms
Mobile, Ala.

Yes. Architects should not be more political; they should be more public. I’ve spent about 20 out of 30 years as an architect working in the public sector at national and local levels, both domestic and foreign. Politics are like war, and as in war, the first casualty is truth. Politicians must “spin” the truth, i.e., lie. We need always to take our case to the public, not to politics.

—Peter Newell McBurney
Kuwait City, Kuwait

This Month’s Question

What building types will dominate the architectural landscape in the next century?

For more than 50 years, RECORD has run a section called Building Types Study, presenting comparative reviews of prominent building types, from schools to hospitals to entertainment facilities [page 131]. Which building types do you foresee as being the most important in the coming century?

Fax your response to ARCHITECTURAL RECORD, 212/904-4256, or visit www.architecturalrecord.com and click on Letters to voice your opinion by E-mail.

Note: Pulse reflects individual responses to each month’s question and is not meant to be construed as formal research.

CRITIQUE Sprawl has everyone scared, but the 21st century will likely see re-urbanization, not more diffusion.

BY ROBERT FISHMAN

A century ago, the English author H.G. Wells interrupted work on such pioneering science fiction as *War of the Worlds* and *The Time Machine* to write a brief article predicting the future of London and other major cities. *The Probable Diffusion of Great Cities* (1900) would prove eerily prophetic of the fate of the 20th-century metropolis. If we wish to understand the likely future of our own 21st-century cities, we might start by reexamining this remarkable prediction.

In 1900, a sense of crisis was provoked by the rapid growth of huge cities whose populations and densities vastly exceeded all historical precedents. Reformers feared that London, New York, Chicago, Berlin, and the other giant "whirlpool cities" (Wells' term) would suck the life out of rural areas and small towns and concentrate the human resources of a nation precisely in those inhumanly crowded vortexes where the physical, economic, social, and moral health of the nation would be destroyed.

Wells was perhaps the first to understand that the era of the whirlpool cities was drawing to a close. Nineteenth-century technology, he wrote, especially the railroad, had concentrated vast populations at those few favored spots where multiple rail lines converged on deep-water ports. But if 19th-century technology meant concentration, 20th-century technology would promote diffusion.

*Robert Fishman, professor of history at Rutgers, is the author of *Bourgeois Utopias: The Rise and Fall of Suburbia*.*

Wells understood that the coming revolutions in transportation and communication would disperse urban economic and social functions throughout vast regions. An advanced society would no longer need urban concentration to maintain complexity. As the city spread into the countryside, the traditional distinction between town and country would cease to apply. Instead, both would be swallowed up in an "urban region." The word "city," Wells predicted, would soon be as obsolete as the word "mailcoach."

A seer of sprawl

At the moment when the dense, centralized whirlpool cities seemed all powerful, Wells foresaw that the city itself would explode over a new posturban landscape of scattered housing developments, industrial parks, office parks, and strip developments. Diffusion would also create the late 20th century's urban crisis: the depopulation and deindustrialization of older cities that had lost their central role. With Wells' diffused urban regions now a reality, it may be tempting to apply his predictions for the 20th century to the 21st. To expect even more radical sprawl, however, represents only a superficial understanding of Wells' rationale. His thoughts in 1900 were so effective because he understood that history rarely moves in straight lines and that the most obvious trends are not always

the most important. Momentum today moves toward diffusion and sprawl, just as momentum in 1900 moved toward overcrowding. Then, as now, however, other forces are at work beneath the surface. Today, Wells might say that the 21st century will see the probable re-urbanization of great regions with distinct edges and vital centers.

A movement begins

This re-urbanization won't mean a return of the 19th-century industrial metropolis with its slums and overcrowding, nor will sprawl miraculously disappear, but in most regions it will be contained. Already, cities such as Cleveland, Baltimore, Providence, and even Bridgeport, Conn., are reviving not only their downtowns and waterfronts but also their blighted industrial corridors. The desire to control growth has

become widespread, as evidenced by the 240 antisprawl ballot proposals in the November 1998 elections and in "smart growth" becoming an issue in the next presidential campaign. Not only will the central cities reclaim something of their lost dominance, but, as in Portland, Ore., some downtowns will also be strengthened by a network of smaller centers linked to the core by revived regional rail systems. This is regional pluralism: many well-defined urban forms coexisting within the same region.

One reason is economic. The future promises globalization, which will increasingly limit the power of nation-states to determine the future of the world economy. The key players will not be nations but competing regions. The regions that thrive will be those that maintain what the planner and author Peter



Many cities are reviving their downtowns and waterfronts. Waterplace Cove Basin in Providence (above) was designed by William D. Warner Architects and Planners as part of the city's "river relocation project."

Hall has called an "innovative milieu," a critical mass of creative people in technology and culture who will conceive the products that succeed in the global marketplace.

An undifferentiated region of endless sprawl might succeed temporarily in fostering an innovative

generation of early 20th-century Modernists that architect Daniel Solomon recently called "the Zeitgeisters." Ideologues for an ideological era, they believed that authentic work must reflect the spirit of the age by rigorously embracing the new and discarding

flexible, balanced transportation system and seek to devote a record \$21.8 billion in the new TEA-21 bill to outer beltways and other roads that will only worsen congestion spawned by diffusion.

With much greater justification, Frank Gehry's magnificent Guggenheim Museum in Bilbao has revived the modernist myth of the great architect who transforms the city by fearlessly defying all precedents to create an avant-garde masterpiece. But the Guggenheim's success depends in large measure on its complex contrast with Bilbao's still-healthy traditional urbanism.

Designers should look to the future by using history as a vital resource to reweave the urban fabric. For example, Anne Spirn and her students of landscape architecture at the University of Pennsylvania are reviving a poor neighborhood in West Philadelphia; Ray Gindroz helped persuade HUD to replace demolished high-rise public housing with traditional streets and row-

houses; William Morrish and his colleagues at the University of Minnesota are seeking to revitalize the unfashionable, post-1945 "first-ring" suburbs; Peter Calthorpe has rediscovered the 19th-century integration of rail transit and coherent communities; and Andres Duany and Elizabeth Plater-Zyberk are reviving the concept of walkable neighborhoods, lively public spaces, and intense mixtures of classes and functions in cities and new developments at the region's edge. Who decreed that these exemplars of successful urbanism belong only to the past and not to the future?

Anyone can build big boxes in a sprawled-out, fragmented environment, but good urbanism always requires complex and sophisticated skills to fit a new addition gracefully into the existing fabric. The reurbanization of our regions—and perhaps the development of a new appreciation of regional aesthetics—will be the major challenge for architecture in the 21st century. ■

REGIONS THAT SUCCEED IN THE END WILL OFFER A RANGE OF OPPORTUNITIES.

milieu, but the regions that succeed in the long run are likelier to be those that offer their citizens a range of choices and opportunities, like active central cities, coherent suburbs and small towns, and easy access to open space. Reinforcing this trend is a new appreciation of compact communities with lively streets, diverse neighbors, a range of destinations within walking distance, and good mass transit.

A transformed attitude toward innovation itself will characterize 21st-century urbanism and design. Wells was a dissenting member of a

the old. Wells understood that technological change moves in complex and surprising ways, but the Zeitgeisters' most influential architect, Le Corbusier, was wed to a single-track vision of modernity, which insisted that the horse-and-buggy era had to be demolished so that the new glory of the highways and the towers-in-the-park of his Ville Radieuse might shine through.

Le Corbusier's future doesn't work. There are, nevertheless, present-day Zeitgeisters who persist in mindless futurism. The worst are the "highwaymen" who ignore calls for a

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DIGITAL ARCHITECT Rapid prototyping, a process borrowed from industrial design, lets architects make scale models from computer files.

BY B. J. NOVITSKI

Some day in the next millennium, architects may be able to put design information into a machine that will automatically construct a complete building. Harbingers of such breakthroughs are discernible in the experiments of Japanese construction companies, in which robots assemble building components in the field. The idea is already being implemented, albeit at a much smaller scale, with a new family of technologies called rapid prototyping, which lets designers build physical models directly and automatically from 3-D computer models.

A dozen varieties of rapid-prototyping devices create models by building up thin horizontal layers of a particular material. They all require 3-D CAD data translated to the STL format, named after stereolithography, the original rapid-prototyping technology. STL files are most easily created from 3-D solids modelers, the digital equivalent of modeling clay.

Rapid prototyping is common in the design of automobiles and consumer products. Industrial designers in these fields routinely use 3-D solids-modeling systems such as Pro/ENGINEER and SolidWorks to describe objects that curve in three dimensions. However, 3-D modeling is still rare in architecture firms. The architectural solids modeler form*Z is only beginning to significantly enter mainstream architectural practice because 2-D drafting is still well entrenched. To architects who typically work in 2-D to design buildings with square corners and vertical walls, such modeling may seem overly compli-

cated, but 3-D modeling is virtually mandatory for creating good STL files. Architects willing to learn one of these 3-D modeling systems can take advantage of rapid-prototyping technologies to build physical models with their CAD data.

Rapid-prototyping options

Only about half the existing prototyping technologies are commonly applied in the U.S., according to Terry Wohlers, whose consulting firm, Wohlers Associates in Fort Collins, Colo., specializes in rapid prototyping. (Learn more at www.wohlersassociates.com).

The oldest and most common system is stereo lithography apparatus (SLA) from 3D Systems Inc. There are several SLA models, which vary in size, speed, and cost. With this technology, a laser beam moves through a vat of ultraviolet-sensitive liquid polymer, following the contours of the model's floor plan. Where the beam hits the liquid, a thin layer is solidified. Then the model is lowered slightly within the vat, and the laser produces the next layer.

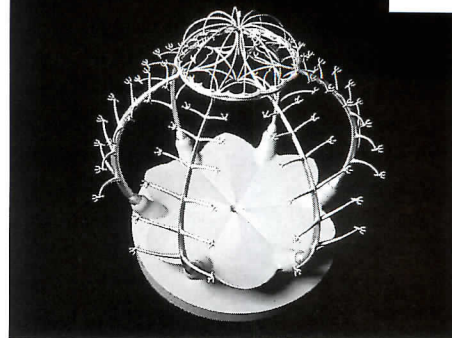
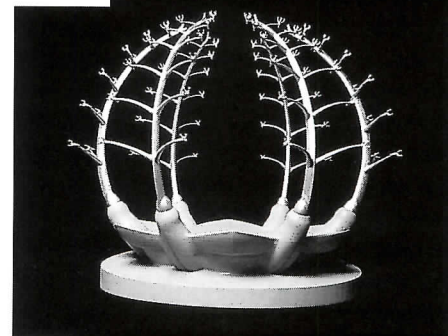
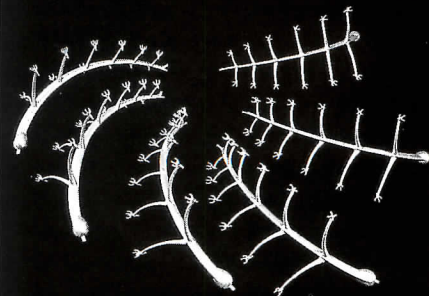
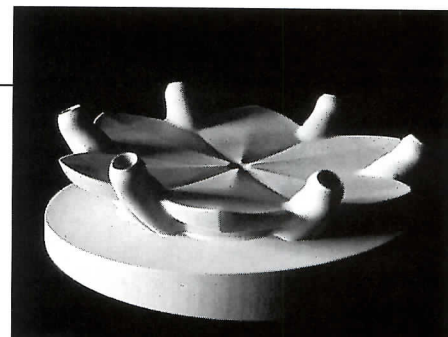
Because the layers are built from the bottom up, the CAD model must provide temporary supports for roof overhangs and similar geometries. Breaking off the supports after construction can potentially damage the model. Toxic fumes from the SLA make it unsuitable for an office environment. The process, however, affords great precision and strength even in delicately shaped objects.

A process called selective laser sintering (SLS), developed by DTM

Corp., is similar, except that the laser beam incrementally raises the temperature of a nylon-based powder to the point of fusing. The surrounding powder supports any overhanging geometry, so extra supports are unnecessary. The extreme heat inherent in the process, requiring increased air conditioning, makes SLS equally unsuitable for an office setting.

Fused deposition modeling, or FDM, sold by Stratasys Inc., features an arm that moves over a horizontal plane carrying a heated nozzle, which deposits melted thermoplastic material in specified locations. The material solidifies as it is deposited, layer by layer. The FDM process can produce several colors but any given piece is monochromatic. Stratasys designs its equipment for use in offices.

Laminated object manufacturing (LOM), from Helisys Inc., involves the successive layering of thin sheets of special paper. Each sheet is automatically placed, bonded to the layer below with a heated roller, and cut with a laser. When complete, the model has the look and feel of wood. It can be sanded and finished with techniques already familiar to architectural model



At Harvard University, Kevin Rotheroe designed a complex conservatory shape using rapid prototyping. These models could not have been built using traditional methods.

builders. LOM machines can produce larger models than other rapid-prototyping technologies. The surrounding cut paper supports overhanging geometries, so it isn't necessary to construct extra supports. This system's cooling and outside air-venting requirements may make it unsuitable for an office environment, however.

In 3D Printing (3DP), invented at the Massachusetts Institute of Technology and commercialized by Z-Corp., a water-based liquid deposited on a thin layer of powder solidifies. 3DP is often called concept modeling because it is relatively fast and inexpensive but lacks the precision of SLA. 3DP machines are safe to maintain in an office setting.

Overcoming obstacles

High cost is no longer a barrier, though Wohlers suspects most architects don't realize how dramatically prices have dropped. "Not long ago, you'd pay a few thousand dollars for a medium sized model," he says. "But now, you can produce a model that fits in a six-inch cube for under \$100. You couldn't do that by hand." In particular, rapid prototyping makes models with complex geometries more affordable than if constructed using traditional means.

Complete 3-D printing systems are now in the \$40,000-to-\$50,000 price range, affordable for large firms that build a lot of models. These lower prices are also reflected in the charges of service bureaus, where architects can have the models made for them.

A more serious barrier is the investment of time and training in conventional software that architects have made. In most cases, a 3-D model developed from 2-D drawings will make a poor STL file. Even this, however, does not stymie Rafael Tapanes, whose Miami-based firm, Reelization, specializes in architectural visualization services for architects.

Tapanes recently experimented with generating physical models from AutoCAD base drawings. He created an AutoCAD model of a Key

West prototype house, which features detailed woodworking for its front porch. By exporting the AutoCAD file to 3D Studio Max, intended primarily for rendering and animation, he was able to create an STL file. The process, however, required some manual tweaking of the model's surfaces to make them come together into an actual solid. Nonetheless, even with this extra work, Tapanes believes he invested less time and money than a solids modeler would have required to build the model from scratch.

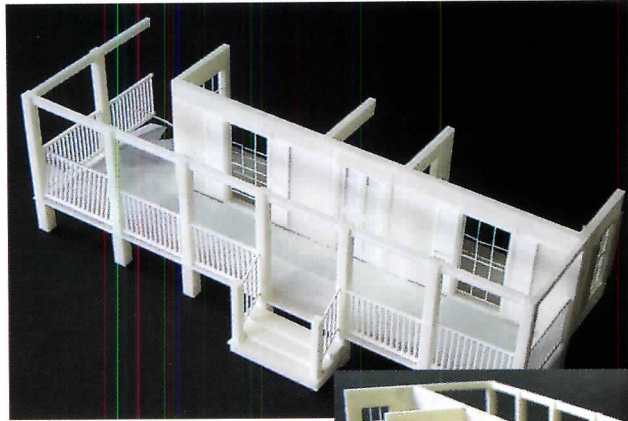
Technicians at DTM processed Tapanes' file in an SLS machine. "The result was an amazingly accurate model," he reports. "The railings are $\frac{3}{4}$ inch wide and still sturdy."

Tapanes hopes that architects will come to appreciate the advantages of this technology. "What better way to explore schematic design options than to produce a model within hours, even minutes, and carry it in your hands to a place where you can examine it from any angle." Despite Tapanes' eventual success after starting with a conventional CAD file, most architects trying rapid prototyping use solids modelers, which more readily produce good STL files.

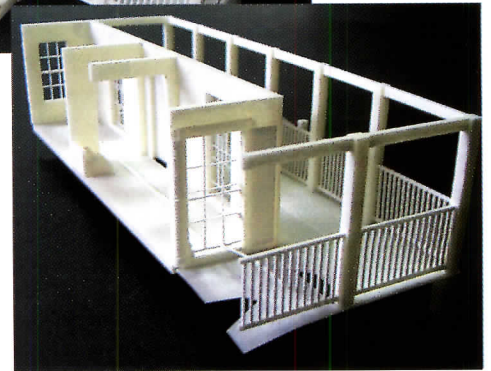
Multiple technologies

Architect Kevin Chaite Rotheroe of New York City, who is currently working on a doctoral degree at the Harvard Graduate School of Design, has chosen to create models with Pro/ENGINEER. Rotheroe's research focuses on metal structures of complex shapes, for which he builds both scale models and full-size mock-ups.

His design for an organically shaped conservatory could not have been modeled with conventional architectural CAD software. A metal frame, whose members resemble curving tree trunks, branch out into a delicate lattice that supports irregularly shaped panes of glass. To create a physical model of the con-



A prototype house was modeled by Reelization Inc. to demonstrate the feasibility of applying existing AutoCAD files to rapid-prototyping systems. The model is sturdy and detailed.



servatory, Rotheroe made the base with LOM, an appropriate technology for large solid parts. The top component was produced by stereolithography; no other method could have produced the combination of precision, strength, and delicacy. The columns were sufficiently complex to require rapid prototyping, but they were all identical, so cost savings came with mass production. He created one column component with SLA that had a silicon rubber mold, from which 10 identical urethane parts were cast. Each subsequent casting cost 17 percent of the original. Such mass-production techniques would have been possible and financially beneficial even if the geometry of his conservatory were not so complex.

Rotheroe points out that the often necessary use of multiple technologies for different types of components argues against architects buying their own rapid-prototyping equipment. It would be better, he suggests, to develop relationships with specialist service bureaus. This would also lessen the burden of learning, maintaining, and keeping up with technological innovations.

Although most rapid-prototyping devices produce fairly small

models, Rotheroe believes they also offer an important opportunity to improve design development through full-size mock-ups of small-building components. He is experimenting with prototypes of a structural column with a complex internal structure. "The use of rapid prototyping during design development can preempt difficulties and misunderstandings during the documentation and construction phases by clarifying a design solution, determining its viability, or highlighting its limitations," he says. "In such cases, a mock-up quickly justifies its cost by avoiding late changes and construction change orders."

For now, such full-size prototypes are limited to connections and other critical details in a structure. But suppose the size of rapid-prototyping machines grew while their cost went down. It's easy to imagine a day when the plastic model emerging from the vat of liquid is the size of a small building. Or when the model emerging from the LOM machine is an actual house. ■

WWW For a list of rapid-prototyping vendors go to: www.architecturalrecord.com and click on Digital Architect.

SOFTWARE REVIEWS

Rendering lighting realistically. New Web-based tools for collaboration. Making marketing easier.

BY JERRY LAISERIN, AIA

Let there be Light

Lightscape Visualization System; Discreet, a division of Autodesk

Louis I. Kahn once wrote, "Our work is of shadows. It belongs to the light." Rendering software enables architects to add the light—in the form of simulated lighting effects—to buildings described by modeling or CAD software. Some software programs are better at adding light than others. The authenticity of these computer-rendered images depends on many sophisticated computer algorithms, but two of the most important are radiosity and ray tracing. The Lightscape Visualization System is among the few programs combining these two algorithms to produce great realism.

Radiosity simulates the dispersion of natural and artificial light and the way that light bounces among various surfaces and materials. Because it accounts for all the light in a space, radiosity is especially useful in representing subtleties, such as indirect light, soft shadows, and color bleeds—the pinkish glow of a white chair on a red carpet, for example. Ray tracing follows the path of all the rays of light entering an observer's eye from every point within a specific view. Because it is view-dependent, ray tracing is well suited to specular highlights, reflections, and transparency effects.

Contributing editor Jerry Laiserin, AIA, consults, writes, and lectures about the impact of information technology on the practice of architecture.

Unlike the company's competitors, who are compatible only with specific modelers or CAD programs, Lightscape is compatible with most major modeling programs and DWG-compatible CAD software. Version 3.2 is the first update of this software since Lightscape was acquired by Autodesk and folded into the company's Discreet subsidiary (formerly Kinetix). It sports enhanced compatibility with AutoCAD (including AutoCAD 2000) and with Discreet's 3D Studio Max and Viz modelers.

The new version's improved user interface includes easier drag-and-drop editing of light sources. As before, these can be based on the Illuminating Engineering Society photometric data from luminaire manufacturers or on custom sources. Software utilities, like network rendering, previously available for an extra cost, are now included in the base price, making Lightscape 3.2 an even better value than previous versions.

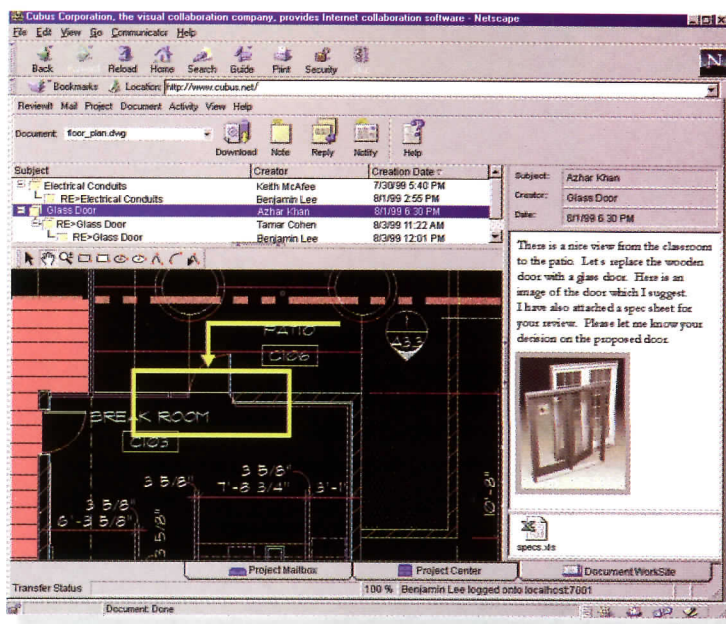
Lightscape remains the most realistic stand-alone rendering software to simulate "the light."

System requirements: PentiumPro 200, 128MB RAM, Windows95/98/NT4.0, XGA graphics (OpenGL graphics accelerator preferred). Contact Discreet, a division of Autodesk Inc., 10 Rue Duke, Montreal, Quebec, Canada H3C 2L7; 800/869.3504; www.discreet.com

Architect-friendly collaboration

ReviewIt AEC, Cubus Corporation

Just as CAD heralded the first archi-



ReviewIt AEC's Web-based project tools can be rented or purchased.

tectural computing revolution, Web-based collaboration, which computerizes communication among firms, heralds the next. Project collaboration on the Web relies on generic Web browsers, like Microsoft Internet Explorer or Netscape Navigator, to serve as the front-end, or access point, for project participants, including architects, engineers, and consultants who want to post, view, and modify documents and data on project Web sites [September 1999, pages 53-54]. Many online tasks, however, like marking up drawings or monitoring project workflow, require computing capabilities not easily accomplished with a generic Web browser.

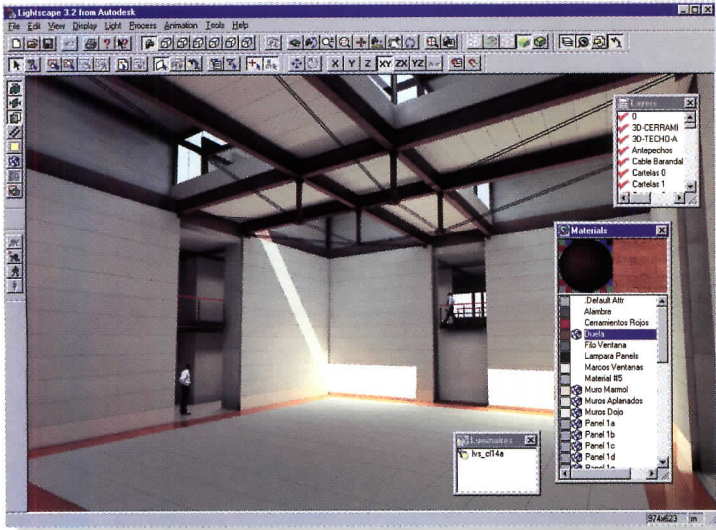
One popular solution to this problem is to program the project Web server to send little applica-

tions, or applets, written in the Java software language, to appropriately "flavor," or configure, each project-team member's browser to each task every time a new view or function is needed. Instead, ReviewIt AEC offers a comprehensive set of browser enhancements that authorized project participants must download just once. This allows users with ReviewIt to perform some complex project operations more efficiently and in fewer steps. For example, ReviewIt includes graphical indexing and context preservation, unique features that automatically cross-reference all project messages and E-mail to the corresponding drawings. ReviewIt also supports workflow monitoring, which can be customized to fit the needs of the user. Some of these needs might include notifying the architect every

time a consultant receives a shop drawing from a contractor.

Available as a per-project rental or for outright purchase, ReviewIt AEC stands out in a crowd of "me-too" Web-based project collaboration tools with its unique and architect-friendly alternative approach.

System requirements: WindowsNT Server 4.0 for Enterprise version; Web browser (Microsoft Internet Explorer 4.01 or Netscape Navigator 4.06). Cubus Corporation, 98 Battery Street, Suite 250, San Francisco, CA 94111; 877/442-8287; www.cubus.net



Lightscape Visualization System was used to create this realistic rendering.

Marketing 101

MarketEdge, MarketEdge Systems

Business development is the process of winning new projects. Many business development tasks don't fit predefined software categories or cut across multiple programs. For example, a marketing coordinator tracking prospective clients may exceed the capacity of address and calendar software that's sufficient for the rest of the firm. Merging project team resumes, images, and work schedules into the cumbersome qualification forms mandatory for government work challenges the multitasking skills of the wildest marketer.

Many marketing-management software packages offer comprehensive solutions to these problems, but MarketEdge, built on the cross-platform FileMaker Pro database, is the only one that runs equally well on Windows PCs or Macintoshes. MarketEdge includes

components for every key business development activity, from address list management, reminder calendars, and call reports to resumes, project descriptions, and follow up letters.

More important is the "project qualifier" module that tracks individual proposals and the overall success rate of the business development process. By reviewing past proposal costs and performance, firms can decide which projects are worth going after and what the probability of winning will be. Rather than just cranking out more proposals, MarketEdge exploits the analytic capacity of computers to help firms market more effectively. This is highly recommended.

System requirements: Any WindowsNT or Macintosh PC running FileMaker Pro 3.0 or higher. Contact MarketEdge Systems Inc., 5567 Fitzpatrick Trace, Norcross, GA 30092; 770/300-0188, www.mktedge.com ■

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BOOKS Two new books go behind the front porch to see what it's like to live in the town that Mickey built.

BY JOHN E. CZARNECKI

The Celebration Chronicles: Life, Liberty, and the Pursuit of Property Value in Disney's New Town, by Andrew Ross. New York: Ballantine, 1999, 340 pages, \$26.

Celebration, U.S.A.: Living in Disney's Brave New Town, by Douglas Frantz and Catherine Collins. New York: Henry Holt & Co., 1999, 342 pages, \$25.

After a blitz of newspaper and magazines articles over the last few years, the first books examining Disney's neotraditional town of Celebration, Fla., have started to hit the market. Interestingly, the first two off the presses take similar approaches to the subject—using the perspective of writers who moved to the new town as part of the first wave of residents.

Like many American towns before it, Celebration is being settled by transplants from across the country, people who left what they had to start anew. The town's initial group of homeowners were drawn to a scene that was "a heady stir of Disney fever, America fever, and property fever," says Andrew Ross in *The Celebration Chronicles*. Ross, a professor and director of American studies at New York University, left Manhattan for a year in Celebration. At the same time, husband and wife journalists Douglas Frantz and Catherine Collins were researching and writing *Celebration, U.S.A.* Frantz and Collins, who had lived in a number of major cities, moved from suburban Connecticut, bought a house in Celebration and sent their two children to school there.

Although not written by architects or design professionals, these two books offer important snapshots of life in the most publicized new town at the end of the century. By spending at least a year in the town and becoming active residents, Ross and

Frantz and Collins humanize their portrayals of Celebration, while offering lessons on the biggest test for a new development: how people interact and live their daily lives.

Contrasting approaches

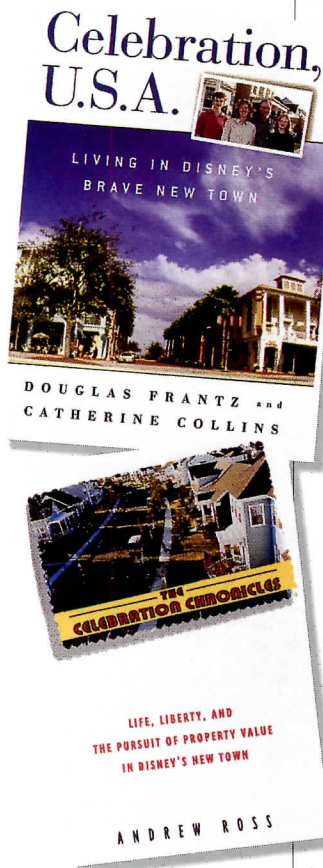
Not often are two books with such similar goals published simultaneously. Redundant? No. Similar issues and anecdotes appear in both books, but are treated differently. Ross' approach is more academic and his insights are deeper, with a greater sense of Celebration's place in the context of American urbanism. And he is good at striking a balance between observer and participant.

Frantz and Collins' book is a lengthy human-interest story, replete with compelling observations about townspeople. Frantz and Collins, though, sometimes get too personal. Do we really need to know, for example, about their children's spats with neighbors or details of domestic abuse in the neighborhood?

Neither book serves as a promotional piece for Celebration. Nor does either succumb to bashing Disney and New Urbanism. The authors all acknowledge the impact of urban design in creating an environment that encourages neighborliness. Ross posits, however, that conflict and stress in dealing with homebuilders, Disney, and Celebration School are what initially drew people together, not necessarily the walkable streets and rarely used front porches. "It had taken the bitter taste of jeopardy to arouse the appetite for strong society," Ross says.

For those in the building professions, *The Celebration Chronicles* may offer the most sobering view of American homebuilding today, though both books note shoddy construction of Celebration homes. Frantz and Collins, on the other hand, are almost too even-handed in playing down the homeowners' problems. Ross, by contrast, succinctly gives one reason for the below-par construction: one of the two Celebration homebuilders, a Chicago-based company accustomed to having a seasoned labor pool at its disposal, had never built in Florida before and relied mostly on unskilled, poorly paid migrant labor with nearly impossible deadlines. Celebration, Ross says, was "planned with impeccably correct intentions, built with improperly low-wage labor, and sold on the basis of improbably lavish expectations."

Disney appears in both accounts as a benevolent dictator in Celebration's development. When they signed their deeds, residents knew and accepted Disney's controls, which included more than 100 pages of restrictions, such as prohibiting complaints about mosquitoes or use of nonwhite draperies. Celebration may, in fact, be the least democratic nongated community in America. As Frantz and Collins say, "Disney's every action should be scrutinized for broader implications." Ross takes this caveat even further, portraying Celebrationites more as customers or consumers than as citizens of a democracy, which may be a good lesson for the future of public life in America. ■



John E. Czarnecki is an urban designer with the firm Urban Strategies in Toronto and is a former editor of Crit, the magazine of the AIAS.



The Building Blocks Series,
by Ezra Stoller. New York: Princeton
Architectural Press, 1999, 80-100
pages, \$20 each.

For much of this century, photogra-

pher Ezra Stoller made popular
icons of landmark Modernist build-
ings, which appeared in
advertisements and consumer
magazines, as well as the architec-
tural press. In so doing, he sparked

the American public's appreciation
of Modernism. His high-contrast
black-and-white images gave the
severe volumes and clean lines of
the new architecture a certain
romance that made it easier for the
public to accept these buildings as
works of art.

Each volume in this collection
of small-format books features
Stoller's images of a different
important building. The first group
covers Le Corbusier's Chapel at
Ronchamp, the United Nations
complex by Wallace Harrison and
others, Paul Rudolph's Yale Art +
Architecture Building, and Eero
Saarinen's TWA Terminal. These will
be followed in the series by the
Seagram Building, Fallingwater,
Taliesin West, and the Salk Institute.
Supporting photographic documen-
tation of each building over time is
a preface by the photographer, a
short historical essay on the design,
construction, and public reception
of the building, and newly redrawn
plans. *David Simon Morton*

Design Directory Series. New
York: Universe, 1999, approximately
360 pages, \$25.

Ambitious and graphically intense,
these directories tell the full story of
selected countries' experiments in
modern product design. For each
country, the directory begins with a
pictorial showcase of the best
wares and follows with a timeline
and history of local modern design.

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facturers, and relevant terms (such
as "ergonomic" and "democratic
design" in the Scandinavia direc-
tory), with each entry receiving at
least two pages of attention. Essays
by academics and curators and an
appendix with the addresses of
museums and manufacturers round
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Single Building Series, edited by Oscar Riera Ojeda. Gloucester, Mass.: Rockport, 1999, 120-150 pages, \$25.

Not every building in this series deserves the exhaustive attention it receives. Even the outstanding projects, such as Vincent James' Type/Variant House, don't really require 200 color photographs and 100 black-and-white drawings, plans, and conceptual sketches for proper documentation. An architect only has so many tricks to play, and this fetishistic presentation seems to be an example of design overkill. Each book includes texts from both the designer and the client. Other titles in the series are Kyu Sung Woo's Whanki Museum, Bohlin Cywinski Jackson's Ledge House, Will Bruder/DWL's Phoenix Central Library, Cesar Pelli's National Airport Terminal, and Gwathmey Siegel's Henry Art Gallery. *D.S.M.*



The Michigan Architecture Papers MAP series. Ann Arbor, Mich.: 70-90 pages, \$17 each. *John Dinkeloo Memorial Lectures and Raoul Wallenberg Lectures:* 42-50 pages, \$12 each.

For four years, the University of Michigan's College of Architecture and Urban Planning has published the lectures of visiting architects and critics in illustrated, heavy-stock, fine-format paperbacks. For readers who want focused looks at the work of, say, Tod Williams and Billie Tsien or Will Bruder and want to know what the architects have to say about their own projects, or Vincent

Scully's or Michael Sorkin's observations about public space, these pamphletlike publications are elegant resources. Especially refreshing are the volumes covering the Dutch firm Mecanoo, the Icelandic Studio Granda, and the light architecture of Richard Horden. Conceived and edited by Dean Brian Carter, the series won the AIA International Book Award in 1998 and continues to add new titles. *D.S.M.*

Hybrid Space: New Forms in Digital Architecture, by Peter Zellner. New York: Rizzoli, 1999, 192 pages, \$50.

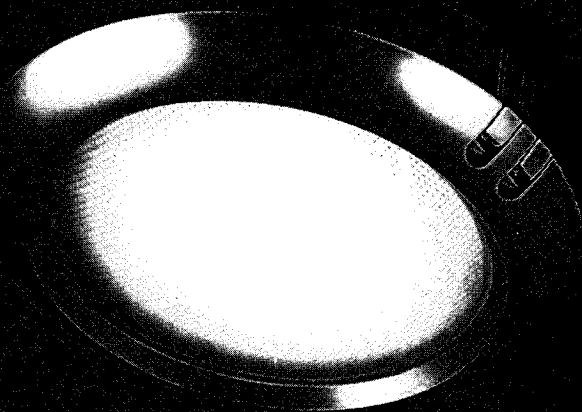
For at least a couple of decades architects have used computers as tools to increase productivity and handle repetitious tasks such as making production drawings. But now, asserts Peter Zellner, a new generation of architects is using computers as creative devices capable of generating new design ideas and forms. The author, who studied with Rem Koolhaas at Harvard's GSD, profiles 12 firms, explaining their design processes and presenting recent projects. The firms include Greg Lynn FORM, Kolatan/Mac Donald Studio, and Reiser + Umemoto [all of whom are featured in RECORD's millennium coverage this month, page 85], as well as Morphosis, Oosterhuis Associates, Ocean, and UN Studio (Ben van Berkel and Caroline Bos). The book's hyperkinetic graphics echo the architects' designs, but don't make it easy to read.

Clifford Pearson

Future Systems, by Marcus Field. London: Phaidon Press, 1999, 208 pages, \$50.

Started in 1979 by Jan Kaplicky and Amanda Levete, the London-based firm Future Systems has designed everything from buildings to brightly colored foam furniture in a style that combines high technology with a pop sensibility. This snazzy monograph captures that style well. *C.A.P.*

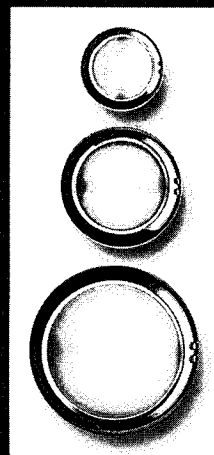
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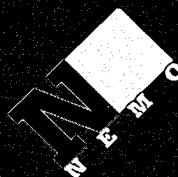


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CORRESPONDENT'S FILE Budapest, a city of myriad historical styles, struggles to find its own contemporary voice.

BY CARL KOVAC



Hungary's Parliament, built in 1905, seen from the Buda side of the Danube.

Budapest has an invigorating effect on visitors. Marvels appear as you explore the neighborhoods: Lean out of a second-floor window overlooking Budapest's 102-year-old Vígszínház (Comedy Theatre) and take in the ornate wrought-iron railings ringing the structure's balconies. Gape at the buildings' intricate cornices and the decorative masonry adorning their facades. Make your way across the Danube to see 2nd-century Roman ruins as well as the tomb of the Dervish Gül Baba, one of the few remaining architectural reminders of 150 years of Turkish occupation.

Frequently, it is visitors "who draw our attention to the remarkable architectural treasures that form the backdrop to our everyday lives," says István Schneller, chief architect for the City of Budapest. He doesn't want this magic to dis-

appear—but it may be in danger.

A long and complicated story

Some knowledge of the area's history is essential to comprehend the local architectural mix. Over the past 1,000 years, Hungary has been invaded and/or ruled by Romans, Ottoman Turks, Austrians, Germans, and Russians. With the exception of the Wehrmacht and the Soviets, each contributed positively to the country's architecture.

Although a number of Baroque and Classical buildings remain from the period following the Turkish occupation, which ended in the late 17th century, the city is dominated by design philosophies dating to the second half of the 19th century: Anti-Historicism, Neo-Renaissance, Neo-Classical, Neo-Gothic, Secessionist, and a Middle European mixture of Austrian Expressionism, Czech Cubism, and late Art Nouveau—you name it. The Bauhaus school emerged during the

1930s, and then came the Soviets, who blighted the country with industrial buildings and apartment estates designed and constructed in Socialist Realist—read drab and boring—configuration.

Now Hungary is being hit by yet another incursion, this time by multinational corporations—an invasion that many architects contend is not only blemishing the city's aesthetics, but is also changing its very culture.

Holding the line

"Today, the main aim for Hungarian architects is to define the Hungarian identity to the world," says József Finta, managing director of Finta and Associates Architect Studio. "Hungarian architecture is very colorful; it has a very characteristic style. It's an eclectic, balanced style, enhanced over 1,000 years by various geopolitical influences. Here, you can find many ways of thinking."

While there's no dearth of

diversity, Budapest doesn't have all that many truly modern buildings yet. "The municipality is quite conservative; they want to preserve the old styles. It is good that they want to preserve the character of the capital, but they are too conservative," says Finta.

Conservatism has its upside. Because Budapest is one of five major European cities with a core of 19th-century architecture intact, the capital has attracted U.S. and international filmmakers in need of period atmosphere. But as Hungary becomes a bigger player in the global economy, modern high-tech office buildings, multiuse complexes, and shopping centers—many of them developed by foreign investors and designed by foreign architects—are beginning to emerge in Budapest and in other major cities throughout the country.

One such example is the \$28 million, 10-story R70 office building on a main artery near the Keleti



MOM Park, a multiuse complex, is taking shape on a 10-acre site.

Carl Kovac is a freelance writer who has lived in Budapest for almost six years.

railway terminal in the city's District VII, for which construction began in early November. Developed by the German investment group Mahler Projekt International GmbH and designed by the Budapest architecture firm Aula-Planconsult Kft, the building will have a glazed elevation dominated by a tower clad in champagne-hued aluminum paneling, accented by blue-tinted windows. Budapest mayor Gábor Demszky sees the project, scheduled for completion in 2001, as a catalyst in revitalizing the district, known in better days as a commercial, cultural, and economic center.

In District XII, on the other side of the Danube, the \$142.5 million MOM Park office, retail, entertainment, and residential complex is taking shape amid a forest of gantry cranes on a 10-acre site once occupied by the former state-owned Magyar Optika Művek (Hungarian Optical Works). Developed as a joint venture between a Budapest company and two companies based in

Kft, and the center by the Antal Puhl architecture studio of Szentendre, Hungary. Architekturbüro Kochta of Munich provided the overall design concept. Slated for completion in late 2000 or early 2001, MOM Park "is an example of modern architecture, but with a very strong German influence," says Tamás Noll, Teampannon's managing director.

The mall invaders

Meanwhile, some 19 shopping centers have been built or are going up in and around Budapest, and this particularly irks Schneller, the city's chief architect. "I'm fighting them always," he says. "I don't like these boxlike structures being built in greenfield areas, these primitive boxes covered with metal. The architecture of these shopping centers is very inhuman. You arrive at a gray parking area and you go into a box. They are claustrophobic."

They also will have an adverse impact on the environment and the historic city's very survival in the not-



One of many: the \$70 million Mammut shopping center opened last year.

The better malls, he says, are mixed-use complexes "of high architectural quality" located at mass traffic junctions, such as the sprawling West End Center adjacent to the Nyugati (Western) Railway Station. The \$200 million complex will initially consist of four separate buildings housing a hypermarket, multiplex cinema, specialty shops, office space, a five-star casino hotel, and indoor parking facilities. There will be a wide promenade along the street side of the complex, and a landscaped roof garden with an ice skating rink will extend over the tracks leading to the commuter station. Ensuing phases will include residential facilities and additional office space, with final completion slated for 2005.

The Nyugati Station was designed and built by Alexandre Gustave Eiffel; in designing West End City Center, Finta retained elements of the terminal so as not to break up the continuity. For example, the glazed roofs of a new commuter station and the main entrance to the center will have the same 22-degree pitch as the roof of the terminal.

The conversion crusade

Buildings registered as national monuments, such as the 92-year-old Gresham Palace and the Ybl Palace, are being converted by foreign developers into five-star hotels and upmarket office, retail, and residential complexes. Finta of Finta

and Associates sees little wrong with this, though the problem "is that there are not too many 100- to 150-year-old buildings that can be adapted to such use."

Other buildings listed as monuments, including Parliament and several museums, also are undergoing refurbishment in a government-financed effort to restore some luster for the new millennium. It's hard to find one of these edifices without a shroud of scaffolding and protective mesh.

A theater debacle

The government hasn't treated other projects so kindly. Citing cost overruns, it killed construction of the new National Theater in fall 1998 after \$12.5 million had been sunk into excavating the site in Budapest's city center and pouring the foundation for a two-level underground parking garage. The project had been launched by the former government, dominated by an opposition party. Plans now call for a smaller theater to be built on a site nearby along the Danube.

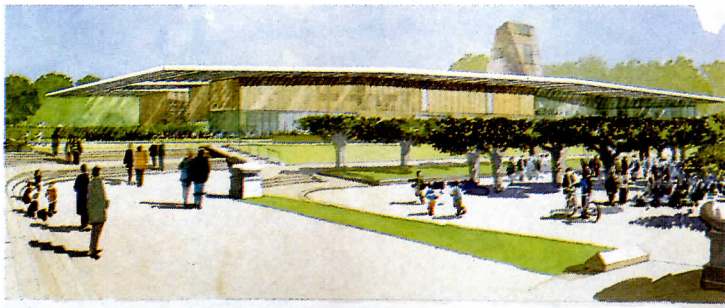
As for the National Hole, as the gaping foundation site has come to be known, the government has no intention of letting it become symbolic of the imperiled position of Budapest's architectural heritage. A trade, tourism, and conference facility will be built on the upper level, while an underground parking lot will be opened on the lower level. ■



Szent István Basilica is being restored by Architekton, based in Gödöllő.

Munich, the complex will encompass four four- and five-story apartment buildings, underground parking, one eight-story and two seven-story office buildings, and a seven-story multifunctional center housing shops, restaurants, coffee houses, a business center, a nine-screen multiplex movie theater, and more underground parking. The apartment buildings were designed by the Budapest firm Teampannon

too-distant future, Schneller predicts. "According to a commercial traffic planning survey we made in 1996, only about 20 percent of shoppers used their cars. All the rest used public transportation, rode bicycles or walked. But the prognosis is that in 10 to 15 years, so many more people will be using their cars that the burden on the road network will increase by 30 percent and pollution will increase even more."



MINIMALIST DE YOUNG DESIGN CAUSES A RUCKUS IN SAN FRANCISCO

For such a socially progressive city, San Francisco sometimes seems a visual prude. The conceptual plan by Swiss firm Herzog and de Meuron for a sleek, 280,000-square-foot new building to replace the seismically unsound, too small de Young Museum has raised eyebrows and blood pressures all over town.

The proposal, which exhibits the hallmark minimalism of Herzog and de Meuron, will replace the existing facility in Golden Gate Park. The firm's plan consists of three parallel bars sliced at shallow angles to interlace with the park's landscape. The ground floor is dedicated almost entirely to the public, allowing nonpaying visitors to wander through the building and to the park beyond. A below-grade level houses exhibition halls, mechanical, loading, and storage. Second- and third-story galleries are capped with a huge soaring roof that covers some of the outdoor spaces on the ground floor. A 180-foot-tall observation tower, narrower at the base and flaring to the top, houses offices and anchors the end of one bar.

A preliminary concept had large expanses of glass wall. The approved, modified version still has large planar elevations, but wood has been added to the palette.

Sneers and support

Clearly, it is not a design that is easily understood. Since the unveiling of the first concept in June,

self-appointed guardians of San Francisco's architectural heritage have been on a tear. For instance, the *SF Weekly* published a backlash piece by the organizer of a group who call themselves People for a New de Young.

After months of haggling and adjustments, the de Young board met in October to vote on a revised design. The room was packed with people waiting to speak about the project, a large majority of them architects who offered emphatic support for the project, including a formal resolution to that effect by the San Francisco AIA board.

Persuaded by the vision of the Swiss firm's proposal and the support for it, the board voted unanimously to proceed with architecture and engineering on the \$90 million building (the total project costs are estimated at \$135 million). The board also announced that the local firm Fong & Chan will collaborate with Herzog and de Meuron as architect of record.

The battle is hardly over. In a city known for almost rabid citizen participation, there are many more public-opinion obstacles for the project to clear before construction starts in 2002. Among those will be the Environmental Impact Report process in mid-2000 and a series of public meetings before final approval by the Recreation and Parks Commission and the Board of Supervisors.

Lisa Findley

COLIN ROWE, INFLUENTIAL THEORIST AND RIBA GOLD MEDAL WINNER, DIES AT 79

Colin Rowe, a professor and historian who had an extensive influence on contemporary architectural theory, died in November at age 79. The cause was lingering complications from a stroke he suffered in May.

Rowe, who was born in South Yorkshire, England, came to the U.S. in 1952 as a Fulbright scholar at Yale. He then traveled across the country before taking a post at the University of Texas, where he was eventually fired—with several colleagues—for what was seen as radicalism. Rowe went back to England only to return to the U.S. as an architecture professor at Cornell University, where he served from 1962 until his retirement in 1990. He also was a visiting professor at the University of Maryland.

One of Rowe's early essays, *The Mathematics of the Ideal Villa*, published in 1947, explained Modernism's dependence on past precedents—a crucial step in debunking the notion that the movement was free of history. Amid many essays and magazine articles, Rowe's books include *Collage City* (1978), written with Fred Koetter, and *The Architecture of Good Intentions* (1994). In 1996, Rowe published *As I Was Saying*, a collection of essays and memoirs. At his death, he was working on a book about Italian Renaissance architecture.

Renaissance man

"Colin's major influence was the ability to analyze and criticize modern architecture given a historic continuity," says architect Judith DiMaio, a long-time friend, student, and colleague of Rowe who is now an associate professor (adjunct) of architectural design at Yale. "He liked and deeply understood modern architecture, but his heart was in Renaissance architecture. He could see the spaces and great buildings of Michelangelo and Borromini and discern their relation to Modernism."

On a personal level, Rowe "had a tremendous following of students and colleagues," DiMaio remembers. "He had an incredible ability to inspire passion and provoke curiosity."

The AIA recognized Rowe's efforts in 1981 with the Topaz Medallion for teaching excellence. Rowe, who became a U.S. citizen in 1987, moved to Washington in 1994. In 1995, he earned another significant honor when he was awarded the Gold Medal by the Royal Institute of British Architects.

Pure, white form

In the 1950s and '60s Rowe favored a formalist approach. By then, the Modernist aesthetic had become diluted; Rowe's antidote was the idea that architecture could embrace the idea of form for form's sake and that the forms of modern architecture could be detached from Modernism's social aspirations. Nevertheless, history was always an underlying principle of his thinking.

In the '60s, the new generation of American architects split into two factions, the Whites and the Grays. The Whites—influenced by Rowe and so-named because of their preoccupation with formal purity and the absence of color—included Michael Graves, Richard Meier, Peter Eisenman, Charles Gwathmey, and John Hejduk (Hejduk also collaborated with Rowe on an essay that appeared in RECORD in 1957). In the 1970s, Rowe turned toward a more contextual approach to design; his concerns about the fate of urban centers amid suburban sprawl were fundamental to New Urbanism.

Rowe is survived by a brother, David, of Oxford, England. A private memorial service was held on November 10. A public service to be held in Washington, D.C., is being planned for early next year.



Rowe at his 70th-birthday party.

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PEI COBB FREED DESIGNS CAMPUS FOR WESTERN-STYLE SCHOOL IN CHINA

The China Europe International Business School (CEIBS) has opened a new state-of-the-art Shanghai campus designed by Pei Cobb Freed & Partners. The new facility, which covers 10 acres and cost \$16.2 million, represents the first phase of a three-phase scheme. CEIBS, founded in 1994 by the European Commission and China's Foreign Ministry, offers Chinese students an education in Western business methods. The EU and the Spanish government were major donors for the project; fittingly, the new campus has both a Spanish Centre and a Spanish Residence.

Although an American architecture firm was appointed, Ian Bader, AIA, project design partner along with Henry Cobb, FAIA, says he made it a point that "the campus not be intellectually, physically, or architecturally an import from

America." He says the site is surrounded by recent, insensitive Western architecture, so he created "an inward-looking campus, so as not to look at the surrounding junk."

A school with soul

The academic center is designed around an L-shaped central garden, with buildings of varying heights plugged into an arcade. The landscaped garden was designed to take visual precedence over the actual buildings; the library alone stands out and is meant to be the symbolic heart of the institution. The architects used local technologies and construction techniques, importing as few components as possible. On any given day, 500 to 600 Chinese workers were on-site, managed by Pei Cobb Freed and its Chinese associates, the local firm ECADI. *Susanna Sirefman*

NEW MIAMI COURTHOUSE COMPLEX BALANCES TRANSPARENCY AND SECURITY

Arquitectonica's proposed \$123 million federal judicial complex for Miami was designed both as a symbol of the U.S. government's efforts to elevate the design of its public buildings and as a response to the 1995 bombing of the federal building in Oklahoma City.

The plans for the complex, unveiled in late October, call for two towers—each irregularly shaped—one concave and the other convex. "They are not symmetrical, like justice hanging in the balance," says Arquitectonica partner Bernardo Fort-Brescia, FAIA. The towers are connected by a transparent, monumental breezeway that begins 45 feet above the ground, crosses a downtown street, and offers a view of Biscayne Bay and the port of Miami. The breezeway will provide a waiting area for the courtrooms it connects in the two towers and will allow the structure to be read—at least from a distance, if not necessarily at street level—as a whole.

Adding some needed green

As a whole, the building is shaped like a ship, appropriate for a down-

town Miami location just blocks from the world's busiest cruise port. The complex sits on two city blocks, and to meet security concerns, it is set back 100 feet. Because this particular section of downtown Miami has little greenery, Arquitectonica chose to make the setbacks into a landscaped park, which Maya Lin will design as a series of undulating waves—a concept that Fort-Brescia terms "a very irregular, very sculp-



tural lawn that could be construed as an ocean."

Seeking clarity

The design intends to offer a symbolic architectural statement: a building that is at once approachable and awe inspiring, a tangible expression of democracy at work. The towers will be precast sand-colored concrete and will use ample glass, letting light flow into courtrooms, a deviation from the traditional judicial design. The glass is also shatterproof.

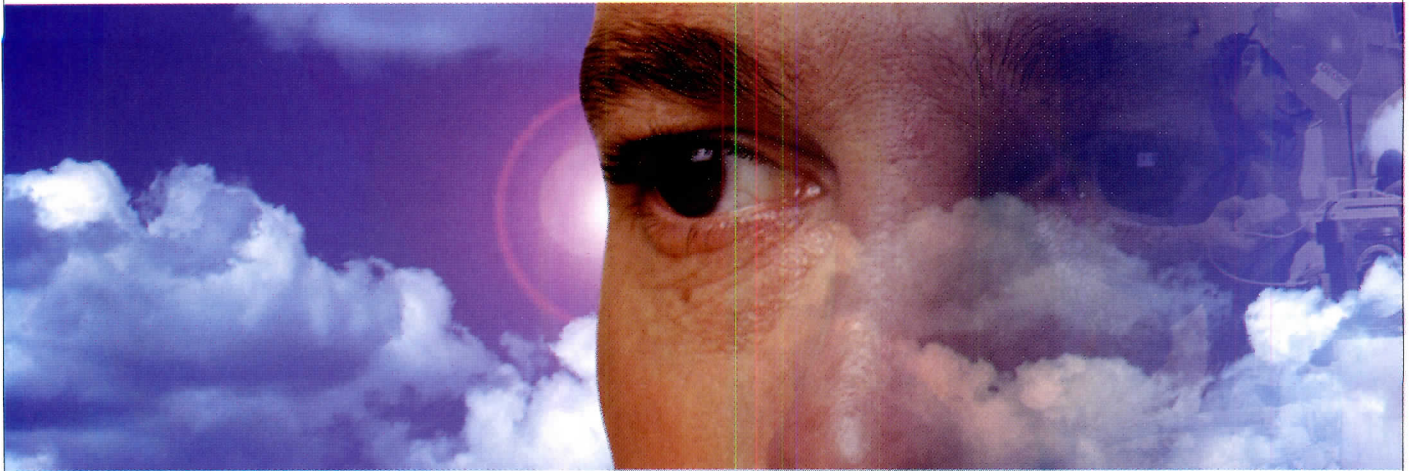
"The building is very transparent," says Fort-Brescia. "It speaks to the transparency of the judicial process today, which is very different from the process of the past. We were intent on making a place that is not intimidating, a place where you could feel that you would be treated fairly." *Beth Dunlop*

PCN SERVICES DOMINATE A/E/C SHOW If successive iterations of the A/E/C Systems show were biological generations, the rate of evolution among Internet services for design and construction would astound even the staunchest digital Darwinist. At November's event, held in Chicago, in conjunction with Computers for Construction, Web-based project collaboration networks services (PCNs) dominated the exhibitor list.

Not only has the number of vendors in this category doubled every six months for the last two years, but also the genre is now splitting into specialized subcategories. Established providers like BluelineOnline, ConstructWare, Cubus, Evolv, Framework Technologies, and MPInteractive are staying close to their roots as document repositories, communications clearinghouses, and construction administration transaction centers. Newcomers BuildPoint, eBricks, HeavyWare, primecontract.com, and PurchaseSoft create online trading hubs or marketplaces to accelerate project procurement—sourcing, bidding, and matching contractors and subs with materials suppliers. PCN stalwart BidCom is adding an E-marketplace, while Autodesk's spin-off, Buzzsaw.com, combines an array of third-party E-market services, like catalogues and estimating, with a PCN that hosts for free projects with up to 100 megabytes of data. Construction.com (run by McGraw-Hill, publisher of RECORD) is also steadily expanding in this area.

While the PCN category as a whole offers architects cost-effective tools to accelerate project design and delivery, individual services likely will struggle for survival over the coming months to determine the digitally fittest.

Jerry Laiserin, AIA



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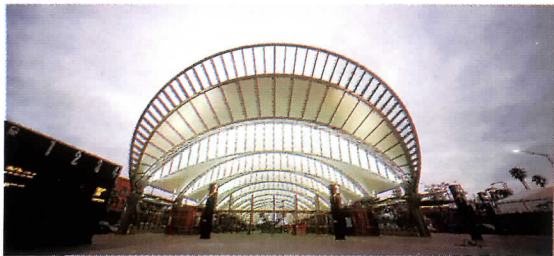
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AS SYDNEY'S OLYMPICS NEAR, NEW STRUCTURES GET MIXED REVIEWS

Sydney's buildings for the 2000 Summer Olympics are nearing completion, and local architects' reactions to their design is decidedly mixed. Some say the structures are well organized, unpretentious, and practical, with some gems among the bunch; others complain of mediocrity and sterility.

The main venues are at Homebush Bay, about an hour's drive from the heart of the city, a site that can also be reached by ferry and a new rail line. Sydney architect Lawrence Nield says the primary buildings are "very good prose buildings," while a select few "rise to the level to poetry." A more common view is that of architect Keith Cottier: "It doesn't push any boundaries . . . I put it down to caution, playing safe."

The main criticisms have concerned a system of design and construction that allowed private developers come in as a financial team with their chosen architects and saw the New South Wales government largely relinquish control. As a result, there were no design

competitions, and finances were the priority, not innovative design.

Raves for the railway

The exception was the Olympics railway station (above left), designed by Ken Maher of Hassell Architects, with the government as client. The zinc, glass, and steel structure will accommodate the arrival of 1,700 passengers every two minutes during the Olympics. The project won the Royal Australian Institute of Architects' (RAIA) national award for public architecture in 1998.

Stadium Australia (above right), designed by the Sydney firm Bligh Voller Nield with London's Lobb Partnership, is already in use and has proven efficient in handling crowds. It has also been criticized by architect Peter Tonkin (who designed the Olympic Boulevard's lighting pylons) as "not exhibiting a mastery of its geometry or scale" and by architect Philip Cox (who designed the Aquatic Centre) as "not breaking new ground, and not iconic enough."

The buildings that have been

uniformly well received are among the more minor ones, designed by Sydney's smaller, more cutting-edge firms. Among the most quirky are the amenities blocks by Durbach Block Murcutt, three splashes of color in an otherwise muted environment. The smoothly contoured structures have

red, yellow, and blue steel portals that are covered by translucent fabric and glow at night like beacons. The archery center, by Stutchbury & Pape, has been described by Professor Leon van Schaik of the University of Melbourne as a "little miracle . . . economic, graceful, and witty [is] the twist in it which mimics the way arrows move toward targets."

Much effort has also gone into landscaping and tree planting. Greenery is beginning to soften the newness and bleakness of the site, and there are great hopes that this effect will be augmented as the trees mature. *Anne Susskind*

ARCHITECTS PLEAD GUILTY IN NEW YORK BID-RIGGING SCANDALS

In the latest phase of an investigation by Manhattan District Attorney Robert Morgenthau, 31 architects, real estate brokers, and construction managers pleaded guilty in October to bribery charges relating to bid rigging on a range of New York City construction projects. The pleas are part of a five-year investigation into corruption in the \$6 billion interior construction industry, in which consultants, brokers, architects, and contractors conspired to rig the bidding for work at the offices of some of the city's most prominent corporations, according to investigators.

Last year, five of the largest contractors in the industry, including Structure Tone, Bennis & Reissman, and AJ Contracting, pleaded guilty to corruption charges. In one instance, nine architects, property managers, and project consultants admitted to taking bribes from Structure Tone in exchange for giving the company work at the IBM offices in White Plains, as well as many projects in Manhattan. Investigators have said that as many as a dozen other construction executives and architects could soon be indicted on bid-rigging charges.

