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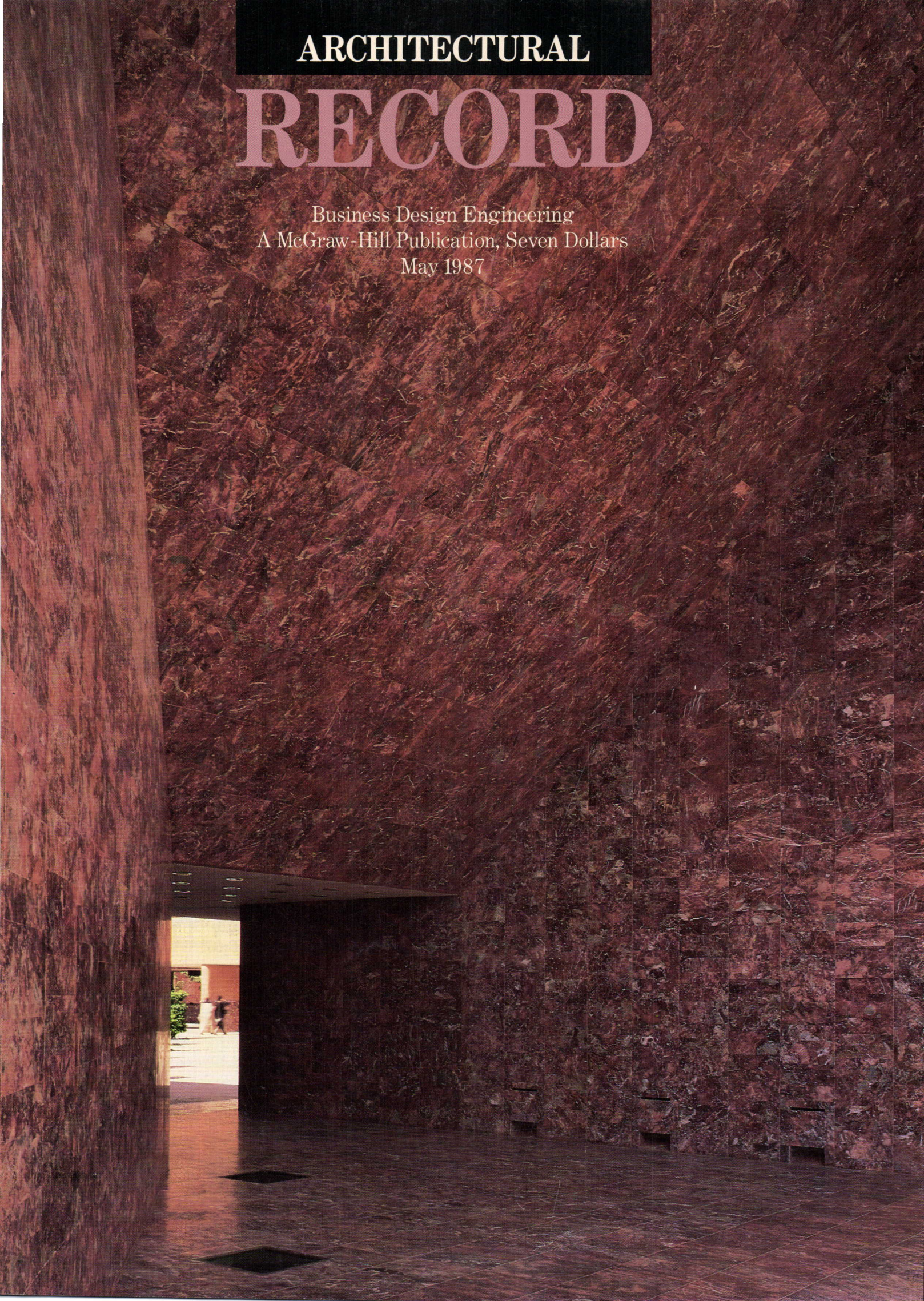

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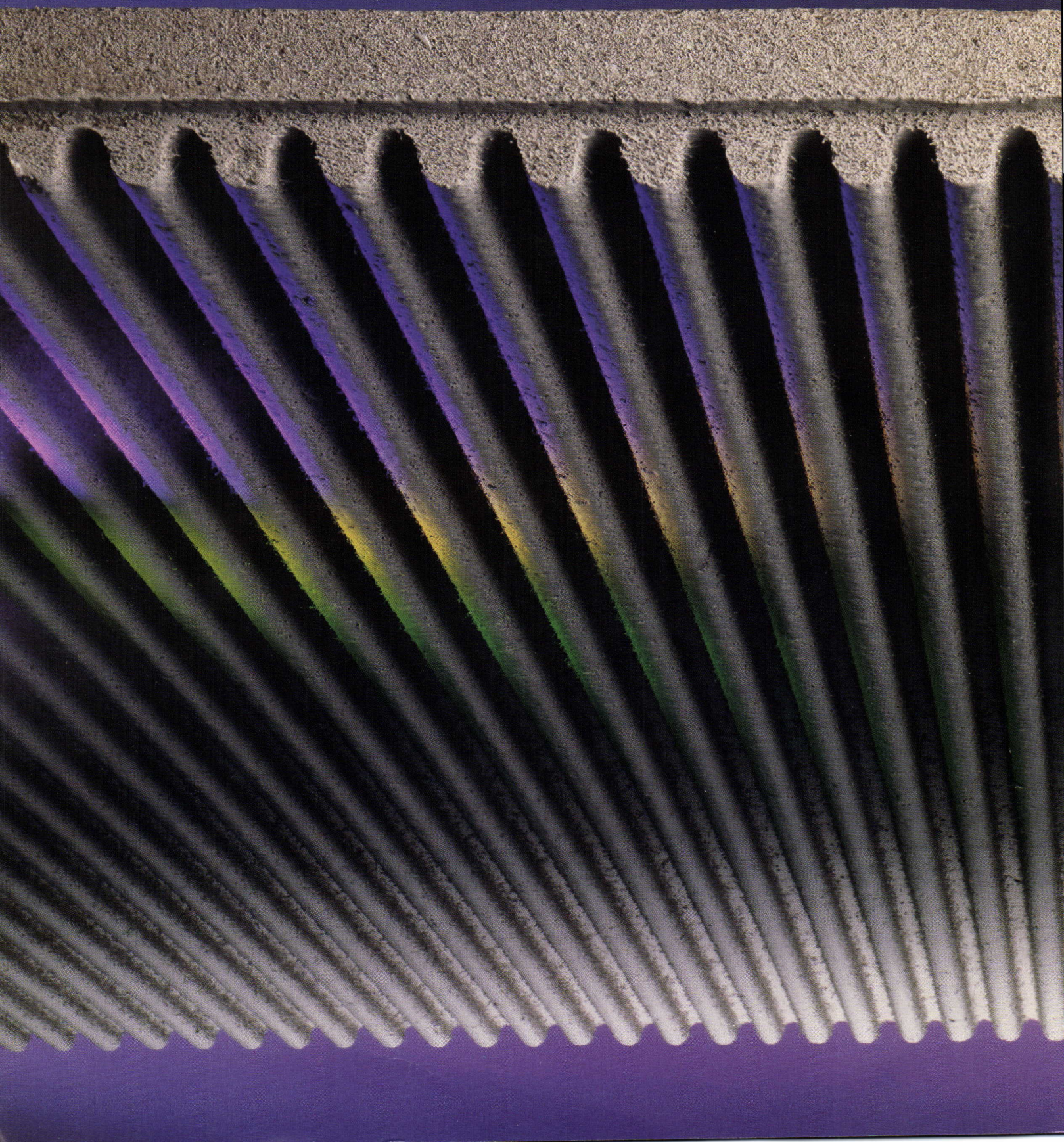

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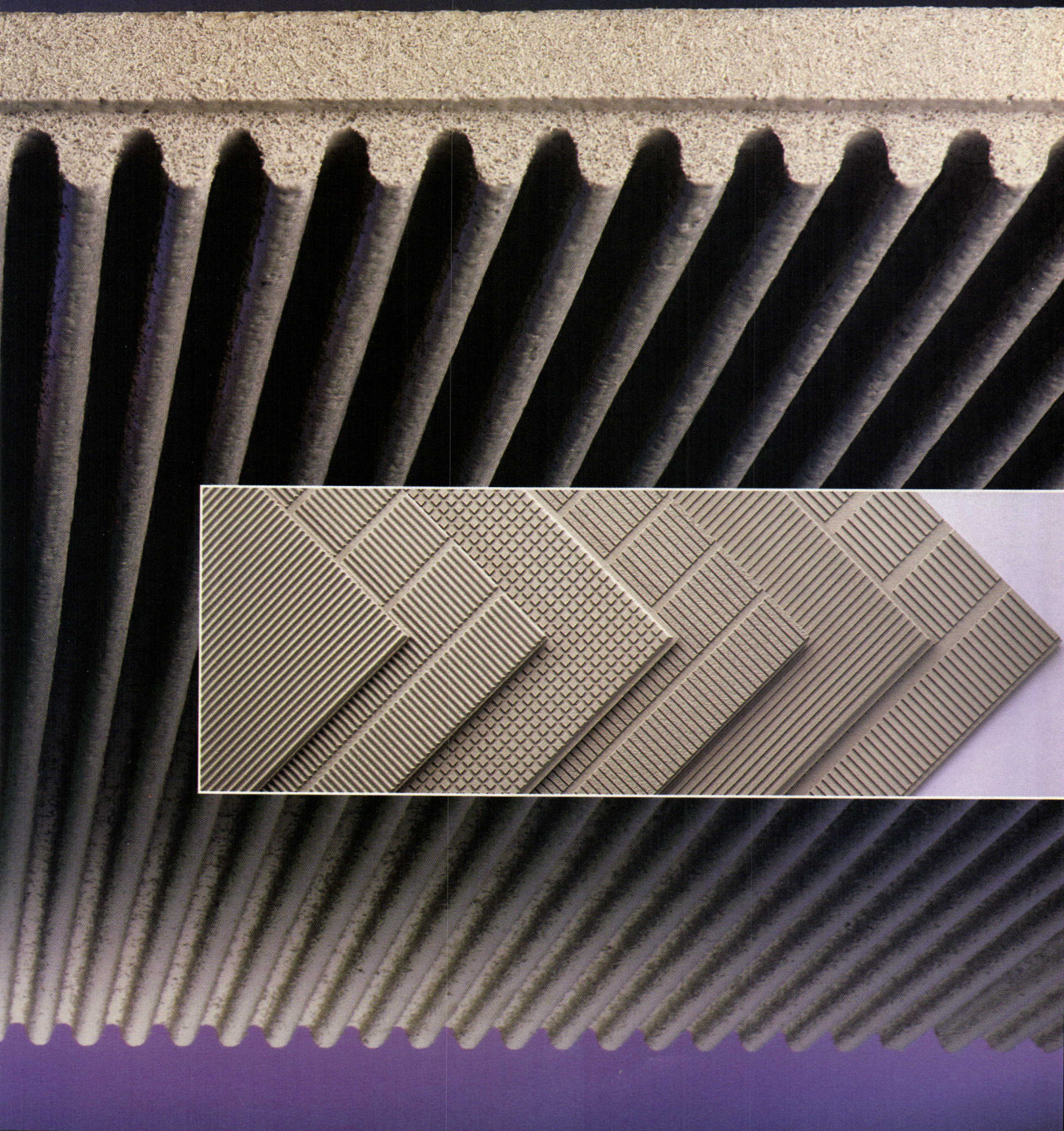

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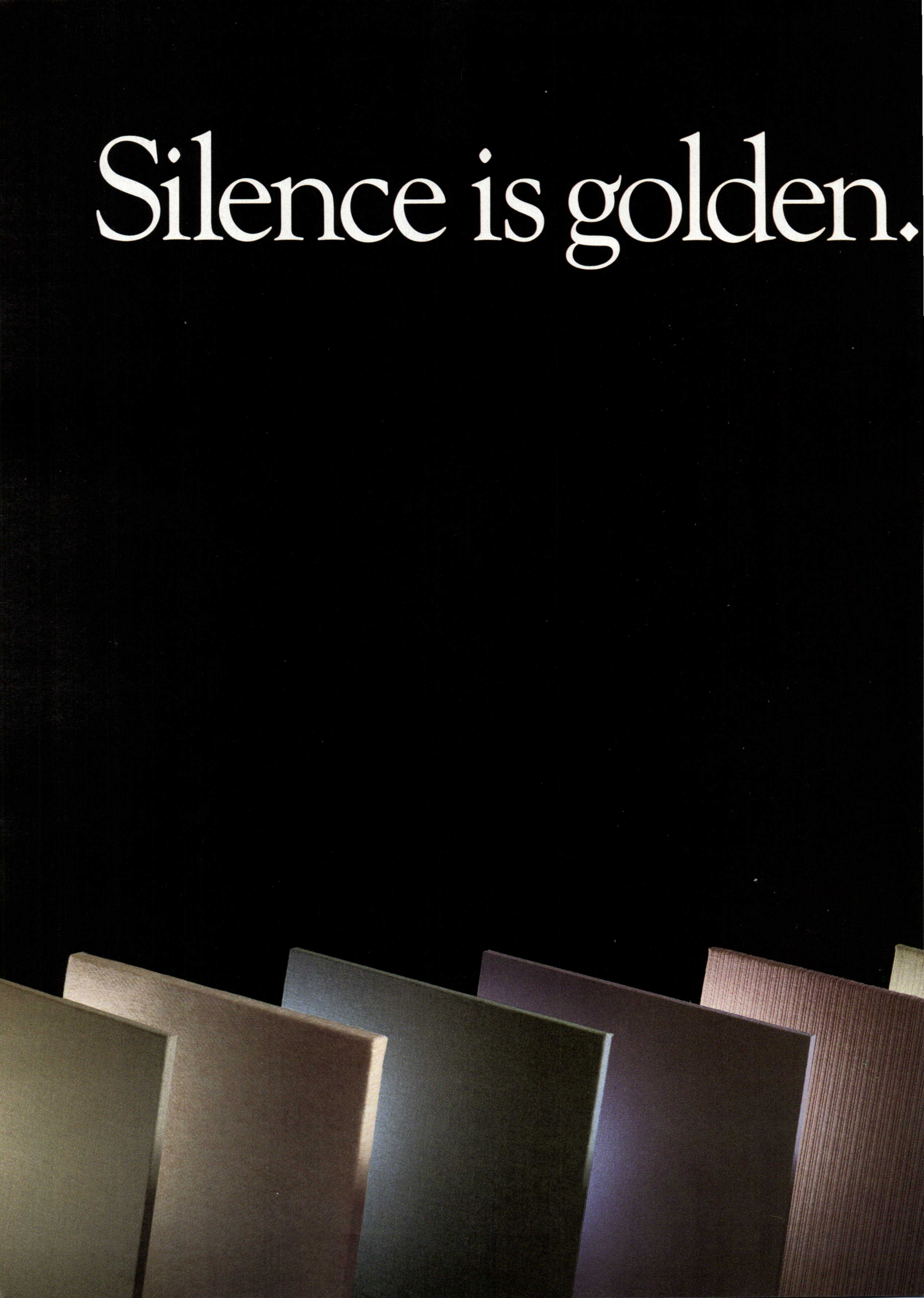

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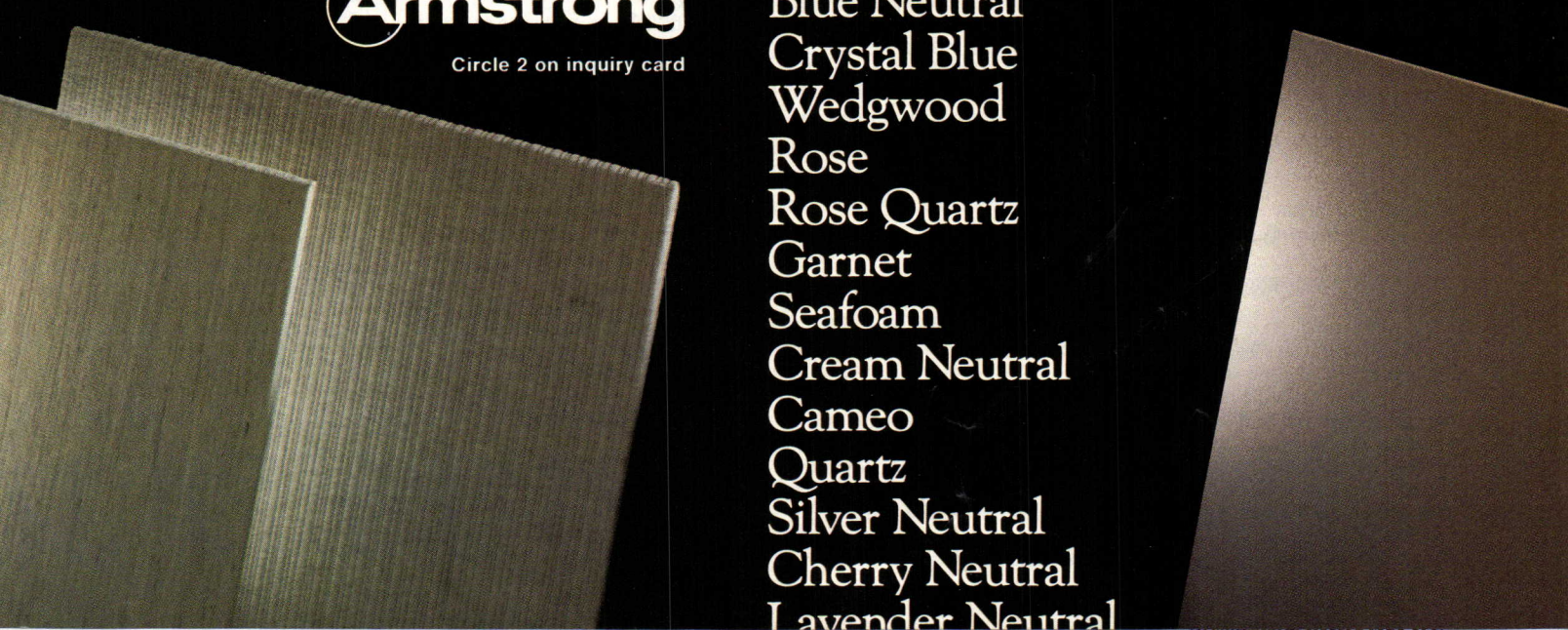

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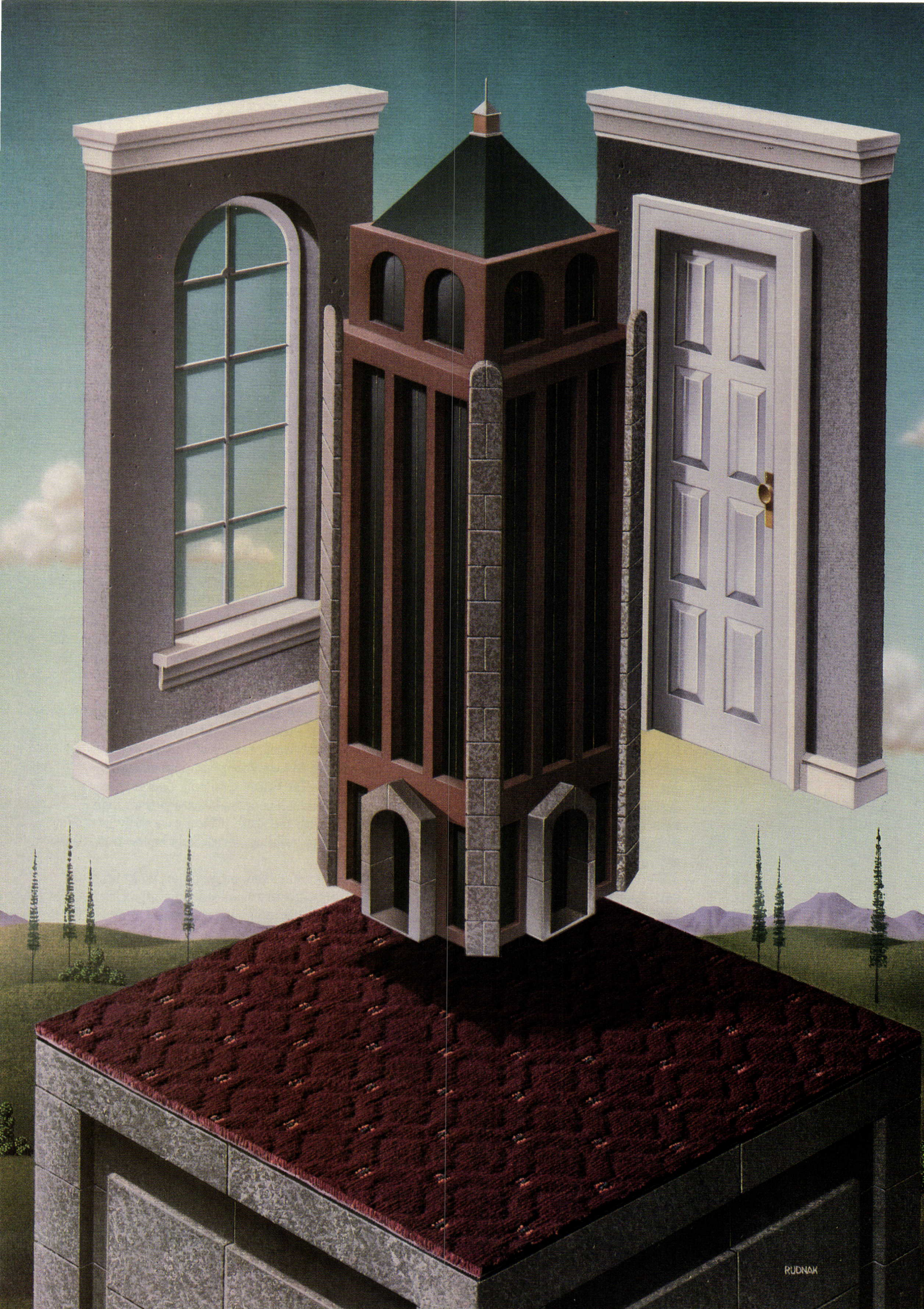
The apotheosis of the atrium

In the article "Hvac systems: In pursuit of comfort" by Ivars Peterson in this month's Engineering section, a passing reference is made to the fact that the hvac system in Helmut Jahn's much-talked-about State of Illinois Center in Chicago is not working too well. This circumstance, while of course serious, is fixable. Not fixable, and the subject of intense debate, is the quality of the architecture itself, and its uses of mixed use. Among the questions is whether the Center's 18-story, skylit atrium/rotunda, encircled at the lower three levels with shops mixed with public-access state functions, has too much in common with a shopping mall to be the principal architectural feature of a major civic building. The current issue of the magazine *Places*, published by the MIT Press, addressing the architecture of the building as a whole, asks whether this bold and singular edifice "is a place, of the place, or out of place," and finds answers from a small consortium of architect/critics, including Stanley Tigerman (who almost likes it), and Donlyn Lyndon (who doesn't).

First Tigerman: "Perhaps what galls most people is the mixed-use concept for a public building in which civic functions are blended with a Western-style capitalistic retail presence. Certainly the glitzy way in which retail shops are presented suggests so much importance to commodities as to infer a suppression of the very presence of the state itself .... [Furthermore], we have such an overwhelming gridiron tradition in Chicago (both on our land and imprinted on the facades of our buildings) that the presence of an object so blatantly disrupting both the frames is very likely to evoke feelings of loathing toward the author of such an intrusive presence ... but think about the terminally boring, dirt gray, albeit tasteful alternatives conventionally employed in any other metropolitan building in recent Chicago tradition. It is amazing that the Illinois body politic commissioned and then approved this strange lump of a building and, to its credit, the resulting structure suggests that indeed there is hope for some kind of future after all ... it just goes a bit further than contemporary taste can quickly adjust to, thus the state of anxiety connected with the object in question .... That whim and wit can find their way into an agenda connected with public building suggests that an Orwellian option is not yet upon us ...."

Lyndon, after calling the building's large glass-walled and roofed rotunda atrium a "launching platform awaiting its missile," describes it as a design for "the era of consumers having fun. Urban life here and elsewhere has been conceived by the Entrepreneurs of Environment as an extended lunch hour, a pageant of casual encounters and festive shopping, with evocative environments cast around in evident unseriousness .... [The State of Illinois Center] has no designated meanings; it is instead a memorable form to which people will attach their own associations, a framework that they are free to fill out with the stuff of their own daily lives. Yet on this scale, and with the weight of significance the state building necessarily bears, this seems not enough."

Were the building to have been more than a glorified atrium/shopping center, what might it have been like? What symbolic meanings should inform a government building appropriate to its place in today's public realm? In Lyndon's words, such a building should "refer beyond itself if to nurture a common bond for its citizens is a part of its intent .... What we wish to know and learn, what we wish to encounter are qualities of mind and sympathy, to observe how others deal with each other, to learn of their works, to recognize lineage and invention, to be made aware of qualities that we might emulate or recommend unto our children. We wish, in fact, to find through our encounters with the public some forms of ethical thought." What would such public spaces be like? Lyndon does not show us a model, but instead tells us what such spaces should do. They should make us believe that individuals are important, "remind us of the thoughts and considerations our predecessors have given to similar circumstances ... embellish our perceptions of space, serve as discernible landmarks in the construction of our public persona, [and] intimate that there is importance in times that will follow." A tough but challenging and worthwhile agenda for today's architects of civic buildings, but also for the many architects who seem to find in the multistory commercial atrium the universally appropriate centerpiece for almost every conceivable building type. The State of Illinois Center, whatever its esthetic merits, has helped focus the argument. Does a glitzy shopping center atrium belong in a government building? Tigerman: Why not? Lyndon, more profoundly: No. *M.F.S.*


RUDNAK

Real-estate interests push for national housing policy

"We are asking the federal government to commit to a set of guidelines that would help the American dream of home ownership become a reality for more families and individuals."

That's what William M. Moore, president of the National Association of Realtors, and other influential association heads representing real-estate interests—James M. Fischer Jr., president of the National Association of Home Builders, and Thomas M. French Jr., president of the Mortgage Bankers Association of America—recently said they hoped to see in the way of enabling legislation.

They agreed that a broad spectrum of issues needed to be addressed in areas such as housing finance, tax policy, and the cost and availability of low- and moderate-income housing.

Fischer pointed out that the impetus for the group's drafting of the joint policy proposal came from a belief on their part that the federal government must give housing the priority it deserves. Moore noted that the nation's rate of home ownership among, for instance, those in the 23- to 34-year-old age group fell from 55 percent in 1980 to 47 percent in 1985.

Informed observers find the association heads' demands rather modest. And, because of the heavy clout their organizations have, it is thought they have a reasonable expectation of seeing what they have in mind become law. A Senate bill incorporating all of the real-estate leaders' ideas has indeed just left the banking committee with full approval.

The specific guidelines the real-estate leaders proposed are:

- A permanent extension of the Federal Housing Administration's operating authority. Currently, FHA functions at the pleasure of Congress, which closed it down six times in fiscal 1986 while trying to attach its annual reauthorization to other bills.
- No new or increased user fees in the future for FHA, the Government National Mortgage Association, the Federal National Mortgage Association, and the Federal Home Loan Mortgage Corporation.
- Authorization of the Fair Housing Initiatives Program. Proposed by the Reagan administration, the two-year demonstration program would establish guidelines and use them to check that realtors do not steer members of ethnic groups to particular neighborhoods.
- A permanent authorization to purchase second mortgages for both the Federal National Mortgage Association and the Federal Home Mortgage Corporation.

Don't litigate, mitigate

In an effort to counter rising liability costs, a new Construction Mediation Service is being sponsored by the AIA, the American Consulting Engineers Council, the American Society of Civil Engineers, and the National Realty Committee. A fifth sponsor, the Center for Dispute Management in Washington, D. C., is the administrator for the program, which is currently effective in Maryland, Virginia, and the District of Columbia.

In explaining his organization's support for the service, ACEC president Daniel Barge underscores the futility of dragging construction disputes through the courts: "Nearly 40 cents out of every insurance-premium dollar goes to paying for the lawyers involved, while 80 percent of the cases against design professionals results in no payment by the insurance companies for indemnity. Something has gone wrong."

"The service offers immediate relief," says NRC president Wayne Threvenot. And CDS director Linda Singer adds that the service has already resolved in record time a protracted dispute between a developer and several citizens' groups in the capital. Says insurance-company executive Paul Genecki, vice president of Victor O. Schinnerer, "We obviously want to help design professionals regain control over liability to the extent they can. If mediation proves to be the way," he concludes, "we intend to find out and support it."

ACEC president-elect Lester Smith notes that another major insurer, the DPIC Companies, reports that, of some 280 cases it sent to the mediation table, some 250 were settled in this amicable manner. He sees the service as a model for others across the country.

FMG spring meeting set for this month in San Francisco

The Financial Managers Group, a national association of financial managers in the design profession, is set for May 22 in San Francisco. Participants will work with mutual problems to effect solutions through the dynamics of group effort under leader Michael Hall. For information, contact FMG executive director Michael Sturdivan in Oklahoma City by calling 405/848-1111.

New AIA contract documents reflect current standards and problems of practice

The American Institute of Architects has just released 12 revised standard-contract documents that reflect changes in the relationships among architects, owners, engineers, and consultants during the last decade.

Since 1976, architects have been working with the same edition of A201, for example, which governs the contractual ties between owner and contractor but also affects the architect. A101, the standard owner/contractor form for a contract containing a stipulated sum, was last revised in 1977.

AIA president Donald J. Hackl says it shouldn't come as a surprise that the institute is making these changes: "The great strength of these documents is that they reflect industry-wide consensus and are considered fair and equitable as to how design and construction should be effected." He adds, "Clearly, both have changed in the last ten years, and our new documents reflect these changes.

"For example, owners are asking for new and different services from both the architect and the contractor," says Hackl. "The documents have been revised to facilitate the delivery of these services and to allow for appropriate compensation for carrying them out."

A201, for example, now contains an expanded provision governing architects' review of shop drawings. It now requires that "the architect be given sufficient time in his or her professional judgment to conduct an adequate review." At the same time, new language specifically excludes the need to check details that are the responsibility of the contractor. It also simplifies and streamlines provisions on arbitration procedures.

B141, covering owner/architect relations, clarifies what architects are to be compensated for in terms of additional services. Two other new sections of that document now require the owner to furnish hazardous materials' tests at his expense and also specify that the architect has no responsibility for the discovery, removal, or disposal of toxic or hazardous substances encountered at the site. Also new is language that the architect may terminate the agreement if the owner fails to pay the design fee or abandons the project for more than 90 days, and that computer-aided drafting is now on the list of reimbursable expenses.

B141 also now notes that preliminary drawings—which, unlike contract drawings, previously were not specifically protected as the architect's property—now are covered as well.

Peter Hoffmann, World News, Washington, D. C.

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Construction economy outlook: Winding down the up cycle

By George A. Christie

Some measures of construction activity show that cyclical decline is already underway. Other measures are saying that decline is imminent, but hasn't quite happened yet. Which measures should you believe? All of them. Like the proverbial ocean liner, the construction market takes plenty of time turning around.

Contracting for new construction—the industry's leading indicator of its future health—reached a peak almost a year ago, in the first quarter of 1986, concluding four years of continuous expansion. During the second half of last year, as the volume of new-project starts slackened, measures of *ongoing construction* activity (construction put in place, shipments of building products and materials, employment in construction) began to stabilize, indicating that indeed there was a turnaround and it had reached its second stage.

As more of last year's high volume of newly started work is brought to completion, this year's diminishing flow of new projects that replaces it will bring the third and last stage of reversal—a shrinking inventory of *construction work in progress.*

Every decline has its own particular characteristics

Whether you look at the construction market regionally or by building type, it is apparent that the decline of construction contracting since the first quarter of 1986 has been selective rather than across-the-board. So far, the weakness has been confined largely to the South (where construction declined by 5 percent) and the West (where construction declined by 4 percent). By contrast, the Northeast and North Central regions were still holding even with last year's peak rate of construction contracting through the first quarter of 1987.

A comparison of building types shows a similar mixture of weakness and strength. Two categories—commercial/industrial building and multifamily housing—led the market into cyclical decline in 1986. At the same time, institutional building and public-works construction made small gains. Most important, the building of single-family houses flourished in last year's environment of falling mortgage rates.

The early months of 1987 brought more of the same. Total construction-contract value continued to shrink in the first quarter as public-works projects joined the casualty list, but sustained strength in the building of houses still made the difference between a gentle letdown and something worse.

First-quarter-1987 contracting data are as significant for what did *not* happen as for what did: Anyone looking for the sudden collapse of commercial building because tax reform took effect at the beginning of the year won't find it in January's and February's statistics. That's because the adjustment to the new tax code has been taking place all through the past year in the form of steadily diminishing construction—especially of offices. And there's more to come.

The play of offsetting positive and negative forces at work in 1987 will limit the decline

The outlook for construction activity in 1987 and beyond concerns a balance of opposing market forces:

- *The politics* of the marketplace are repressive. Last year's legislation mandating tax reform and deficit reduction has altered the environment for commercial building and for public-works construction. All of this requires an adaptation to a new austerity for these two building categories. Besides that....
- *The economy's future* is shaky. Forecasts that extend last year's 2.5 percent real growth through 1987 rest upon bold assumptions about a reversal of trade that may be unrealistic. The options: at best, more substandard growth; otherwise, stagnation. On the brighter side....
- *Interest rates* are likely to remain near their low current level for at least another year. As we all should know, no other single influence on construction activity is as important as the credit that fuels construction of all types. In addition....
- *Demographic support* is emerging for certain categories of building. The '50s generation has reached the age of home ownership, and the children of that generation are entering school, increasing the demand for both housing and schools.

These are some of the events that will mold the contour of the other side of the building cycle. In Dodge/Sweet's most recent *Construction Economy Outlook* (RECORD, October 1986, pages 35 through 43), it was concluded that offsetting positive and negative market forces at work in 1987 would limit the decline of total construction—in constant dollars—to approximately 5 percent below the 1986 peak. An estimated 3 percent rise in construction cost this year would hold the loss to only 2 percent in current dollars.

The evaluation still stands, although 1987 will be only the beginning of a period of cyclical decline that will be seen to span several years.

The element of risk might cause us to group construction categories most properly in an unconventional way

A 2 percent decline from the 1986 peak of construction contracting doesn't sound very threatening. It must be appreciated, in this, that a relatively thin slice of the construction market (comprised of those who previously benefited most from tax shelters) will bear a very large part of the decline.

At the same time, as much as half of total construction activity will be supported at or above its 1986 level of contracting—as long as interest rates remain reasonably steady. The rest of the construction market (approximately one-fourth) doesn't have a convenient label such as "tax-sheltered" or "credit-sensitive." For a variety of reasons, as we shall see, this remaining group will be showing a moderate decline in 1987.

This unconventional grouping of construction categories (in place of the usual classifications of nonresidential, residential, and non-building) offers the advantage of being able to sort out those building types with risks as opposed to those with potentials.

The high-risk group consists of those building types that will have to adjust to the realities of the marketplace without tax breaks

The two categories of construction most affected by tax reform—offices and apartments—have already revealed their vulnerability. These "tax-shelter" markets, both vastly overbuilt during the five years following the Economic Recovery Tax Act, reached their peaks in 1985.

Even before tax reform brought the arithmetic of real-estate development back to reality, soaring vacancy rates had ordained the boom's end. In 1986, contracting for offices declined 13 percent, and multifamily housing was cut back 6 percent.

It was only the beginning. Because the reduced 1986 levels of contracting for offices and apartments were still much too high to make a dent in the oppressive vacancy rates that prevailed in those two markets, the rates still prevail and further contracting declines are needed to restore a supply-and-demand equilibrium that will be appropriate to the post-ERTA period.

It is expected that contracting for office building, which declined from its 1985 peak of $24.9 billion to $21.8 billion in 1986, will ease another 18 percent in 1987 to $17.8 billion, on its way to a low of new contracts of about $13 billion by 1989.