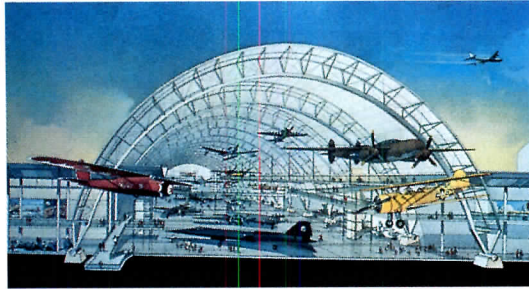
All the architects who pleaded guilty have been sentenced to probation and have been ordered to pay fines. New York State is starting proceedings to revoke architects' licenses due to the felony convictions. In addition, the AIA's National Ethics Council will decide its own penalties based on the seriousness of the activities, which violate the AIA's code of ethics. *Soren Larson*

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NEW SMITHSONIAN PROJECT GETS GO-AHEAD AFTER BIG PLEDGE

The Smithsonian Institution's National Air & Space Museum expansion project, the Dulles Center, got a big boost recently with an astounding pledge of \$60 million from Hungarian-born businessman Steven F. Udvar-Hazy. The design, by Hellmuth, Obata + Kassabaum (HOK), was presented in 1998, but

had been on hold until the site was finalized and legislation was passed to authorize federal funds for the project. HOK is also the architect of the Air & Space Museum's primary facility built in 1976 on the National Mall in Washington.

The Dulles Center will provide more than 700,000 square feet of

exhibition space on a 17-acre site at the southeast corner of Dulles International Airport, in northern Virginia. Estimated to cost \$130 million, construction should be completed by fall 2003, the centennial of the Wright brothers' flight at Kitty Hawk.

The Air & Space Museum, the

most popular of the Smithsonian's museums, has been in the process of creating a second museum for more than a decade. The museum has been limited in displaying large parts of its collection; many items have never been exhibited and are stored in an antiquated warehouse in Suitland, Md.

The proposed structure will display the Space Shuttle *Enterprise*, an F-4 Phantom fighter, and the B-29 Superfortress *Enola Gay*. Visitors will move through various levels of the vast hangars by way of skywalks, which will allow multiple views of rockets, various types of aircraft, and satellites. Restoration workshops, a large-format theater, a restaurant, and library facilities are also planned. *Ellen Palmer Sands*

IT FORUM SETS STAGE FOR DIGITAL REVOLUTION IN BUILT ENVIRONMENT

The AIA-sponsored "Critical Issues Forum" last month left the abiding impression that the impact of information technology (IT) on the built environment—particularly on higher education, the courts, and retailing—is so radical and rapid that its effect on even the near future is largely unpredictable.

"Pervasive, profound, more positive than pernicious," is how Todd S. Phillips, AIA, director of the AIA's Center for Advanced Technology Facilities Design, described IT. William Mitchell, FAIA, dean of MIT's School of Architecture and Planning, sounded the forum's prevailing theme: IT is simultaneously causing a "radical breaking of bonds and reconstituting them in new ways." IT's decentralizing effect already allows people to work, bank, and shop from nearly anywhere at any time. And by recombining work and home, IT creates new neighborhood patterns: "finer-grained urban neighborhoods, a reinvigoration of humane, preindustrial models," said Mitchell.

Saskia Sassen, author of *Globalization and its Discontents*, saw a similar fragmentation and reconcentration, but for *different*

reasons. Globalization makes business more complex and prone to risk, she said, and corporations are outsourcing the most specialized and difficult work, while concentrating their hold on information.

Speaker David Sebring, a market intelligence manager for IBM, said that Harvard, Duke, Berkeley, Penn, and other universities are racing to put courses online. He also noted that research universities are partnering with local business, government, and corporations to spawn incubator businesses. Added Mitchell: "You might think the learn-anywhere-anytime phenomenon would diminish the university as a place. But most universities are mixing interactive learning with intense human interaction, and MIT has its biggest building program ever."

Classrooms will have to accommodate two or more student-centered, IT-supported learning experiences at a time, said Richard Rittelmann, FAIA. He cited flexibility as the architect's most valuable design asset, and he warned not to expect one plan to fit all needs, not to wait for the next technology, and not to forget to budget for replace-

ment furnishings and equipment. On his "do" list: provide acoustically zoned areas, movable furniture, increased storage, measures to reduce glare, and indirect lighting.

IT poses at least one conundrum for the judicial system, said Fred Lederer of the College of William and Mary: "There are already some 100 high-tech U.S. courtrooms, and you can hold a trial where no one's in the same physical place, but that doesn't mean the public or judge find it acceptable. There are differences between what we can do and what we should do." It was accepted, however, that courthouses of the future will need

to adapt and that courtrooms will have to accommodate banks of electronic monitors, televisions, cables, and other hardware.

Burgeoning E-commerce, speakers agreed, is scattering some retail functions, centralizing distribution, and recreating small-scale shopping districts of restaurants and specialty shops. This won't mean the disappearance of malls, said Ezra Ehrenkrantz, FAIA. They will be reinvented to furnish one-stop family outings for a population that has increasingly less leisure time—an unintended consequence of the IT revolution. *Andrea Oppenheimer Dean*

OLD SAN FRANCISCO WAREHOUSE TURNS INTO AN OFFICE WITH A VIEW
The 68-year-old C&H Sugar warehouse on San Francisco's Pier One, which extends 700 feet into San Francisco Bay, is being converted into a 151,000-square-foot office building, encircled by a public promenade, with stellar views of the city. The \$38 million conversion is the start of a redevelopment of the city's waterfront that will include illuminated sidewalks and other amenities. The architect, Simon Martin-Vegue Winkelstein Moris



of San Francisco, will maintain the structure's industrial character but will work to enhance views; for instance, loading doors will be turned into massive windows. Completion is slated for December 2000. *S. L.*

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NEW SHIPS RIDE HIGH-DESIGN WAVE

The Walt Disney Co. launched its second cruise ship, the *Disney Wonder*, in October with a full range of design styles onboard. The boat, created by a group of European and Scandinavian architects (the initial winning design was by Norwegian Robert Tillberg along with Disney Imagineering), is 964 feet long and 106 feet wide, contains 875 staterooms, and has room for a 919-person crew. The look is meant to evoke the classic steamers of the 1930s, with details such as round portholes, tapered ends, and two roof towers (most modern ships have just one).

Inside, Disney called on a trio of New York City designers to provide a variety of eating and entertainment destinations. Adam Tihany designed the flashy, Art Nouveau entry lobby (above), as well as the Triton restaurant. David Rockwell fashioned the Animator's Palate and several nightclub areas, while Marty Dorf did the upscale Palo restaurant.

Last month, Royal Caribbean cruises launched the *Voyager of the Seas*, which it claims is the largest cruise ship in the world. Boston architecture firm Wilson Butler Lodge designed the two main entertainment venues, including the first ice rink ever built on a cruise ship and La Scala, a 1,350-seat theater. The firm has also designed theaters for the Celebrity Cruise Line's *Millennium* ships. S. L.

IN FITS AND STARTS, CHARTER SCHOOL FOR DESIGN OPENS DOORS

The nation's first charter high school with an architectural theme, which opened this fall to some 400 Philadelphia area students, is off to a shaky start—though its organizers remain optimistic that the venture will succeed.

The Architecture and Design Charter High School, located on a 26,000-square-foot floor of an office building near Independence Mall, is heavily supported by the Philadelphia chapter of the AIA and by local architects who have devoted considerable time and some \$60,000 so far in donations, along with loan guarantees to help renovate the formerly vacant facility. Five of the school board's 11 members, including its chairman, are AIA members.

Unforeseen problems

Classes began on September 13, but with construction complete on only 5 of the 18 planned classrooms, a barely adequate lunchroom, an incomplete security systems, and no firm procedures to enforce dress codes or discipline, the school's leaders abruptly shut down the new school for two weeks in October following resignations by several teachers and headline-grabbing student fighting outside school.

"Physically, we weren't ready to conduct school," says school board chairman Donald R. Matzkin, a principal of Friday Architects/Planners, who blamed the early chaos and closure on the scant time permitted by the state's charter law to create new schools from scratch.

"We had a principal who had never been a principal or participated in a school start-up," Matzkin adds. "So we were naive in setting up an appropriate system."

Like more than 1,700 charter schools that have opened across the country since the first one opened in Minnesota in 1992, the Architecture and Design Charter High School receives public education funds for every student it attracts, but is free of many of the

regulations that some believe inhibit ordinary schools. It must, however, demonstrate its stability and educational worth to renew its charter, which under Pennsylvania law expires after about five years.

Sandy Garz, executive director of the Philadelphia AIA, says plans are afoot to offer students internships with area architecture firms and building contractors, as well as to use the city itself as a living laboratory.

Back in business

The school reopened on October 25 and Matzkin and Garz now say that the school's worse-than-expected start-up problems are largely behind them. Classes that lacked walls, carpeting, and computer wiring have been completed, and lunchroom renovations are proceeding. A veteran administrator has replaced the original principal, stability has been restored to the teaching staff, security issues have been addressed, several unruly students were "counseled out" of the program, parent

involvement is being more actively courted, and fewer than 20 parents withdrew their children as a result of the temporary closure.

Future priorities

Development curricula and training teachers in the various schools of design thought remain key unmet challenges, concedes Matzkin. Architecture-oriented subjects such as drafting and 3-D design are appendages to the curriculum rather than integral parts of it. "One of my motivations," he says, "is to incorporate into our curriculum visual problem solving, which is absent from most schooling."

While Philadelphia has the first charter school focused on architecture, Miami has had a public high school devoted to the topic since 1992. The Design and Architecture High School, in Miami's Design District, educates students in industrial design, fine arts, and fashion design, as well as architectural design and theory.

Lee D. Mitgang

VINOLY DESIGNS A CONVENTION CENTER FOR BOSTON BAY SITE Rafael Vinoly Architects, which recently won a competition to design a new convention center on the waterfront in Pittsburgh [April, page 58], is doing the same for Boston. The Boston Convention and Exhibition Center—a huge, 1.7 million-square-foot, \$700 million project—will be built on a 60-acre site in the city's South Boston Waterfront District, an area undergoing extensive rehabilitation by the city. The most striking feature of Vinoly's design is a curving, stainless-steel-surfaced roof that will jut over the various exhibition spaces and create a shining presence visible from around the city. S. L.



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MAJOR EUROPEAN OPERA HOUSES GET NEW DESIGNS AND NEW LIFE

European operagoers, rejoice! A trio of classic opera houses has been restored and expanded, with new productions at the revamped venues starting this fall and winter.

London's finest

After three and a half years of construction, the Covent Garden Opera and the Royal Ballet triumphantly returned to their refurbished 1868 home in London (right) on December 1. The reconstruction of the opera house was one of the most ambitious ever undertaken for a cultural facility.

The architect, Dixon Jones BDP, restored the auditorium's Victorian splendor (designed by E. M. Barrie) while altering the floor's rake to improve sightlines, tuning surfaces to achieve a drier sound, updating the seating plan to improve comfort, and adding seats, which now total 2,250. Also, the

auditorium now has its first air-conditioning system, says Charles Broughton, the project director.

Floral Hall, an 1858 glass-covered building abutting the opera house, was pressed into service as a multilevel expansion of its cramped foyer and lobby space. New escalators and elevators make most of the auditorium accessible to the disabled for the first time. More new construction houses vastly augmented back-of-house facilities, six new ballet studios, and a 400-seat studio theater. The architects wrapped the new construction in an arcaded band of retail, facing the historic square occupied by the Covent Garden Market, first laid out by Inigo Jones in 1641.

For a time, completion of the \$325 million project was threatened by an internal management crisis—now said to be resolved—which was exacerbated by the



stresses of a capital campaign and the scattering of resident companies to temporary quarters.

Setting the stage in Paris

Paris' Chatelet Theater reopened in October following a complete renovation of its stage, where Nijinsky danced to Diaghilev's choreography and Debussy created *Le Martyre de Saint Sebastien*. The year-long, \$12 million renovation involved the mod-

ernization of the stage facilities (opposite left), most of which are invisible to the public but essential for an international theater hoping to attract the best new productions.

The project included an entirely new metallic infrastructure, greater fire protection, improving sound insulation, and the computerization of motorized pulleys, lighting, and set changes. The entry lobby was also restored and cleaned. The

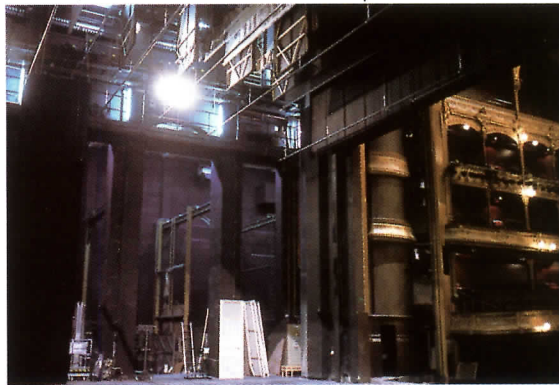
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Italian-style theater itself had been renovated 10 years earlier.

Chatelet was inaugurated in 1862 and is considered a historic monument. Contemporary theater productions require a greater flexibility of set movement than that offered by the 1862 structure, so the technical grid—the false ceiling from which several tons of equipment is suspended—was raised to allow more operating space, and a new technical grid was installed over the backstage area. The lateral supports were lengthened by narrowing the bridges—open metal gangways—to each side of the stage. Technicians will have to operate in a narrower space but the addition of more bridges will give them greater access. A computerized system will allow 24 different set or lighting maneuvers at the same time. The most delicate operations will still be done manually.



its trend-setting architecture and urban design, but no contemporary work of architecture has been as enthusiastically received by Barcelonans as the recently reopened Grand Theater of the Liceu (above right), the city's historic opera house, which was gutted by fire in January 1994. Since it was first built in 1847 on the Ramblas, the main street of the medieval quarter, the Liceu has been the center of upper-class social life, Spain's leading musical institution, and an important part of the city's identity.



The theater that was inaugurated in October is a meticulous reproduction of the original, built by local architect Josep Oriol Mestres after a fire in 1861. Only the stage curtain, designed by fashion designer Antonio Miró, and the ceiling rosettes, by created by local artist Perejaume, add a contemporary note. Backstage facilities, however, have been completely modernized, following a renovation plan developed by architect and historian Ignasi de Solà-Morales before the 1994 fire. (Solà-Morales was

also responsible for the 1986 reconstruction of Mies van der Rohe's Barcelona Pavilion.) The size of the building has nearly tripled, from 130,000 to 345,000 square feet, with expanded foyers, new basements and roof structures, and the expropriation of several neighboring buildings. The Liceu's \$94 million cost was funded by national public institutions, with contributions from local businesses.

*James S. Russell, AIA (London);
Claire Downey (Paris);
David Cohn (Barcelona)*

New life for the Liceu

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CIRCLE 39 ON INQUIRY CARD

Sylvia Kwan, FAIA, is acting on it: she was named chair of the San Francisco Chamber of Commerce in November. Kwan, president of Kwan Henmi Architecture and Planning, and a member of the chamber's board, will begin her term next year.

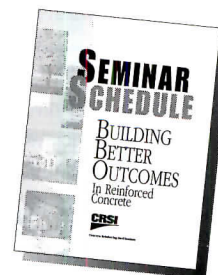
Pegasus flies again The winged horse that has ridden the top of the Magnolia Building in Dallas since 1934, but which has been dark for several years, will make a dramatic comeback on New Year's Eve. As part of the city's millennium celebration, the 35-foot-tall horse—long an icon of the skyline—will be dismantled, reconstructed of more durable materials, and relit on December 31.

Towering achievement The Hong Kong Town Planning Board has approved a design by Adrian Smith of Skidmore, Owings, & Merrill (SOM) for a 102-story building that will be built on a podium over the Kowloon Airport Railway. The 1,902-foot-tower will include a retail Galleria, luxury hotel, office space, public observation deck, and restaurants. The design features a series of folding crystalline planes, each catching light at different angles, with a tapered vertical shaft.

Garden State gala Princeton University hosted AIA/New Jersey's Design Day 1999 in November. A gathering of architects—including Charles Gwathmey, FAIA, David Childs, FAIA, and homestate stalwart Michael Graves, FAIA—honored the winners of this year's design competition, which included two silver awards for the Newark-based firm CUH2A. In addition, panel discussions explored what motivates young-, mid-, and senior-career architects.

Hellmuth, Perriand die George F. Hellmuth, FAIA, cofounder of Hellmuth, Obata + Kassabaum (HOK), died November 5 in St. Louis at age 92. In 1955, Hellmuth; Gyo Obata, FAIA; and the late George E. Kassabaum joined to create HOK in St. Louis with 26 employees. The firm now has more than 1,600 architects, engineers, interior designers, planners, landscape architects, graphic designers, and support personnel in 24 offices worldwide. Hellmuth served as HOK's board chairman until 1979 and then was chair of HOK International Inc. until he retired in 1986.

Charlotte Perriand, a French designer who created influential furniture in the 1920s and '30s, died in Paris in October at age 96. During her long career, Perriand—who subscribed to the Modernist notion that furnishings and architecture should be developed as a single entity—designed chairs with Le Corbusier and Pierre Jeanneret, bamboo furniture in Japan, lobbies for Air France, workers' housing, and ski-resort interiors. ■



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A few clicks and the drama and vision of the architectural future appear before your eyes as conceived by nine brilliant architects commissioned by RECORD to design buildings for the new millennium.

Exclusively on architectural-record.com, Kurt Andersen, author of *Turn of the Century* stimulates with compelling images and commentary **in addition to those published in the December issue.**



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LET'S GET DIGITAL

Rapid Prototyping, a process borrowed from industrial design, lets architects make scale models from computer files, fast! For December, **Digital Architect online** takes you there with the scoop on rapid-prototyping software products, applications, and **vendor contact lists**. Plus, past Digital Architect columns and high-tech product reviews and vendor listings keep you **connected to the data you need to fulfill your IT needs.**

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DATESEVENTS

Calendar

Constant's New Babylon**New York City***Through December 30*

The first major U.S. exhibition of Constant Nieuwenhuys' magnum opus, an urban utopia imagined through models, paintings, films, and sound. The Drawing Center. 212/219-2166.

Big Buildings**New York City***Through December 31*

This exhibition explores a dimension of the skyscraper just as impressive as its height: sheer volume. The Skyscraper Museum. 212/968-1961.

The Lamps of Tiffany: Highlights from the Egon and Hildegard Neustadt Collection**Wilmington, Del.***Through January 2, 2000*

More than 45 objects provide an overview of the achievements in glass by the Corona, N.Y., workshops of the Tiffany Glass and Decorating Co. Delaware Art Museum. 302/571-9590.

The Work of Charles and Ray Eames**New York City***Through January 9, 2000*

A retrospective of the work of these midcentury pioneers of design. Cooper-Hewitt, National Design Museum. 212/849-8400.

Landmark American Bridges of the 21st Century**Boston***Through January 28, 2000*

Documentation of the design and engineering of seven major American bridges currently under construction or in their final design phases. The Architects Building/BSA. 800/662-1235.

Rambusch: The Art of Craft**New York City***December 7 to January 1, 2000*

A look at 100 years of the interior arts produced in the Rambusch family's lighting studio and workshop. National Arts Club. 212/475-3424.

Cedric Price: Mean Time**Montreal***Through February 27, 2000*

On exhibition are the often humorous unbuilt projects of English architect Cedric Price, whose work explores how architecture can adapt itself to

new uses over time. Projects include an abandoned railway line converted into a roving university and a demountable house for an archeologist. Canadian Centre for Architecture. 514/939-7000.

Triumphs of the Baroque**Montreal***December 9 to April 9, 2000*

An exhibition of European architecture, 1600-1750, highlighted by 30 large-scale architectural models. The Montreal Museum of Fine Arts. 514/285-1600.

At the End of the Century:**100 Years of Architecture****Chicago***December 19 to March 12, 2000*

A traveling multimedia exhibition highlighting major trends in 20th-century architecture. Museum of Contemporary Art. 312/280-2660.

A Century of Design, Part I: 1900-1925**New York City***December 14 to March 26, 2000*

The first in a series of exhibitions surveying 20th-century design of furniture, metalwork, glass, ceramics, textiles, jewelry, and drawings. The Metropolitan Museum of Art. 212/535-7710.

Art Deco Festival**Miami Beach***January 10-16, 2000*

A festival celebrating the 75th anniversary of the 1925 Exposition Internationale des Arts Decoratifs et Industriels Modernes. There will be guided tours of Miami Beach's Art Deco district, a collectibles street fair, films and lectures, and live music. For information, call the Miami Design Preservation League at 305/672-2014.

ICON 2000**Dallas***January 14-17, 2000*

Over 70,000 construction industry professionals are expected to attend this year's event, which combines the International Builders' Show and the International Commercial Construction Exposition. Register online at www.BuildersShow.com or www.ICCON.com.

Material Evidence:**Chicago Architecture at 2000****Chicago***December 11 to March 5, 2000*

Guest-curated by Cynthia Davidson, this exhibition investigates how the use of materials drives contemporary Chicago architecture. Featured

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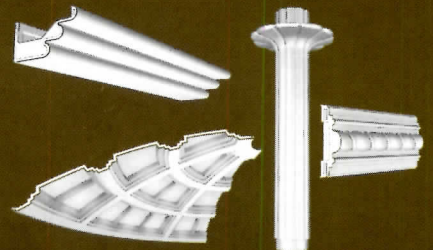
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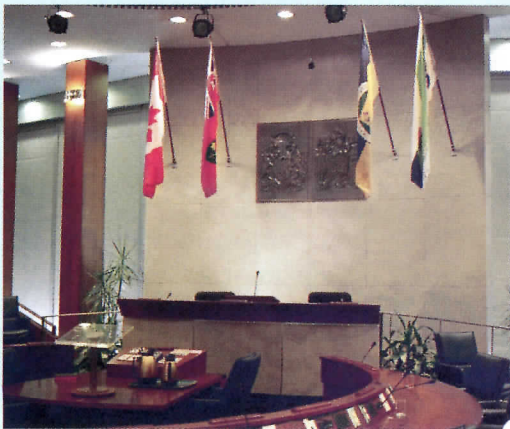


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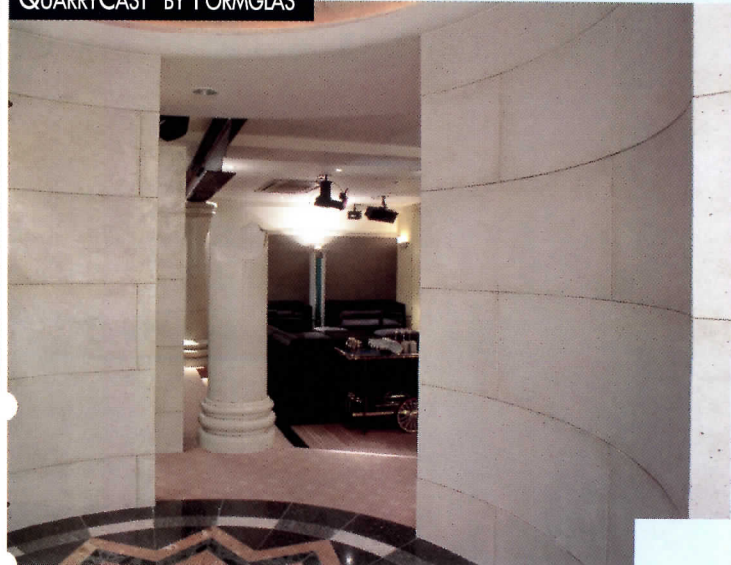
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Design: Prizma Design for Hamilton City Hall

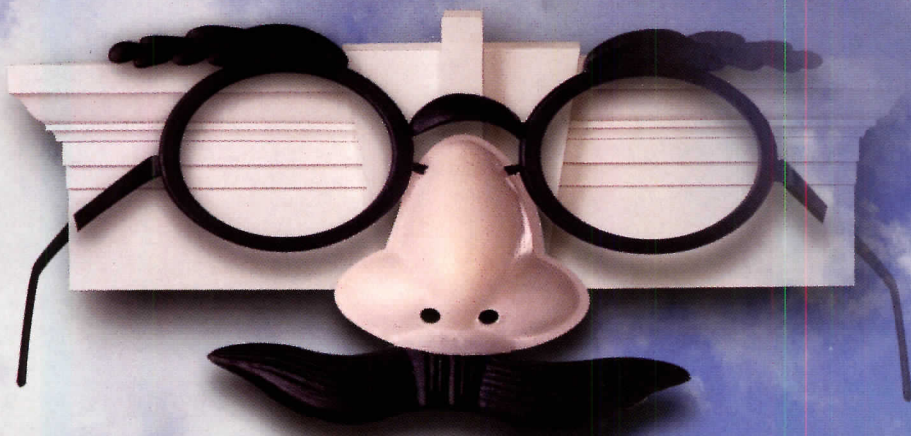
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contemporary Chicago architecture. Featured architects include Ron Krueck, Obi Mwazota, Carol Ross Barney, and Joe Valerio. Also on display are commissioned installations by Sarah Dunn/Martin Felson, Studio Gang/O'Donnell, Doug Garofalo, and Helmut Jahn. Museum of Contemporary Art. 312/280-2660.

Masonry Expo 2000

Las Vegas

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The annual convention and tradeshow for the masonry and paver construction industry. Las Vegas Convention Center. 877/627-3976.

Competitions

ALFA Best of Home 2000 Design Awards

Application deadline: January 7, 2000

Submission deadline: February 8, 2000

These awards honor assisted-living projects. Architects, interior designers, and assisted living providers may enter. Categories include interiors, new construction, renovation/remodeling, and Alzheimer's/dementia care. E-mail info@alfa.org.

The Rotch Traveling Scholarship

Application deadline: January 10, 2000

This \$30,000 scholarship allows a young architect to study in a foreign country for up to a year. Eligible are U.S. citizens under 35 years old with at least one year of experience at a Massachusetts firm or an architecture degree from an accredited Massachusetts architecture program plus one year of professional experience anywhere. Visit www.rotchscholarship.org.

The James Beard Restaurant Design & Graphics Awards

Submission deadline: January 31, 2000

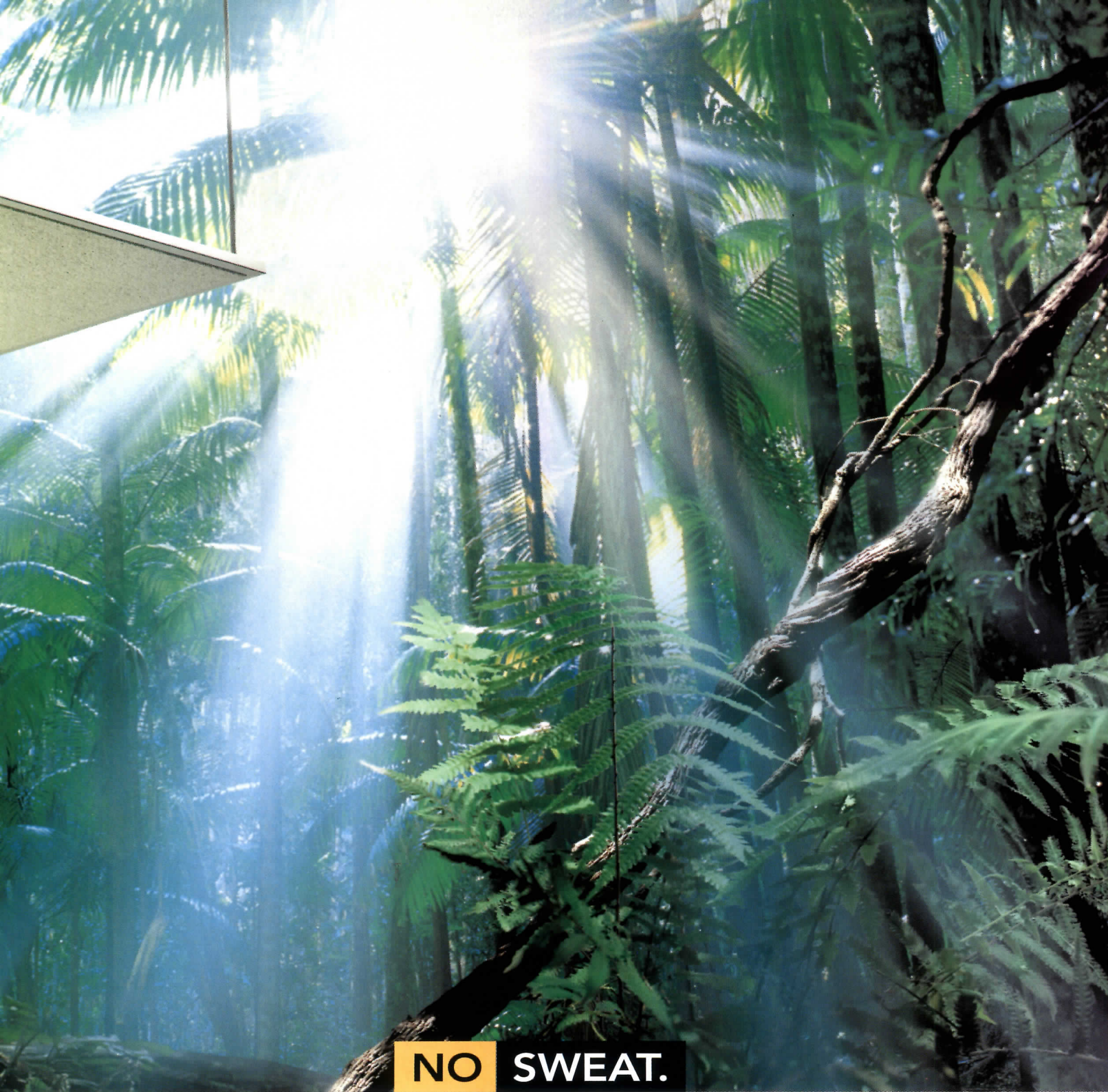
For architects and interior designers who exhibit excellence in restaurant design. Call 212/627-1064 or 212/645-3654 or visit www.jamesbeard.org.

1999-2000 Young Architects Forum

Submission deadline: February 18, 2000

This annual ideas competition, sponsored by the Architectural League of New York, is open to architects who have graduated from architecture programs within the last 10 years. Winners receive a cash prize and are invited to exhibit their work and present lectures in May and June. For an entry form, call 212/753-1722. ■

Please submit information for the calendar at least six weeks prior to the magazine's publication date (December 15 for the February issue).



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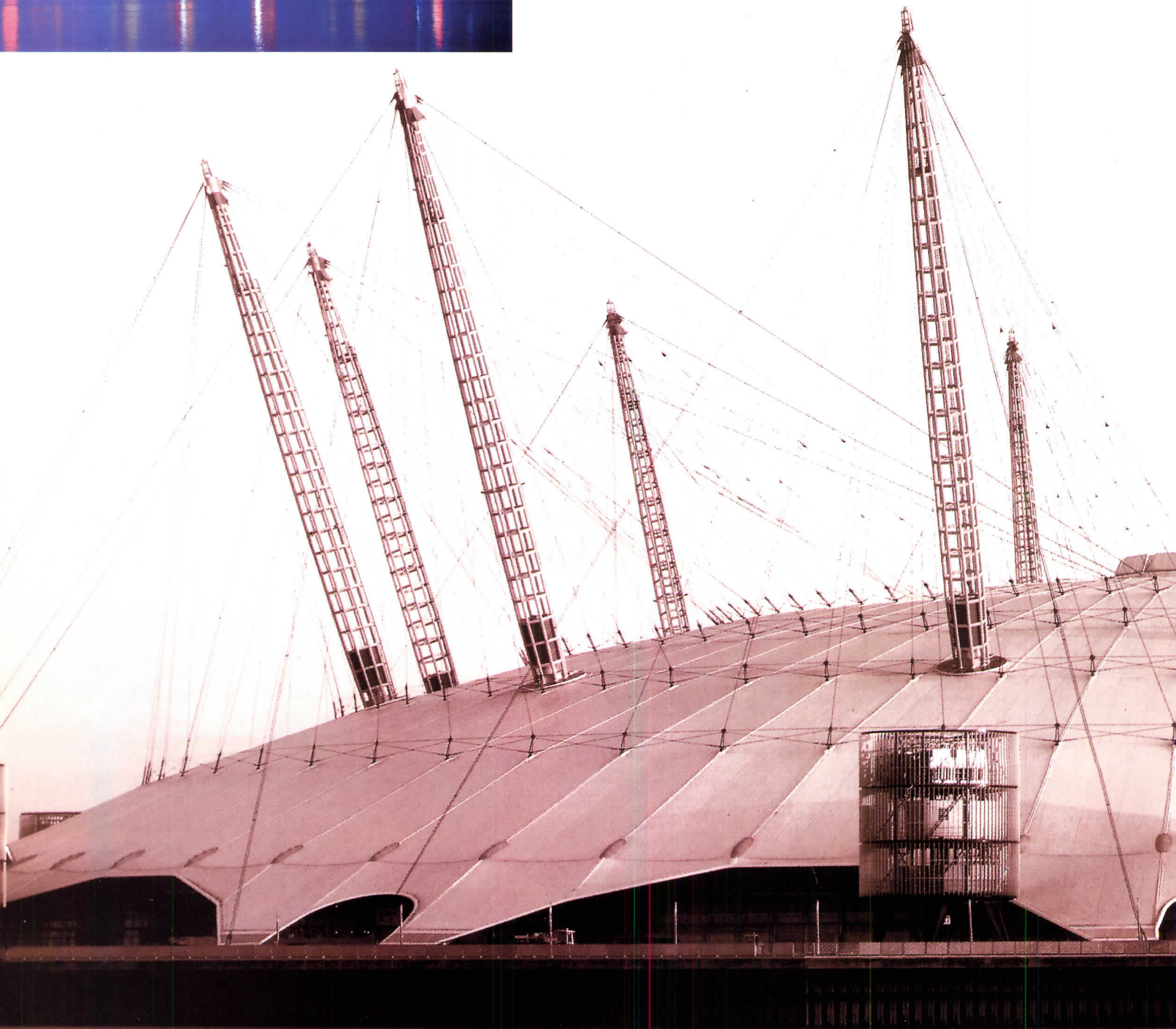


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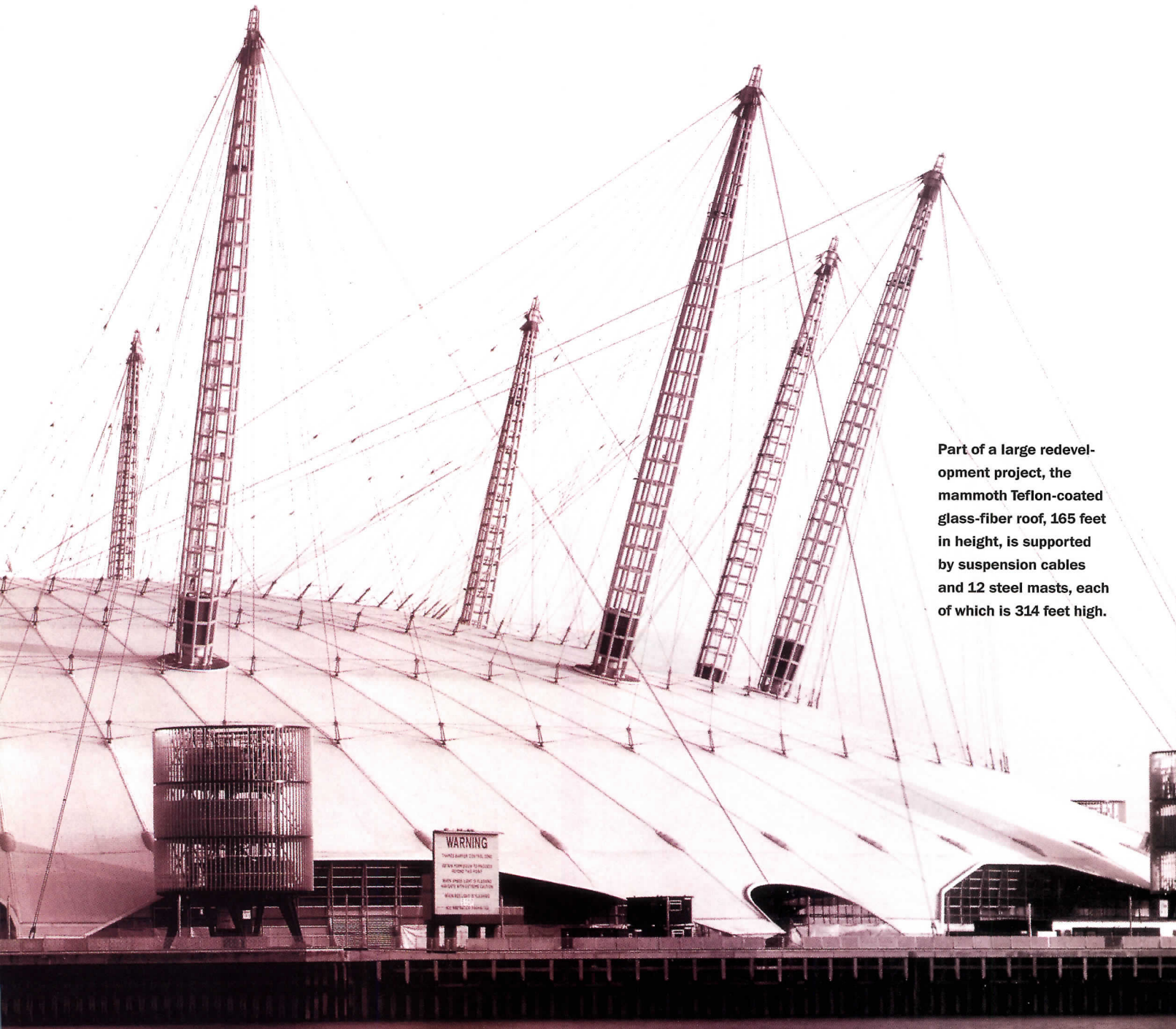


by Suzanne Stephens

The much-ballyhooed Millennium Dome is almost ready for the Big Moment. From the outside, the largest tensioned membrane structure in the world (20 acres in size) seems to float serenely over the former industrial wasteland of the Greenwich Peninsula, east of London. Inside, a last-minute frenzy of construction goes on, as 14 exhibition pavilions, or "zones," are rapidly nearing completion.

Designed by Richard Rogers Partnership with Buro Happold as consulting engineers, the 1,056-foot-diameter circular dome had long engendered debate about its contents. In 1997 the government-supervised New Millennium Experience Co. was charged with solving what became a thorny question. And so 14 corporate-sponsored exhibition zones are arrayed in pie-wedge fashion around a central arena where "The Millennium Show,"

replete with dancers and acrobats, will be staged five times a day. Because both the exhibitions and the show must appeal to a wide range of people, including children, the zones have been assigned such feel-good themes as "faith," "shared ground," "learning," and "money" (true!). Clearly, kitsch and superficiality hover over the spectacle of infotainment. Nevertheless, several of London's edgier architects were commissioned to design pavilions (although not necessarily the exhibitions inside). The results should intrigue some of the 12 million visitors expected during the year-long festival. In 2001 the dome will be up for grabs: bidders want to turn it into a sports arena, a film studio, or a cultural center. For now, however, the agglomeration of edifices under a fabric sky could illustrate the possibilities inherent in Bucky Fuller's futuristic vision for a city under one roof.

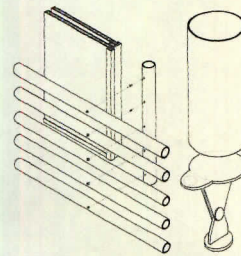
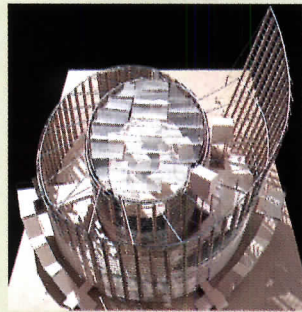
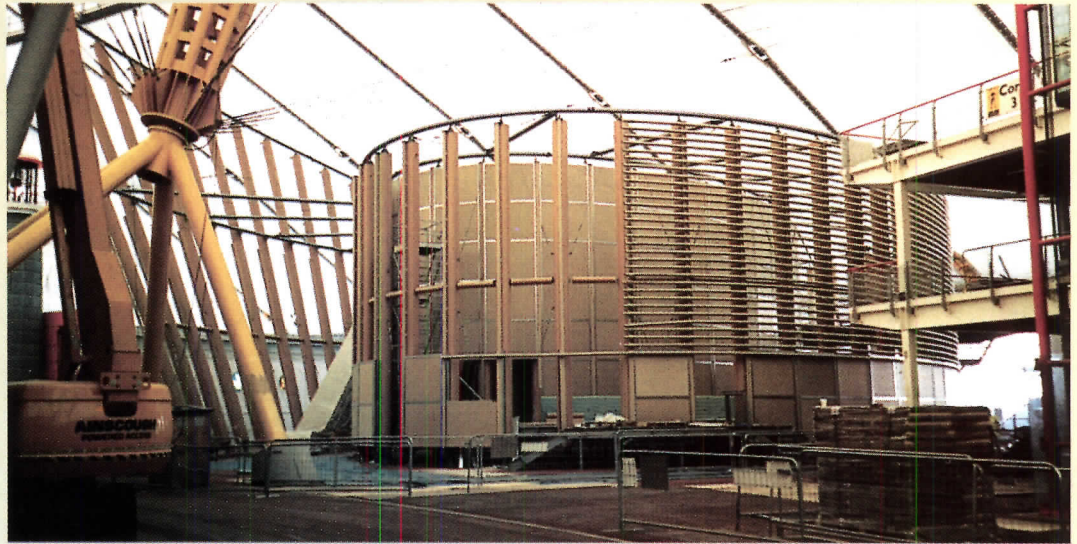
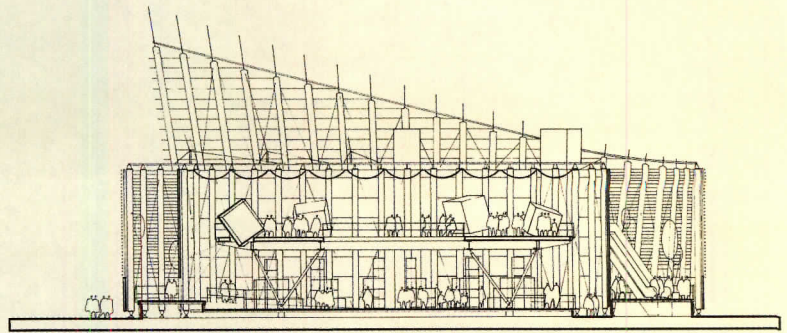


Part of a large redevelopment project, the mammoth Teflon-coated glass-fiber roof, 165 feet in height, is supported by suspension cables and 12 steel masts, each of which is 314 feet high.

GUMUCHDJIAN & SPENCE WITH SHIGERU BAN

The clean, sculptural spiraling form of the pavilion for the “Shared Ground” exhibition is created from recycled cardboard. Devoted to an exhibition on the relationship between community and space, the paper building was designed by Philip Gumuchdjian and Stephen Spence, recent alumni of Richard Rogers Partnership, along with Shigeru Ban, the Tokyo-based architect known for his cardboard refugee housing in Japan. The three, working with Buro Happold on engineering and English materials research firm DCAB, came up with a cardboard structural system of tubular columns, mullions, louvers, and panels.

“We wanted to show that rubbish could be made into high-quality architecture,” says Gumuchdjian. The cardboard for the spiral structure was donated by children in Britain and also came from industrial waste. Both short- and long-fiber paper was then spun into 100 columns, the secondary structural elements, and cladding. A steel deck and a steel ring beam provide extra stability.



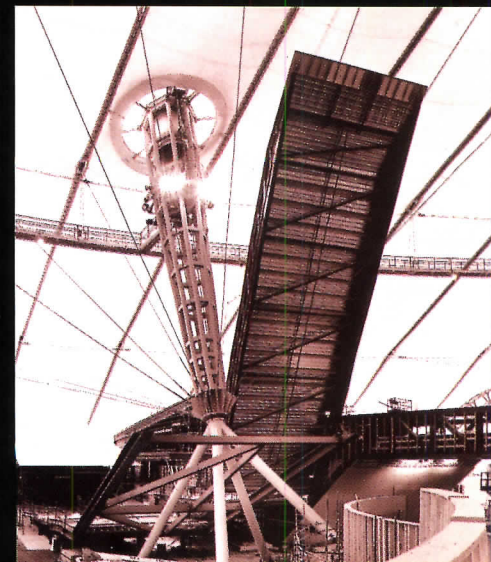
In the Shared Ground pavilion, recycled cardboard forms columns, mullions, louvers, and panels. The 15,000-square-foot structure ranges from 40 to 80 feet high.

ZAHA HADID

At 16,140 square feet, the Mind Zone is the largest project in Britain by Zaha Hadid's office. The steel structure, with timber-composite secondary trusses, was designed with Ove Arup as consulting engineer. Striking elements include a 79-foot-long cantilevered deck, a high entrance panel clad in a stretched mirrored material, and a continuous floor, wall, and soffit surfaced in lightweight glass-fiber-reinforced polymer panels. These panels are combined with aluminum honeycomb for the floors and laid

over steel-stud construction for the walls and ceiling. Lit from behind, the luminous blue shape should provide an eerie backdrop for spectators parading through the 99-foot-high pavilion on a linear (but spatially varied) circuit.

Unlike the others, Hadid had control over the Mind Zone's content. With the help of art consultant Doris Lockhart-Saatchi, she selected a number of young artists to come up with installations for reflecting (and perhaps provoking) the mind's various thought processes.

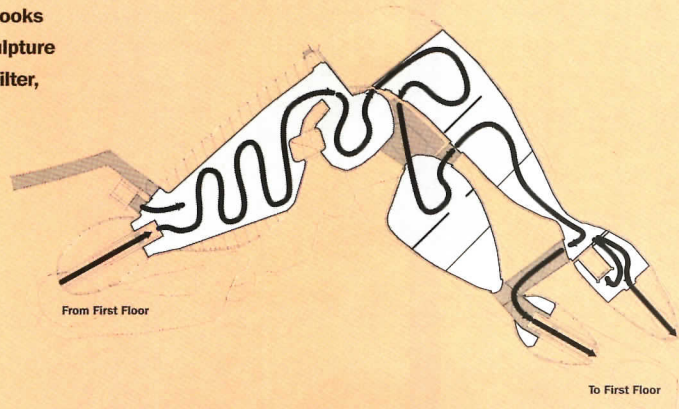


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The Body Zone, which looks like a Henry Moore sculpture through a psychedelic filter, has two levels.

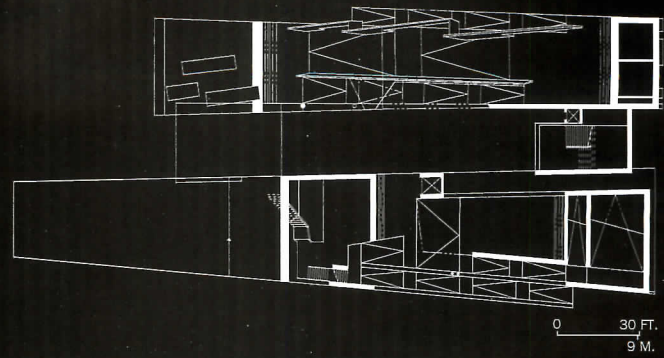
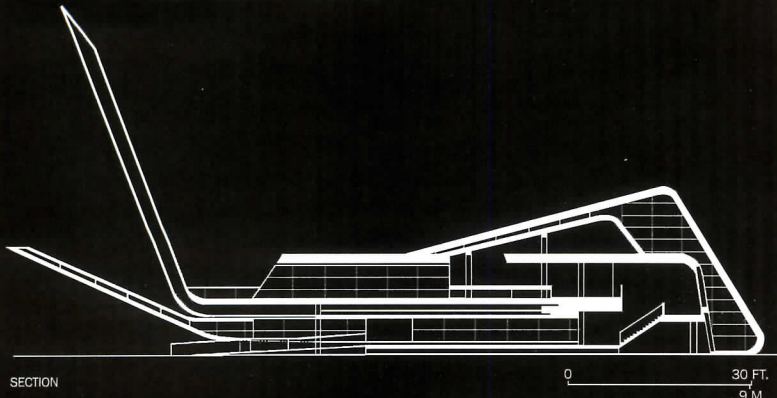


The flesh-colored forms of a large humanoid couple have given the Body Zone its particular identity. Visitors will roam through the abstracted innards, looking at exhibitions having to do with health, beauty, and lifestyle. While Doug Branson and Nigel Coates did not have control over the installation, the zooty vulgarity of the 84-foot-high structure easily makes it a showstopper.

In the computer-generated pavilion, for which Buro Happold was consulting engineer, four steel tubes of different sizes run from the ground to the head and are attached to a heavy-duty steel platform. Bent-profile steel hoops, 189 in all, form the contours of the body. From the hoops extend 20-millimeter-thick steel bars, much like quills, whose ends are cropped to meet the contours of the skin. A mass of 10-millimeter-thick steel rods are welded to these ends, with a fine mesh tied to them.

A central tower helps support the structure, and elevator towers add stability. The skin itself is glass-fiber-reinforced concrete sprayed onto the frame, which in turn is surfaced in 83,000 iridescent plastic tiles ranging in color from blue to pink to yellow.

In the Mind Zone, visitors enter under a large screen of mirrored material and walk through the structure on a path that leads into open ramps and enclosed spaces, as seen in the plan (below) and section (right).



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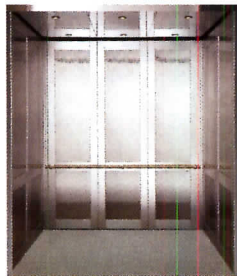
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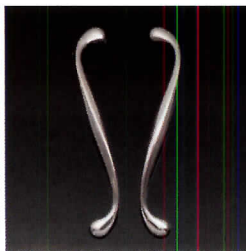
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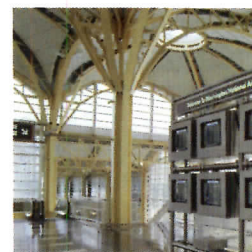
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Millennium Part Two: Futures to Come

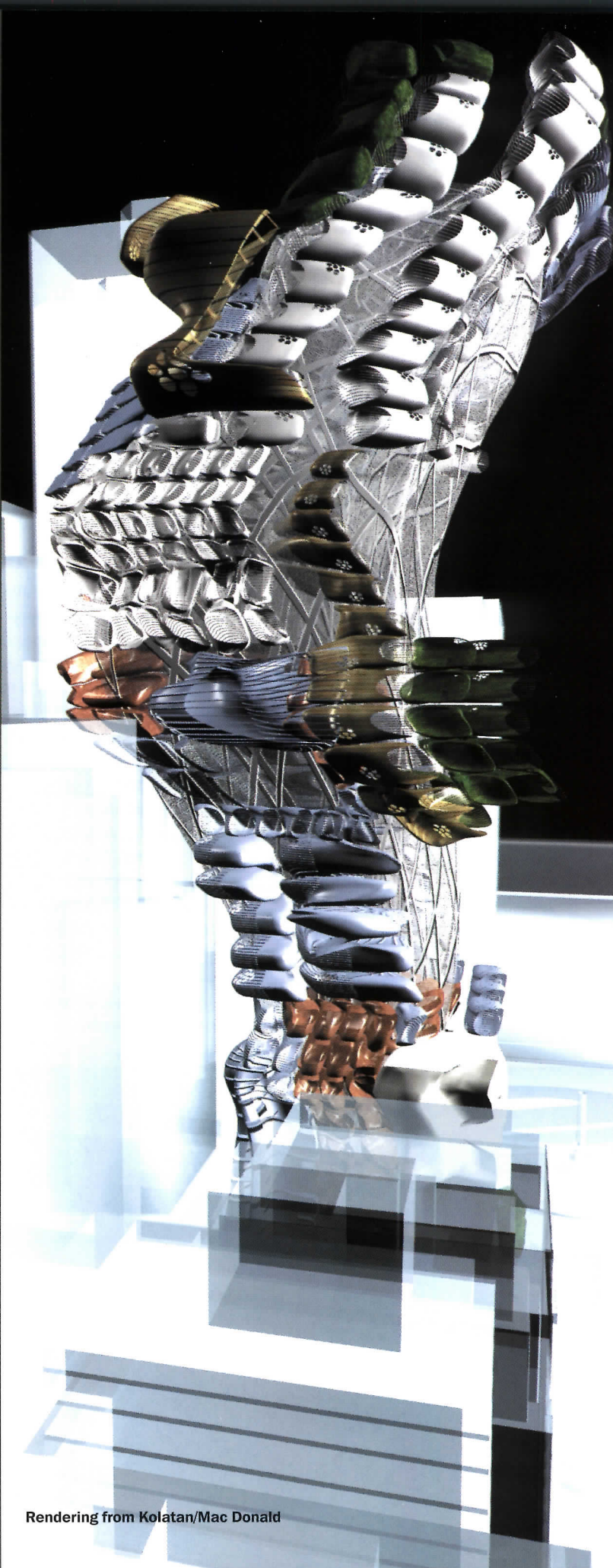
What form will architecture take in the next one hundred years? For ARCHITECTURAL RECORD's Millennium Issue, Part II, we asked a group of young, innovative, American architects to come up with a range of schemes that address specific needs in the 21st century.

Forget sci-fi intergalactic extravaganzas. We sought designs that were both speculative and realistic. Therefore, we charged the nine U.S. firms selected with investigating new solutions for existing building types, from a high-rise apartment house to an office tower. We favored American architects outright. Because the work of architects in other countries receives so much attention today, the challenge was to see what our younger architects could produce if they had just the right clients (us!).

Not every building type is represented, and not every future problem is anticipated, but the schemes explore a number of solutions to social concerns by harnessing solar power, providing accessible housing for the elderly and disabled, and developing more efficient transportation systems. The designs suggest new applications for materials and technologies being developed in other industries. And no matter how unusual they are, the projects reflect a desire to create meaningful architecture, for dynamic and contemplative environments and for aesthetic quality.

To gain an outside perspective, we asked culture critic Kurt Andersen to comment on the sumptuous feast. What is served up is undeniably design for thought.

Suzanne Stephens and Clifford Pearson



Rendering from Kolatan/Mac Donald



KOLATAN/MAC DONALD STUDIO creates “vertical urbanism” in its RESI-RISE SKYSCRAPER

Project: Resi-rise

Location: Manhattan's Columbus Circle, Central Park South corner

Architect: Kolatan/MacDonald Studio—Sulan Kolatan and William MacDonald, principals; Stefano Colombo and Jonathan Baker, design coordinators; Linda Malibrán, Yolanda do Campo, German Rojas, Christian Ditlev Bruun, Anthony Burk, Beat Schenk, and Maria-Eleni Kosmidou, design team

Consultant: Buro Happold Consulting Engineers

Program: Residential hotel and offices for short- and long-term occupation with entertainment and retail facilities

Size: 51 stories; 44,000-square-foot base

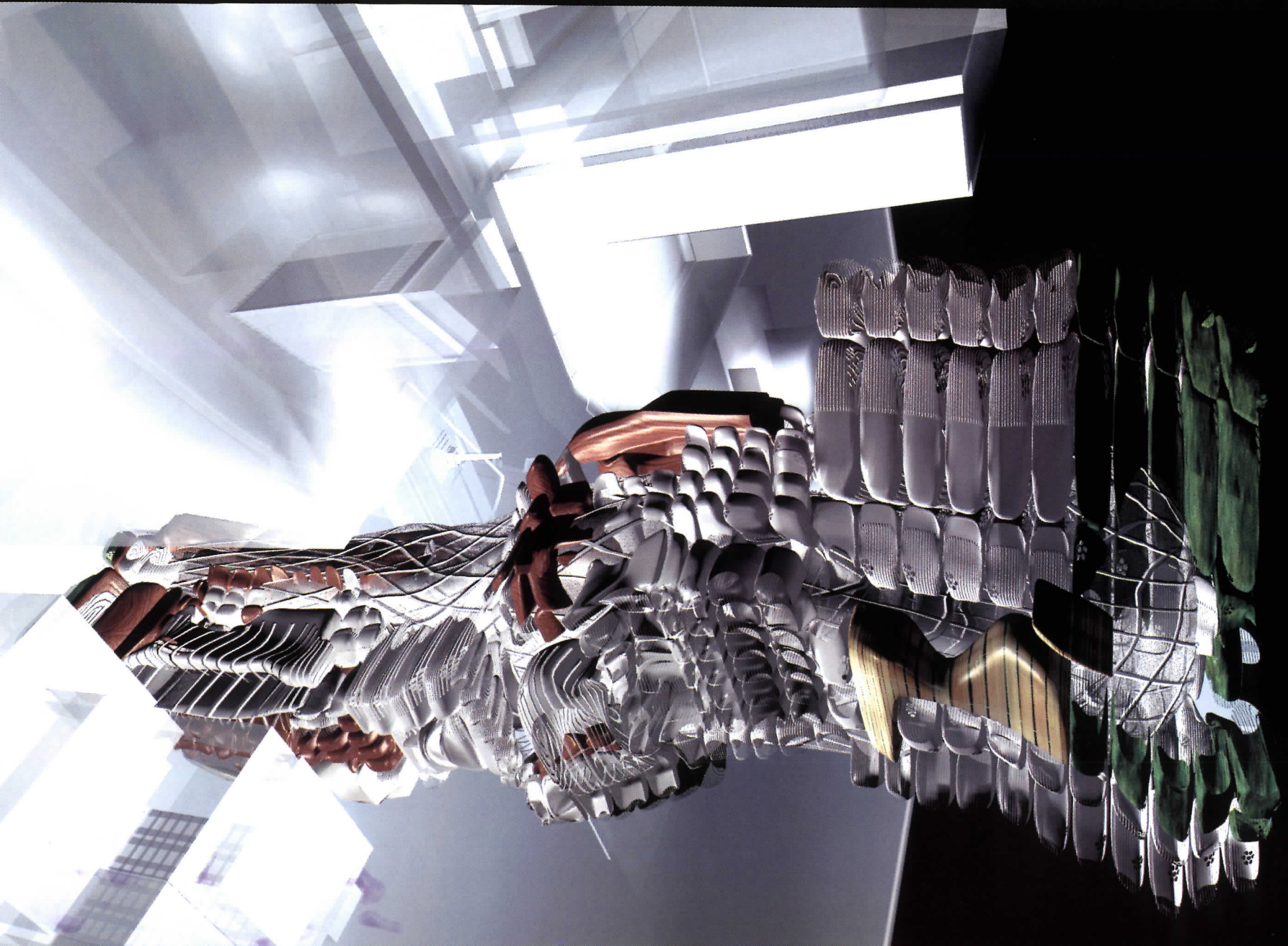
Completion Year: 2005; roll-outs planned in other locations and cities

Design Intent: The Resi-rise was conceived less as a building and more as “vertical urbanism.” Its frame, a 3-D matrix of “lots,” is built to the maximum allowable zoning envelope, deforming in response to site influences, such as views and adjacencies.

Once the infrastructure and frame—a load-bearing structure of fiber-reinforced polymer composite



The massing of the Resi-rise tower is determined by the maximum allowable zoning envelope and site parameters such as views and adjacent setback heights.



components—are complete, individual rental tenants supply and inhabit their own “pods” without depending on full occupation of the building. Resi-rise’s top and bottom levels—typically the most desirable real estate—would likely fill first, leaving the midsection free for later pods. This condition is akin to a new block with its infrastructure and first few residents in place—quite unlike a partially populated shell-and-core building.

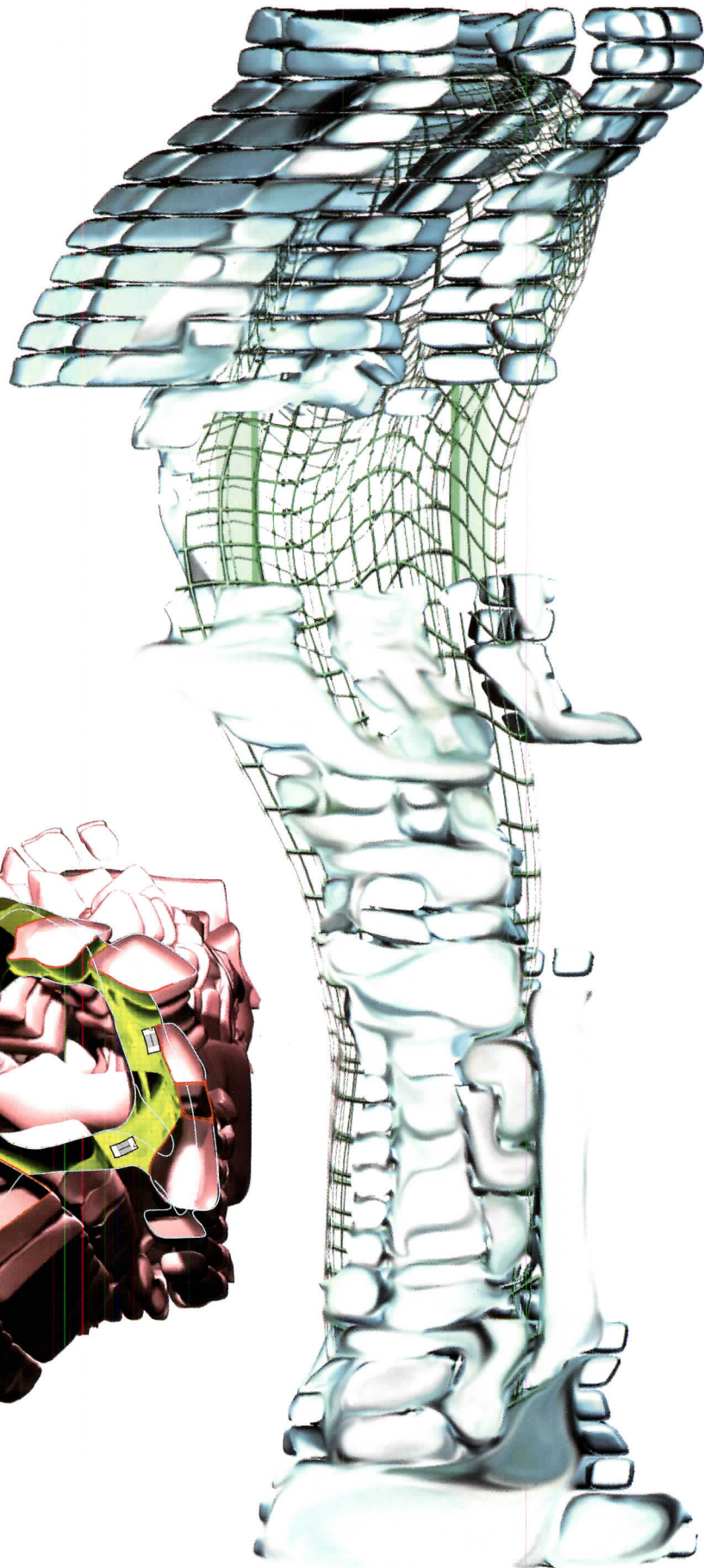
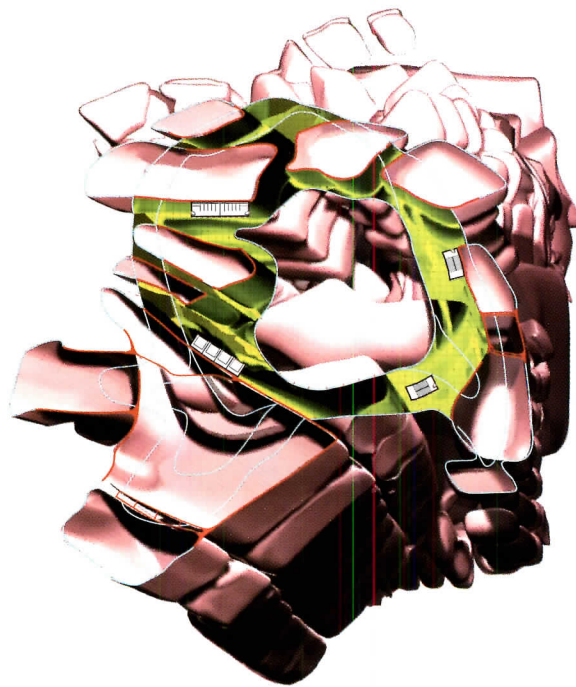
The pods, made of a low-density core material, a high-density skin, and curved, laminated glass, contain plumbing, ventilation, and electrical/communications networks, which are linked up when the units are installed. Lifted into place by a permanent crane system, the pods are removed for recycling after use. Secured to the matrix, the pods play a structural role, supplanting load-bearing frame members.

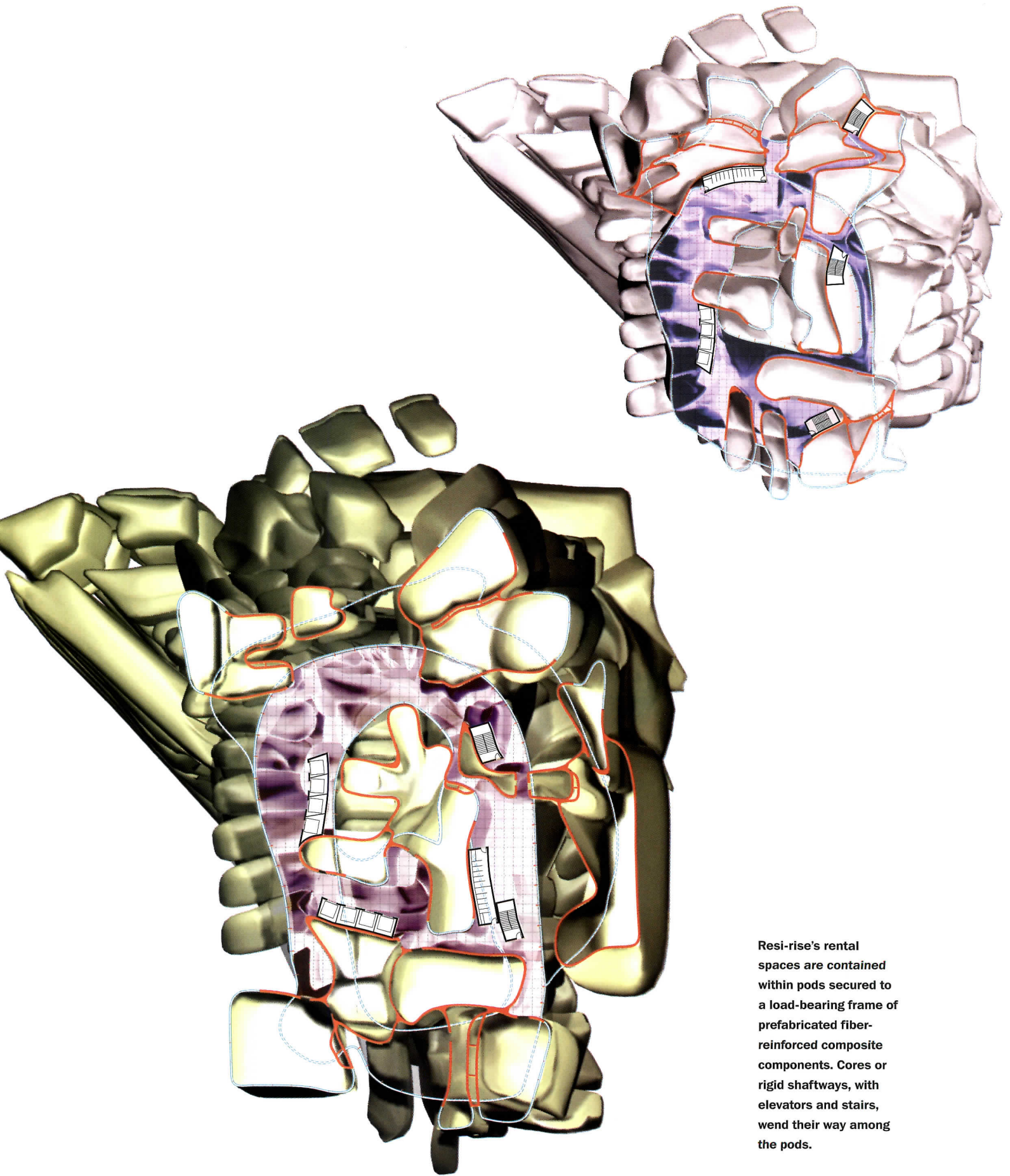
A lightweight industrial-grade fabric with transparent, translucent, and opaque areas wraps the frame. Elevator shafts run at angles, with skylobbies connecting to local escalators and stairs. Much of the building’s electrical power is generated by thin-film on-site photovoltaics.

The pod morphology, size, programming, function, materials, and furnishing can be customized within Kolatar/ MacDonald’s parameters. Like a chimera, the Resi-rise merges multiple identities within a collective, unified system. Individual residents can influence the units’ spatial distribution. With the removal of old pods after tenants leave, short-term scenarios become feasible. Groups can come and go with their own pods.

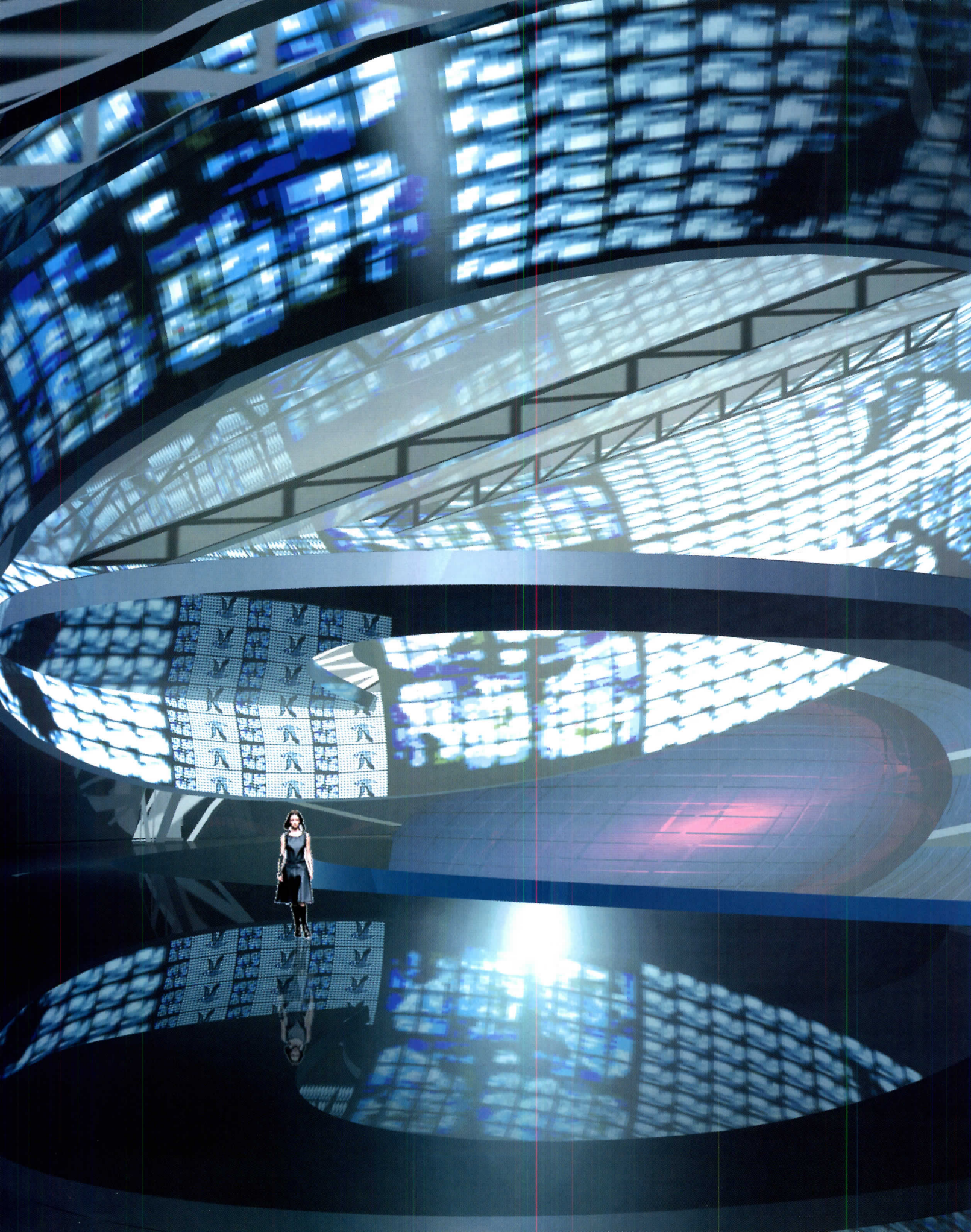
For the tenant, the pod is less like real estate and more like a leased car. The architects remain involved with their product by giving the owner/tenant the option of upgrading to the latest model as new materials and technologies emerge. Construction of the Resi-rise is thus open-ended.

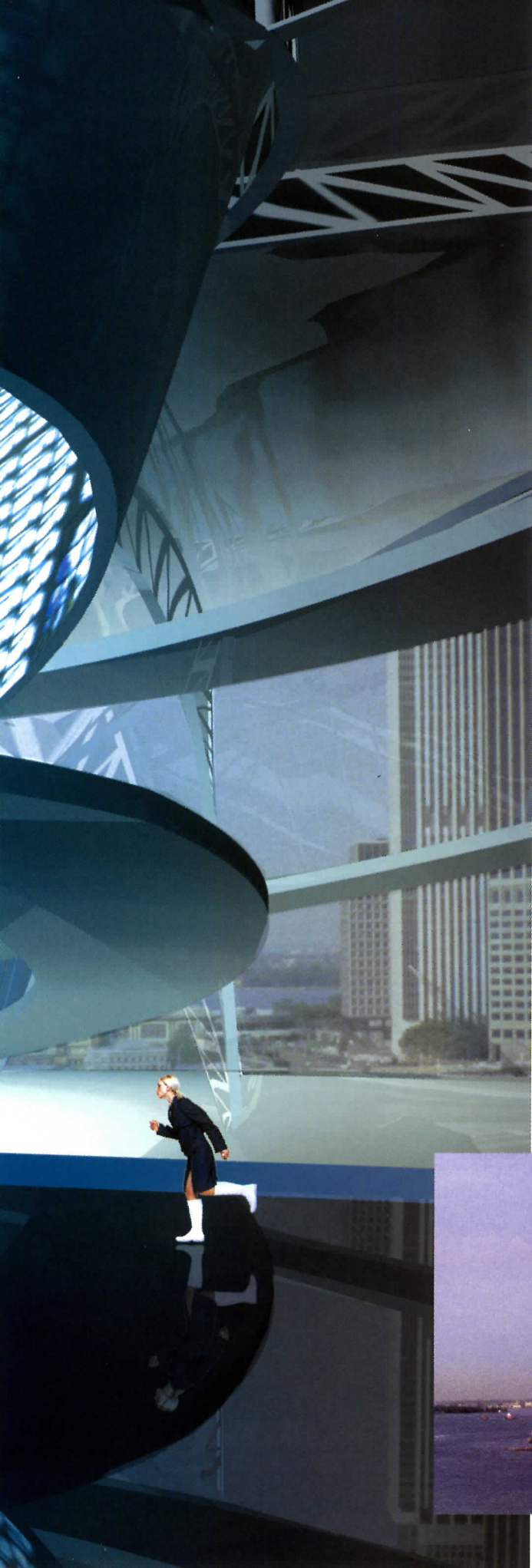
Materials and Technologies: Plastics that undergo molecular restructuring with stress; smart glass that responds to light and weather conditions; anti-bacterial woven-glass-fiber wall covering; smart interior walls that control climate; and pultruded fiberglass-reinforced polymer structural composites





Resi-rise's rental spaces are contained within pods secured to a load-bearing frame of prefabricated fiber-reinforced composite components. Cores or rigid shaftways, with elevators and stairs, wend their way among the pods.





ASYMPTOTE envisions a sleek and dynamic MUSEUM OF TECHNOLOGY CULTURE

Project: Museum of Technology Culture

Location: Present site of East River Piers 9 and 11, Manhattan

Architect: Asymptote Architecture—Hani Rashid and Lise Anne Couture, principals; John Cleater, Noburo Ota, Florian Pfeifer, David Serero

Program: Large- and small-scale spaces for expositions and media events, a theater, education and administration areas

Size: Approximately 900-by-250-foot base; 500,000 square feet total

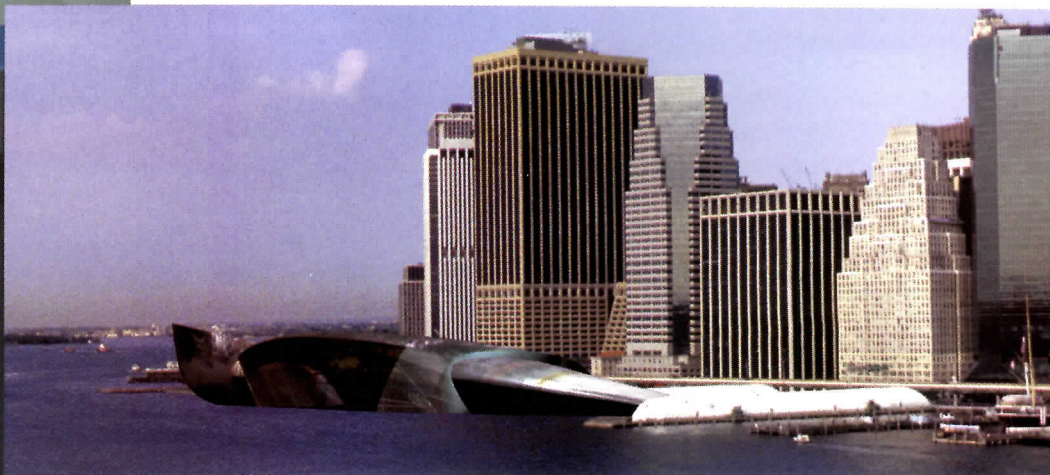
Completion Year: 2005

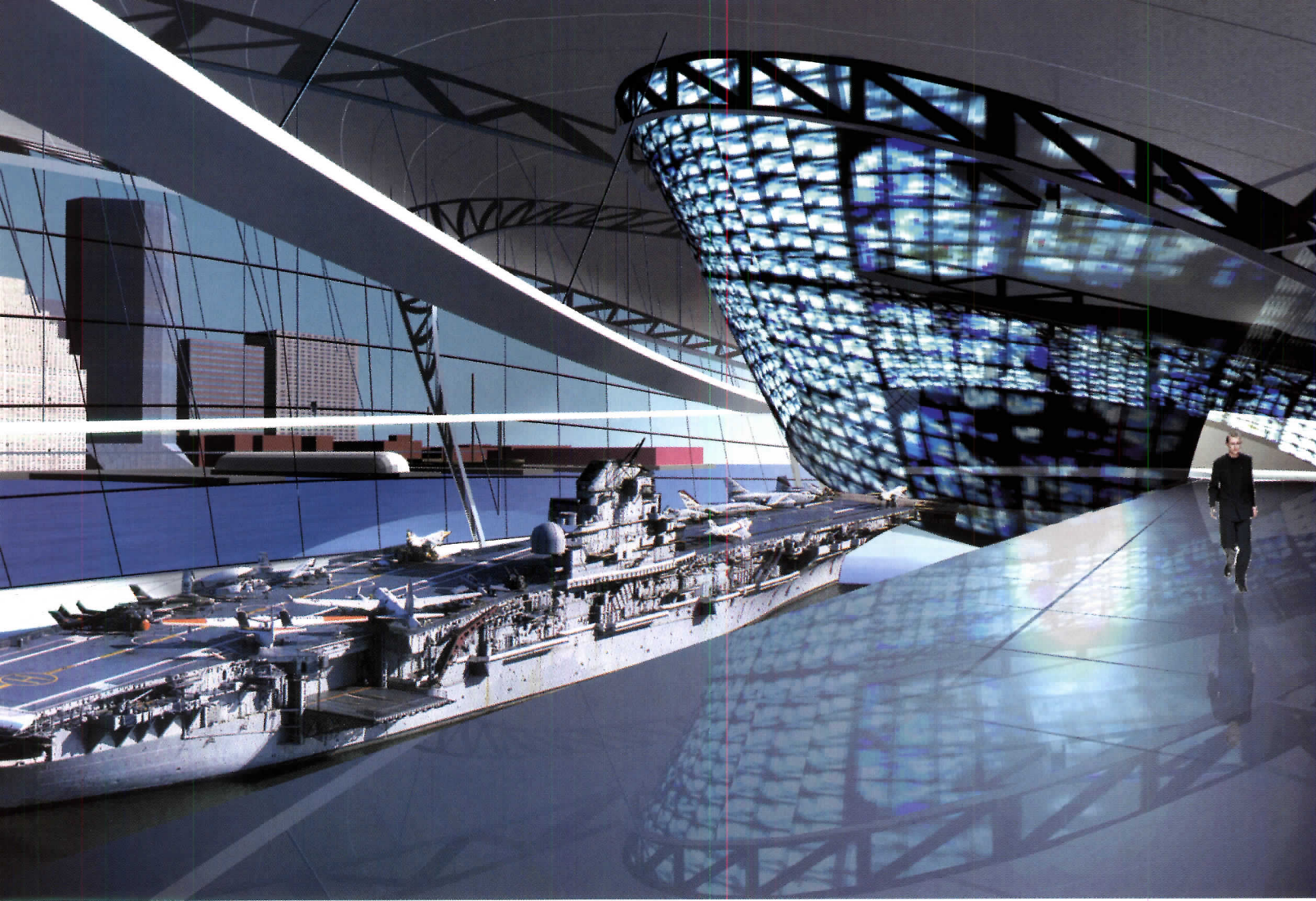
Design Intent: The Museum of Technology Culture was conceived as a hybrid structure merging the typology of a convention center with the utility of a hangar, the public-event character of a sports stadium, and the cultural programming of an art museum.

The museum focuses on late-20th-century technology in relation to the human condition. The concept traces origins in the early Machine Age, when such 19th-century buildings as Joseph Paxton's Crystal Palace anticipated a century of technological innovation setting the standards of progress.

The former providence of technology expositions has migrated to the sanctum of art museums—as evidenced, for example, by the New York Guggenheim Museum's exhibition of motorcycles on its famous ramps. The

Protruding into the East River (below), the museum extends Manhattan's urban density. The building is transformed as digital signals flash across its skin and its interior ramps (opposite) change configuration.





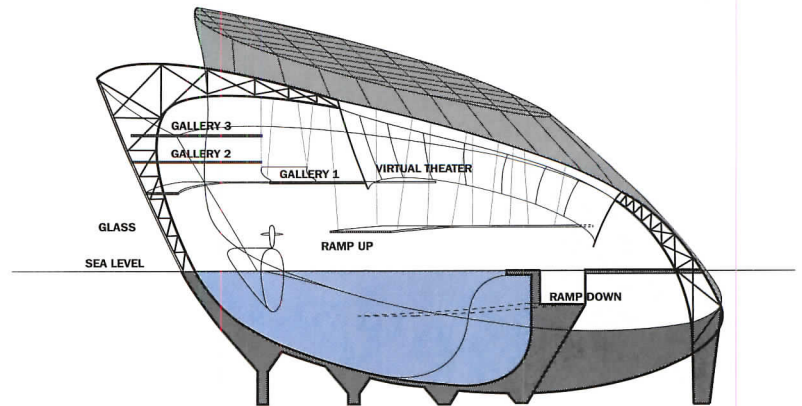
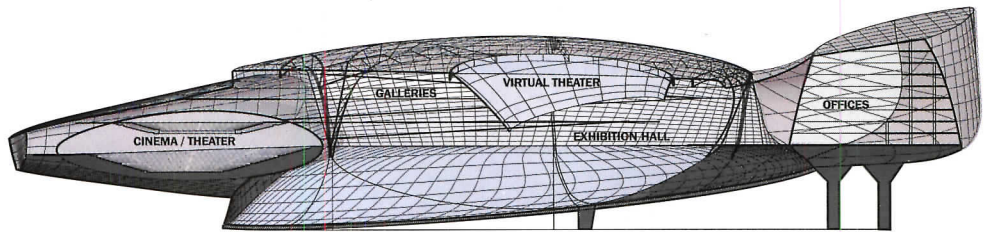
Museum of Technology Culture responds to such treatment of technology as art, and to the dematerialization and simulation of all aspects of culture through information technology.

Unlike the Crystal Palace's fixed iconic form, Asymptote's museum is interactive. Its malleable interior can transform itself in plan and section: Its exhibition floor, for example, slides back to create an aquatic arena, and its meandering ramp can be reconfigured.

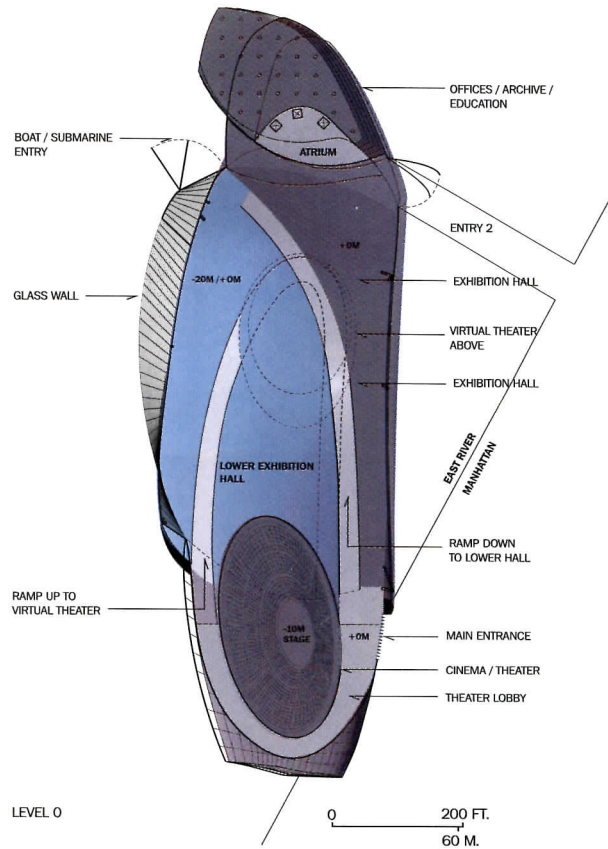
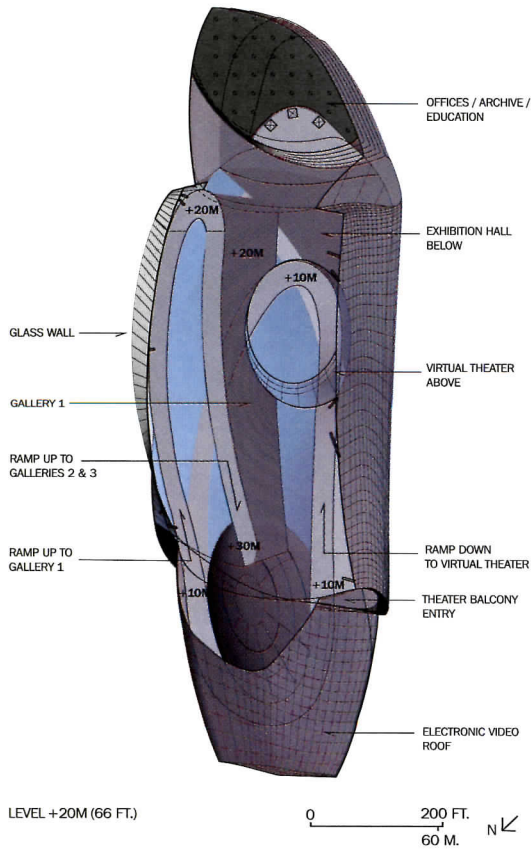
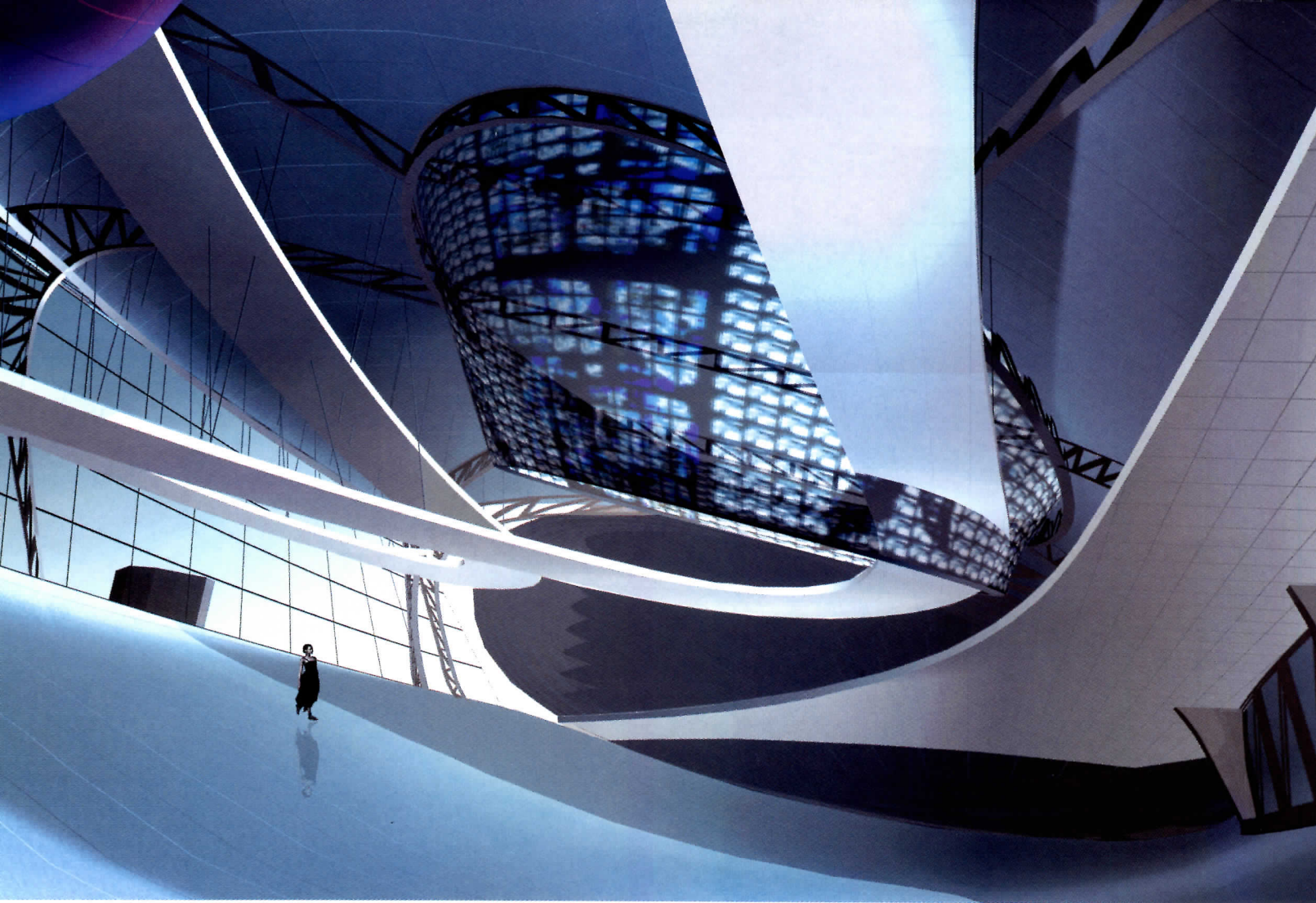
The structure is like a great barnacle, extending Manhattan's urban density. With LCD cladding, it can broadcast digital signals across its exterior surface. The building thus becomes a "real" physical entity, as well as an ephemeral mediator of information. This duality, like the urban condition itself, perpetuates a constant state of flux.

Materials and Technologies:

Computer-modeled and computer-fabricated lightweight structural steel; LCD cladding



SECTION A-A



The vast interiors with meandering ramps are framed by computer-modeled and fabricated lightweight steel structures. The exhibition hall's floor can slide back to create an aquatic arena (this page and opposite).

MICHAEL SORKIN wheels out plans for a sustainable RETIREMENT COMMUNITY

Project: Wheelchair Village

Location: Somewhere in the Midwest

Architect: Michael Sorkin Studio—

Michael Sorkin, Andrei Vovk, partners

Program: Retirement community with recreation and social facilities, using ecologically sustainable building and waste technologies

Size: 1,500 residents

Completion Year: 2030

Design Intent: Like many baby boomers, the architects say they don't expect to fully retire and they wouldn't want to live in a place filled with old people or people of any one type. There are some aspects of a retirement community they find attractive, however, such as the expansive space it devotes to sports and leisure activities, its dedication to pleasure, and its predominant mode of transportation, namely, slow, safe, nonpolluting golf carts.

What the architects don't like about present-day retirement communities is the homogeneity, the tendency to sprawl over the landscape, and that

PHOTOVOLTAIC SKIN

LOFTS WITH GREENHOUSES

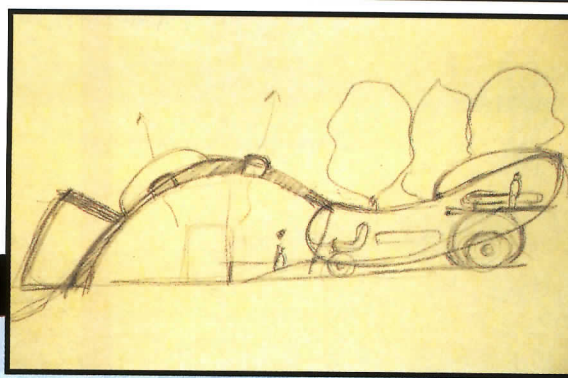
LIVING MACHINES

PERSONAL GARDENS

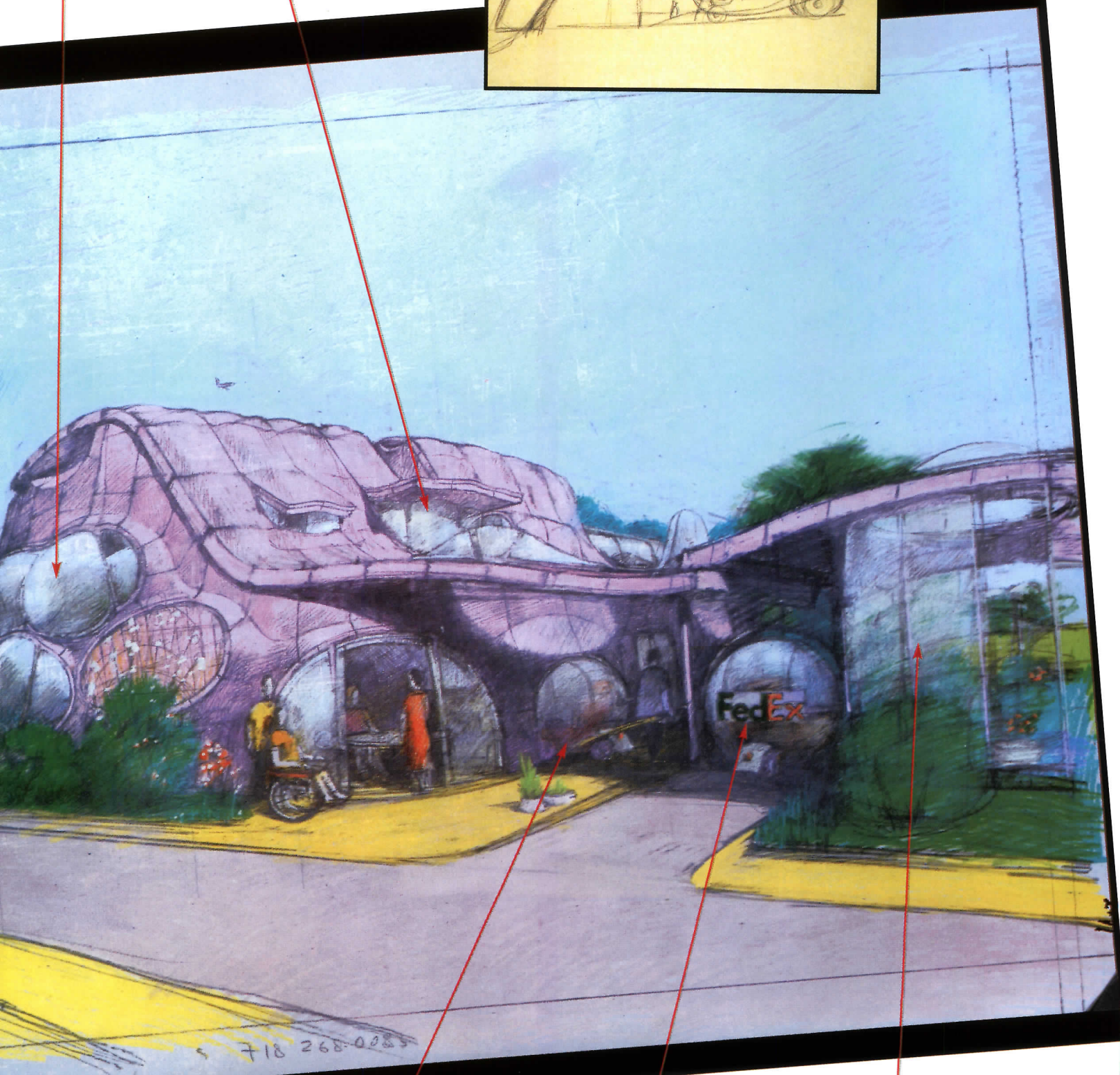


SLO-MO CAR

**RIGID, SOY-DERIVED PLASTIC
STRUCTURAL PANELS**



**TUNABLE AEROGEL
WINDOWS**



**INTEGRATED SLO-MO
CAR DOCKING**

**AUTOMATED
DELIVERY CAR**

LIVING MACHINE

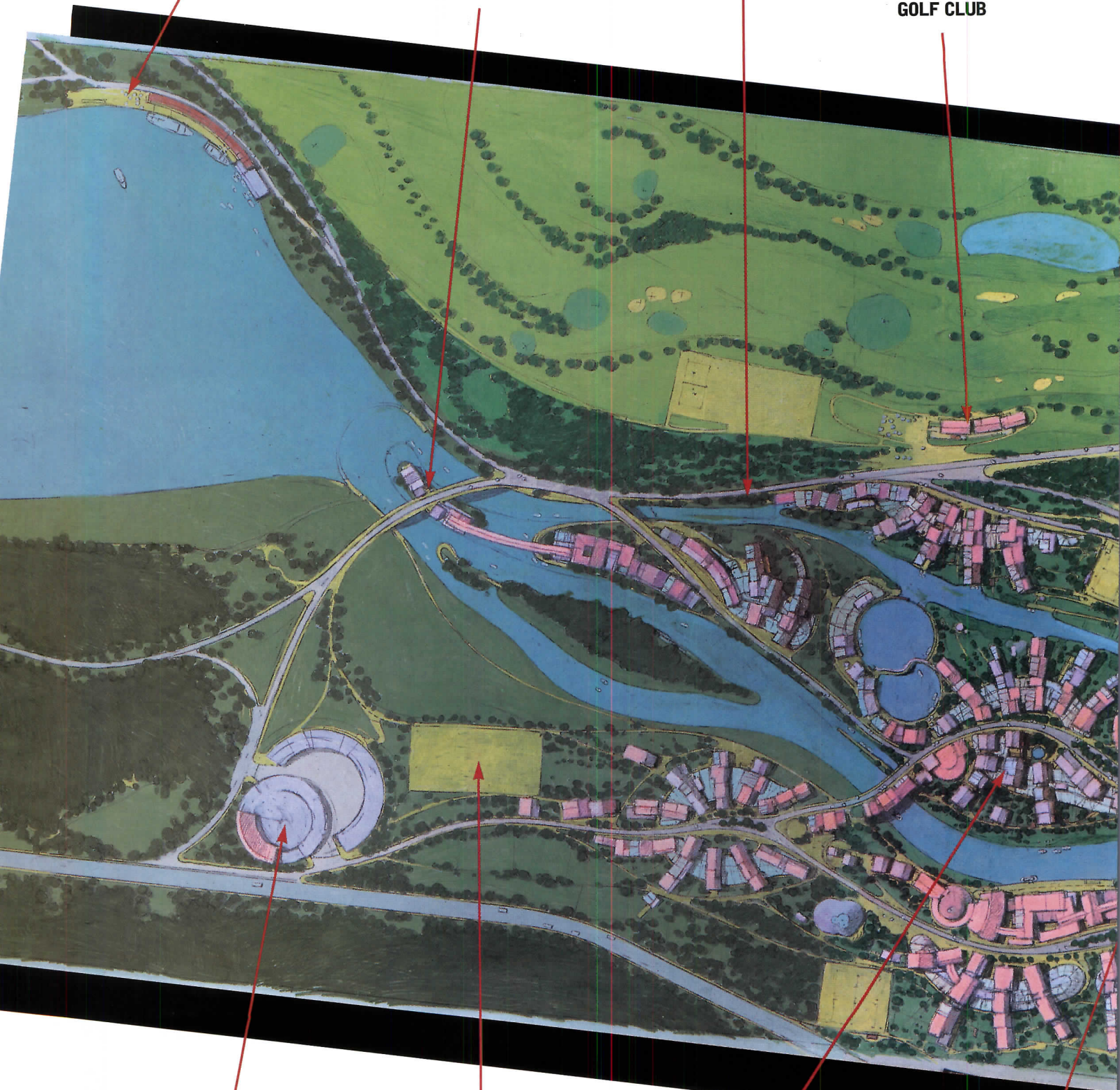
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**INTERMODE PIER: TRANSFER
FROM BOATS TO SLO-MO BOATS**

HYDROELECTRIC DAM

SLO-MO CAR ROUTES

GOLF CLUB



**INTERMODE GARAGE: TRANSFER
FROM CARS TO SLO-MO CARS**

TENNIS COURTS

COHOUSING CLUSTERS

COMMUNITY CENTER

RECREATION CENTER



nobody works. "So many of these places are simply clean ghettos, way-stations to the hereafter," states Sorkin. The community designed by Sorkin and Vovk would take the best of Sun City, eliminate its dull and uniform aspects, and inject a healthy dose of ecologically sensitive urbanism. Located on a small waterway, the development would combine living and working environments and offer a pedestrian-oriented setting. To reduce pollution and save energy, residents would park their cars at communal garages, then take small, bubbled wheelchairs powered by foot, solar energy, or hydrogen fuel. The chairs would plug into the houses and move through all buildings, while also linking up to both a public transit system servicing villages in the area and to a very high-speed interstate system. Clusters of cohousing units would combine private spaces and shared rooms (such as communal kitchens and living rooms).

Materials and Technologies: Greenhouses, ponds to collect solar power, and a hydroelectric dam would allow the community to be self-sufficient in terms of energy and even some food production. The village would also handle its own wastes, recycling them to help generate energy and fertilizer. The architects are exploring new kinds of soy-based feltlike building materials for constructing houses, which would come from renewable sources and be biodegradable. Photovoltaic cells on roof surfaces could reduce the residents' dependence on other sources of energy, while "tunable" aerogel windows could change from transparent to opaque. Taking direct responsibility for its own energy, waste, and even food source, Wheelchair Village would "reestablish rhythms that are lost to plural culture," says Sorkin, and create a "democratic style of environmental accountability."

SOLAR PONDS

GREENHOUSES

HARIRI & HARIRI conjures up THE CINE, an experimental film center for the year 2020

Project: The Cine

Location: Pier #2, Brooklyn Heights,
Brooklyn, New York

Architect: Hariri & Hariri—Gisue Hariri
and Mojgan Hariri, principals; Anne
Uhlman, Marc Stierlin, Nadya Liebich

Consultant: Texas Instruments

Program: Experimental film center to
include indoor and outdoor theaters,
film sets, a gallery, a film school, a
video arcade, and a cyber cafe

Size: 50,000 square feet

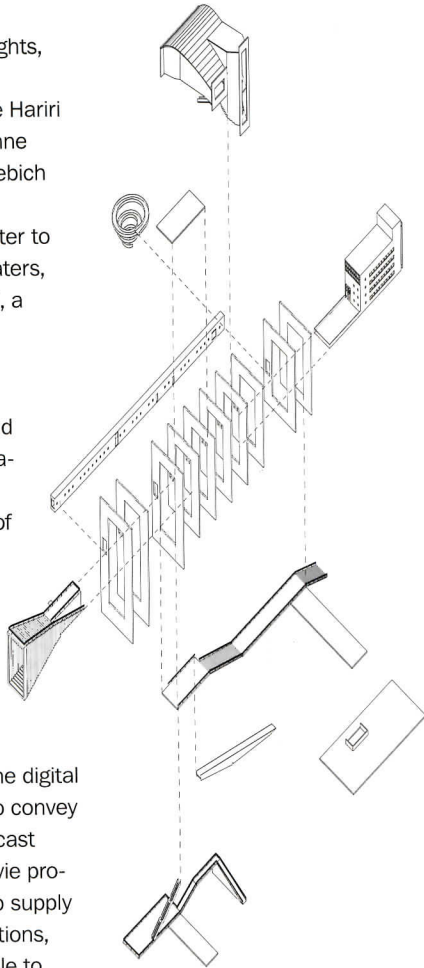
Completion Year: 2020

Design Intent: Through form and
structure, The Cine explores rela-
tionships between architecture and
film—and the very nature of
21st-century entertainment.

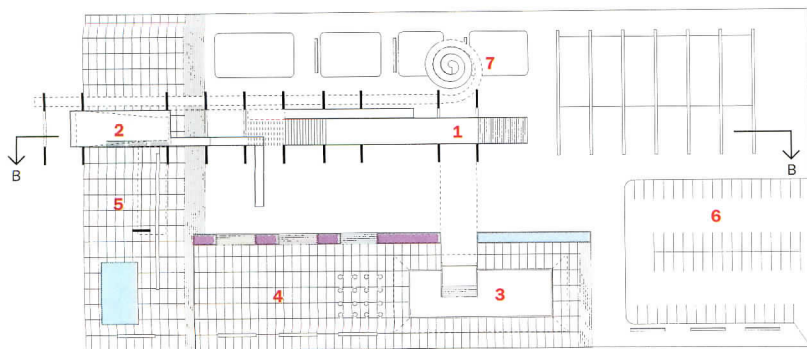
Sited on a pier near New
York City's Brooklyn Bridge,
this experimental film cen-
ter features digital-
micromirror-device (DMD)
screens that are visible from
both the street and the river. The digital
displays can be programmed to convey
information, receive and broadcast
films via satellite, or act as movie pro-
jection screens. With a back-up supply
of virtual actors, sets, and locations,
this DMD technology will be able to
generate a new movie at any time.

In the complex's pier structure, a
series of concrete frames support the
programmable elements. At the entry to
the film school and the entire complex,
a digital screen offers movie previews.

The school component is a rectan-
gular box housing classrooms,



1. Outdoor lobby/
shooting gallery
2. Observation deck
3. Cyber cafe/video arcade
4. Outdoor cafe
5. Promenade
6. Parking
7. Ramp

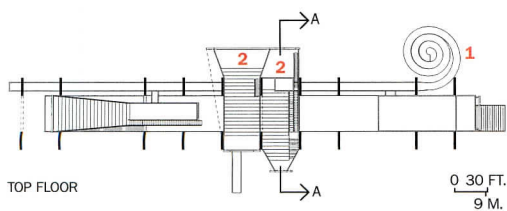
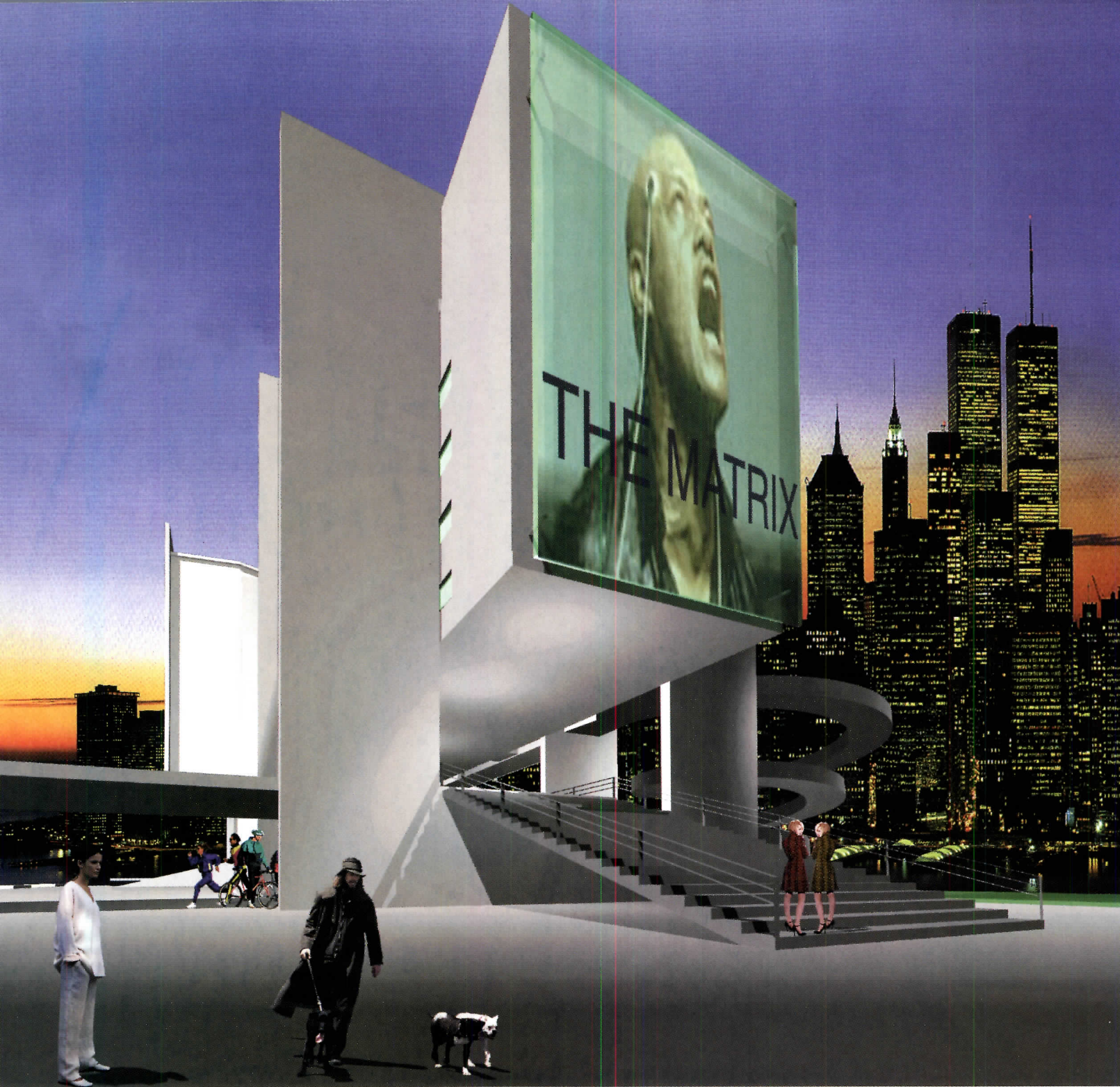


MAIN FLOOR

0 30 FT.
9 M.



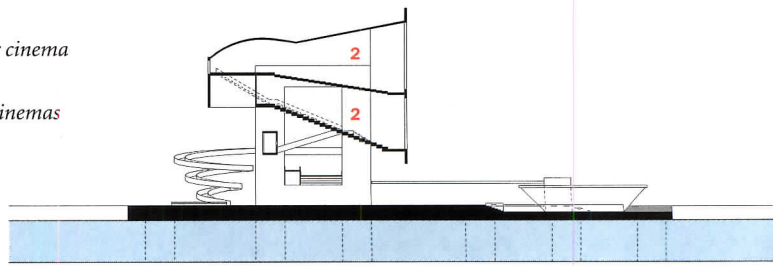




TOP FLOOR

0 30 FT.
9 M.

1. Ramp
2. Indoor cinema
3. Covered outdoor cinema
4. Film school
5. Vertical-screen cinemas



SECTION A-A

0 30 FT.
9 M.

screening, editing, and sound studios.

The Film Track Gallery, a long DMD-clad tube, is linked to the street by a spiral concrete ramp. Film strips exhibited on the DMD walls are visible from the interior, as well as the exterior, where a plaza provides benches.

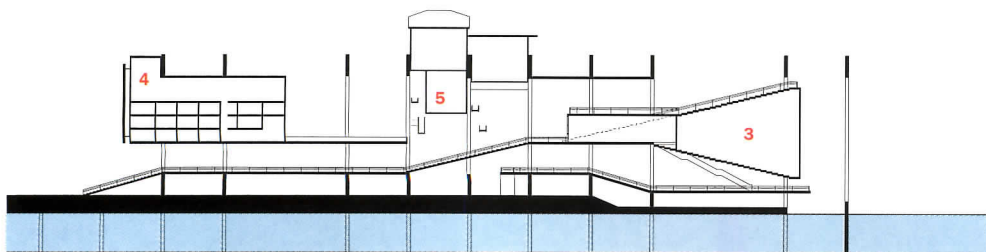
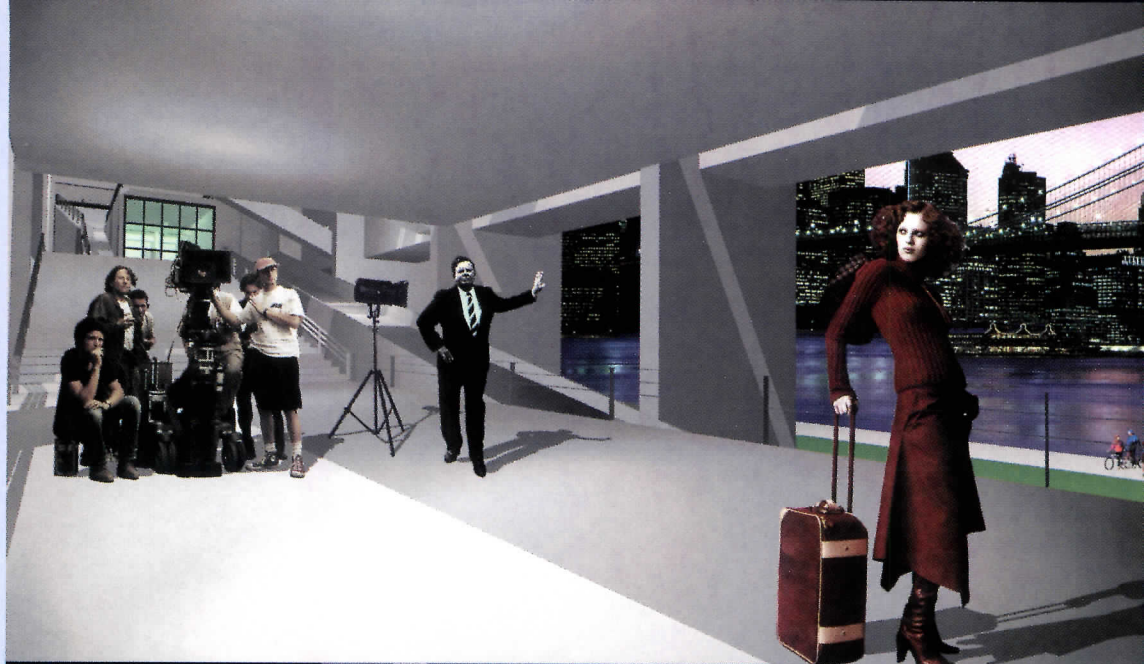
At the complex's center, three theaters with large-scale vertical and horizontal digital displays challenge the conventional screen format and dimensions—suggesting possibilities for future films.

At the pier's end, an indoor/outdoor theater for film festivals features a freestanding DMD screen that faces Manhattan, across the river. Reminiscent of the popular drive-in cinemas of the 1950s, this screen addresses those reaching the theater by boat or sailing past it. "We want to invert the idea of a cinema as a closed space, isolated from the city," says architect Gisue Hariri, "by opening it and merging it with the urban setting."

Ramps, bridges, and covered film-shooting galleries, threading through the buildings, offer film locations, as well as public spaces for meditation or movie and people watching. A glass-enclosed video arcade and cyber cafe—places for social gathering—bring together the next generation of filmmakers.

With new digital technology changing the process of photography and infiltrating the entertainment and communications fields, "one can only imagine," says Gisue Hariri, "how the film industry—and the architecture created to accommodate it—will change in the near future."

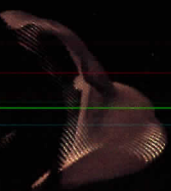
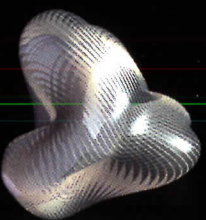
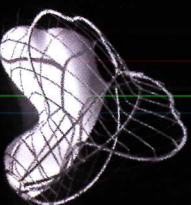
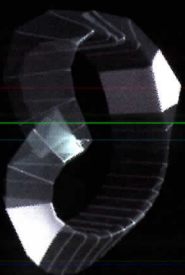
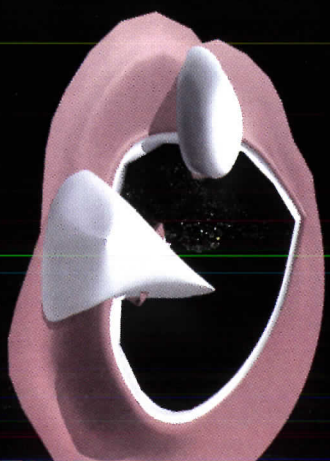
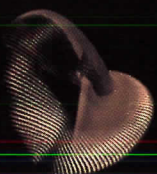
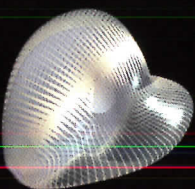
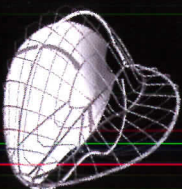
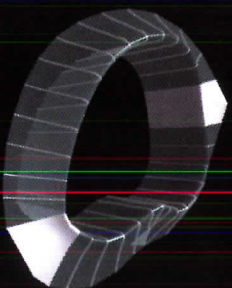
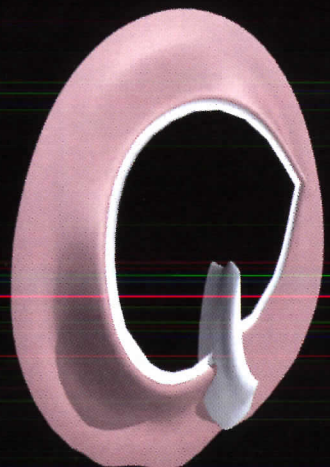
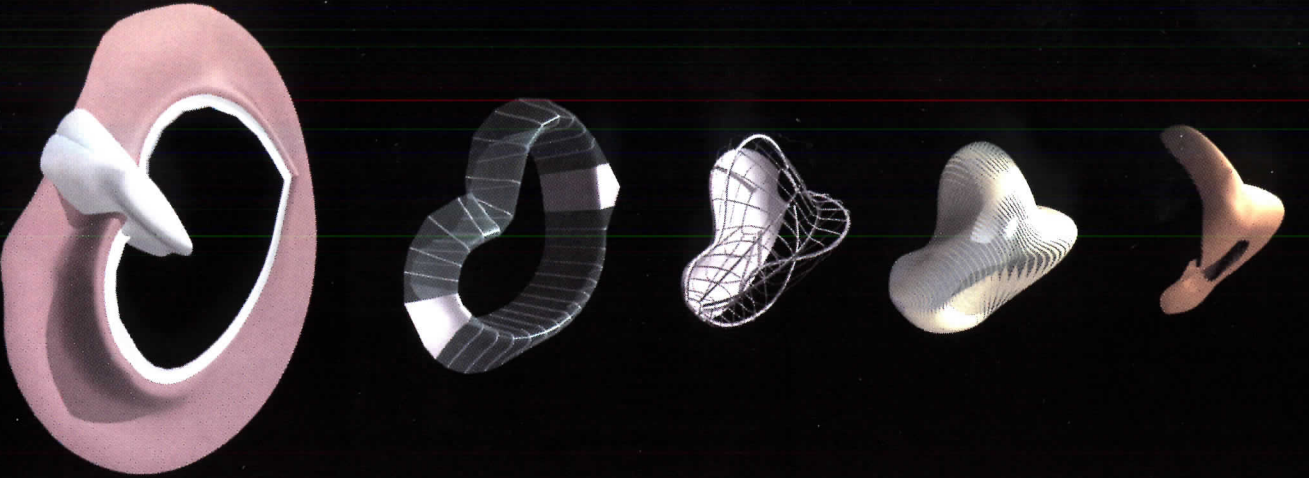
Materials and Technologies: Structural concrete frames, steel, glass, DMD (digital micromirror device) screens



SECTION B-B

0 30 FT.
9 M.