Continued on page 41

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1987 National Estimates
Dodge Construction Potentials

First Update March 1987

		1986 Actual	1987 Forecast	Percent Change 1987/86
Nonresidential Buildings				
Floor Area (millions of square feet)	Office Buildings	285	225	−21
	Stores and Other Commercial	572	525	− 8
	Manufacturing Buildings	142	140	− 1
	Total Commercial and Manufacturing	999	890	−11
	Educational	117	115	− 2
	Hospital and Health	73	72	− 1
	Other Nonresidential Buildings	142	143	+ 1
	Total Institutional and Other	332	330	− 1
	Total Nonresidential Buildings	1,331	1,220	− 8
Contract Value (millions of dollars)	Office Buildings	$ 21,768	$ 17,825	−18
	Stores and Other Commercial	22,975	21,775	− 5
	Manufacturing Buildings	6,548	6,700	+ 2
	Total Commercial and Manufacturing	$ 51,291	$ 46,300	−10
	Educational	$ 10,565	$ 10,800	+ 2
	Hospital and Health	7,810	7,900	+ 1
	Other Nonresidential Buildings	11,869	12,200	+ 3
	Total Institutional and Other	$ 30,244	$ 30,900	+ 2
	Total Nonresidential Buildings	$ 81,535	$ 77,200	− 5
Residential Buildings				
Dwelling Units (thousands of units*)	One Family Houses	1,082	1,130	+ 4
	Multifamily Housing	737	585	−21
	Total Housekeeping Residential	1,819	1,715	− 6
Floor Area (millions of square feet)	One Family Houses	1,730	1,803	+ 4
	Multifamily Housing	719	570	−21
	Nonhousekeeping Residential	100	89	−11
	Total Residential Buildings	2,549	2,462	− 3
Contract Value (millions of dollars)	One Family Houses	$ 83,219	$ 89,525	+ 8
	Multifamily Housing	30,615	25,200	−18
	Nonhousekeeping Residential	7,281	6,700	− 8
	Total Residential Buildings	$121,115	$121,425	—
Nonbuilding Construction				
Contract Value (millions of dollars)	Transportation Construction	$ 25,110	$ 24,150	− 4
	Environmental Construction	13,860	14,325	+ 3
	Total Public Works	$ 38,970	$ 38,475	− 1
	Utilities	$ 2,107	$ 2,000	− 5
	Total Nonbuilding Construction	$ 41,077	$ 40,475	− 1
All Construction				
Contract Value (millions of dollars)	Total Construction	$243,727	$239,100	− 2
	Dodge Index (1982 = 100)	155	152	

*F.W. Dodge basis.

Prepared March 1987 by the Economics Department of the McGraw-Hill Information Systems Company, George A. Christie, vice president and chief economist

Similarly, multifamily housing, which retreated from its 1985 peak of $32.6 billion to $30.6 billion in 1986, will decline another 18 percent in 1987 to $25.2 billion. One more year (1988) at this reduced level of contracting should eliminate most of the surplus apartment space now on the market.

Supportive safe markets will take up some, but not all, slack

For the time being, several important construction markets—including single-family housing, institutional buildings, and environmental construction—will remain supportive in the sense that their exposure to decline in 1987 is minimal. Their potential for increase is also very limited, however. The trade-off between this group and the high-risk group, which worked so well in 1986 to keep total construction activity expanding, will still be working in 1987, but not as well.

Last year, the best part of the construction business to be in was the building of single-family houses. (The best place to do it was in Southern California, which was the locale of three of the nation's top ten house-building cities.)

As contracting for commercial building sagged, single-family housing—the biggest of all the building markets—responded to favorable credit developments with a 20 percent increase in volume. Falling mortgage rates attracted more than $14 billion of new construction demand in 1986. With such high volume, it was easy enough to cover the $5 billion decline of offices and apartments.

But in 1987, when office and apartment building is expected to skid another 18 percent, single-family-house building will be hard-pressed to come through with another gain the size of last year's. Even with the support of lower mortgage rates and strong demographics, the 1987 potential for single-family housing is more like a gain of 5 to 10 percent than last year's 20 percent.

Institutional building (schools, health facilities, public-administration buildings) has been one of the pleasant-surprise markets of the 1980s. Driven by demographics (school-age kids and oldsters, mainly) and financed by bonds (not much direct federal funding anymore), institutional building has emerged from a long period of dormancy.

With rising births (an echo of the 1950s baby boom) and falling interest rates both reinforcing the educational-building market, total institutional-construction contract value has grown by more than 50 percent since the beginning of the 1980s—from just under $20 billion to its current $30 billion annual value. In 1987, when federal deficit reduction (especially the cancellation of revenue sharing) indirectly adds stress to state and local government finances, temporary stability of contracting rather than continued expansion is the short-term outlook for this category of building.

Prospects for environmental construction (water resources, waste-water-treatment facilities) have brightened as a result of recent Congressional action. One of the first priorities of the new Congress was to reintroduce the Clean Water Act which had been vetoed by the President between sessions. Overwhelming Congressional support for this program assures a continuing flow of federal construction grants from the Environmental Protection Agency for the next several years while the transition is made to a revolving-loan program.

Only a few months earlier, the previous Congress enacted the first major water-projects bill in ten years, authorizing a total of 262 new Corps of Engineers projects with a combined value estimated at $16 billion. The appropriation of federal funds on a year-to-year basis is on a collision course with deficit-reduction targets, however. There is bound to be considerable resistance to federal funding of public works by the Administration (which would opt for "user fees" and "local determination"), but the new solidarity of the Congress suggests that priorities concerning public-works construction, at least, have taken a subtle change for the better.

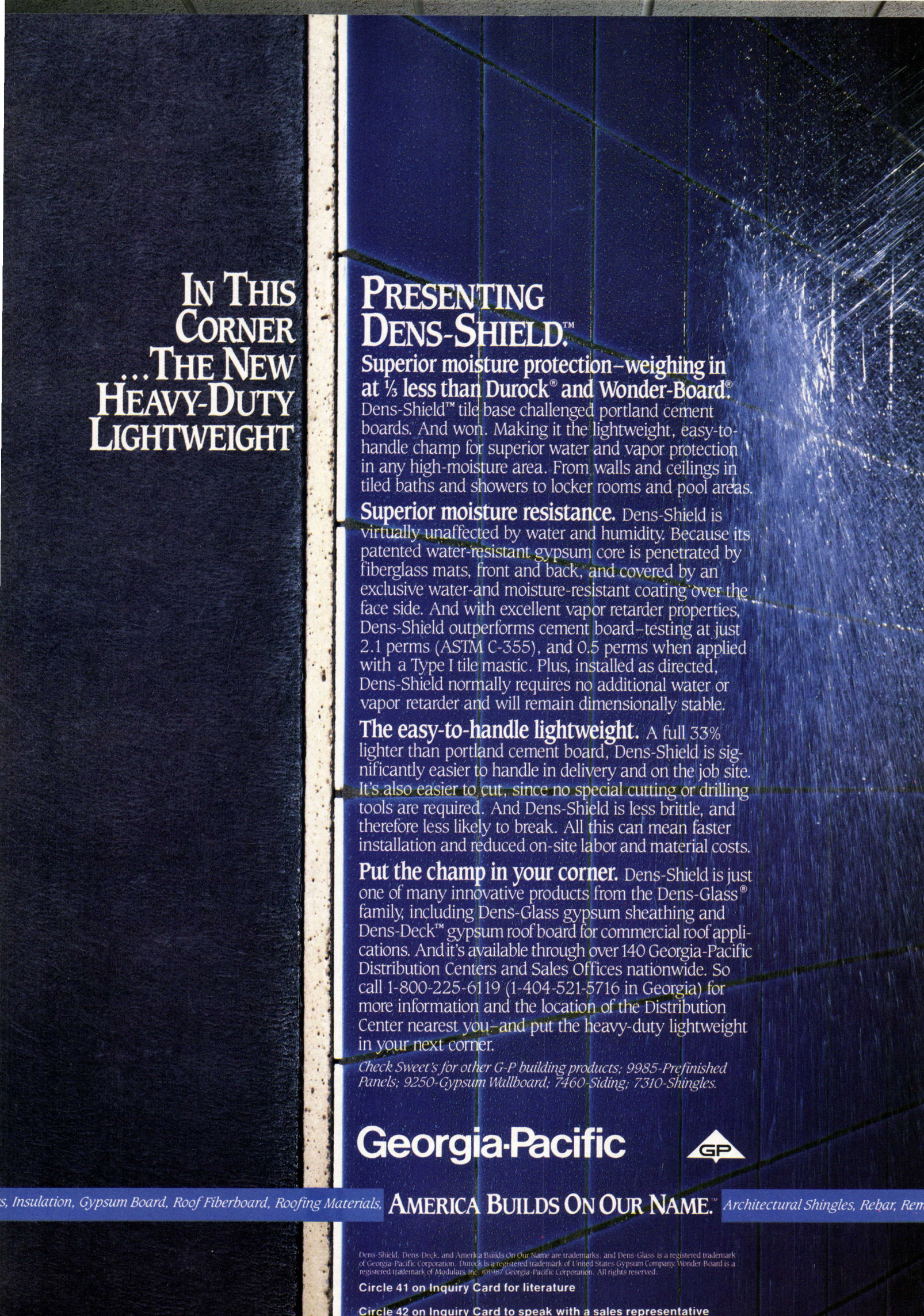
Industrial construction merits inclusion among the "safe" building markets for 1987 only on the grounds that contracting isn't likely to sink any lower than its already depressed level. Recovery, which depends on improving trade balance to take up slack capacity, may be two years away.

The "other" group is as varied as the reasons for this group's projected modest decline

The components of a third group of building types—retail buildings, hotels and motels, and transportation construction—have little in common except for the prospect of a 1987 decline of modest proportions.

Retail building is closely linked to the housing market. As is usually the case, strength in residential building, combined with general economic expansion, induced a high level of retail construction during the mid-1980s. And now, as housing starts recede in 1987 from their 1986

Continued on page 43



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Architectural education: Drawing the line—graphics should clearly communicate design

In this age of CAD, it is refreshing to find that the strong symbiotic relationship of architectural drawing and design is still being explored. Professors Porter and Dombek explain their experimental "Introduction to Graphics" course at Florida A & M in Tallahassee

By Tom Porter and George Dombek

Many forests have been pulped in the production of books that claim to teach architectural students how to draw. The vast majority of such books preach, not a drawing method that transmits any real visual image, but a "drawing-board style," i.e., an artificial language of spatial coding. Such books appear highly seductive to the unwitting student because, in presenting an easily imitated and superficial formula, they short-circuit any profound spatial experience, and give little understandable communication to outsiders.

The resulting pictorial stylism describes a world perceived through standardized eyes; a strange drawing-board world in which an often colorless, sometimes tinted architecture is hatched and scribbled against line and dot backcloths—whose bleakness is occasionally punctuated by stereotype automobiles and mass-produced trees, and peopled by odd, balloon-shaped beings. In adopting such a stylized form of expression, students can lose contact with reality, and may later misrepresent their design ideas to lay people; but, most importantly, they run the risk of impairing irreparably their own perception and design progress.

Mystery and secrets

Two major factors seem to be responsible for this sad state of affairs, and both are rooted in the evolution of the modern architect. The first concerns the historical background to the concept that the built environment can be preconceived by exclusively using graphics. Evidence of such a genealogy is threadbare and surrounded with mystery.

Tom Porter is Senior Lecturer in graphics and design at Oxford Polytechnic's Department of Architecture in England, and is currently visiting Associate Professor at Florida A & M University in Tallahassee. He is author of a number of books on graphics and color.

George Dombek is Associate Professor of graphics and design at Florida A & M University School of Architecture in Tallahassee. He is an architect and an established painter, with work represented in several museums and public collections.

For instance, it is now known that the ancient Greeks, and the Egyptians before them, had little or no use for any graphic overture to design; and, later in history, only scraps of information regarding a medieval design process have emerged from the secret societies, who were known to have killed before divulging their building-design secrets.

Later still, after his invention of perspective during the Renaissance, a guarded Brunelleschi was heard to reply to an inquisitive fellow artist, "Never share your inventions with many." Indeed, even our knowledge of orthographics emerged from the shadows of an 18th-century, French military top-secret file; the army, in recognizing the potential power behind physicist Gaspard Monge's development of projection drawing, immediately made it classified information.

Then came art for art's sake

The second factor behind the current situation is the gradual separation of "drawing" and "experience," a distancing that was triggered during the Renaissance, when a hitherto multidisciplinary designer-role eroded under the pressures of specialization, and caused the later re-emergence of new and discrete roles, such as those of "architect," "sculptor" and "painter." However, the architect has often been reluctant to relinquish the "art" of making pictures. Today, the 19th century *École des Beaux Arts* attitude to architecture as drawing and, in turn, architectural drawing as *objet d'art*, again recycles with the draftings of Graves, Krier, et al, changing hands on an international art market. One can even buy a signed Arata Isozaki in Bloomingdales!

Therefore, Tallahassee's School of Architecture has developed a freshman course that questions the convenient, but case-hardened and artificial, subdivision between graphics and design.

Design requires all the senses

In order to avoid any predictable cloning of a stereotyped architectural student, we have continuously emphasized the direct experience of space in the concept of each project. To initiate this experiment, students were blindfolded prior to each of a sequence of drawing and construction assignments. Before reaching for pen or pencil, they were required to "lose" their sight in favor of a preliminary exploration of objects and their environment, and to use the sensations of touch, smell, and hearing. Immediately, concepts of a tactile awareness and a haptic understanding of space were established, with the subtle awareness of bodily movement and its kinesthetic appreciation. Once sight was "restored," resultant drawings appeared as informed and invigorated perceptions. Inspired by the teachings of Johannes Itten, the culmination of these unsighted encounters used a massive, wall-mounted "tactile dictionary" that—in inviting physical contact—explored the three-dimensional scales of touch through roughness and smoothness, pleasure and "pain," together with those of plasticity and temperature.

Then, an anthropometric study saw the meticulous recording of individual class members as full-scale outline figure drawings—against which an elevational scale of related architectural dimensions was introduced, such as the heights of seats, worktops, knobs, and switches, etc. However, the latter were inserted after each had been first located and "tested" by the students while blindfolded. Apart from sparking a keen debate on the relativity of body contact points in the built environment, this project also challenged the tradition of making objective drawings at "sight-size," i.e., at a scale in which objects are perceived in the visual field. In other words, by introducing full-scale drawing exercises, we avoided more distancing between the experience and the experienced.

Ensuing environmental color studies replaced the traditional color circle by placing it within the spatial dimensions of hue, value, and chroma. To do this we asked students to "draw" its variables in space as an armature on which they inserted found color chips (culled from magazines) to realize a physical version of the spatial world of color. After flooding the "walk-in"-sized model with colored light, the inextricable link between color and light (all too often separated by design education) was established, together with the fundamentals of additive and subtractive color mixtures.

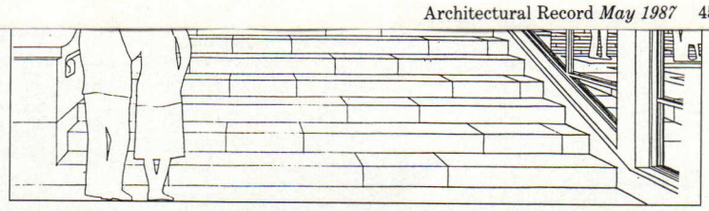
Drawing for 3-D communication

Our first "architectural" assignment continued our introduction to graphics as a reflex response to thinking "in the round." This took the form of a treehouse initially designed directly into the space of a branch that simulated the parent tree (one design is to be adapted for a tree site in a Tallahassee nursery school, followed by its post-occupancy evaluation). In extending a tradition of eyeballed design (that includes much of the architecture of antiquity, the construction of Nelson's flagship *H. M. S. Victory* and Herb Greene's "Prairie Chicken House"), the importance of the experience of design without the aid of drawing is stressed. Studies conducted at Oxford have found that many architectural students are preconditioned to a graphic process of organizing space that uses only the exclusive and familiar elevational extrusion of plans. To counter this, the tree house represented a raw and graphically uncontaminated design concept, from which students were later introduced to its orthographic and perspective translation—and again, these were produced as "full-size" drawings.

When we have focused on graphics, our input has concentrated mainly on accuracy and honesty. Also, the communication prowess of each drawing, such as its ability to span distance as well as hold up to close scrutiny, has been thoroughly reviewed. This approach necessitates some understanding of visual scanning patterns based on the Eye Movement Recorder research—with associated studies of compositional balance, focal point location, and the attendant orchestration of degrees of optical interest. In fact, in an age of highly competitive graphics, this aspect of our course is related more to advertising research than to the encouragement of either graphic formulae or drawing as an art form.

The results of this experimental year are most refreshing, and are to be documented in a new book. We believe that this approach is in good company, because any review of those whose talents transcend the codified, drawing-board style—such as Antonio Gaudi, Frank Lloyd Wright, and Mies van der Rohe—discloses that all had an early taste of working materials directly into the space of their ideas. Others, such as Eero Saarinen and Louis Kahn, also realized the strict limitations of a graphic representation, because—in the face of more complex ideas—they supplemented drawing with a three-dimensional expression. All of those designers were also master draftsmen, and are remembered both for their architectural contributions, and for their personal, creative and, above all, nonconformist graphic skills.

faced Neo-Classicism of the existing building nor establish a dissonant language all its own. Instead, the combination of old and new seems respectful, yet idiosyncratic enough to hold its own amid the visual cacophony of Trafalgar Square.
K. D. S.



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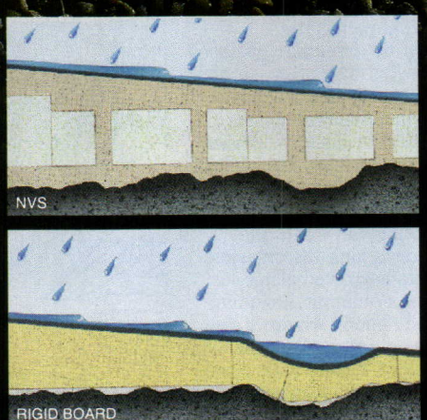

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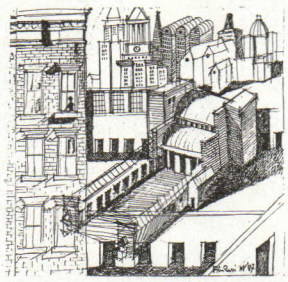
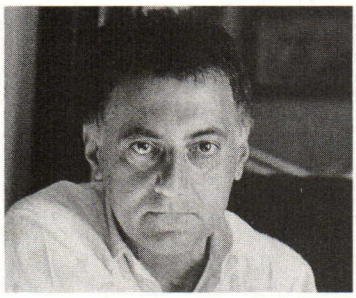
Aldo Rossi makes his American debut



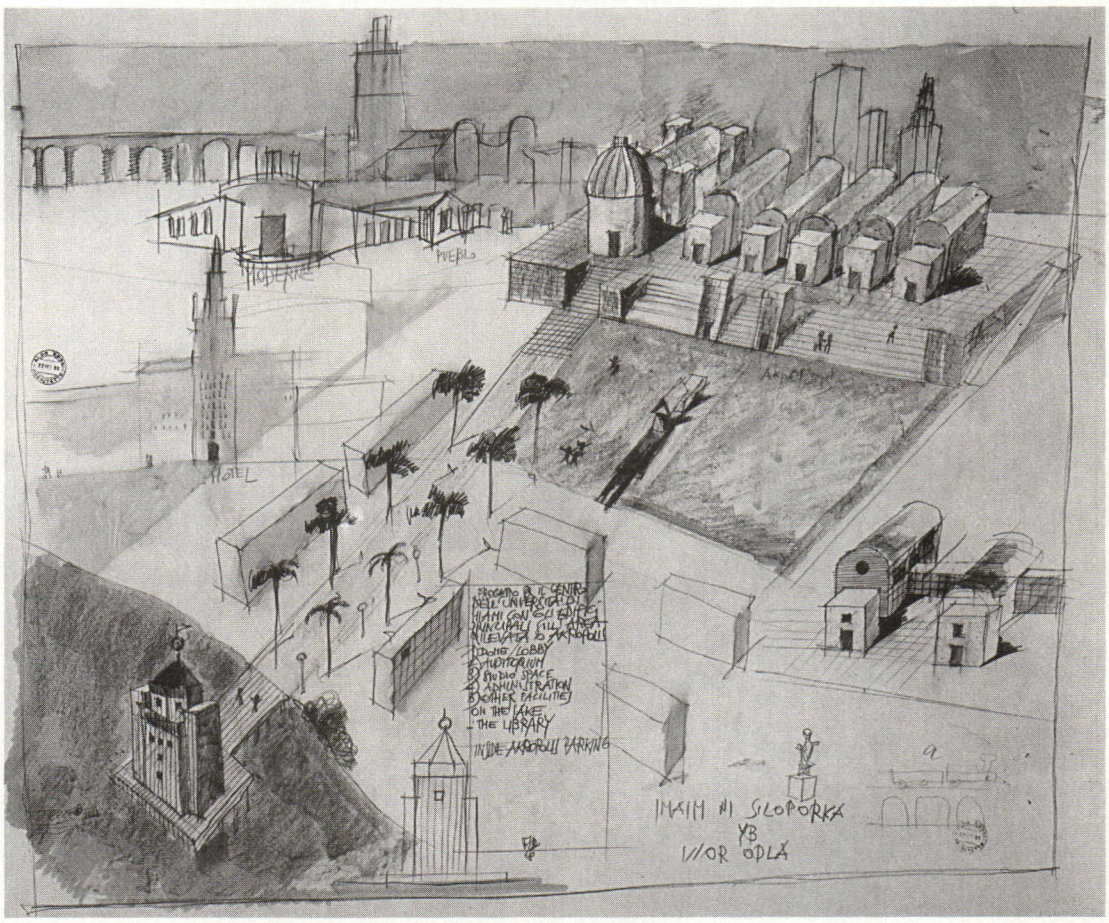
A drawing by Aldo Rossi, made during a recent trip to New York, depicts a building of his design, currently under construction in Italy, surrounded by excerpts of the Manhattan skyline.

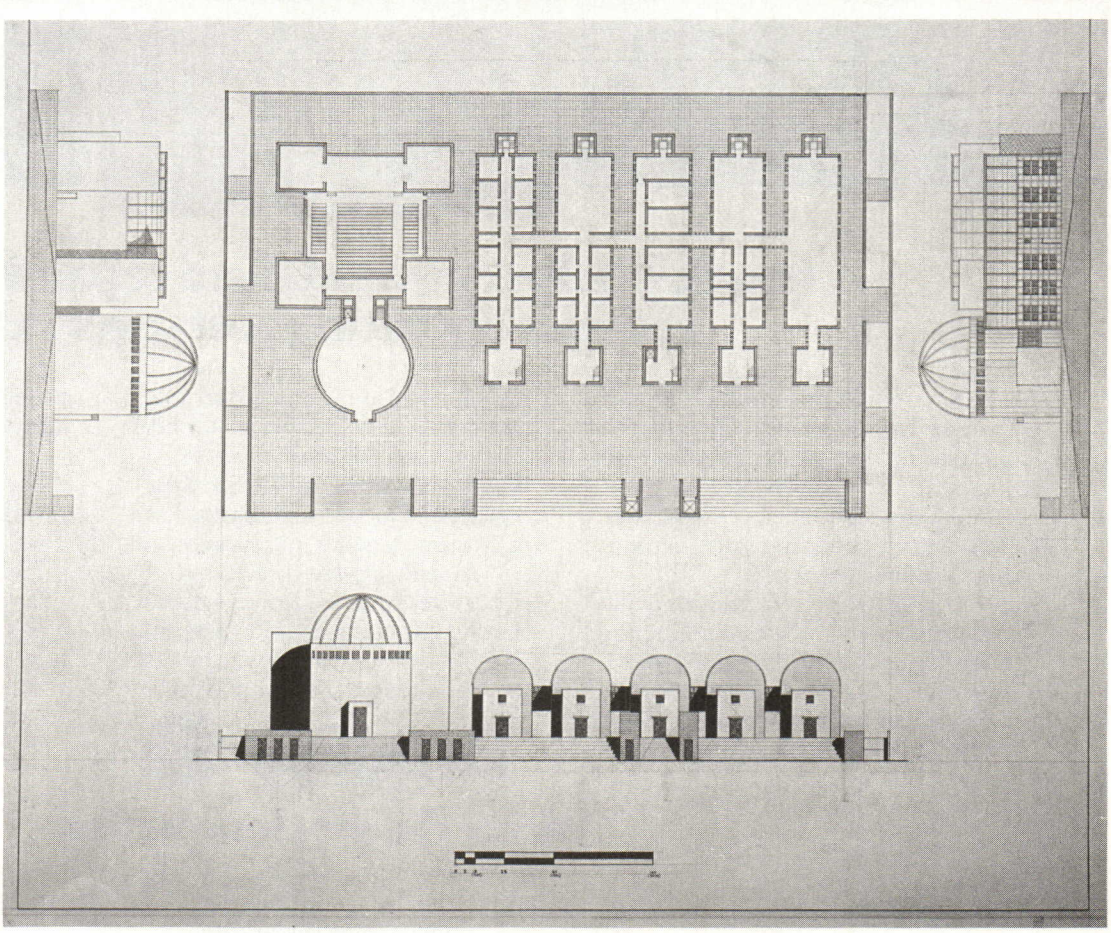


Italian architect Aldo Rossi has long held a place in the pantheon of academe—his seminal *The Architecture of Cities* has been brandished by a generation of studio critics and students alike. In this country Rossi is revered as much for his drawings as for his writings; his hauntingly evocative collages—reminiscent of compatriot De Chirico's paintings—combine conceptual explorations of the design problem at hand with mediations on the built environment at large. To date, Rossi's list of completed projects is regrettably minimal; his most famous are a housing block in Milan, a cemetery in Modena, and Il Teatro del Mondo theater, now destroyed, which floated down Venice's Grand Canal for the 1980 Biennale.

Now Rossi will make his American debut, in, of all places, Florida, with the design of a new architecture school for the University of Miami (drawings right). As of this month his Milan-based Studio di Architettura will officially open a New York office to supervise the project and, shortly, a showroom for an Italian furniture manufacturer at the International Design Center in Long Island City. (Thanks to the latter commission, New York won't have to relinquish its assumed eminence as the port of entry for architectural stars for too long.)

Rossi's design for the University is at once familiar and original. Dubbed by Rossi "The Acropolis in Miami," the school will consist of a complex of buildings atop a plinth, which will house an underground parking garage. On this base will be an auditorium in the form of a rotunda and five barrel-vaulted pavilions containing offices. (Classrooms will remain in the campus's existing buildings.) A library, located at the opposite end of a palm-lined avenue, will face the entrance to the rotunda. Situated on a lake—for Rossi the campus's most memorable element—the miniature medieval castle cum library appears to be Il Teatro del Mondo reincarnate. Rossi's quotation from his own oeuvre reveals his obsesssion with linkages: from past to present and, at long last, from Europe to America. *K. D. S.*

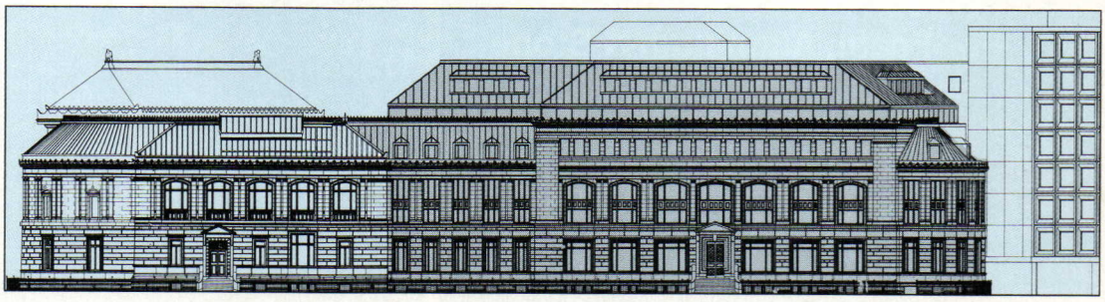




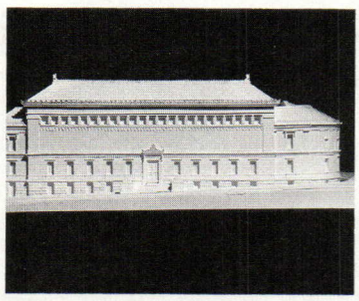
NEOCON 19 will examine "The Challenge of the New"

NEOCON 19, the annual furnishings market and complementary design symposium held in Chicago's Merchandise Mart, is scheduled for June 9-12. This year's lecture, workshop, and seminar program is organized around the title "The Challenge of the New" and features a diverse group of prominent speakers, including Massimo Scolari of Venice, Hans Hollein of Vienna, Charles Vandenhove of Brussels, Denise Scott Brown of Philadelphia, Robert A. M. Stern of New York, Leon Krier of London, and Tobia Scarpa of Milan. For a complete schedule of NEOCON events, contact the Communications Department of the Merchandise Mart (312/527-4141). The New Products section of RECORD's August issue will feature a sampling of the contract furniture introduced during NEOCON 19.

The business of art: The Corcoran Gallery in Washington gets an office building



The Corcoran Gallery of Art in Washington, D. C., has announced plans to fill its parking lot with a building (shaded portion above) designed by Hartman-Cox Architects. The annex will not be used for exhibitions; instead, the 100,000 square feet of leasable office space will respond to the institution's need for a source of steady income. Although the new building will adjoin the museum's



current structure, designed by Ernest Flagg in 1893 and added to by Charles Platt in 1924, the architects will probably avoid the brouhaha that has surrounded proposed museum additions in New York. Eschewing a "Manhattan solution," the firm opted for a careful combination of adaptation and replication that, in drawings at least, appears virtually indistinguishable from the original.

In Memoriam

Like so many others in the world of architecture and design, I was saddened by the death of Arthur Drexler. Soon after he died, I asked his longtime friend and colleague, Mildred Constantine, to write about him for RECORD. *Constantine, who served New York City's Museum of Modern Art in various architecture and design curatorial and consulting capacities from 1948 to 1972, began to work with Drexler in 1950, when he was chosen as curator by Philip Johnson (then director of the Department of Architecture and Design). She became Drexler's associate curator after he replaced Johnson as director in 1956. Constantine's eulogy is entitled "Letter to a Dead Friend."* M. F. S.

Dear Arthur:

It was so good to talk to you after Christmas when I recalled to you my enjoyment of the recording of the great songs of Victoria de los Angeles, a gift from you so many years ago. And as I said au revoir, and you wished me a happy New Year, I murmured something unintelligible. After all, I knew and you knew what was to come. You were so ill. I sat there and began to recall the many years we spent together working, talking, agreeing, arguing, each winning some and losing some—accumulated memories of long fruitful years.

From the beginning, when Philip Johnson brought you into the department at the Museum of Modern Art, you had carried within yourself a direct vision of what it was you knew, felt, and were committed to carry out. Still, you were always patient and respectful of my point of view. Sometimes you were tolerant, sometimes determined. But our accomplishments together were the results of our abilities to share concepts, ideas, and focus.

René D'Harnoncourt asked, early in your career at MOMA, whether I thought you were a genius or just very, very talented. After all, I was somewhat older than you; I had been in the Department before you came and knew what you had inherited. Since working with you on your very first, modest, concise and beautiful Corbu exhibition, I was aware of your diverse talents, even of your genius in some areas. I told René that we had to watch the wunderkind develop, to see whether those qualities, talent and genius, were separate or combined in a single person.

As you pulled the Department of Architecture and Design together I was reminded of a conductor of a great string quartet who also played first violin. Greta Daniel, Wilder Green, and myself were the players in your quartet. During the '50s and '60s we did our great work.

When the cast of characters changed in our department, you extended yourself to accommodate those changes in both personalities and talents. But your focus remained steady and clear—you were unswerving in your confidence that the creativity in our field could be developed.

For sure, there were setbacks, disappointments, and criticism, but these only served to sharpen and clarify the meaning of our work, the firm basis upon which we were to build.

You had an unerring eye. But, still, how we "batted each other around" when examining works proposed for acquisition or exhibition. "Over my dead body" you would exclaim—but afterward the body remained. It was your flexibility, your willingness to see and to understand that brought consensus.

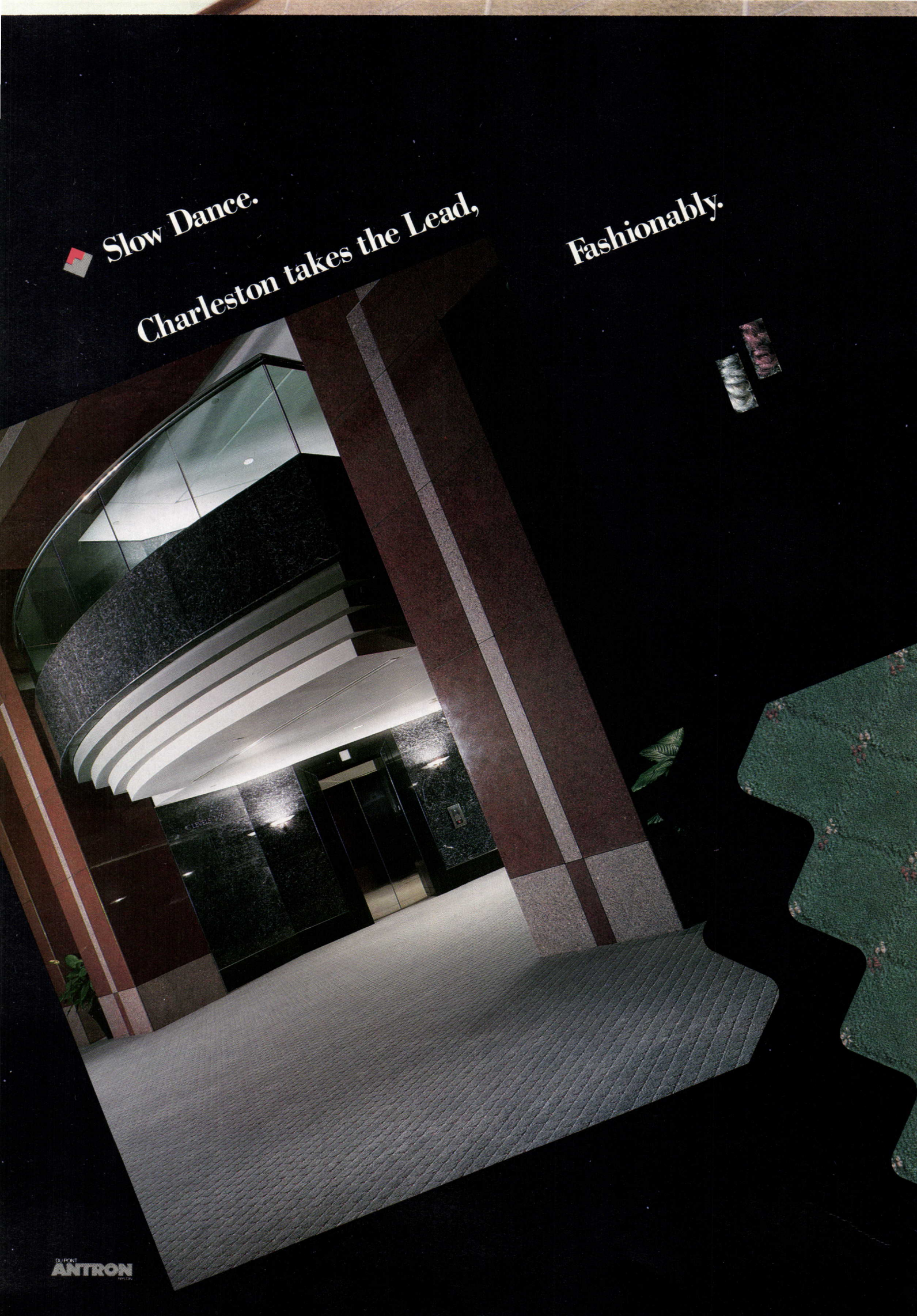
I observed for two decades as you pored over drawings of installations. Ever hopeful, you also endlessly drew schemes for buildings which were never built. These shelved dreams were perhaps your greatest frustration.

What did we talk about? Music, literature, history, society, architecture, design. And sometimes when we got bogged down on a project, off we went to see some exhibition, totally outside our immediate problem, but relevant to the world of art. Then you were part teacher, part critic. You opened me to artists whom I might never have considered—Fragonard, for example.

You so admired the writing of Alfred Barr because of its clarity. You stressed the fact that each word in his writing was made to count. He allowed no superfluity, no excess, no fat. That is what you strived for in all your writing, drilling into each of us working with you that no fat would be permitted. After I left MOMA at the end of 1971, I followed the evolution at the Museum and especially in "our" department. I admired your tenacity and courage to do the unexpected and unfashionable: the Beaux-Arts exhibition, the great Mies exhibition, in the face of opposition of all kinds. But you won out—over some dead bodies. Your focus, your tenacity, and your spirit is your legacy to the Museum, and to those of us, now on the outside, looking on with an insider's affection and memories.