GREG LYNN develops a system
for generating biomorphic
MANUFACTURED HOUSES



Project: Embryologic House

Location: Variable

Architect: Greg Lynn FORM—Greg Lynn, principal; Nicole Robertson, project designer; David Chow, David Erdman, Andreas Fröch, Jefferson Ellinger, project team

Garden designer: Jeffrey Kipnis

Sponsors: International Design Forum, Ulm; Wexner Center for the Arts

Program: Manufactured house

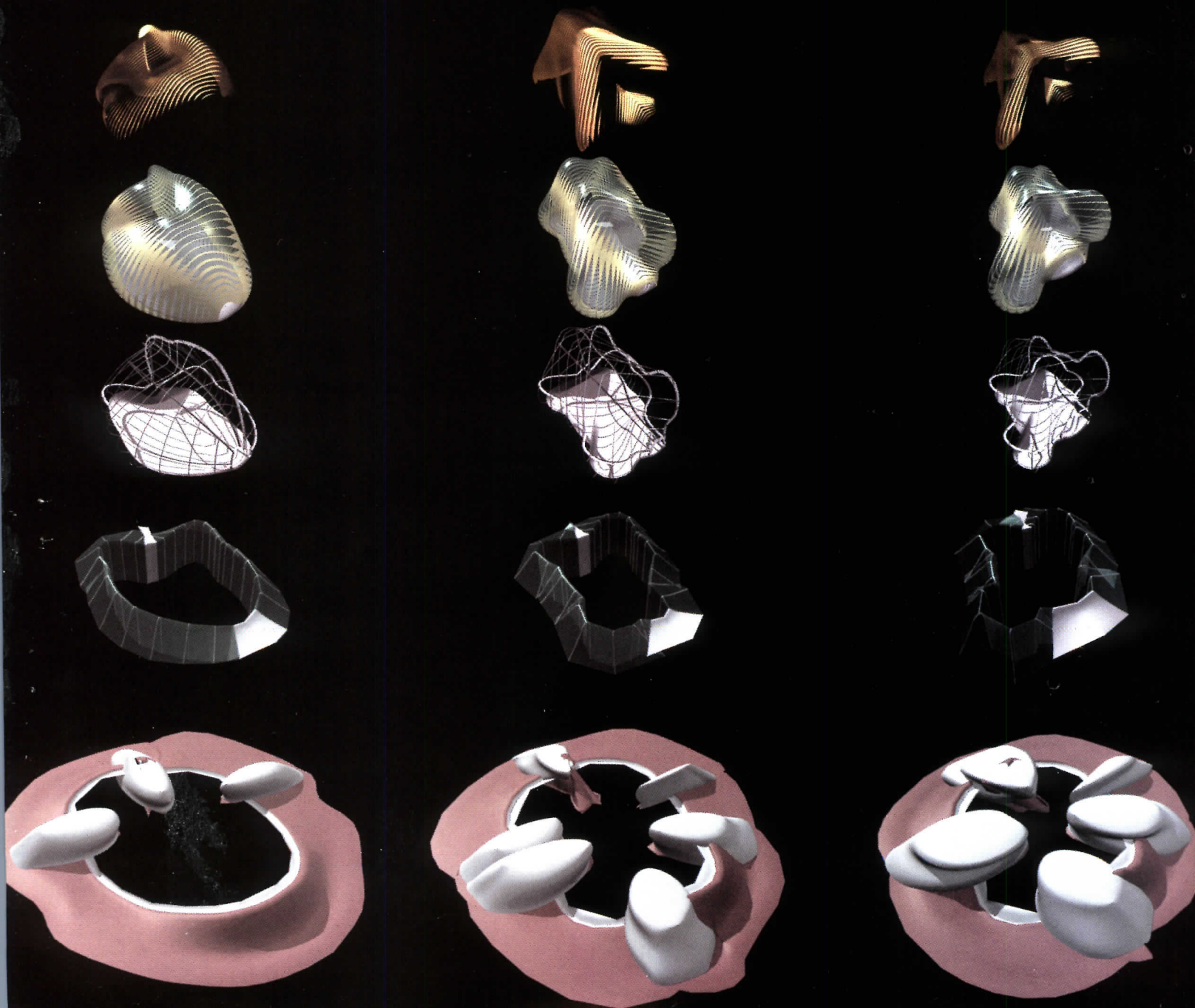
Size: 1,800 to 3,200 square feet

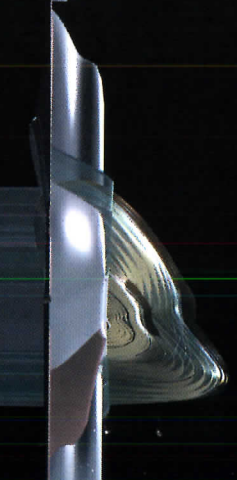
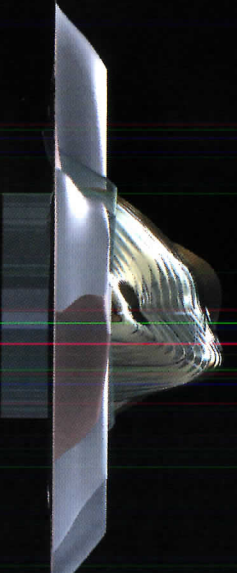
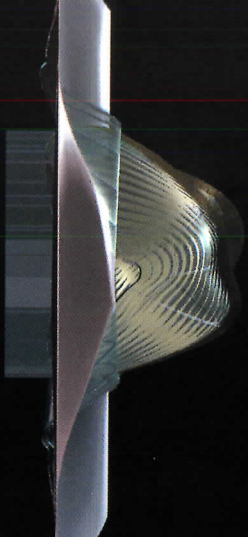
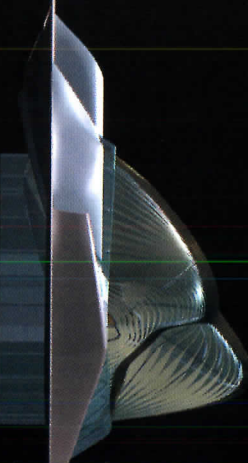
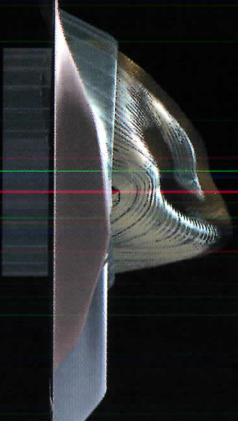
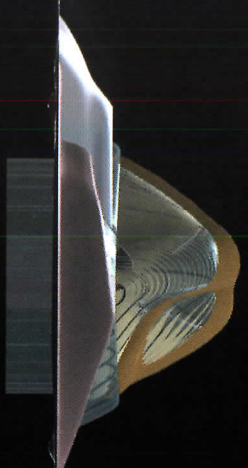
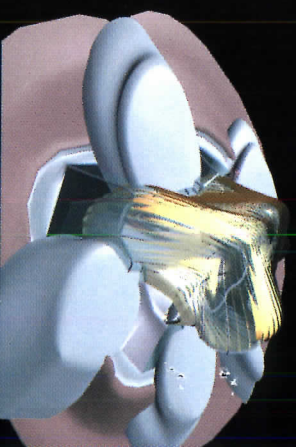
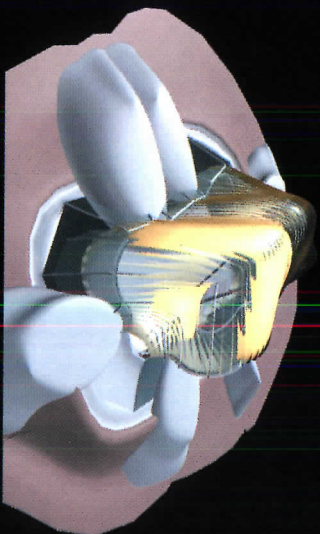
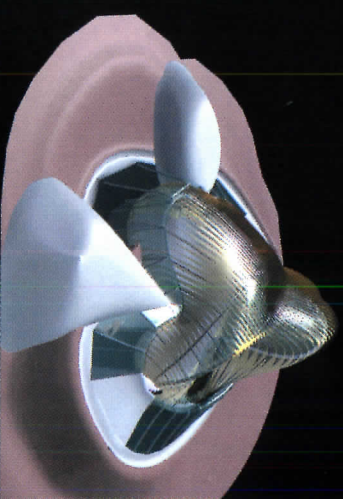
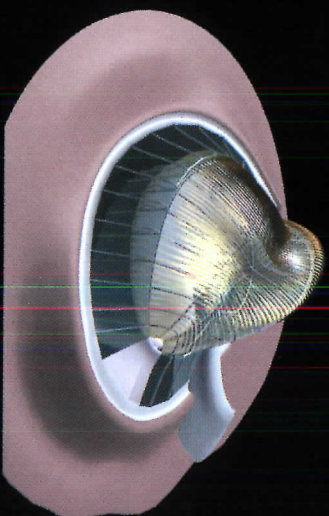
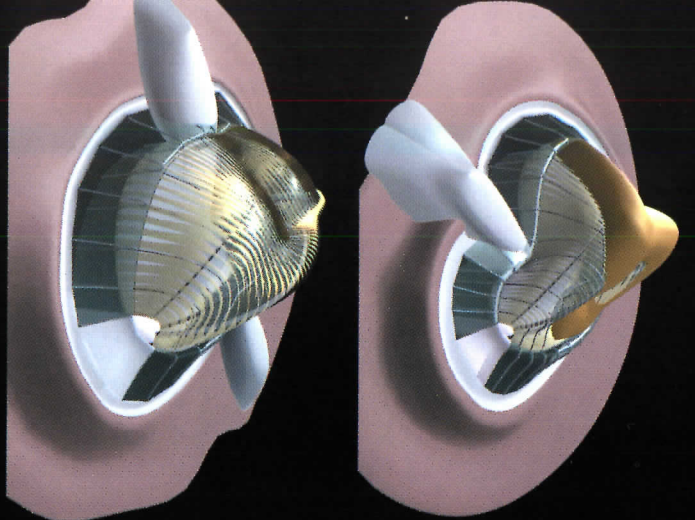
Completion Year: 2003

Design Intent: The architect's goal was to design a line of houses, much as Nike might create a new line of athletic shoes or Ford a new model Mustang. Merging architecture with industrial design, the project required imagining a manufacturing process, as well as an individual building.

"The trend in many industries today is to use 'flexible manufacturing,' in which computerized machines can

make a range of components," explains Greg Lynn. Employing such a system, Lynn and his staff planned a house made of a fixed number of double-curved aluminum panels resting on a frame of rolled-aluminum tubes and long-span tubular steel beams. While the number of exterior panels stays the same, as the house's configuration varies (three bedrooms or four, large kitchen or small), the size and shape of the panels change. Instead of the old





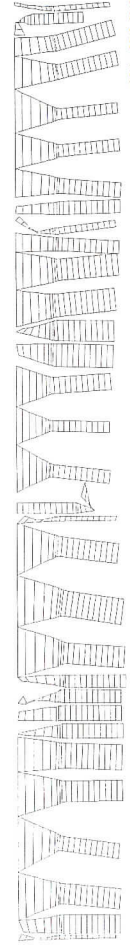
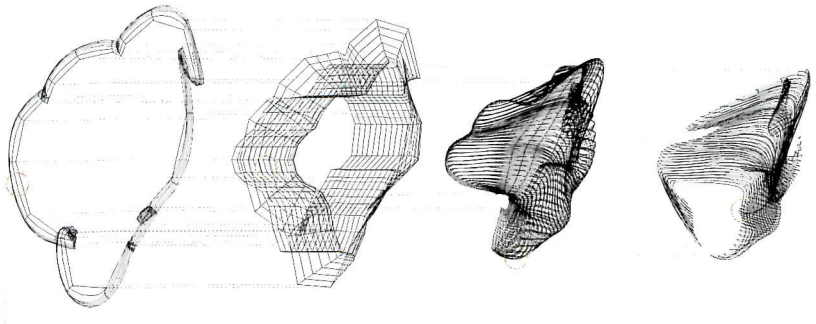
A flexible manufacturing system can generate an endless variations on the prototype house. Computer-rendered images (above) show

how room and garage appendages can affect the form of the house and the surrounding landscape. Drawings (opposite) illustrate

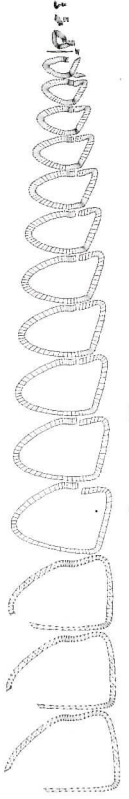
building elements that compose each house—including the metal armature, aluminum sandwich panels, and photovoltaic panels—can differ.

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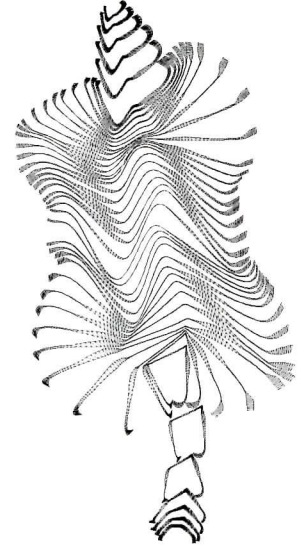
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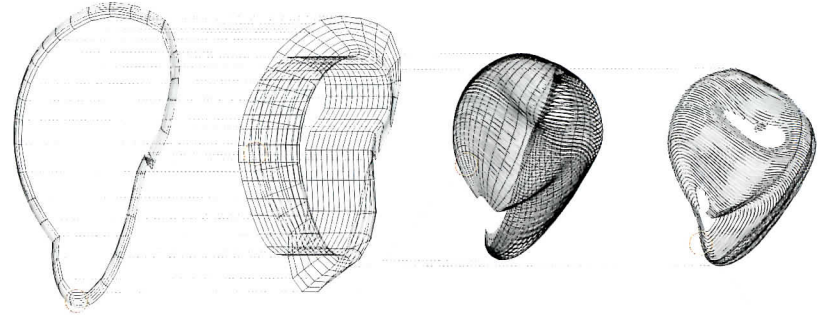
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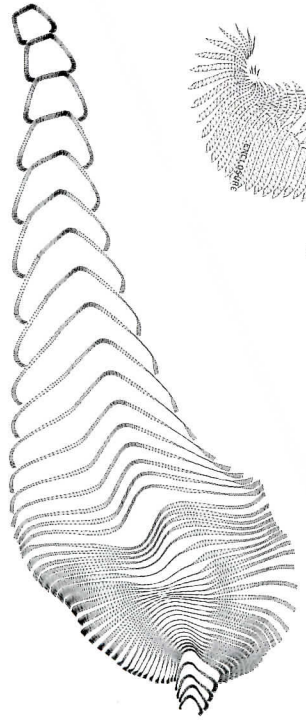
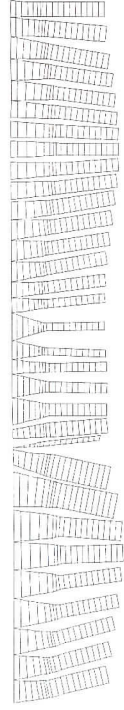
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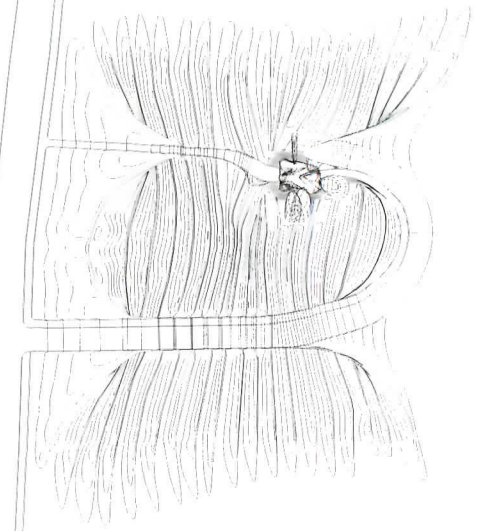
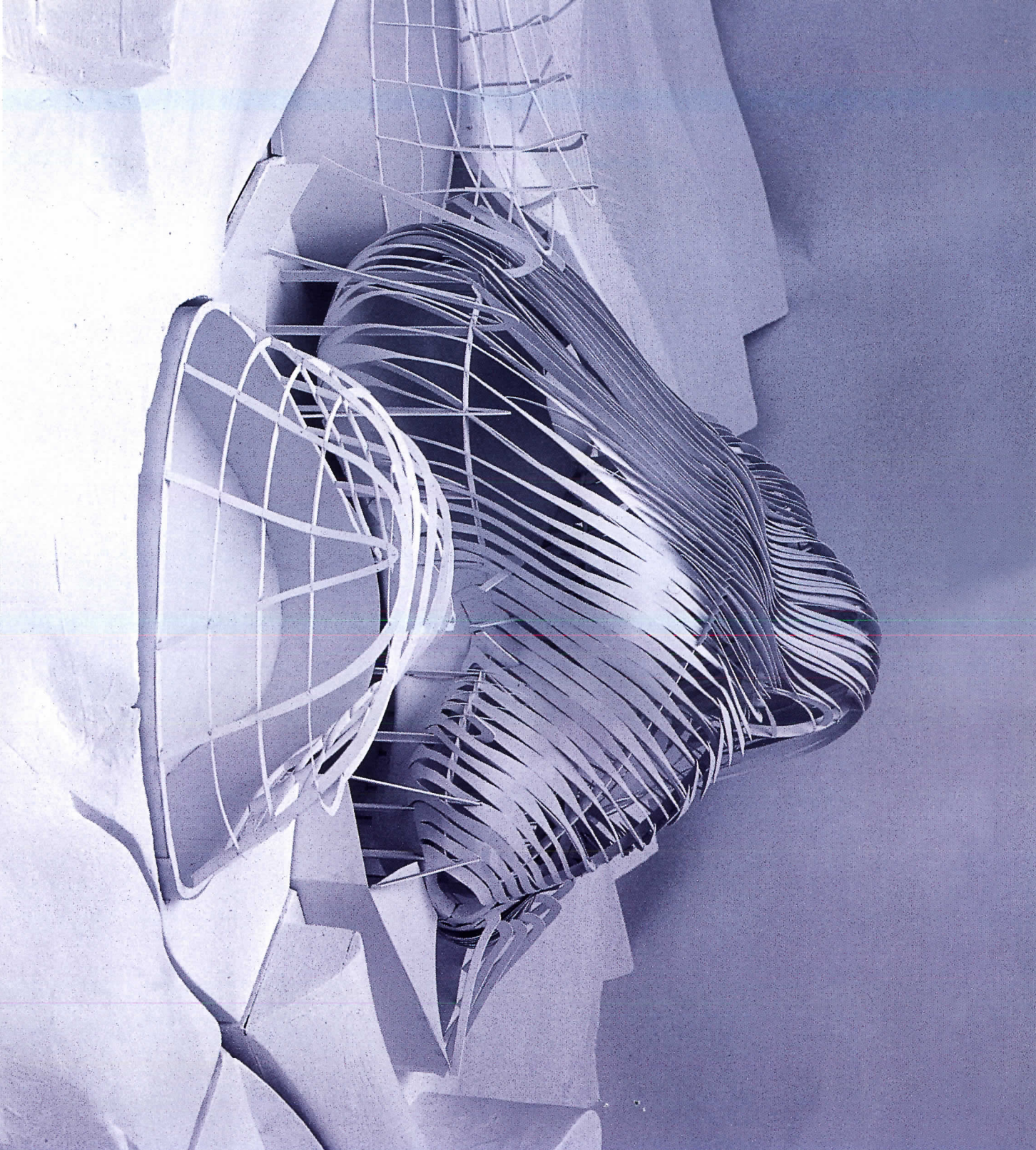
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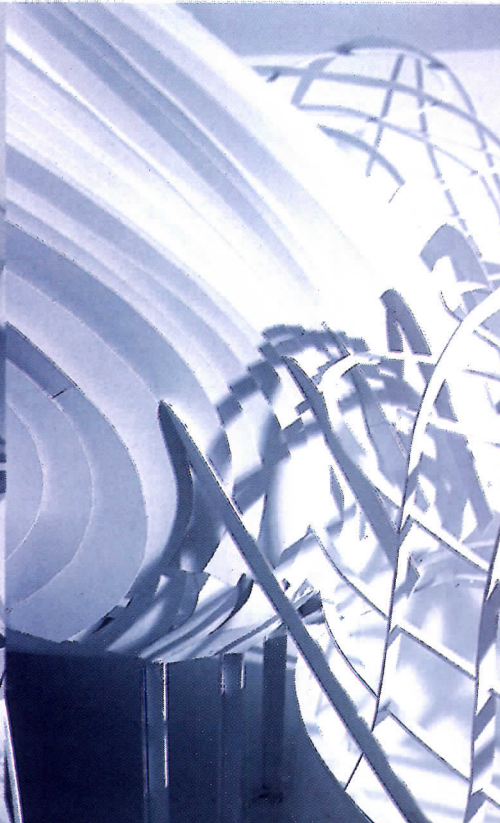
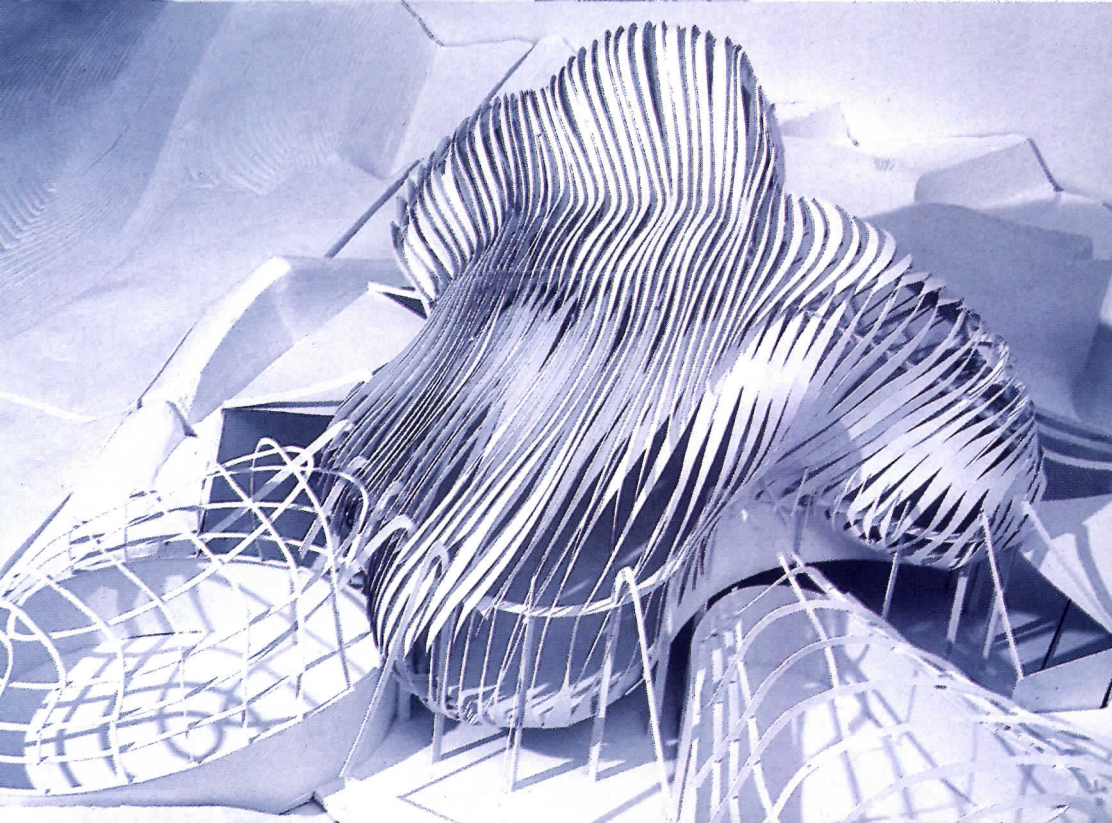
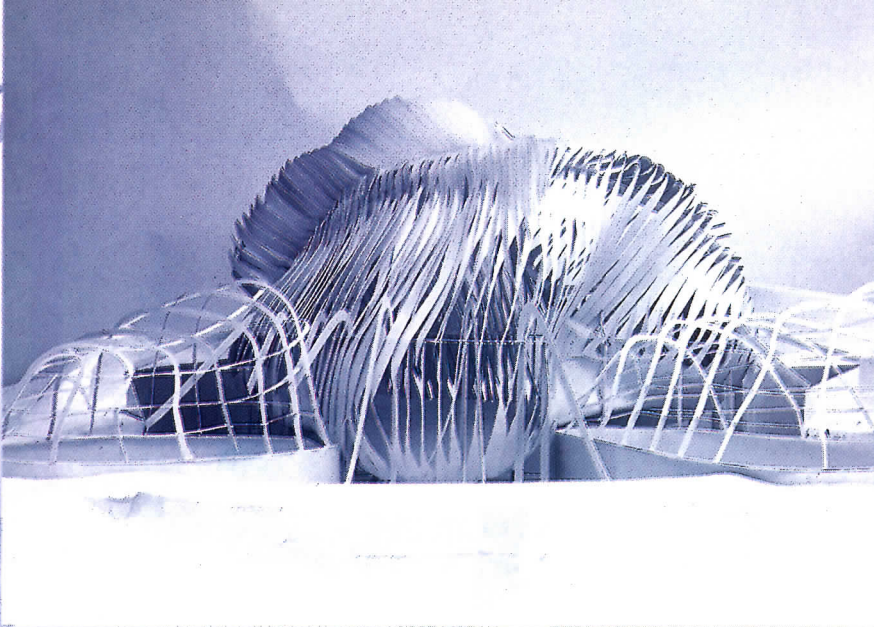
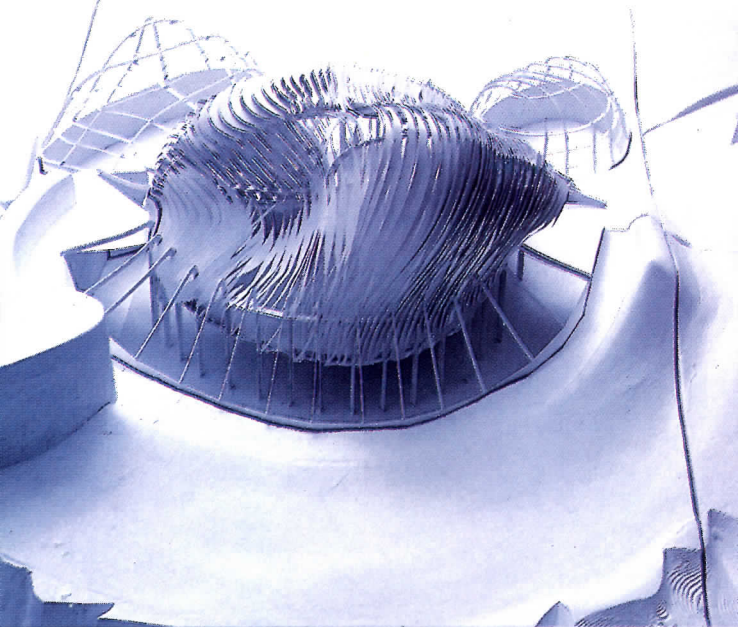
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Kit-of-parts approach to building, in which standardized elements are added or subtracted, the Embryologic House employs a strategy almost biological in concept, i.e., the pieces themselves vary with each iteration. Because the relationship among individual parts doesn't change, the houses have a familial similarity or a brand identity. The idea, says Lynn, is that "if you design a seed, you can grow endless variations from it. But all of the information needed for any variation is encoded in the original."

Earth berms wrap around part of the house, and the main entry is on the upper of two floors. Rather than be defined by a fixed set of rigid points, the volume of the house is contained within a soft, flexible curved surface.

Openings for doors and windows come between panels like tears or shreds in the house's surface, not sharp cuts. From some angles the house appears buried in the earth; from others, it seems to float above the ground. Form and color also work



together, with metallic iridescent colors “picking up the voluptuous curves” of the house, says Lynn.

Inside, each of the two floors has its own character. The smaller, upper floor is fitted out with custom furniture designed to complement the “blobular” structure. The larger, lower level has a more traditional feel, with partitions dividing the space into rooms.

Materials and Technologies: The house is an aluminum monocoque structure with more than 2,000 insulated and prewired curved aluminum

sandwich panels. Flexible photovoltaic panels mounted on a light-steel structure help shade the house and generate energy. The sandwich panels and concrete-slab floor provide radiant heat, making all surfaces environmentally controlled. Some of the fenestration includes an active-glass system that can change from transparent to opaque, depending on sunlight conditions and residents’ wishes. For the interiors, the architects specified recyclable materials, such as aluminum, wood, and plastics.

The house can be built on any site with a 100-foot-diameter clearing and less than a 30-degree slope (site plan, opposite). Earth mounds and undulating berms protect the house and define gardens.

GUTHRIE + BURESH sketches out an **ARTS SCHOOL** where space and program interlock

Project: College of Modern Art,
Los Angeles

Location: Sunset Strip overlooking the
L.A. basin

Architect: Guthrie + Buresh Architects,
West Hollywood, Calif.; Danelle Guthrie
and Tom Buresh, principals; Kai
Riedesser, Mark Skiles, design team

Program: A university-level arts-education
complex.

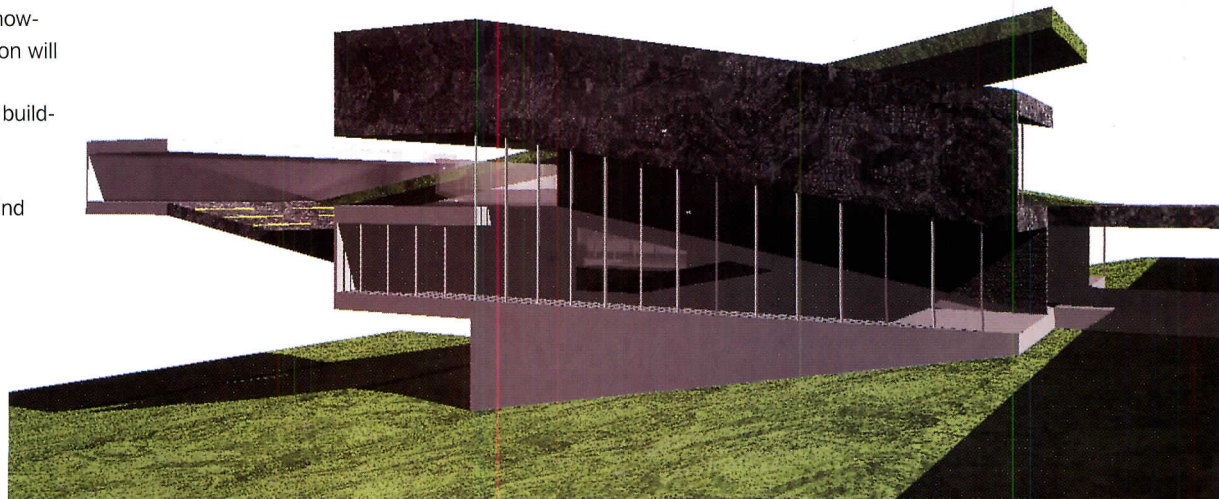
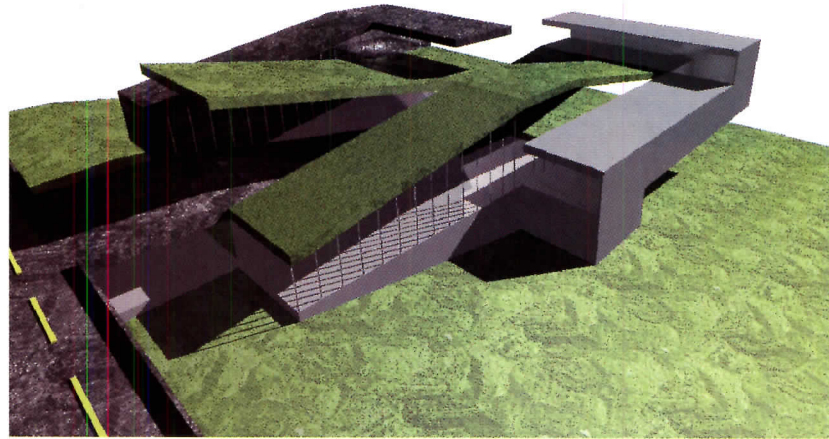
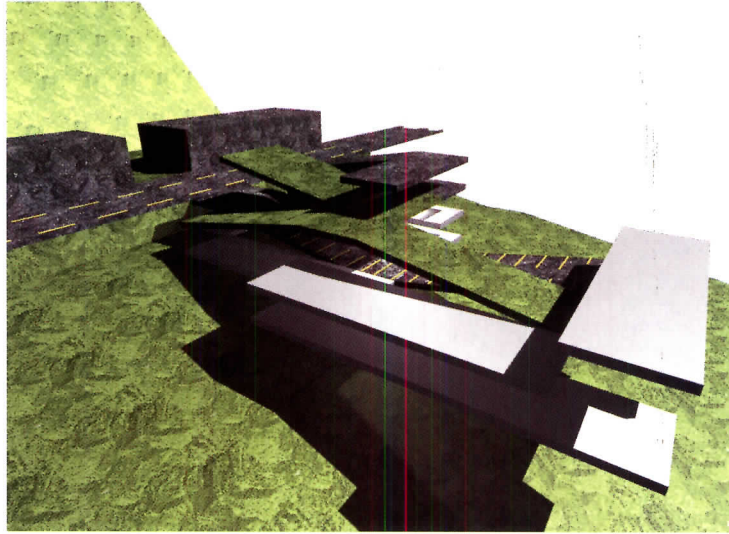
Size: 80,000 square feet on 1.25 acres

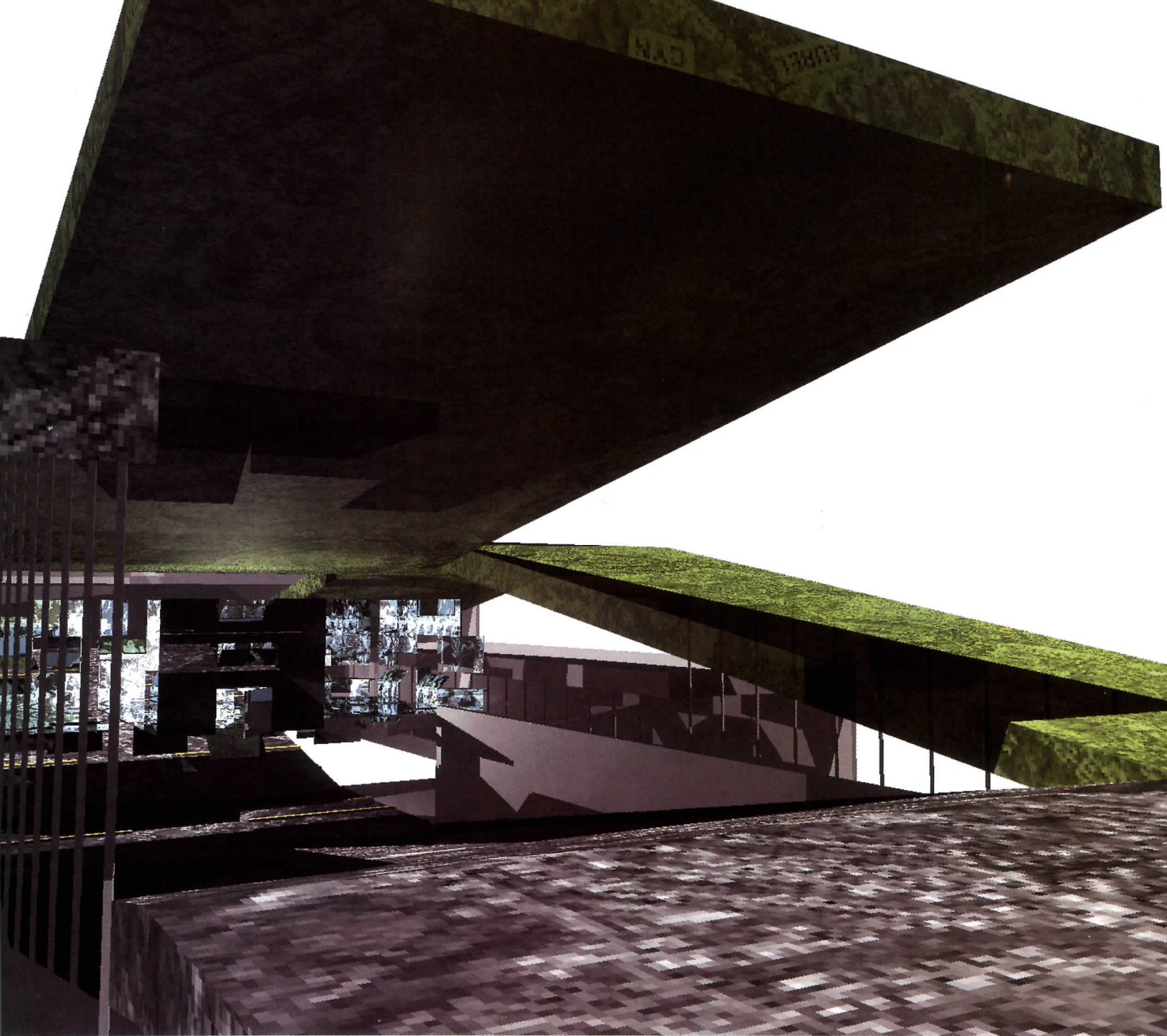
Completion Year: 2020

Design Intent: After the architects
investigated several fine arts schools,
they developed a spatial diagram that
would reflect a multilevel educational
approach. "We are trying to spatialize
the curriculum," says Danelle Guthrie.

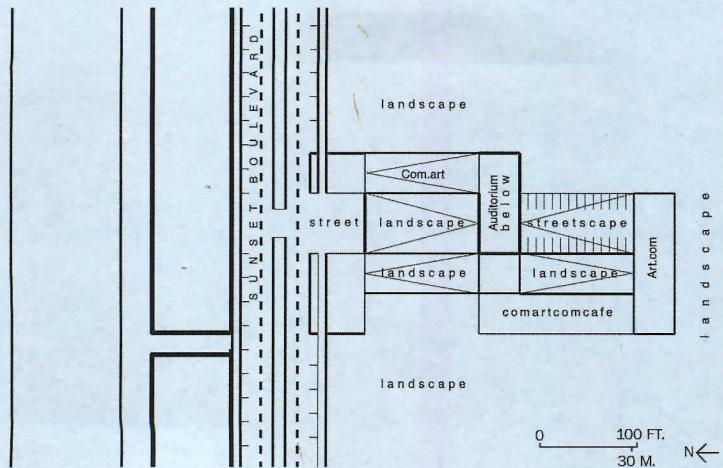
The primary space would be a
series of wide ramps conceived along
the lines of a figure-eight knot. The
ramps would accommodate all kinds
of activities in the form of a street-
scape, landscape, and schoolscape.
Both the streetscape and landscape
would come right into the ramped
structure, integrating the school with
the outdoors.

The main entrance to the building,
on Sunset Boulevard across the street
from Chateau Marmont, would receive
both pedestrians and cars. "You could
drive into it, put the cars on the inclined
ramp, and get out and go to class,"
explains Tom Buresh. "We are accept-
ing the car as part of architecture." Not
all students would arrive by car, how-
ever, because public transportation will
be a significant means of getting
around in the future. Once in the build-
ing, students would walk to the
relatively flat ramps forming the
schoolscape, where they would find
their art studios or classes.

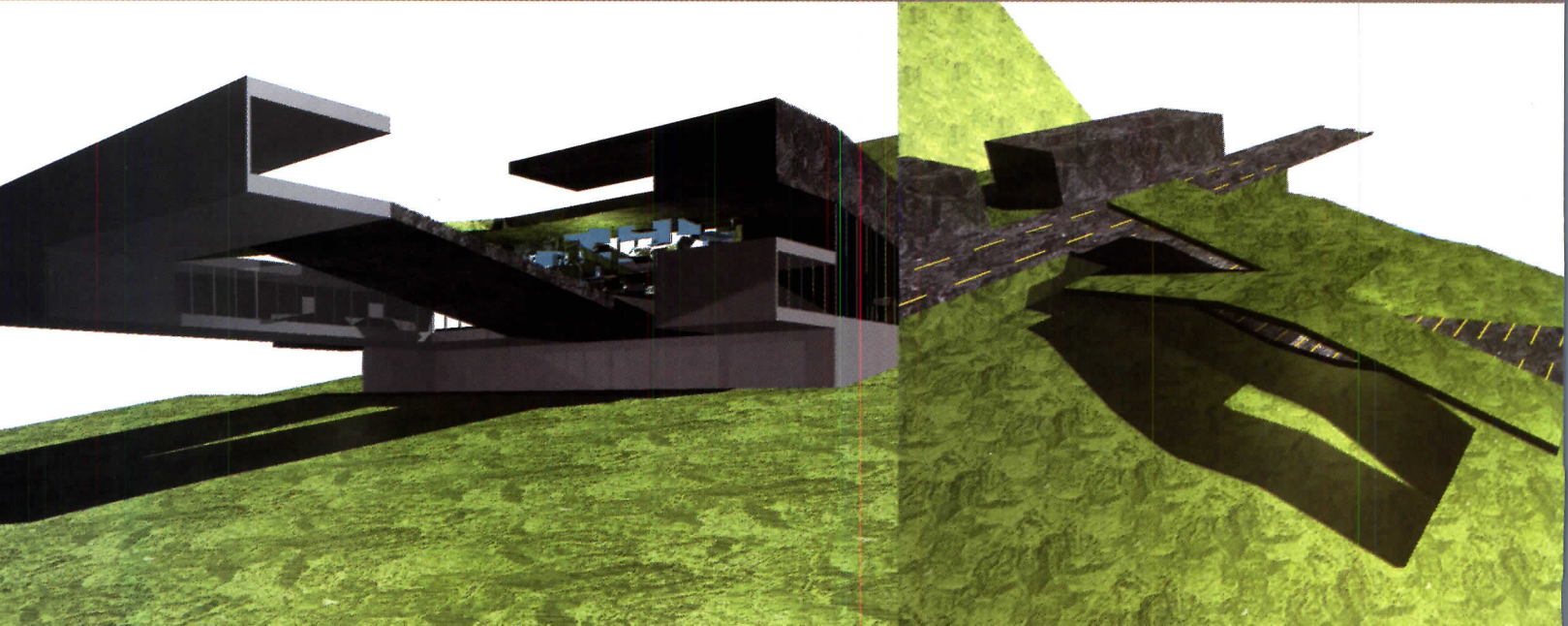
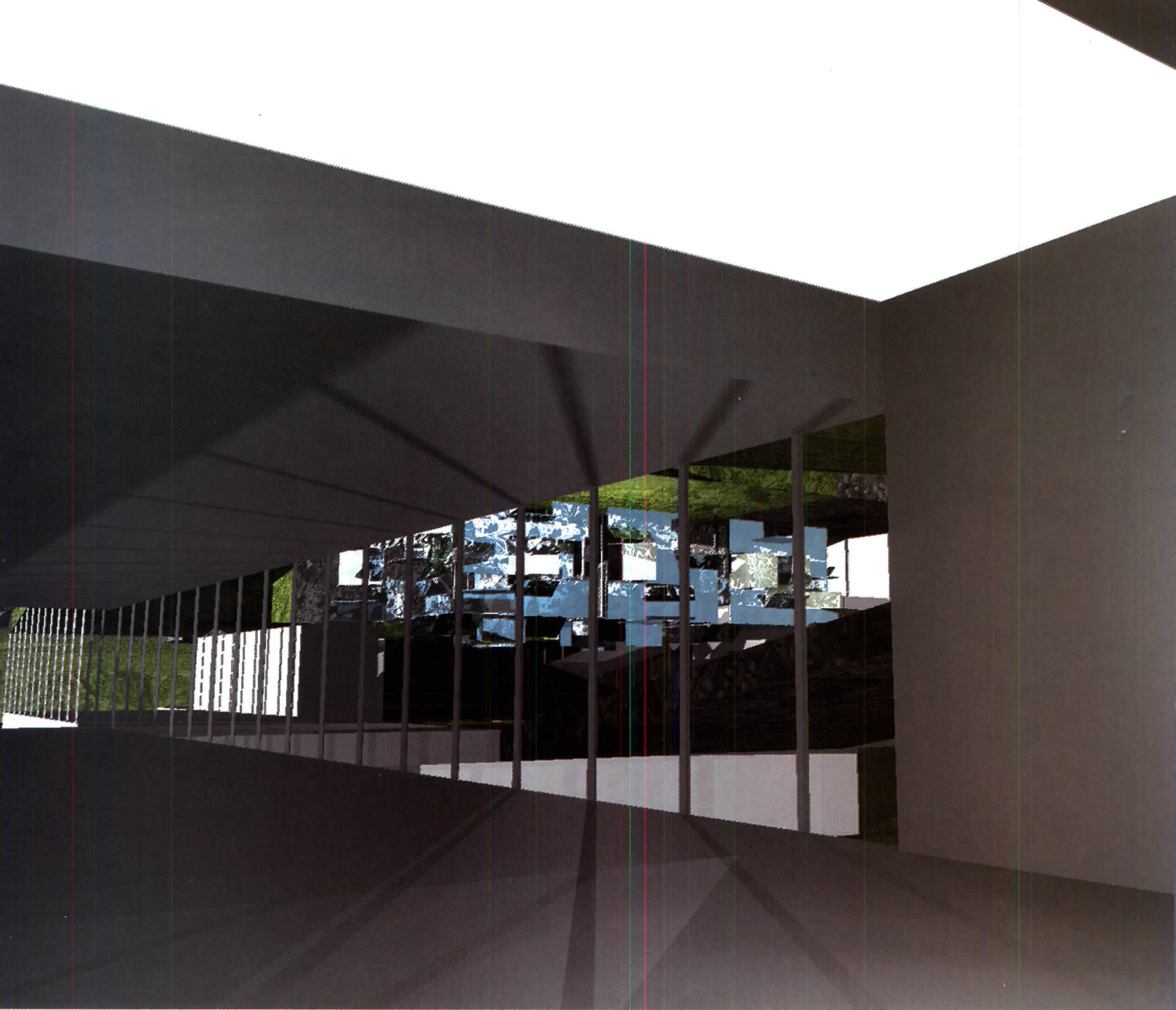


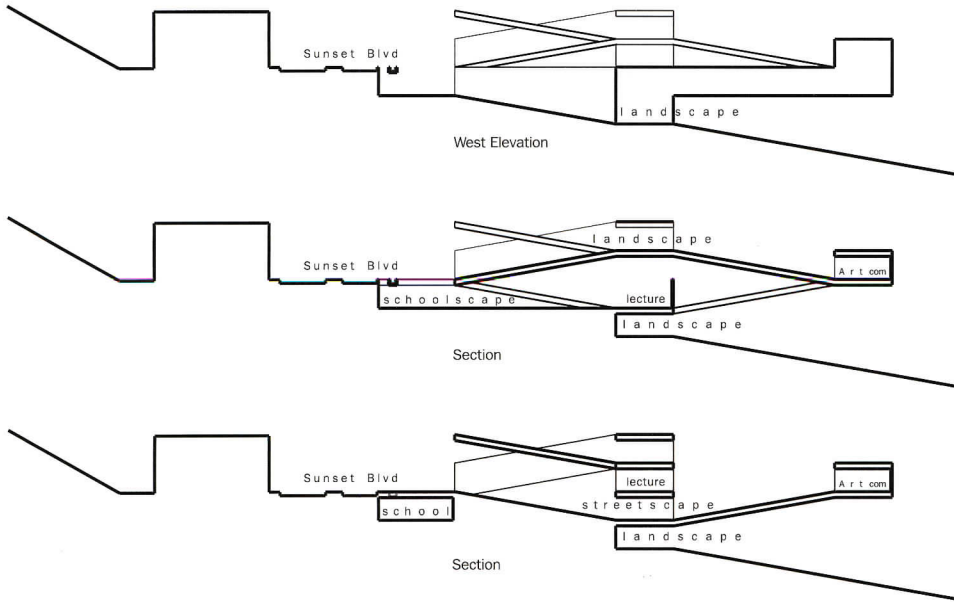


Views of the art school show how the various levels sit in the hillside along Sunset Boulevard: the southwest corner (opposite top), the northwest corner (middle), and the northeast corner (bottom). Entering the school (above) students see both classrooms and sloping landscape.



Site Plan





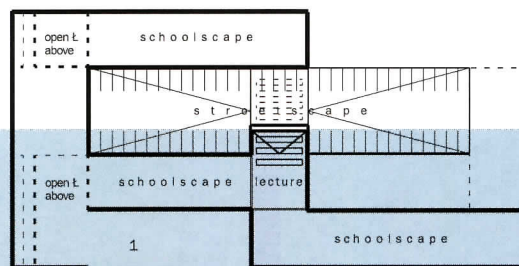
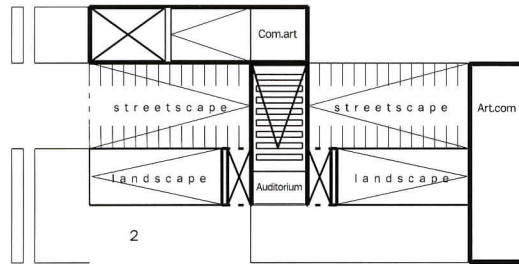
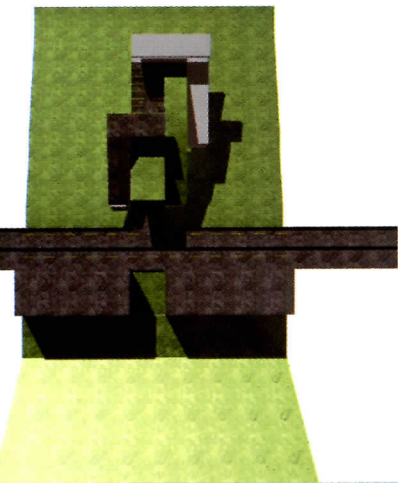
The large auditorium would hover above the inclined streetscape ramp. At the far end of the ramp, an art gallery (“art.com”) would cantilever over the back slope. In addition to the gallery would be a shop (“com.art”) where students’ work could be sold.

Secondary spaces composed of podlike structures would accommodate seminar meetings and darkroom activities. “This is the tight-fit architecture where spaces are tied so closely to the program,” says Buresh.

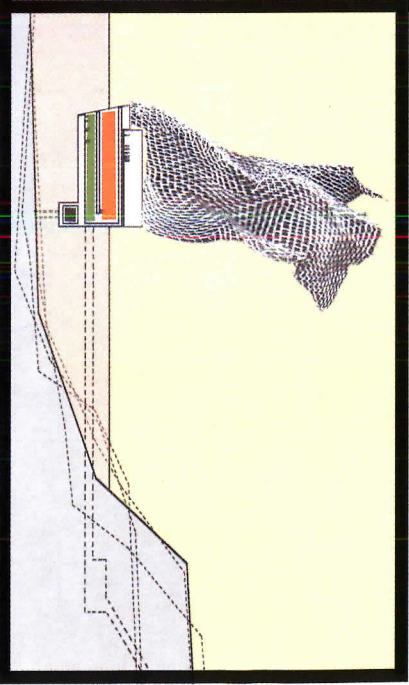
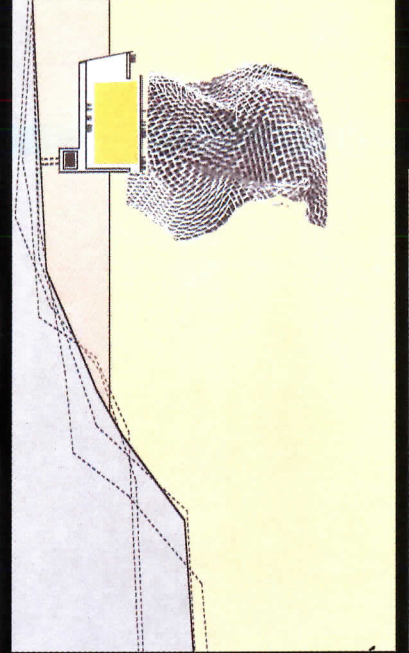
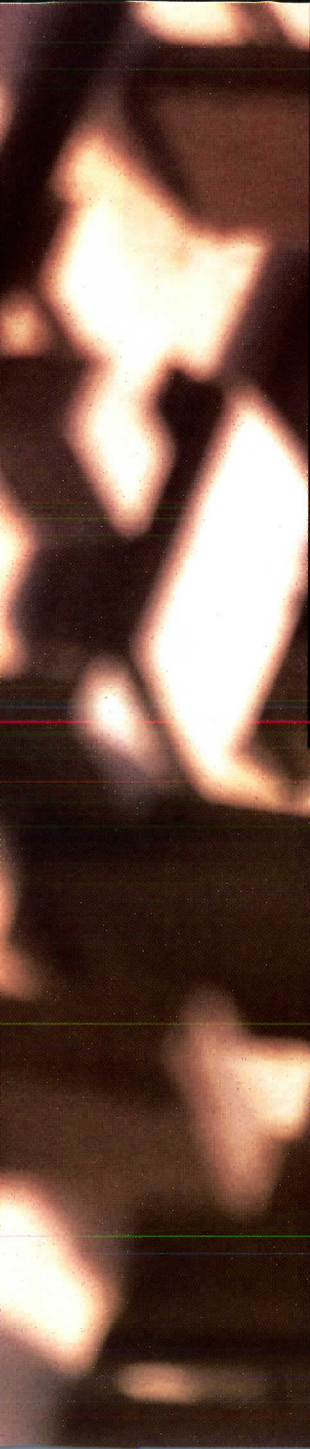
Interwoven among the street and the school would be landscape ramps, or “manufactured nature,” adds Buresh, “in keeping with the L.A. environment.” The landscape part would connect to the hill behind the school and form the roof surface, where a cafe would be installed.

“We are trying to animate the ground and sublimate the figure (the building) instead of having the two polarized,” Buresh says. “It is not figure/ground, but figured ground.”

Materials and Technologies: The structural frame and enclosing surfaces would be constructed of a high-density lightweight polymer.



The ramplike school spaces are entered from Sunset Boulevard to the north. Looking into the school from the southwest corner (opposite), the auditorium is visible. The roof (right) is landscaped and accessible for student use.



MOCKBEE/COKER designs an ecologically monumental CITY HALL for the future

Name: New city hall

Location: In the Mississippi River, anchored by an elevator shaft connected by a tunnel to downtown Memphis

Architect: Mockbee/Coker Architects; Coleman Coker, principal; Jonathan Tate, Vincent Bandy, Carl Kennon Jr., Kenton Keeter, design team; Henry Yamamoto, Trey Harrison, computer graphics

Program: The design for a city hall responds to the fragmented, decentralized society in which electronic technologies have decreased the hierarchical relationship between the

government and the individual, and increased the potential for involvement in local matters directly from the home or office computer. The time-consuming annoyances of bureaucratic life, such as registering for auto tags, filing property deeds and legal documents, and getting licenses, will reside in the past. The city hall can instead reassume its function as a monumental symbol of the polis, instilling civic pride and encouraging a sense of community.

Size: 390,000 square feet, five levels

Completion Year: 2025

Design Intent: To create a civic symbol, the city hall has a large nonstructural



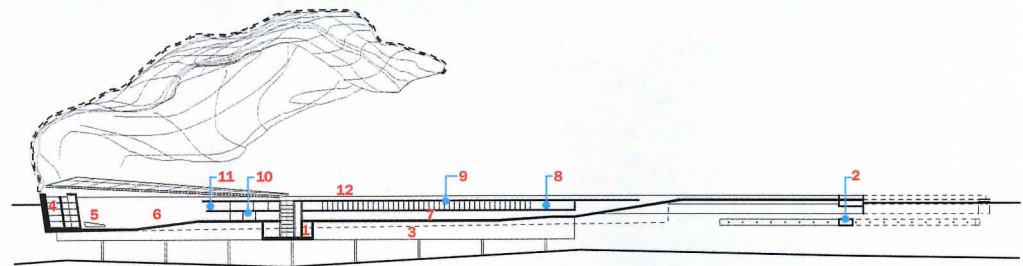
fabric “dome,” rather like a sail, that is kept aloft by gases held in the double-walled fabric. This surrogate dome, which expresses the uncertain era heralded by quantum mechanics, as opposed to the earlier age of observable Newtonian laws, will be in a constant state of flux, moving with the wind and the changing climate.

To enhance the community spirit, a public place for festivals, concerts, or simply watching the sunset is made a central component of the design. In addition, a broadcast facility for discussing city matters would be included, along with an interactive archive that documents the city’s history. This archive could be visited from home via computer, as well as at City Hall.

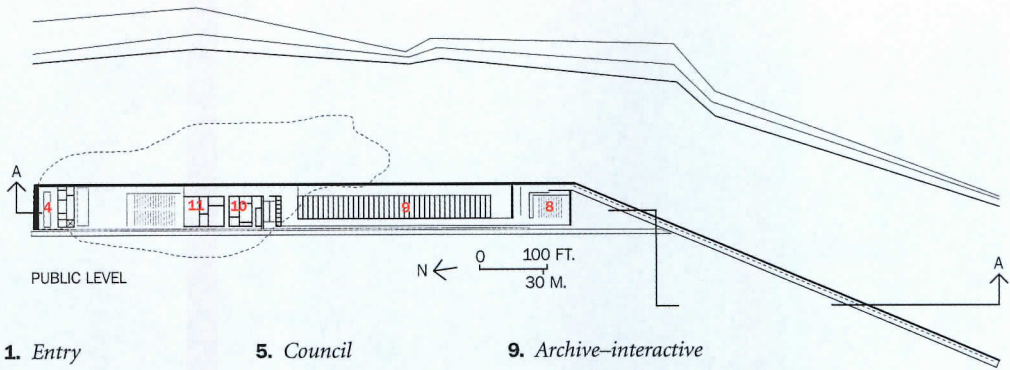
Materials and Technologies: The lower structure is made of solid glass with a light- and temperature-sensitive metal skin. The fabric will be made of acrylic-coated nylon. A photovoltaic layer on the fabric would produce some of the electricity needed to keep the fabric structure aloft, and a local helium vendor would supply the necessary gases.

The mechanical systems would convert the temperature differences between the river water and the air into energy through an advanced heat-pump system, which in turn will help air-condition the structure. Miniturbines attached to the side of the structure below the water line will take advantage of the strong river current to generate additional electrical energy for the city hall.

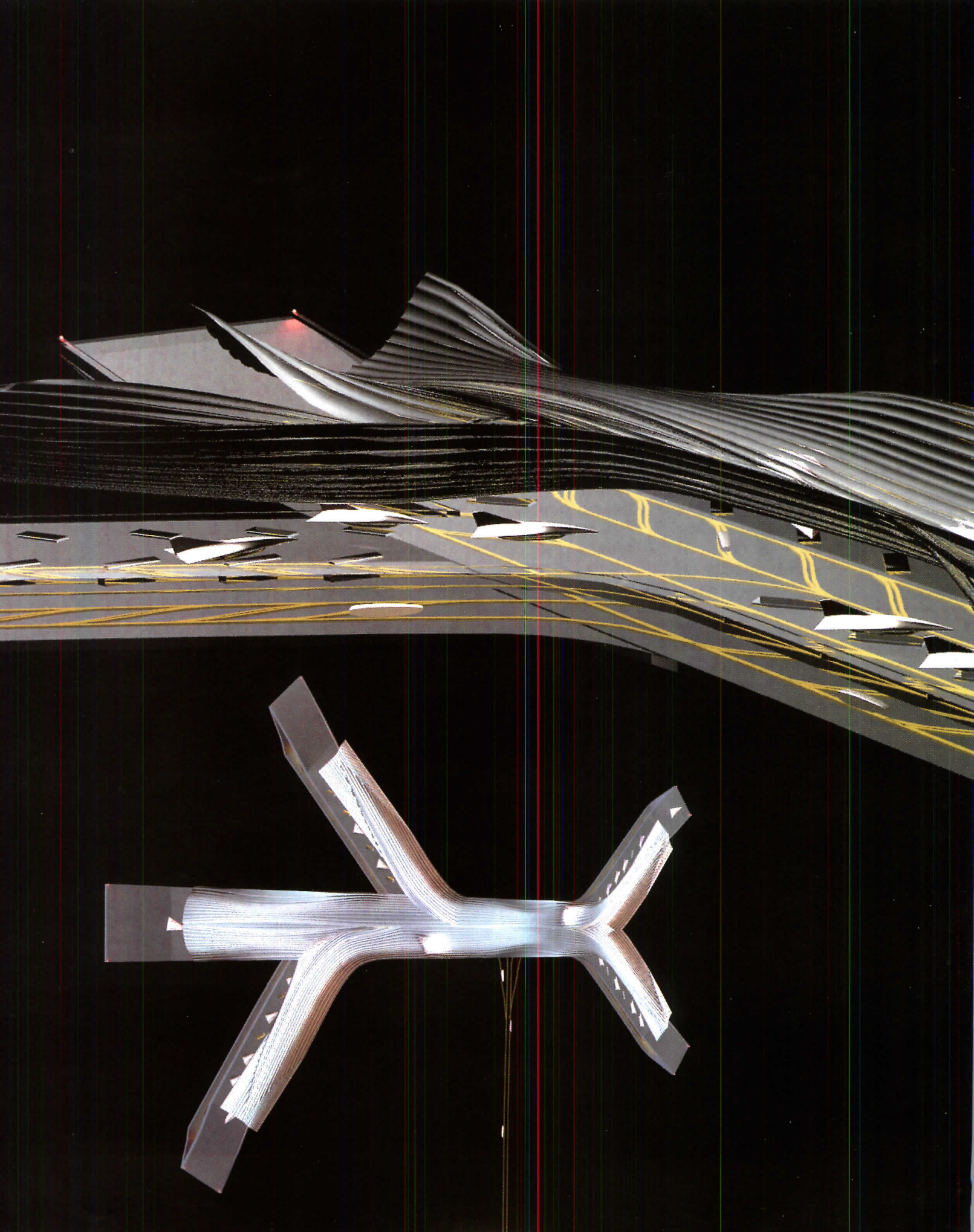





SECTION A-A



- | | | |
|------------------------------------|--------------------------|--------------------------------|
| 1. Entry | 5. Council meeting place | 9. Archive-interactive |
| 2. Turbines | 6. Broadcast facility | 10. Council chambers |
| 3. Thermal exchange (water source) | 7. Archive-retrieval | 11. Mayor |
| 4. Mechanical | 8. Archive-for viewing | 12. Public place and promenade |





REISER + UMEMOTO designs a streamlined **AIRPORT** for vertical takeoffs

Project: A prototypical airport for New York City

Location: Hudson River, west of midtown Manhattan

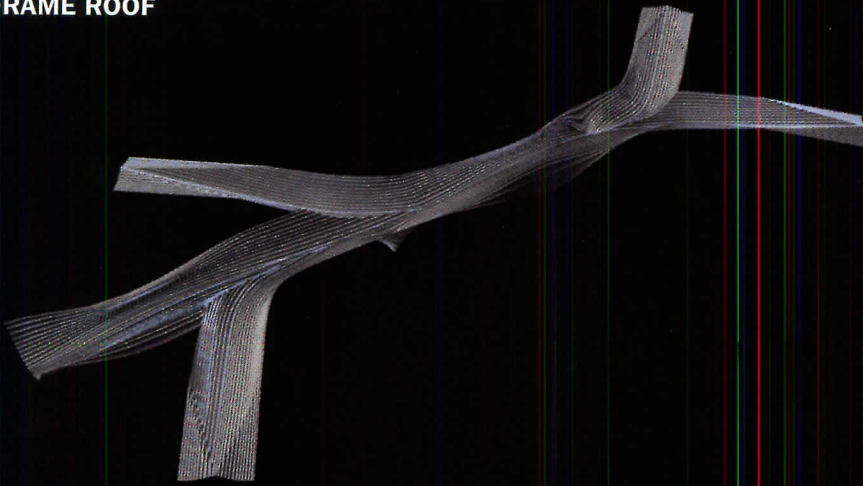
Architect: Jesse Reiser, AIA, and Nanako Umemoto, principals; Jason Payne, Nona Yehia, Keisuke Kitagawa, project team

Program: To develop an integrated airport and ground-transportation system for passengers and freight. The small-scale dispersed nodes would be compact and highly localized to decrease commuting time to the airport. The transportation network would be part of a global system and owned by corporate nation-states.

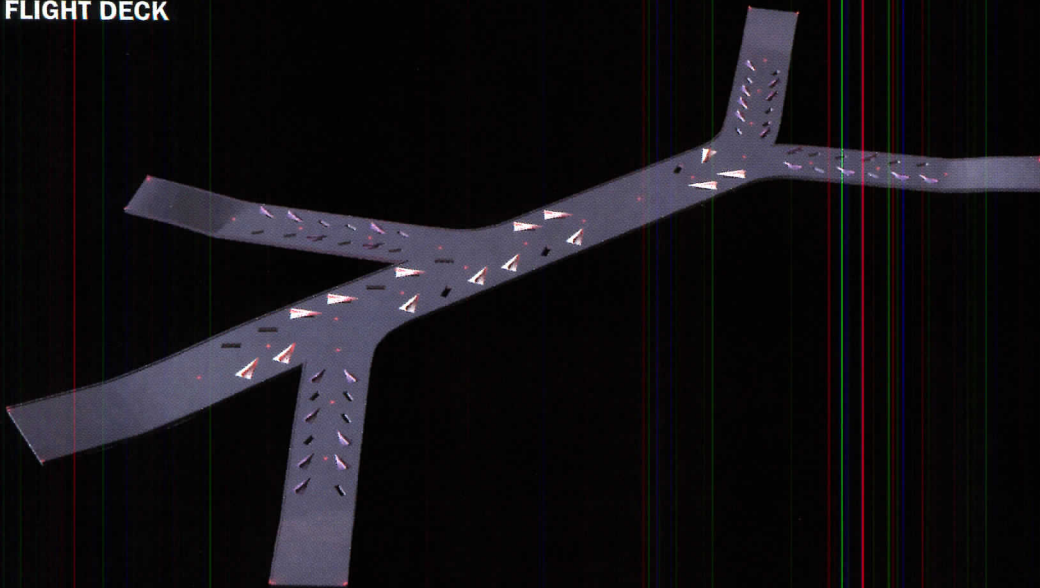
Size: 300,000 square feet

Completion Year: 2030

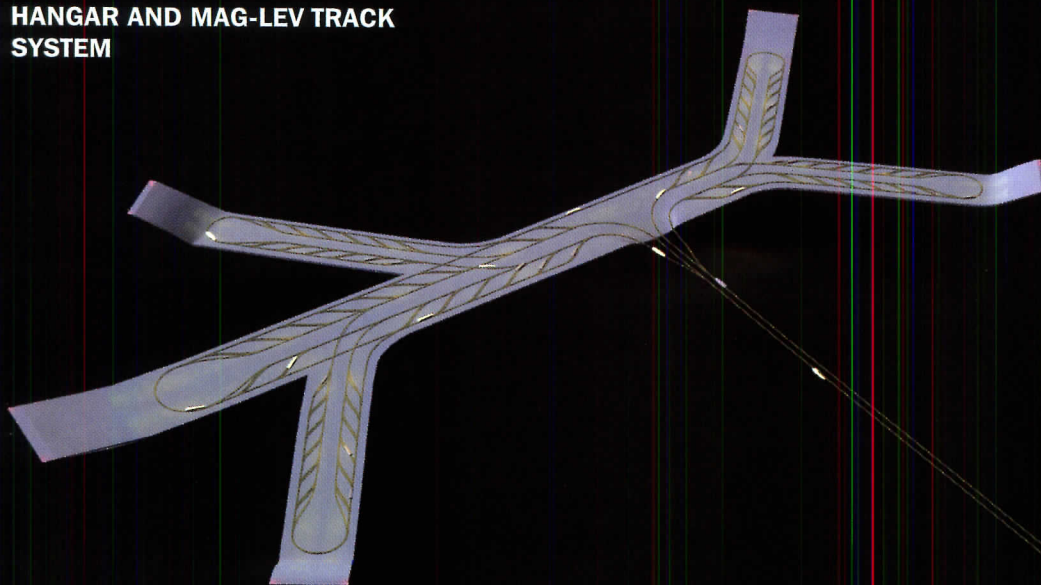
SPACEFRAME ROOF



FLIGHT DECK



HANGAR AND MAG-LEV TRACK SYSTEM



Design Intent: This intermodal transportation system calls for magnetic-levitation (mag-lev) high-speed surface transit to be hooked into small vertical-takeoff airports. The use of hypersonic vertical-takeoff aircraft would eliminate the need for long runways and provide flexibility in scale, capacity, and configuration of the airports.

The prototypical airports vary in capacity for large and small planes and basically consist of a multipurpose platform or flight deck, much like that of an aircraft carrier, with a landing pad at one end, a takeoff pad at the other, and a taxi area in between.

Beneath this platform are tracks that receive removable aircraft fuselages. These intermodal pods drop from the planes' underbellies at the terminal and then connect via mag-lev paths to central train stations. A spaceframe roof covers the entire airport structure, which could be developed as an artificial parkscape.

A passenger flying from New York to Paris, for example, could board the pod or compartment at a mag-lev transit station. The pod arrives at the airport, where it is hoisted off the tracks, and taken into the underbelly of the spacecraft.

While the spaceplanes are generically designed for overall efficiency, the pod would be outfitted according to the corporate/national sponsor's wishes. The passenger would stay in the pod for the duration of the trip, about a half-hour to Paris, hardly time to consume the once-reviled airplane snack.

Materials and Technologies: The enclosing roof is covered by a composite structural-glass spaceframe, which is pleated and glazed. The landing deck is made of a polymer matrix reinforced with graphite fiber, while the aircraft would be made of titanium with an ablative (heat-dissipating) coating. The bodies of the pods are either fiberglass or graphite fiber.

VERTICAL TAKEOFF AREA

LARGE-CAPACITY PLANES

FLIGHT DECK

VERTICAL
LANDING AREA

DISTRIBUTION
TRACKS

SMALL-CAPACITY PLANES

PLANE TAXI AREA

PARENT TYPOLOGY

SINGLE TAKEOFF AREA

FLIGHT DECK CURVED
IN DIRECTION OF ARRIVING
AND DEPARTING FLIGHTS

SINGLE LANDING AREA

HANGAR LEVEL
UNDERNEATH FLIGHT
DECK

SMALL- AND LARGE-SCALE FLIGHT DECKS
ACCOMMODATE DIFFERENT SCALES AND
CYCLES OF AIR TRAFFIC

PROTOTYPE 1

DUAL TAKEOFF AREA

PROTOTYPE 4

DUAL LANDING AREA

PROTOTYPE 2

INTERCHANGEABLE
LANDING/TAKEOFF
AREAS PROVIDE
VARIOUS POSSIBLE
AIR-TRAFFIC CYCLES

PROTOTYPE 5

MULTIPLE CONFIGURATIONS OF
SIMPLE BRANCHING SYSTEMS
PRODUCE A LARGE VARIETY OF
POSSIBLE ORGANIZATIONS;
AIRPORTS AS MULTIPLE,
CONTEXTUALLY IMMERSSED
INTERMODAL HUBS

PROTOTYPE 3

KRUECK & SEXTON combine rockets and rippling forms in a MIXED-USE TOWER

Project: Glass tower

Location: Downtown Chicago, at the corner of Michigan Avenue and Wacker Drive

Architect: Krueck + Sexton—Ronald Krueck, FAIA, Mark Sexton, AIA, Parus Kiravanich, Nemish Shah, design team

Program: Mixed-use office and residential tower with entertainment facilities and preschool/kindergarten

Size: More than 1,484 feet high

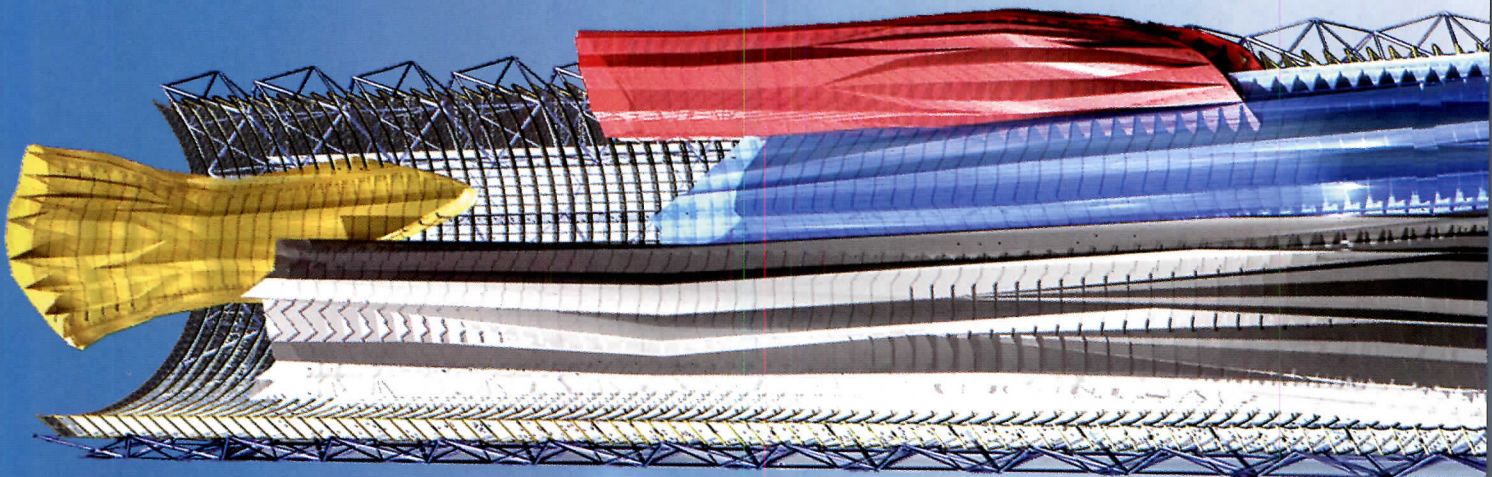
Completion Year: 2020

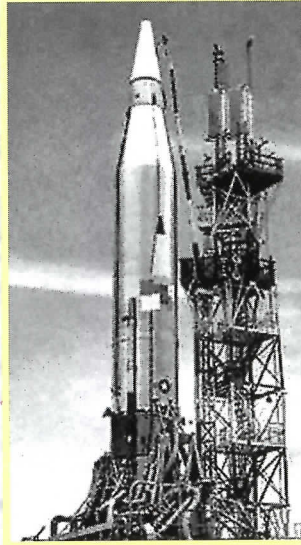
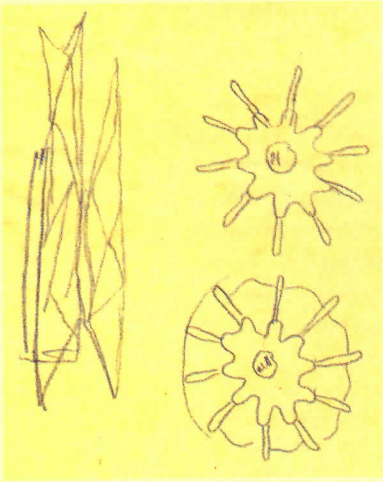
Design Intent: Echoing the embrace of rocket and gantry—dynamism with support—this tower rises in two parts: an irregularly shaped crystal shaft and an adjacent structural frame. By pulling the structure off to one side, the architects create column-free interiors that

have 360-degree views and are adaptable to many different uses.

Mechanical, circulation, and outdoor terraces occupy the gantry, which can be extended skyward maintaining the building's status as the world's tallest—no matter what is erected elsewhere. The architects even imagine "beer and hibachi parties" in the gantry's outdoor spaces. Separating support from tower also makes it easier to modify office and living spaces as functions and needs change over time.

By combining working, living, learning, and entertaining functions in one building, the project forms a "complete environment," says Ronald Krueck, FAIA. "It's building as supreme perk," capable of attracting the best



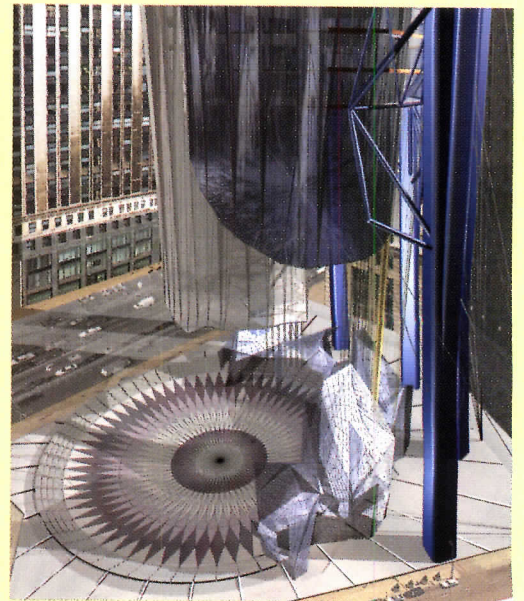
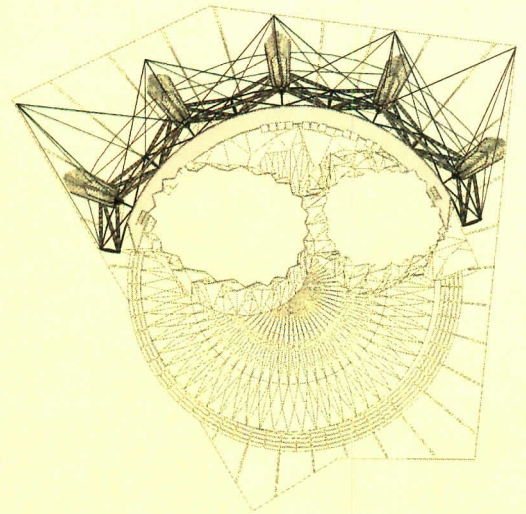


Inspired by both a down-to-earth vase and an icon of late-20th-century technology, the architects designed a building that would synthesize the two (drawings this page). Like a rocket gantry, the skyscraper's ectoskeleton is pure structure. The building's lighting and even its color will change at the flick of a switch.

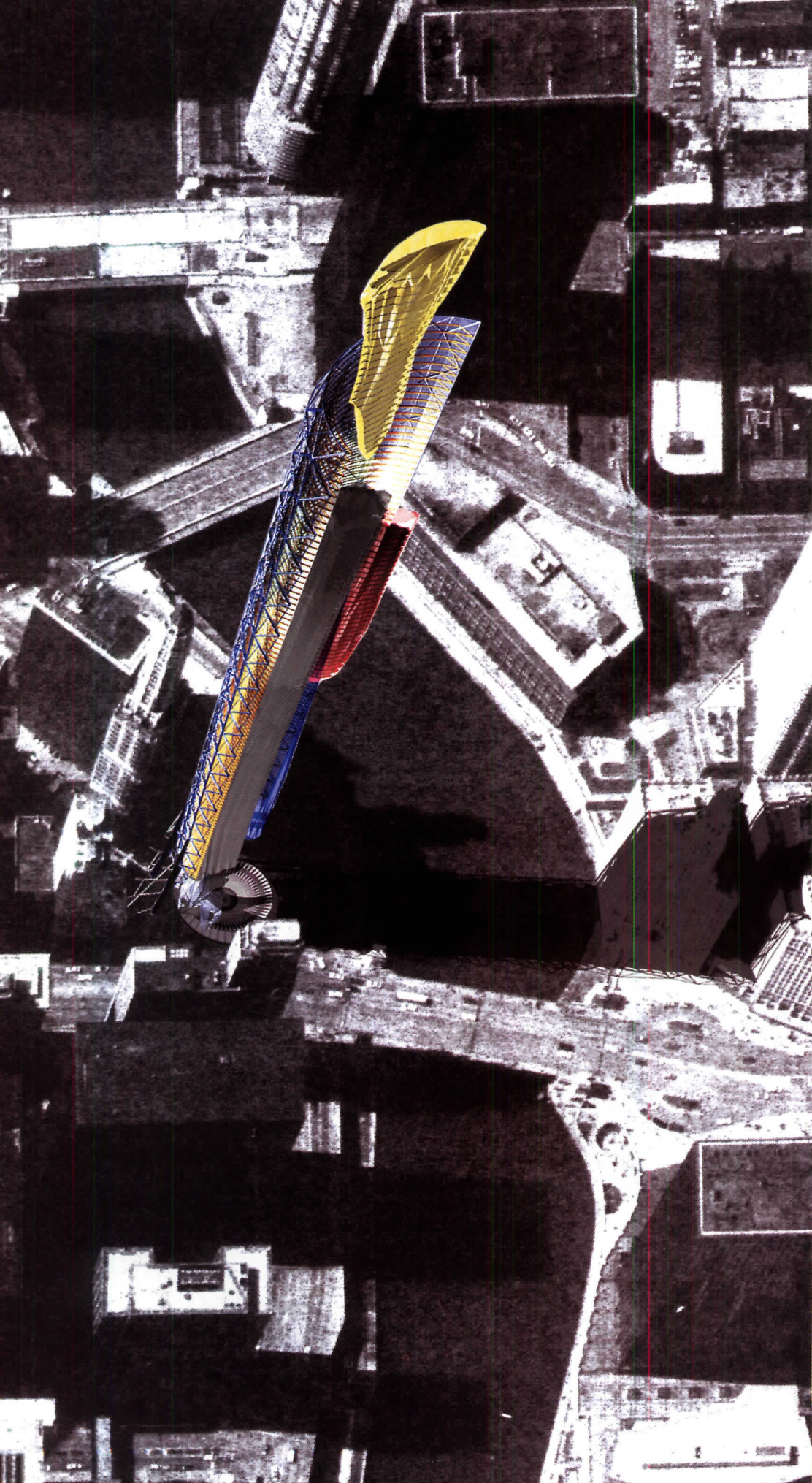




A steel gantry structure (left and below) embraces the glass tower, allowing it to have column-free interiors and 360-degree views. During the day, the building could serve as a giant sundial (bottom), marking time on its street-level plaza. At night, it will be a beacon of color and light (left).







tenants and employees, he adds. "Commuting is dead. Leave driving for the weekend home."

The "irregular form of the building matches the irregularity of life" in the 21st century, explains Mark Sexton, AIA. Instead of the Euclidian forms of earlier towers, this skyscraper's complex geometries reflect a time when talk of chaos theory and surfing the Web shape our worldview. Thus, the building's glass curtain wall is folded, permitting multiple shafts to snake their way from ground to sky.

Materials and Technologies: The architects envision a new kind of hyper-strong LCD glass that can switch instantly from transparent to opaque, from red to blue. It also would display various images and textual information on both the interior and the exterior. While an electronic ribbon might project the latest quotes from the New York Stock Exchange on the outside of the building, the residents of apartment 55A could call up video tape of the sunset 12 hours earlier in Hong Kong. Or, exterior facades might present images from the product catalogues of companies with offices in the tower, while a shopping center inside shows real-time views of what's happening in Rio de Janeiro. "We've gone from being a carbon-based society to a silicon-based society," says Sexton, "and glass exemplifies that."

The tower would rise from the dense fabric of downtown Chicago, across the river from Bertrand Goldberg's Marina City towers (top of photo). In a city famous for its skyscrapers, the building's use of color, light, and high-tech glass would stand out.



BIRDAIR. TENSIONED MEMBRANE SOLUTIONS FOR THE NEXT

MILLENNIUM

The U.K.'s Millennium Exhibition Dome -- fabricated and constructed by Birdair -- is the largest tensioned membrane dome structure ever built. With a 320 m. diameter and 80,000 sq. m. of floor space, the Millennium Dome could easily house the entire Atlanta Georgia Dome or the Denver International Airport main terminal. In fact, several 25,000 sq. m buildings will be erected inside the dome to help ring in Y2K. The 144 PTFE membrane panels (totaling 188,000 sq. m. of fabric) cover a cable net consisting of 2,600 cables. Twelve 95 m. inclined masts rise through the membrane to support the entire structure. It is a wonder, this Millennium Dome, large, complex and difficult. Such large scale projects have become emblems of Birdair's very special capabilities, but the megadomes represent only one part of Birdair's mission entering the next millennium. Tensioned membrane technology has been applied to:

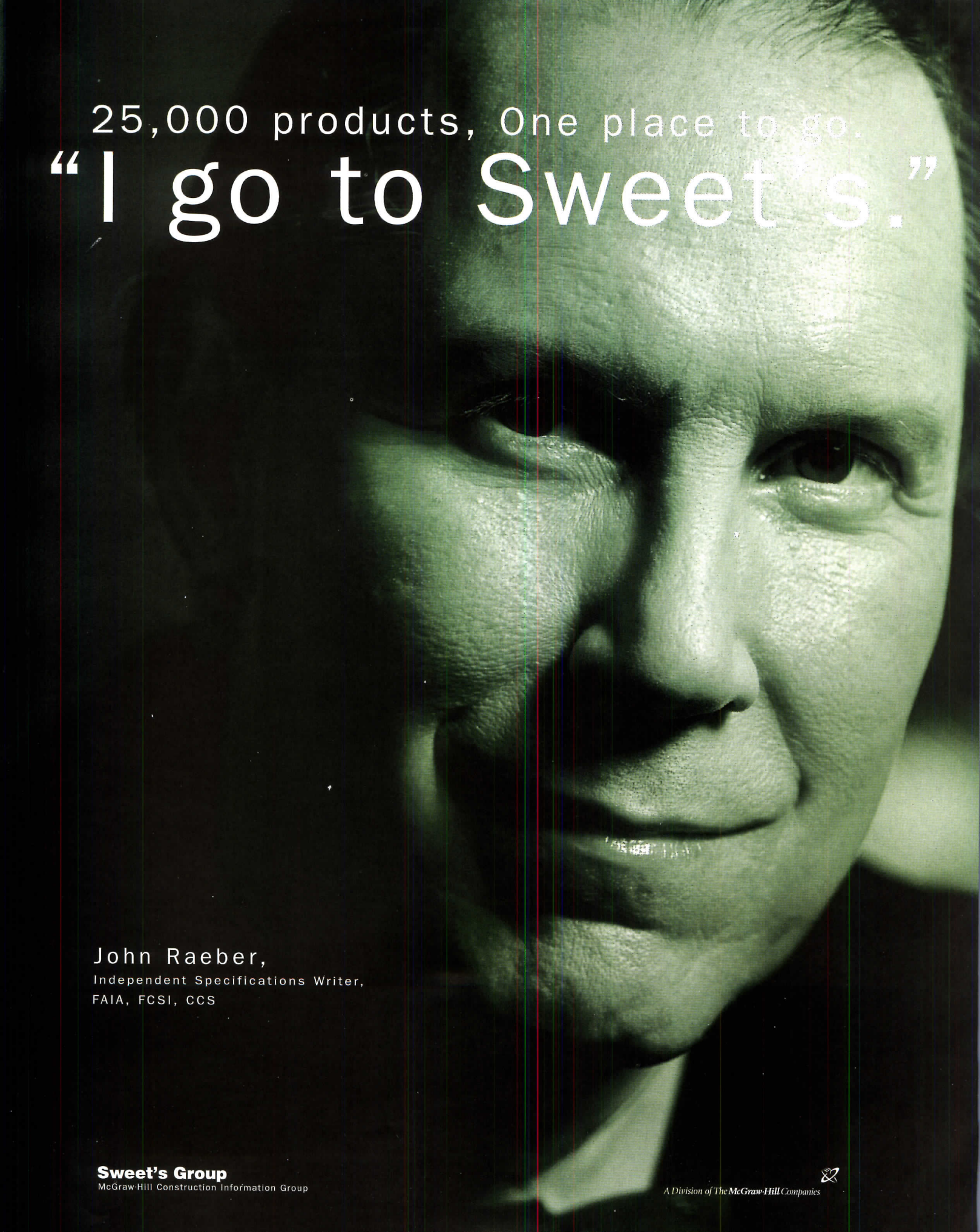


amphitheaters, sports venues, retail malls, auditoriums, museums, hotels, transportation terminals and commercial buildings. This unique architectural form enhances building envelopes as very few building products can. A Birdair structure is technological vision that works. To learn more about how you can use tensioned membrane to create new buildings in the next millennium contact us for complete technical and application information.



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ENTERTAINMENT BUILDINGS

Form in the Era of Fun

THE LESSONS LEARNED FROM 150 YEARS OF EXPOSITIONS, WORLD'S FAIRS,
AND THEME PARKS HAVE FORMED THE BASIS FOR A REVOLUTION IN DESIGN.

by Gregory Beck, AIA



1

DisneyQuest

In Chicago's Gold Coast neighborhood, Disney's newest experiment in themed entertainment must be quiet enough for the neighbors, but loud enough to advertise what's inside.



2

Times Square Studios

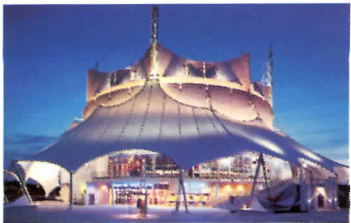
Disney uses a sculptured, kinetic sign to draw attention to a new television studio on a chaotic corner in New York City.



3

Terminator 2: 3-D Attraction

A prominently placed, themed attraction relies on abstract forms to play up the excitement of the high-tech world of the Terminator films.



4

Cirque du Soleil

The avant-garde circus company sets up permanent residence in Orlando and worries about compromising the mystery of its unusual performances.

Entertainment design intends to inspire, to convey ideas, and to affect the emotions. The kind of experience that many of us had at the 1964 World's Fair—a fantastic amalgam of pavilions, streets, exhibits, space travel, and the future—is what entertainment design, at its best, should evoke. And the success of it and the other fairs, expositions, leisure attractions, and conceptual projects (such as Archigram's Walking City), of the last 150 years have laid the foundation for a revolution in design.

Today, the lessons learned from these places are being applied to a host of mainstream building assignments. We are moving into an "experience economy," where the value of buildings, objects and services is measured by the quality of the personal interaction they provide us. These are, in turn, redefining the ways in which we learn, shop, and have fun. Entertainment has become a dominant factor influencing design and real estate development decisions the world over. It is reshaping our expectations of what places can do for people, and it has raised the public's estimation of the value of the designed environment. The result is a kind of architecture unplugged from a building's shell, that challenges our traditional views of design. It isn't your parents' architecture.

Entertainment design demands that architects draw on an array of skills. It blends talents in environmental design, media technology, and storytelling to create content-rich environments. As a result, new priorities are emerging from the traditional concerns of architects in which creating content-rich locales and predicting their effectiveness as entertainment environments are what counts. It challenges us to respond to contemporary issues with more than aesthetic answers, deepening the impact of our work. Places can then become the central cast of a story, narrate scripts, communicate brand messages, and enhance information delivery.

Entertainment design is preoccupied more with communication and emotion than architectural form. It integrates digital, electronic, and broadcast media, but it is not about media. It focuses on

Gregory Beck, AIA, designed special-venue theaters at Luxor Las Vegas, retail projects for Swatch, and new development plans for Coney Island. He is the former director of architecture for Sony New Technologies, an assistant professor in the department of industrial design at Pratt, and an instructor at the Harvard Graduate School of Design.

Great moments in entertainment design

before 1900



1851 Crystal Palace, London



1855 Universal Exposition Park, Paris



1876 Centennial Exposition, Philadelphia



1878 Idlewild Park, Ligonier, Pa.

1843 Tivoli Gardens, Copenhagen, Denmark



1889 Great Paris Exhibition, Paris



1893 Chicago World's Columbian Exposition



1894 Euclid Beach Park, Chicago



1893 Midway Plaisance, Chicago

1896 Blackpool Pleasure Beach, U.K.



1897 Steeplechase Park, Coney Island, N.Y.



1895 Sea Lion Park, Coney Island, N.Y.



1899 Sans Souci, Chicago

1900



1900s Trolley Parks



1903 Luna Park, Coney Island, N.Y.



1904 White City, Chicago



1904 Louisiana Purchase Exposition, St. Louis



1906 Wonderland Park, Revere Beach, Peabody, Mass.

1907 Hersheypark, Hershey, Pa.

1910



1900s Palisades Amusement Park, N.J.

1904 Dreamland, Coney Island, N.Y.



1904 Riverview, Chicago



1905 Abbot Kinney Pier, Venice, Calif.



1911 Fraser's "Million Dollar" Pier, Ocean Park, Venice, Calif.



1914 Panama Pacific International Exposition, San Francisco



1916 Looft's Pier, Venice, Calif.

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the guest experience, the pulse and character of individual interaction. To commodity, firmness, and delight it adds media, light, sound, and narrative. Taking this lead, entertainment design can show us how to reconnect the values of architecture with the desires of popular and commercial culture.

Timeline: a history of expos, world's fairs, and theme parks

Our timeline of attractions—which, due to the constraints of space, cannot include every important event or place—begins in the mid-19th century. Western society was becoming increasingly industrialized, and people had leisure time and disposable income. Increasing rates of literacy enhanced imagination and curiosity. There was suddenly an opportunity to produce a world for learning, sharing, and profiting from a culture that was also increasingly civic-minded. Design merged with the content and experience that people craved—and the result was the birth of entertainment design.

In Europe in the 1850s, the great expositions created large places for the public display of information and celebrated architectural innovation and industrial prowess, first at the Crystal Palace in London (1851), followed by the Universal Exposition Park in Paris (1855). The

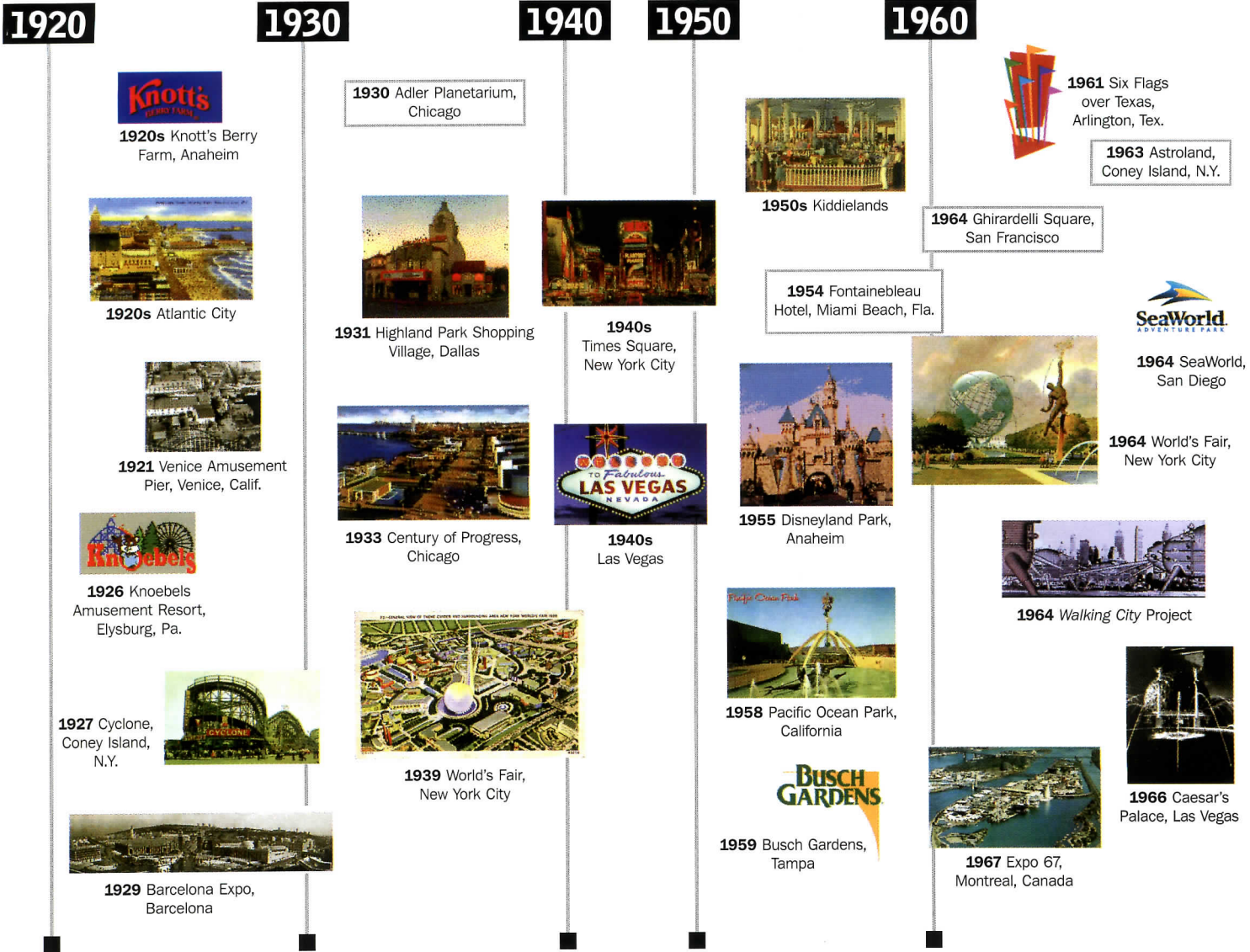
movement spread to the U.S. with the Centennial Exposition in Philadelphia (1876), and the World's Columbian Exposition in Chicago (1893). All these projected unbridled optimism about progress and the power of the human spirit. Seen as experiments in design and planning, these industrial festivals were the ideal expression for a new age.

By the turn of the century, amusement parks in Europe and the U.S. were in full bloom. The beaches of Coney Island, N.Y., over-

EXPOSITIONS SHOWED OPTIMISM FOR THE POWER OF THE HUMAN SPIRIT.

flowed with immigrants anxious to forget the trials of urban life and pursue new forms of pleasure and fantasy. Here, at last, was tangible evidence that the American Dream could pay off. Amusement park architecture leapt from the pages of storybooks and pulp science fiction into the American experience. A visit to Coney Island's Dreamland attraction (1904) immersed guests in an unforgettable world of palaces and rides that were both lyrical and surreal.

The intellectual backbone of expositions combined with the



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visceral call of leisure parks to produce a uniquely modern event, the World's Fair. Equal parts exhibition, technology, amusement, and design, the world's fairs were an international movement, promoting global awareness and cultural harmony. The 1939 and 1964 New York world's fairs sparkled with the fresh ideas of leading architects who promoted contemporary design ideals. These major events provided an opportunity for them to link architecture with national, social, and environmental issues. Above all, architecture represented cultural progress. While world's fairs and expos have continued, their future is clouded by politics and financial restraints.

Architecture with a plot

The modern theme park was born during the mid-1950s at Disneyland Park in Anaheim, Calif. Filmmaker Walt Disney's attraction was a quantum leap from its contemporary attractions. It was an amusement park with characters he had invented an entirely new way to for people to experience stories in real time and space. Here design, planning, and technology were put to work to serve theatrical goals—architecture with a plot. Along the way, Disney sparked a billion-dollar industry that now does its storytelling on a global scale: Walt Disney

Imagineering, the in-house design group, is the largest planning, research, and development office on the planet.

The theme parks of Disney and others continue to be big business and are the most profitable way to extend film and character-based experiences into the marketplace [see Universal Studio Hollywood's Terminator attraction, page 140]. The movement toward entertainment design has exploded in the last 10 years, influencing the look and feel of many commercial, leisure, cultural, and educational projects. And the attractions themselves have escaped from the theme park, becoming anchors for shopping centers, or stand-alone urban magnets, like the new DisneyQuest in Chicago [page 136], a strategy that builds on the Disney brand by extending the Disney experience beyond Anaheim and Orlando, Fla., home of DisneyWorld. Themed restaurants, like Hard Rock Cafe, make the dining experience into a celebrity-driven adventure, packed with musical artifacts and fantasy. A renewed interest in projects that will combine retail, multiplex theaters, restaurants, and attractions—called “location-based entertainment”—has enticed major corporate sponsorship for developments like Sony's Metreon in San Francisco [October 1999, page 154]. Retailers have strengthened their brands using entertainment-designed destination specialty stores. Niketown, for

1970

1970 Japan World Exposition, Osaka, Japan



1971 Hard Rock Cafe London

1974 Expo '74, Spokane, Wash.

1976 Lowell National Historic Park, Lowell, Mass.

1976 USA Bicentennial



1971 Walt Disney World Resort, Orlando



1972 City of the Captive Globe Project



1976 Paramount's Great America, Santa Clara, Calif.

1976 Faneuil Hall Marketplace, Boston



1978 Atlantic City Casinos, Atlantic City

1979 Piazza d'Italia, New Orleans

1980

1980 Crystal Cathedral, Garden Grove, Calif.



1981 Paramount Canada's Wonderland, Toronto



1983 Tokyo Disneyland Park, Tokyo, Japan

1985 Expo '85, Tsukuba



1985 Horton Plaza, San Diego



1987 Futuroscope Park, Poitiers, France

1989 Pink Floyd "Delicate Sound of Thunder" Stadium Tour



1989 Pleasure Island, Walt Disney World Resort, Orlando

1990

1990 The World of Coca-Cola, Atlanta

1990 Harborplace, Baltimore

1992 Niketown, Chicago



1992 Knott's Camp Snoopy, Bloomington, Minn.

1994 BMW Visitors Center, Spartanburg, Tenn.



1996 AT&T Olympic Pavilion, Atlanta

1997 GameWorks, Seattle

1998 ESPN Zone, Baltimore



1998 DisneyQuest, Chicago



1990 Dolphin and Swan Resorts, Orlando

1993 Forum Shops, Las Vegas

1993 Liberty Science Center, Jersey City, N.J.



1994 Celebration, Fla.



1996 Canal City Hakata, Fukuoka, Japan

1999 Estacao Plaza, Curitiba, Brazil



1982 Epcot, Walt Disney World Resort, Orlando

1984 Olympic Ceremonies, Los Angeles

1987 The Disney Store



1988 SeaWorld Texas, San Antonio



1989 Disney-MGM Studios, Walt Disney World Resort, Orlando

1989 Third Street Promenade, Santa Monica, Calif.

1989 Parc Asterix, Plailly, France

Florida logo © Universal Studios; Mall of America logo © Mall of America; Luxor Hotel and Casino © Circus Circus Enterprises Inc.; Knott's Camp Snoopy logo © Knott's Berry Farm; Universal Studios CityWalk © Universal Studios; Fremont Street Experience © The Jerde Partnership Inc.; This Timeline contains an image copyrighted by The Celebration Company; AT&T Olympic Pavilion © AT&T; Official All-Star Sports Cafe © Rockwell Group; SegaWorld © Sega Enterprises Inc.;

example, immerses visitors in brand-saturated settings, where everything Nike prevails. Even broadcasters like ABC have gotten into the act, installing a new studio for Good Morning, America in Times Square [page 138] creating a new kind of "brand theater."

New "culture parks" are doing the recreative setting of Colonial Williamsburg one better, interpreting history with stories and scenes. Even the most hallowed sites are recast. At the Gettysburg National Military Park, for example, a new plan calls for reenacting the battle story from many points of view—the world view, the soldier's view, a child's view, Lincoln's view, and how descendants recall the event—restructuring the historical narrative to engage a wider audience. Along with a new visitors center, portions of the landscape will be returned to their 1863 appearance.

Shifting from the public domain to the private sector

The most striking, and perhaps most important, aspect of the timeline of the development of entertainment architecture may be what it reveals about the journey of entertainment design, from an idealistic, world-changing optimism to corporate-sponsored commercialism. Whereas governments, civic pride, and individuals fueled the early

growth of expositions, leisure parks, and even events like the Olympics, most large entertainment projects now are extensions of corporate brand building. Even the highest ideals of world's fairs have fallen prey to political cynicism and the lure of sponsorship money.

Some people think entertainment design has attained apogee. Others worry that it has suffered apoplexy. The 1990s have seen such an eruption of themed projects that everywhere we go, something different is "themed," sometimes to the point of absurdity. Yet, the condensed, edited, escapist stories give us the opportunity to enter new environmental scripts for pleasure and without risk—the New York, New York Casino in Las Vegas attracts people who would never visit New York City, perhaps because they could not afford to or because they perceive it to be overwhelming and unsafe.

In a more direct way than we encounter in films, themed environments invite us to step into stories and participate in their telling. In our digital culture, we find joy in the opportunity to suspend disbelief in search of adventure and redemption. Theming is simply a way of telling stories by using environmental design. Like other forms of design, it can be good, bad, or just plain ugly. Some projects, like Cirque du Soleil in Orlando [page 142] are successful by

1990 Universal Studios Florida, Orlando

1990 Sanrio Puroland, Tama, Japan

1991 Planet Hollywood, New York City

1992 Mall of America, Bloomington, Minn.

1992 Disneyland Paris Resort, Paris

1992 Expo '92, Seville, Spain

1993 Sony Wonder, New York City

1993 Luxor, Las Vegas

1994 House of Blues, Boston

1994 Sony IMAX Theater, New York City

1994 The Trocadero, London

1995 Universal CityWalk, Los Angeles

1995 Universal's Port Aventura, Tarragona, Spain

1995 Fremont Street Experience, Las Vegas

1995 Official All-Star Sports Cafe, New York City

1995 Mohegan Sun Casino, Mystic, Conn.

1996 SegaWorld, London

1997 Virgin Megastore, New York City

1997 Newseum, Arlington, Va.

1997 Downtown Disney, Orlando

1997 Cirque du Soleil, Orlando

1998 Times Square, New York City

1998 Disney's Animal Kingdom, Orlando

1998 Navy Pier, Chicago

1998 NBC Access Store, New York City

1998 Casinos and Resorts, Las Vegas

1999 Disney Magic

1999 Universal Studios Islands of Adventure, Orlando

1999 Sony Metreon, San Francisco

2000 The Millennium Experience, Greenwich, U.K.

2000 Discovery Cove, Orlando

2000 Volkswagen Autostadt, Wolfsburg, Germany

2000 Rose Center for Earth and Space, New York City

2000 Expo 2000, Hannover, Germany

2001 Tokyo DisneySea, Tokyo, Japan

2001 GM Experience, Detroit

2001 Disney's California Adventure, Anaheim

2002 Gettysburg National Military Park, Gettysburg, Pa.

2002 Destination Technodrome, Montreal, Canada

2000s Ocean Park, Bremen, Germany

2000 Jazzland, New Orleans

2003 Spaceport Sumurcity, Sumur, Malaysia

2000

NBA City logo © Universal Studios Escape; Metreon logo © Sony Development; Islands of Adventure logo © Universal Studios; Millennium Dome © Millennium Dome 2000; Discovery Cove © Discovery Cove Inc.; Rose Center for Earth and Space © American Museum of Natural History; Autostadt logo © Volkswagen AG; Ocean Park © Ocean Park; Spaceport Sumurcity logo © Spaceport Sumurcity

keeping the theming deliberately understated. In other situations the real key to success is how effectively the architects can communicate the story.

Blasting into the future

With its illustrious past and celebrated present, entertainment design will continue to invigorate our ideas about architecture, and serve as a testing bed for new ways of creating guest environments. What will this mix of entertainment, technology and design offer next? Some predictions for the next decade: Entertainment will continue to be a catalyst for urban revitalization projects across the country. Here, special attractions, multiplex/large format cinemas, and local attractions have become the high-impact drawing card necessary for visibility in a competitive marketplace. After years of failed development plans for a troubled district, Disney stepped into Times Square and spearheaded a billion-dollar upgrade, creating one of the most celebrated public spaces. Entertainment design will continue to bring delight to places such as this and make them profit centers.

Finally, entertainment design will be recognized as a multi-disciplinary design field. Already, we hear museum directors talking

about the “guest experience.” Retail merchandisers speak about “immersion,” “brand narratives,” and “length of stay.” And, borrowing a phrase from the computer industry, developers chant, “It’s the content, not the hardware, stupid.” In many settings that not too long ago we took for granted, we are now seeking stories and an emotional connection to give them context in our lives. Entertainment design

THEMED ENVIRONMENTS INVITE US TO PARTICIPATE IN THE TELLING OF STORIES.

electrifies us with the power to communicate ideas. It has just begun to be a part of our lives.

Are these types of projects a passing fad, soon to be replaced by the next fashionable thing? Are they what Ada Louise Huxtable called “synthetic environments?” The need for fine building design will be essential in the next century. Entertainment design supports this mission, celebrating the opportunity to engage clients and guests with work that is relevant and distinctly valuable. Our modern-laced, hyperreactive society will wait on no one to give form its shape and meaning. ■

1

DisneyQuest Chicago

FORCED BY STUFFY SURROUNDINGS TO VEIL ITS TRUE COLORS, DISNEYQUEST STILL SEIZES ATTENTION.

by David S. Morton

Project: *DisneyQuest, Chicago*
Owner: *The Walt Disney Company—Disney Regional Entertainment Company, operator*
Architect: *Walt Disney Imagineering*
Architect of record: *Walt Disney Imagineering*
Associate architects: *Hodgetts & Fung (Score Zone); Michael Vanderbyl Design (Create Zone and lobby); JMA Associates (Replay Zone, FoodQuest, and Wonderland Cafe)*
Interior designer: *Walt Disney Imagineering*
Lighting: *Walt Disney Imagineering*
Acoustical: *Walt Disney Imagineering*

Size: *90,000 square feet*

When developing projects beyond home turf in Anaheim or Orlando, Disney must follow someone else's rules. Because the company has global plans for DisneyQuest, its new brand of themed entertainment centers, DisneyQuest buildings need to glide effortlessly through the often sticky permitting processes of municipal bureaucracies.

For instance, the first DisneyQuest built outside Orlando appeared this year in Chicago's ritzy Gold Coast neighborhood, where its neighbors would have stood fast against any brash incursions. Exposed, the guts of DisneyQuest would certainly be considered intrusive; it's a floridly styled interactive theme park driven by compact, virtual-reality attractions. Outside, however, DisneyQuest is a windowless cube, a "sophisticated and urbane" approach, in the words of the project's chief Imagineer, Larry Gertz. By Disney standards, the exterior design is basically mute.

Loudly mute. The city forbade any exterior animation, fearing that it would confuse traffic, yet the surface of the building is stubbornly active. The glass panels that curtain the four stories above the ground floor are sprayed on their interior faces with an iridescent paint, a

David S. Morton, a freelance writer in New York, was formerly on the editorial staff at RECORD.



custom shade of turquoise known among the project's Imagineers as "throat-drop blue." Metal flecks in the paint give the facade sparkling variations, especially on the convex surface above the main entrance on Ohio Street.

Like many Disney properties, the building's exclamation point and primary distinguishing factor is a huge "Hurricane Mickey" logo on the Ohio Street facade. A reflective mosaic composed of 285,000 one-inch-square acrylic tiles secured to the glass by silicon adhesive, the looping logo has the visual burn of neon without neon's pale glare. The same logo, this time a similarly sized etching in glass, dominates the Rush Street facade.

Disney is counting on what is essentially a high-profile billboard strategy to generate excitement for



attractions that, for the most part, represent the cutting edge of entertainment technology. Considering the power of the mouse logo in the marketplace, it doesn't seem so great a risk. ■

Except for a giant logo, DisneyQuest's relatively quiet glass shell (below) hides the wild exuberance of the attractions within (right and opposite).



2

Times Square Studios New York City

DISNEY'S IMAGINEERS AND HLW CONCOCT AN ATTENTION-GETTER ON A PROMINENT SITE AMID THE CACOPHONY OF TIMES SQUARE.

by Soren Larson

Project: Times Square Studios, New York
Owner: Disney Enterprises Inc.
Exterior and signage designer: Walt Disney Imagineering
Architect of record: HLW International LLP—John Gering, partner-in-charge; James Lee, project manager; Stephen Newbold, project architect
Signage architect: Kupiec Architects
Engineers: HLW (structural), Tom Gasbarro, project engineer; Edwards & Zuck (mechanical, plumbing, electrical)
Consultants: Gordon H. Smith (exterior walls); The Systems Group (production control systems); Sony Electronics; The Lighting Design Group (studio lighting and rigging); Pook, Diemont & Ohl; Cerami & Associates (acoustical); Van Deusen & Associates (elevators); IO Media; Jerome Gillman Consulting Architects (building codes)
Construction manager: Tishman Interiors Corporation
Curtain wall: W+W Glass Systems
Glazing: Schott Corp., W+W Glass Systems
Special doors: Industrial Acoustics Co.
Special surfacing: Crossfield Products
Lighting: Arri/transtechnik (studio rigging); Production Arts (system integrators); Electronic Theater Controls (studio controls); Sony Electronics (production controls)
Conveyance: Nustar Elevator Construction Co.
Electronic sign: Sony Electronics (jumbotron); Multimedia (LED signage)

WWW For more information on the people and products involved in this project, go to **Projects at:** www.architecturalrecord.com.

Times Square was already quite bustling by the time the Walt Disney Co. decided to build a television studio there to host ABC's *Good Morning America* and other programming. Nevertheless, Disney's Imagineers, together with HLW International, managed to design an eye-popping facility on the site that they think cuts through the clutter.

"We wanted to create a window onto Times Square, and we were lucky to find this location," says Wing Chao, FAIA, executive vice president of master planning, architecture, and design at Disney Imagineering. "But the big question was, 'How do you stand out?' The [exterior] lighting was the key."

That lighting takes the form of a constantly changing, 4,000-square-foot video sign that wraps around the northwest corner of the new Times Square Studios, creating a 24-hour-a-day parade of news, promotions, and live broadcasts. "This is media as architecture," says Eddie Sotto, who as senior vice president at Imagineering headed the design team (he has since left the company). "We wanted something both sculptural and kinetic."

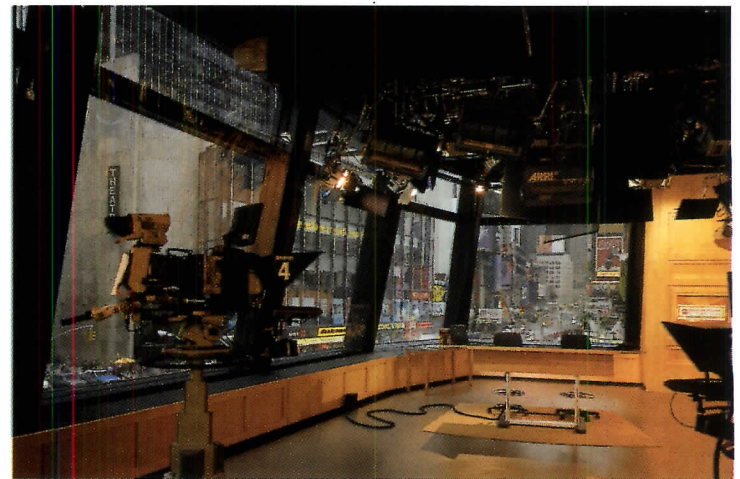
The other essential feature is the 4,600-square-foot Marquee Studio. The project's entire design, begun in spring 1998, sprang from a single viewpoint: a clear sightline up Broadway north from 44th Street, taking in all the area's frenetic

energy. The architects centered the design around maximizing this view and cantilevered the second-floor studio over the sidewalk.

Before any new construction, the first step was to gut the interior of the existing structure from the fifth floor down. Heavy concrete columns in the middle of the space were taken out, and the load was shifted to steel trusses along the edge. The ground floor hosts a second studio with three removable glass panels—the 14,000-pound units are floated on cushions of air, allowing them to be easily moved to engage passersby on the street. The glass in the ground floor and in the Marquee Studio was manufactured by Schott Corp. to

have ultra-low reflectivity, maintain clarity, and provide soundproofing.

So far, Disney's decision appears prescient: *Good Morning America's* ratings are already up. ■





Times Square Studios' flowing sign adds a kinetic, constantly changing presence to a busy corner (this page, opposite top); the Marquee Studio was cantilevered over the sidewalk to take full advantage of the view up Broadway.

3

Terminator 2: 3D Attraction Hollywood

TO PRESERVE THE HIGH-TECH EXCITEMENT OF THE TERMINATOR MOVIES, A THEATER IS CLOTHED IN ABSTRACTIONS.

by David S. Morton

Project: *Terminator 2: 3D Attraction*, Universal Studios Hollywood

Owner: Universal Creative Planning and Development—Bob Ward, senior vice president

Architect: RIOS Associates Inc.—Mark W. Rios, Frank Clementi, Polly Furr

Architect of record: Morris Architects—Gerald Palmer Smith, project manager; Walt Geiger, design principal; Gerald Koi, managing principal; Sheila Rowley, project architect; Jed Prest, Richard Schneider, Timothy Burnett, John McWilliams, B.K. Cho, Javier Negroni, Calvin Peh

Engineers: IWA Engineers (civil); Ficcadenti & Waggoner (structural engineer); Syska & Hennessy (mechanical, electrical)

Consultants: Associates in Architecture & Design Ltd. (retail interiors, signage and graphics); RIOS Associates (landscape); Lighting Design Alliance (lighting); City Design Group (water plaza)

Sources

Building skin: *Mimetic Poly-Alloy*

Sound doors: *Krieger*

Automatic door closers: *Horton*

Retail millwork: *K and Z Cabinets*

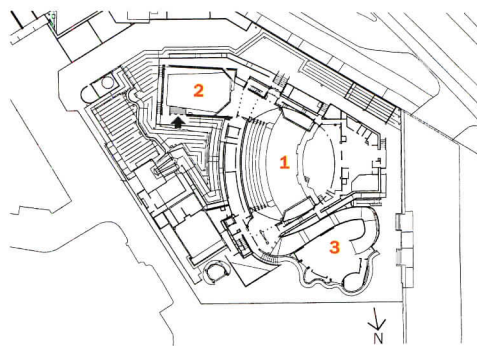
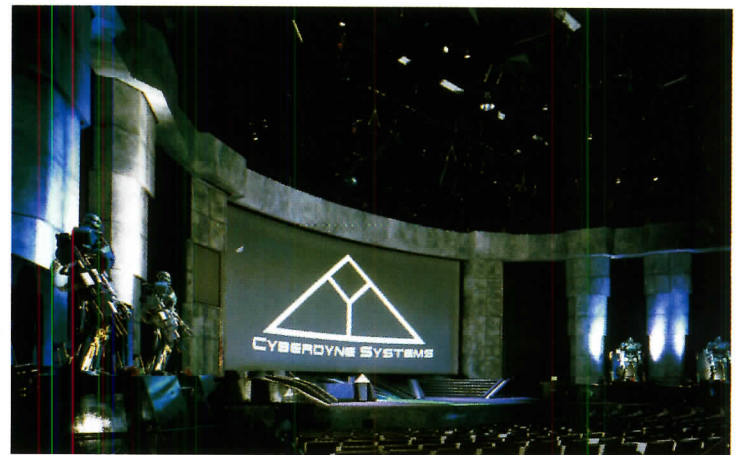
Paints: *ICI*

Acoustical panels: *Sound Control*

WWW For more information on the people and products involved in this project, go to **Projects** at: www.architecturalrecord.com

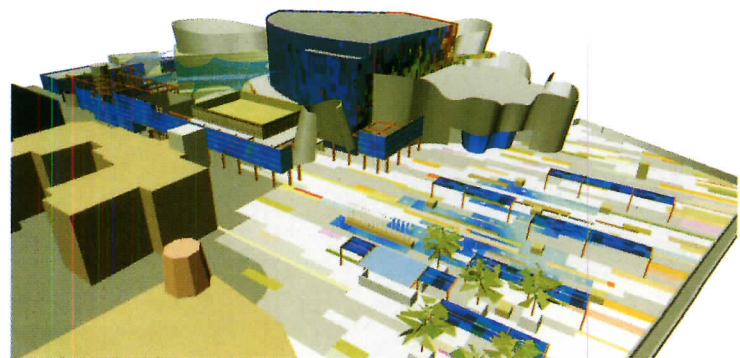
See a Terminator movie too many times, and the thrills diminish. So it follows that if you pack too much Terminator into a conspicuously themed building, you risk corrupting the brand. Overdoing a theme is exactly what architect Mark Rios, FAIA, tried to transcend when designing exterior elements for Universal Studios' newest attraction, a 3-D experience based on the Terminator films. The building, which sits on top of a six-story parking garage at the edge of a Hollywood theme park, is one of Los Angeles' more visible structures. "We wanted to avoid any sort of literal theming," says Rios, "the building should be a piece of architecture and not a Xerox copy of the movie."

The curving roof and wall elements, built of plaster and painted silver, refer to the morphing technology that the movie *Terminator 2: Judgment Day* introduced to the world. On the theater volume, a mosaic of variously sized, colored rectangular pixels in carefully arranged patterns creates a more abstract high-tech impression. Small to mid-size pixels cover the facade seen from inside the park, while medium to large pixels cover the side of the building visible from the freeways and the L.A. hills. In effect, the pixelation—whether seen up close or from afar—breaks up the theater volume's mass. As a result, the building promotes itself while also conversing with its context. ■

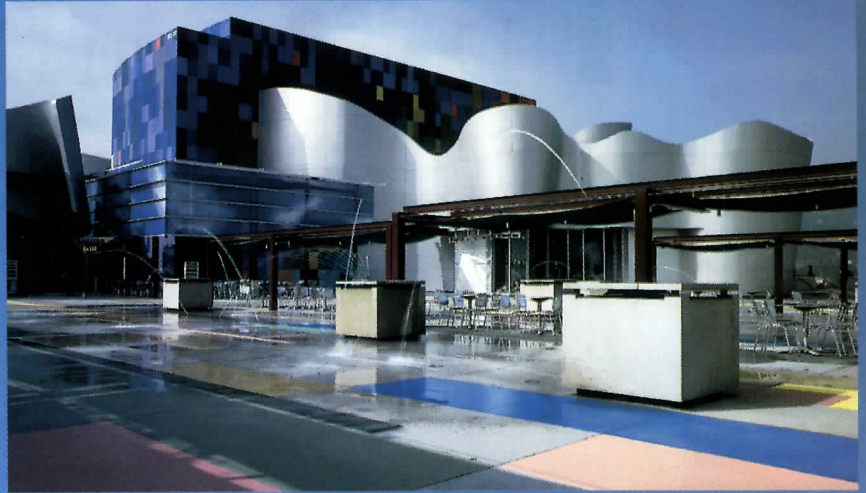


1. Theater
2. Preshow
3. Retail

Visitors don't encounter Terminator cyborgs until they enter the 3-D theater (above).