As always,

Connie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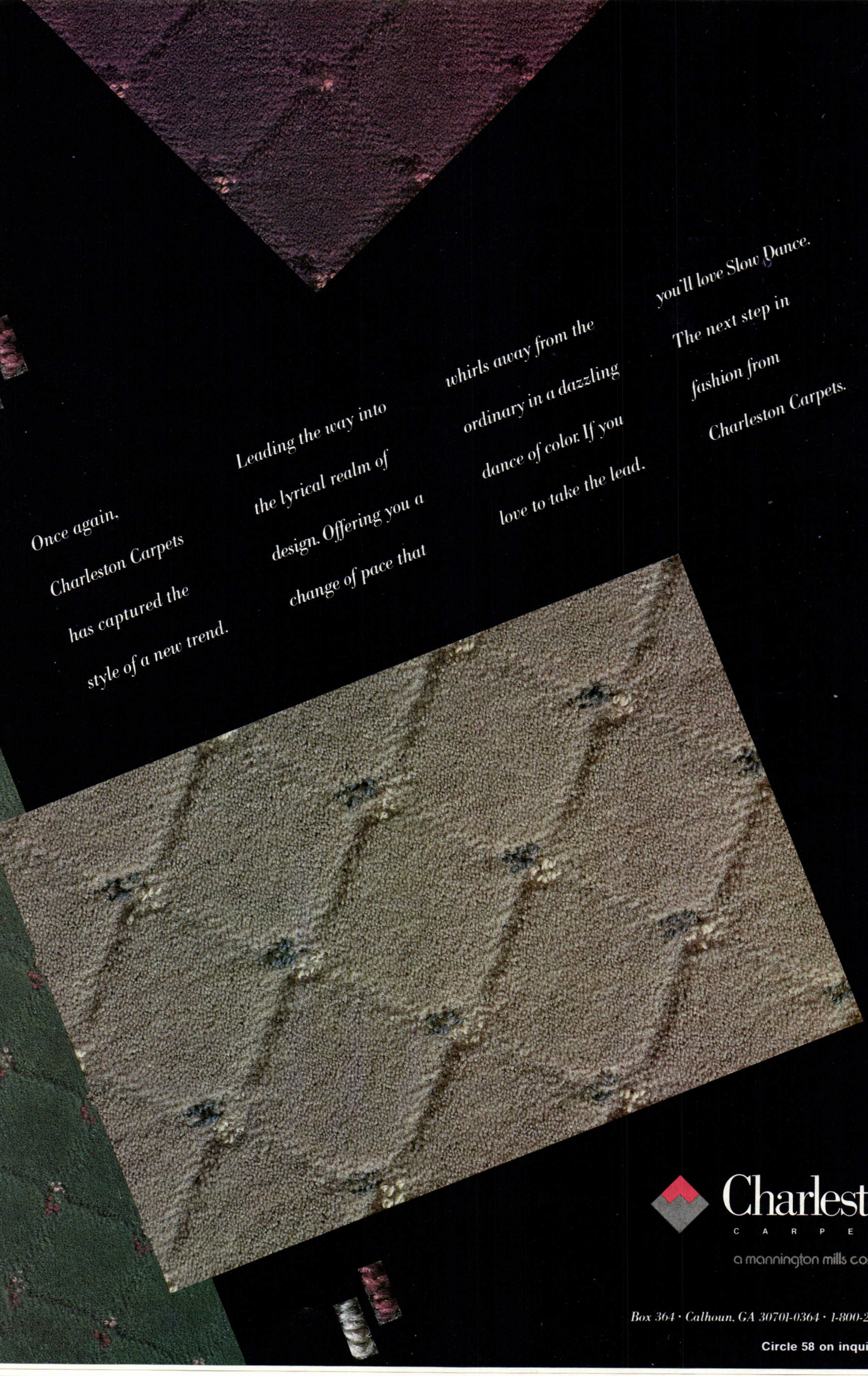

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Books

Court and Garden: From the French Hotel to the City of Modern Architecture, by Michael Dennis. Cambridge: The MIT Press, 1986, $40.

Reviewed by Barry Bergdoll

Like its parent, Colin Rowe's *Collage City*, Michael Dennis's "French hotel book" enjoyed an underground life long before its eagerly awaited publication, circulated among architectural students as a coveted set of photocopied plans—a sort of manual of design strategies. Dennis's study of the French hotel extracts one of the most intriguing and least-studied pieces of Rowe's collage—the Parisian town house plan—and posits it as microcosmic laboratory to test ideas about the development of post-Renaissance architecture and urban space and their relevance for contemporary design problems.

The overriding thesis of *Court and Garden: From the French Hotel to the City of Modern Architecture* is simple and compelling. The transformation of this single urban fragment from the complex plan of a Hôtel Beauvais—by now a Postmodernist icon for its deft manipulation of fragmented and local symmetries and pliant *poché* to make regular spaces within a complex urban tissue—to the clarity of profile and plan of a freestanding neoclassical pavilion in a park encapsulates, for Dennis, the fundamental shift in the modern conception of the city. The aristocratic hotel's gradual gestalt shift from ground to figure charts the role reversal of the public and private realms in the creation of the urban environment and sets the stage for the formless and alienating voids of post-war American urban space. Inspired by Rowe's famous juxtaposition of the Baroque Nolli plan of Rome (1748) with Le Corbusier's polemical Voisin plan for Paris (1925), Dennis bemoans the emergence of "the tyranny of the private realm" in our cities. Shifting between the bird's-eye view of Paris in the perspectival Turgot plan (1734-9) to an aerial photograph of "downtown" Houston (1986), he laments that "the city of platonic voids was to be replaced by the city of platonic solids, the city which contained parks was to become the city in the Park."

Despite Dennis's fluency with the literature on French domestic architecture— in particular the great 18th- and 19th-century plate books of which his own volume has already proven a descendant—his account tells us more about our own architectural concerns than it does about those of the fashionable designers of the *ancien régime*. The analysis is largely formal and imagines a community of interest between the practitioners of the past and present. Although aware of the French tradition of planning functionally specific domestic spaces (as a reflection of an evolving social and class ritual), Dennis's analyses rarely acknowledge the complexity of social patterns and relations that are encoded in those plans. These can be read, of course, only with very different tools: a painstaking recreation of the everyday life of a long-lost world and scrupulous attention to the changing meanings of words from those used to describe individual household functions to the more general terms "private" and "public," which also have a history. Any historian of French architecture is bound to be irritated by the adherence to a relatively useless division of time into Baroque, Rococo, and Neoclassical as well as an insistence that the hotel represents a critique of the public architecture of its own period (although, in fact, it was often produced by the very same architects). The designer's overview of the plan erases easily all class and social restrictions, rendering it an abstract printed pattern in which no doors remain closed and all courtyards and gardens are accessible.

Even the neatly delineated historical scheme that traces the birth of Le Corbusier's cartesian cruciform towers to the neoclassical pavilion-type hotel skirts the issue of the 19th-century social and urban systems that shaped Paris as a model city of public life. Dennis acknowledges the reflection of the planning techniques he so adeptly reads in the hotel as having a continuity in Haussmann's apartment-block fabric of Second Empire Paris, but he is content to skim over them since the Neoclassical pavilion in the garden seems to him to have already predicated the world of private objects that will become the Modernist "object-city." (Le Corbusier's towers were, it should be pointed out, hardly private objects in the same sense as the aristocratic jewels in the gardens of Versailles or the faubourgs of Paris, although Corb's admiration for them is clear in his diagrams of their *tracés regulateurs* in *Toward a New Architecture*.)

But such objections or qualifications are ultimately

Continued on page 87

Barry Bergdoll teaches architectural history at Columbia University and is a frequent contributor to RECORD.

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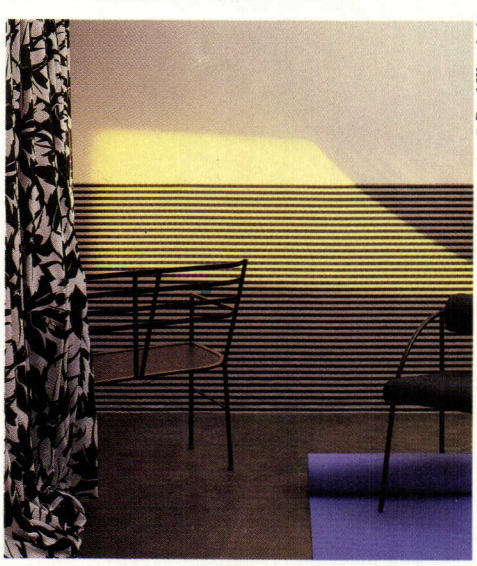
To market we go

A few years back, when "designer showrooms" were young, there was a tendency on the part of some clients to overindulge their hired esthetic guns. The result was that, although specifiers raced to the high-profile showrooms in droves, many walked away muttering the damning words: "It's beautiful, but what are they selling?" Manufacturers took note. Nowadays, not surprisingly, contract industry leaders appear to have re-established their priorities. "We hope to strike a balance between showroom design and product demonstration," reports Davis A. Chiodo, vice president of design and development for Cleveland-based SunarHauserman, a company more intimately acquainted with the subject, perhaps, than any other. Though the roster of design talent assembled for the cause is no less impressive today than it was in the late '70s and early '80s—both Aldo Rossi and Mario Botta will make their American debut with contract-furniture showrooms this fall—even "star" architects are being asked not to lose sight of the program, which, bluntly stated, is selling furniture, fabrics, and office systems.

Call it the new conservatism, common sense, or *Marketing 101*, but the contemporary state of showroom design suggests that the over-zealous salad days when manufacturers appeared almost intimidated by their showroom designers are decidedly past. And not a moment too soon. Considering the staggering number of "to the trade" design centers now cropping up throughout the country, the question of appropriate contract-furniture accommodation is more pertinent than ever. In New York, for example, Gwathmey Siegel & Associates' recently completed International Design Center (IDCNY) contains two million square feet of showroom space (RECORD, June 1986, page 144), and in Los Angeles, Cesar Pelli's expansion plans for the great "blue whale" will, when completed, bring the Pacific Design Center's square footage total to an impressive 1.6 million square feet of space. For the architects and designers who will be tapped to fill these and other trade-center behemoths, a two-dimensional walk through the three showrooms included in this portfolio might be well advised. For, while each of the design teams responsible for Gullans International's showroom in Long Island City, Herman Miller's showroom in Dallas, and SunarHauserman's San Francisco showroom, approached the respective commissions with its own esthetic agenda, none lost sight of his client's desideratum—persuading specifiers, as they say in the trade, to "drop paper."

Charles K. Gandee



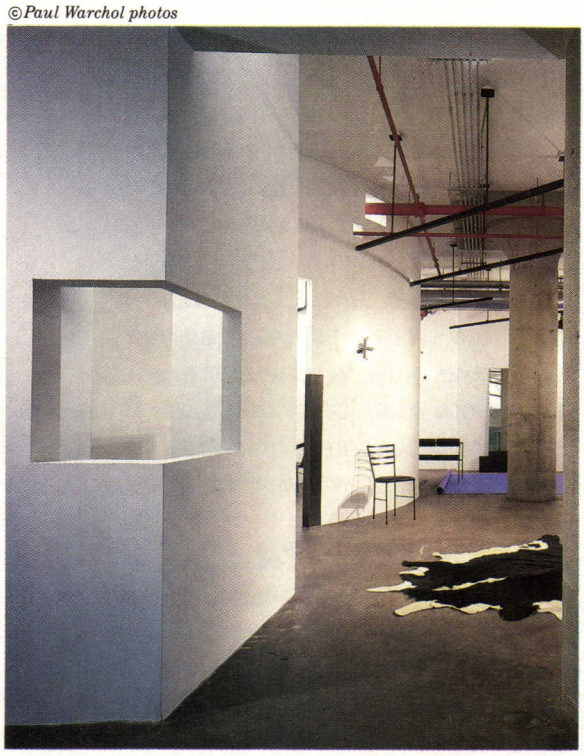
© Paul Warchol

Gullans International Showroom by Joseph Paul D'Urso with Bentley LaRosa Salasky, Design

Gullans International/IDCNY
Long Island City, New York
Joseph Paul D'Urso with
Bentley LaRosa Salasky, Design

A leg up

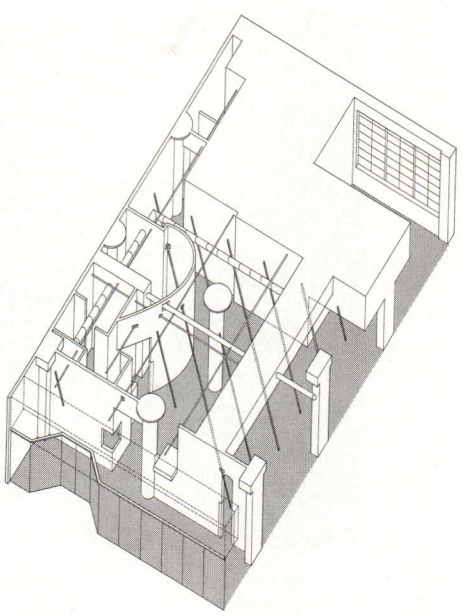
©*Paul Warchol photos*



Gullans International/IDCNY
Long Island City, New York
Owner:
Joan Gullans
Designers:
Joseph Paul D'Urso with Bentley LaRosa Salasky, Design—Salvatore LaRosa, partner-in-charge; Adam Rolston, assistant
Engineer:
Syska & Hennessy (mechanical/electrical/hvac)
Consultant:
David Bradescu (stylist)
Contractors:
LS Construction; Wainland's (custom metalwork)

After cutting her teeth at Knoll and ICF, Joan Gullans decided to go it alone two years ago and approached the owners of the Padua-based manufacturer Bieffeplast, who granted her exclusive U. S. distribution rights to its furniture, accessory, and lighting designs. Uptown Manhattan rents being what they were (and still are), the then 28-year-old independent set up shop in a sublet corner of a decidedly *down*town loft, and business, if not booming, was at least brisk. But the savvy streak in the young entrepreneur told her that while the residential trade she was getting was fine, the contract trade she was not getting was finer. In Gullans's estimation, Bieffeplast's *au courant* product line was not realizing its mass-market potential, i.e., mega contract consumers weren't exactly racing to her out-of-the-way loft. Gullans needed, as young businesses do, visibility. For that she looked to the International Design Center (IDCNY), and to Joseph Paul D'Urso.

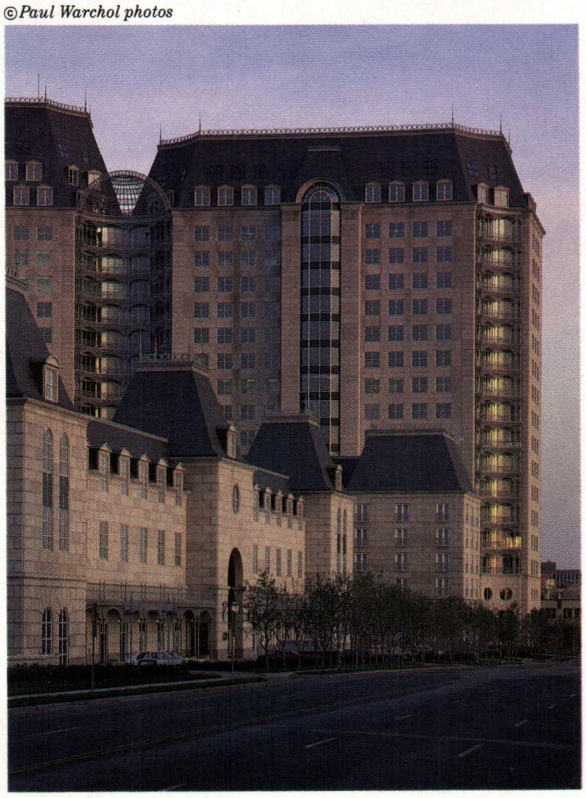
Though the designer's time was already committed to super-client Esprit, he accepted the modest, $150,000 commission (Could it have been because Bieffeplast manufactures D'Urso's "Cono" table series?) providing Gullans was amenable to a collaboration between himself and architect Salvatore LaRosa. She was. From the outset, client, designer, and architect agreed that the 2,400-square-foot showroom should exploit, not mask, the gutsy, industrial character of the IDCNY; so rather than deny the container, i.e., drop a new ceiling, carpet the floor, and reclad the walls, D'Urso and LaRosa elected to accept the concrete slabs and columns as given. (Well, almost as given: the columns were sandblasted, and the floor was filled, ground, and waxed.) Since the room was essentially a box (save for an existing fire-stair enclosure along the window wall), the design duo sought to introduce some tension into the static, if highly textured, space. The diagonal lighting tracks do precisely that (opposite). The interstitial area between the new, "implied" 10-foot ceiling plane and the 12-foot ceiling slab was, in the designers' hands, a 3-D canvas on which to draw a sprightly medley of conduits, ducts, and fire-engine-red sprinkler pipes. (Because enough is finally enough, some ductwork was enclosed in a soffit.) Beneath this kinetic, Kandinsky-like heaven, D'Urso and LaRosa inserted powerful, sculptural forms: a massive rectilinear enclosure for receptionist and staff, and a great, sweeping curve beyond for the owner (above left). Since Gullans was not interested in giving away the store, visually speaking, D'Urso and LaRosa created a display window along the public corridor (below left). The cantilevered shelf and the incised doorway through which only furniture may pass offer visual enticements to lure specifiers in. "Sometimes," explains LaRosa, "an ankle is sexier than a leg." *C. K. G.*



Herman Miller Showroom
Dallas, Texas
Taft Architects

Lone Star

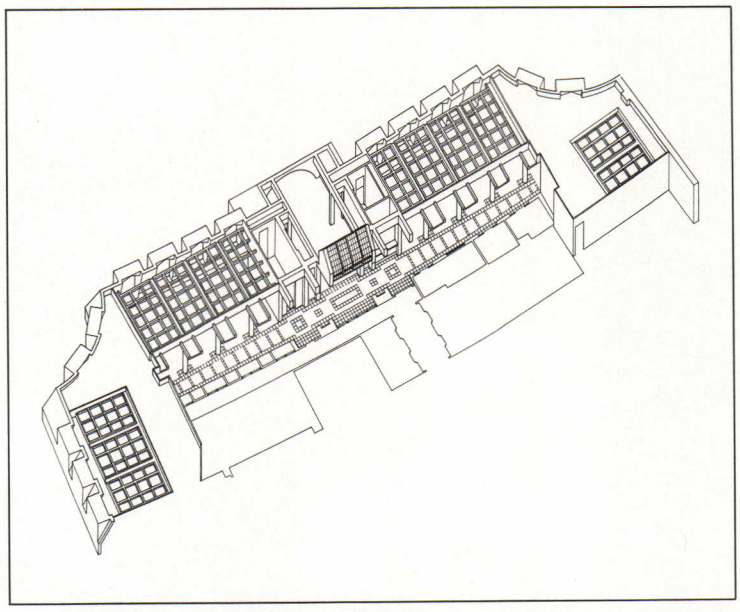
©*Paul Warchol photos*

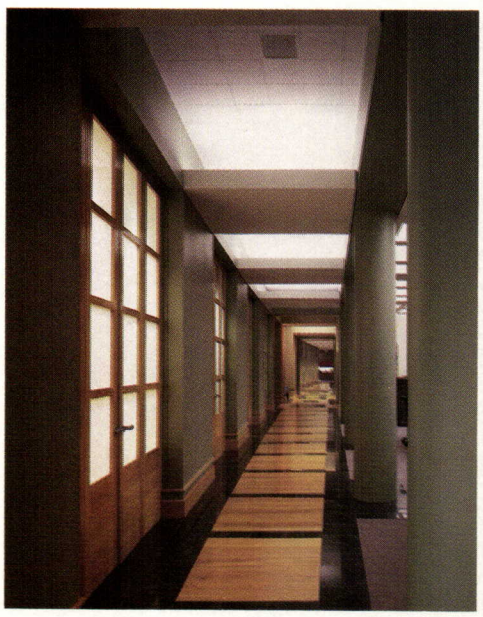


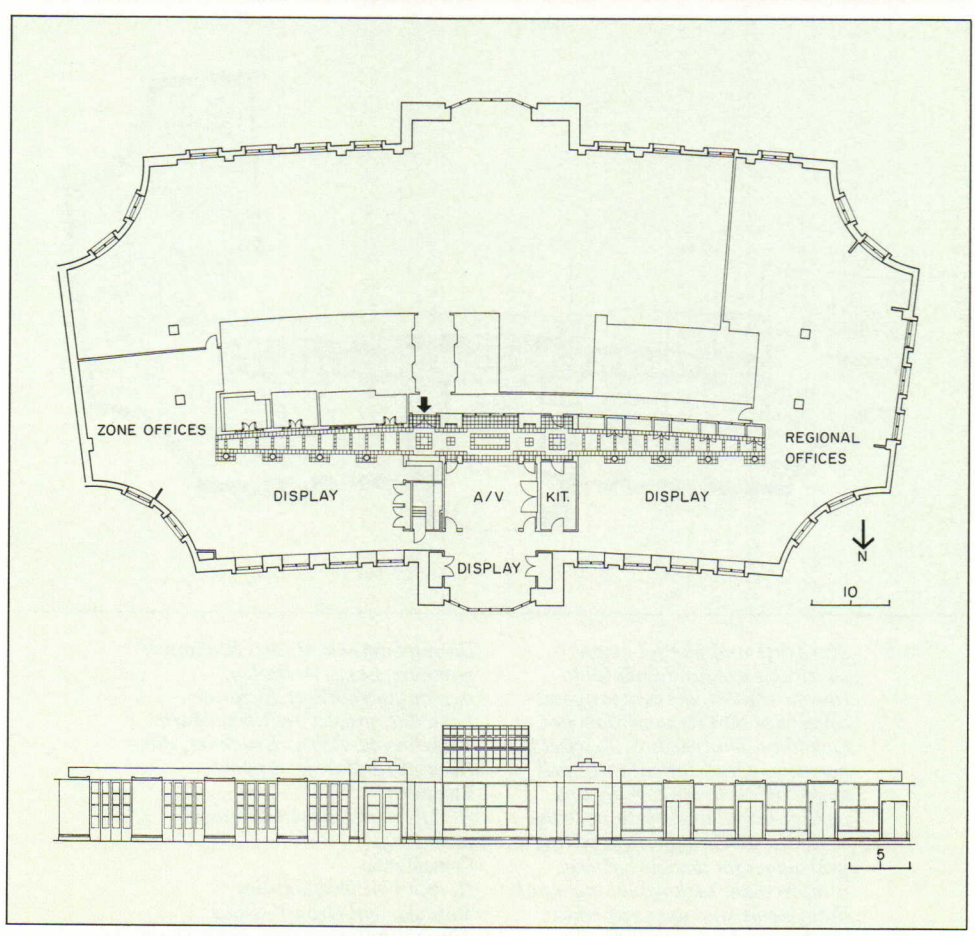
Though one uncharitable architecture-cum-social critic was moved to dismiss the Crescent as "an armature filled with totems of vulgar gentility" (RECORD, *September 1986, page 80), Herman Miller, Inc., obviously feels quite differently about the mixed-use complex designed by John Burgee Architect with Philip Johnson (above). The Michigan-based manufacterer leased 10,000 square feet on the 17th floor of one of the Crescent's three office towers for its new Dallas showroom (opposite).*

Over the last few years, when the need has arisen for a new, company facility, the corporate powers-that-be at Herman Miller have shown a marked preference for commissioning "local talent"—providing, of course, that "local talent" possesses a national reputation. In Chicago, for example, Margaret McCurry (of Tigerman Fugman McCurry) was tapped for a showroom in the Merchandise Mart; in California, Frank Gehry was the architect of choice for a manufacturing plant; and, most recently, in New York, Gwathmey Siegel & Associates received the go-ahead for a showroom in the International Design Center (IDCNY). It was, perhaps, inevitable then that the Michigan-based manufacturer would put in a call to John Casbarian, Danny Samuels, and Robert Timme—the three-part harmony that is Taft Architects—to design its new showroom in Dallas. After all, in Texas, the Houston-based firm has stolen the spotlight with its palatable brand of Postmodernism.

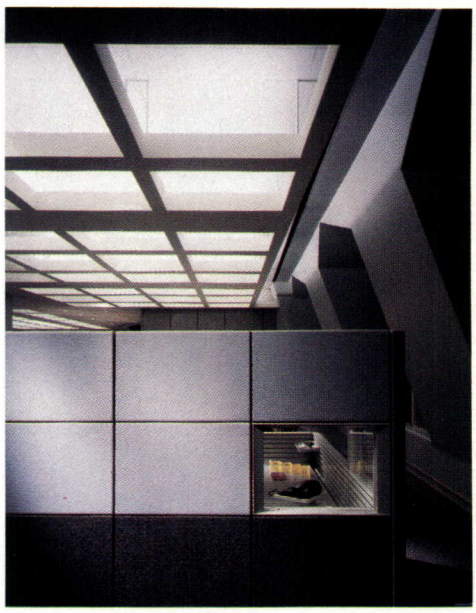
What was not inevitable was Herman Miller's decision to leave the competition in the Dallas World Trade Center, and go it alone in the Crescent, an unabashedly upscale mixed-use complex known locally as the "croissant" (left). But the company that gave us Charles Eames and the *Action Office*, the *Equa* chair and the *Ethospace* system, does not suffer from name recognition; consequently, the much-touted synergy of a design center could be weighed against alternative benefits—such as exclusivity and adjunct services, which is where the Crescent came in. "Prestige address" and "plenty of parking" notwithstanding, however, the space was less than ideal. As the mansard roofline suggests, the interior walls slope and curve; the building's scalloped corners made a difficult situation more so. Taft's job, bluntly stated, was to fit the square peg of Herman Miller's orthogonal office systems into the round*ish* hole of the Crescent. The problem of the conflicting geometries was solved, according to the architects, with a 120-foot-long circulation spine that repeats, on the core side, the slope and curve of the perimeter walls, and introduces, along the showroom side, the new orthogonal grid with a straight line (plan page 113). The oak-and-marble corridor greets visitors at the elevator core, and guides them past a receptionist into the orientation area, where—when a pair of rolling doors roll down—they are introduced to the Herman Miller philosophy and product line with the company's lavish audio-visual presentations (opposite). When the doors roll up, it's back on the runway for a tour of the real thing. Though the product-display areas—*Ethospace* to the left, *Action Office* and *Burdick* system to the right (page 114-115)—are not as rich in color, detail, or material as the general reception area, Taft's workmanlike approach ensures that Herman Miller's line looks, as they say in Texas, "mighty fine." *C. K. G.*

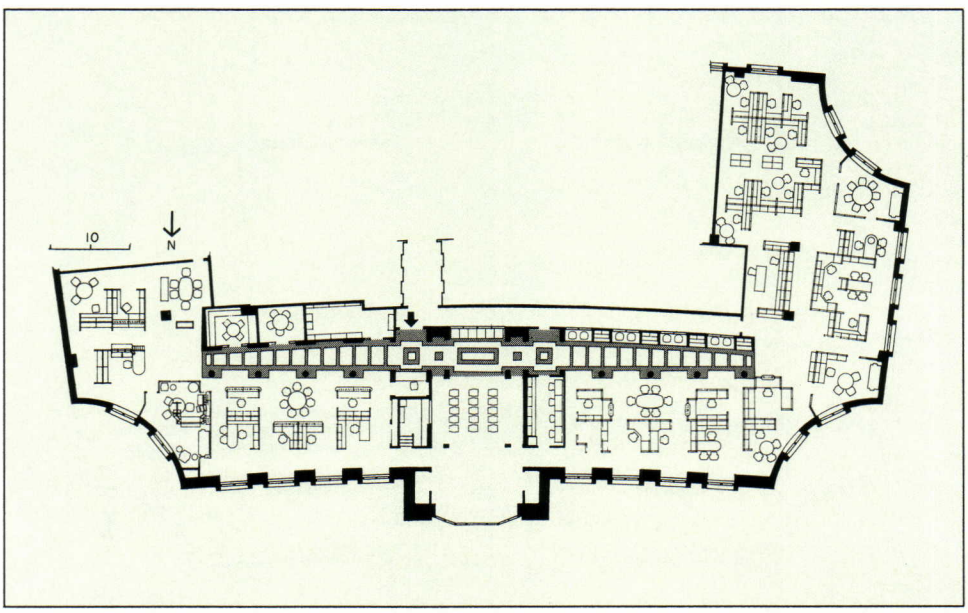






The problem of making functional sense out of the quirky floor plan architects John Burgee and Philip Johnson plotted for the Crescent (above) was exacerbated for Taft Architects by Herman Miller's multifaceted program. The Zeeland, Michigan-based manufacturer asked for showroom space to display its wide range of furniture and systems for office, health-care, laboratory, and industrial environments, but it also requested workspace for both regional and zone officeworkers, the whole of which should be a paradigmatic product-installation display. The 40-yard-long circulation spine Taft inserted into the 10,000-square-foot space solves the problem quite neatly (section above). It acts as a corridor for getting to and fro, but, no less importantly, as a luxurious porch for looking out over the company's wares (top).





Since full- and partial-height partitions are fundamental to Herman Miller, the company was concerned that its showroom not look like a Skinner Box. To offset the potential effect, Taft situated full-height offices to the corners and partial-height workstations to the center (top). The gypboard ceiling grid allows for flexible lighting, reinforces the orthogonal layout of the systems, and opens up what might have been an oppressive ceiling plane. Natural light is controlled by shutters (opposite); the window seats are more pleasant than ergonomic.

Herman Miller Showroom
Dallas, Texas
Owner:
Herman Miller, Inc.
Architects:
Taft Architects—John J. Casbarian, Danny Samuels, Robert H. Timme, partners; Larry A. Dailey, managing architect; Suzanne Labarthe, project architect; Mark Volpendesta, Robert Bruckner, Steve Hecht, Eric Morris, support
Engineer:
BL&P (mechanical/electrical/plumbing)
Consultants:
Herman Miller Facilities Management Group—Doug Zimmerman (director), John Stivers (regional manager), Bede Van Dyke (project designer), Sue Lepo (technical coordinator); Peter Barna—Light and Space (lighting); Carol Naughton & Associates (graphics); Herman Miller, Inc., Corporate Communications Department, and Ralph Nelson Associates (audio-visual)
General contractor:
Partners Construction, Inc.

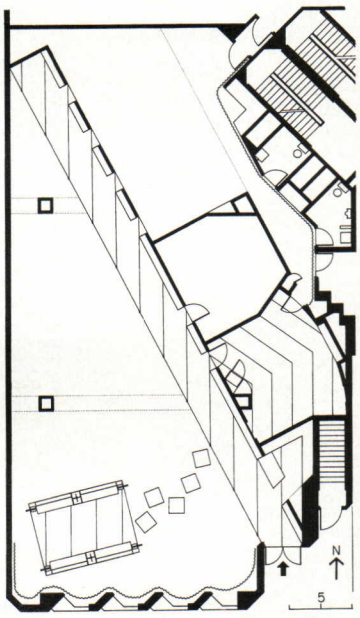
In the great tradition

SunarHauserman Showroom
San Francisco, California
MACK, Architect

"When we talk about our interest in design, it's more than just talk," reports Davis A. Chiodo, SunarHauserman's vice president of design and development. And it's true. The Cleveland-based manufacturer of contract furniture, fabrics, office systems, and demountable partitions has, over the years, shown its support of the architecture and design community—and in the process, naturally, writ its name large in that same community's consciousness—by commissioning no lesser luminaries than Michael Graves, Lella and Massimo Vignelli, Arata Isozaki, Frank Gehry, and, next year, Ettore Sottsass, to design SunarHauserman's showrooms. Though Mark Mack's late entry in this all-star portfolio is more modest than many of the earlier ones, the relatively cautious tack the company charted for itself in San Francisco was well-advised. The City by the Bay is trying to build a design center; if it succeeds, SunarHauserman executives will undoubtedly give careful consideration to the alternative.

Although it is something of an honor among the architectural vanguard to receive a call from Cleveland, Mack was less than delirious after being apprised of the budget, the program, and the range of products to be displayed. Also less than inspiring was the space the young architect was presented with: a 4,400-square-foot, ground-floor slot adjacent to the lobby in a spec office building that arguably makes up in location what it sorely lacks in architectural distinction. After persuading his client that they couldn't have it all (the sales offices had to move to another site), Mack was still left with precious little room for maneuvering. He sought one powerful, decisive gesture that would not only organize the space but also give it character, and he found it. Call it a "pergola," as Mack does, or call it a runway, as many do, but whatever, the richly mottled concrete carpet the architect laid diagonally through the space is more than serviceable. Visitors step onto the circulation spine at the front door and are greeted by a receptionist (below); they then can proceed directly to the conference room, manager's office, or a mock-up installation area (for the company's wall system), all situated behind a massive, canted wall lining the corridor on the right. On the other side of the spine, through the spindly columns Mack designed to visually support the corrugated metal canopy overhead, visitors look out to SunarHauserman's wares situated in the decidedly open-plan showroom area, which accommodates a fabric pavilion as well as select furniture pieces and open-office-system displays. Terminating the axis (opposite), and reinforcing SunarHauserman's commitment to design, is Arata Isozaki's homage to Marilyn Monroe, a chair allegedly modeled after the sex goddess's famous curves. *C. K. G.*

©Christopher Irion photos



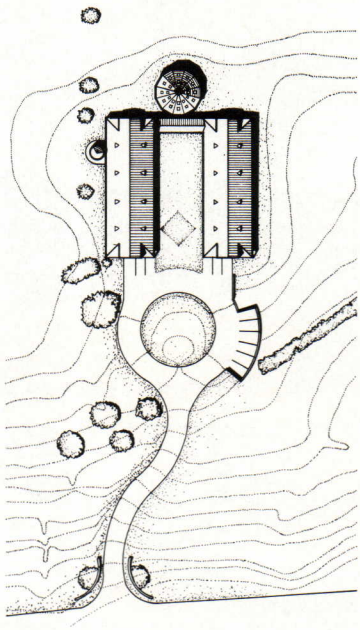
Bisecting the 4,400-square-foot space SunarHauserman leased for its San Francisco showroom with a clean, diagonal swath was architect Mark Mack's answer to the problem posed by the unruly room he was handed just off the lobby of a red brick, mid-rise office building (plan top). The divisive axis separates the showroom area from the more private zone (conference room, private office, mock-up area, and, beyond, kitchen and lavatory), as well as leading specifiers to their specific destination, rather than risking the possibility of losing them in a maze of office systems. Mack's love of "real" materials and "honest" construction methods is revealed most clearly in the circulation corridor (opposite): the floor is custom-colored concrete, scored with lay-in metal strips; the canopy is corrugated and perforated metal with integrated track lighting; the canted wall is integral color plaster over gypboard; and the toothpick-thin columns are wood with sandblasted and lacquered steel fittings. Though Mack likes to think of the herringbone pattern he applied to the doors leading to the conference room (right) and the manager's office as "medieval," the yellow-and-green woodwork rather seems to recall, not the Middle Ages, but a period closer to our own—the supergraphic '60s, perhaps?

Despite its massive concrete columns and exposed steel supports, the fabric pavilion Mack designed as a functional "folly" sitting out in the field of SunarHauserman's showroom is a delightfully lighthearted construction (opposite and bottom). Swatches are hidden behind pull-down panels that double as trays, and the canvas canopy overhead states the sales staff's cause most effectively. Elsewhere throughout the showroom area, Mack kept his architectural moves to a minimum. Only the ceiling has been manipulated. The exposed metal frame over the open-office system display (right) is missing, as a glimpse confirms, its panels: "I'm uncomfortable with lay-in ceiling tiles," confesses Mack, who also liked the theatrical air the open ceiling provided. SunarHauserman didn't push it.

SunarHauserman Showroom
San Francisco, California
Owner:
SunarHauserman, Inc.
Architect:
MACK—Mark Mack, principal-in-charge; Shaun Weston, project architect; Russell Thomsen, Joe Decredico, Wooi-Cheng Choong, design team
Engineers:
SJ Engineers—Kreyne Sato, Neil Joson (mechanical); Toft, Wolff, Farrow Associates—Larry Wolf (electrical)
Consultant:
ProMedia—Joel Saint-Cyr (audiovisual)
General contractor:
Ryan Associates—Paul Ryan, partner-in-charge; Scott Roger, foreman

Equine expectations

Broodmare barn and turnout ring
Catoctin Stud
Waterford, Virginia
Perry, Dean, Rogers & Partners, Architects

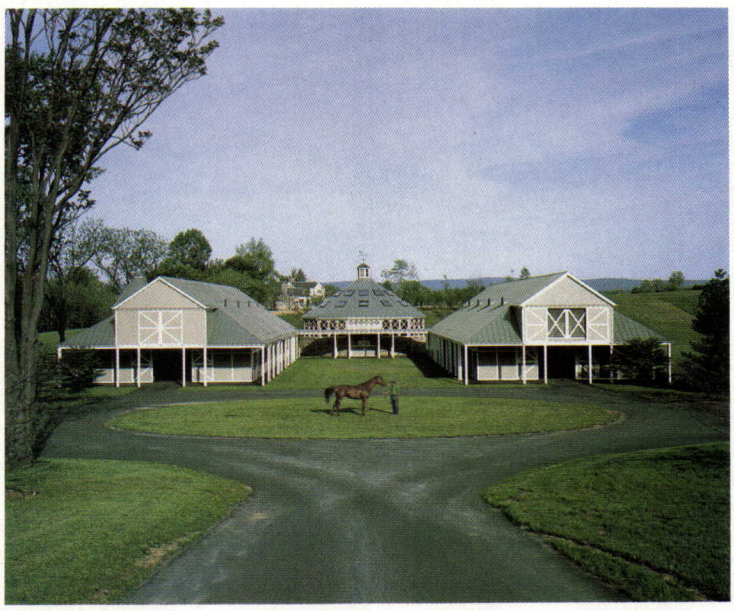


Royalty enceinte, with succession to a crown at stake, could scarcely be more assiduously attended than those queens of the sport of kings, the broodmares from whose fecundity flow both gold and glory. In the Houyhnhnmic realm of racing, it is unexceptional that as an aside to their commission for the principal residence on a prominent breeder's 750-acre estate in the gently rolling hills of Virginia's "horse country," architects Perry, Dean, Rogers & Partners were also asked to design expanded living quarters for the farm's champion band of broodmares.

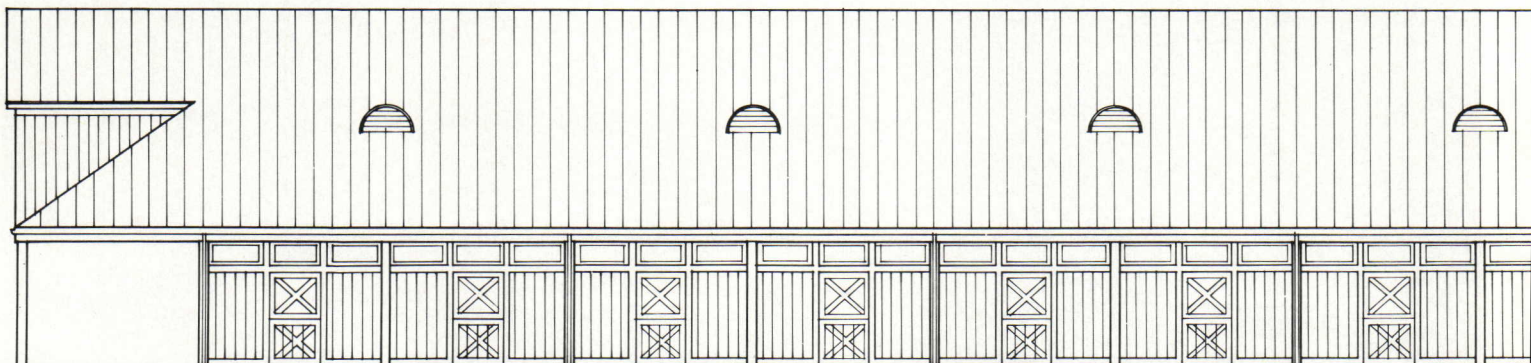
Like all successful domestic architecture, the equine additions—an exercise ring and 16-stall stable joined by covered passage to a look-alike existing barn—derive from the requisites of their inhabitants. Hands above the common herd, these grand dams are former stars of the turf, gracefully retired from illustrious racing careers to take up the no less estimable second career of passing their talents on to their offspring. Bred each year between January and early July, the broodmare spends the next eleven months relaxing and eating protein-fortified grain while awaiting the birth of her foal, a benign but bland existence brightened by daily periods of "turn out" to spacious nearby paddocks for exercise and grazing. In an area subject to frequent freezing rains that can make the paddock grass dangerously slippery, the new turnout ring offers a welcome winter alternative, although its primary purpose is to provide a protective setting where new mothers and their wobbly babies can be safely exercised for the first few days after birth while the foal finds its legs and its balance.

For Perry, Dean, Rogers, work on the barns, with their minimal mechanical requirements and simple, clearcut functions, was a refreshing breather from the complexities of design for the two-legged—"a clean exercise," says project architect David Storeygard, in expressing and accommodating the intertwined routines of the broodmares and their human attendants. Housing for horses—especially horses as valuable and vulnerable as these—is not without its technical arcana, but the designers finessed much of it by accepting as prototype the existing barn, which they essentially replicated in the new stable, at the same time sprucing up the original and introducing to both such niceties as crossed-batten trim on the stall doors.

In the turnout ring on which the buildings converge, however, the workmanlike stables turn playful. Its 12-sided fieldstone base, batten pattern pierced to window tracery, and perky, lantern-topped conical roof so irresistibly evoke a carousel that one hears the calliope's wheeze and sees the marionette prancing of whirling mechanized steeds. Can a structure whose crowning weather vane depicts a stork bearing a diaperful of gangling foal be altogether serious? *M. F. G.*

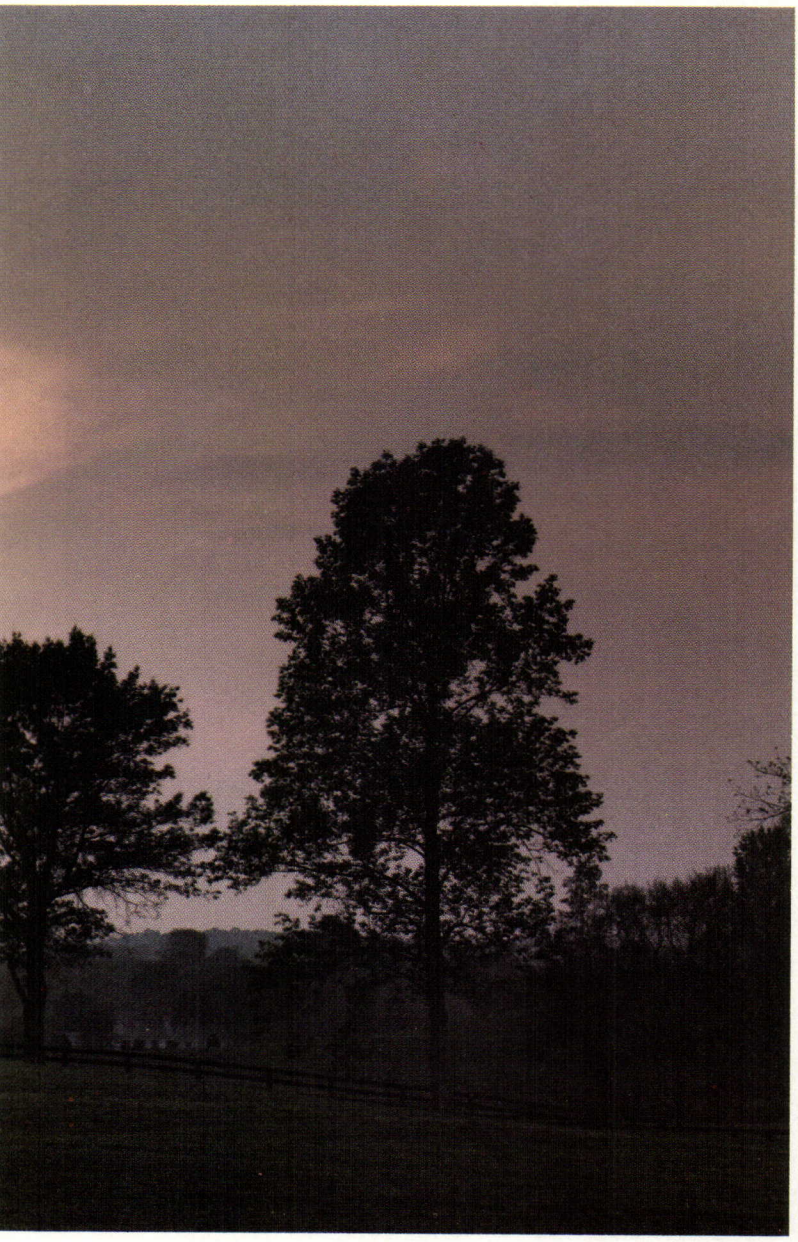


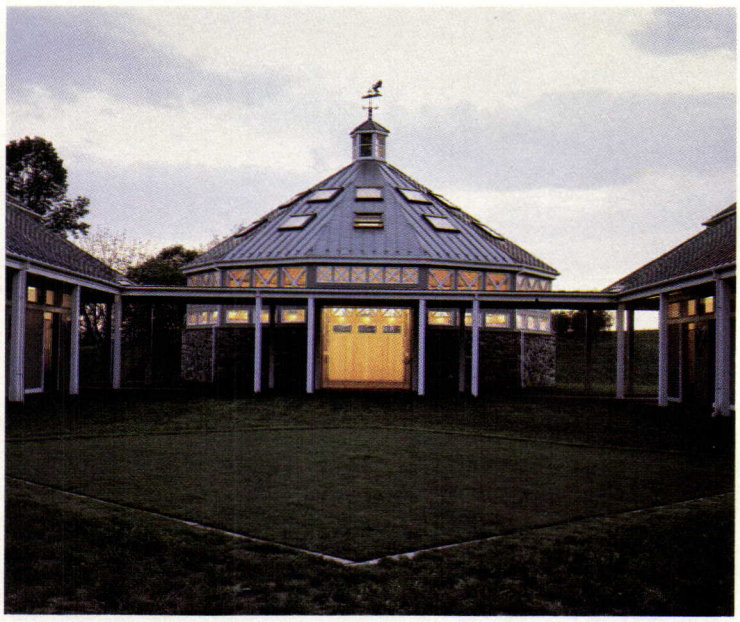
The handsome existing barn (left in plan), designed in 1975 by Johnson, Craven + Gibson of Charlottesville, became with few changes the model for the new stable paired with it—a simple, near-generic structure with a metal-roofed timber truss expanded at each end to large dormers opening to the hayloft and supported on exterior columns that form a covered perimeter passage, now extended to join the two barns and the turnout ring. Because the original provided such special spaces as foaling stalls, offices (one in the former silo), and utility rooms, the new barn is wholly given over to stalls designed to accommodate—or balk—equine eccentricities. Efficient, draft-free ventilation, for example, is essential but must be achieved with windows above the mare's eye level lest she be injured in an attempt to turn herself out to an alluring morsel of pasture. Similarly, since horses are exceptionally thin-skinned and even the most well-bred may indulge the indelicate habit of "cribbing"—i.e., gnawing anything they can grab—their oak stalls are detailed to eliminate sharp edges, protrusions, and chewable materials. Elaborating on the barns, the 12-sided turnout ring employs a base of the local fieldstone used earlier for the silo,

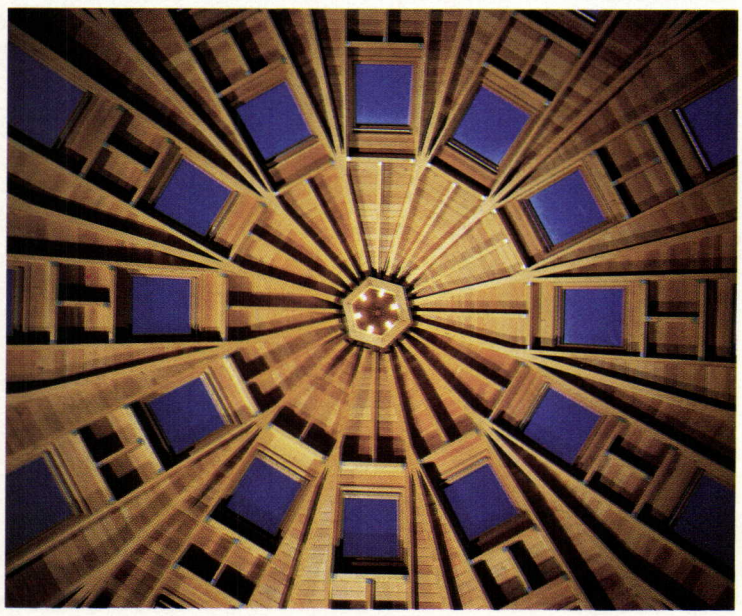


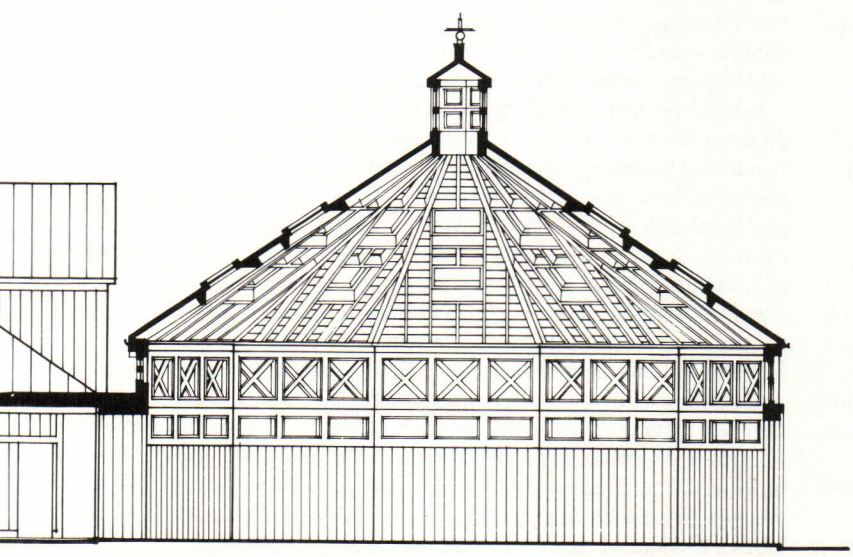
which itself referred to the oldest outbuildings on the estate. Though clad in the same metal roofing, the simple truss becomes a spider web of glue-lam members dotted with skylights and floated on the criss-cross tracery of the band of glazing.

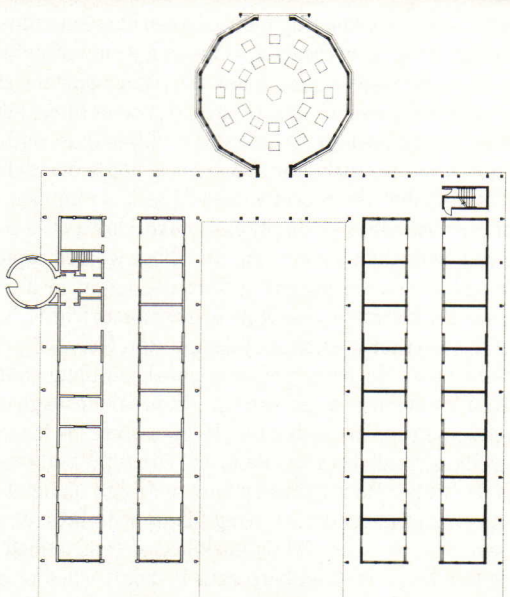
Broodmare barn and turnout ring
Catoctin Stud
Waterford, Virginia
Owner:
Bertram R. Firestone
Architects:
Perry, Dean, Rogers & Partners—Charles Rogers, principal-in-charge; David Storeygard, project architect
Engineers:
Boston Building Consultants (structural); BR+A (electrical)
General contractor:
Catoctin Stud











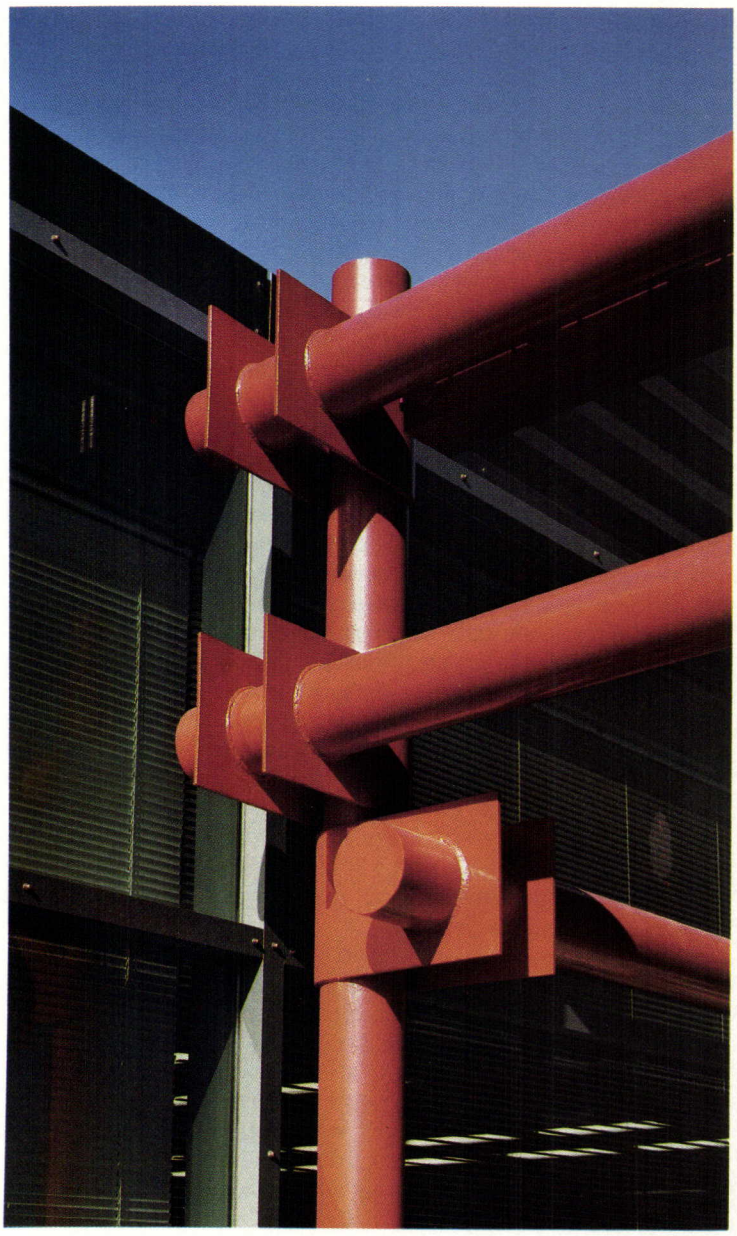
Heavy metal

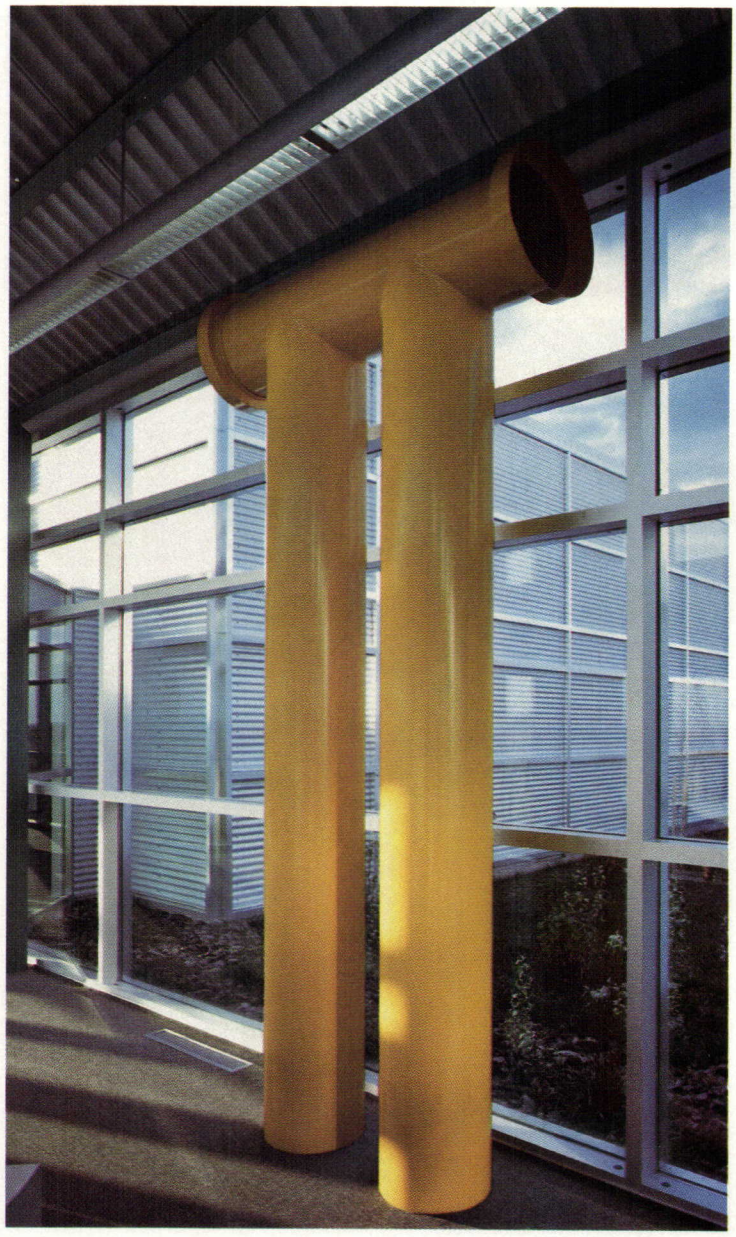
Gerry Kopelow photos

It is tempting to view the brilliantly painted steel elements illustrated above and conclude that their creators must be a group of detail-obsessed architects who never quite made the philosophical leap from the fantasy of childhood erector sets to the exigencies of real-world building. Except for the part about obsession with details, nothing could be further from the truth. For if there is a single overriding quality that distinguishes the recent work of IKOY Architects, it is a seriousness of purpose that one might easily overlook as the camera zooms in on a red, wide-flange steel column whose welded capital merges easily with web beam stiffeners (left, this page), or a Brobdignagian pair of chrome-yellow return air ducts (right, facing page) that IKOY's partner-in-charge of design Ron Keenberg dubs "honkers." While virtuosic, even tongue-in-cheek detailing contributes mightily to IKOY's machine-tooled esthetic, the real message coming out of the Canadian firm's Winnipeg and Regina offices is that, owing to today's scarcity of skilled craftspeople and the tight budgets of most building projects, architects must learn how to design using standard industrial parts, manufactured in existing plants with little or no modification and assembled on site by unskilled or semi-skilled laborers. This "action of building," as Keenberg calls it, is governed by an attitude that equates architecture with the unabashedly visible manner in which a project's structural, mechanical, and electrical parts are assembled. The finished product is less a case of pure form following a single function than a compendium of individual, frequently idiosyncratic forms following the panoply of functions that make any contemporary work of architecture tick.

Founded in 1968, IKOY spent much of its first decade designing pleasant but relatively conventional high-rise commercial and residential buildings in Saskatchewan and Manitoba. Although these projects hinted at what would become the firm's current esthetic, the real turning point came in 1975 when, during a study trip to Scandinavia, Keenberg visited a technical college in the Swedish town of Linköping, designed by Bengt Hidemark. Of the school's straightforward, industrial-style interior, Keenberg recalls that "for the first time I could understand the entire building—its plan, structure, skin, mechanical and electrical layouts, and fitments—just by walking into it. In most buildings, everything real was usually hidden; here, everything real was *making* the building." Keenberg returned to Canada to articulate what he had seen in Linköping and, with its first built post-Scandinavian work—the firm's own two-story offices in Winnipeg (RECORD, April 1983, pages 146-149)—IKOY's mature style sprang forth in all its full-grown transparency.

Three buildings by
IKOY Architects

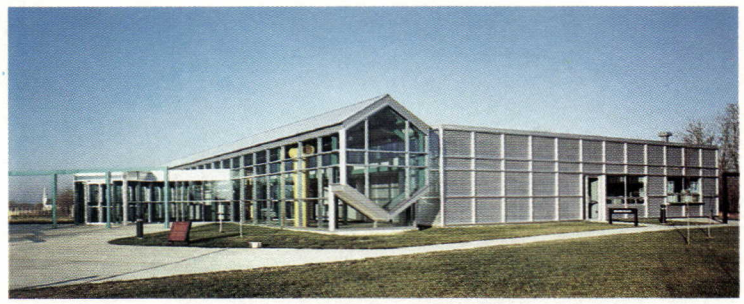




The completion of IKOY's offices in 1978 came at a time when skyrocketing interest rates were beginning to eliminate most of the commercial and residential commissions that had sustained the firm during the '70s. Over the past seven years, IKOY has turned to smaller-scale institutional projects, and the three structures reviewed on the following pages, all completed within the last two years, exemplify how easily the firm has adapted its machine-age art to three distinct building types, producing an engaging portfolio of work through the inventive manipulation of the tried and true. The architects have discovered that there is no need to reinvent the wheel when, for example, the metal staircase designed for a provincial office building in northern Manitoba will work just as well—and look just as good—at the University of Manitoba's new Wallace Building (right, facing page). Likewise, if the method of joining steel pipes that IKOY specified for the wind stabilizers at its own office building seemed both structurally sound and visually pleasing, why not use that technology to create Wallace's ornamental entrance canopy (left, this page)?

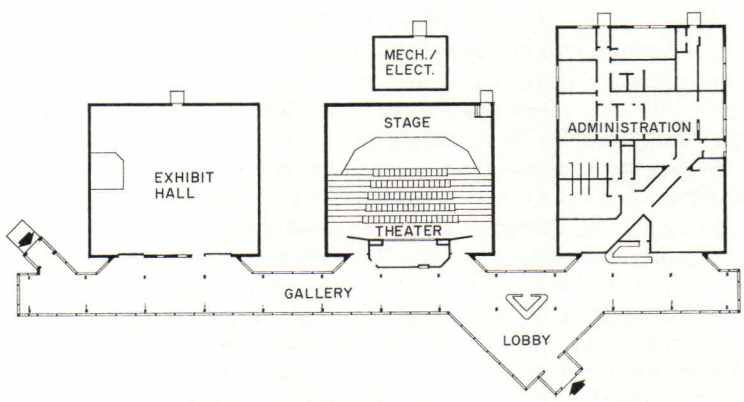
It is this interchangeability of parts, together with a reliance on off-the-shelf componentry, that separates IKOY's work from that of, say, Richard Rogers or Helmut Jahn, both of whom use high-end budgets and custom-designed elements to create what Keenberg likes to call "buildings for the Medici." Moreover, if Rogers and Jahn work in an idiom whose technical high-jinks appear computer-driven and futuristic, the Canadian firm's architecture, born of the heavy-metal foundry and welder's shop, is a relatively "low-tech" embodiment of this, or an even earlier, time. When Keenberg speaks of how the architect's role is that of an industrial-age craftsman designing buildings for the people, he evokes the principles that Walter Gropius voiced at the Bauhaus nearly a century ago. The difference between the Bauhaus and IKOY, says Keenberg, is that the former advocated a machine-based architecture at a time when the manufacturing process was still relatively unsophisticated. European architects consequently had to "image" an industrial look with handcrafted designs, and by the time manufacturing caught up with style later in the century, Modernism had become, especially in North America, a mode of architecture symbolic less of the people than of corporate patronage. IKOY, by contrast, has taken advantage of the vast arsenal of mass-produced products currently available to create a cost-effective, strongly didactic body of architecture. "Our work has a great deal to do with visual comprehension," concludes Keenberg. "We don't want to hide structure; we want people to know why a building stands. Out of that knowledge comes a sense of comfort and delight." *Paul M. Sachner*

Passage through history



The 19th-century territorial struggle between the Indians and European-born settlers was played out with as much intensity in Canada as in the United States. In 1885, near the Saskatchewan settlement of Batoche, widespread opposition to the government's land policies provoked an armed resistance by 300 Métis (Canadians of mixed Cree or Chippewa and European blood) against the dominion's troops. Although the government ultimately triumphed at the Battle of Batoche, the site along the banks of the South Saskatchewan River has come to symbolize the Métis' last stand as a united people, the end of their independence, and the eventual closing of the Canadian frontier.

Today, Parks Canada maintains Batoche as a national historic site, visited by some 25,000 people annually. To commemorate the centennial of the uprising, the government commissioned IKOY in 1984 to design a new reception and administration center that would interpret the history of the Métis settlement, prepare visitors for self-guided trail tours through the adjacent battlefield, and house site-maintenance facilities. Although IKOY's brightly painted industrial esthetic might initially seem at odds with Batoche's solemn place in Canadian history, the firm's traditional no-nonsense approach to design—reflected here in a 15,000-square-foot structure clad in green-tinted glass and anodized, corrugated-aluminum panels—is perfectly at home on the stark, central Saskatchewan prairie. Since the only other extant buildings on the site are the modest 1883 parish church and rectory of St. Antoine de Padoue, designing a stylistically contextual facility was less of an issue than creating an unassuming "non-building," in the architects' words, that might take visitors on a literal and emotional journey through history. Toward that end, IKOY placed the structure's three principal programmatic elements—a small office block, an 80-seat theater, and an exhibition hall—in pavilionlike wings behind a 236-foot-long, glass-walled "grand passage." Inside the gallery blue hollow structural-steel framing, oversized yellow air returns, and a corrugated-aluminum ceiling make up a familiar IKOY palette; so do such exterior details as a steel entrance "arch" and mirror-finish aluminum rivets and wall trim. Unlike much of IKOY's other work, however, the center's imagery transcends structural and material considerations. In the realm of architectural metaphor, the glass gallery is meant to represent a spyglass or telescope—hexagonal in elevation, raised slightly off the ground, and pointed directly at the nearby church steeple (facing page). As visitors travel through the building and out into the battlefield, the church remains constantly in sight—an appropriately sacred image for a place that is haunted by an almost spiritual sense of the past. *P. M. S.*

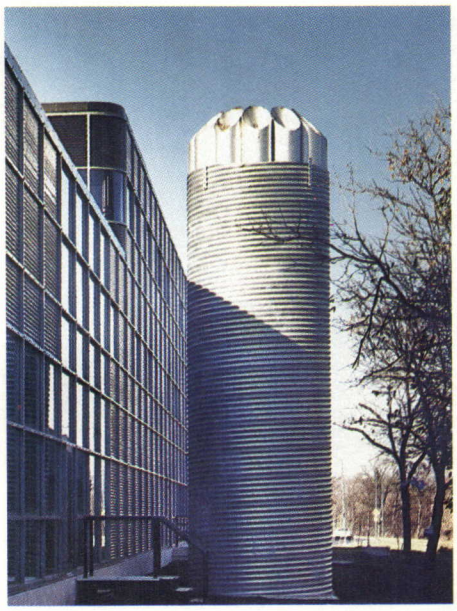


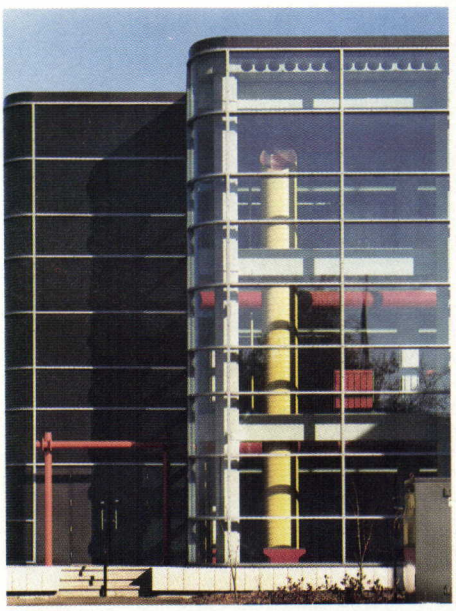
Visitor Reception Center
Batoche National Historic Park
Batoche, Saskatchewan
IKOY Architects

Although Saskatchewan wheat farmers cleared the prairie surrounding the new Batoche visitor reception center of poplar groves following the Métis uprising, Parks Canada has embarked on an ambitious tree-planting program that will return the land to its approximate pre-battle condition. When fully grown, the new trees will shield the visitor center from view, allowing guests to simulate the movement of troops through the bush as they might have approached the site in 1885. Once safely inside IKOY's glass-walled gallery, visitors can take visual aim at the steeple of the historic Church of St. Antoine de Padoue (above).

Visitor Reception Center
Batoche National Historic Park
Batoche, Saskatchewan
Owner:
Parks Canada
Architects:
IKOY Architects—Ronald Keenberg, director of design; Ken Scherle, partner-in-charge; David Brown, project administrator
Engineers:
Reid, Crowther & Partners Ltd. (structural); Yoneda & Associates Ltd. (mechanical); Ritenburg & Associates (electrical)
Consultants:
Habitat Design Limited (landscape)
General contractor:
PCL Constructors Western, Inc.

Over-achiever

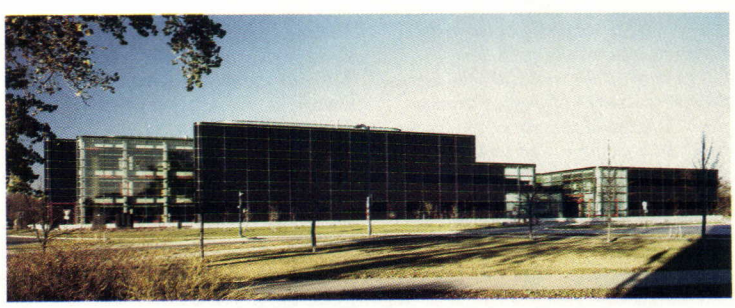




True to the form of many large North American colleges, the University of Manitoba is graced with a lovely core of early 20th-century brick and limestone buildings surrounded by an unlovely ring of post-World War II academic sprawl. In an especially misguided move made during the 1960s, the university constructed a broad access road around the campus that offers visitors an unappealing institutional vista of parking lots and building backs. It was for a site along this road, overlooking the Red River, that IKOY was commissioned to design the new Wallace Building, housing classrooms, laboratories, and offices for the university's earth sciences department.

If the success of the three-story, 130,000-square-foot structure is measured against three major criteria—the department's wish for an up-to-date facility to replace antiquated quarters on the original campus quad, the architects' goal of creating a memorable gateway along the characterless northern loop of the ring road, and the university's predictably limited financial resources—then IKOY deserves high marks. In a remarkable combination of exuberance and restraint, the architects have produced a building that both embodies the firm's belief in interior and exterior structural transparency and reflects geology's recent evolution into a high-tech laboratory science—all for a cost that initially came to $1.6 million (Canadian) under budget. Because the local code required a two-hour fire rating, IKOY had to abandon its favored steel framing for precast concrete—a structural system visible through rounded, pale green-glass corners that are intended to harmonize with the green stained glass of a nearby Catholic church. The rest of the facade is clad in a muted combination of black corrugated-aluminum sheets bolted to steel studs, and black-glass windows whose seemingly random occurrence was actually determined by interior requirements.