Undulating plaster elements for rooftop and retail areas, painted a metallic silver, allude to the morphing technology featured in the Terminator sequel. The reds, blues, and greens of the exterior mosaic respond, respectively, to the tiles of neighboring roofs, the sky, and the plants growing on the parking garage below the theater (bottom inset).



At night, the building takes on a more colorful life, and the depths of the white expanses are revealed in shadow (right). Cirque du Soleil is, of course, a circus, and so unlike most theaters, the seating circles around the performance area (below).



iconography. Four vertical trusses, peaking 125 feet above the ground, reach above the roof of the cylinder, emulating a big top. The trusses, attached by rigging to the crests of the crowning roof elements, don't actually support the roof, but provide moorings for the rigging of the building's real canopy. The roof crown is an EIFS construction that masks mechanical equipment and merely mock the appearance of a canopy.

The fabric canopy, 21,100 square feet of Teflon-coated woven fiberglass material, shapes an outdoor space on the most public half of the building. It also mitigates the imposing size of the cylinder by visually splitting the volume in half and by easing the connection between the roof and trusses, high above and out of reach, to ground level where visitors walk among the rigging.

Peering inside, a flood of color

From the West Side promenade, visitors may notice only limited areas of color: the harlequin-themed patterns painted on the concrete steps leading to the second-floor entrance lobby. The platforms double as preshow performance spaces, but when no one's performing, which is most of the time, the building's public face is very quiet. The canopy obscures much of the view into the interior.



Only a small logo on the stairway's main landing announces that Cirque du Soleil performs inside.

When visitors come nearer to the entrance, however, and under the lip of the canopy, the interior's vivid reds and blues appear through the lobby glazing. Here,

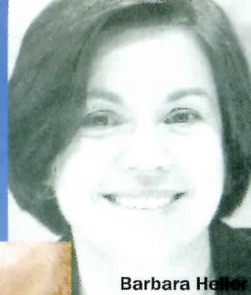
beneath the canopy, the building reveals its depth and, through the bleeding tones, the now unrestrained spirit of Cirque du Soleil performances.

The visual temperature rises even higher at night. Light directed onto the undulating roof elements

casts new depths of shadow, color-tinged light from the lobby fills the area under the canopy, and backlighting lends the fabric the glow of moonlight.

"If from far away the building is an object," says Rockwell. "Up close, it's truly a space." ■

PRODUCT REPORTS



Barbara Heller



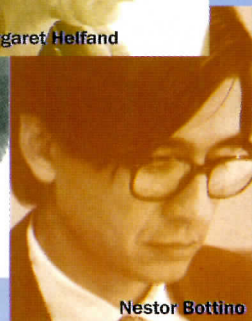
Mark Kalin



Margaret Helfand



Michelle Brewster



Nestor Bottino

Although it highlights our December issue, the Product Reports process actually commences much earlier in the year. As early as June, we start contacting building product manufacturers to identify what have been the newest, hottest products introduced that year. Over the course of three months, we process hundreds of submissions, organize them according to CSI category, and then present them to a panel of design professionals who evaluate the products' innovation, problem-solving potential, and architectural interest.

This year, a variety of products sparked the judges' interest, from a cement made through a more sustainable process, to a pre-fabricated wood-framing system, to a child-size waiting-room couch. Products were scrutinized not only for aesthetic appeal, but also for technological merit.

"It is really exciting to see something that's not just pretty, but an example of elegant engineering," explained judge Margaret Helfand, FAIA. All our judges admitted that at the end of the panel, they walked away with ideas for current or future projects.

Product Reports Judges 1999

Selecting an informed jury is a vital component of presenting our readers with a valuable resource each year. Our jury members, whose work covers the residential, commercial, and institutional markets, each brought their own expertise to the panel. Our special judge for Division 1, which covers architectural software and hardware, was Jerry Laiserin, AIA. Laiserin is a technology consultant and lecturer, as well as a contributing editor to RECORD.

Mark Kalin, AIA, is president of Kalin Associates, an independent specification consulting firm located in the Boston area. He is a registered architect, certified construction specifier, and licensed construction supervisor. Kalin is also cochair of the Specifications and Building Technology PIA.

Michelle Brewster has been a resource coordinator for Hellmuth, Obata & Kassabaum's New York office since 1995. She has set up a 1,000-square-foot-plus architectural/interior library and a product database for the firm's intranet site.

Nestor Bottino, AIA, joined the New York office of Hardy Holzman Pfeiffer Associates in 1987. An associate of the firm, Bottino received a master of architecture degree from the University of Texas at Austin and a bachelor's degree in environmental design from Texas A&M University.

Margaret Helfand, FAIA, of Helfand Myerberg Guggenheimer Architects, New York City, has served as a planning and design consultant for the City of New York and the University of California at San Francisco. Her current projects include Brooklyn's Flatbush Public Library and a science complex for Swarthmore College in Pennsylvania.

Barbara Heller, AIA, of the Washington, D.C., specifications consulting firm Heller & Metzger PC has been responsible for the preparation of more than 300 project manuals for a range of building types. Heller is a member of the AIA Documents Committee and chair of the Specifications and Building Technology PIA. Rita F. Catinella

151 General Data	173 Finishes
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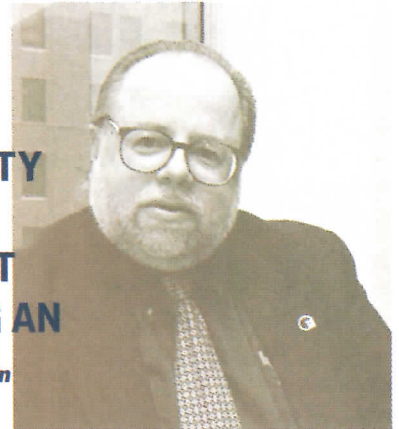
CIRCLE 52 ON INQUIRY CARD

GENERAL DATA

Computer software • Computer systems • Design office equipment & materials

While in the past architects could choose from only CAD or project management software, today they are inundated with a selection of products for every aspect of their business. Hardware manufacturers have also recognized that architects can benefit from technology (from printers to workstations) geared specifically to the way that architects work.

THERE'S SUCH A DIVERSITY OF TOOLS. THERE IS NOW SOMETHING ON THE MARKET FOR ALMOST EVERYTHING AN ARCHITECT DOES. —Jerry Laiserin



Design visualization

3D Studio VIZ R3 software for design conceptualization and visualization works with all Autodesk's Design 2000 applications to produce realistic renderings, animations, and Web content. 415/547-2258. Autodesk Inc., San Francisco.

CIRCLE 200

2-D and 3-D viewing software

ARRISview can rotate and cross section 3-D models, resulting in deeper exploration during the design process. 2-D and 3-D redline and mark-up tools streamline information flow. 318/449-9900. Sigma Design Int., Alexandria, La.

CIRCLE 201

CAD printer

The HP DesignJet ColorPro CAD printer allows design professionals to generate checkprints fast and to review designs on paper before printing a final version. 800/851-1170. Hewlett-Packard Company, San Diego.

CIRCLE 202

2-D schematic design

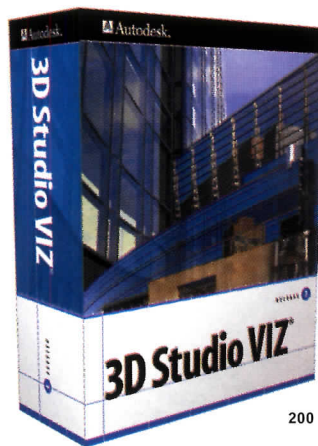
Project Architect-Schematic allows users to import a client's spatial requirements directly from a spreadsheet and to export completed designs to MicroStation, AutoCAD, or the Project Architect production environment. 800/260-0246. Intergraph Corporation, Huntsville, Ala.

CIRCLE 203

Project team system

PerSpective is a Windows 95/98/NT/2000 application offering a master database of preformulated, easy-to-edit performance statements organized by Unifomat. 877/893-0896. CSI/DBIA Joint Venture, Atlanta.

CIRCLE 204



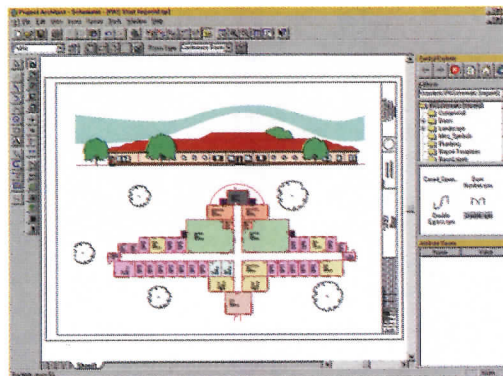
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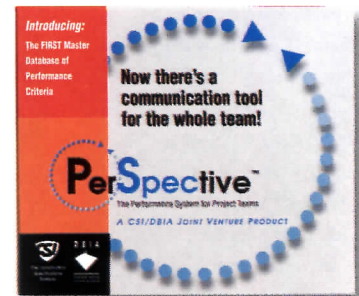
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GENERAL DATA

Computer software • Computer systems
Design office equipment & materials

Computer workstation

The Dell Precision Workstation 420MT includes one Pentium III Processor at 733MHz, 18GB Ultra2/wide SCSI hard drive and a Matrox G400 Max graphics card, which increases 3-D graphics performance. 800/424-1373. Dell Computer Corporation, Round Rock, Tex.

CIRCLE 205

Financial management tool

The Wind 2 FMS for Windows, version 4.0, financial management tool offers new features including a purchase order module, the executive information system, and links to Microsoft Project, Microsoft Outlook, and Best Fixed Assets. 800/779-4632. Wind2 Software, Inc., Fort Collins, Colo. CIRCLE 206

DVD database

The Construction Criteria Base system, comprising more than 10,000 documents and advanced tools, is now available on a single DVD disc. 888/222-5667. National Institute of Building Sciences, Washington, D.C.

CIRCLE 207

Internet collaboration

ReviewIt AEC 2 is Internet collaboration software optimized for architecture, engineering, and construction. It provides a virtual collaboration environment to share, review, redline, and revise visually rich drawings and documents. 877/44-CUBUS. Cubus Corporation, San Francisco. CIRCLE 208

Laser imaging system

Cyrax is a portable, PC software and auto-scanning laser system that measures, visualizes, and models large structures and sites. 510/633-5000. Cyra Technologies Inc., Oakland.

CIRCLE 209

Project information manager

Details 2.01 supplies a framework for managing all the essential information, contacts, and correspondence for a design professional. 800/346-9413. AEC Software, Sterling, Va. CIRCLE 210

Quick, large-format printer

The HP DesignJet 1000 Series, running on JetExpress technology, prints large-format graphics with a top-quality finish in less than one minute. 800/851-1170. Hewlett-Packard Company, San Diego.

CIRCLE 211



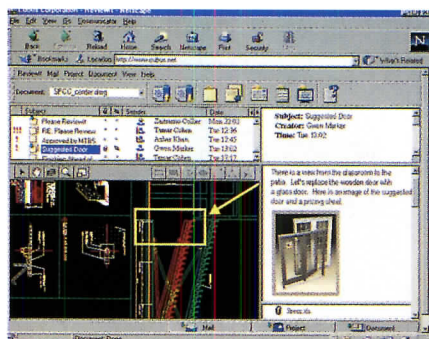
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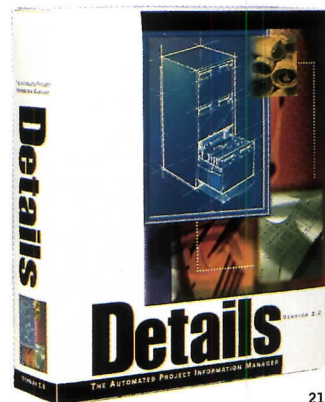
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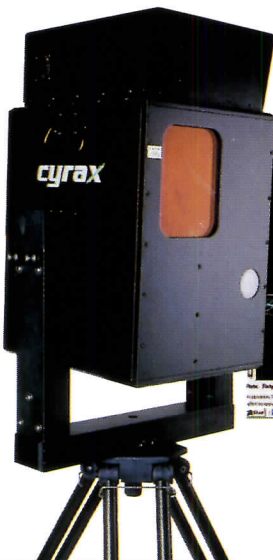
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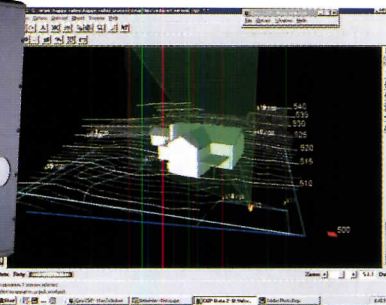
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CIRCLE 53 ON INQUIRY CARD



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More coverage available to design firms in all 50 states
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 More legal defense attorneys
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 More loss of earnings reimbursement
 More and higher limits of liability
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 More regional risk management seminars
 More voluntary education program services
 More continuing education credit
 More contract reviews
 More professional liability newsletters
 More legislative and regulatory updates
 More joint venture coverage
 More programs for specialty consultants
 More pollution liability coverage
 More worldwide coverage
 More construction management coverage
 More equity interest coverage
 More programs for architects and engineers
 More programs for land surveyors
 More first dollar defense coverage
 More programs for environmental consultants
 More premium credits for longevity
 More split limits
 More and wider ranges of deductibles
 More prior acts coverage
 More employment practices liability coverage
 More than a promise
 More optional coverages
 More multi-year policies
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 More simplified applications
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 More features that offer program flexibility
 More premium credits for risk management
 More reasons why we're the market leader
 More financial strength

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CNA PRO

CIRCLE 54 ON INQUIRY CARD

SITE WORK

Earth retainage • Outdoor sculpture & ornament • Site, street, & mall furnishings

Our judges appreciated the refined design of the site furnishings submitted this year, which ranged from outdoor shelters to cafe seating. Other site work that caught their attention included an efficient rain-storage chamber and an outdoor fountain sculpture that is part of the landscape of a Napa winery.

IT'S NICE TO SEE A HIGHER LEVEL OF DESIGN IN SITE FURNISHINGS.

—Mark Kalin

Fountain sculpture

This fountain sculpture, designed by Gordon Huether for the Artesa Winery, is composite resin, fiberglass, and powdered aluminum. 707/255-5954. Architectural Glass Design Inc., Napa, Calif. **CIRCLE 212**

Outdoor shelter

Kaleidoscope is a pre-engineered modular wall, canopy, and seating system. Combined individual components can define an exterior space or create a shelter. 800/521-2546. Landscape Forms, Kalamazoo, Mich. **CIRCLE 213**

Water-storage chamber

Rainstore³ is a subsurface water-storage chamber. An impermeable membrane liner will allow Rainstore³ to offer long-term storage for irrigation or fire protection. 800/233-1510. Invisible Structures Inc., Aurora, Colo. **CIRCLE 214**

Stately bench

The Withers four-seater bench, which comes in wrought iron or wrought aluminum, is shown here in a clear powder-coated finish over orbital-sanded aluminum. 804/358-2385. McKinnon and Harris Inc., Richmond. **CIRCLE 215**

Cafe seating

The Strada armchair and table are designed for lightweight commercial use. Made of warm beechwood, all pieces have two polyester coats. 415/389-8300. Smith & Hawken, Mill Valley, Calif. **CIRCLE 216**

Bringing the outdoors in

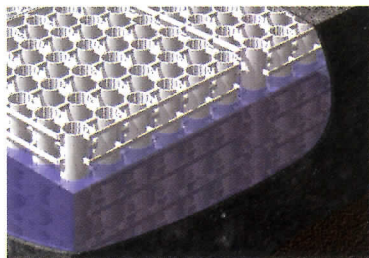
The Jackson Settee is offered with a fabric seat insert for contract and residential interiors. 800/456-6483. Weatherend Estate Furniture, Rockland, Maine. **CIRCLE 217**



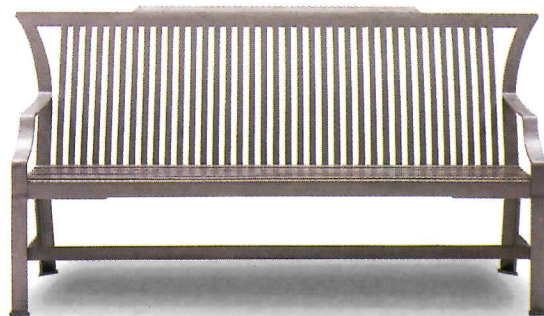
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All along your path in life, concrete made with Lehigh White Cement has cemented your journey. When you were born, concrete was right there in the hospital silently keeping you safe from harm. You ran and skipped and jumped on it at recess. You studied with it in school and admired it in art galleries. You live with it in your home and swim with it on vacation. You never really think about it, but concrete made with Lehigh White Cement has been building better communities.

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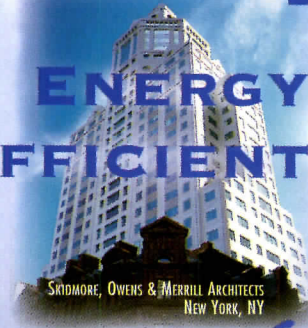
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CIRCLE 55 ON INQUIRY CARD



CONCRETE

Concrete materials • Concrete accessories • Form liners • Precast concrete

Our judges were pleasantly surprised by the selections in the concrete category. They were particularly impressed by a cement made from a recycled slag material that makes the cement-making process much more environmentally friendly. Topping systems offering a variety of flooring options also captured their interest.

IT'S IMPORTANT TO KEEP IN MIND THAT THE WAY THESE PRODUCTS ARE PRESENTED IS NOT THE ONLY WAY THEY CAN BE USED. —Nestor Bottino

Four-inch form unit

Complete with 90-degree corners, the Blue Maxx Form Unit provides stay-in-place forming and insulation for a four-inch reinforced-concrete wall. 800/293-3210. AAB Building System Inc., Cobourg, Ontario, Canada. **CIRCLE 218**

Flooring option

Bomanite Thin-Set, a polymer modified topping system, allows the installation of a thin, imprinted Bomanite topping to any structurally sound concrete substrate. 800/854-2094. Bomanite Corporation, Madera, Calif. **CIRCLE 219**

Precast-concrete wall panel

Slenderwall architectural precast-concrete brick wall panels reduce building foundation, structure, shipping, installation costs, and thermal transfer. Part of New York City's 42nd Street renovation project, the panels create a single, efficient exterior wall system. 800/547-4045. Easi-Set Industries, Midland, Va. **CIRCLE 220**

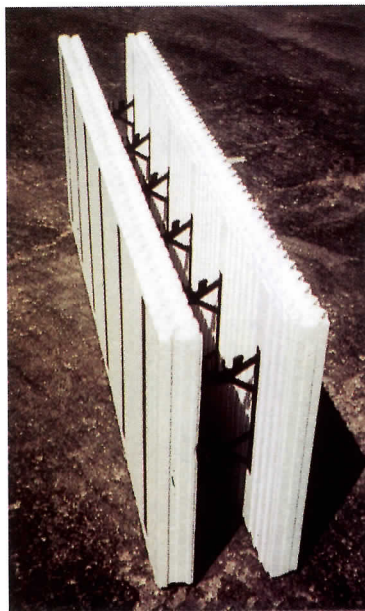
Environmentally friendly cement

GranCem is a ground granulated blast-furnace slag material that typically replaces, kilo for kilo, a portion of the other cement in mixtures. A recycled material, GranCem makes concrete more durable, easier to handle, and brighter, as seen here in the Rock and Roll Hall of Fame. 636/537-6057. Holnam Inc., Chesterfield, Mo. **CIRCLE 221**

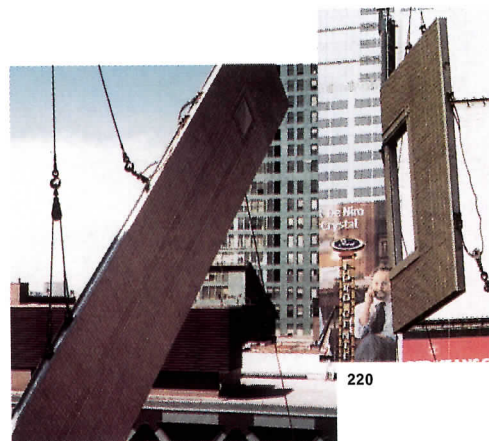
Stone replication

The Thin-Crete stamped overlay system, combined with a copolymer resin, can be colored and imprinted with Increte texturing tools to replicate natural brick, stone, and slate. 800/752-4626. Increte Systems Inc., Tampa. **CIRCLE 222**

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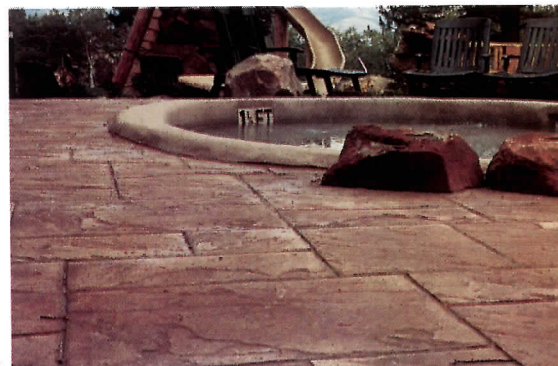
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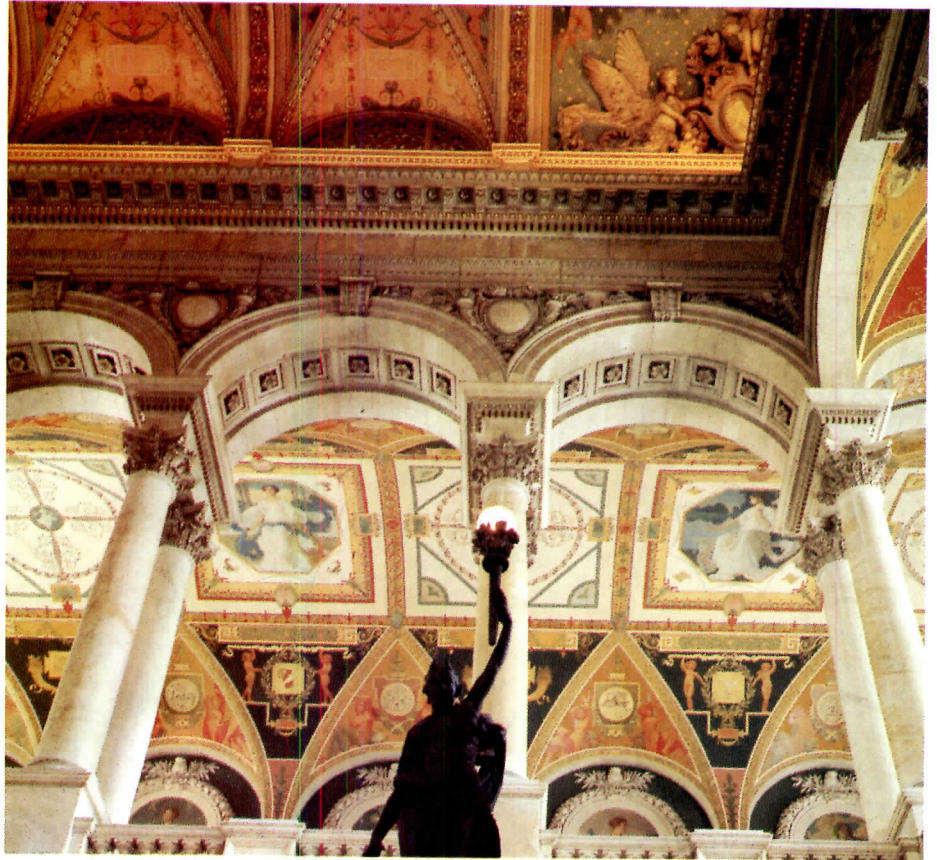


222

WE GIVE OLD BUILDINGS NEW LIFE



The Library of Congress. One of the finest examples of 19th Century architecture in America. This magnificent structure has just gone through a thorough interior masonry restoration. Commissioned by the Architect of the Capitol, the work was done by union masonry contractors and craftworkers. Only they have the skill to restore the original beauty of the tile, marble, stone and mosaic materials that give this building its character. The International Masonry Institute has a wealth of information, as well as a fully trained staff of architects and engineers who can help answer your questions about masonry restoration or the design and construction of new masonry buildings. Find out more: Call us at 1-800-IMI-0988, or visit our Web site: www.imiweb.org



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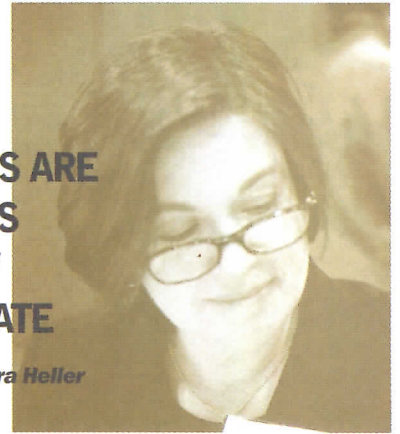
The International Masonry Institute — a labor/management partnership of the International Union of Bricklayers and Allied Craftworkers and the contractors who employ its members.

MASONRY

Cast stone • Simulated stone • Stone • Unit masonry

The judges who reviewed masonry took an interest in how manufacturers offer materials that stand on their own, with their own material identity, instead of imitating other things. They also wanted to learn more about sophisticated technologies in fabricating stone into pre-engineered panels, such as the waste-free process described below.

IT'S CLEAR MANUFACTURERS ARE BUILDING BETTER MOUSE TRAPS AS WELL AS USING NEW TECHNOLOGIES TO RE-CREATE FAMILIAR MATERIALS. —Barbara Heller



Waste-free stone cutting

Architect Angelo Mangiarotti designed the roof of the IMM Carrara SPA headquarters using a new profiling machine that cuts curved stone with a diamond wire tool, eliminating process waste altogether. 323/879-0950. Italian Trade Commission, Los Angeles. **CIRCLE 223**

Two new form liners

New, low-reuse form liners are eight times lighter than conventional urethane-rubber form liners and can be cut around intricate areas such as archways and windows. Removable keystone form liners eliminate seams that are created when form liners are ganged or configured together. 800/752-4626. Increte Systems Inc., Tampa. **CIRCLE 224**

Historical brick shapes

The 17th Century line of shapes for decorative brick work are created using the old-fashioned, wood-mold technique for brick making. 800/5-BORAL-5. Boral Bricks, Roswell, Ga. **CIRCLE 225**

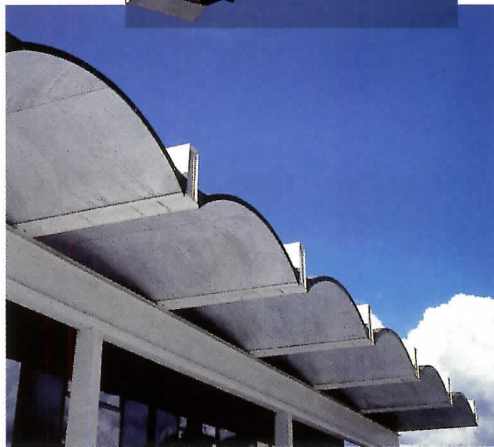
Unusual dry wall

Chapel Stone garden walls, edging, and retaining walls can be laid as a dry-stack wall (with no mortar) up to a three-foot height, or as a mortared wall. 800/426-4242. Hanover Architectural Products, Hanover, Pa. **CIRCLE 226**

Nature fossil stone

Coral Stone molds are created from hand-selected coral reef stones that are cut and sized to expose fossil patterns and delicate coral surface characteristics. 800/255-1727. Cultured Stone Corporation, Napa, Calif.

CIRCLE 227



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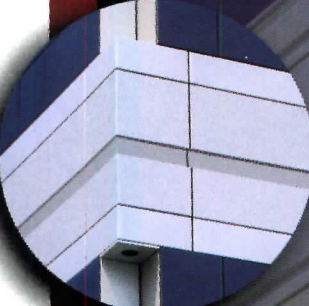
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227

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METALS, WOOD, & PLASTICS

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Our panel was surprised to learn that it took 25 years for the Japanese KES wood-framing system to be made available in the U.S. Other favorite materials included translucent laminates that diffuse light; a cheap, custom laminate program; engineered straw board with nontoxic resins; and an arsenic-free pressure-treated wood.

THE PRE-ENGINEERED KES SYSTEM WAS THE MOST INTERESTING THING I SAW ALL DAY. IT'S AN EXAMPLE OF ELEGANT ENGINEERING.

—Margaret Helfand



Surfacing with recycled solids

Cottonwood is the newest pattern to be added to Avonite's series of solid surfacing. The colored chips are produced from recycled solid materials. 800/428-6648. Avonite, Albuquerque. **CIRCLE 228**

Prefabricated wood framing

The Japanese-engineered prefabricated wood-framing system KES is now available in the U.S. 206/522-4445. Shelter USA, Seattle. **CIRCLE 229**

Custom door work

Southern Architectural Woodwork custom builds veneered flush doors that accommodate the most complicated blueprint demands for reveals, inlays, and grain matching. 803/754-4619. Southern Architectural Woodwork, Columbia, S.C. **CIRCLE 230**

Looks like concrete

The Concrete Collection of Surell solid-surfacing material is a renewable and nonporous substitute for concrete. 800/FORMICA. Formica, Cincinnati. **CIRCLE 231**

A better Vitricor

Flex V is a richer textured, more stain-resistant, and more workable reformulation of the Vitricor series of laminate. 800/526-9469. Decorative Products Division, International Paper, Odenton, Md. **CIRCLE 232**

Cut with water jets

Robinson Iron can translate intricate, 3-D drawings onto metal with water jets. The technique is quicker than the alternative and won't heat up the metal. 256/329-8486. Robinson Iron, Alexander City, Ala. **CIRCLE 233**



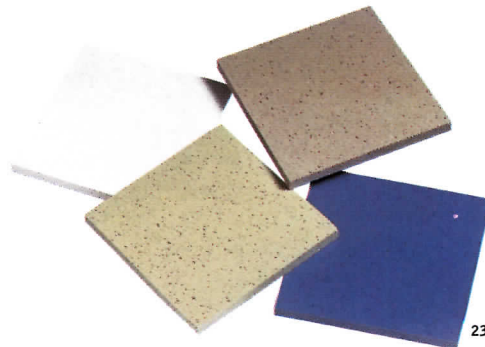
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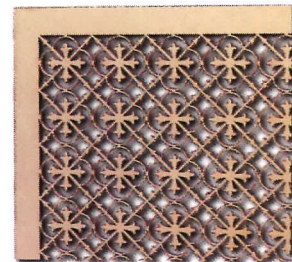
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METALS, WOOD, & PLASTICS

Architectural woodwork and metalwork • Laminates •
Prefabricated structural wood • Solid polymer fabrications

Test chamber for joint covers

C/S Group has developed a chamber for testing the strength of standard and seismic joint covers up to 70 inches wide. The chamber replicates four-way movement, including vertical displacement and lateral shear. 908/236-0800. C/S Group, Muncy, Pa. **CIRCLE 234**

Metal design for metal panel

Gage has added a new panel pattern for its modular aluminum panel system, Woven Metal, design number 601. 800/786-4243. Gage Corporation, Sparta, Wis. **CIRCLE 235**

Boards made of straw

ISOBORD is a fiberboard composed of straw fibers and nontoxic resins, making the material at least 10 percent lighter than traditional engineered board and more environmentally friendly. The straw is a waste product that would otherwise be incinerated. Panels come in standard lengths and widths; custom sizing is available, as is a fire-retardant option. 503/242-7345. Isobord, Portland, Ore. **CIRCLE 236**

Copper-based wood treatment

To mitigate possible environmental damage, Preserve treated wood products are coated with a copper-based preservative, instead of the commonly used chromium and arsenic treatment. Biodegradable preservatives offer additional protection from fungi and insect attack that copper alone would not control. 704/522-0825. Chemical Specialties, Charlotte. **CIRCLE 237**

Both translucent and 3-D

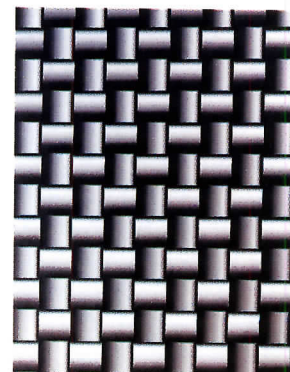
The 21 patterns of the Diafos series of translucent laminate material feature 3-D decorations. Each sheet is 51 by 120 inches, and when coupled with phenolic backing, the laminate can be used for desktops and other horizontal applications. 800/228-2238. Abet Laminati, Englewood, N.J. **CIRCLE 238**

Laminate design collection

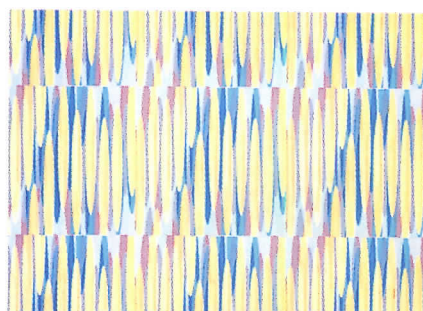
An inexpensive alternative to custom laminate designs, the Wilsonart Graphic Standards Collection offers 30 pre-designed laminate patterns, 12 silk screened, and 18 digitally printed, on 4-by-8-foot sheets. 800/433-3222. Wilsonart, Temple, Tex. **CIRCLE 239**



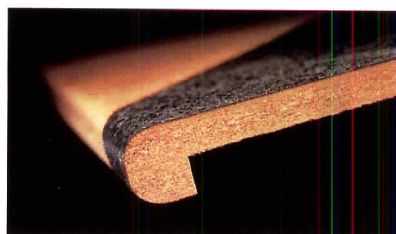
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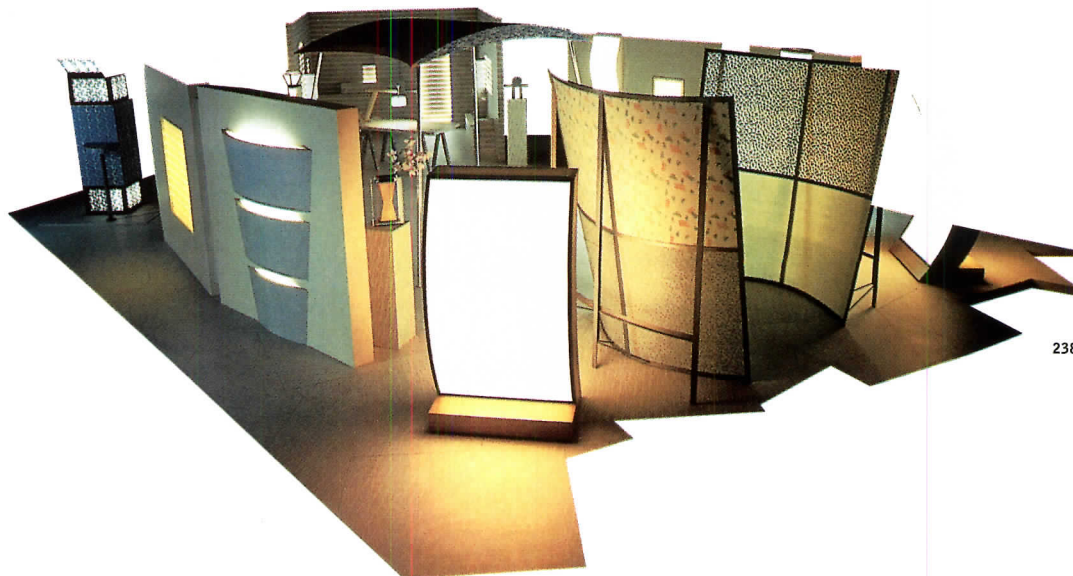
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THERMAL & MOISTURE PROTECTION

Roof accessories • Insulation & finish systems • Siding

When our judges observe more and more designers turning to a specific product in the field, they consider this an endorsement in itself. Which is one fundamental reason why they selected the CENTRIA Formawall line. Also, they noted that several products solved roofing problems and offered retrofit solutions, such as easy-to-install insulation.

SOME OF THESE PRODUCTS SHOW A REAL ACKNOWLEDGEMENT OF THE REMODELING OR RECONSTRUCTION MARKETS.

—Mark Kalin

Protection for roof units

The RPI Ice Deflector protects HVAC equipment, piping, or anything else on the roof exposed to winter's hazards. 800/262-6669. Roof Products Inc., Chattanooga. **CIRCLE 240**

Simple insulation retrofit

Retrofitting reflective bubble insulation for metal buildings is made easier by Fi-Foil's Retro Shield System, which uses simple clip and pin components. 800/448-3401. Fi-Foil Company, Auburndale, Fla. **CIRCLE 241**

Self-ventilating metal panels

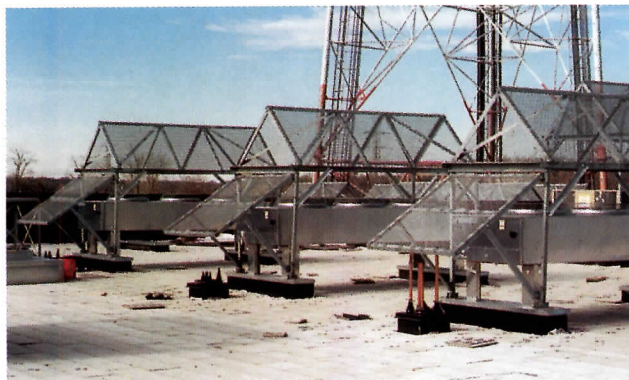
Each panel in a Europanel metal rain-screen system is self-ventilating, with no gaskets or sealants. 801/323-9993. Pohl of America, Salt Lake City. **CIRCLE 242**

More choices for panel system

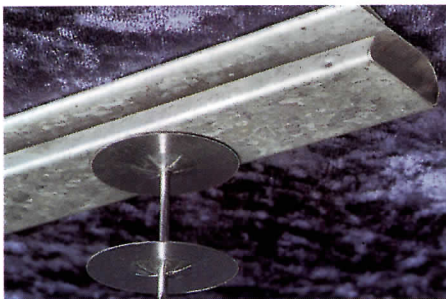
The Formawall Dimension series adds design flexibility to the Formawall line of foamed metal-panel systems. New panel options include variable reveals, thicknesses, and profiles, as well as a range of finishes and colors. 800/759-7474. CENTRIA, Moon Township, Pa. **CIRCLE 243**

Durable roof metals

Follansbee Steel has introduced two new roofing metals: TCS II, composed of architectural stainless steel, and TERNE II, composed of prime, carbon steel. Both are coated with the company's new zinc and tin alloy and have low coefficients of expansion, and neither is degraded by exposure to the sun. 800/624-6906. Follansbee Steel, Follansbee, W.Va. **CIRCLE 244**



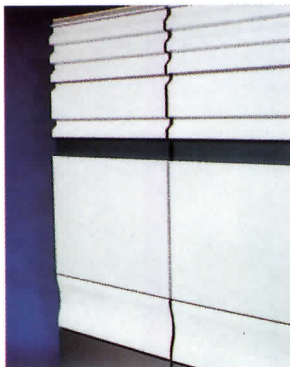
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241



242



243



244

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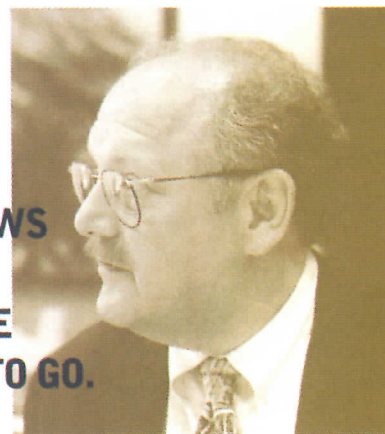
DOORS & WINDOWS

Wood and plastic doors and frames • Metal windows • Glass • Glazed curtain walls • Automatic entrance doors

One panel member considered glass the most encouraging product category overall, because instead of imitating another material, its natural properties and texture possibilities are emphasized. Another judge felt that too few solar-energy products were submitted and advised that architects raise their awareness of this category.

**A LOT OF THE FINISHES,
DOORS, AND WINDOWS
WERE LOW MAINTENANCE.
THEY COME FROM THE
FACTORY ALMOST READY TO GO.**

—Mark Kalin



Copper-clad window frames

Willmar's Real Copper Clad windows will age with time but come in two prepatina finishes—hand rubbed and speckled—for those who want a head start. The interior of the window frames is Pacific Coast hemlock. 877/533-2094. Willmar Windows, part of the JELD-WEN family, Winnipeg, Manitoba. **CIRCLE 245**

Glass below your feet

Joel Berman Glass Studios fabricates kiln-cast textured-glass panels for use as stair treads. Transparent, translucent, and opaque varieties are available in more than 2,000 colors. Panel sizes reach up to 54 by 108 inches. 888/505-4527. Joel Berman Glass Studios Ltd., Granville Island, Vancouver, British Columbia. **CIRCLE 246**

Blue moods

Arctic Blue is a blue-tinted float glass designed to achieve high daylight transmittance while maintaining good solar control. A reflective alternative, Arctic Blue Eclipse, also achieves low UV transmittance and glare control. 419/246-6078. Pilkington LOF, Toledo, Ohio.

CIRCLE 247

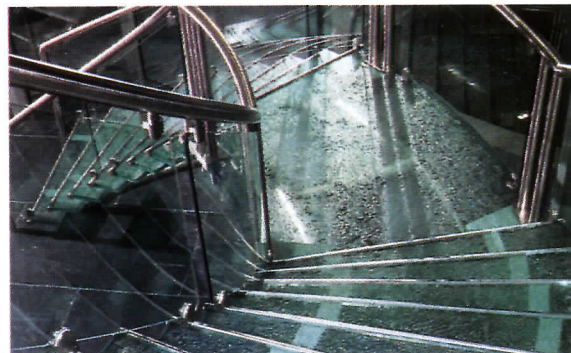
Profiled glass system

The Profilit profiled glass system incorporates translucent, cast glass, and minimal aluminum framing. The elongated "U" shape of the glass panels give them structural strength, allowing the self-supporting system to be installed at high elevations or over long lengths without the need for extra vertical or horizontal mullions. 910/579-4441.

Pilkington LOF, Toledo, Ohio. **CIRCLE 248**



245



246



247



248

DOORS & WINDOWS

Wood and plastic doors and frames • Metal windows • Glass • Glazed curtain walls • Automatic entrance doors

PRODUCTS

Strong and stable door core

TimberStrand LSL, a structural composite lumber door core, is stronger than a stave lumber core with respect to screw-holding and -bending properties while featuring the engineered stability of a particleboard core. 800/423-5808. Trus Joist MacMillan, Boise, Idaho. **CIRCLE 249**

Sleeker automatic door

The DORMA ES-A automatic sliding door features a 4½-inch header designed to blend with standard storefront profiles. 877/367-6211. DORMA Automatics, Upper Marlboro, Md.

CIRCLE 250

Heavy-duty door hardware

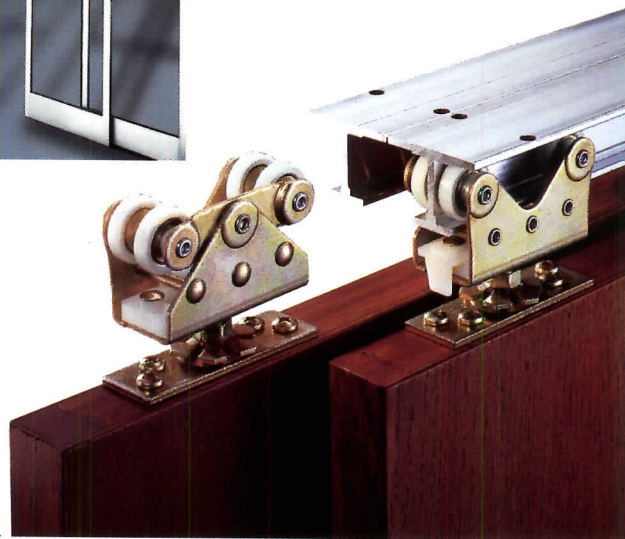
L.E. Johnson has introduced its Series 200 line of heavy-duty door hardware. The 200SD hangers for sliding doors feature built-in height adjustment and can carry door weights up to 300 pounds. The 200FD system can carry folding doors weighing up to 125 pounds. 800/837-5664. L.E. Johnson Products Inc., Elkhart, Ind. **CIRCLE 251**



249



250



251

For more information, circle item numbers on Reader Service Card or go to www.architecturalrecord.com Advertiser & Product Info

Metpar's POLLY™ SOLID PLASTIC Toilet Partitions

"These full height brackets are too strong!"

"Metpar uses an integral hinge - so nothing gives!"



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"This POLLY won't rust, delaminate, or hold graffiti!"

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Sorry Gremlins... Metpar's toilet partitions' full height brackets, integral hinges and attractive gapless design are not only tough - they're standard - so they're as easy to afford as they are to maintain.

"Better go look for an easier target, guys!"



CIRCLE 60 ON INQUIRY CARD

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Leader in toilet, dressing & shower enclosures since 1950

20-minute fire-rated wood door

Eggers offers the 20-minute fire-rated True Divided Lite wood door in flush and stile-and-rail versions. 920/722-6444. Eggers Industries Inc., Neenah, Wis. **CIRCLE 252**

Quick-to-test chain hoist

For easier fire testing, the Fireset 3 fire door chain hoist allows the door to drop during testing without releasing spring tension. 800/959-9559. Atlas Door, division of Clopay Building Products, Cincinnati. **CIRCLE 253**

Low-profile exit device

Impact recessed exit devices for doors extend only 1.25 inches from the door surface, facilitating compliance with clear-width requirements for cross-corridor doors. 317/613-8944. Von Duprin, Indianapolis. **CIRCLE 254**

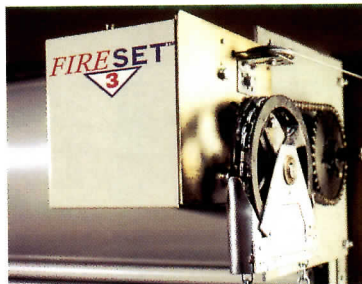
Choices in glass doors

Apart from custom options, Surface+ tempered-glass doors are available in one of four standard patterns. Available in steel, aluminum, and bronze, rails have square or beveled-edge details. 877/626-7788. Surfaces+, a Forms + Surfaces Company, Carpinteria, Calif.

CIRCLE 255



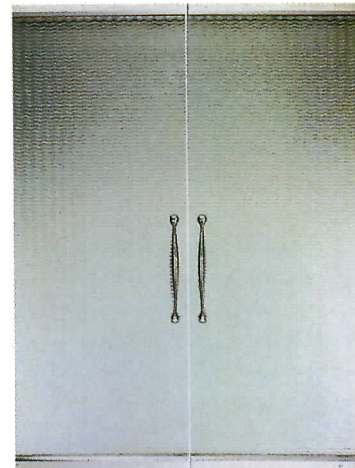
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253



254



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A/D FIREFILM® on structural steel

DOORS & WINDOWS

Wood and plastic doors and frames • Metal windows • Glass • Glazed curtain walls • Automatic entrance doors

Custom glass everywhere

Nathan Allan custom-designed cast-glass meets all safety codes for tempered glass. The studio has created a range of glass furnishings, from partitions and glass tops to sinks and railings. 604/277-8533. Nathan Allan Glass Studios Inc., Richmond, British Columbia.

CIRCLE 256

Translucent curtain wall

Skywall's SW-250 translucent curtain-wall system offers clean, two-and-a-half-inch sightlines with no exposed fasteners. The system also eases the transition between translucent panels and glass. Optional faces are available, including radiused and special profiles. 800/259-7941. Skywall Translucent Systems, Terrell, Tex.

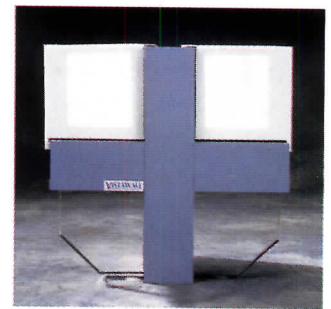
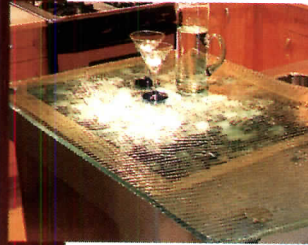
CIRCLE 257

Structural, operable windows

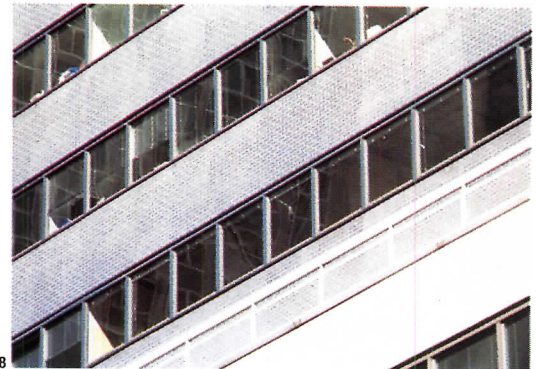
Skyline structurally glazed Tilt-n-Turn windows may be operable, but they preserve an all-glass appearance. 212/491-5630. Skyline Windows, New York City. CIRCLE 258



256



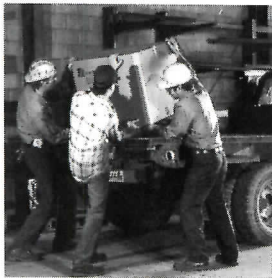
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258

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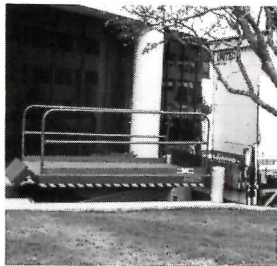
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Corrugated translucent glass

WaveLite glass comes in four standard translucent colors and in any thickness up to one-half inch. Its corrugated configuration gives it greater strength. 310/202-6001. Glasstech, Los Angeles.

CIRCLE 259

From paper to glass

Architectural Glass Design transforms drawings into colored-glass panels. 707/255-5954. Architectural Glass Design Inc., Napa, Calif. CIRCLE 260

Curtain-wall variety

Wausau Window's selection of curtain walls is vast. The exterior frame of structurally glazed Series 6750 FlexWall is unexposed. Series 6250 SuperWall and SlopeWall are energy efficient. SuperWall spans from floor to floor. 877/678-2983. Wausau Window and Wall Systems, Wausau, Wis. CIRCLE 261

Highly insulating glass

Superglass Quad insulating glass features an insulation value from R-10 to R-12.5, the highest of any standard glass available in the U.S. 650/962-9111. Southwall Technologies, Palo Alto, Calif.

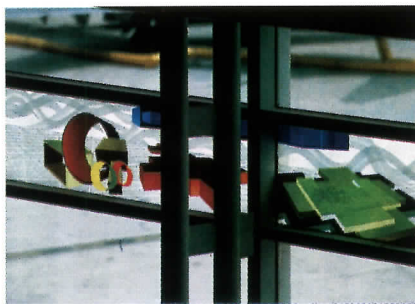
CIRCLE 262



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261



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262

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PEMKO Fire Life Safety Solutions.

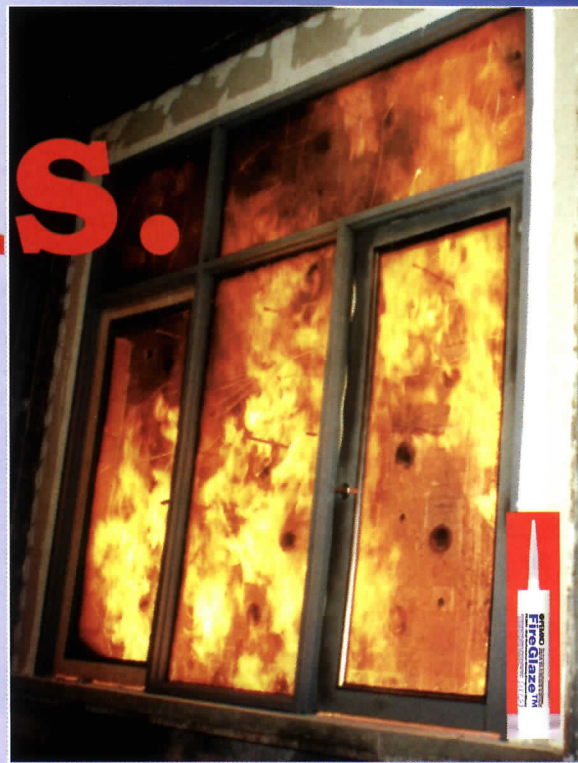


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Like Gaudí, the ceramic tile manufacturers of Spain are legendary in their industry. True artisans, for more than eight centuries they have proudly combined a rich history of craftsmanship and quality with forward-thinking technologies and innovations.

From ancient methods to the state-of-the-art technologies used today, the tile manufacturers of Spain have remained at the forefront of the industry. Their masterful understanding of traditional concepts and modern innovations continues to develop the techniques and products of the future.

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www.tilesofspain.com

CIRCLE 65 ON INQUIRY CARD



Bauhaus

FINISHES

Special flooring • Tile • Acoustical treatment • Wall coverings • Gypsum fabrications • Painting materials

The finishes that received the most attention are considered by their manufacturers to be green in some way (such as those that used postconsumer waste). Our judges found that very encouraging. They also saw a nostalgic trend in some of the designs, with products having a strong tendency toward looks of the past, be they from 1700, 1900, or 1950.

I FOUND MYSELF RESPONDING TO THINGS THAT HAVE REFLECTIVE QUALITIES THAT CREATE LUMINOSITY AND DEPTH. —Margaret Helfand

Hardwood floor medallions

Oshkosh hardwood floor medallions come in 52 stock designs or can be custom ordered. 800/222-1068. Hoboken Floors, Wayne, N.J. **CIRCLE 263**

High-res images for tiles

Two new images, Citrus and Pacific Blue, have been added to Imagine's line of ceramic tile. Imagine's vivid, high-resolution graphics on tile is a process in which ceramic glazes are applied like printing inks. 800/680-8453. Imagine Tile, Jersey City, N.J. **CIRCLE 264**

Italian marble mosaics

The Pietre Romane line of antiqued marble mosaics are satin finished with rounded edges. 212/829-8341. Sisis USA Inc., New York City. **CIRCLE 265**

Woven fiberglass for walls

Textra is a woven fiberglass wall-finish system available in 12 textures and many colors. The material facilitates natural moisture-vapor diffusion. 800/654-3103. Johns Manville, Denver.

CIRCLE 266

Designer sound treatment

The Eurospan wide-span acoustical treatment has the look of painted gypsum board, but recreates the softer look of a fabric ceiling. 800/359-3312. Wall Technology Inc., Broomfield, Colo.

CIRCLE 267

Glass mosaic tiles

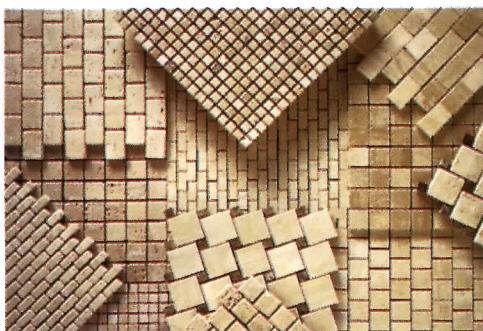
Bisazza has added a new style, Metron, to its collection of terrazzolike glass mosaic tiles, which are lighter, thinner, and more flexible than conventional terrazzo. 212/463-0624. Bisazza, New York City. **CIRCLE 268**



263



264



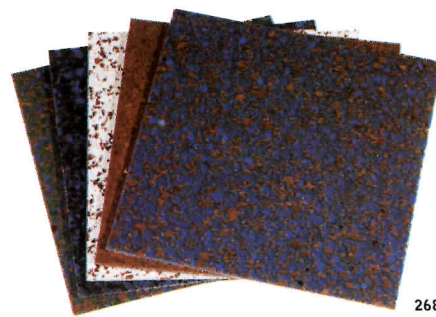
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268

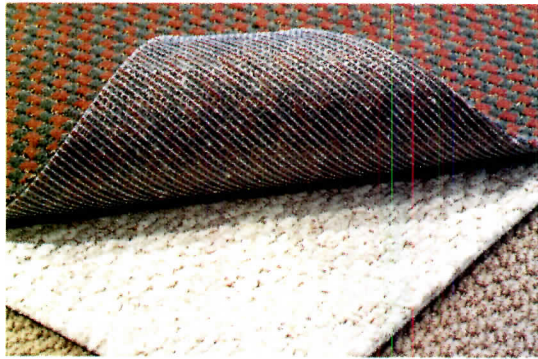
FINISHES

Special flooring • Tile • Acoustical treatment •
Wall coverings • Gypsum fabrications • Painting materials

Green carpet backing

Using the AdBac composite backing system in the fabrication of carpets makes carpets more than 25 percent lighter. Because the material is thermoplastic, the carpet can be recycled at the end of its use. 800/872-0765. Amoco Fabrics and Fibers Co., Dalton, Ga.

CIRCLE 269



269

Custom puzzle-piece floors

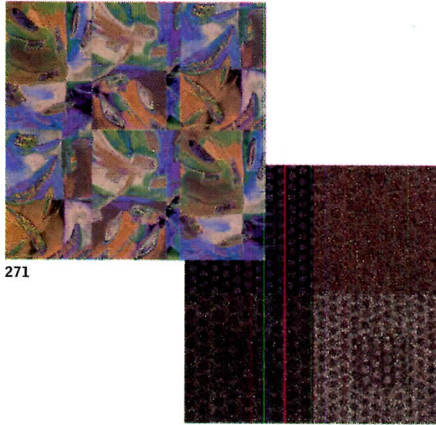
Architectural Shapes & Colors custom manufactures tile in interlocking shapes of the architect's making. 877/497-4273. Architectural Shapes & Colors, Canton, Ohio. CIRCLE 270



270

Carpets and corporate image

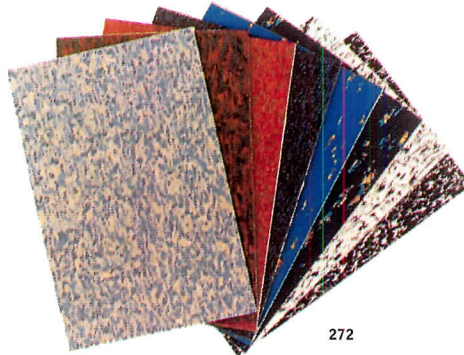
Milliken has launched Image Forum, an educational program that shows designers how to use Millitron Imaging technology to integrate corporate imaging and branding into custom-made carpets. 800/241-4826 x8433. Milliken Carpet, Commercial Markets, LaGrange, Ga. CIRCLE 271



271

New linoleum line

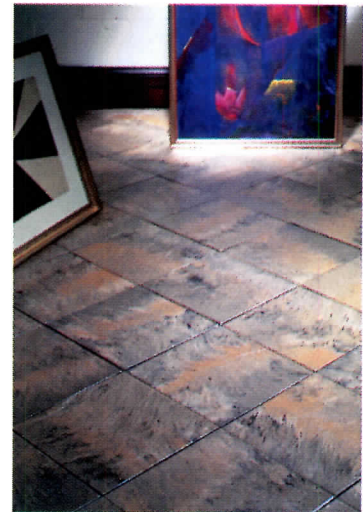
Forbo has expanded its Artoleum line of linoleum with Artoleum 2, a collection of 57 new colors in 4 different patterns. 800/842-7839. Forbo Industries Inc., Hazelton, Pa. CIRCLE 272



272

Tiles with natural fibers

The tiles in the Madera line are made of a bio-alloy material and recycled natural fibers such as postconsumer maple hardwood. The tiles are lighter than natural stones and ceramics, yet quite strong and durable. 800/465-4605. Matrix Composites, Mississauga, Ontario. CIRCLE 273



273

Cement icing

Micro-Top is a paper-thin cementitious medium that can be troweled onto the horizontal or vertical surfaces of concrete, metal, wood, plastic, or asphalt to add color impression or to create a logo. 559/673-2411. Bomanite Corp., Madera, Calif. CIRCLE 274



274

Authentic antique terra-cotta

Ann Sacks offers antique French terra-cotta. The material is rare, and its condition varies. Colors vary from light ochre to deep cordovan. 800/278-8453. Ann Sacks, Portland, Ore. CIRCLE 275

275



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CIRCLE 66 ON INQUIRY CARD

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FINISHES

Special flooring • Tile • Acoustical treatment •
Wall coverings • Gypsum fabrications • Painting materials

Tough wallboard

Gold Bond Fire-Shield Type X Hi-Abuse wallboard, designed for use in high-traffic areas like classrooms, corridors, and dormitories, is highly resistant to surface abrasion and indentation. 800/NATIONAL. National Gypsum Company, Charlotte. **CIRCLE 276**



276

Large slabs of terra-cotta

Cottostone combines the qualities of quartz-based materials and terra-cotta, allowing slabs to reach sizes up to 120 by 300 centimeters. 212/758-2593. Sannini Impruneta, New York City. **CIRCLE 277**



277

Faux stones

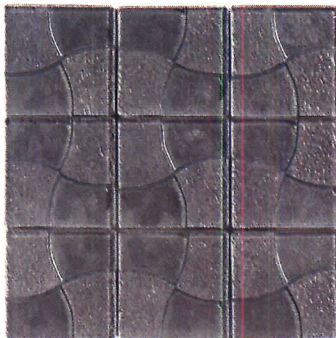
Questech Stone is a lightweight cast stone manufactured to look natural and aged. Each stone is individually finished to ensure variations from piece to piece. 802/388-4567. Questech, Middlebury, Vt. **CIRCLE 278**



278

Glass tiles with depth

Primarily for wall surfaces, and suitable for backsplashes and fireplaces, Northwest tiles are 3/4-inch clear glass, painted on the back in colors inspired by the Pacific Northwest. 800/278-8453. Ann Sacks, Portland, Ore. **CIRCLE 279**



279

Colors of old

The 149 historically correct colors of the Historic Colors of America paint collection were conceived with the research assistance of the Society for the Preservation of New England Antiquities. Paints are available for both interiors and exteriors. 800/225-1141. California Paints, Cambridge, Mass. **CIRCLE 280**



280

Flexible cement backerboard

PermaBase Flex is a flexible cement backerboard, the only one on the market with a 1/2-inch thickness. An alkali-resistant fiber mesh makes the board suitable for use for both interior and exterior curved surfaces. 800/NATIONAL. National Gypsum Co., Charlotte. **CIRCLE 281**



281

Eco-sensitive modular tile

One hundred percent recycled carpeting composes the vinyl backing for Powerbond ER3 modular tile. The tiles are designed for commercial and institutional use. 800/248-2878. Collins & Aikman Floorcoverings, Dalton, Ga. **CIRCLE 282**



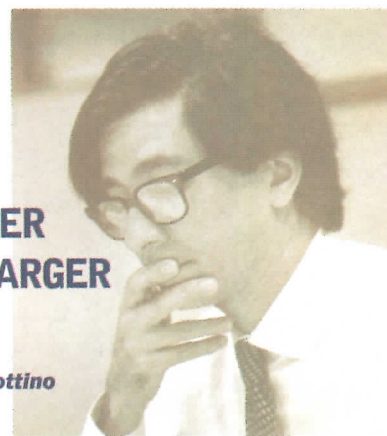
282

SPECIALTIES

Wall and corner guards • Grills and screens • Lockers • Operable partitions • Toilet and bath accessories • Signage and graphics

In the specialties category, simple solutions are key, such as an inexpensive fastening system or an easy-to-grasp handrail. The bronze insect screen that was selected allows designers to make a statement with a product that is often invisible. Also, our panel saw an array of exciting new glass shower enclosures.