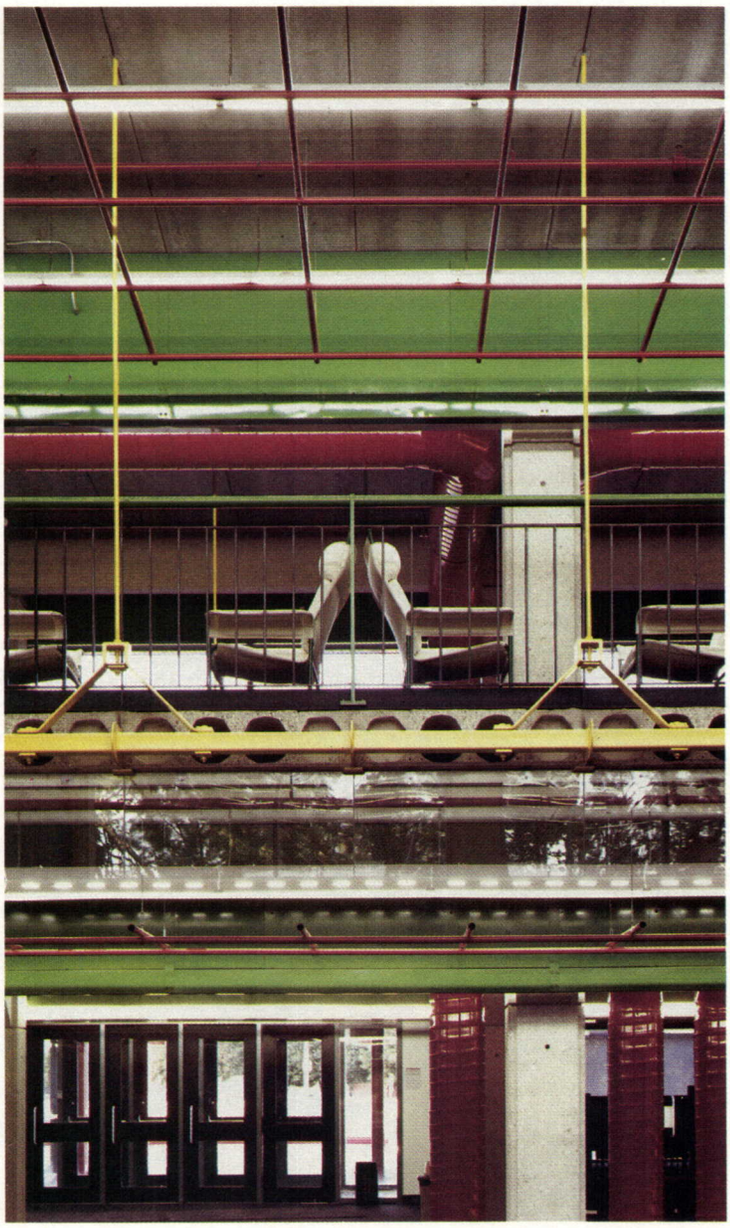
Within this taut wrapper, the architects organized the structure along two sides of a naturally illuminated gallery that relieves the visual oppression of mostly windowless classrooms and labs. It is in this three-story-high space that the structural elements which had been merely glimpsed from outside become a full-scale panorama of concrete columns, beams, and hollow-core floor slabs, mingled with a colorful catalog of pipe railings, supply and return hvac ducts, hangers, and electrical raceways (pages 132-133). Depending on one's mood, the impact can be exhilarating or, especially when the gallery fills with gaggles of chattering students, a little overwhelming. IKOY's Ron Keenberg acknowledges the visual cacophony and admits that if he had to design Wallace again, he might expose only 50 percent of the bright red, 24-inch-diameter ducts that hurtle through the gallery. Even for this dyed-in-the-wool expressionist, less can be more. *P. M. S.*

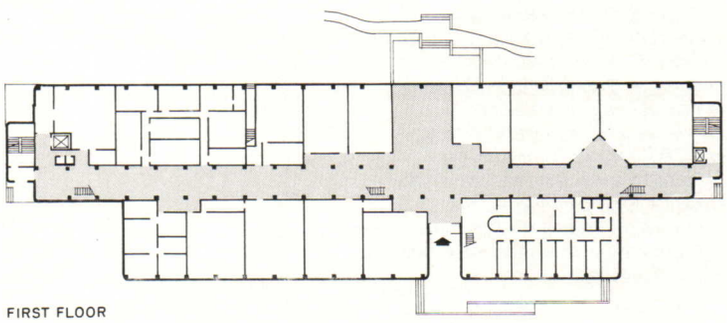


Wallace Building
University of Manitoba
Winnipeg, Manitoba
IKOY Architects

The fact that some students at the University of Manitoba have taken to calling their new earth sciences center the "Darth Vader Building" is probably a function of the structure's idiosyncratic details, especially the fearsome trio of bundled aluminum exhaust stacks (top left, facing page) and the ominous-looking, but ultimately benign, red-painted steel entrance canopy (above).

In the Wallace Building gallery, red supply air ducts, yellow hangers and return ducts, and green stair rails and raceway covers form a vibrant palette that belies the architects' serious intentions—namely, to provide students and faculty with an inviting retreat, including an informal lounge (left, facing page), from the rigors of lab and classroom work. Although high-chrome colors have become something of an IKOY trademark in recent years, the firm is planning a switch to what Ron Keenberg calls "fuller-bodied" tones—subtler shades of blue and lavender, among others—for its latest project, an integrated computer research facility now under construction at the University of Waterloo in Ontario.

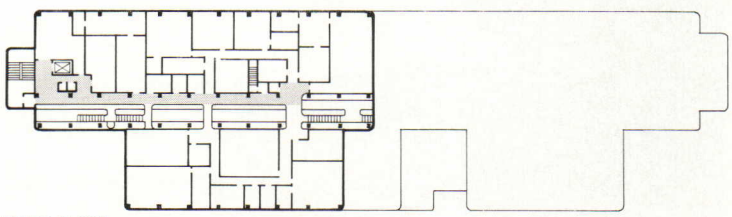




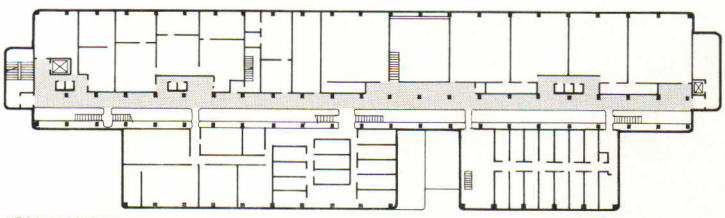
FIRST FLOOR

Wallace Building
University of Manitoba
Winnipeg, Manitoba
Owner:
University of Manitoba
Architects
IKOY Architects—Ronald Keenberg, director of design; Terry Stratton, partner-in-charge; Don Blakey, project architect; Ken Berman, project administrator

Engineers:
William Hanuschak & Associates—Richard Muzyk, project designer (structural); G. H. Currrie & Associates Ltd. (mechanical); AEB Engineering Group (electrical)
Consultants:
Spantec Limited (project manager)



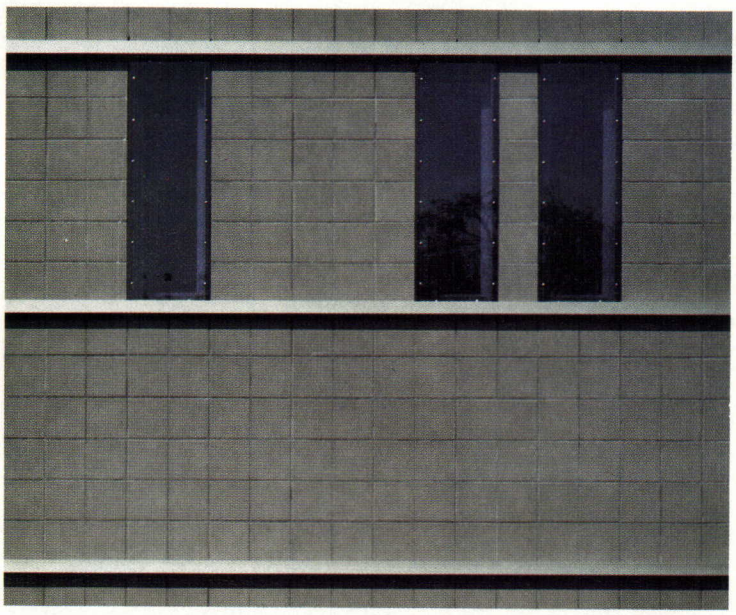
THIRD FLOOR



SECOND FLOOR

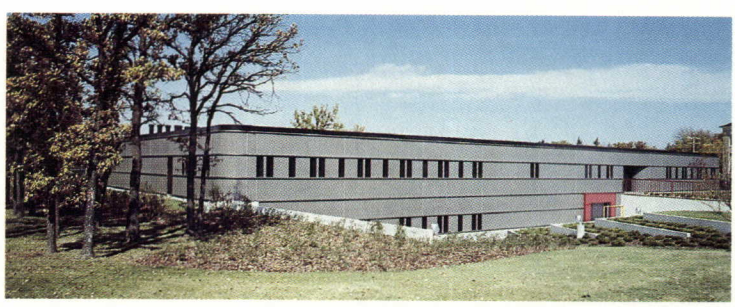
RCMP Forensic Laboratory
Winnipeg, Manitoba
IKOY Architects

Criminal elements



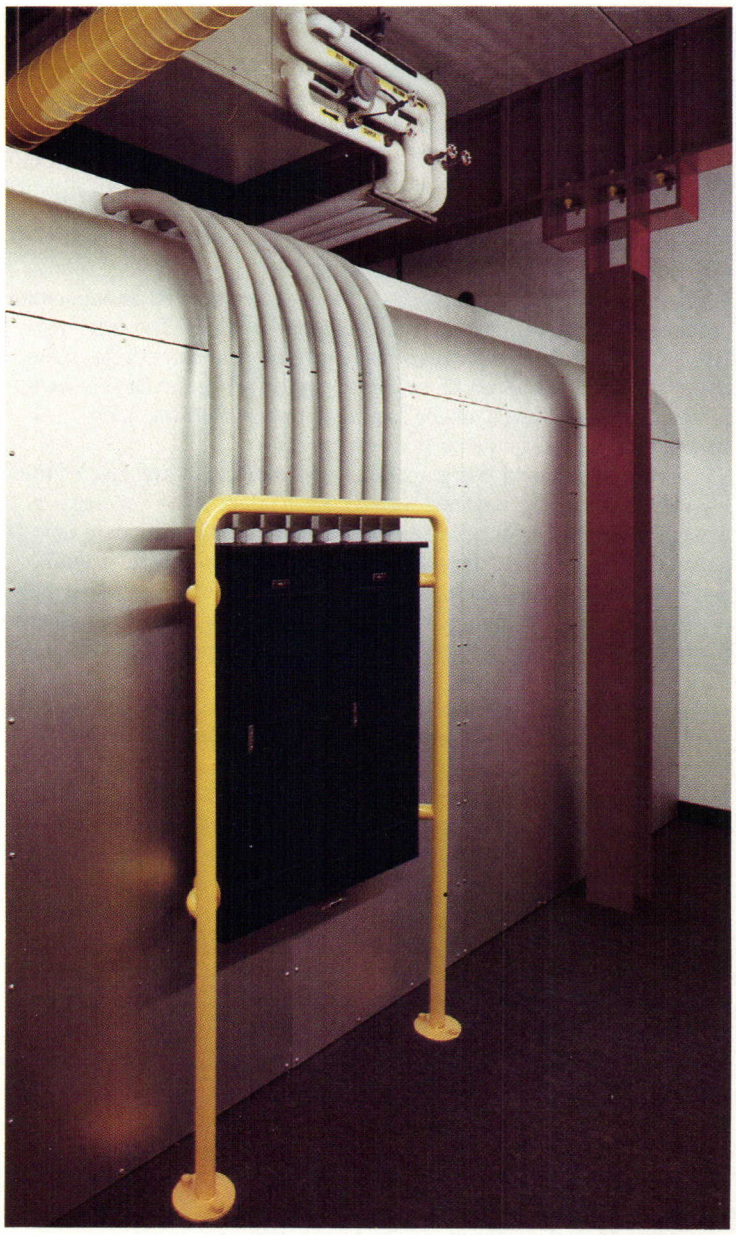
If American perceptions of the Royal Canadian Mounted Police have been hopelessly warped by Hollywood, a visit to the RCMP's new forensic-science laboratory in Winnipeg should dispel any lingering images of Nelson Eddy riding off into the sunset. Like the FBI, the RCMP serves as Canada's federal police force, and the agency operates a network of regional crime-detection laboratories where white-coated scientists analyze bullets, clothing and hair fibers, blood, and other pieces of potential evidence collected in criminal cases. For its 30,000-square-foot Winnipeg facility, the RCMP sought something of a contradiction in terms: an introspective, high-security building set into an open, parklike landscape and an architectural imagery meant to discourage curiosity without seeming too somber or unfriendly. The overriding issue of security meant that IKOY had to eschew the crystalline transparency that characterizes its work at Batoche and the University of Manitoba in favor of something considerably less revealing. The architects' solution—a simple two-story rectangle placed partly below grade—is sheathed in eight-inch-square, glazed concrete block. Although IKOY's Ron Keenberg was unenthusiastic about the need to conceal the interior ("They made me do it," he moans, only half-jokingly), rounded corners, 2 1/2-inch extruded aluminum banding, and narrow, black-glass windows bolted flush with the facade help soften, if not eliminate, the building's inevitably forbidding appearance.

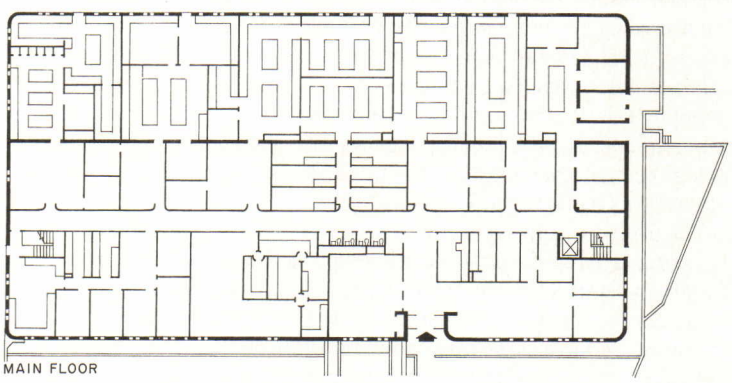
Inside, the architects seem more at home. They have taken a straightforward program—offices and research laboratories devoted to the study of toxins, firearms, alcohol, chemical substances, and drugs—and a fairly prosaic, bilevel layout of rooms flanking a 187-foot-long corridor and produced their sleekest, perhaps most successful, interior to date. While white-painted labs equipped with all the latest tools of the technician's trade are pleasant enough, it is out in the hallway that IKOY has created a tour de force of industrial imagery that seems more evocative of the corridor on a bullet train or the passageway of a nuclear-powered submarine than of anything in the realm of stationary architecture. One corridor wall, sheathed in gently arching, gray aluminum sheets, is broken down into bays articulated by electrical switching boxes, red steel columns, and small laboratory "vestibules" whose doors are clad in rubberized, raised-dot flooring; the other wall is an unbroken row of doors covered in black melamine panels. Both finishing materials are screwed into metal framing studs, their exposed rivets imparting the impression that this building has been battened down, sealed, and, above all, extraordinarily well-assembled. IKOY has transformed Le Corbusier's machine for living into a finely tuned instrument for solving crime. *P. M. S.*



If the exterior of the RCMP's forensic facility seems a bit grim, the interior comes across as relatively playful—in its own mechanistic way. Along the main-floor corridor, hollow yellow pipes protect switching boxes from the stray lab cart (below left). On the opposite side of the hallway, supply air ducts emerge above red scaffolding that conceals an electrical raceway and fluorescent lighting fixtures (right).

RCMP Forensic Laboratory
Winnipeg, Manitoba
Owner:
Royal Canadian Mounted Police
Architects:
IKOY Architects—Ronald Keenberg, director of design; James Yamashita, partner-in-charge; Arthur Buse, project architect
Engineers:
William Hanuschak & Associates—Richard Muzyk, project designer (structural); E. J. Faraci & Associates (mechanical); AEB Engineering Group (electrical)
Consultants:
Hilderman, Witty, Crosby, Hanna & Associates (landscape)
General contractor:
PCL Constructors Western Inc.





Indigenous high-tech

Can a university hospital be indigenous, rooted in a traditional vernacular, and high-tech all at once? Challenged by the Aga Khan to design such a phenomenon, architects Thomas Payette and Mozhan Khadem have produced a unique medical complex that could become a prototype for other such facilities in the Third World

It is by now widely known in architectural circles that the Aga Khan is the world's leading patron of architecture. The founder of the Aga Khan Award for Architecture, which seeks to recognize architectural achievement by and for Muslim peoples, he has also established the Aga Khan Program for Islamic Architecture at Harvard and MIT and sponsors the architectural journal MIMAR. The recently completed Faculty of Health Sciences and the Aga Khan University Hospital bring his interests in architecture and medicine into conjunction. This complex is phase one of the newly constituted Aga Khan University, based in Karachi, which will eventually have a full range of academic departments, including the possible establishment of faculties in other countries.

The medical center comprises a 721-bed teaching hospital, a community clinic providing referral service to 1,500 outpatients daily, a medical school, a school of nursing (RECORD, October 1981, pages 81-90), male and female student housing and, eventually, a mosque. Located on 84 acres of land donated by the government of Pakistan, the complex was conceived in 1970 to address the shortage of trained medical personnel and improve the health-delivery system throughout the country. By frequent participation in the design process, the Aga Khan played a significant part in the conceptualization and design development, as did his brother, Prince Amyn, who paid particular attention to interior design and ornamentation. Architects Thomas Payette, Mozhan Khadem, and their design team began the task by undertaking an on-site study of historic and vernacular architecture in Spain, North Africa, the Middle East, and Pakistan. This research and study produced guidelines for the physical layout, architectural development, landscape, and interior design of the facility.

It was determined from the beginning that the complex should be an architecture of continuous interior spaces surrounding the observer rather than an "object building" standing apart and aloof from him. Thus the diverse physical requirements of the different facilities were incorporated into one organic whole, and the different architectural functions are represented through the identification of appropriate entrance portals, fountains, changes of levels, and vistas. The visitor, therefore, is not aware of the exterior geometry of any particular edifice within the complex. Instead his architectural experience consists of movement through portals, transitional spaces, and courtyards. Each courtyard has its own character, expressing its particular relationship to the functions that surround it.

It was also decided that attention was to be paid to surface treatments in order to, in the words of Khadem, "focus the intrinsic architectural characteristics of the complex and express the geometry of the design and the structural concepts of the building more eloquently. Surface treatment in Islamic architecture seldom depicts a story as do frescoes in a Christian church. Be it calligraphy or a composition of motifs based on natural forms, it possesses significant symbolic, cultural, and theological meaning. Different kinds of birds, trees, and flowers have differing symbolic significance. Depending on the degree of sophistication of the observer, he can discover in such imagery and calligraphic designs many layers of literary, cultural, and religious concepts." Indigenous arts, crafts, and building techniques were to influence form, construction, and ornamentation.

Offsetting this concern with the traditional was the demand that the medical, research, and teaching facilities be state-of-the-art. Structures were to be designed to handle the most advanced technological equipment. Furthermore, the complex had to be designed and zoned for the future expansion of all major activities. The hospital, set back from the road to minimize noise, will accommodate expansion either by duplication of entire units or expansion of individual departments. The entire complex is laid out horizontally, rather than vertically, to avoid dependence upon elevators. To achieve quality and flexibility in the direct care of the hospitalized, rooms are designed for privacy, incorporating space for controlled treatment. The ward units are located on a quiet section of the site, within easy reach of the necessary services of the main hospital. All the surgical beds are located on level one with access to surgery immediately adjacent.

The private wing is an inpatient facility consisting of four floors of private-room accommodations, connected to the main hospital by a corridor on level one. Each floor has one nurse station servicing approximately 30 private rooms. Many can be utilized as sitting rooms for a patient's family, since it is common in Pakistan for relatives to stay in the hospital with the patient.

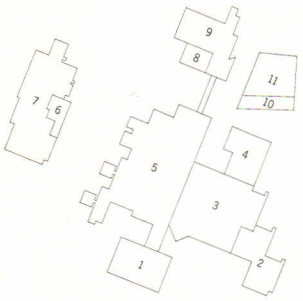
The medical school lecture halls have been designed to accommodate both highly sophisticated and traditional teaching aids. The teaching labs include capabilities for rear-image projection and are designed so that classrooms and research spaces along the perimeter can be used for small groups of students or special activities while the main teaching lab carries on its normal activities.

The student housing is organized around courtyards and divided into separate facilities for men and women. Each offers private rooms, which function as study areas as well as bedrooms. To eliminate the necessity of air conditioning, the rooms are located on single-loaded corridors for cross ventilation. The open side of each gallery is partially covered by a trellis of bougainvillea, which provides shade and privacy for students walking along the corridor to the common toilet and shower facilities at building junctions.

Now that the medical complex is virtually complete, it must be asked whether a horizontally stretched, rather than a vertically stacked, hospital will turn out to have been the best solution. With few exceptions, of which this particular medical complex is the most notable, large modern hospitals are designed as high-rise as well as high-tech buildings, efficiently arranged with support services at or below ground level, medical services in the middle section, and the patient private rooms and wards at the top, all three segments rapidly interconnected by elevators. Elevators are problematic in the Third World because of power shortages and difficulties of maintenance, this being one of the principal reasons given by the architects for choosing a low-rise solution. Since Third World luxury hotels manage to keep elevators in operation, however, the "elevators are impractical" rationale for the medical complex's horizontal spread appears disingenuous. In truth, it was the mandate given to the architects by the Aga Khan to adapt traditional forms to a high-tech building type that precluded a high-rise elevatored scheme.

Does the horizontal organization of services along the 1/4-mile-long corridor, taking the place of more typical vertical configurations connected by elevator shafts, work efficiently? The Payette team has carefully balanced adjacencies so that patients requiring surgery or other complex technological services are located near them, and other planning relationships work smoothly. And although additional staff is required to transport laundry, food service, and supplies back and forth along the main corridor, the hospital facility was intended to be labor-intensive as befits a Third World economy.

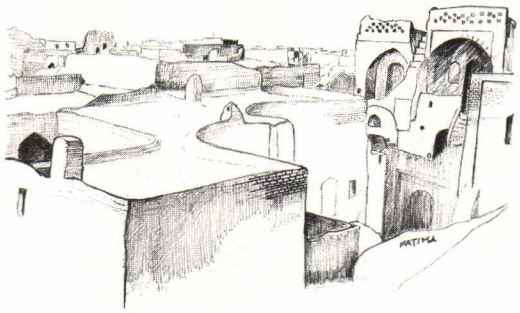
The principal benefits of the horizontal scheme are manifest in the beautiful courtyards and gardens—the larger filled with Pakistani families who traditionally come in large groups to give comfort to and await the fate of their loved ones, and the smaller for inpatients, or students. Because these courtyards facilitate cross ventilation, making air conditioning mandatory only in the private wards, clinics, treatment rooms, surgeries, and labs, considerable energy savings have been achieved. In many respects this hospital and teaching facility can serve as a model for medical facilities currently being planned for the developing world. Worthy of careful study, it has much to teach about the design of spaces that comfort, the techniques of building in warm climates, the uses of ornament, and the revitalization of indigenous craft. *Mildred F. Schmertz*



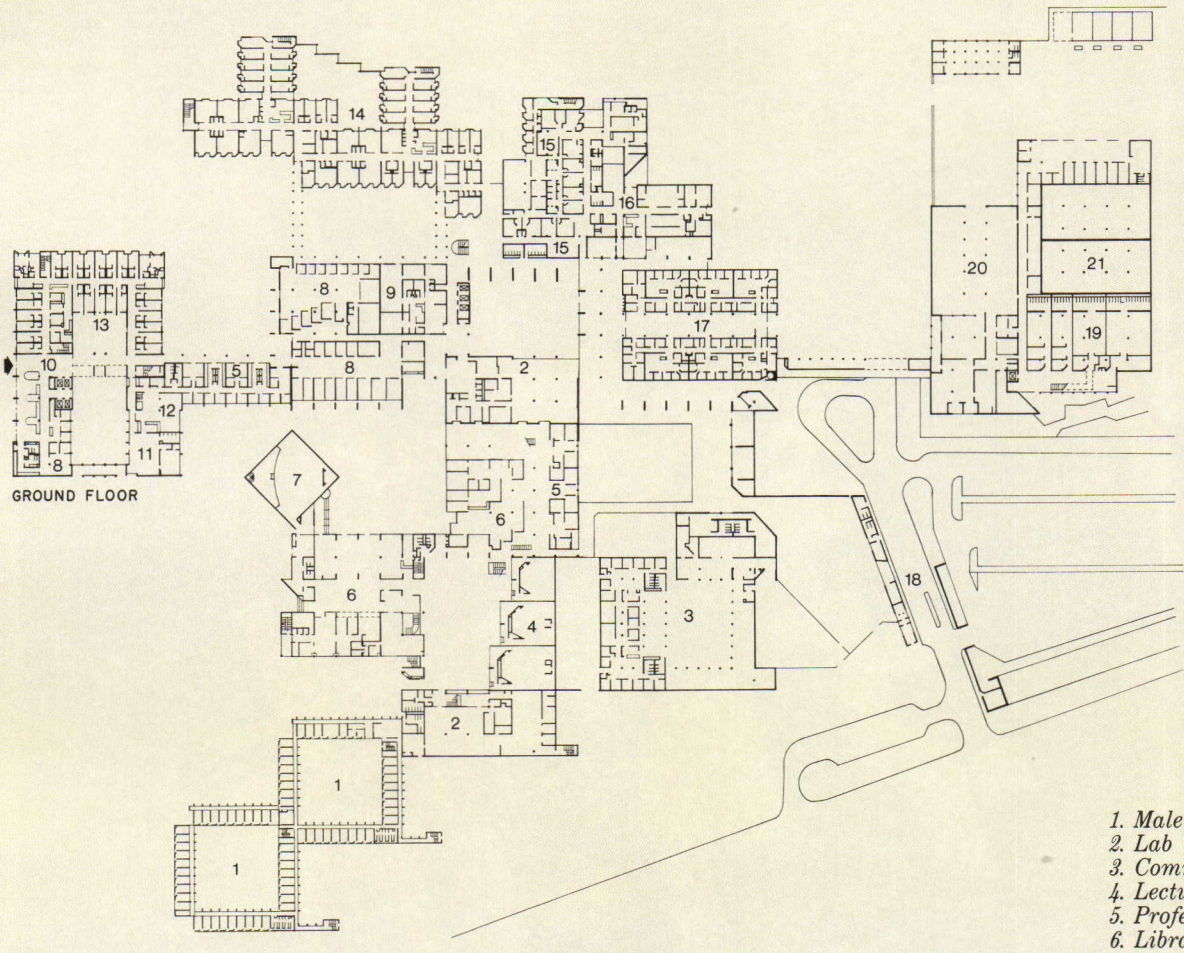
1. *Private patient wing*
2. *Male hostels*
3. *Medical college*
4. *Community clinic*
5. *Hospital*
6. *Nursing school*
7. *Female hostels*
8. *Plant*
9. *Service building*
10. *Gate house*
11. *Mosque*

Aga Khan University
Hospital and Medical College
Karachi, Pakistan
Payette Associates, Architects
Mozhan Khadem,
Design consultant

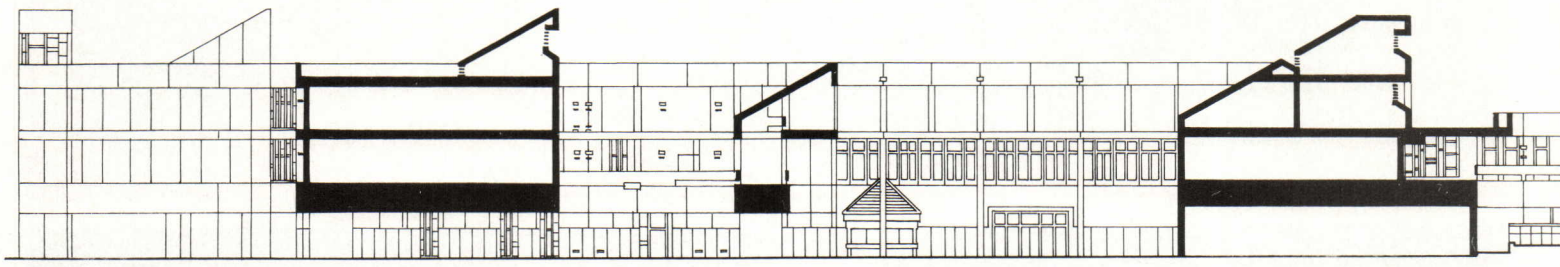
©*Paul Warchol photos*

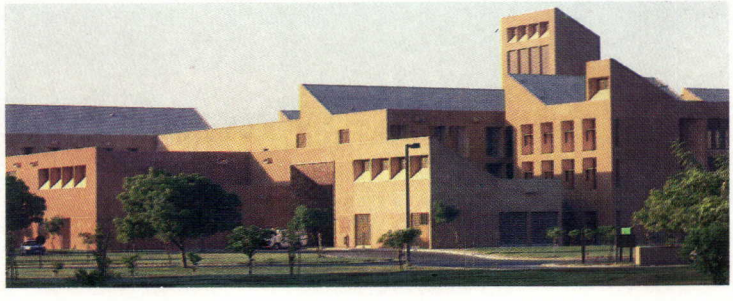


The complex has been designed as an architecture of continuous spaces that surround the observer, as in this sketch of roofscapes (left) in the Iranian village of Murchekhort. This concept, which is also to be found in other Islamic art forms such as miniature paintings and rug designs, is in contrast to the idea of the building as object, and was considered by the Payette design team as a more appropriate



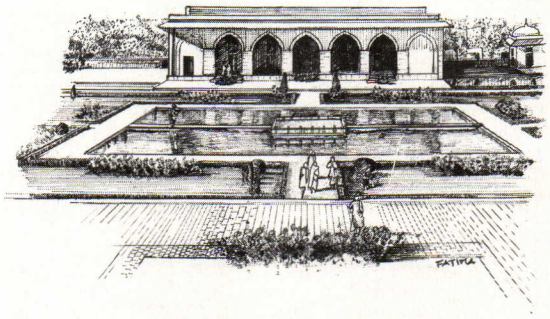
1. *Male hostels*
2. *Lab*
3. *Community clinic*
4. *Lecture halls*
5. *Professors' offices*
6. *Library*
7. *Auditorium*
8. *Administration*
9. *Physical therapy*
10. *Entry lobby*
11. *Doctors' lounge*
12. *Transcription*
13. *Patient rooms*
14. *Patient wards*
15. *X-ray*

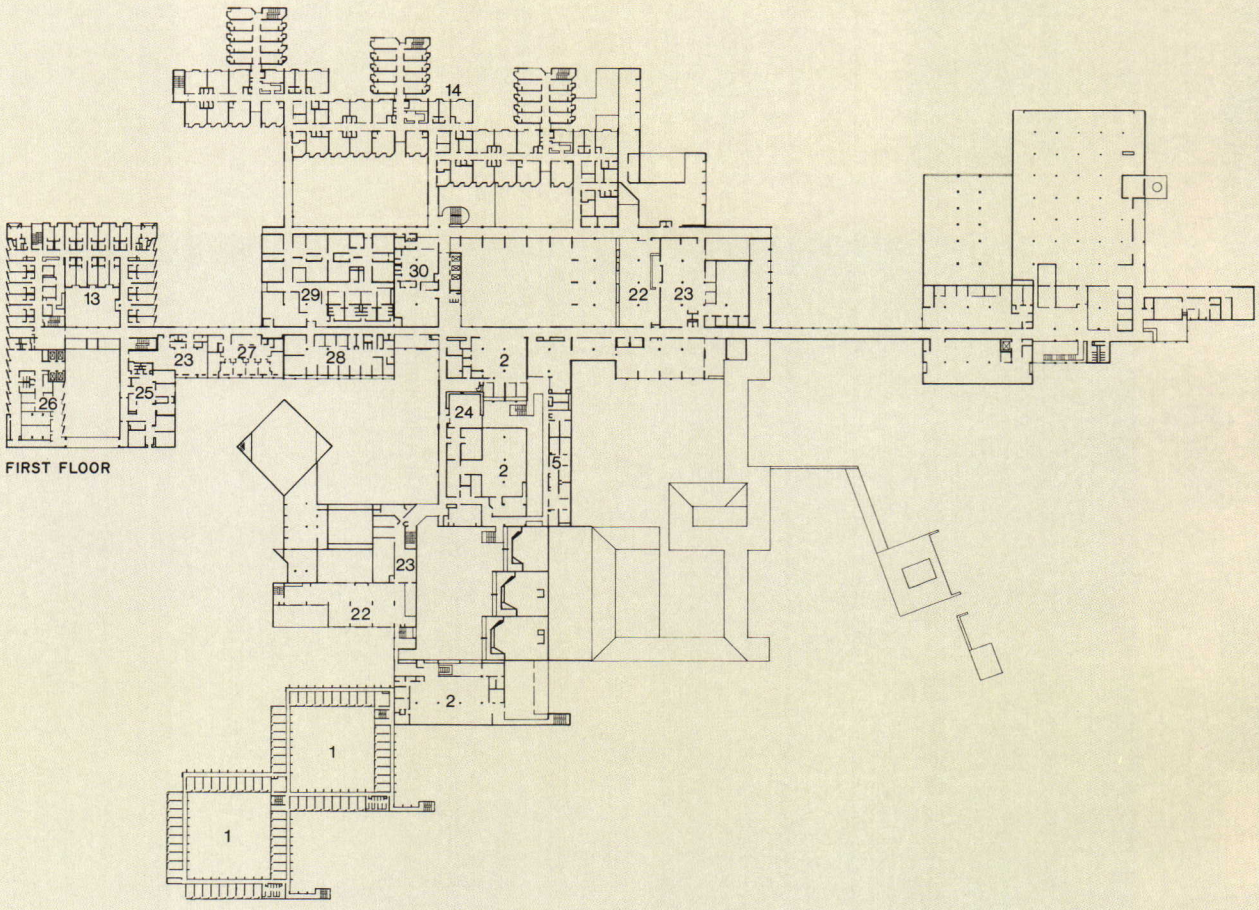




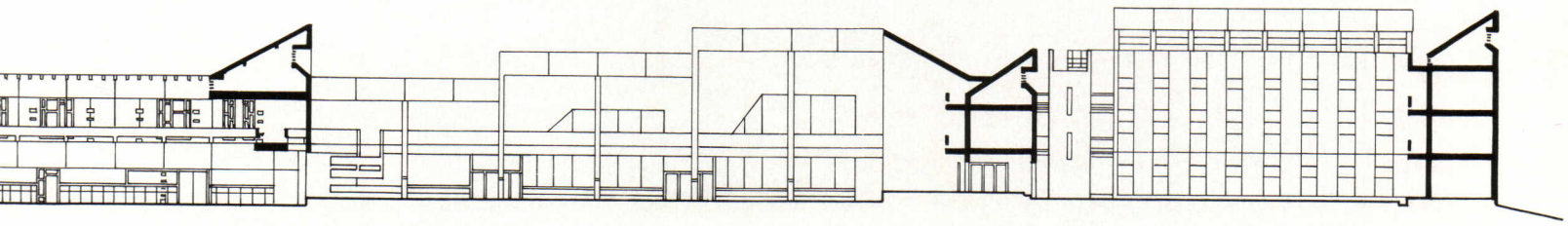
The basic building forms were configured in an L shape and oriented toward the prevailing westerly and southerly breezes from the Arabian Sea. The sloped roofs and integrated air scoops (left and section above) catch the air currents that travel over the buildings, causing the breeze to pass through and cool the shaded attic spaces. In air-conditioned areas, such as clinical and treatment rooms, a deep

expression of the way of life of the Pakistanis. The Jihangir Court (right) in the Akbar Fort in Lahore was a source for the design, as were other historic Islamic sites. The medical complex courtyards, however, unlike their historical prototypes, are not symmetrical in plan or landscape. References to tradition are found in ornament and other forms of surface enrichment.

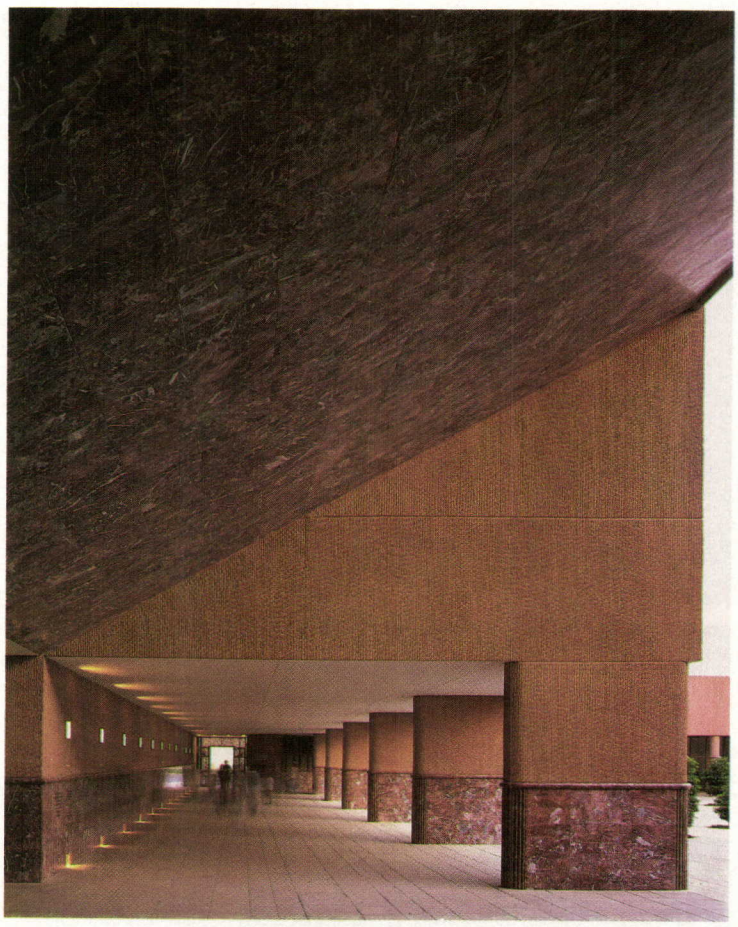




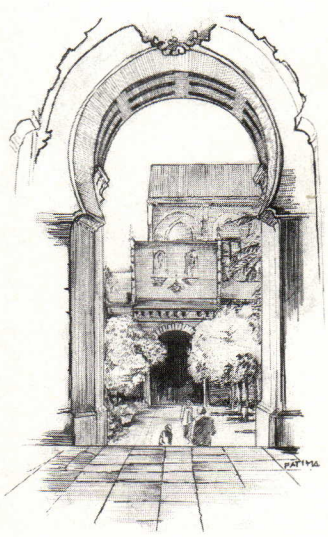
16. Emergency
17. Outpatient
18. Gate house
19. Locker rooms
20. Plant
21. Water storage
22. Dining
23. Kitchen
24. Autopsy
25. Delivery
26. Nursery
27. Cardiac care unit
28. Intensive care unit
29. Surgery
30. Central sterile supply department



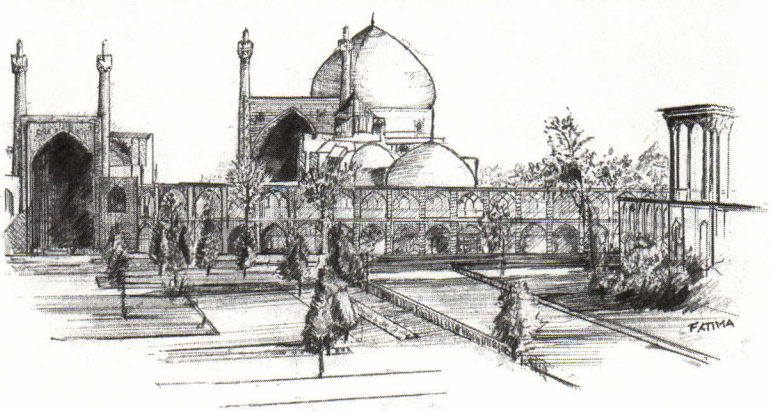
plan was acceptable. In non-air-conditioned areas, however, such as patient wards, office spaces, and public corridors (right), shallow planning allows for the maximum use of cross ventilation. Windows facing the sun are recessed and angled. Landscaping and shadows cast from adjacent structures all help to cool the air before it enters the buildings.



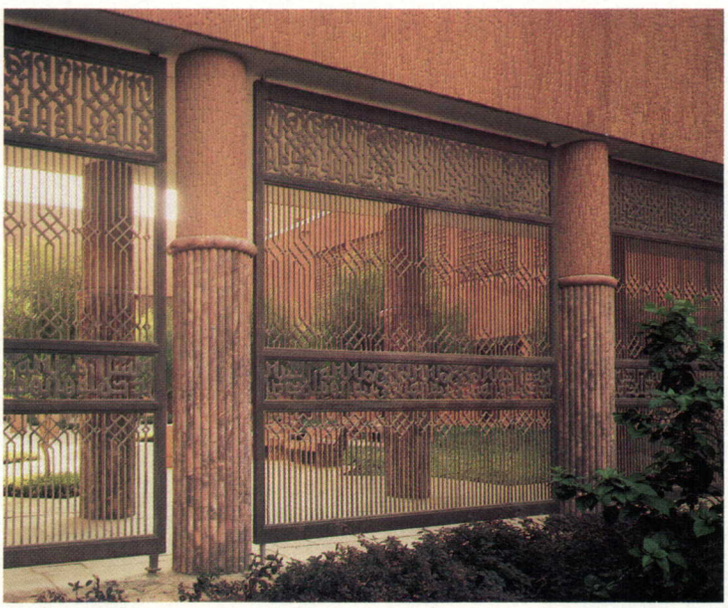
Entrance portals have been significant features in traditional Islamic buildings, and were often the only means by which mosques could be distinguished from caravanserais or other building types. Just as importantly, such portals announced the beginning of the esthetic experience. These doorways have traditionally received very special volumetric and surface design. Inspired by this custom, all the entrance portals and gates of the hospital and medical college have been designed with great care. Most have calligraphic ornamentation comprising Koranic verses. The main entrance of the complex (facing page) is, like all the other entrance portals, covered in marble with the quotations from the Koran incised in mirror image to form a border motif. Offering further guidance to the Payette team is the fact that in traditional Islamic buildings, transitions from portals to passageways to courtyards are handled with great artistry, as the sketch of a mosque in Cordoba, Spain, indicates. In the medical complex, entrance portals lead to transition spaces (top and bottom left), which prepare the visitor for succeeding architectural experiences. These openings and passages partially or completely conceal the full spatial impact of courts that lie beyond.

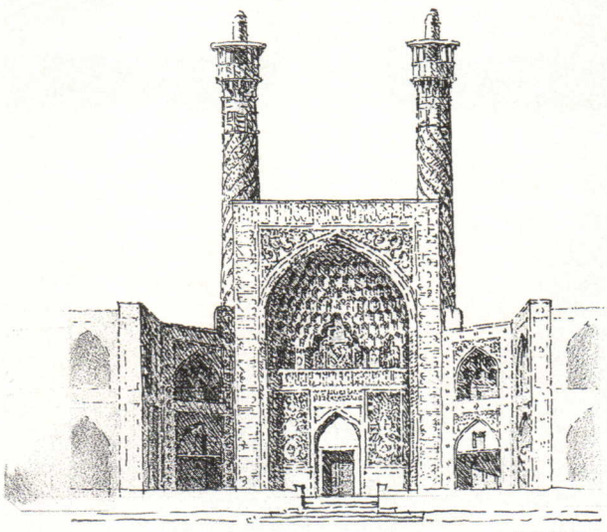


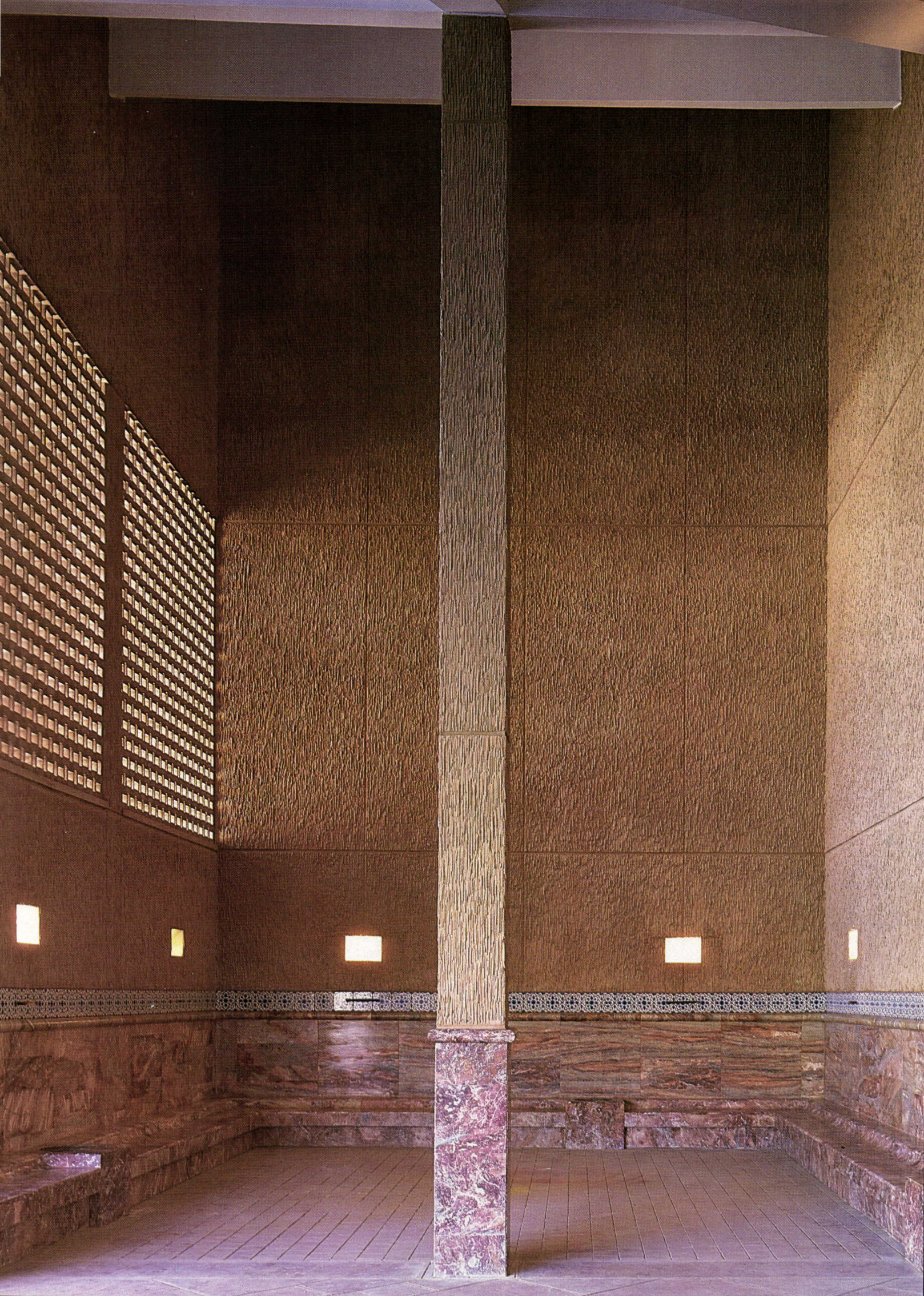
Although none of the courtyard spaces are intended to have the grandeur or formality of the Meydan-I-Shah, in Isfahan, Iran (sketch below), some seem ideal for private contemplation (top right and facing page), others define waiting areas for hospital patients and visitors (bottom right and pages 144 and 145), while those in the medical school and the school of nursing encourage student interaction. Developed by landscape architect Garr Campbell as oases with appropriate vegetation, surface treatment, and water, they are not only visually pleasing and restful, but effective climate-control elements. Within the courtyards and passageways, local marble has been used for wall and column surfaces to accent and protect heavily used public spaces such as entries and foyers. Durable, beautiful, and needing minimal maintenance, it is used on surfaces close enough to be touched. Marble has indeed been used throughout the complex, in patterns adapted from tradition, for paving courtyards, pools, and wherever enrichment of detail was desired. By the selective use, judicious adaptation, and refinement of indigenous forms and finishes, older Islamic building vocabularies have been successfully transformed for contemporary use.



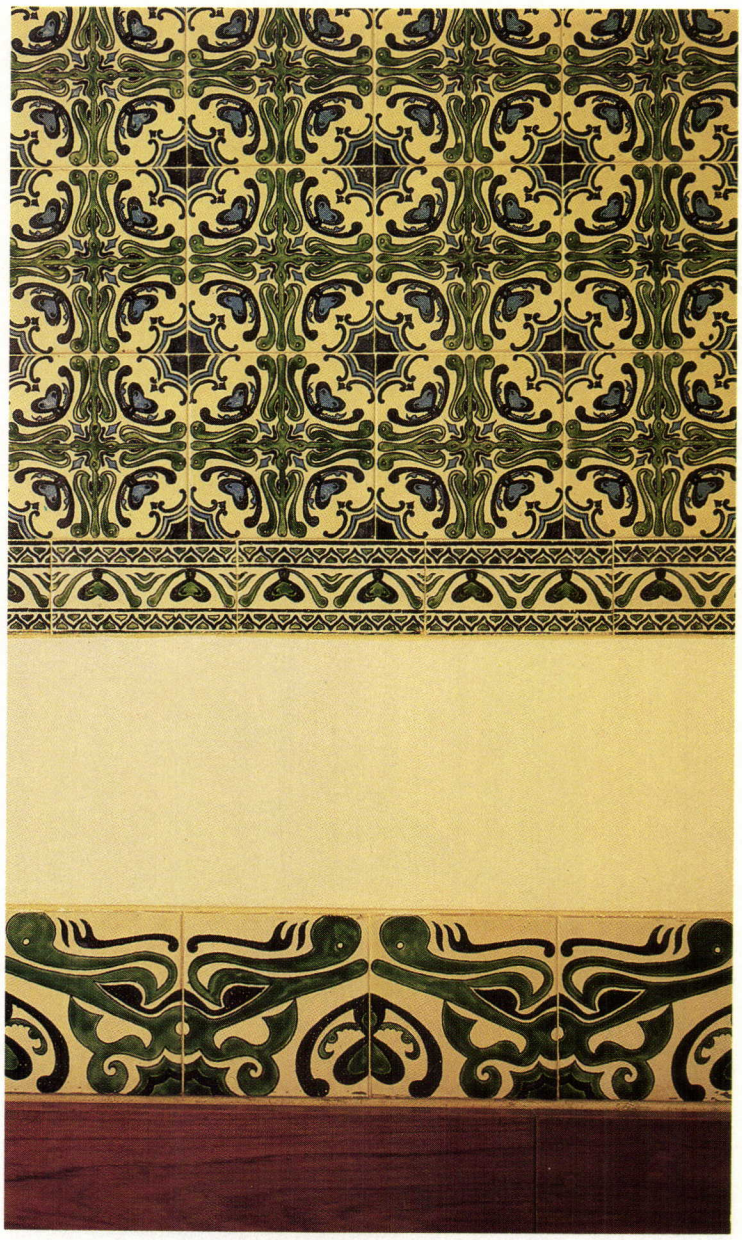
All of the significant traditional architectural works in Islamic cultures demonstrate a high level of collaboration among architects, builders, and the indigenous artists and craftsmen. The rich elaborations of a great tile designer, muqarnas worker, ornamental metal artisan, calligrapher, wood, plaster and marble carver, or rug and fabric weaver cannot be separated from the esthetic of the whole. The medical complex makes extensive use of indigenous building materials, processes, and systems. Many appropriate local building ideas, methods, techniques, and details were either modified or directly incorporated in the design. Building walls are of double-insulated concrete block with a textured cement plaster finish referred to as weeping plaster. Traditionally, this handcrafted finish is applied and then painted, but in this contemporary application, a natural pigment was added to the cement to make it less susceptible to fading and peeling. The color blends well with Karachi's reddish soil. The striated texture of the weeping plaster casts its own shadow, thus cooling portions of the exterior wall and reducing glare. The photos on this and the facing page indicate how Pakistani marble, weeping plaster, terra cotta "jali block" screens, and bronze gates enhanced by calligraphic ornament have been combined to rich effect. Inspiration for contemporary embellishment was found in such great traditional works as the Masjed-I-Shah in Isfahan, Iran (sketch below).








بسم اللہ الرحمن الرحیم
دانتوں کا کلینک
Dental Clinic



A number of Islamic calligraphic styles, such as Tuluth, Kufic, Nastaliq, etc., using quotations from the Koran, have been incorporated in tile ornamental borders (facing page). The calligraphic work at the top of the tile panel (left) was designed to evoke the image of flowers. The forms are based on the word Mohammad. According to the popular stories of Miraj (The Heavenly Journey), the emergence of the flower "rose" on earth related to the heavenly journey. The double-mirror imaging is intended to evoke the four theosophical realms of Lahout, Malakut, Jaharut, and Nasut. The calligraphy at the base of the panel can be read by the knowing as the word Mohammad used in mirror image based on Maqhrebi Kufic script. This calligraphic border was designed to evoke the image of the legendary bird simurgh, depicted as the object of the quest of man in his journey from the self to the Self.

Adding impetus to the desire of the Payette design team to use indigenous materials and finishes was the hope that the medical complex could become a catalyst for the upgrading of the building-materials industry within Pakistan. Among the products selected were Hala tiles. Hala is a small town 160 miles northeast of Karachi where the art of making and painting tiles dates back to the early 8th century. The tiles available, however, did not meet an acceptable standard and lacked the quality in craft of the traditional tiles. In the hope of finding a way to improve the product, the architects journeyed to the Hala factory. They found the artisans sitting on the ground, pounding the clay with their hands, just as their forefathers had done. Asked to come to Karachi to work at a tile factory that met contemporary standards of manufacture and price, the artisans at first refused. After the project and the design were explained to them, they agreed to help the Payette team at the Shabbir Tile factory in the city. Tradition and contemporary technology were blended. From the beginning, the artisans rejected the stools and benches and began working on the factory floor. The factory workers didn't hesitate to sit beside their teachers. Before long, the intricate designs in the traditional Hala pigments of green, dark blue, and light blue were produced in size and strength consistent with modern tiles. Since the completion of the Aga Khan Hospital and Medical College, the dying tradition of Hala has been rejuvenated and is once again being used extensively in Pakistan.

Aga Khan University Hospital and Medical College
Karachi, Pakistan
Owner:
The Aga Khan Foundation
Architects:
Payette Associates; Mozhan Khadem, design consultant—Payette Associates team: Thomas Payette, principal-in-charge; John Ruffing, project architect; Peter Haney, Dan Meus, Gary Graham, Dennis Kaiser, project managers; Jonathan Warburg, site management; Thomas Walsh
Local consulting architect:
Bhamani Associates Ltd. Site architect: Farouk Noormohamed
Engineers:
Simpson Gumpertz & Heger, Inc. (structural); Mushtaq & Bilal (local engineering consultant); Lehr Associates (mechanical/electrical); Anwar Saadat & Company (local mechanical engineering); Zaheeruddin & Partners (local electrical engineering consultant)
Landscape architects:
Garr Campbell/Sasaki Associates and Aiglemont Secretariat
Consultants:
Herman and Lees (signage and graphics); Hospital Corporation International, Kaiser Foundation International (hospital consultants); Hayley and Aldrich (soil and ground water); Tenda (UK) Limited (calligraphy design)
Contractors:
Trolloppe Colls Cementation Overseas Ltd., UK (main contractors); Ellis Pakistan Ltd., UK (mechanical and plumbing); Phoenix Pakistan Ltd., UK (electrical); Allied Medical Group Ltd., UK (medical equipment)
Construction managers:
D. J. Jones and Partners, UK Turner International Industries Inc., USA (to June 1982)

The principal auditorium (facing page and above) is decorated with "jali" screens of teak combined with a ceiling of patterned plaster panels. Although these surfaces closely resemble handwork, they are a result of a semi-industrialized process carefully worked out by the Payette team in collaboration with local craftsmen, as are the decorative incised metal borders on the back of the seats. Similar plaster surfaces in the medical school auditorium (top) are combined with panels of printed silk.


EXIT

Hvac systems: In pursuit of comfort

By Ivars Peterson

The two articles comprising this month's architectural engineering section are concerned with the design of heating, ventilation, and air-conditioning (hvac) systems. "In Pursuit of Comfort" is a report by science journalist Ivars Peterson, on the state-of-the-art within the hvac industry. Drawn from interviews conducted with engineers, architects, and building owners from around the country, the article considers a broad range of topics, including energy conservation, new methods for calculating cooling and heating loads, safeguarding the efficient operation and maintenance of hvac systems, and the education of future hvac professionals. There has been tremendous progress made in the field during the past decade but, as Peterson's sources indicate, developments of even greater proportion are near-at-hand.

"Tempering a Landscape," which begins on page 154, presents an innovative hvac design for a two-acre, glass-enclosed atrium space under construction in Nashville, Tenn. The Cascades, a name given to this six-story wonderland surrounded by hotel rooms, was designed by the architectural firm of Earl Swensson Associates, Inc. as an extension to a similar facility at the Opryland Hotel. Mechanical engineers for the Cascades, I. C. Thomasson Associates, Inc., were charged with creating a thermal environment that is sympathetic to the conflicting needs of users and lush, tropical plant life. The engineers were challenged, furthermore, to make their system invisible from within the atrium. This they did by ingeniously concealing ductwork and grilles within manmade rock formations, and the sections of pedestrian ramps and bridges. D. R.

Take away a skyscraper's heating, ventilation, and air-conditioning (hvac) systems, and you'd be left with an uninhabitable steel, concrete and glass shell. The structure would retain its sleek, elegant look, but no one would be able to live or work comfortably inside the building for any length of time. According to historian Carl W. Condit, improvements in mechanical systems during the 19th century contributed as much as advances in structural design and materials toward making high-rise commercial buildings possible. Furthermore, effective hvac systems are essential for today's hospitals, industrial plants, laboratories, shopping malls, concert halls—any spaces where people congregate or work and where they must be kept safe and comfortable.

Hvac: an evolving science

Despite the crucial role they play, hvac systems are practically invisible when they are doing their jobs properly. "When you walk into a building in which the environment is good, you don't even notice it," says Donald R. Bahnfleth, president of ZBA, Inc., in Cincinnati. "Therefore, you don't comment on it," he says. "You notice the one that's bad. It's the one that sticks in your mind." Although most building hvac systems function well, says Bahnfleth, there are enough bad ones around to suggest that some changes in hvac system design and operation may be desirable.

Israel A. Naman of I. A. Naman & Associates, Inc. in Houston is somewhat more critical. In a paper presented last year at a conference commemorating the second century of the skyscraper, he noted, "Present air-conditioning systems are complex and difficult to operate properly; they are inefficient and frequently cannot provide satisfactory levels of comfort." He cites a combination of poor design, installation, operation, and maintenance as contributing to the problem. "Most building systems never perform the way the designer intended them to perform," he says.

Ivars Peterson is the Technology and Policy Editor for the weekly newsmagazine, Science News.

Examples are easy to find. Newspaper reports, for instance, document the continuing problems at the two-year-old, $172-million State of Illinois building in Chicago, where a modern heating and cooling system designed to be energy-efficient isn't operating as required. Workers in the building complain that summer temperatures are too hot and winter temperatures are too cold. System designers contend that unanticipated changes in specifications during construction, such as the use of single-pane rather than insulating glass, have affected the system's efficiency. Moreover, software problems have plagued the building's computer-controlled ventilation system, which is now being operated manually.

Last October, at the new Convention Center in Washington, D. C., participants at the 10th Triennial Congress of the International Council for Building Research, Studies, and Documentation (CIB '86) complained bitterly during at least one session when the hall's noisy air-conditioning system sent disturbing blasts of cold air into the room.

Even simple errors can lead to significant problems. A Texas church suffered air-conditioning troubles until an inspection showed that a unit for chilling water to the right temperature had been shipped from the factory with the wrong thermostat. When the system was installed, no one had bothered to check the water temperature.

A recent survey by The Trane Company, based in La Crosse, Wis., shows that frequent interruptions of hvac service and poor temperature control are major reasons that commercial tenants give for not renewing their leases and for relocating. According to the Trane report, "Spaces that are too warm or too cool are the number one complaint in existing buildings." The report goes on to say,"Greater emphasis on the maintenance and service of existing comfort systems, additional training for building operations personnel, and more attention to original system design for new facilities is recommended to developers."

Says Bahnfleth, "The challenge for the architect and the engineer is to establish what the owner really requires." Bahnfleth identifies three key factors that define a given project: its scope, the budget, and the desired quality, and he says the design professional must retain control of at least one of these three factors.

Engineer and owner must collaborate closely

Many problems stem from a developer's or owner's desire to keep costs as low as possible. Often, when a building project goes over budget or contractors' bids are higher than expected, hvac systems are among the first features to be cut back to save money. "The whole question of how engineers, architects, owners, and contractors function as a team is very important," says Bahnfleth. "It means maximum communication on a nearly continuous basis so that you resolve issues immediately."

Bahnfleth's company, ZBA, started out in 1957 as a firm of consulting engineers operating in the traditional manner, but it soon sought ways to make closer contact by working with clients directly rather than through an architect or some other intermediary. "If you're trying to solve and serve a client's real needs, you really have to have a close relationship with the client," says Bahnfleth. "You can't be at arm's length, which is the way many mechanical-engineering firms have to operate." By 1973, ZBA had added an architectural division to support its engineering work.

ZBA's approach, with its emphasis on creative problem-solving and close consultation with clients, is somewhat unusual in the field of hvac engineering. About 40 percent of the firm's work involves development of master plans, examination of leading-edge technologies to see what may be appropriate or useful for clients, and finding innovative solutions for problems encountered by clients. Often, ZBA's feasibility studies offer a range of solutions, from which the client can choose one that fits best. ZBA's projects have included comprehensive redesigns of mechanical and electrical systems; designs for diesel-engine test

facilities; chilled-water plants; coal-fired central-heating plants; and special facilities such as laboratories and clean rooms.

Two crucial steps start off a typical project. "We deliberately force a lot of interaction with the client," says Bahnfleth, "to be sure that we understand what he really has to do." In this way, both the objective and the problem can be clearly defined. Then ZBA staff, starting from scratch, evaluates the situation. As staff members begin to understand the problem better and better, the plan of attack often changes. The client's original thoughts and plans may have been based on apparent symptoms rather than on the real problem.

Bahnfleth cites the case of a major foundry, which pumped about 50 million gal. of water every day and was having frequent pump failures. The company's chemists, who knew a great deal about water treatment, came up with some very expensive schemes for treating the water to change the way it flowed. ZBA engineers were invited to take a look at the situation. They found the problem wasn't chemical at all; it was cavitation (the generation of a partial vacuum that puts great stress on mechanical parts). The answer was to add a control valve to make sure the flow rates and pump speeds were well matched so that sufficient water always reached the pump.

"We try to go back to ground zero and look at the problem from a total- systems point of view," says Bahnfleth. "We can develop solutions where other people may focus on one piece of the problem."

One important design consideration is ensuring that hvac systems, no matter how complex or sophisticated, can be maintained and operated easily, says Donald E. Nichols of I. C. Thomasson Associates, Inc. in Nashville, Tenn. "But the fact is that a lot of owners don't even attempt to do the easy job of maintaining their buildings." (This was not the case when I. C. Thomasson Associates designed the hvac system for a major extension to the Opryland Convention Center, pages 154-157.) It's not uncommon for engineers who have been called in to determine the cause of poor ventilation and other environmental problems to discover that details such as clogged filters and broken fan belts are frequently the culprits. One inspection, for example, uncovered filters that hadn't been changed since the building had been constructed; several had been pulled out of their frames and were found wrapped around fans; in other cases, broken fan belts meant that motors had, perhaps for years, done nothing more than spin in place.

Every hvac system is a little different. System designers routinely produce operation and maintenance manuals for their clients and even run training seminars after a building is completed and its hvac system has been tested and is operating as it should. "We prepare whatever is necessary, depending on the scope of the project," says David S. Butler, Sr. of Bowron & Butler Consulting Engineers in Jackson, Miss. "That helps somewhat, but the problem is far from being solved." There's no guarantee, even with well-designed and clearly written manuals, that the persons responsible for operating and maintaining building systems will be able to understand and execute the instructions. A few firms are now looking into video and other means for conveying essential information.

Butler likes the idea of taking a building on "a shakedown cruise" by letting the design engineer work with the building for several months after it's completed and turned over to the owner. "Let the engineer himself get involved," says Butler. "Let him live with it and teach the building owner and operators how it's supposed to function, how to maintain it, and how to operate it." Some companies, including I. C. Thomasson, have tried that approach, but few clients are willing to pay for the extra service.

Energy conservation: a fundamental concern

Another major concern among hvac system engineers is the current erosion of interest among clients in energy efficiency and conservation. "We have lulled ourselves to sleep again," says Bahnfleth, who finds that energy-conscious design is extremely important for both new and remodeled buildings. A vast array of technology is now available for designing and installing energy-efficient systems, and Bahnfleth believes that any engineer not trying to use it is doing his or her client a disservice.

Naman, however, contends that many hvac systems being designed today actually don't provide both energy efficiency and adequate levels of comfort. He argues that hvac engineers sometimes fail to analyze and understand all of the advantages and disadvantages of a particular design. Variable air-flow systems, for example, which allow the volume of circulating air to vary from place to place and over time, are now used almost exclusively. Many design engineers consider these systems to be both flexible and energy-efficient. Yet factors such as occupant discomfort during periods of low air circulation are often not considered. Furthermore, if the systems provide only cooling, energy may be wasted during the heating season even if system fans run at a low level during that time. Similar criticisms concerning the actual amount of energy saved can be made about systems that bring in outside air for cooling in winter or about refrigeration units that produce and store ice during the night, when utility rates are low, to provide cooling during the day.

Indoor air quality: Need sacrifices be made?

More complicated and controversial is the issue of indoor air quality and the recent spread of what some people have called the "sick-building syndrome." To many hvac engineers, much of the problem is a consequence of poorly conceived efforts by building owners and operators to keep energy costs down by tightening up buildings. "You don't have to sacrifice energy efficiency for indoor air quality, nor do you have to sacrifice indoor air quality for energy efficiency," says Butler.

Joseph B. Olivieri of the Lawrence Institute of Technology in Southfield, Mich., warns that an unjustifiable hysteria about indoor air quality may be building up. "The technology has been there as long as I've been around," he says. "If you design it right and use the right kind of filtration, you won't have any trouble."

Bahnfleth is a little more cautious. "There's a need for a coordinated, extensive effort to tie down this indoor air-quality issue," he says. "Some of the technology is available, but we don't know what we need because we don't understand precisely what the problems are." More definitive information is needed on the hazards of various contaminants, both by themselves and in combination with other substances. On top of that, removing a few parts per million of suspected contaminants from the tons of air that circulate daily through a typical office can quickly become an expensive proposition.

Educating hvac engineers

Most hvac engineering performed by consulting firms involves integrating pieces of equipment already on the market into a system suitable for a given application. That's a skill that most hvac engineers, who generally start with a degree in mechanical engineering, learn on the job. No university specifically offers a degree in hvac engineering, although a few allow students to specialize in topics that are useful in the field. This lack of university and college support has bothered many hvac engineers for years. "It's a sad situation," says Nichols. "It's left up to the consulting engineers to bring these graduates up to speed when they come out of school and want to get into the field." That usually means at least a year spent on small, mundane projects and on learning the realities of being a consulting engineer. Members of the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE), the professional society that looks after the interests of hvac engineers, have been working with various organizations in an effort to establish a graduate program or a five-

A recent report from the American Society of Mechanical Engineers (ASME) outlines some of our current hvac needs: "Nearly all energy systems must be designed to meet severe, often conflicting, performance objectives. As a result, there is a rapidly expanding need for the sophisticated techniques of mechanical systems which permit the use of 'finesse' in the operation of systems to meet stringent goals in such areas as energy efficiency, pollution, noise, safety, and reliability." The development of low-cost, high-speed microprocessor technology, the report continues, "has made possible real-time control and optimization of mechanical systems in ways that would have been unthinkable a decade ago."

A recent survey by The Trane Company shows that frequent interruptions of hvac service and poor temperature control are major reasons that commercial tenants give for not renewing their leases and for relocating. According to the Trane report, "Spaces that are too warm or too cool are the number one complaint in existing buildings." The report goes on to say, "Greater emphasis on the maintenance and service of existing comfort systems, additional training for building operations personnel, and more attention to original system design for new facilities is recommended to developers."

year undergraduate program that would provide an appropriate grounding in the field.

On the other hand, says Lawrence Tech's Olivieri, "everyone in industry expects us to turn out someone that is trained specifically for their industry." To do that would be a serious mistake, he believes, arguing that programs should be flexible enough so that students aren't restricted to one narrow specialty. Olivieri has been developing a balanced program at Lawrence that allows engineers to specialize in hvac engineering while getting a sense of what architects are trying to do. "Because you're going to be doing application engineering," he says, "in order to be a good hvac engineer, you've got to take a little architecture."

"Engineers need to know what architects do and vice versa," says Bahnfleth, "but I don't know that you can teach that. You learn that when you get involved in design, setting criteria, working with codes, working with your client." He adds, "I think that a good, basic engineering program with a couple of applied engineering courses prepares someone more properly for engineering in this field than a program that is highly vocationally oriented and probably dead-ended."

ASHRAE plays a major role in keeping hvac engineers up-to-date in their profession. Monthly chapter meetings, two national meetings every year, a variety of publications, and committees for establishing standards convey that information to interested members. "If someone wants to grow in this field, the place to be is in ASHRAE," says Bahnfleth, a past president of the society. ASHRAE itself sponsors about $1 million a year in research covering a wide range of topics to provide the basic applied information that hvac design engineers need. In 1986, for example, it initiated studies involving smoke movement and smoke control, indoor air quality evaluations, and extensions of methods for calculating cooling loads, and for analyzing the dynamics of heating and cooling plants.

Olivieri complains that too few engineers attend ASHRAE's technical meetings. "One of the problems that we have," he says, "is that people seem to think that the day they get their degree they've learned all they've had to learn." Such an attitude is evident in practically all of engineering and in other professions, he says.

At ASHRAE's winter annual meeting, relatively few engineers attend technical sessions, but thousands more pass through the equipment displays. Many hvac engineers, in fact, rely heavily on manufacturers and their representatives for information on new equipment and systems. Part of the reason for that lies in the nature of hvac engineering. "I'd say 80 to 85 percent of the consulting engineer's role in designing hvac systems is the application of present equipment and adapting it to a specific project," says Nichols. "There remains some challenge and effort on the part of the engineer to develop these schemes and new ways of doing things, but you still have to use what equipment is on the market."

Bahnfleth, however, contends that the information provided by manufacturers is either biased and unsatisfactory or incomplete. "There are very few sales representatives who understand systems and the part their equipment plays in the system," he says. "The business press . . . and technical societies like ASHRAE are far more important than what a vendor does when he comes to my office." Nevertheless, although Bahnfleth encourages his staff to read widely and to participate in technical society meetings, he's been finding it tougher and tougher to get people, especially those who are new to the profession, to give up time outside of work for such activities. "I think the future belongs to those who take the time," he says.

The impact of computers on practice

The arrival of personal computers and engineering workstations has had a significant impact on the way hvac engineers do their jobs. Even the smallest firms of consulting engineers have at least a personal computer and a variety of software for performing heating and cooling load calculations and for selecting equipment. Manual calculations that had been too time-consuming to meet project deadlines can now be done routinely.

"It's one of the greatest things that's happened to us as designers and engineers," says Butler. "It gives an engineer who likes to do some real design work an opportunity to do things that he once couldn't because of time and money constraints. Frankly, we don't even have to charge the architect or the client for the extra services." Although experience still, to some degree, dictates the type of system put into a given building, hvac designers can make choices based on an evaluation not only of initial capital outlay but also of operation, maintenance, and energy costs over the long term.

Hundreds of different computer programs are now available. They cover practically everything from the basics of hvac design to energy forecasting. However, the widespread use of these programs brings its own danger. "Engineers are producing answers without testing them for reasonableness," says Ross Meriwether, an engineer and software developer at Ross F. Meriwether & Associates, Inc., in San Antonio. "Say that in some instances, maybe 50 percent of the engineering studies that are produced are grossly in error."

Olivieri finds that some engineers start to rely on computer programs too much and lose sight of common-sense solutions. And, sometimes, the programs themselves are inadequate or possibly faulty. "The thing that bothers me," says Olivieri, "is that for energy management, for example, I can use three different software packages, and I'll get three different answers. That scares me." But Meriwether says, "More incorrect answers are produced by the engineer's choice of input than they are by the design of the program itself."

Although a few gaps in the design and analysis field may still need to be filled, the trend in the next few years won't be toward the development of additional software, according to Meriwether. Instead, people will be looking for more efficient ways to use existing programs in an engineering office. Right now, data required to do a computer model of a building must be manually extracted from plans and specifications, then correctly transferred to the computer program. An integrated system that allows different programs to work together and has automatic extraction of information from drawings done by computer-aided drafting would be a significant improvement. In addition to saving time for engineers, it could reduce the number of errors that occur during transfers of data.

Computers and electronic controls are also starting to play an important role in hvac systems themselves and are creating opportunities for developing new mechanical elements. "I think you're going to see more work with variable-speed drives, variable volumes of water and air, and much better control," says Bahnfleth, who is sure this will result in better performance and reduced energy use.

Automating temperature-control systems

Creative designs, new types of equipment, and greater automation could overcome many of the deficiencies now observed in mechanical systems. Israel Naman sees a need for systems that are easier to install and that have a "rugged simplicity" to allow operating personnel to keep them functioning properly and efficiently. "Computer control operation of all energy-consuming equipment is ahead," predicts Naman, "with improvement in both comfort conditions and energy use."

With the stepped-up energy demands because of a greater number of people per square foot in many offices and because of the heat thrown off by computer hardware, much better and more specialized heating, cooling, and ventilation is essential in future buildings. A recent report from the American Society of Mechanical Engineers (ASME) outlines some of the needs: "Nearly all energy systems must be designed to meet severe, often conflicting, performance objectives. As a result, there is a rapidly expanding need for the sophisticated techniques of mechanical systems which permit the use of 'finesse' in the operation of systems to meet stringent goals in such areas as energy efficiency, pollution, noise safety, and reliability." The development of low-cost, high-speed microprocessor technology, the report continues, "has made possible real-time control and optimization of mechanical systems in ways that would have been unthinkable a decade ago."