I THINK PUBLISHING MATERIALS MADE BY SMALLER COMPANIES MAY COMPEL LARGER COMPANIES TO PUSH MORE BOUNDARIES. —Nestor Bottino



Easier-held handrail

The easy-to-grasp Acrovyn leaning rail is designed for those who have trouble with traditional handrails. 800/233-8493. C/S Group, Muncy, Pa. **CIRCLE 283**



283

Traditional porch screen

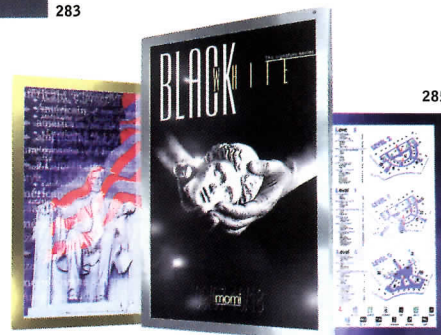
The Phifer bronze screen gives coastal homeowners a more durable alternative to the common fiberglass screen. 800/874-3007. Phifer Wire Products, Tuscaloosa, Ala. **CIRCLE 284**



284

High-style frame systems

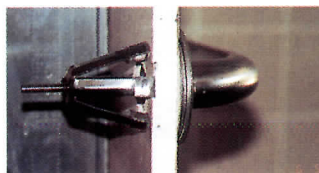
Using the latest optical technology, Revelation frames permit elegantly thin signage. 619/621-7257. Visions of Light, San Diego. **CIRCLE 285**



285

Simple attachment

The WingIt fastening system allows the mounting of grab bars, hooks, and other bathroom accessories without attachment to studs or blocking. 732/257-6900. WingIt Innovations, South River, N.J. **CIRCLE 286**



286

Knock-proof lockers

Lenox Lockers, made of polymer resin, are corrosion-proof, won't absorb odors, and won't fall apart because each locker is one piece. 414/251-6000. Bradley, Menomonee Falls, Wis. **CIRCLE 287**



287

Do-it-yourself glass shower

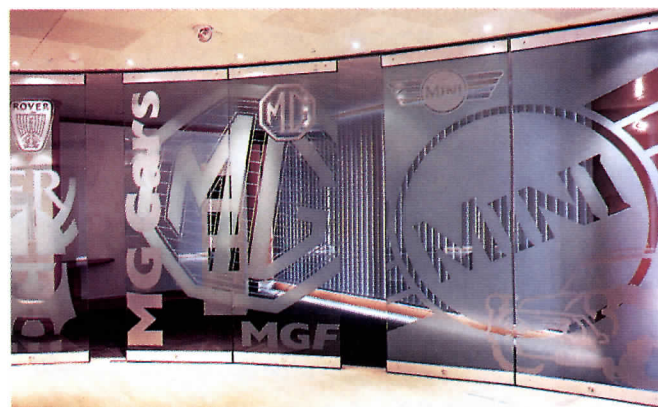
Glass-block shower systems, once only a custom option, are now available as pre-designed, unbuilt packages. 800/624-2120. Pittsburgh Corning, Pittsburgh.



288

Leaves no trace

Glasswall floor-to-ceiling operable partitions forgo the need for floor tracks. Partitions are ½-inch thick. 800/542-2371. Hufcor, Janesville, Wis. **CIRCLE 289**



289

THE PROJECT REQUIRED A FLAWLESSLY INTEGRATED DISHWASHER...



MIELE DELIVERED.

Miele dishwashers are designed to integrate beautifully into any architectural setting. Special spacer

bars allow perfect alignment with surrounding cabinetry and all models can be fitted with custom panels to match any style or finish. Stainless steel, white or black front and control panels are also available, giving you a variety of choices for your design.

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expert installation and a full inventory of parts, it is our job to make your project, and you, look good. As a Miele specifier, you'll be entitled to many privileges, such as invitations to A&DRG events from coast to coast and a subscription to Design Forum, our informative newsletter.

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EQUIPMENT

Audiovisual equipment • Residential appliances • Athletic equipment • Kitchen cabinets

Kitchen appliances and cabinet systems were the strong winner in this year's equipment category. The Driade Neoz kitchen island challenges the notion that a kitchen must be large and bulky, while the high design of the Sub-Zero wine cabinet can keep bottles inside at different temperatures.

THE NEOZ KITCHEN PRESENTS A CONCEPTUAL CHANGE IN THE APPEARANCE OF KITCHEN FIXTURES AND CASEWORK BY CREATING A SENSE OF TRANSPARENCY. —Mark Kalin

Sketch on PDPs

Users of plasma display panels can now mark up presentations by dragging a finger or a stylus across the Matisse, a display overlay. 888/427-6278. Smart Technologies, Calgary, Alberta. **CIRCLE 290**

A restaurant range at home

It's the same size as a conventional home range and it's self-cleaning. When it comes to cooking, however, the 30-inch-wide VGSC is a professional-grade gas range. 662/455-1200. Viking Range, Greenwood, Miss. **CIRCLE 291**

Keep one wine cool, one warm

The Sub-Zero 400 series of wine cabinets allows for independent temperature settings for two separate storage compartments. 800/222-7820. Sub-Zero Freezer Co., Madison, Wis. **CIRCLE 292**

Mobile systems double space

Spacesaver's mobile carriage storage systems are easily customized for storing athletic equipment. 920/563-0728.

Spacesaver, Fort Atkinson, Wis. **CIRCLE 293**

Kitchen hardware as furniture

Driade's Neoz kitchen island is a marble-topped table with built-in sinks, gas range, and waste pipes. 800/494-4358.

Luminaire, Chicago. **CIRCLE 294**

Kitchen that avoids laminate

The System 25 kitchen emphasizes materials close to the elements: stainless steel, aluminum, glass, and wood. 310/288-3875. Bulthaup, Los Angeles. **CIRCLE 295**

Pininfarina-styled

The IDEA 2000 kitchen is a minimalist update of a system highlighted by handle-free doors and drawers. 877/SNAIDERO. Snaidero, Los Angeles. **CIRCLE 296**



290



291



292



294



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293



296

OPEN ARCHITECTURE A work environment either liberates or constrains. Platform is possibly the most liberating office furniture system ever designed. Aesthetically outstanding yet ultra-functional, it's the first system to allow for abundant lay-in cabling without post connectors, and the first with an integrated HVAC system for individual climate control at the workstation. Elegant, immensely versatile, and literally a snap to install, Platform is the next generation in office systems. Now. **DESIGN WITH INTELLIGENCE**



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FURNISHINGS

Multiple seating • Office furniture • School/library furniture • Fabric treatments

Our panel selected furnishings that not only exhibited high design, but also kept in mind the way people work. Architects need to specify organized, flexible work environments that offer privacy and interaction, with stylish, yet sturdy materials. Comfort should not be overlooked; one product even allows workers to control the temperature at their workstations.

THE CHILDREN'S FURNITURE SUBMITTED BY GRESSCO OFFERED A SOLUTION I WAS LOOKING FOR. —Michelle Brewster



Modular bench

The Kurv modular seating system can be continuously extended, with the option of inserting tempered-glass tables from among several styles between the seating modules. 336/434-0976. AGI, High Point, N.C. **CIRCLE 297**



297

Opening the open-plan grid

Open-plan offices tend to become fixed grids of cubicles. The Resolve system opens up the floor plan further to ensure spaces for interaction will never be squeezed out. The secret is that 120-degree corners replace 90-degree corners at the core of the system. 800/851-1196. Herman Miller, Zeeland, Mich. **CIRCLE 298**



298

Speak softly

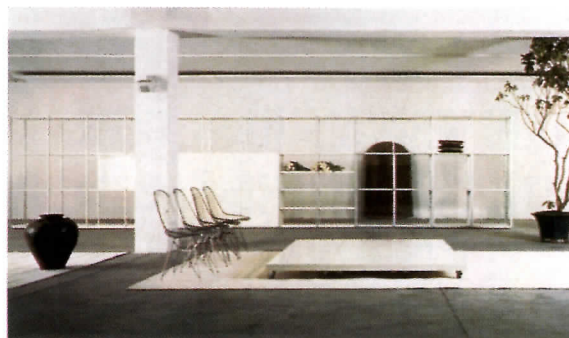
The HT aluminum shelving system is nearly invisible, despite its strength. 800/494-4358. Luminaire, Chicago. **CIRCLE 299**



301

Floor cushion as kid's couch

While taking up a lot of floor space, the KinderSystem Cozy Couch makes a more comfortable play area for kids. The frame is polyurethane-coated solid maple, and the cushions come with either vinyl or plush fabric slip covers. 800/345-3480. Gressco, Waunakee, Wis. **CIRCLE 300**



299

Screening options

The curved-laminate screens of the Cinus and Cobra screen systems come in maple and birch and with a variety of infill options: perforated wood, perforated metal, frosted plexiglass, and PUR rubber. 800/237-1625. ICF, Valley Cottage, N.Y. **CIRCLE 301**



300

FURNISHINGS

Multiple seating • Office furniture • School/library furniture • Fabric treatments

Personal control over HVAC

Fitted to a Platform panel spine, the Viaduct overhead raceway delivers heated or cooled air to individual workstations, allowing the worker to control the air temperature. 905/836-7676. Inscape, Holland Landing, Ontario.

CIRCLE 302

Wired at lectures

The Concerto with Power and Data is a lecture-hall seating system designed specifically to facilitate the use of laptop computers. Power and data outlets are found below the armrest caps. 800/454-9796. KI, Green Bay, Wis. CIRCLE 303

Table-size adjuster

Tabletop size is easily adjusted with a retractable hand crank in the Adjustable Table Mechanisms line of table supports. Depths can be adjusted between 24 and 36 inches, and widths between 30 and 96 inches. Mechanisms are available for freestanding, slab-end attachment, and corner-return table styles. 800/423-3531. Häfele, Archdale, N.C. CIRCLE 304



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Clearly organized

Jump Stuff translucent desktop tools—trays, shelves, dividers, and boxes—attach to a two-way aluminum rail support that allows both vertical and horizontal placement. 800/344-2600. Haworth, Holland, Mich. **CIRCLE 305**

Easy-to-change wall dividers

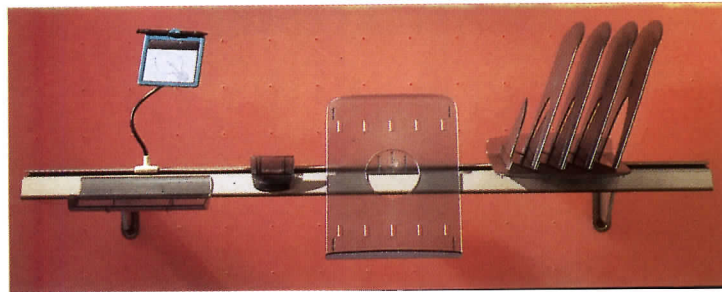
The Altos full-height wall system adds privacy to open-plan layouts. The panels are easily removed and replaced by a variety of different panel styles. 877/835-6466. Teknion, Marlton, N.J. **CIRCLE 306**

Synthetic fabric, natural feel

Like vinyl upholstery, Force Field synthetic fabric is durable and stain and moisture resistant. Its woven construction lets it to breathe and makes it comfortable. 516/582-3434. Maharam, Hauppauge, N.Y. **CIRCLE 307**

Out of the cubicle

Another office system that breaks up the conventional open-plan grid, the Flexible WorkSpace encourages nonlinear arrangements through the use of floor-to-ceiling power and data nodes. 800/454-9796. KI, Green Bay, Wis. **CIRCLE 308**



305



306



307



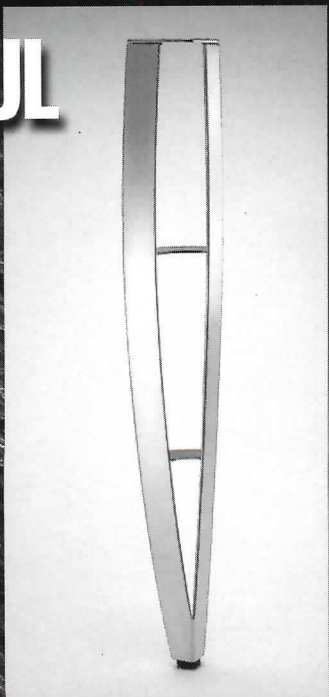
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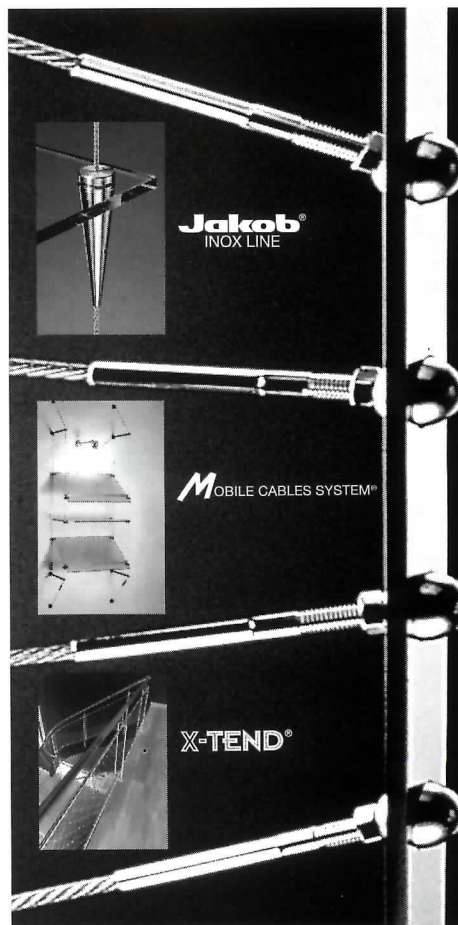


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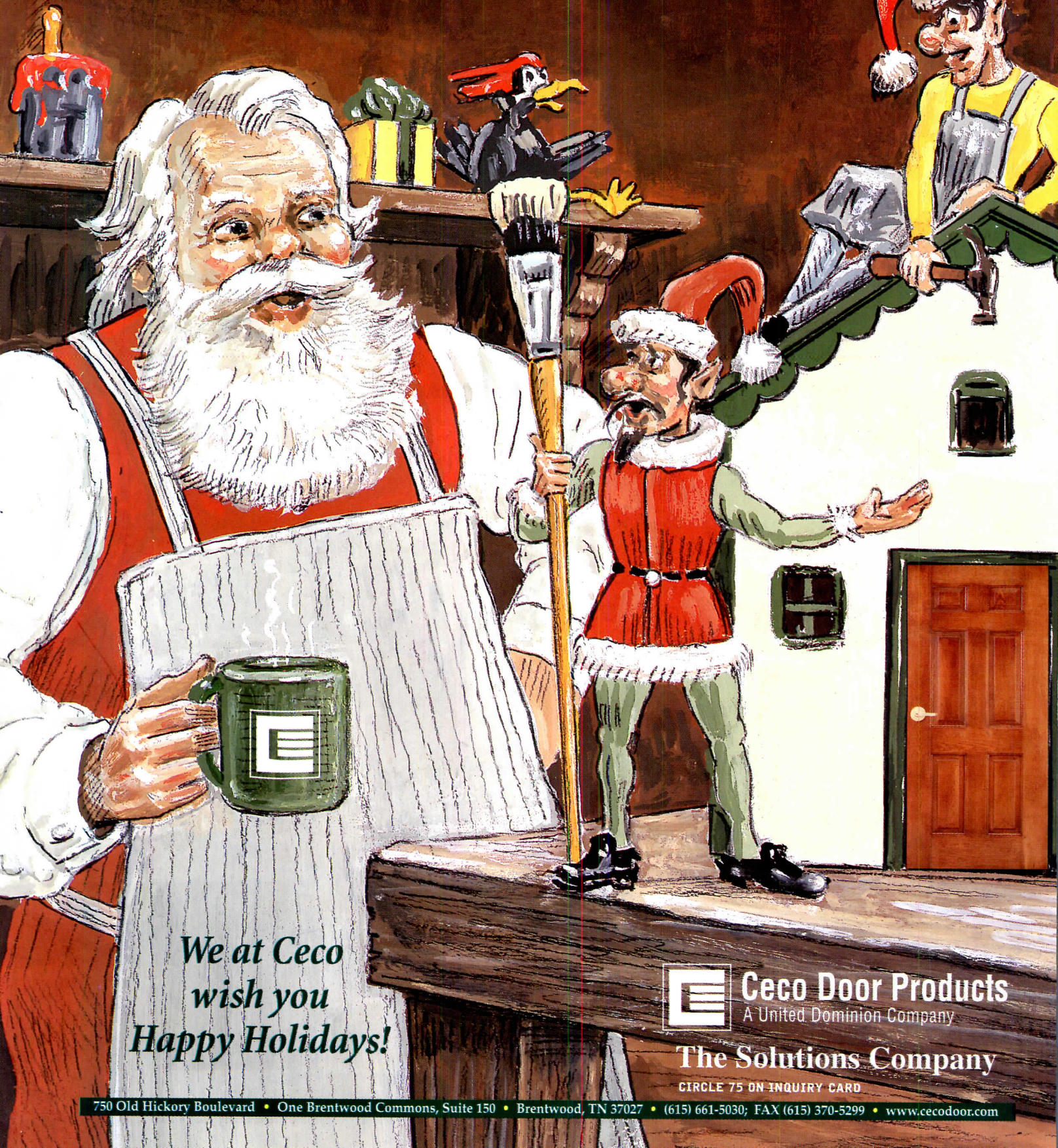
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SPECIAL CONSTRUCTION & CONVEYING SYSTEMS

Sound & vibration control • Whirlpool spas • Specialties • Elevators • Passenger cabs

When we asked what specific product our panel would like to find on the market, one juror noted he'd like to see electric elevators that go up just one floor. "In a lot of the buildings we are working on there is a need for something less elaborate than a hydraulic elevator," he said. Below are the jury's selection of special construction and conveying systems currently on the market.

MANUFACTURERS ARE DOING MORE RESEARCH THAN EVER, WHICH LETS THEM MOVE NEW THINGS INTO THE MARKETPLACE FASTER. —Mark Kalin

Bathroom entertainment

The J-Allure whirlpool bath features a four-speaker stereo system and the option of a cable-ready TV monitor. 800/288-4002. Jacuzzi Whirlpool Bath, Walnut Creek, Calif. **CIRCLE 309**



309

Easy accessibility

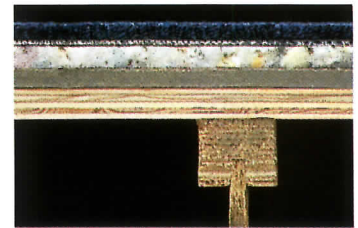
Much of the Flexi-Lift Limited Use/Limited Application elevator comes prewired and preassembled. 800/925-3100. Access Industries, Grandview, Mo. **CIRCLE 310**



310

Subtle sound deadener

The 440 Sound Barrier fiberboard sound deadener offers a much thinner profile than the concrete alternative. 800/257-9491. Homasote Co., West Trenton, N.J. **CIRCLE 311**



311

A hybrid elevator drive

The Elevette residential elevator's new hybrid drive system combines the reliability of a cable drum lift with the smooth ride of a hydraulic lift. 717/234-8065. Inclinator Co. of America, Harrisburg, Pa. **CIRCLE 312**



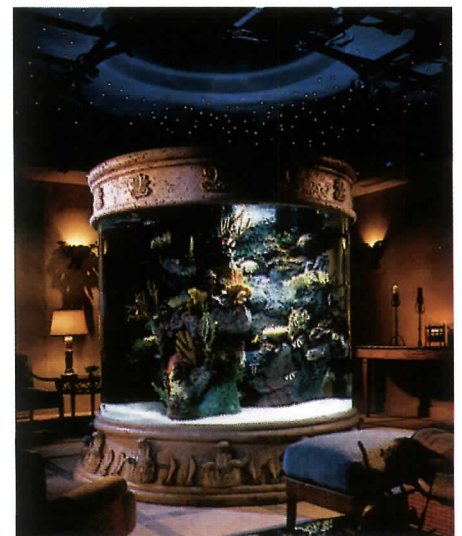
312



315

Luxury aquariums

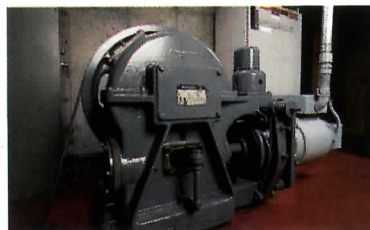
These custom-built aquariums have an architectural flair. 954/970-9511. Living Color Enterprises, Ft. Lauderdale, Fla. **CIRCLE 313**



313

Quick modernization

The ACVF Express elevator modernization system for midsize buildings comes prepackaged. 973/397-6500. Schindler Elevator Corp., Morristown, N.J. **CIRCLE 314**



314

Almost custom made

The CabForms System of premade panels, handrails, trim pieces, and ceiling give elevators a custom look. 877/626-7788. Surfaces +, Carpinteria, Calif. **CIRCLE 315**

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MECHANICAL

Plumbing fixtures • Water coolers • Air distribution equipment

European styles and stainless-steel finishes marked trends in products selected in the mechanical division. Other products that addressed issues of current interest to our panel included a high-performance pressure-assist flushing system, an accessible water cooler, and a ventilation system that uses textile ducts to eliminate excess noise.

THERE WERE MORE INTERNATIONAL PRODUCTS THAN I'VE EVER SEEN. THE ABUNDANCE OF ENTRIES SHOWS THERE'S A VITAL CONSTRUCTION MARKET. —Mark Kalin

Bathe with Graves

Michael Graves has designed a bathroom furnishings line called Dreamscape, which is conceived in the familiarly exuberant Graves idiom. 888/DURAVIT. Duravit, Duluth, Ga. **CIRCLE 316**

Restyled fixtures

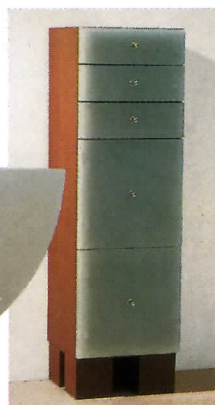
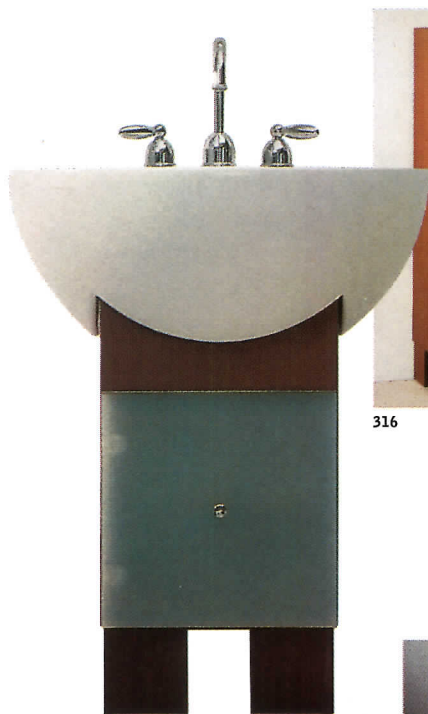
The Madison bridge faucet (shown) is Dornbracht's contemporary revision of a classic fixture. The Meta Tec single-mixer fixtures for toilets, bidets, showers, and tubs are the latest expansion of the Sieger-designed Meta series, taking the series in the direction of matte aluminum. 800/774-1181. Dornbracht, Duluth, Ga. **CIRCLE 317**

Streamlined toilet

The Metro-Urban toilet, part of Acorn's Neo-Metro collection, is fabricated from heavy type-304 stainless steel and features sleek contours and seamless welded construction. Available options include a high-polish mirror finish and a powder-coated finish. 800/951-9050. Acorn Engineering Co., City of Industry, Calif. **CIRCLE 318**

A whirlpool-like shower

Imagine the whirlpool concept translated into a shower module. In addition to a showerhead, the fully plumbed Pharo Shower Panel Moonlight directs five water sprays at the body from the knee to the chest level. The unit's body is made of eight-millimeter-thick tempered glass backlit with a stripe of low-voltage diodes. A mixing valve continuously corrects the water temperature and guards against thermal shock. 800/334-0455. Hansgrohe Inc., Cumming, Ga. **CIRCLE 319**



316



317



318



319

MECHANICAL

Plumbing fixtures • Water coolers • Air distribution equipment

More kitchen prep room

The PRO TaskCenter introduces a commercial-grade kitchen work area, with either two or three deep basins and a 60-inch span of countertop.

800/4KOHLER. Kohler Co., Kohler, Wis.

CIRCLE 320



320

High-pressure flush system

The Flushmate system consumes only 1.6 gallons of water per flush, but by utilizing water-supply line pressure still cleanses the bowl thoroughly on the first flush.

800/982-5839. Sloan Valve Co., Franklin Park, Ill.

CIRCLE 321



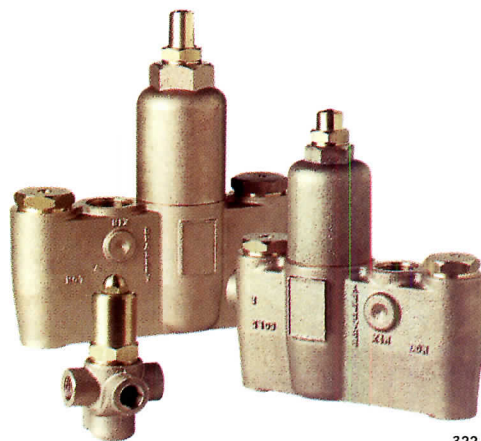
321

Emergency water control

For use with emergency water fixtures, the Navigator EFX Thermostatic Mixing Valve ensures 15 minutes of tepid water, facilitating compliance with new ANSI standards.

414/251-6000. Bradley, Menomonee Falls, Wis.

CIRCLE 322



322

Accessible water coolers

The 19 models in the restyled EZ water cooler series meet ADA accessibility guidelines by reducing the thickness of the upper shroud, allowing plenty of knee clearance for wheelchair-bound users.

630/574-8484. Elkay Manufacturing Co., Oak Brook, Ill.

CIRCLE 323



323

Fabric duct system

The KE-Interior ventilation system resolves traditional problems of air distribution with fabric. Fresh air slowly diffuses through the textile ducts, so there's no draft and very little noise.

877/229-0695. KE Fibertec, Oro Valley, Ariz.

CIRCLE 324



324

Silent, powerful exhaust fan

The SV160 multiport bathroom exhaust system is powerful enough to ventilate large bathrooms—for which there are three ports for three different areas of the bathroom—while remaining very quiet. The casing of the motor is acoustically insulated, and the unit can be remotely mounted.

800/255-7749. American ALDES Ventilation Corp., Sarasota, Fla.

CIRCLE 325



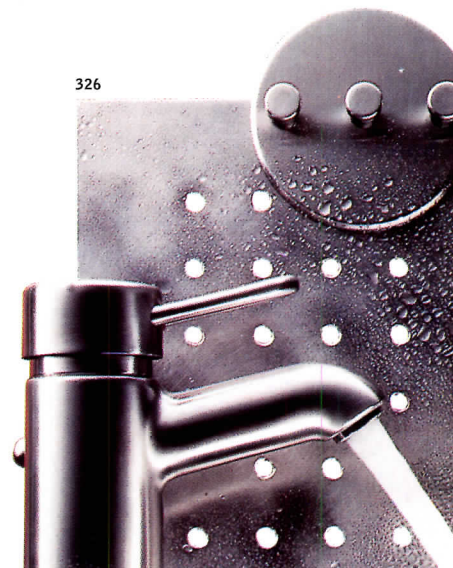
325

Single-minded bathroom line

The advantages of stainless steel are its strength, resistance to corrosion, and longevity. Axor Steel is a bathroom line composed entirely of the material, lightly brushed.

800/334-0455. Hansgrohe Inc., Cumming, Ga.

CIRCLE 326



326

ELECTRICAL

Interior and exterior luminaires • Fiber optics • Wiring devices • Lighting controls

A wide variety of items were chosen from the electrical category. This was made possible by the fact that more products were submitted in this category than any other. The amount of material available reflects the vast amount of innovation taking place in the areas of lighting, light sources, fiber optics, controls, and wiring devices.

**SOME OF THE TINY,
WELL-DESIGNED THINGS REALLY
PUSH THE LIMITS IN TERMS OF
THEIR DIMENSIONS.**

—Margaret Helfand

Wall-mounted swinger

The A-7001 swings away from its wall mount to put direct halogen light where it's needed. 201/641-1997. Estiluz, Moonachie, N.J. **CIRCLE 327**

Italian glass sconce

Designer Carlo Forcolini's NAOS sconce for Nemo is suitable for general, indirect, or accent lighting. 203/407-8000. Il America, Hamden, Conn. **CIRCLE 328**

Direct/indirect fluorescent

The Aria uses microprisms to direct light into a batwing distribution for low-glare office lighting. 800/932-0633. Zumtobel Staff, Highland, N.Y. **CIRCLE 329**

Color-changing LED lamp

The iColor, the world's first digitally controlled lamp, fits in an MR16 socket. The light source is a trio of light-emitting diodes that, using the company's control technology, can produce more than 16.7 million colors. 617/429-9999. Color Kinetics, Boston. **CIRCLE 330**

Graceful area lighting

The polished-cast aluminum housing of the Canto area light is supported by a curved steel pole. 704/471-2211. Hessamerica, Shelby, N.C. **CIRCLE 331**

Highbay alternative

The IPS from SPI is a 92 percent optically efficient fluorescent fixture that can be used in place of HID. 414/242-1420. SPI Lighting, Mequon, Wis. **CIRCLE 332**

LED cove lighting

Another Color Kinetics product, the iColor Cove, uses LED lamps housed in a cove. The cove can change color and produce special effects. 617/429-9999. Color Kinetics, Boston. **CIRCLE 333**



PRODUCTS

ELECTRICAL

Interior and exterior luminaires • Fiber optics • Wiring devices • Lighting controls

Underfloor electrical ducts

The Steel City underfloor duct system offers great flexibility in the management of data, voice, and power wiring.

800/888-0211. Thomas & Betts Corp., Memphis. **CIRCLE 334**

Teeny-tiny downlighting

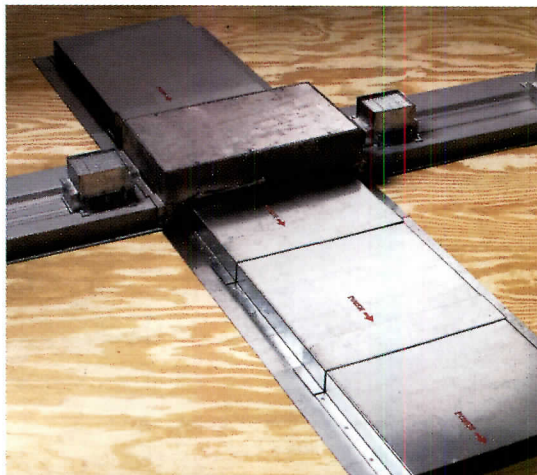
The Pinhole takes a 50-watt MR16 lamp, is aimable, and has an aperture under 2 inches. It can be installed in a non-accessible ceiling. 210/227-7329. Lucifer Lighting, Austin, Tex. **CIRCLE 335**

Fiber-optic light bar

The LinearEssence fiber-optic light bar produces light without heat, UV, or IR, making it suitable to display fragile objects. 800/327-7877. Fiberstars, Fremont, Calif. **CIRCLE 336**

Really flexible remote dimming

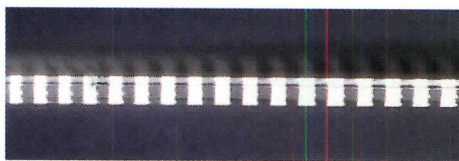
Spacer, the remote-control dimmer, is now available with two different hand-held controllers: one sets a favorite scene, the other accesses four preset scenes. 610/282-3800. Lutron, Coopersburg, Penn. **CIRCLE 337**



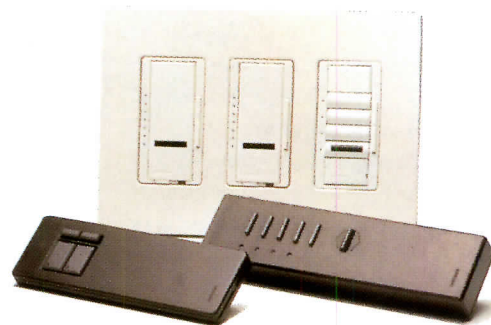
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337

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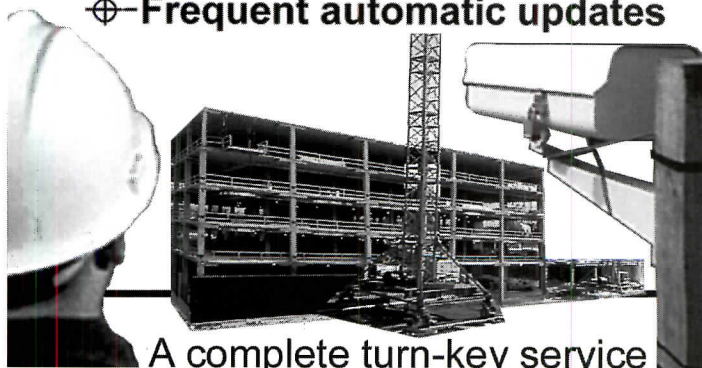
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CIRCLE 80 ON INQUIRY CARD

Fluorescent with many options

The Ciroso blends function and aesthetics. The extruded fixture comes with sculpted endcaps, and a system connector allows rows of fixtures to be joined in a range of different angles. Seven different diffusers are available, allowing specifiers to choose a downlight distribution that meets their preferences. 781/294-0100. Lightcontrol, Hansen, Mass. **CIRCLE 338**

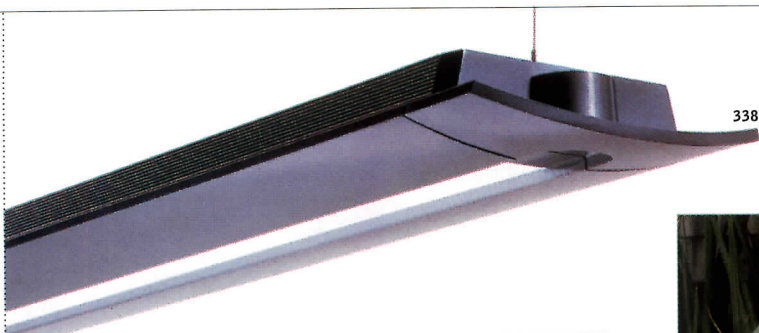
Wall and ceiling luminaire

Italiana Luce's Bridge fixture is ideal where an arc-shape is desired. The arms are polished aluminum, and the transparent glass shade is covered with perforated metal. It takes a 250-watt halogen lamp. 203/407-8000. Il America, Hamden, Conn. **CIRCLE 339**

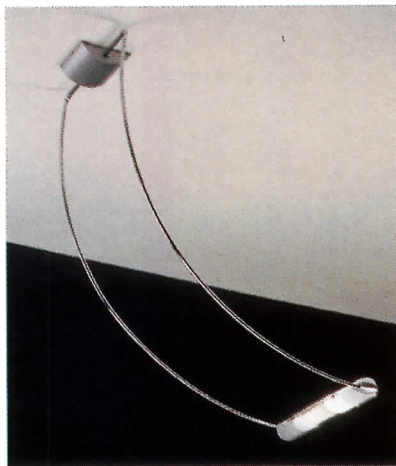
The path of least resistance

Kim has introduced the Ravenna line of landscape lighting fixtures. They are weather resistant and either cast aluminum or bronze. The Highlighter is tall enough to stand over ground cover and light walkways, or it can be adjusted to provide uplight. The Lowlighter is similar but of a somewhat lower profile.

626/968-5666. Kim Lighting, City of Industry, Calif. **CIRCLE 340**



338



339



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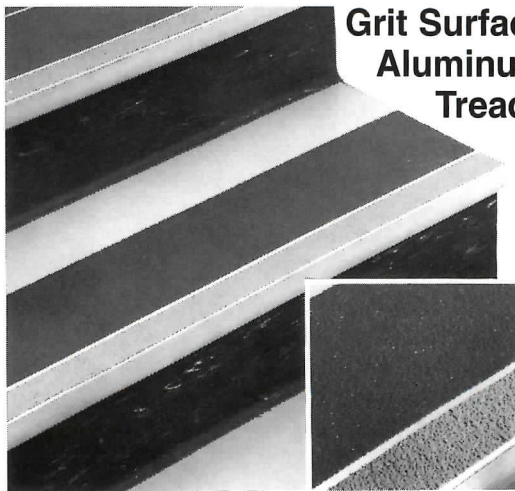
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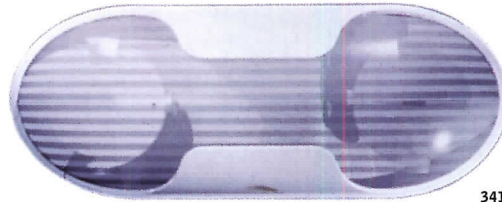
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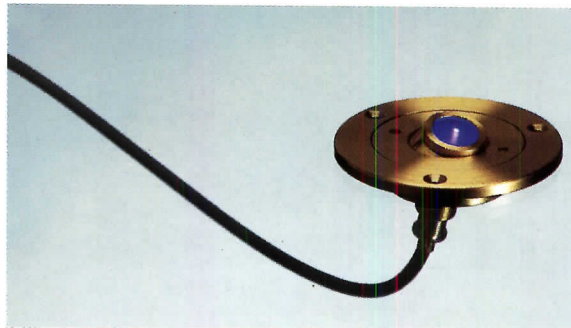
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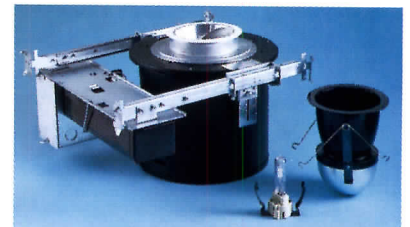
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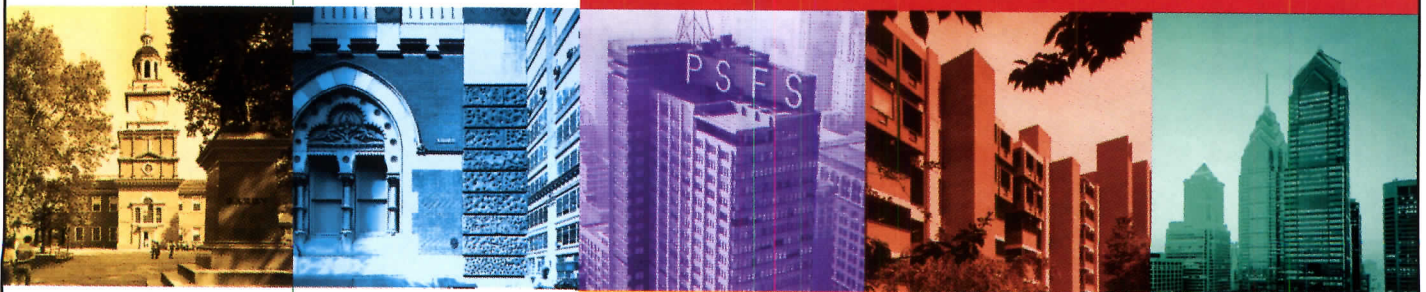
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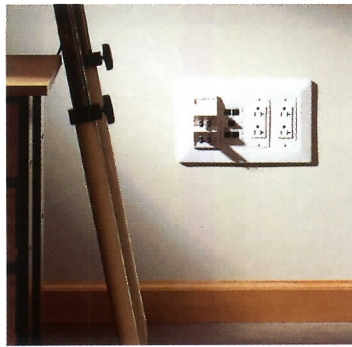
The WallSource Box allows high- and low-voltage service ports to be located together at any point in a wall. More than 60 different port types including electrical, voice, data, and video are available to snap into the box and can be changed as needed. 800/621-0049. Wiremold, West Hartford, Conn. **CIRCLE 345**

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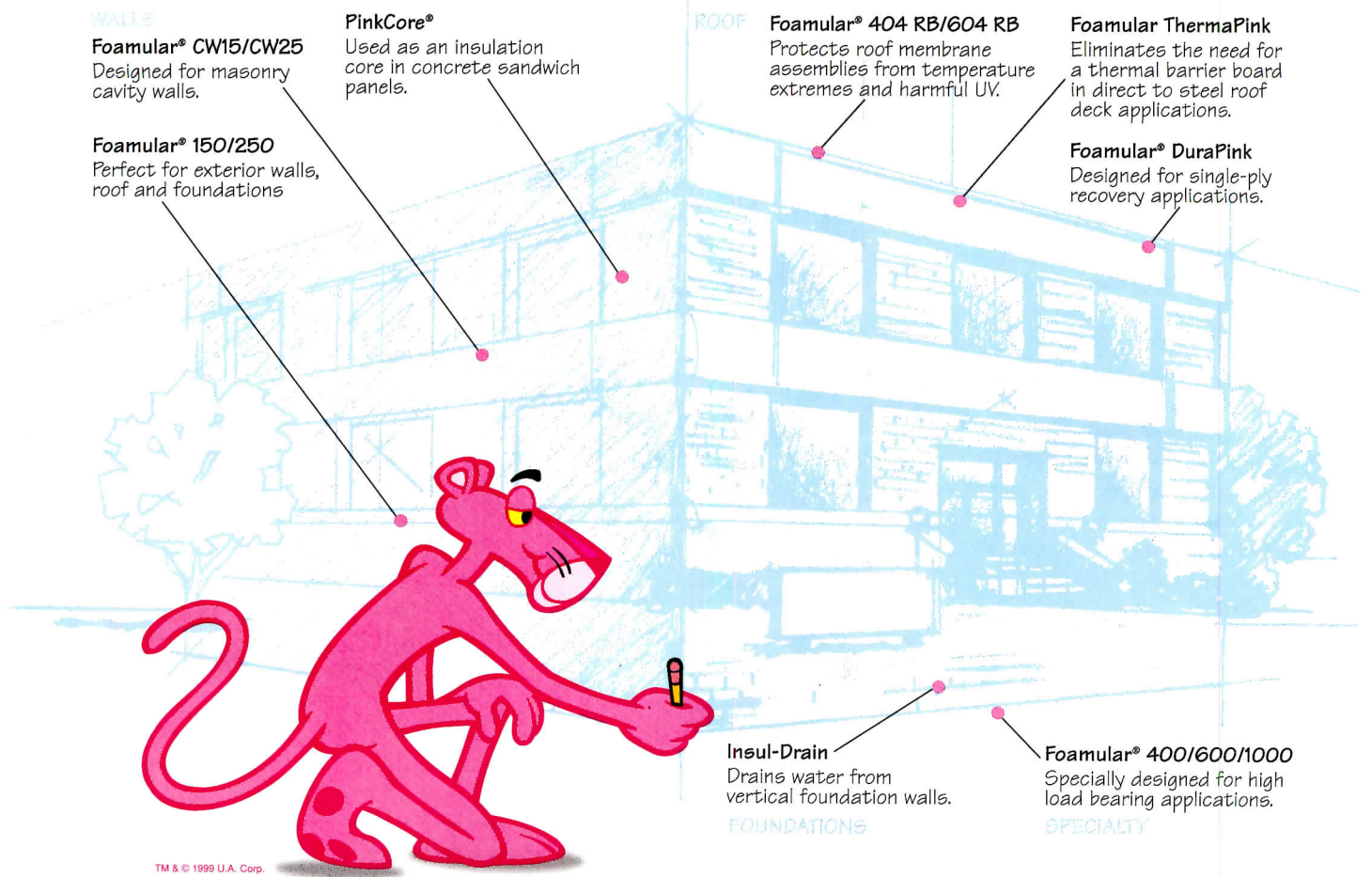
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CIRCLE 85 ON INQUIRY CARD

Giving Back to the Environment

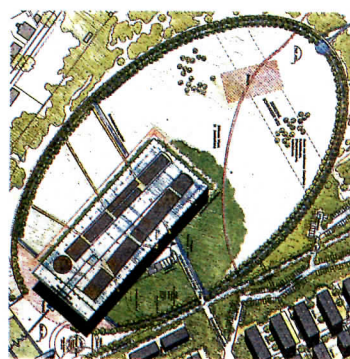
A RADICAL, ENERGY-EFFICIENT GREENHOUSE STRUCTURE THAT ENVELOPS A SMALL, SOLAR-POWERED VILLAGE BECOMES THE NEW CENTER OF AN OLD MINING TOWN.

by Claire Downey and Wendy Talarico

The Mont-Cenis Academy complex is proof that daring design can be generated by ecological solutions—solutions that, despite their technological sophistication, do not make the resulting space feel driven by machinery and computer calculations. The villagelike grouping of buildings that compose the civil service training academy and community center, built on abandoned coal fields in the town of Sodingen (since joined with the adjacent town of Herne), take a holistic approach to energy-conscious architecture. From its transparent facades to the tall pine logs that serve as columns, this boxy, overarching greenhouse structure and the buildings inside seem simple at first view. But Mont-Cenis is a complex project that carries a complex message with implications for the future of the region and of building design in general: architecture in the next millennium will take place not in new construction on virgin land, but in renovating existing buildings or erecting new structures on sullied sites.

The academy is in the Ruhrgebiet, a once mighty industrial region north of the Ruhr River in Germany and home to towns like Duisburg, Essen, and Dortmund. It was Europe's largest industrial region, but economic factors, including a recession in the 1980s, closed its coal mines, steel works, and coke processing plants. The economic devastation was significant, but the pollution was even more destructive to the region. During the processing plants' peak production, acid rain dumped several million tons of sulfur dioxide each year on the soil, some of which was already contaminated by coal sludge and other industrial waste.

The mine at Sodingen, which served as the economic and physical center of town, closed in 1978 and was later razed. In its place, Mont-Cenis, with its surrounding town park, was conceived as a new center that would contain the area's social security offices and a



The Mont-Cenis Academy complex is located at one end of a town park that sits atop an elliptical mound—the earth below is filled with gravel, tailings, and other debris from the mine shafts that surround the site. The complex consists of a glass envelope that houses several buildings, including the area's social security office, library, and civil-service training academy.

multifunction hall, along with the training academy. The public is free to enter the building, eat in the cafeteria, or use the library. If rooms are available, they can stay the night in the academy hotel.

The portion of the Ruhrgebiet where Mont-Cenis is located was bucolically rebaptized as Emscher Park about 10 years ago. The region includes 17 cities with a combined population of 2 million people, many of whom are set on forgetting the area's sooty past by investing in a "green" future. With so many old factory sites to be saved, converted, or destroyed, and with a new building program to be defined, the regional government established the International Building Exhibition Emscher Park (IBA) in 1989. Not an exhibition per se, IBA is a land development program like the one formed to organize the reconstruction of Berlin (though Berlin's building program focused on new buildings while the IBA worked predominately with existing structures). The IBA established devel-

CONTINUING EDUCATION

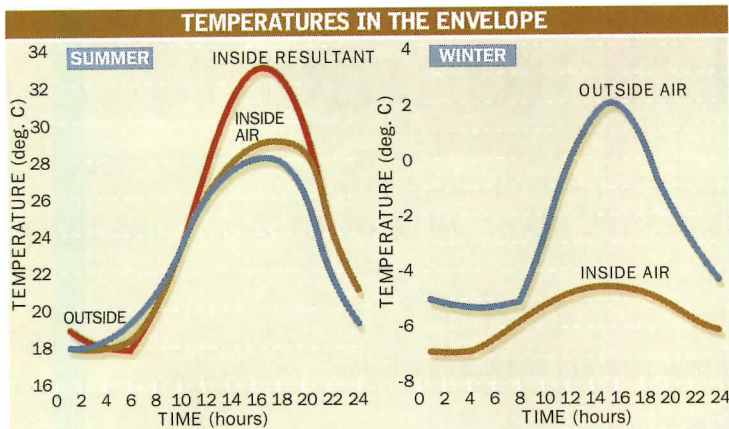


Use the following learning objectives to focus your study while reading this month's ARCHITECTURAL RECORD/AIA Continuing Education article. To receive credit, turn to page 208 and follow the instructions.

LEARNING OBJECTIVES

After reading this article, you should be able to:

1. Explain how a mining site was reconstructed to become a village center and training academy.
2. Describe how natural resources are conserved in the Mont-Cenis Academy complex.
3. Describe the advantages of the greenhouse environment over the natural environment.
4. Describe how photovoltaics are incorporated into the project.



SOURCE: OVE ARUP & PARTNERS

In winter and summer, the glass envelope moderates internal temperatures.

opment guidelines emphasizing the use of ecological approaches and new technology in building projects. The thrust of its mission was to renaturalize the landscape, renovate housing sites, clean up polluted rivers and land, and transform major industrial sites into recreational or cultural venues.

The changes in the region within the past 10 years are dramatic. The cities within Emscher Park are now linked by a chain of parks that runs along the Emscher River which, like the Ruhr, was cleaned and stocked with wildlife. Old factories are now galleries and concert halls. The artist Christo recently installed 13,000 painted steel drums inside the empty, 330-foot-high gas storage tank at Oberhausen, west of Herne-Sodingen.

Perhaps the most impressive industrial renovation is the site of a former factory at Zollverein, also to the west. A temple of brick architecture, the central factory building was turned into an industrial design museum by British architect Lord Norman Foster, Hon. FAIA. Here, the latest and slickest industrial products contrast with massive rusted valves and ovens, all still in place. Outside, the public is attracted to the area by exhibition spaces, cafes, and restaurants located among the acres of

outbuildings, mine shafts, and pipes that surround the factory.

At a recent gala at Mont-Cenis, the IBA celebrated the conclusion of its 10-year program. Altogether 120 projects were realized, representing an investment of 5 billion DM (about \$118 million), two-thirds of this from public money and one-third from private funding. The Mont-Cenis Academy, completed last summer, is the organization's major accomplishment.

"This wasn't an experimental building," says project architect Françoise-Hélène Jourda. "There is no possibility of risk in architecture." Perhaps the risk lay with the IBA, whose challenge was to take a site scarred with mining shafts that once released toxic gases into the air and convert it into a place that gives back resources and provides spaces in which to live and learn.

The glass envelope

The Mont-Cenis project began with a 1991 competition, won by French architects Jourda & Perraudin (Gilles Perraudin was Jourda's partner). In 1992, the pair joined with German architects Hegger Hegger Schleiff (HHS). Jourda, now with her own Paris firm, describes the combination of talents as a true collaboration: she took the lead on the conceptual design, and Manfred Hegger contributed ideas and knowledge of the region. HHS, a firm that specializes in environmental design, also worked on other Emscher Park projects and oversaw construction on Mont-Cenis.

From the first, Jourda was set on using a glass envelope to create a microclimate for the buildings within, a concept she has used on a smaller scale in other projects. But Mont-Cenis marks the first time such an approach has been so thoroughly and so successfully applied in the region, and perhaps internationally.

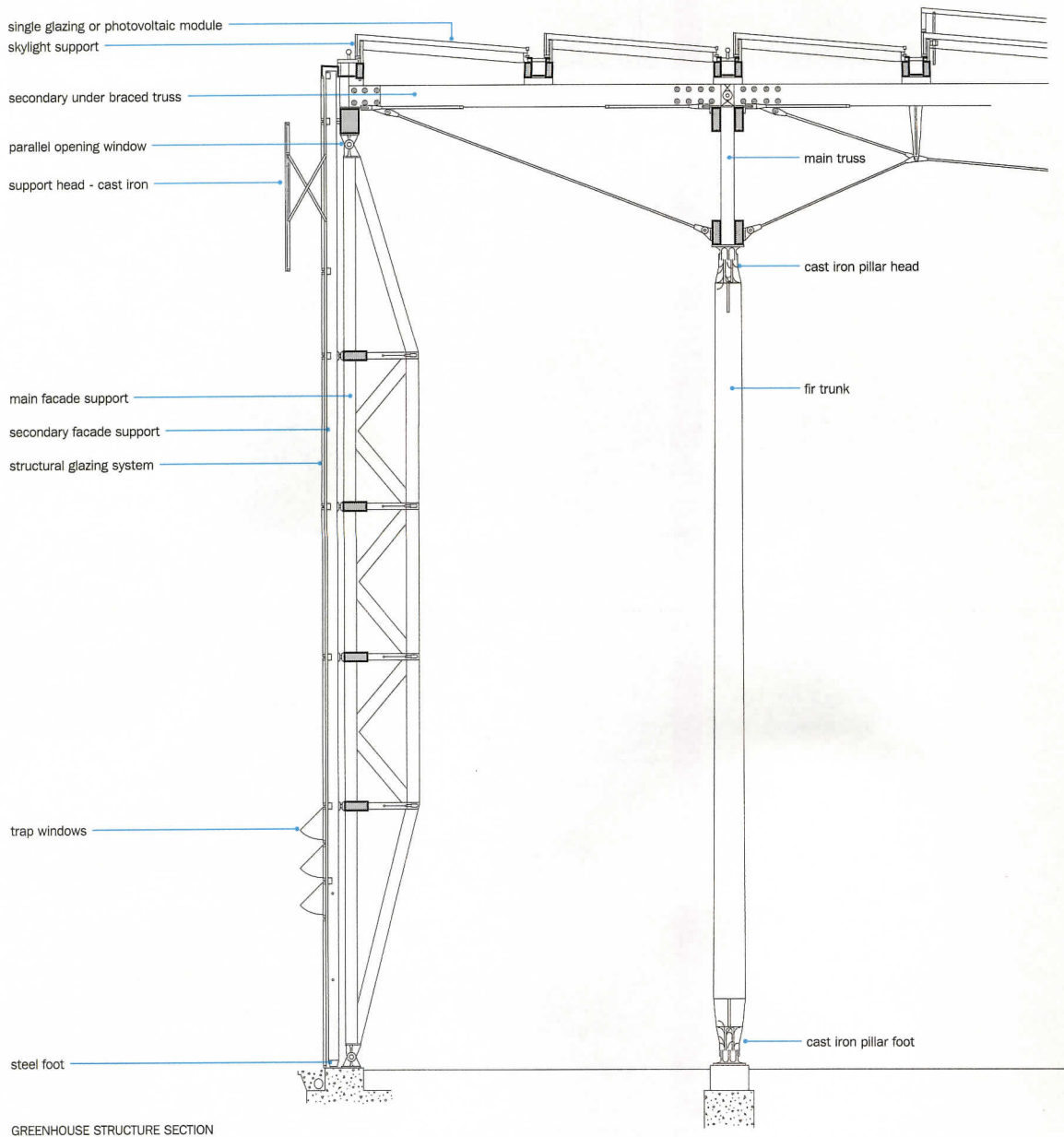
The architects, working with the University of Dortmund, Germany, spent a year using computer and physical models to analyze airflow, heat exchange, lighting, and ventilation. The result is a 123,200-square-foot clear-glass greenhouse with a climate that's more in line with the south of France than northern Germany. As a result, the interior buildings were designed without the heavy insulation, HVAC equipment,



Jourda used an industrial theme for some of the buildings, such as the library (opposite left), which resembles a truncated smokestack. The rooms in the academy hotel open onto a balcony (opposite right) that overlooks the crushed-stone floor and pathways. A broad overhang (right) announces the front of the complex and shades it from the strong summer sun. The timber structure (below) includes pine logs, 16 inches in diameter and 50 feet tall, that were taken from nearby forests. The roof trusses are laminated wood.

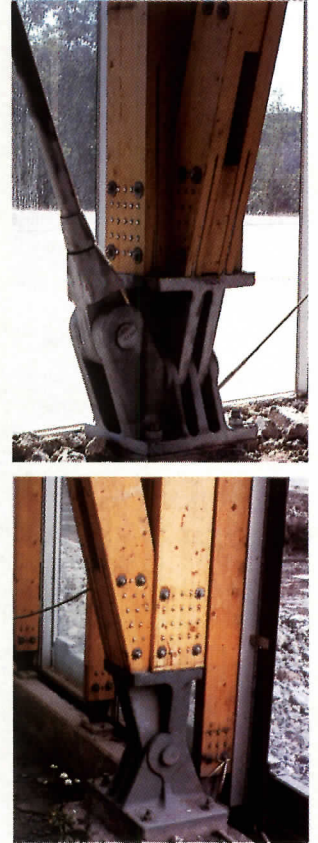




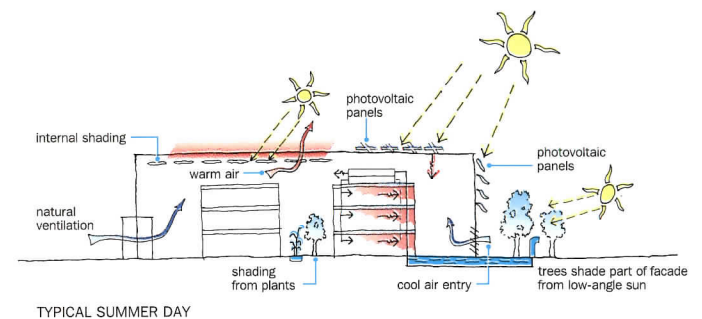
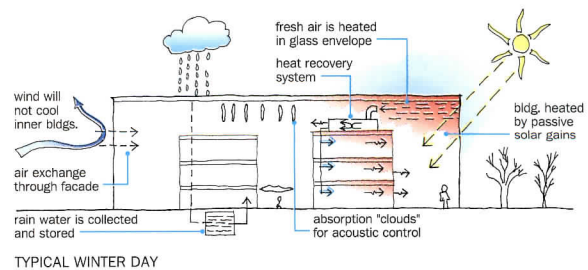


GREENHOUSE STRUCTURE SECTION

The rustic log columns (opposite) are supported by an infrastructure of laminated wood posts and beams. The posts culminate in a series of custom-made cast-iron feet located inside and outside (below) that were designed by the architects and the structural engineers.