The ASME report, "Research Needs in Thermal Systems," identifies a number of areas for further research. Among those urgent needs are methods needed for modeling large buildings on a computer so that design engineers can develop appropriate, energy-efficient heating- and cooling-control strategies. The report also recommends the development of on-line adaptive control for energy-efficient system operation. It pinpoints four areas in which research is needed: thermal interaction of the structure and the environment, including the definition of the thermal micro-environment; capacity modulation and interaction among building components; on-line adaptive control and the use of artificial intelligence for optimal control; and the thermophysical properties of complex materials in the system. Furthermore, the report suggests that smart, self-calibrating, inexpensive sensors and fault-detection mechanisms for thermal environmental systems are needed, especially for noninvasive applications.

Naman envisions more sophisticated temperature-control systems that would control heating and cooling sequences and perhaps even the amount of solar energy that enters through glass surfaces. Ideally, he'd also like to have an energy-efficient air-conditioning system that would be under the complete control of an individual tenant and would require no ductwork, no central cooling or heating plant, no operating personnel, and little maintenance. One possibility, he says, is the development of methods that provide local cooling by direct use of electrical energy. Such a cooling method is already in use today in some small refrigerators and for specialized applications in the NASA space program.

Looking toward the future

Gradual improvements in system design, in mechanical, electrical, and electronic components, and in construction methods and materials may help combat the problems that plague many of today's buildings and may aid engineers in solving the complex problems and conflicting demands placed in modern mechanical systems. Beyond these near-term goals lie more startling possibilities. Bahnfleth has speculated that a day may come when each person would carry a thermostat on his or her lapel. "When you walk into a space, you'll get whatever you need," he says. "It will principally be radiation, either cold or warm, because that's most easily controlled." But he adds, "That's an expensive dream."

Architect Walter M. Kroner of Renssalaer Polytechnic Institute in Troy, N. Y., imagines a house with walls as changeable as the weather. The walls would be made from materials that adapt to external conditions and internal needs as readily as people change clothes. The combination of computer technology and advanced materials engineering may eventually change the way in which people look at their homes or offices. Not only would such buildings be more energy-efficient, he says, but the sense of control and comfort found in these flexible buildings could lead to improved health and productivity for their inhabitants.

That's what hvac systems are all about.

Tempering a landscape

The Opryland Hotel's Cascade addition will be tied into the hotel's central energy-management and control system (EMS) that monitors all equipment, temperatures, and flows of chilled water and steam. Used in conjunction with the EMS, the hvac's variable-frequency drive will cause pumps and air-handling units to frequently run at lower speeds, reducing energy consumption. In addition to energy management, the EMS detects any safety hazards, such as fire, and triggers the appropriate hvac function. In the event of fire, smoke removal in the Cascades will be served by its four air-handling units. Upon activation of the fire-alarm system, the units' smoke-removal process begins whereby each unit draws in 100 percent outside air from louvers mounted in an areaway at the exterior wall.

A fanciful, intricate landscape is under construction in Nashville, Tenn. What makes this two acres of rocky cliffs, playful water, and paths cut through tropical verdure particularly remarkable is that it is surrounded by hotel rooms, covered with glass, and thermally controlled for human comfort. When completed, the Cascades at the Opryland Hotel will be linked to a similar two-acre configuration, the Conservatory (site plan, above right). When it opened in 1983, the Conservatory became an immediate tourist attraction and an integral component to the hotel's outstanding commercial achievements (the hotel is in the nation's top one percent of annual revenues per room—over $50,000—and boasts a 90 percent occupancy rate). The architects for the original hotel and convention center, and for all the subsequent extensions, Earl Swensson Associates, took confidence in the first atrium project's success, exercising even greater ambition and panache in the design of the Cascades. Here, dining "islands" and a revolving bar will be set amidst pools fed by waterfalls 40-, 18-, and 17-ft high (plan, right, and section, page 156). Meandering walkways on the ground will connect to elevated paths that tunnel through man-made rock formations while linking the upper level of the Conservatory to the mezzanine level of the Cascade's entrance lobby. Among the technical complexities presented by the design, the hvac engineers, Nashville-based I. C. Thomasson Associates, were charged with the unconventional challenge of balancing the environmental needs of tropical plant life with the hotel management's design prerequisite that, even on a summer afternoon when temperatures outdoors reach well into the 100s F, no guest is to feel the least bit of discomfort while strolling, relaxing with a drink, or surveying the scene from private balconies adjoining guest rooms. Management also dictated that the hvac system delivering this anomaly of nature be invisible from within the atrium.

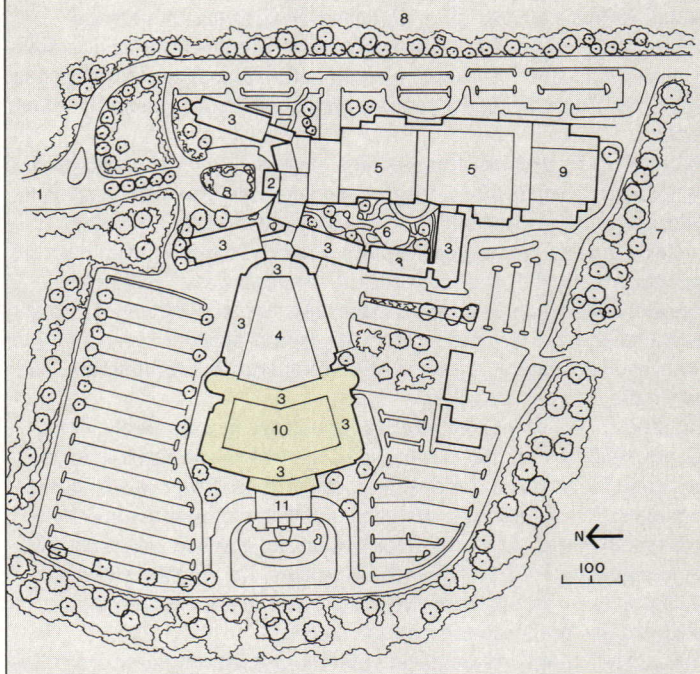
Establishing the solar-heat loads associated with several thousand sq ft of glazed skylighting was the first factor to be resolved in the hvac design. The engineers favored a tinted, reflective glass for its relatively low emissivity. However, the horticulturist in charge of the Cascade's plant life argued for ample, full-spectral light. The owners, too, wanted the sky to enter the space without significant visual modification. Therefore, a virtually clear, laminated, single-glazed membrane was specified that will be outfitted with operable fiberglass scrims used to cover the inboard surface of the skylight when insolation is excessive.

With thermal loads established, the engineers developed an air-tempering system that is as elegant in its simplicity as it is clever in its detailing. Four low-pressure air-handling units are placed in pairs on the north and south ends of the Cascades (plan diagram, opposite page). In cooling the space, outside air is drawn into the air handlers and mixed with cool air from the complex's central chilling facility. Air is then distributed along the walkways and restaurant areas (i. e., only where people are to be found) through diffusers that are hidden in the rocks on the south side of the space, and integrated within the elevated walkways in the north half (distribution diagram and section details, page 157). Once distributed, air is returned through four air shafts disguised as pilasters (top interior elevation, opposite page). During the summer, return air will enter through the lower register of the shaft—a conservation technique that allows warm air to build up at the roof level. During the winter, air will be returned through the upper register, thus taking advantage of the stratified warm air by pulling it back into the air-handling units and recirculating it through the system.

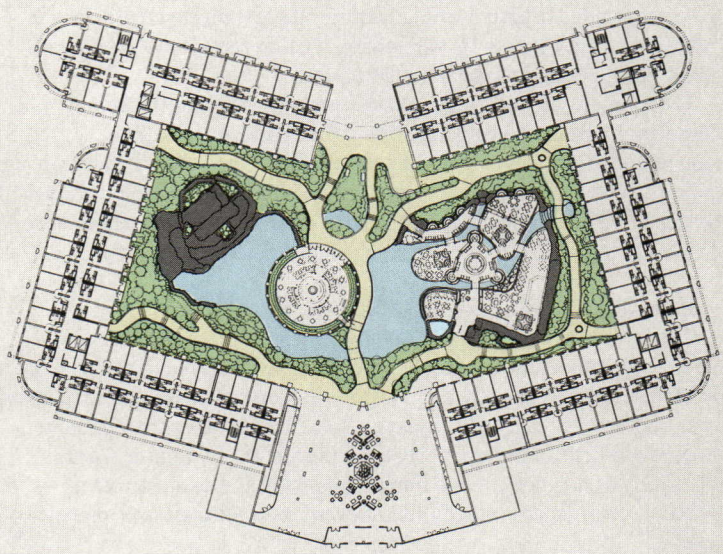
Will the Cascades ultimately fulfill the promise of its design? Certainly the answer to that question will come into focus when the facility opens in May, 1988. If, however, the level of collaboration is maintained among owner, architect, and engineer that has characterized the success of the Opryland Hotel's existing facilities, the Cascades should prove a true delight to all. *Darl Rastorfer*

Below, landscape detail from the Conservatory, a two-acre enclosed atrium that will connect with the Cascades (right and on pages 155-157). Like the Conservatory, the Cascades will incorporate abundant plant life, manmade rocks, fountains, and pools.

Mark Ross



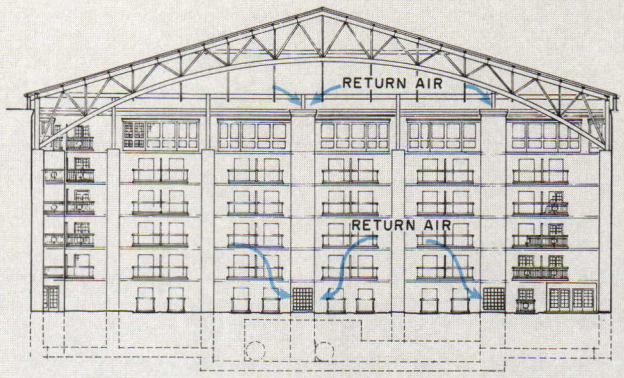
1. *Entrance Drive*
2. *Main lobby*
3. *Rooms*
4. *Conservatory*
5. *Convention/Exhibit area*
6. *Courtyard/swimming pool*
7. *Theme park*
8. *Parkway*
9. *Convention/exhibit area expansion*
10. *Cascades*
11. *New entrance canopy and pool*



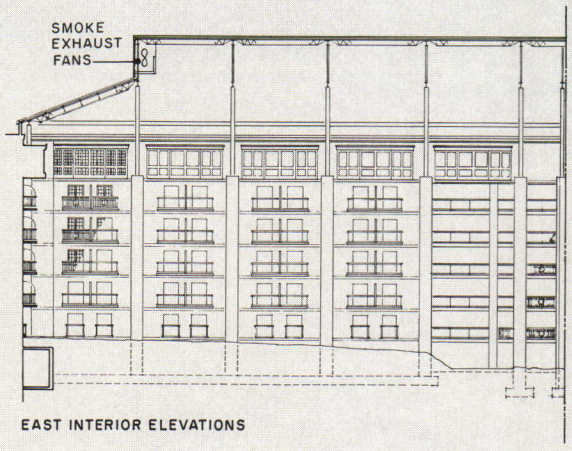
GROUND LEVEL PLAN, THE CASCADES

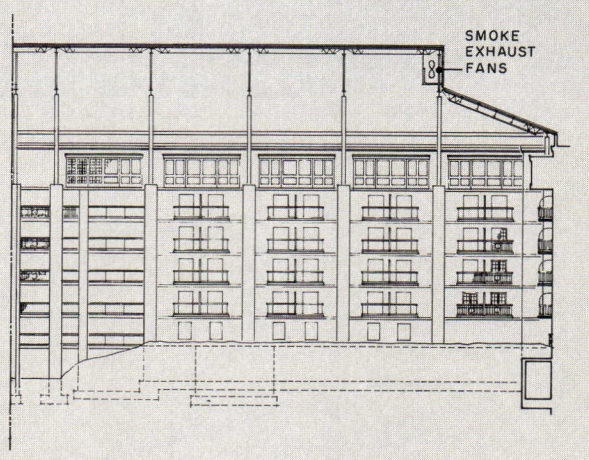
Simultaneously, all exterior doors in the lobby are automatically opened, providing the balance of outside air required for the smoke-removal system. The fresh air pouring into the space would be exhausted at two openings in the atrium roof, each equipped with four fans (partial sections below). The total amount of air exhausted by the smoke-removal fans is estimated at 320,000 cfm, equivalent to four air changes per hour as required by the 1985 Standard Building Code. The total amount of air make-up would be 152,000 cfm mechanically, and 88,000 cfm by the opening of the main lobby doors. The smoke-removal system is, of course, powered by emergency generators, as are the lights that line the Cascade's paths, which, during a fire alarm, would serve to lead any occupants to the appropriate exits.

The Cascades
Opryland Hotel Convention Center
Nashville, Tennessee
Earl Swensson Associates, Inc., Architects
I. C. Thomasson Associates, Mechanical Engineers

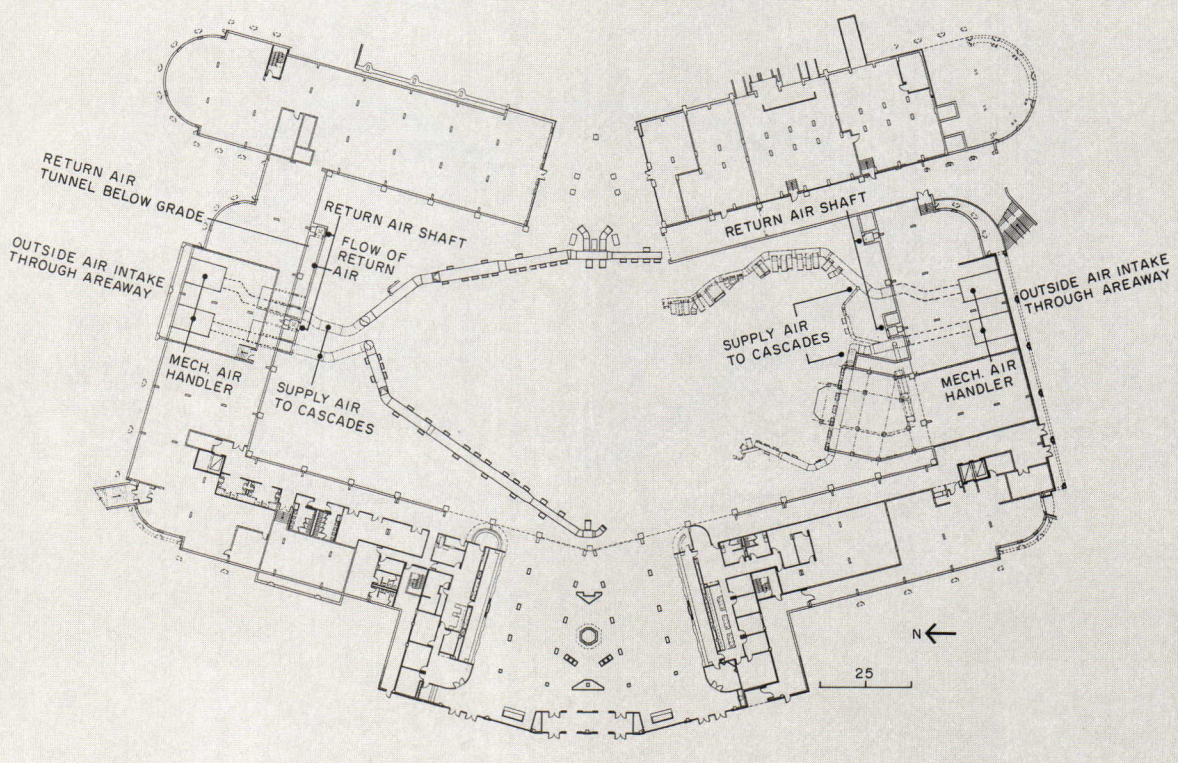


NORTH INTERIOR ELEVATION

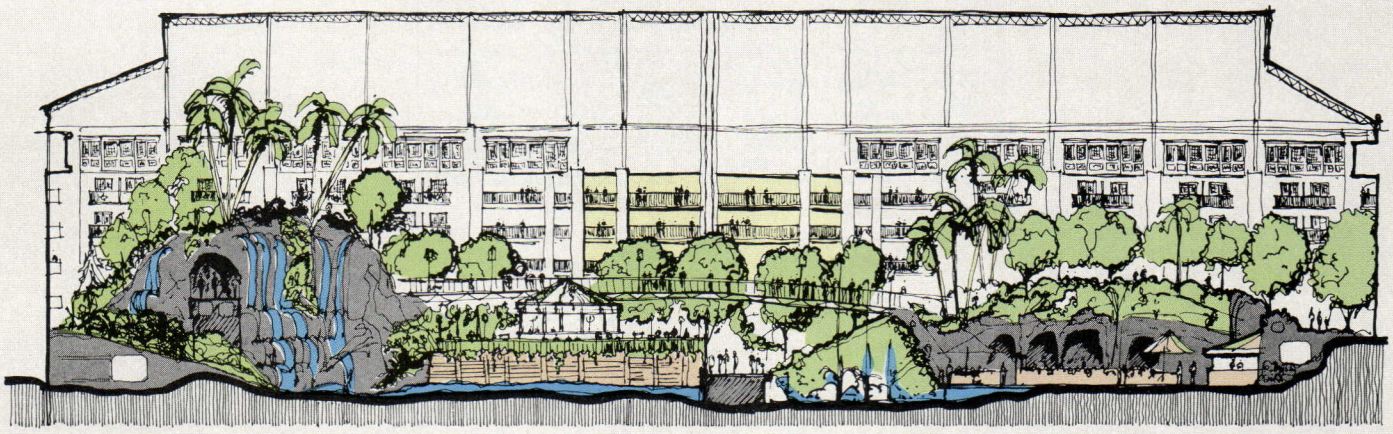


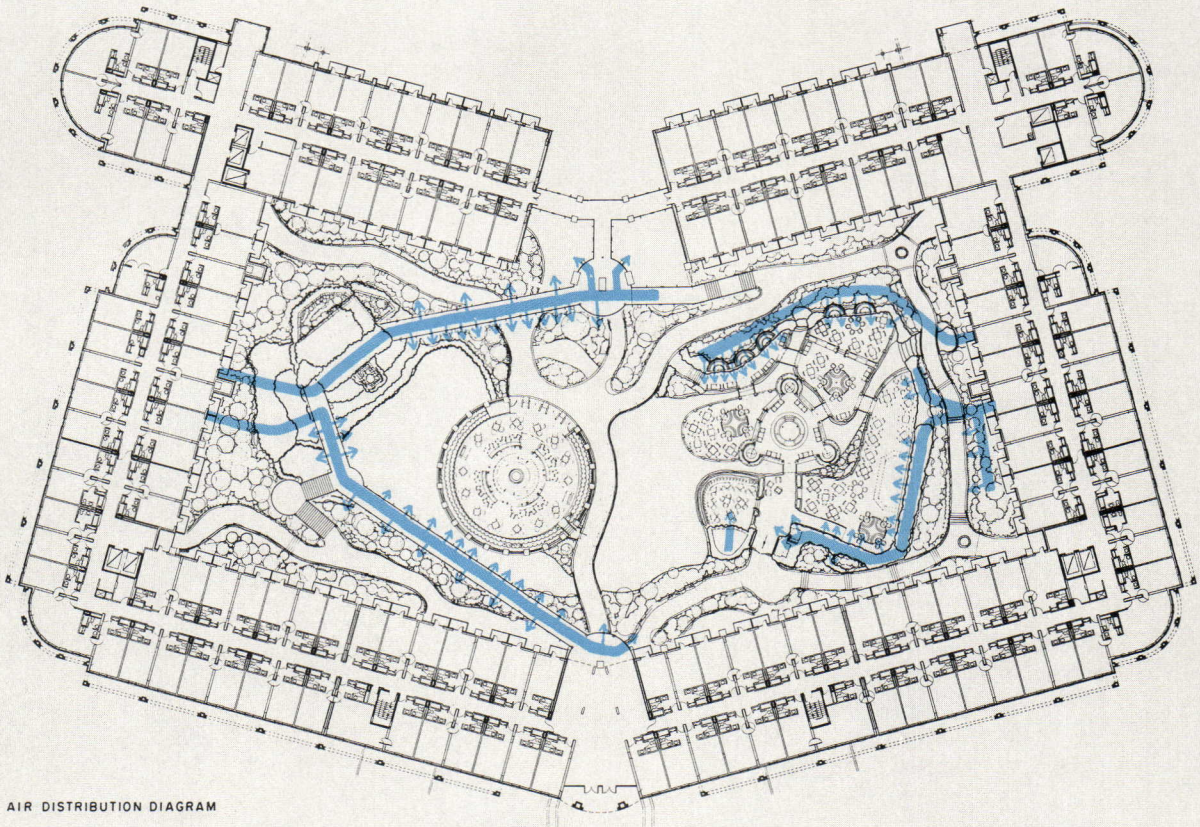


EAST INTERIOR ELEVATIONS



As is suggested by the section below, the Cascades at the Opryland Hotel will comprise a highly complex landscape. It's a naturalistic fantasy incorporating pools with "dancing water" that will be animated with laser light, waterfalls as tall as 40 ft, pathways and pedestrian bridges cutting through lush and varied plantings, grottos, an archipelago of dining areas, and an exquisitely detailed revolving bar patterned after an antebellum gazebo. This totally fabricated environment is being constructed on what was once a swampy stretch along the banks of the Cumberland River. Not without references to the regional landscape, the manmade rocks, are, for example, based on the color, texture, and formation of naturally occurring limestone outcroppings in the Nashville area. Tempering the landscape for user comfort, while

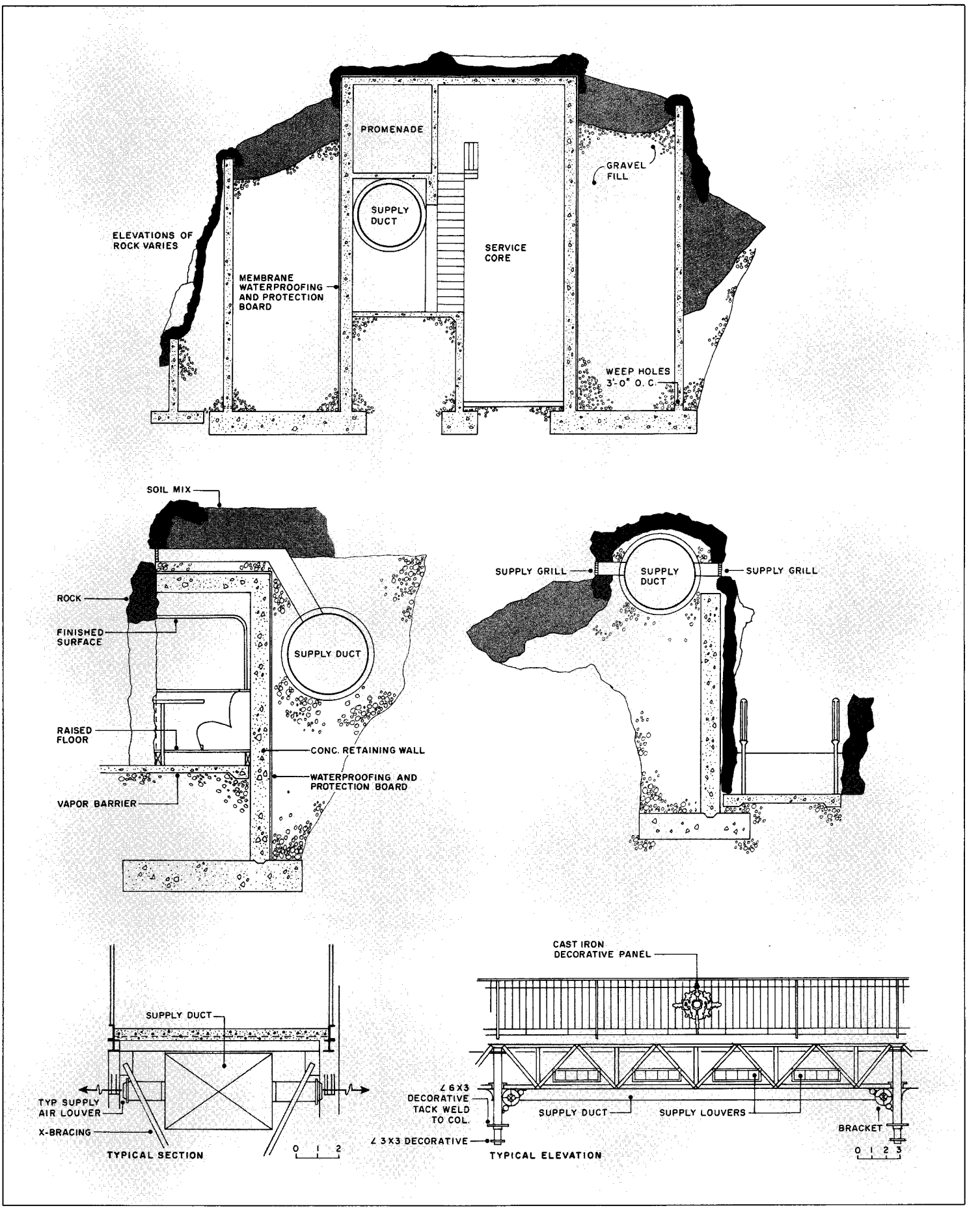




AIR DISTRIBUTION DIAGRAM

maintaining an atmosphere sympathetic to the selected plant life, was a formidable challenge to the mechanical engineers, particularly since all hvac apparatus was to be concealed from view. In their design solution, the engineering firm I. C. Thomasson Associates, Inc. strictly confined the tempered air distribution to areas where people move or are at rest (distribution plan, opposite page), permitting the remaining landscape to thrive in a microclimate sympathetic to its needs. As indicated by selected details presented below, ductwork and grills will run within the built-up rock on the south side of the Cascades, and will be integrated within the raised walkways on the north side (bottom-most section and elevation). Air is returned at shaftways detailed as pilasters on the atrium facades.

The Cascades
Opryland Hotel Convention Center
Nashville, Tennessee
Owner:
Gaylord, Inc.
Architects:
Earl Swensson Associates, Inc.—Earl Swensson, Dick Miller, Ron Lustig, design; Buddy Ferguson, David Miller, Alan Dooley, project directors; Delores Clark, Kathleen Evers, Stephanie Thomas, Janet Baldauf, interiors
Engineers:
I. C. Thomasson Associates, Inc. (mechanical, electrical, plumbing) —John Wimberly III, J. Wayne Neblett, project engineers for mechanical; Stanley D. Lindsey & Associates, L t d. (structural)
Landscape:
Hollis Malone (plantscape); Rock & Waterscape Systems, Inc. (rock and waterscape)



New products: West Week

West Week 1987
From March 25-27 the nation's contract furnishing manufacturers, an impressive line-up of invited speakers, and members of the press joined with local designers at the Pacific Design Center in West Hollywood for West Week 1987. The product showcase included several new introductions, a sampling of which is featured on these pages.

1. A side from Sottsass
Versatility is one of the features ascribed to the *Mandarin* chair by its designer, Ettore Sottsass. A simple, flowing shape with a curved back and tubular steel arms, the chair is suggested for open-plan or executive offices, conference and dining rooms, restaurants and libraries. The arms seem to wrap around the chair without touching the upholstered seat or back, sloping to let the chair fit under a desk or table. Knoll International, New York City.
Circle 300 on reader service card

2. Italian articulation
Shown here is the table model of the *Berenice* lamp, designed by Paolo Rizatto and Alberto Meda for *Luceplan*. Constructed of cast aluminum finished in black or silver, the lamp takes a 35W halogen bulb placed in a reflector of either aluminum or green pressed glass. The transformer is in the wire; the on-off switch is in the nylon head hinge. Artemide, New York City.
Circle 301 on reader service card

3. Task lamp
Another fully articulated Italian light, the *Tolomeo* lamp uses a 100W A bulb. Reflector and arm are polished aluminum; base is black-finished metal. Designed by Michele De Lucchi and Giancarlo Fassina. Artemide, New York City.
Circle 302 on reader service card

4. Jacquard fabric
Woven of a blend of cotton, rayon, wool, and nylon, *Pissarro* upholstery fabric has been designed by Ward Bennett to be evocative of the pointillist techniques of the French Impressionist artist. The fabric is said to be particularly suitable as a wall covering, as its large-scale repeat and diffuse pattern will camouflage seams. Brickel Associates Inc., New York City.
Circle 303 on reader service card

5. Wood-framed seating
Robert DeFuccio's *Strada* chair has a light yet sturdy appearance. The two components of each laminated-wood arm/leg assembly are finished first, then glued together exactly to form the frame. The lounge chair is shown here; a side chair version is also offered, both with a white oak frame in a variety of finish and upholstery options. Domore Corp., Elkhart, Ind.
Circle 304 on reader service card

6. Chair with flair
The *Butterfly* chair is suggested for use in restaurants, executive dining rooms and other areas that require distinctive yet rugged seating. Designed by Jochen Hoffman for the *Casala Collection*, the chair is manufactured in the United States with a beechwood frame and foam-covered plywood back and seat. Finish options include colored lacquers and wood stains; upholstery may be fabric, leather, or COM. Krueger International, Green Bay, Wis.
Circle 305 on reader service card

7. Bent beechwood
The *Fyn Chair* looks hand-made, but is produced by computer-controlled routing of the laminated bent beechwood frame. The seat may be a matching wood, cane, or upholstered; finishes include clear beech or walnut, and 24 painted colors. The side chair was designed by Brian Kane. Metropolitan Furniture Corp., South San Francisco, Calif.
Circle 306 on reader service card

8. Two-toned glass fixture
Designed by architect Ezio Didone, the *Diva* sconce has two semi-circular glass diffusers: the front, frosted glass panel in white or rose, the textured rear panel in white. Diffused light is supplied by a single 100W incandescent bulb. Atelier International, New York City.
Circle 307 on reader service card

9. High-tech pull-up
Welded steel frame, elastic webbing, and fiberbond seat platform encased in injection-molded polyurethane foam make the *Michelangelo* both comfortable and lightweight. The sculptured body is covered with fabric, vinyl, or leather attached by zippers and *Velcro* tape. Designed by the Center for Design and Communication/Milan, the chair is made in the U. S. Atelier International, New York City.
Circle 308 on reader service card

10. Iridescent upholstery
From a distance, this worsted upholstery fabric appears to be a solid color; closer inspection displays another subtle coloration, for an iridescent effect. Named *Kabuki* by its designer, Sina Pearson, the wear- and flame-tested fabric comes in 15 colorways. Unika-Vaev Division, ICF, New York City.
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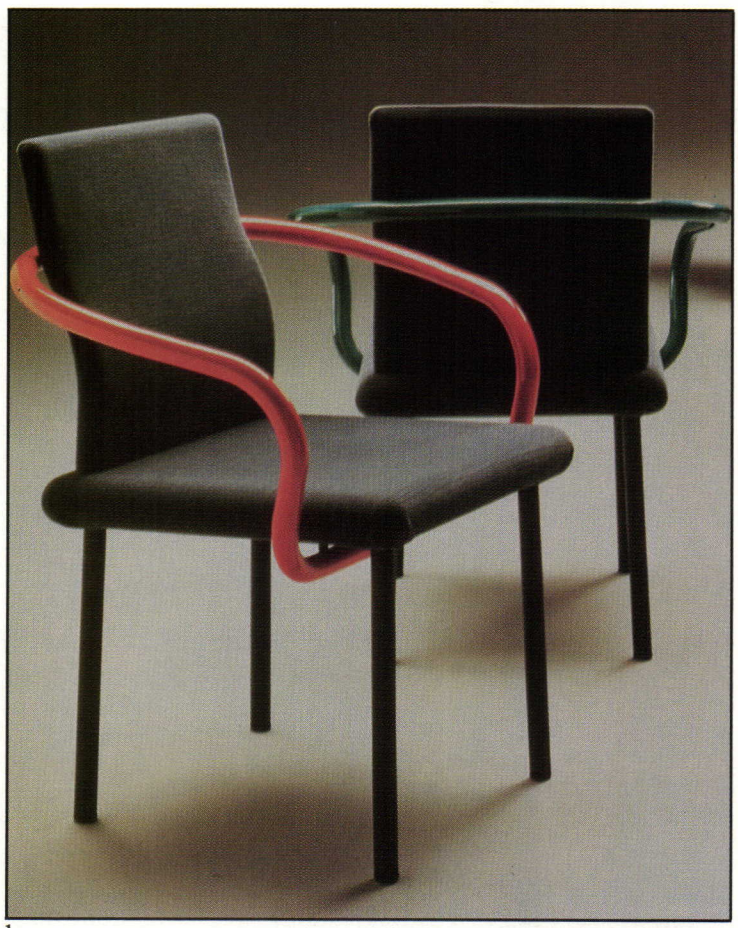
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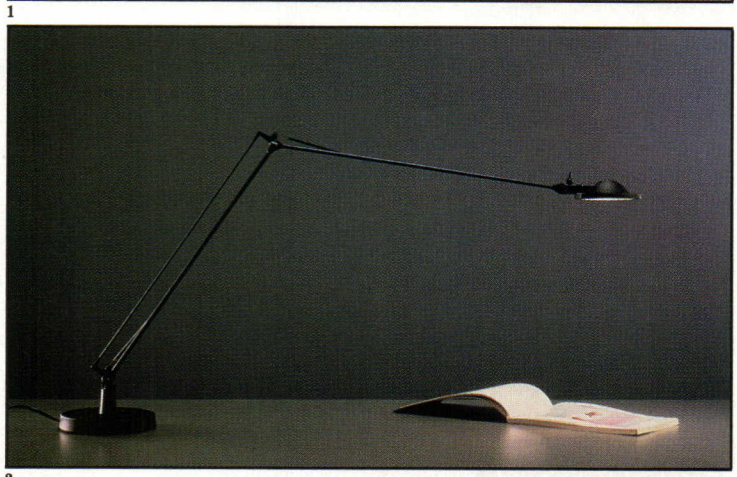
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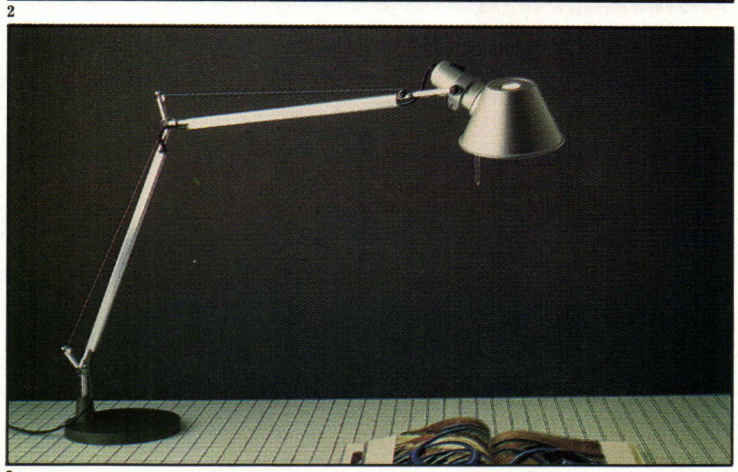
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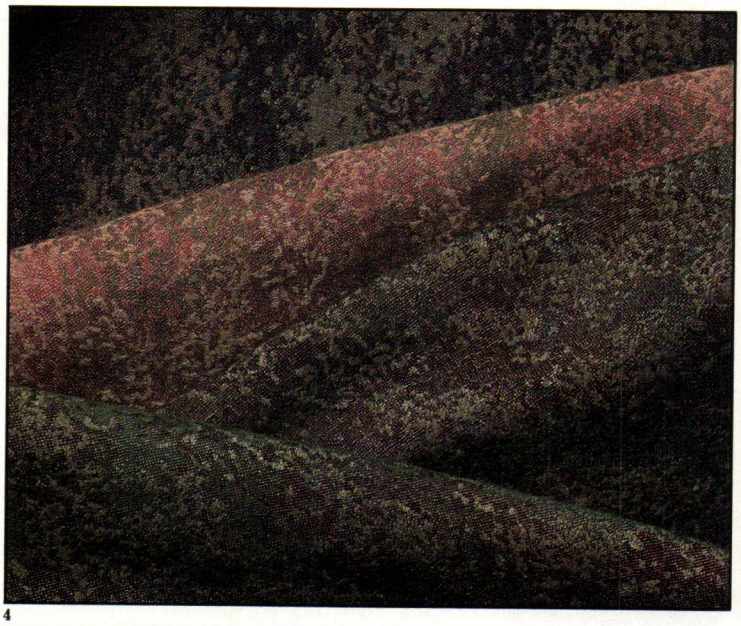

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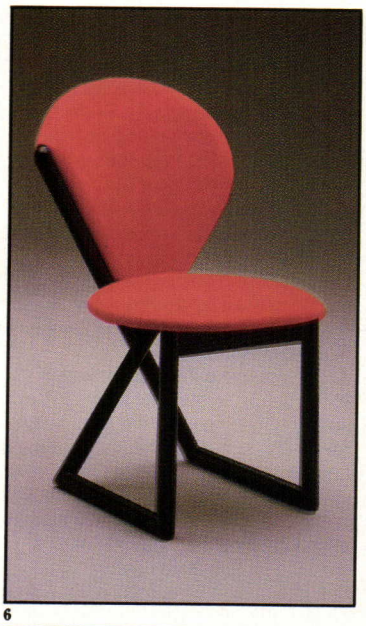

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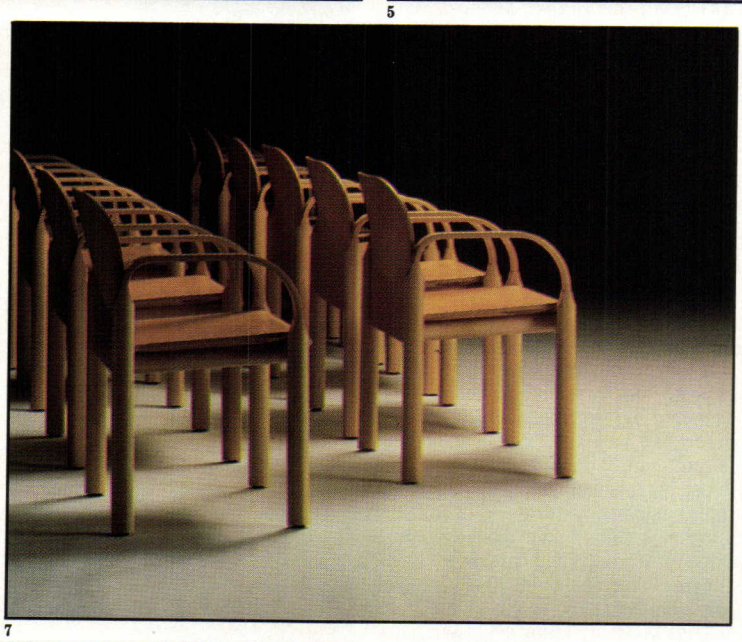

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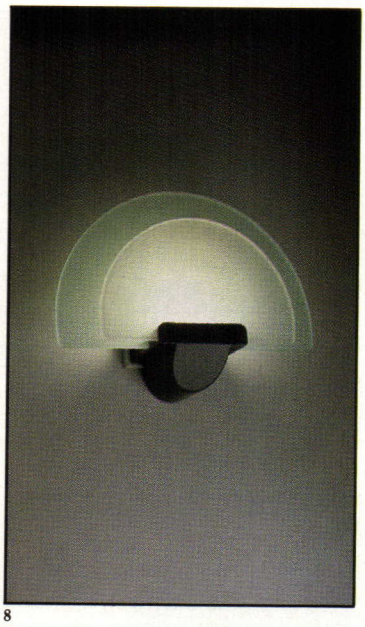

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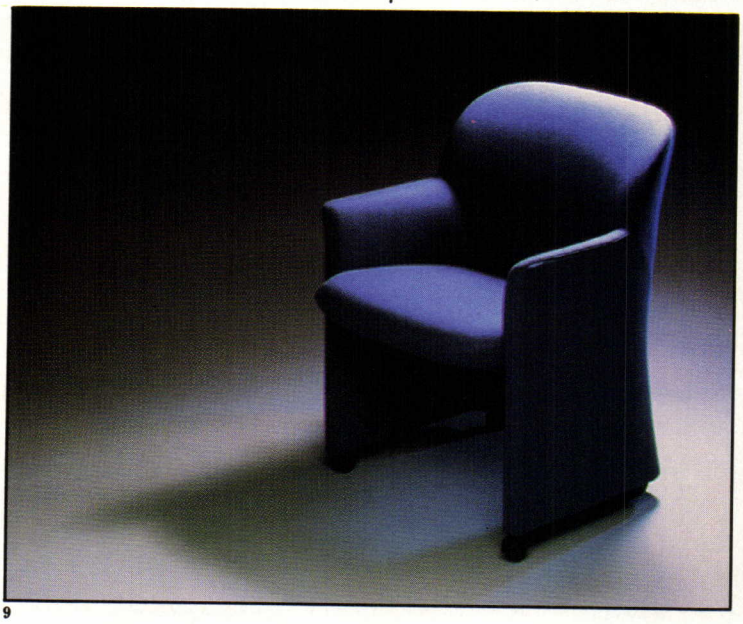

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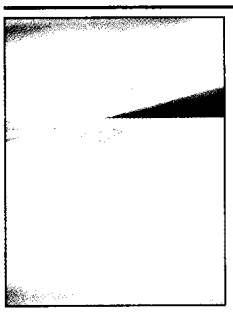
Product literature

For more information, circle item numbers on Reader Service Card



Thermostats
Color folder pictures all models offered by this manufacturer of control devices for residential and commercial heating, ventilating, and air-conditioning systems. Appearance and user-friendly features are explained. Honeywell, Minneapolis.
Circle 400 on reader service card

PC-based controls
A 4-page brochure describes how the *JC/85* energy-management system has been adapted to work with the *IBM PC-AT*, controlling all the functions of multisite hvac equipment. The *JC/85* is said to minimize energy costs without compromising the comfort or safety of building occupants. Johnson Controls, Inc., Milwaukee.
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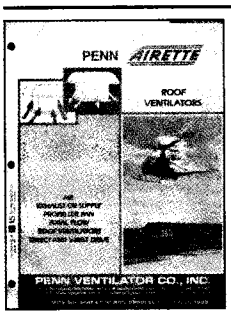

Roof ventilators
An 8-page catalog describes the *Airette* line of roof ventilators, low-contour, axial fans for exhaust applications, or for supplying a dust- and dirt-free supply of outside air for the proper functioning of air conditioning systems. Penn Ventilator Co., Inc., Philadelphia.
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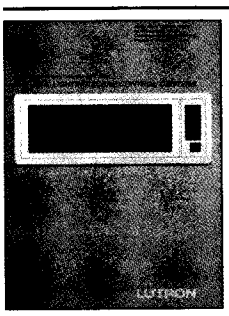

Lighting-scene controller
A new interface enables the *Aurora* lighting-scene control to operate a variety of in-place equipment, including drapery closures, security systems, building management systems, and time clocks. A color folder describes the auxiliary equipment interface. Lutron Electronics Co., Inc., Coopersburg, Pa.
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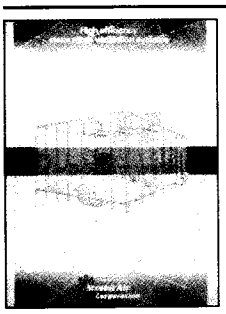

Clean-room ventilation
A 4-page brochure explains how the *Mini-Mod* air-handling system provides quiet, smooth, and cost-effective ventilation for high-tech clean rooms. PNC 55 levels are achievable, using variable pitch, axial flow fans. Strobic Air Corp., Bensalem, Pa.
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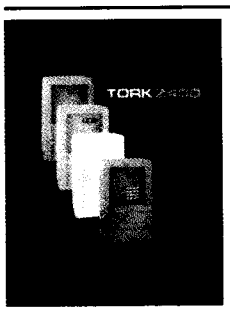

Digital controller
All four channels on *Tork's* seven-day time switch may be set for Astronomic, as well as for 365-day automatic control of lighting, hvac, and other equipment in mid-size commercial buildings. Astronomic scheduling—sunset to sunrise—is desirable for control of outdoor security lighting in particular. TORK, Mt. Vernon, N. Y.
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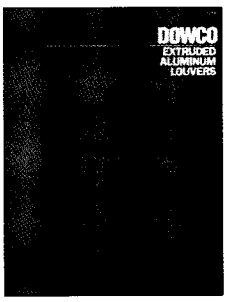

Louvers
Both fixed and adjustable-blade aluminum louvers, certified by the Air Movement and Control Association as to pressure drop and water infiltration, are described in an 11-page catalog. Mullion, jamb, and frame details are illustrated; free area calculations are charted. Dowco Corp., Dallas.
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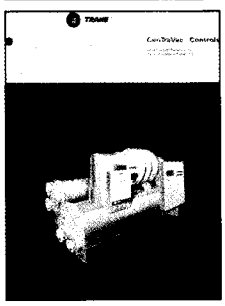
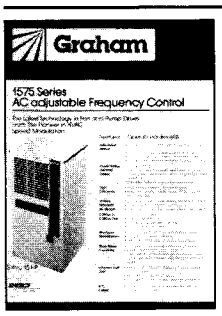
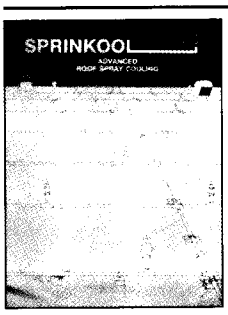


Multiple chiller controls
An 8-page technical booklet describes how microprocessor-based unit and system-control devices work on *CenTraVac* chillers to provide more-efficient, reliable, and safe operation of commercial air-conditioning equipment. The *CenTraVac* control panel now includes self-diagnostic features. The Trane Co., La Crosse, Wis.
Circle 407 on reader service card

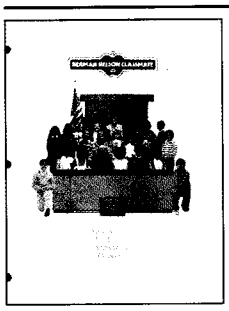


Retrofit AC drive
A data sheet on the *Series 1575 AFC* explains how these fan and pump drives use nearly 60 percent less energy in conventional hvac systems than the constant volume systems they replace. Available in ratings from 5 to 15 hp, the drives have applications in cooling towers, fans, and centrifugal pumps. Graham Co., Milwaukee.
Circle 408 on reader service card



Roof-mist cooling
An 8-page booklet on *Sprinkool* roof cooling describes how its solid-state control monitors temperature, humidity, and wind-velocity changes throughout each day, and alters the spray amount as the conditions for optimal evaporation change. System is said to lengthen the life of the roof while reducing cooling costs. Sprinkool Systems, Inc., Killen, Ala.
Circle 409 on reader service card

Steam heat
Energy-efficient upgrades for existing steam systems are explained in a 6-page folder on *Vari-Vac* differential heating, a two-pipe system using steam at various pressures to equalize temperatures. Radiators, automatic and manual controls, and steam valves are included. Dunham-Bush, Inc., Marshalltown, Iowa.
Circle 410 on reader service card

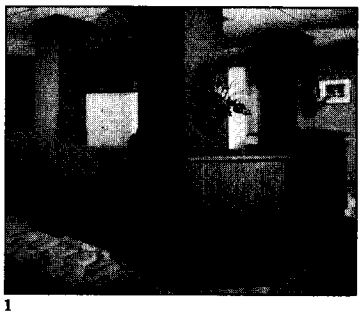


Unit ventilators
Designed expressly for schools, *Herman Nelson Classmate* unit ventilators are said to provide quick response to sudden thermal changes in a room. An 8-page color brochure explains how the unit can neutralize the heat gain from lights, sunlight, and children to provide comfortable ventilation. American Air Filter, Louisville, Ky.
Circle 411 on reader service card

New products *continued*

For more information, circle item numbers on Reader Service Card

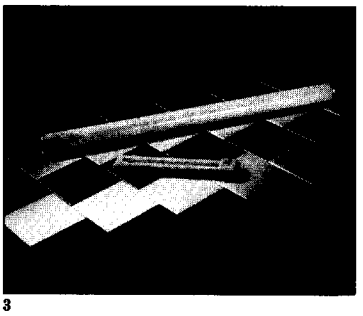
1. Health-care cabinetry
A new product line for this manufacturer, modular cabinets have been designed specifically for medical and dental offices. Standard laminate-faced units and drawers come in a range of sizes to provide a built-in look, yet are movable as necessary. Components feature concealed hardware and easy-to-clean surfaces. Lamco, Inc., Stamford, Conn.
Circle 310 on reader service card


1

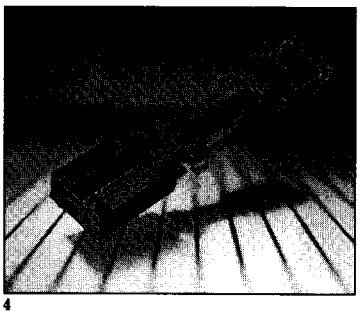
2. Office seating
The *Soma* chair is intended to meet a wide range of office seating requirements, and is said to incorporate all of the best ergonomic features. Fabric upholstery and molded foam are fused; cushion and shell accommodate a continuous shift in body weight. Designer Charles W. Pelly has provided easy-to-reach controls for height, tilt, and tension adjustments. Westinghouse Furniture Systems, Grand Rapids, Mich.
Circle 311 on reader service card


2

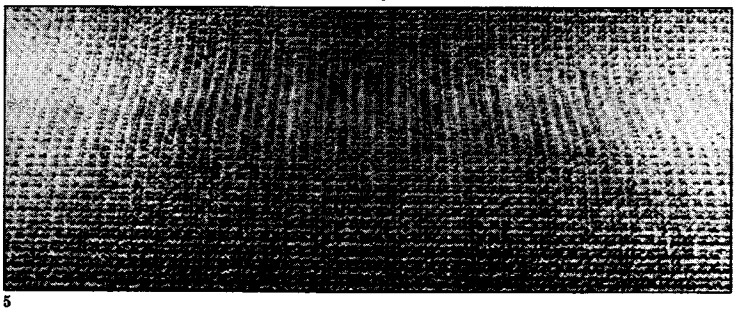
3. Compact fluorescent
An addition to the high-lumen BIAX fluorescent line, the 18-W, 9-in.lamp shown here produces the same light as the conventional 20-W tube behind it. The compact bi-axial lamp is said to achieve an excellent color-rendering value. General Electric, Cleveland.
Circle 312 on reader service card


3

4. Floor closer
The shallow-depth concealed *50 Series* closer fits in a concrete slab as thin as 2-in. For use on single- or double-acting doors, tempered glass and labeled fire doors, these closers meet most existing codes for the handicapped . Rixson-Firemark, Franklin Park, Ill.
Circle 313 on reader service card

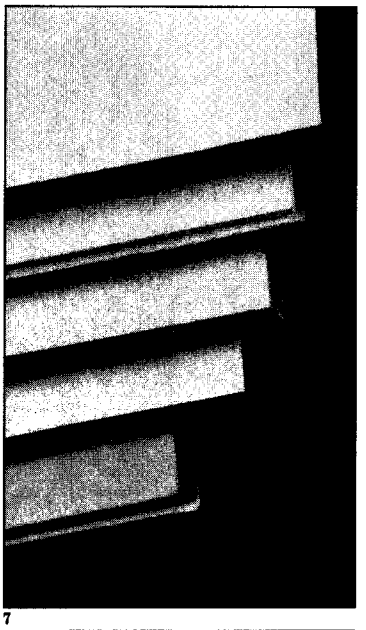

4

5. Heavy-duty fabric
Intended for high-traffic contract-upholstery applications, *Streetcar* two-toned woven-pile fabric from Germany carries a heavy-duty abrasion rating. The epingle may also be used for direct and upholstered wall installations. Gretchen Bellinger Inc., New York City.
Circle 314 on reader service card

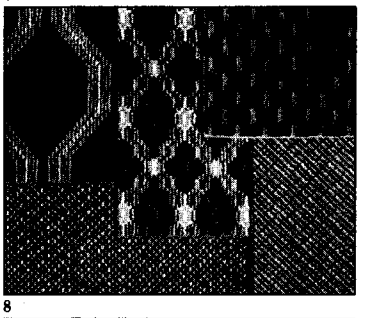

5


6

6. Lounge seating
These high-back lounge chairs are a recent addition to the *Bitsch Seating System*, designed by Hans U. Bitsch for contract office and residential applications. Constructed with a chrome-accented black frame, the chair comes in a black leather upholstery option as pictured. Kusch USA, Inc., New York City.
Circle 315 on reader service card


7

7. Fiberglass ceilings
Said to provide superior acoustical control in commercial applications, fiberglass-based ceiling panels are offered with a NRC of up to 1.00. Finishes include nubby glass cloth fabric; embossed, washable vinyl; and *Softscape* molded panels wrapped in woven *Dacron* or COM fabrics. Sizes range up to 60-in.-square, all with a Class A flame spread. Most ceilings are available with a foil backing. Capaul Corp., Plainfield, Ill.
Circle 316 on reader service card


8

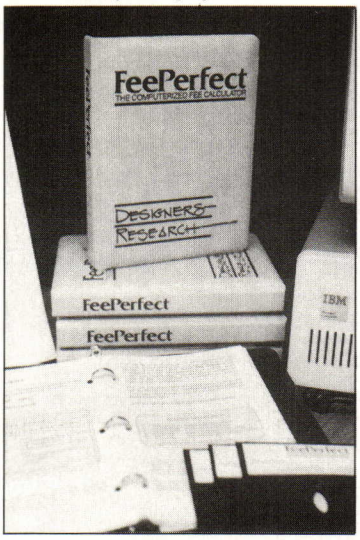
8. Commercial broadloom
Shown here are five additions to the *Colonnade* contract carpet line, including a small-scale pin dot and a large, geometric design. All are made of *Ultron 3D* nylon, said to have superior soil-hiding characteristics. Each carpet comes in 6 colorways; custom colors are available in the *Colonnade* commercial line. Collins & Aikman, Dalton, Ga.
Circle 317 on reader service card

9. Cabinet hardware
Made of high-impact ABS plastic, *Elan* knobs and pulls are available for 32mm production cabinets as well as for traditional hole spacing. Gloss finish colors include red, black, brown, almond, and white, as well as combinations involving stripes and inserts. Amerock Corp., Rockford, Ill.
Circle 318 on reader service card
More products on page 173

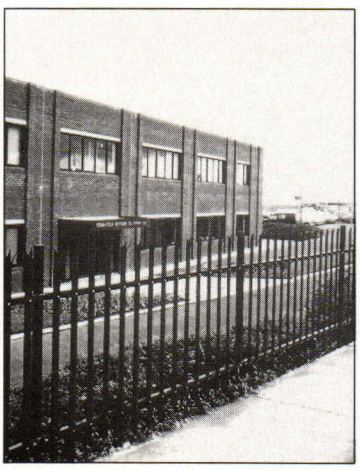

9

Cold Spring Granite. Its beauty is its strength.

Continued from page 168



Design-costing software
Written for architects and engineers and designed to run on all IBM PCs and full compatibles, the *Fee Perfect* program tracks all the financial aspects of a project. The user is guided through a review of the design costs: professional and consultant fees, billable hours, construction costs, reimbursable expenses, etc. The software estimates a reliable fee proposal and manages the project's progress, reporting on dollars and hours spent each week, spent-to-date, and computing the budget balance at each interval. *Fee Perfect* is offered in slightly different versions for architects and engineering specialities. Designers Research, Boulder, Colo.
Circle 319 on reader service card



Steel security fencing
Described as a lower-cost alternative to wrought-iron fencing, with a less-menacing appearance than wire-topped chain link, the *Palisade* security-fence system consists of parallel posts made of cold rolled 12-gauge steel, bolted to two horizontal rails at the top and bottom. The poles are spaced to prevent climbing; the *Triad*-design pole top provides further deterrence. The fence is available in over 250 *Colorgalv* high-gloss colors, guaranteed against rust for 20 years. Duncan Fence Co., Everett, Mass.
Circle 320 on reader service card

Clean-room seating
The *Dorsal Environmental* operator's chair is said to meet Class 10 clean-room standards, eliminating static charges and contamination problems; uses include pharmaceutical, biological, and semiconductor facilities. Krueger, Inc., Green Bay, Wis.
Circle 321 on reader service card

Upholstered seating
Italian architect Carlo Santi set the "Cornelius" two-seat sofa on triangular chrome legs, and repeated the triangle motif in the back detail and stitching. Imported from Belgium for the contract market, *Durlet* seating features a range of leather upholstery, as well as fabric or COM options. Axiom Designs, New York City.
Circle 322 on reader service card

Kimball is off the wall.

It was grounds for separation. ▪ We had two companies, Kimball and Artec. ▪ Kimball was well-known for casegoods and seating. Artec for office systems. ▪ But Artec also offered casegoods and some seating. Which it wasn't so well-known for. And Kimball ventured into office systems. Also not common knowledge. ▪ So we did some logical corporate restructuring. We moved Artec's casegoods and seating over to Kimball. And made Artec the office systems specialists. ▪ So now it's simple. ▪ When you need the industry's most comprehensive range of casegoods and seating, call Kimball. ▪ When you need the office systems

cle 84

Unibond carpets in over 200 colors, all with coordinates in modular systems. Photography: Fred Schenk. ©1987 Burlington Industries, Inc.

CRAFTED WITH PRIDE IN AMERICA

Manufacturer sources

For your convenience in locating building materials and other products shown in this month's feature articles, RECORD *has asked the architects to identify the products specified*

Pages 106-109
Gullans International Showroom/ IDCNY
Joseph Paul D'Urso with Bentley LaRosa Salasky, Design
Page 106—Paints: Benjamin Moore & Co. Fabric wallcovering: Sutter Textiles. Laminate surfaces: Formica.
Track lighting fixtures: Halo.
(top) Chair: *Sardegna* by Abdenego and Anna Anselmi.
Seating: *Vienna* settee by Rodney Kinsman. Mirror: *Gym Mirror* by Terry Pecora. Light: *Diski 4* by Matteo Thun. (bottom) Table: *Cono* by Joseph Paul D'Urso. Chair and barstool: *Tokyo* by Rodney Kinsman. Accessories: Josef Hoffmann. Light: *Spargi* by Matteo Thun with Andrea Lera.
Page 107—Table: *Attic* by Sottsass Associates. Cabinet: *Settimanale* by Matteo Thun. *Aero* light by Sottsass Associates.
Page 108—Light: *Tender* by Michele DeLucchi.

Pages 110-115
Herman Miller Showroom, Dallas
Taft Architects
Page 111—Skylighting: Kalwall. Tempered glass: PPG Industries, Inc. White translucent glass: Globe Amerada Glass Co. Drywall: USG. Wood doors: custom by architects, fabricated by West Texas Millworks. Natural finishes, paints (throughout): Devoe & Raynolds Co. Locksets: Sargent. Hinges: Soss & McKinney. Closers: LCN. Cabinet hardware: Stanley. Wood flooring: Harris-Takett Inc. Marble: Julien Green. Carpet: Milliken (Kingsley Square). Chairs: Charles Eames *Soft Pad Aluminum Group.*

Pages 113-114—Ceiling suspension system: National Rolling Mills. Acoustical tile: Armstrong (Travertone). Laminate surfaces: WilsonArt. Recessed downlights: Lightolier. *Equa* chair. *Time/Life* Chair, table by Charles Eames.
Pages 114-115—Office components: *Ethospace System.* Wood shutters: ELR Enterprises, Inc.; Soleil.

Pages 116-121
SunarHauserman Showroom, San Francisco
Mark Mack
Page 116—Acoustical metal ceiling on open grid T-bar: Alpro. Veneer plaster: La Habra. Concrete finish: ConSov (Kolorbleu).
Page 117—Chair: Arata Isozaki. Track lighting: Halo.
Page 118—*Ball* chairs and *Race* conference table. Solid-core ash veneer doors: Limited Production Inc. Locksets: Schlage. Recessed ring light fixtures: Shaper.
Page 120—(top) Desks: *The Race System.* Chairs: *Dravert.* (middle) *Rotunda* chairs by Lella and Massimo Vignelli. *Kyoto* table by Gianfranco Frattini. (bottom) Chair and ottoman by Niels Diffrient. Display lighting: *Mini Light.* Carpeting: Pacific West Mills.

Pages 122-125
Broodmare and Turnout Barn
Perry Dean Rogers & Johnson Wanzenberg
Pages 122-123—Standing seam roofing: Wheeling-Pittsburgh Steel Co., Inc. Exterior paint: Sherwin Williams Co.
Page 125—Skylights: Velux-America, Inc.

Pages 128-129
Visitor Reception Centre, Batoche National Historic Park
IKOY Architects
Enamels: Custom by architects, formulated by Northern Paints. Stair and treads: custom by architects, fabricated by Patra. Curtain wall framing: Kawneer.

Pages 130-133
Wallace Building, University of Manitoba
IKOY Architects
Bollards: Patra. Paints (throughout): custom by architects, formulated by Northern Paints.
Page 132—Rubber flooring: Mondo.

Pages 134-135
RCMP Forensic Laboratory
IKOY Architects
Door pulls: Ferrum Metal Manufacturing Co.

NEOCON 19

JUNE 9 – 12, 1987
THE MERCHANDISE MART
CHICAGO

THE WORLD CONGRESS ON
ENVIRONMENTAL PLANNING
AND DESIGN

Where ideas converge. NEOCON is the most important display of new product in the contract industry. But it also achieves a separate and equal importance as the World Congress on Environmental Planning and Design, the year's most compelling resource of ideas. At NEOCON, you will have access to the insights and opinions of the leaders in design, architecture, business and education through seminars, workshops and panel discussions. This year's Symposium on Modern Architecture explores "The Search for Definition." The Chicago Architects Awards Luncheon honors Denise Scott Brown, Leon Krier and Harry Weese, with a keynote address by *New York Times* critic Paul Goldberger. Other sessions address issues from how light shapes response to the design-made object. In order to gain first consideration for session tickets to all these presentations of ideas, use the coupon to pre-register for NEOCON 19.

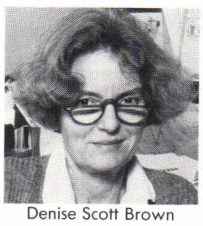
SELECTED SEMINARS

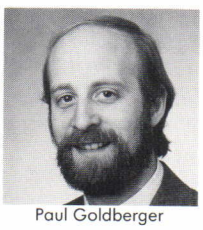
TUESDAY JUNE 9 4:00 PM

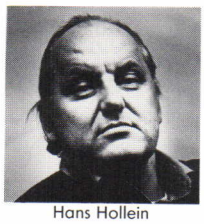
2. EMERGING VOICES:
The Young, Bright and Talented Minds in American Design
Four young American designers—Katherine McCoy, Adrian Smith, Michael Vanderbyl, and Kevin Walz—discuss new directions within their individual disciplines.

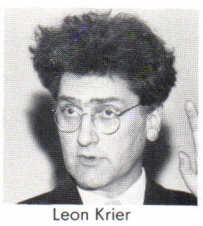
WEDNESDAY JUNE 10 8:30 AM

3. KEYNOTE ADDRESS:
The High-Flex Society: Meeting the Challenge of Change
Pat Choate, author, speaks on how America can make use of our "national genius" for adaptation and making change to meet future international challenges and competition.

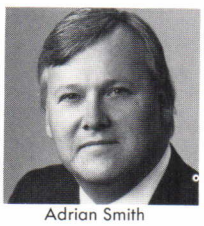

Denise Scott Brown

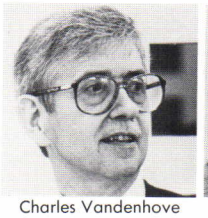

Paul Goldberger

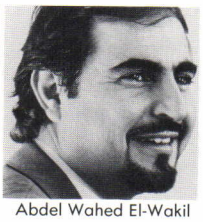

Hans Hollein


Leon Krier


Massimo Scolari


Adrian Smith


Charles Vandenhove


Abdel Wahed El-Wakil

PARTICIPANTS

Joy E. Adcock, president, ASID
William Agnello, corp. v.p.
Denise Scott Brown, architect
John Busby, design partner
Richard Carlson, architect
Edward J. Carr, IDRC v.p.
Pat Choate, author, keynote
David Cotts, president, IFMA
James Dailey, dealership pres.
A. John Dodson, Sr., dealership pres.
Robert Douglas, facility planner
John J. Dues, corp. director
Peter Ellis, Ph.D., consultant
Larry Evans, dealership pres.
Rodney Fitch, designer
Steve Gathings, dealership pres.
Paul Goldberger, architecture critic
Terence C. Golden, GSA administrator
James Goodson, architect
Keith Grant, council dir.
Don Griesdorn, dealership pres.
Donald J. Hackl, president, AIA

4:30 PM

4. DESIGN DIRECTIONS:
New Corporate and Commercial Interiors

Gary Whitney and James Terrell present their most recent accomplishments in contract interiors.

4:30 PM

5. ARCHITECTURE + UTOPIA:
Visions for the Post Industrial Society

Massimo Scolari and Hans Hollein present an overview of their visionary and mystifying new work, drawn from both built and unbuilt projects. Donald J. Hackl is the moderator.

THURSDAY JUNE 11 8:30 AM

6. THE CONTINUING REVOLUTION IN LIGHTING:
Compact Illumination

Don Thomas and Terry K. McGowan, with chairperson Richard Linington, speak on new R&D advances which make scaled-down lighting possible without sacrificing quality.

4:30 PM

9. THE DREAM OF A CITY:
International Design Directions

Abdel Wahed El-Wakil, Charles Vandenhove, Denise Scott Brown and Robert A.M. Stern speak on their individual philosophies of architecture as they relate to urban planning and living. L.A.L. Rolland is the moderator.

FRIDAY JUNE 12 8:30 AM

11. THE DESIGN-MADE OBJECT:
International Expressions

From Europe, Asia and the United States, four designers—Takenobu Igarashi, Dakota Jackson, Tobia Scarpa and Jack Lenor Larsen—discuss the aesthetic and cultural factors which have influenced their work.

12:00 NOON

CHICAGO ARCHITECTURE AWARDS LUNCHEON

Honoring Denise Scott Brown, Harry Weese and Leon Krier, this important awards event will be highlighted by an address by *New York Times* critic and author Paul Goldberger.

2:00 PM

12. THE SYMPOSIUM ON MODERN ARCHITECTURE IV:
The Search for Definition

An unprecedented meeting of minds in the field of architecture, this panel discussion features Denise Scott Brown, Abdel Wahed El-Wakil, Leon Krier, Charles Vandenhove, Tobia Scarpa, Massimo Scolari, Adrian Smith and Robert A.M. Stern, with Paul Goldberger moderating.

SELECTED WORKSHOPS

WEDNESDAY JUNE 10 10:30 AM

E. DESIGN IN SEARCH OF PRODUCTIVITY:
Coping with the Complexities of the Electronic Office

2:30 PM

G. AMERICAN EXPRESS CORPORATE HEADQUARTERS:
A Case Study in Design and Facility Management

THURSDAY JUNE 11 10:30 AM

H. DRAWING, DESIGN, AND DATA MANAGEMENT:
The 3-Ds of Computer-Aided Design for Space Planning

2:30 PM

J. HEALTH CARE TODAY:
Form Follows Function and Demand

2:30 PM

K. ILLUMINATING BEHAVIOR:
How Light Shapes Response

FRIDAY JUNE 12 10:30 AM

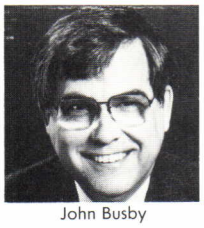
L. DRAMA AND AMBIENCE:
Retail and Restaurants as the New Entertainment

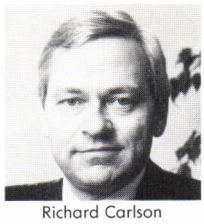
10:30 AM

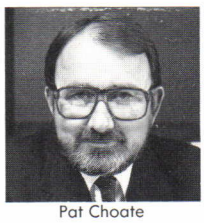
M. BRITISH DESIGN COMES OF AGE:
New Marketing and Business Strategies

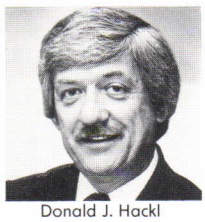
VIP PRE-REGISTRATION.

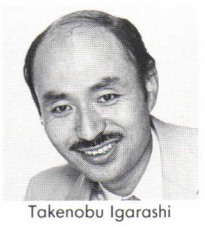
Pre-register today to receive your NEOCON 19 credentials and first consideration for session tickets. There is no conference fee for NEOCON.


John Busby


Richard Carlson


Pat Choate

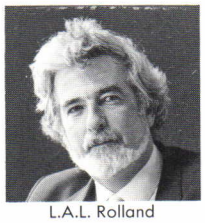

Donald J. Hackl


Takenobu Igarashi

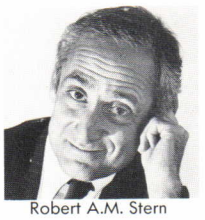

Dakota Jackson

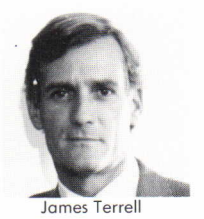

Jack Lenor Larsen

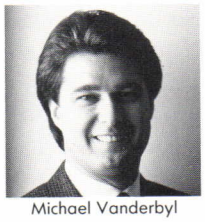

Katherine McCoy

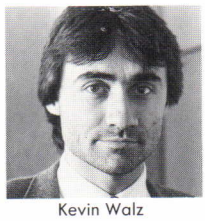

L.A.L. Rolland


Tobia Scarpa


Robert A.M. Stern


James Terrell


Michael Vanderbyl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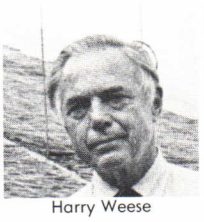
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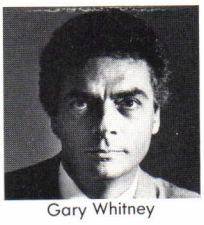
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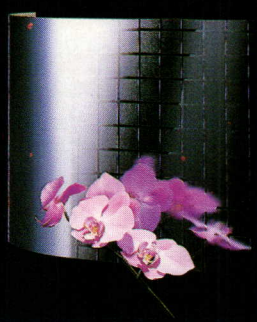

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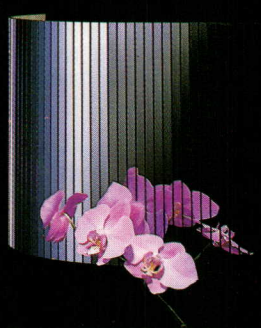

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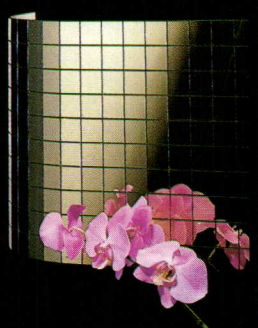

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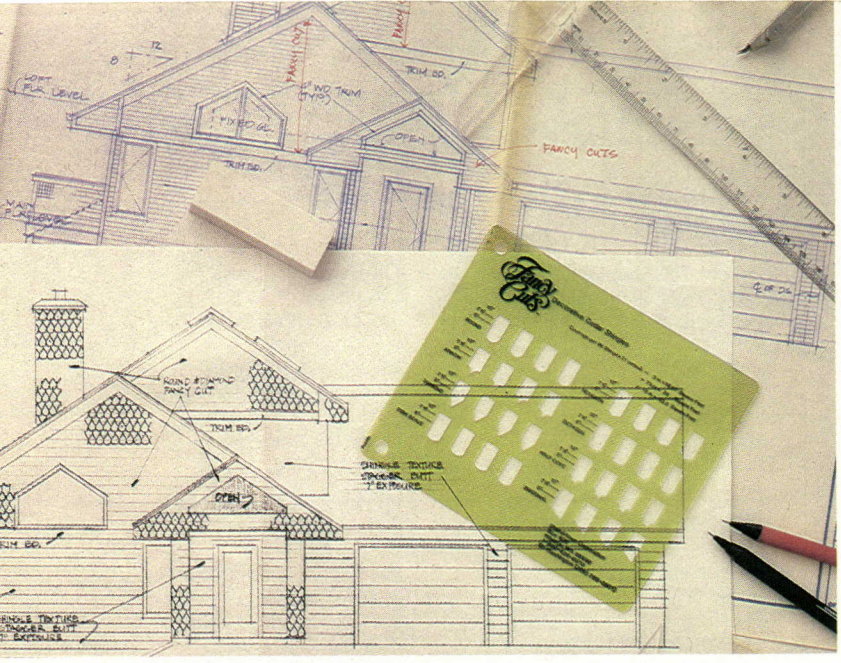

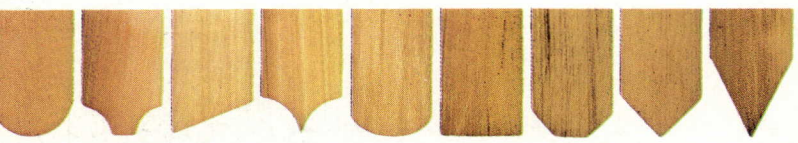

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