Photovoltaic panels (left) are arranged to gather solar power and to provide shading that prevents the interior from overheating. The envelope is naturally ventilated and there is no air-conditioning. In the winter (drawing, top), the concrete and gravel serve as a heat sink, while heat-recovery units pull the warm exhaust air from the conditioned spaces. In the summer (drawing, bottom), cool air is pulled in through envelope openings.



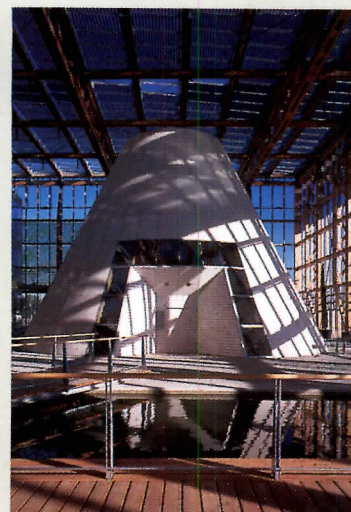
The sum of its parts

The minimalist buildings beneath the glass envelope are arranged in slightly offset rows to create an urban perspective. The buildings are intentionally simple; the architects intended for occupants to spend most of their time in the vast, light-filled atrium.

Limiting the structures to three main building materials—wood, glass, and concrete—maximized the use of pre-fabricated components. Working with a limited palette and designing buildings on a grid, with no irregular shapes and corners (aside from the conical library), minimized waste. In addition, the concrete acts as a heat sink, contributing heat-storage capacity.

The buildings used most frequently by the public are the 2,600-square-foot cone-shaped library and the 5,500-square-foot civic administration offices. They are just inside the front entrance of the complex.

The library serves as an information center, with books, maps, and other materials on Mont-Cenis and the surrounding region. The wood-framed structure is capped by a skylight that's covered with white-light holograms. These direct the sunlight entering the space to



the ground floor.

The blocky, three-story civic administration building, next door to the library, is used by residents seeking social security; unemployment remains high in the region.

The 22,000-square-foot classroom building, which, like the

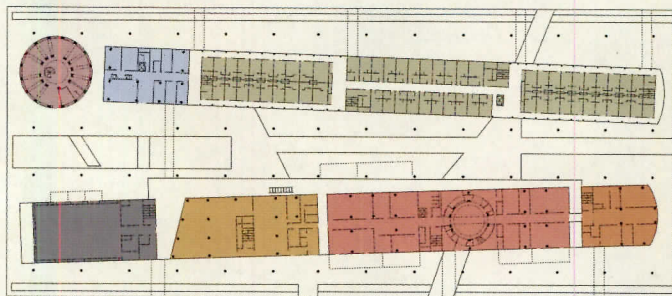
envelope, is mostly glass, is accessed from a door on the east side of the complex. It contains another cone-shaped structure which serves as the lobby. Holograms on the skylight over this cone create a kaleidoscope of color on the floor. In the classrooms, floor-to-ceiling windows,

spanned by light-shelves, maximize light and air circulation.

Other structures include a three-story hotel with continuous wood balconies around each level; a multiuse hall; and a restaurant, open to the public, with seating inside and out in the atrium.

GROUND FLOOR

- Library
- Civic Administration
- Meeting Center
- Restaurant
- Academy
- Hotel
- Administration Academy



and other elements used in cold-climate construction.

The buildings are arranged in two rows along a central street and canal. Paths crisscross the landscape of concrete, gravel, and exotic plants. The influence of the industrial machine is clear; the truncated library recalls a smokestack, while the multipurpose hall is contained in a windowless rectangular box. But the factory metaphor blurs when the architectural details and materials are examined. The buildings are clad in rough, bleached-wood siding, while portals are found in some of the building's doors. Continuous wooden decks run outside the buildings. Without its protective glass envelope, this is an architecture that would be unthinkable in a northern climate.

The hangar-like greenhouse is at once simple and sophisticated. In the winter, it works in tandem with the concrete and gravel floors to collect solar energy, while acting as a thermal buffer. In the summer, doors are left open to allow the breezes to enter. Louvered openings in the lower quadrants of the glass structure bring in cool air, while warm air is exhausted through roof vents. The stack effect is enhanced with internal shades near the ceiling that trap solar heat and induce airflow. Potted tropical plants and a central pool contribute their own cooling effects.

These seemingly basic operations are controlled by a highly specialized computer system that adjusts the size and number of openings in

the envelope on an hourly basis. Sensors within the building and outdoors monitor internal and external temperature differentials, wind direction, the angle of the sun, building humidity, lighting, and other factors. This information is fed to the computer system, which adjusts the building's mechanical systems accordingly.

Concrete-lined tunnels, or "earth ducts," almost 10 feet below ground, conduct fresh air from their intakes, located 164 feet from the center of the envelope, to the building. The air, driven through the 6½-by-6½-foot tunnels with fans, is naturally cooled or heated during very hot or very cold periods respectively, thanks to consistent below-grade temperatures.

The buildings within the envelope were positioned to maximize airflow. Each has windows that open to the hall, bringing in the naturally conditioned air. Heat-recovery units pull the warmth from exhaust air and minimize the demand for heating energy. There is no artificial cooling in the complex.

Air is not the only natural element circulated through the project. Rainwater is collected from the roof by a syphon system using four-inch-diameter pipes that run down the facade behind the vertical columns. The water, collected and filtered in an underground cistern, is used to clean the roof, flush the toilets, and water the lawns.



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CIRCLE 86 ON INQUIRY CARD



On-site power plants

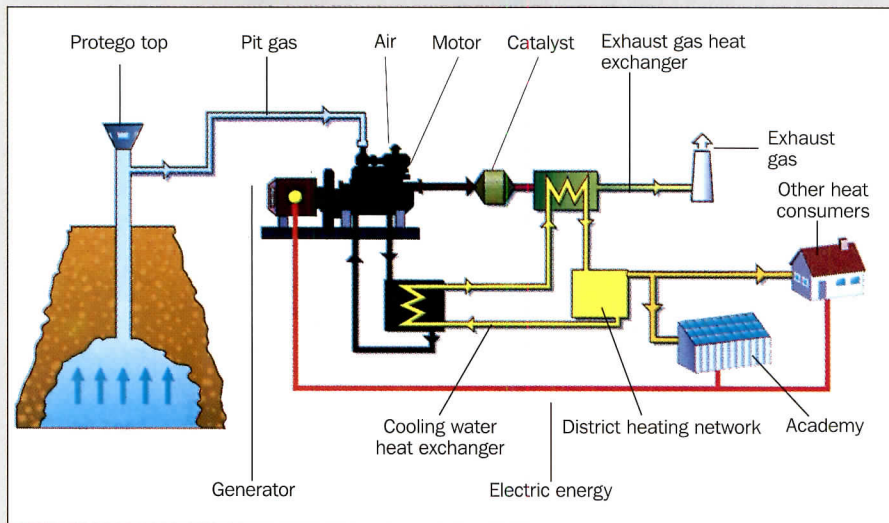
Almost all coal mines emit some gas and the shafts surrounding the Mont-Cenis Academy are no exception. The mines vent approximately 36 million cubic feet of methane, as well as other toxic gases, each year. Before Mont-Cenis was built, this gas was simply vented into the atmosphere. But Jourda and Hegger, working with the University of Dortmund and the local utility, Stadtwerke Herne AG, conceived of two cogeneration plant modules at Mont-Cenis that would use the gas to create electricity and heat.

Located at the eastern edge of the park, the mine-gas-driven cogen-

eration plants supply 235 KW/year of electricity and 378 KW/year of heat. The electricity supplements that produced by the photovoltaic array atop the building envelope. The heat is used to warm the com-

plex. Oddly, more gas rises in over-cast weather conditions than when the sky is clear, making the cogeneration facilities a perfect compliment to the photovoltaic system.

Some of the energy that isn't used is stored in a 2.2 MWh battery storage plant, also on the property. That energy is used to reduce peak demand loads, to compensate for perturbances in the solar supply system, and to supply emergency power to the complex. Any remaining supply is fed back to the utility grid. The plants are likely to pay for themselves within their first year of operation. That's because the amount of power they're giving back to the grid is enough to prevent the local utility from having to build a new power-generating station. These savings are being passed on to Mont-Cenis.



Building openings (left) are controlled by a computer system that monitors indoor and outdoor temperatures. There is no air conditioning. PV panels, clustered in varying densities on the roof (right), create cloudlike patterns below. There are no panels over the center atrium.

Over the mines

The site conditions were, in many respects, the major constraint of the project. Mine shafts lie all around the site. One reaches a depth of 4,268 feet—the deepest in the Ruhr region. The barren site of a former coke furnace, with soil so polluted that vegetation will not grow, lies 650 feet north. The former pit head of the mines lies directly beneath the building. In fact, the site stands several yards above street level, thanks to the 20-foot-high pile of tailings, gravel, and waste material taken from the shafts

“The original competition brief spoke of finding a context for the structure from the nearby town,” Jourda says. “But we were, instead, worried about the land beneath us.” Rather than engage the site, she floated the project on concrete piles.

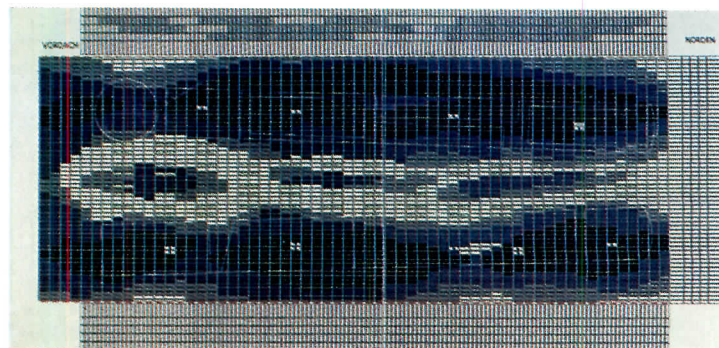
The envelope is a three-part structure. Its primary support system, a grid of tree trunks 18 inches in diameter and 50 feet tall, supports the laminated roof trusses. The forest of rough-hewn fir columns is both rustic and refined. “Wood is the ultimate ecological material,” Jourda says. “It is renewable and can be used with little waste.” The pines, selected

from nearby forests, were cut more than a year before they were installed, leaving them time to dry naturally. Even so they are scored along their entire length to allow shrinkage without cracking. The trunks are anchored to the concrete foundation with custom-made cast-iron feet designed by the architects and the engineers. The connections allow for movement in the logs, which sway as the building moves.

The primary support system is capped by a secondary structure of wood beams and wall trusses. The function of this is to support the tertiary structure. This consists of structural-glass facades and an aluminum frame that holds the laminated-glass roof.

Rooftop power plant

It is no wonder that the architects refer to the roof as a power-generating station. Photovoltaic (PV) cells are embedded in an ultraviolet-resistant resin between the layers of glass on the roof and also on the south and west facades. These produce two and a half times the energy that the complex needs, about 750,000 KW/year. The power generation is monitored by a computer system that directs any surplus into Herne-Sodingen's electric grid. At night and during periods of low



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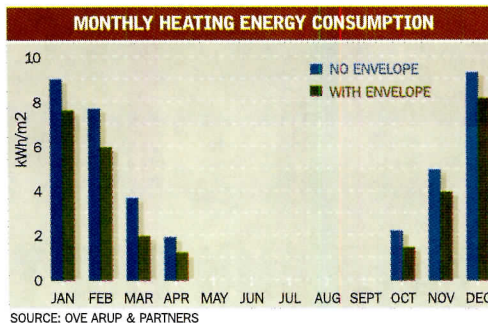
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light, the complex pulls energy back from the electrical grid or draws from methane-powered cogeneration plants on the site. The rooftop PV array covers 83,700 square feet, while the facades support a 7,000-square-foot array. The solar energy is converted to usable power with 600 modular inverters. Altogether Mont-Cenis represents the largest use of PVs in Germany, Hegger says.

The original competition brief didn't call for the use of PVs. But when the architects showed the clients how much energy the space could produce, the installation of the PVs became a priority. In fact, it was the power company that funded half of the 15 million DM (about \$28 million) budget for the PV system, an investment that is paid back daily in additional energy resources.

The roof has a 4 percent southfacing incline to optimize solar gain. Originally, the solar cells were evenly distributed across the roof. But computer modeling demonstrated that the building interior would be darkened by the density of cells. So Dr. Helmut Muller, a professor at the University of Dortmund who led the solar design research, concentrated the cells over the internal buildings and left clear glass between the buildings and over the central thoroughfare. Also, the cells within the panels are arranged in varying densities—from 86 percent directly over the buildings to 58 percent in transitional zones. The dappling of the cells, along with the shifting daylight, creates ever-changing cloud patterns.

"The PV panels also satisfy the need for shade and enclosure," Hegger adds. To avoid overheating the building, 65 to 80 percent of the



roof area and 25 to 40 percent of the south and west facades are shaded. Trees around the envelope and ivy planted along the walls also help.

The PV system, along with the other energy-saving aspects of the building, are manageable and intelligent choices that architects can use to help overcome the odds at a site like Mont-Cenis. "With the end of heavy industry in Germany, we have learned that knowledge is the best protection," Hegger says. "We have seen a lot of fashions in architecture. But real change

comes from economic or political forces. We are entering a phase when these economic questions need to be solved and architecture will need to find solutions." Jourda agrees: "Most ecological architecture is just good sense." ■

Credits

- Project:** Akademie Mont-Cenis
- Owner:** Federal State Nordrhein-Westfalen, City of Herne
- Architects:** Jourda & Perraudin Architectes, project; Jourda Architectes, planning; Hegger Hegger Schleiff HHS Planer + Architekten BDA
- Engineers:** Ove Arup & Partners, Schlaich Bergermann + Partner, HL Technik AC
- Interior designer:** Jourda Architectes

Landscape architect: Desvignes +

- Dalnoky; Latz, Riehl, Schulz
- Lighting:** HL Technik AG
- Climate and daylight simulations:** Institut für Licht und Bautechnik

Sources

- Structural system:** Schneider
- Concrete:** PH-Holzmann AG
- Glazing and photovoltaics:** Pilkington Solar International
- Skylights:** ESCO



AIA/ARCHITECTURAL RECORD CONTINUING EDUCATION

INSTRUCTIONS

- ◆ Read the article "Giving Back to the Environment" using the learning objectives provided.
- ◆ Complete the questions below, then check your answers [page 221].
- ◆ Fill out and submit the AIA/CES education reporting form [page 221] or file the form on ARCHITECTURAL RECORD's Web site at www.architecturalrecord.com to receive two AIA learning units.

QUESTIONS

1. What were the problems with the Emscher Park site?

2. How were site conditions used and improved at the Mont-Cenis region?

3. What are the advantages of the glass enclosure?

4. How are natural resources conserved at Mont-Cenis?

5. What has been learned from this innovative project?

Today's Research, Tomorrow's Software

FOUR DOCTORAL DISSERTATIONS DEMONSTRATE THAT THE MOST CREATIVE
NEW PROGRAMMING FOR ARCHITECTS WILL COME FROM SCHOOLS.

by B.J. Novitski

There is a crystal ball that can show us the future of architectural software. It depends not on gimmickry but on the fact that tomorrow's technology goes through years, sometimes decades, of development before it becomes commercially available. All over the world, architecture professors and their graduate students are engaged in innovative software research and experimentation. For many, the goal is to produce inspiring design tools, such as those that make 3-D modeling more intuitive, in contrast to the production tools offered by most commercial software developers. For others, the goal is to improve the integration between applications, promising efficiency benefits to the entire construction industry.

Examples of student research-turned-product include the conceptual modeler DesignWorkshop, from Artifice Inc., which architect Kevin Matthews (matthews@artifice.com) began developing as a master's thesis at the University of California at Berkeley and further developed while teaching at the University of Oregon. Lightscape rendering software has its roots in Cornell University's Program of Computer Graphics. Countless other pieces of commercial software have their theoretical or computational origins in the volumes of academic journals from the last several decades.

Unfortunately, it takes more than a good idea to make a marketable product. According to Matthews, the obstacles are both technical and institutional. In academia, he says, a narrowly focused solution is acceptable as a "proof of concept," in other words, the concept is valid, so fully developing it is unnecessary. Direct interaction between researchers and users makes manuals and technical support unnecessary.

"But to succeed in the marketplace, software has to be part of a complete solution for problems in real-world jobs," Matthews says. "That means you have to develop flawless software plus accessory information, documentation, training materials, packaging, delivery systems, marketing, sales, and support." Although professors can receive academic kudos for generating good ideas, they are less likely to be rewarded for all the work required to bring a program idea to mar-



Modeled with Design Workshop, from Artifice Inc., this interior of a home in Japan demonstrates lighting patterns and effects. The program was developed by Kevin Matthews, an architect who worked on it originally as part of his master's thesis at the University of California at Berkeley. It is one of the few student-developed software programs to reach the commercial market.

ket. Furthermore, work that's done in a university setting is subject to disputes over copyright or patent ownership—does the university itself or do the students and professors retain these rights?

Even so, university researchers tirelessly pursue their innovative work, assuming that the obstacles can be overcome. The following glimpse of four current doctoral dissertations shows some tools that practitioners may be using in the future. Whether all of these will be successfully brought to market is a matter of speculation and luck.

Design by physics

In the architecture department at Texas A&M University in College Station, Tex., doctoral student Scott Arvin (arvin@viz.tamu.edu) is developing a system for “physically based space planning.” In other words, the computer prototype accepts building program parameters, such as square footages and adjacency and separation requirements, and uses them to construct a range of viable floor plans. It is the digital equivalent of moving around scaled pieces of paper to create plan configurations, except that the individual pieces can change shape, many complex considerations can be simulated at the same time, and the resulting footprint has exterior walls that are logically aligned.

IF HUMANS CAN INFER DESIGN INTENT FROM SKETCHES, COMPUTERS CAN, TOO.

Imagine that each space in a bubble diagram is attached to other spaces by springs. The architect assigns a relative strength to each spring proportionate to the need for adjacency between the two spaces. Arvin’s computer program applies the laws of physics to the springs to pull some spaces together and push others apart, until the configuration reaches equilibrium. Similar physical simulations are performed for moving spaces that require particular views to particular orientations, for moving interior spaces toward the center of the overall footprint, for aligning the boundaries of adjacent spaces, and for maintaining the necessary area or proportion of each space. For example, a kitchen and dining room would be pulled together while a concert hall and a noisy loading dock would be pushed apart. All of this occurs in an animated format, allowing the designers to observe the effects of the parameters they specify.

What makes the software a design tool, one that could become part of a larger design system rather than an exercise in physics, is that it allows the designer to interact with the various parameters and make continuous adjustments. This adds the designer’s intelligence to the simulation and affords multiple plan configurations from which to choose. “This interactivity,” Arvin says, “evokes the feeling that one is

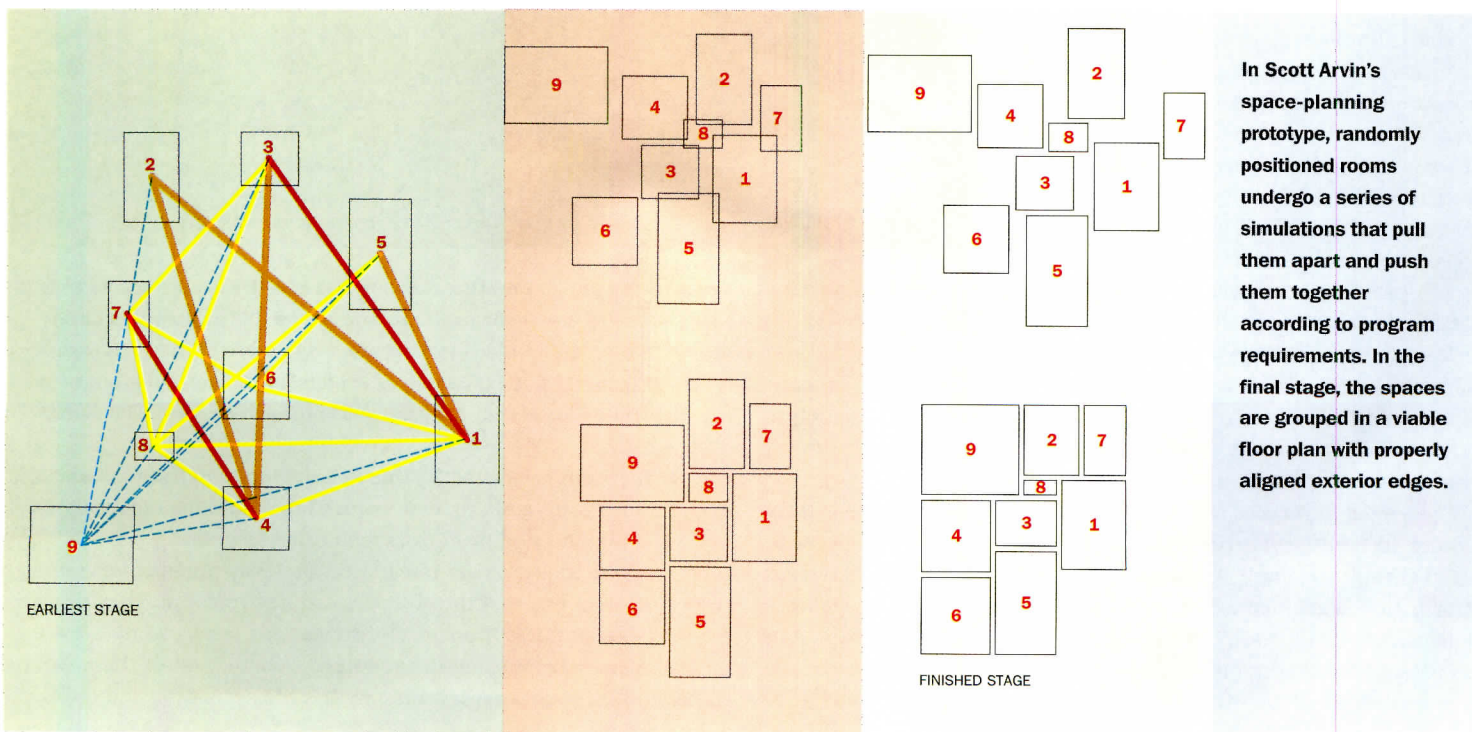
working with a living design, one that responds to the user in ways consistent with the programmatic objectives, though it still provides intuitive designer control.”

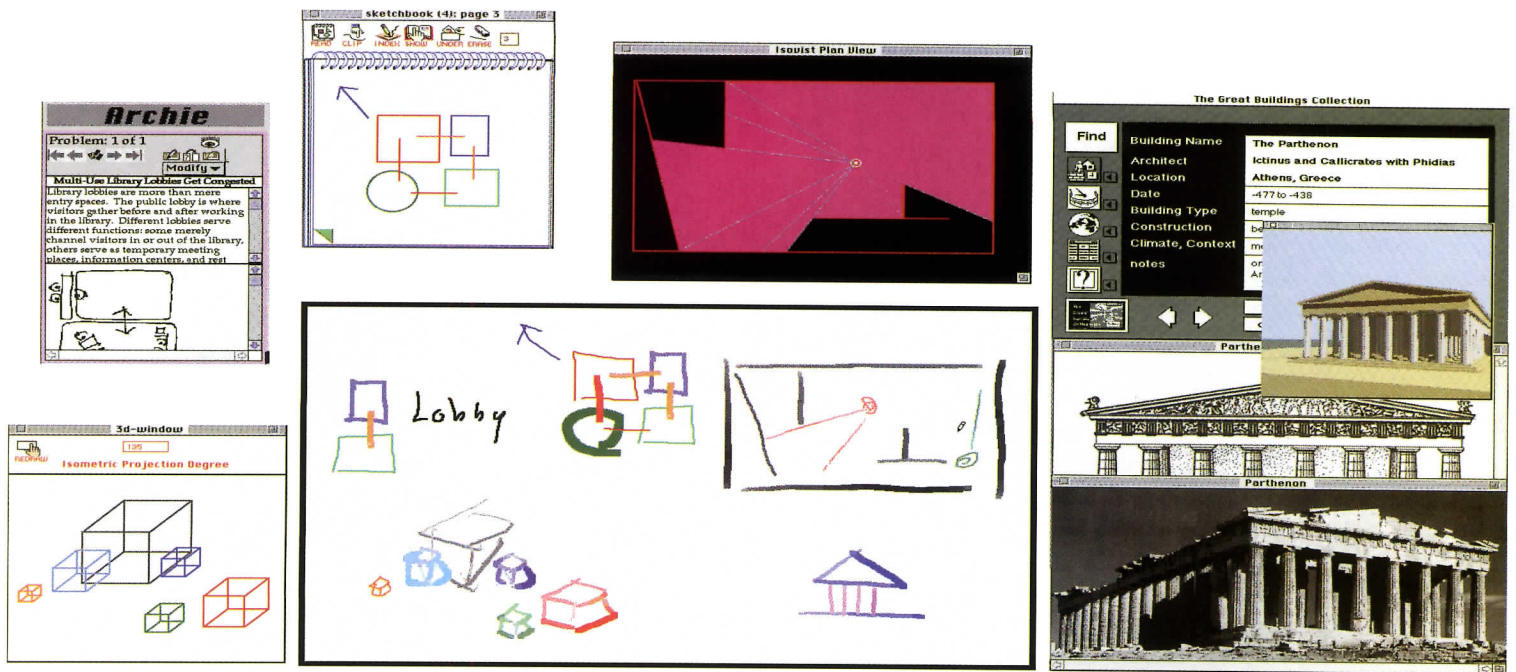
Right tool at the right time

Many architects remember a favorite design professor who could, after merely glancing at a drawing, pull down the perfect reference book to help develop the idea. If humans can infer intent from sketches, maybe computers can, too. So reasoned Ellen Yi-Luen Do, (ellendo@u.washington.edu) now a professor at the University of Washington. For her recently completed doctoral dissertation from the Georgia Institute of Technology, she developed a prototype sketch environment in which the computer software recognizes drawn shapes, determines the drawing type, and interprets symbols to derive design intent. It then launches other software applications that perform reference searches or provide some analysis of the drawing.

For example, a certain configuration of lines can be construed to be a floor plan. If the architect draws a few arrows emanating from a point, Do’s software infers that he or she is thinking about views within the plan. This launches a program called Isovist, which highlights the portion of the plan visible from the viewpoint, taking into consideration walls, windows, and partitions. The architect then continues designing without having to think about software mechanics.

Do’s prototype, dubbed “The Right Tool at the Right Time,” or RT², depends on a foundation of sketch recognition software which, like Isovist, was developed at the University of Colorado’s Sundance Laboratory for Computing in Design and Planning. RT² can identify whether a drawing is a bubble diagram, floor plan, section, or 3-D view; it can recognize commonly understood symbols such as windows, walls, ground lines, sun angles, and numbers. In addition to Isovist, RT² can launch Archie, a library of post-occupancy evaluation case studies developed at Georgia Tech; the Great Buildings Collection from Artifice Inc, an encyclopedia of hundreds of famous buildings; a numeric calculator; and a geometric modeler that converts sketched rectilinear massing into a





Ellen Yi-Luen Do, a professor at the University of Washington, developed reference software while pursuing her doctorate at the Georgia Institute of Technology. The Right Tool and the Right Time, dubbed RT², provides a sketch environment (bottom center) in which certain symbols automatically call up appropriate reference and simulation tools. Shown clockwise

from the bottom left, the tools include a 3-D modeler; Archie, a library of post-occupancy evaluation case studies; a digital notebook in which the irregular sketch is translated into the equivalent, rectified figures; Isovist, for displaying a view analysis, and several images from the Great Buildings Collection.

3-D model that can then be turned and viewed from other perspectives. In theory, RT² can link to any number of support applications, Do says, including commercial design software such as AutoCAD or form*Z.

Hand-crafted digital models

Good news from Brazil for everyone who has ever felt like they had one hand tied behind their back when trying to manipulate 3-D forms with a 2-D drawing instrument. University of Brasilia architecture professor Edison Pratini (pratini@usp.br) is developing a program he calls 3-D SketchMaker. It relies on natural, expressive hand gestures for creating 3-D computer models, a process that removes the discontinuity between conceiving a form and translating it into a digital model. Pratini began the project as part of his dissertation at Pennsylvania State University's Department of Architecture and has since refined it.

NEW SOFTWARE RELIES ON NATURAL HAND GESTURES TO CREATE 3-D MODELS.

"Pointing devices [such as a mouse] and menus in existing software do not allow the freedom, quickness, and spontaneity needed to establish a continuous cycling of information between eye, brain, hand, and paper," Pratini says. He wanted to take advantage of the natural gestures used when describing the shape of objects. His first prototype relies on a 3-D mouse that transmits x, y, z data to the computer instead of the x, y data that's transmitted by a conventional mouse. The designer waves the 3-D mouse through space to create two curves or lines. The software translates one curve into a sectional profile and the other into a path. Then it creates a surface model of that profile being extruded along the path. The resulting rough model is further refined with normal 3-D modeling software.

A second version relies on a data glove containing numerous sensors that interpret finger position and movements in space. Gestures for describing cubes, spheres, and other shapes are translated into corresponding digital forms. They can also be edited in a similar fashion; opening the hand wider, for example, makes the form larger. Beyond creating primitive forms, it is easy to imagine this interface expanding to enable architects to literally mold their schematic designs.

Linking design and science

For decades, research scientists have been developing extremely sophisticated analysis tools to study the energy performance of buildings. These tools are typically unsuitable for architects, however, because the interface is cumbersome, the output is largely numeric, and the input requires mechanical engineering data that comes at the end of the architectural design process. To make simulation tools useful in schematic design, when important energy-related decisions about building form are made, Konstantinos Papamichael (k_papamichael@lbl.gov), of the Lawrence Berkeley National Laboratory at the University of California at Berkeley, created the Building Design Advisor (BDA). This software is close to becoming commercially available. A beta version can be downloaded from kmp.lbl.gov/BDA.

The BDA maintains graphic and numeric definitions of a building that is under design, and links the design data to various simulation tools, such as DOE-2 for energy performance calculation, Radiance for lighting calculation and rendering, and DELight for daylight and electric lighting analysis. (These three programs are in the public domain.) The input needed to run each of these programs is different, and the BDA makes the necessary translations.

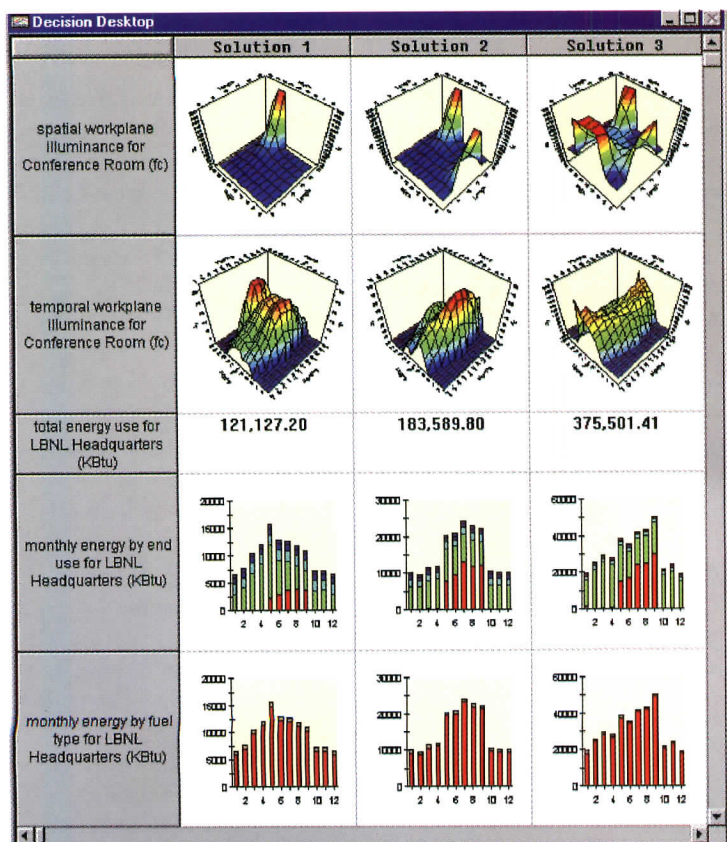
In cases where a building's design is still sketchy, the BDA creates "smart defaults" to fill in the gaps of missing data. For example, it retrieves

performance data from the Department of Energy and ASHRAE to specify wall insulation levels even before the wall material has been selected. Thus, the architect can look at high-level performance evaluations even during schematic design. Moreover, the BDA supports different building assemblies simultaneously so that the architect can compare these configurations—wood studs placed at 16 or at 24 inches on center, for example.

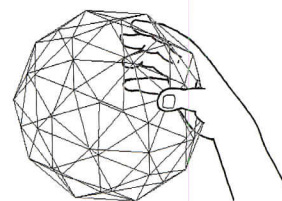
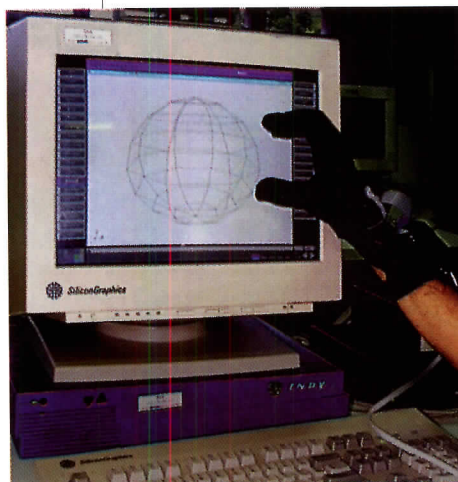
The BDA sports its own Schematic Graphic Editor, which allows a designer to input and edit a simple sketch. But Papamichael expects very soon to replace this with links to commercially available object-oriented CAD systems, such as Autodesk's new Architectural Desktop. In the future, the BDA will link to any number of architectural applications, such as cost estimating, environmental impact analysis, and electronic product catalogs.

Putting it all together

These four examples are isolated approaches to architectural design computing. Each demonstrates a narrowly focused capability that is desirable but missing from current practice. However, each prototype is founded in the belief—ubiquitous within academia, it seems—that the ultimate goal is to connect all tools of drawing, design, analysis, simulation, and visualization to a single, cohesive, complete model that contains everything that can be known about the building under design.



Konstantinos Papamichael's Building Design Advisor features three schematic building designs that are rated on each of five criteria. At a glance, the architect can evaluate the amount of daylight present throughout a space, on a daily basis, throughout the year. The program also portrays annual and monthly total energy consumption for each estimate.



With Edison Pratini's 3-D SketchMaker, various forms, such as cubes and spheres, can be shaped by ordinary hand gestures with the help of a data glove. Once the basic forms are created, they can be combined and edited with conventional CAD modeling software.

Bringing these ideas into the commercial software market is made even more difficult by this singular approach, which represents a mismatch between the structure of the construction industry and what is needed for the single building model approach to be accepted, says Robert Aish (Robert.Aish@Bentley.com), a research scientist with software vendor Bentley Systems.

Fifteen years ago, Aish worked on an English design system called RUCAPS, which later came to the U.S. and was renamed Alias Sonata. The system allowed multiple users from all disciplines, or "enterprises," within the construction industry, to work on a single model with parametrically defined components. Drawings are generated from the model, thus guaranteeing their consistency.

Sonata was a commercial disappointment. One reason, Aish says, is that its concept of "enterprise computing" required a restructuring of teams within the industry. For example, it required more detailed input by architects for the benefit of the engineers and contractors downstream. But there was no motivation or compensation for the increased workload upstream. As a result, the now-familiar drafting systems that run on low-cost personal computers won over the U.S. market because drawing efficiency could be improved without requiring major readjustments in the way business is done.

Now software developers are joining academic researchers in calling for the professions to make these adjustments, revamping the relationships between architect, engineer, builder, and owner and rethinking how various players are compensated for their contributions. Until that happens, Aish says, Bentley is working on methods for easing the transition. Their new ProjectBank technology creates a central data repository that looks much like a traditional CAD environment, but is accessible to the entire team.

At the same time, software developers, including Bentley, are working with architectural and sociological researchers who study collaboration. Their goal is to understand the key social and technical barriers that have prevented a restructuring of the design-to-construction process. This time, Aish says, "we want to get both the technology and the business conditions correct—and correctly matched."

This adds an optimistic note to the story of architectural software research. With sufficiently powerful hardware and support software, all the clever research ideas—automating space planning, hand-crafting forms, calling up reference materials with sketches, and performing complex energy simulations early in design—will eventually become part of a practitioner's everyday toolkit. The obstacles may be many but the rewards are compelling. ■



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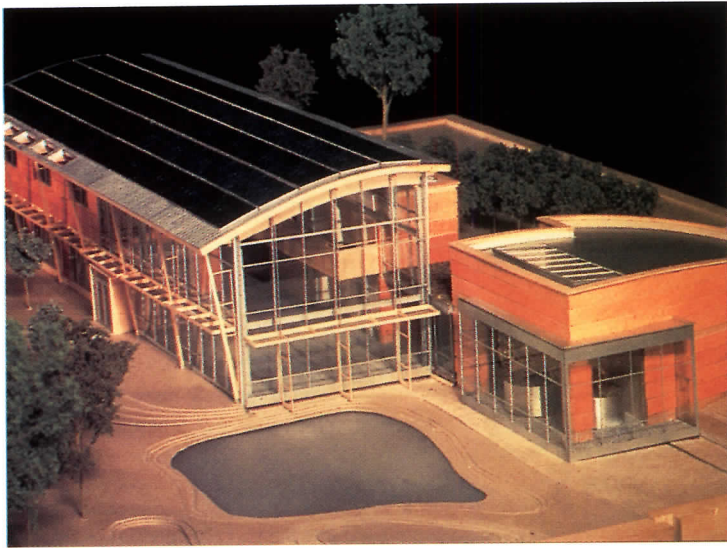
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NEW PHOTOVOLTAIC PRODUCTS ARE INTEGRATED INTO THE BUILDING SKIN

Architects are recognizing that buildings must be environmentally sound, as well as aesthetically appealing. And they are responding by specifying energy-efficient products, being cognizant of indoor-air-quality issues, and using sustainable design techniques. But it's not enough. Rather than use smaller amounts of nonrenewable fuels and create less pollution, designers must make buildings that rely completely on renewable resources to produce some and, eventually all, of their own energy without polluting.

Photovoltaic (PV) technology is a truly elegant means of producing electricity on-site, by directly harnessing energy from the sun. Developed in the early 1950s at Bell Laboratories to power space applications, PV systems convert sunlight into electricity silently, with no moving parts, no maintenance, no toxic emissions, and no depletion of resources.

PV systems located on individual buildings can displace utility power and help customers save money. On a broad scale, this approach also eliminates the need for more power-generating stations.

And, of course, the environment benefits when power is generated from the sun.

Building-integrated PV (BIPV), where the PV elements actually become an integral part of the building skin, is a commercially viable reality. These systems, which provide electricity for the building where they are used, will achieve widespread use in the near future. In fact, Europe and Japan are already using them on a significant number of structures.

How photovoltaics work

A PV system starts with a collection of wafers made of silicon (or a similar semiconductive material) that are exposed to sunlight. Each wafer, called a solar cell, is roughly four-inches square. Wafers must be protected from moisture, wind, erosion, and other weathering factors by some type of transparent protective coating, often glass. The substrate can be a range of materials, including stainless steel, but glass is used most often for architectural applications.

The number of wafers or cells used is dictated by the building's energy requirements. A cluster of

cells is configured in series to create a module, or panel. These modules are also wired in series to create an array. The number of modules used in the array is dictated by the building's energy requirements. To deliver maximum power, the array is positioned for optimal solar exposure.

Unlike in the past, when solar panels poked up from rooftops like slim, rectangular satellite dishes, the new building-integrated arrays not only offer an aesthetic improvement, but they are also forgiving in their solar orientation. Standard modules come in varying levels of power output and a range of sizes and shapes. They are often custom designed, however, to blend with a building's individual aesthetic character and meet its power-generating needs.

For example, at the Mont-Cenis Academy in Herne-Sodingen [page 219], the largest PV installation in Germany, the manufacturer of the PV panels, Pilkington Solar International in Cologne, Germany, packed the solar cells on the roof-mounted panels in varying densities. Too many wafers crowded onto the clear-glass substrate would have blocked the sun from entering the space below. Fuel cells

packed in densities ranging from about 50 percent to 85 percent were used to create a dappled effect in the building, as if wispy clouds were moving through. Panel colors range from blue to purple to charcoal gray, depending on the specifications.

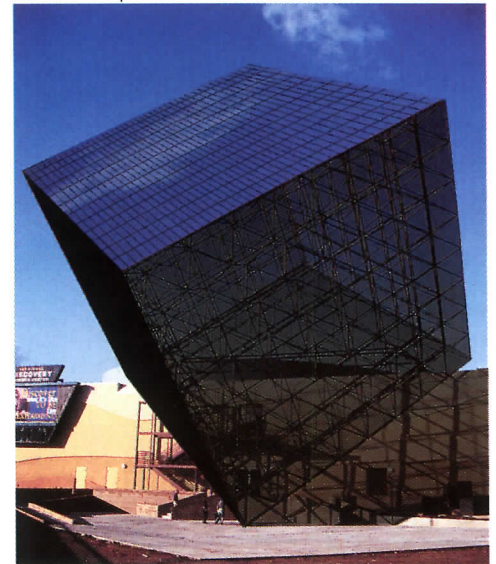
The power that's produced is direct current. It's converted to alternating current with an inverter, typically located in the electrical equipment room. Power is fed into

the building electrical system at that point.

Some systems include a storage medium, often lead-acid batteries, which provides power at night, when there is insufficient sunlight, or when backup power is required. But more often the building is connected to the local electrical utility grid. These so-called utility-interactive projects draw power during low-light times and feed surplus power back at other times.

New products

PV manufacturers have finally realized that their standard product, the 24-by-48-inch shiny gray panel with an extruded aluminum frame, is of little interest to architects. Few designers ever really knew how to place these ungainly looking mod-



The curved roof at the Environmental Sciences Building (top left) in Oberlin, Ohio, by William McDonough + Partners, will hold PV modules. The topmost gray surface in this rendering of the Discovery Science Center in Santa Ana, Calif. (above), by Arquitectonica, is a thin-film PV array.

ules on buildings without destroying their appearance.

A number of companies now offer PV products specifically designed as building materials, some of which incorporate a new and promising manufacturing approach called thin-film PV. While

TECHBRIEFS

PV cells are discrete pieces that must be manufactured individually, thin-film technology uses a process similar to vacuum deposition (used for applying coatings on high-performance glass) in which thin layers of semiconductive materials are applied to sheets of glass in a single operation. This quick and easy manufacturing approach saves money without sacrificing the efficiency of the PV system. In general terms, a building product that uses thin-film technology will have an added cost of \$25 per square foot. By comparison, conventional cell panels add about \$50 per square foot to the cost of a product or material.

For example, BP Solarex offers a new thin-film PV used on semi-transparent glazing, displacing conventional facade, skylight, or

facade-integrated PV sunshades, which contain the panels on the top surface of the shades. This product is so new, no prices have been set.

Viracon is working on BIPV glazing systems that provide thermal- and cooling-load control, such as conventional high-performance architectural glass. United Solar Systems offers BIPV roofing products that replace conventional standing-seam metal roofing or asphalt shingles. Solar Building Systems now has glass-over-concrete BIPV roof tiles, called SunSlates, for steep-slope construction.

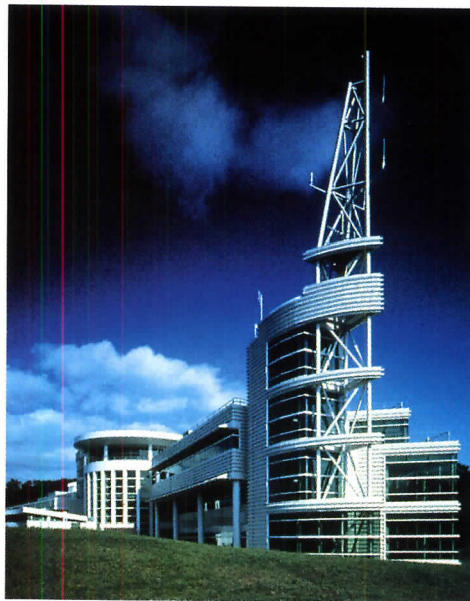
PV specialists from at least 15 countries are working with the International Energy Agency, a quasi-governmental organization under the auspices of the United Nations, on a five-year effort to optimize and promote the use of solar

building materials.

Meanwhile, architects throughout Europe and Japan are exploring creative ways of incorporating them into their designs.

Motivated by strong support from clients, the public, and their governments, the Japanese and Europeans, the Swiss and the Germans in particular, have installed thousands of BIPV systems on commercial and residential projects and are monitoring performance to further refine design and installation practices.

The Japanese, for example, are focusing on installing



At the Environmental Science Laboratory in Albany, N.Y., Cannon Architects incorporated PVs into the operable sunshades. The panels line the tops of the sunshades, which rotate according to light conditions and season.

atrium glazing. Other manufacturers are experimenting with thin-film products for 2000.

Curtain-wall manufacturer Kawneer's Power Wall is a pre-engineered facade and sloped-wall glazing system that incorporates conventional cell panels. The company is also developing

residential and commercial roof systems that have integral PV components. In Japan, PV is not at all a new and unfamiliar technology. By encouraging the use of these rooftop systems, the Japanese government reasons, it is nurturing a domestic industry and creating a new source of power. U.S. architects



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are completing some pioneering applications for BIPV systems for roofs, facades, sloped glazing, and sunshades. Cannon Architects, in Buffalo, N.Y., created a future-oriented design for the new Environmental Science Laboratory



The Olympic Natatorium in Atlanta, by Rosser Fabrap, features a solar canopy over the entry, as well as PV modules on the main roof. The PV system was designed by Solar Design Associates.

at the State University of New York at Albany. The building incorporates operable sunshades, which move according to the amount of light that hits them, topped with PV modules. There is also a PV entry canopy on the south facade.

New York City-based Fox & Fowle Architects incorporated BIPV as spandrel glass in its new, sustainably designed high-rise at 4 Times Square in New York City. Hellmuth, Obata & Kassabaum's St. Louis office, working with Somerville Architects of Green Bay, Wis., used BP Solarex's semitransparent thin-film PV in the atrium of the New Academic Facility at the University of Wisconsin in Green Bay. And William McDonough + Partners of Charlottesville, Va., specified a roof-

top PV system in the new Environmental Sciences Building at Oberlin College in Oberlin, Ohio.

New motivation

Two attractive federal tax incentives encourage private investment in solar-energy equipment and systems. A 10 percent credit and a five-year accelerated depreciation option are available. A number of states also offer incentives. California, one of the most generous states, has a renewable energy fund that provides up to \$3

per peak watt to help buy down BIPV-system costs. (A peak watt is the uniform measurement for how much power a given solar module will produce under ideal conditions—with full sunlight shining perpendicular to it.)

These incentives can amount to a 42 percent reduction in the cost of the PV system. And, in all BIPV applications where the solar components displace conventional building materials, the cost of these conventional materials and the labor to install them can be applied to the BIPV budget.

The best motivation for incorporating BIPV may be the financial savings for occupants, owners, and local utilities. But these systems provide a highly visible and attractive public statement about the building owner's environmental commitment, as well. *Steven Strong*

Steven Strong is an architect and president of Solar Design Associates in Harvard, Mass.

AIA WORKSHOP: GOING SOLAR The AIA is offering full- and half-day workshops for architects that provide an overview of building-integrated photovoltaic systems, including descriptions of the system components and many examples of solar-electric architecture. The workshop is hosted by regional AIA chapters and qualifies for health, safety, and welfare continuing-education credits. For information, contact Solar Design Associates at 978/456-6855.



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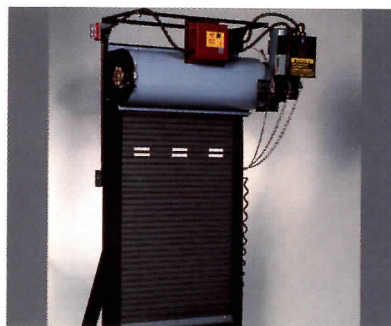


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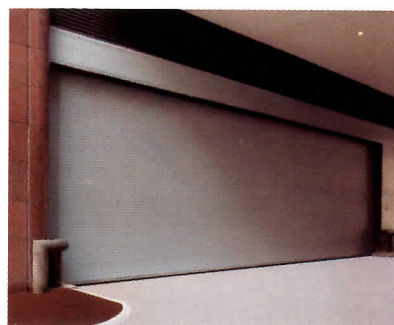


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continued from page 86

BIOGRAPHIES OF MILLENNIUM ARCHITECTS

Asymptote Architecture

New York City, established 1989

Lise Anne Couture and Hani Rashid

For MArch degrees, Couture went to Yale and Rashid went to Cranbrook. Couture teaches at Parsons School of Design and at Columbia, where Rashid is an associate professor. Their work will be in the Venice Biennale next June and at the Pompidou Center in Paris in 2001.

Guthrie + Buresh

Los Angeles, established 1988

Tom Guthrie and Danelle Buresh

Buresh received an MArch from UCLA, and Guthrie

received her BA and MArch from UC Berkeley. Both teach at SCI-Arc and have lectured or been visiting critics at architecture schools in the U.S. and abroad. Their work was exhibited recently in the "Unprivate House" at the Museum of Modern Art.

Hariri & Hariri

New York City, established 1986

Gisue Hariri and Mojgan Hariri

The Sisters Hariri received BArch degrees from Cornell where Mojgan also earned an MArch. Gisue has taught at Columbia and been a visiting critic at Cornell, McGill University, and Parsons. Their work has earned national AIA awards and appeared in the professional and popular press. They were included in MoMA's "Unprivate House."

Kolatan/Mac Donald Studio

New York City, established 1989

Sulan Kolatan and William Mac Donald

Both Kolatan and Mac Donald received an MS in architecture and building design from Columbia, where they now teach and where Mac Donald is director of the MS program in architecture and building design. Their design for an apartment was in MoMA's "Unprivate House."

Krueck and Sexton

Chicago, established 1991

Ronald Krueck, FAIA, and Mark Sexton, AIA

Krueck and Sexton, who have worked together since 1980, received BArch degrees from IIT, where both have taught. Their work is in "Material Evidence: Chicago Architecture at 2000," opening this month at the Museum of Contemporary Art in Chicago.

Greg Lynn FORM

Venice, Calif., established 1994

Greg Lynn

Lynn graduated from Miami University in Ohio with BAs in philosophy and environmental design, before earning an MArch at Princeton. He is a professor at ETH in Zurich and will be the Davenport Professor at Yale for the years 2000 and 2001, as well as a visiting professor at UCLA. He is author of *Animate Form and Folds, Bodies & Blobs*.

Mockbee/Coker Architects

Memphis, established 1987

Coleman Coker and Samuel Mockbee

Coker received an MFA from the Memphis College of Art before becoming a registered architect in 1982. Mockbee earned a BArch from Auburn University. Mockbee/Coker's AIA award-winning work has appeared in numerous publications, including *RECORD HOUSES* (1992 and 1997).

Reiser + Umemoto

New York City, established 1986

Jesse Reiser, AIA, and Nanako Umemoto

Reiser, a former fellow of the American Academy in Rome, completed his MArch at Cranbrook, while Umemoto received a BArch from Cooper Union after studying urban design at the Osaka University of Art. In 1999, the firm was a runner-up in the West Side competition sponsored by the Canadian Centre for Architecture and received the Daimler/Chrysler Award for excellence in design.

Michael Sorkin Studio

New York City, established 1977

Michael Sorkin

Sorkin, who received architectural training at Harvard and MIT, is a contributing editor for *RECORD* and has written and edited several books, including *Variations on a Theme Park* and *Exquisite Corpse*. He has been both a Davenport and a Bishop professor at Yale and has taught for 10 years at The Cooper Union. He is director of the Institute of Urbanism at the Academy of Fine Arts in Vienna. ■

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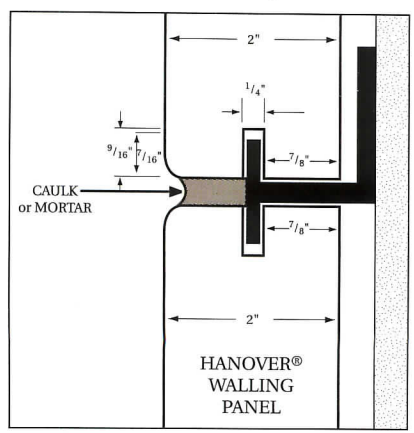


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CIRCLE 106 ON INQUIRY CARD

THE FUTURE

The next generation of architects will design completely within a virtual world. What will be the architectural language of the future?

BY RITA F. CATINELLA

As we enter the next century, what is likely to be the architectural language of the future? We have witnessed the gradual shift from the hand to the computer this century, and digital design students now have the potential to be the pioneers of new methods of designing; this time in the virtual world.

One expert who is familiar with the potential for digital architecture is Eden Greig Muir, director of Computers, Graduate School of Architecture, Planning, and Preservation at Columbia University and founder of Cybersites Inc., a firm that creates unique virtual communities.

"The new generation of students have skills in video, web design, animation, and interactive multimedia. They are using 3-D design as a real working environment for inventing form and space. That is their new habitat," says Muir.

Muir feels the question of an emerging architectural language is related in many ways to the new tools available. These tools include numerically controlled milling of building components and stereolithography, which builds any shape as a plastic replica using a polymer resin and a laser beam.

"These technologies take us directly from the virtual 3-D model to the built form," says Muir. "Economical automated construction of customized designs is on the horizon, beginning with components such as windows, furniture, and modular homes, and leading to full-scale production of architecture of previously impossible complexity benefiting from direct architectural

control by a new generation of 'digital master builders.'"

This advancement is not without repercussions. "It's interesting that the technical vocabulary of young digital designers is already separating them in many ways from older architects," adds Muir, referring to terms such as NURBS (Non-Uniform Rational B-Splines) and procedural textures. NURBS-based tools provide the designer with an amazing amount of control over the geometry of curves, via

"weights" and "knots" which can be pushed and pulled. "This means talented young architects can leapfrog past their elders into new areas."

Unfortunately, these new terms and techniques replace older skills.

"Sadly, I think they will lose the skill to draw, and this is already apparent," says Muir. "The best students can still work on a conceptual sketch, but they don't have the time to practice those skills."

The 3-D design process has been adopted by recent Columbia

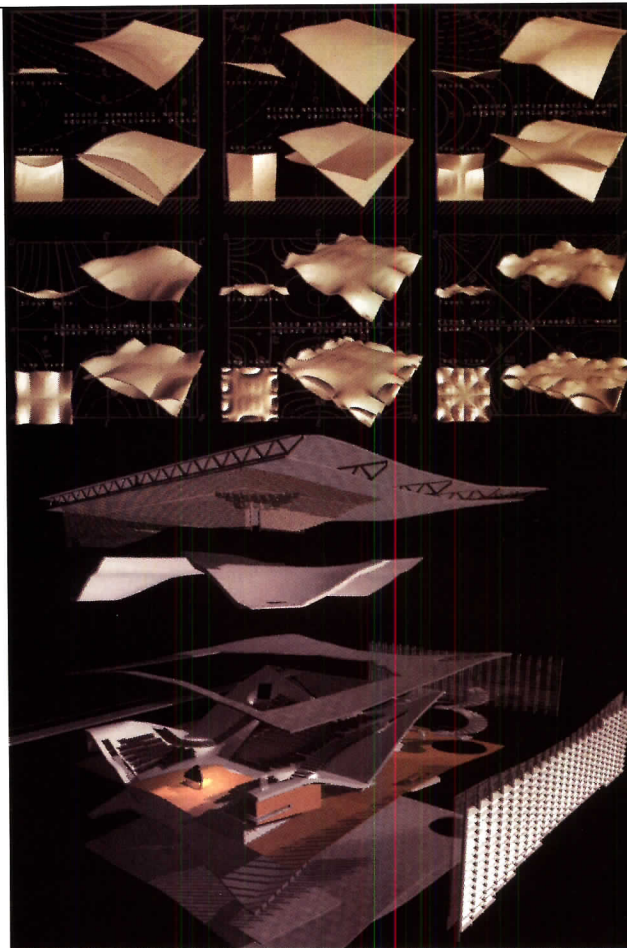
graduate student Joseph Kosinski. Last year, in Victoria Meyers' studio at the GSAP, Kosinski designed a proposed music performance space for the University of Minnesota, Duluth. The project entailed the development of a spatial concept through interactive manipulations in a 3-D animation environment.

The catalyst for this project, Kosinski explained, was a series of topographical diagrams developed in the 18th century that attempted to describe, two-dimensionally, the deflection of rigid plates subjected to vibrations such as sound waves. With the aid of a 3-D computer modeling program (form*Z 3.1 by Auto*des*sys), he was able to transform these diagrams into 3-D surfaces (top). "At that point, it was a matter of working the program into this formal study. In the end, it's as if the building responds to the program within."

In addition to defining the program, which included a 450-seat performance hall, a lobby space, and a rehearsal room, the plates also work tectonically, supporting themselves as reinforced-concrete shells and creating the unobstructed space of the performance hall (bottom). But using new tools changes the intrinsic thought process of creating architecture, explains Kosinski.

"Architects are now experimenting with the computer as a partner in the design process that helps generate ideas," he adds. "The architect almost acts as a programmer who sets up a system the computer then operates on."

Welcome to the 21st century. ■





Office Standards

by Charlie White, AIA

Last month, Sigma Design International introduced the next generation in emerging technology for the profession of architecture – ARRIS 2001. One of the most important features of this new technology is an easy to use interface for architects to develop and establish office standards for their firm's CAD environment. Strong office standards are an essential part of being productive and efficient with your work on the computer.

The best vehicle in our profession for streamlining the redundant tasks of our daily routine is the computer. Establishing good office standards can greatly reduce the time required to produce working drawings and at the same time increase consistency and improve communication. It is important that everyone in the firm understands and uses the office standards in order to keep the entire project team on the same page. Ultimately, this results in increased profitability for the firm.

Unfortunately, most architectural firms do not have effective office standards. Recently, we have been consulting with an architectural firm who is working in a joint venture on a multi-million dollar project here in the U.S. The architectural firm they are working with is one of the most renowned and respected design offices in the world. Our client is producing 40% of the drawings for the project and contacted the design firm to coordinate office standards for the project in order to work together more efficiently and minimize compatibility issues. Much to our client's surprise, the design firm informed them that they had no established office standards for their CAD environment. None! There is no way that the design firm mentioned can be utilizing their computing solution effectively.

Unfortunately, this is a typical scenario for our profession. In developing ARRIS 2001, we tackled the all-important issue of how to create effective standards in your CAD system that can be easily adopted by everyone on the project team. Only ARRIS 2001 delivers powerful new tools that make it easy to create a standard and then catalog that standard in an easy to use visual pager. Nothing could be simpler or more effective.

The majority of software systems used in architectural offices today are incapable of utilizing the more advanced technologies that are emerging. You will be changing the way you work soon. There are simply better systems available to do your work. Architectural solutions such as ARRIS 2001 dramatically affect the productivity and ease of use of technology by your staff. Most importantly, these advanced systems can have a significant effect on the bottom line profitability of your business.

Call me and let me introduce you to ARRIS 2001 and how it can help your firm move into the new millennium.

ARRIS Success Story

The Banana Republic Chicago on North Michigan Avenue was designed by McCall Design Group of San Francisco. McCall is a multi-disciplined 50-person firm emphasizing the collaborative process in forming creative solutions to clients' design and building needs.

Utilizing planning and design research to understand each client's unique needs, McCall Design Group is committed to providing the highest level of personalized customer service.

The firm practice centers around a team approach to project delivery. Each team is responsible for its projects throughout all phases of the design and construction process. In addition to using the traditional techniques of sketching, drafting, rendering, and model making, McCall makes extensive use of the newest and most powerful computer systems available for architectural applications.

Hardware includes PCs, Sun Microsystems SPARCstations, and Silicon Graphics workstations organized into a firm-wide network utilizing the Unix operating system and extensive graphics applications by Sigma Design. ARRIS' efficient database and file structure coupled with the Unix network allows every staff member to collaborate and share up-to-date information effortlessly. Use of the Internet and direct dial modems allows the firm to transfer electronic data, including drawings, to clients and consultants across the country and internationally.

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