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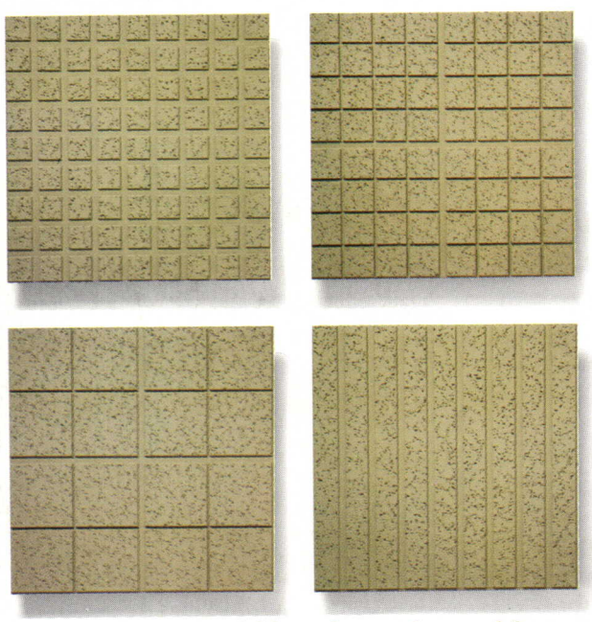

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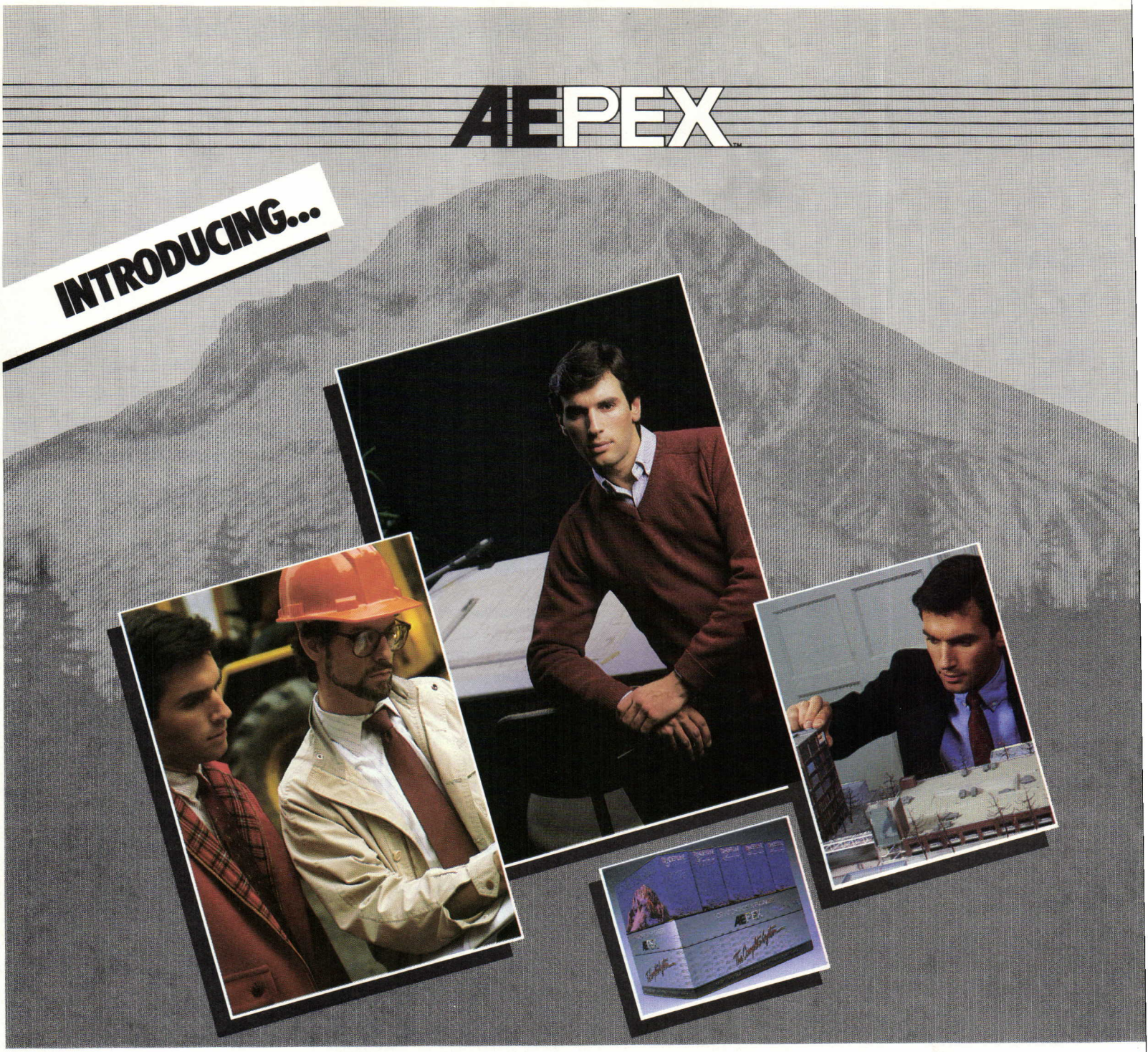

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An explosion of computer use predicted

According to James R. Newcomb, vice president and director of design for Dataquest, Inc. (the subsidiary of Dun & Bradstreet), the worldwide market for computer-aided design and manufacturing systems will grow from $3 billion last year to $15.4 billion by 1989—and construction-related applications will keep pace.

Mechanical engineers are currently the largest CAD/CAM users, followed by electronics industry engineers. But the third largest group, construction, spent $401 million last year and will buy $2 billion worth of automated design equipment in 1989, he says.

The manufacturers are jockeying hard for position, says Newcomb, in what has become a "very tough market." IBM, considered a latecomer to CAD/CAM, has catapulted itself to the top with 1984 sales of $700 million, or 23 per cent of a mostly CAM market. Following IBM were Computervision, with $556 million in 1984 sales, and Intergraph, with $404 million in sales. IBM is expected to try to increase its market presence. "We know they have 50 workstation products under development," Newcomb adds. In all CAD/CAM products, technology advances will allow sophisticated features now in the software, such as zoom and rotation, to be in hardware in the near future.

Rudimentary artificial intelligence is beginning to appear, as solids-modeling technology improves. This allows a workstation to alert a designer, for example, that two pipes are about to collide, or that a structural connection cannot withstand its load.

Despite the proliferation of personal-computer-based CAD systems, Newcomb warns that these systems have severe performance limits (see *Computers*, this issue). "There's really a false perception about what a lot of these systems can do." However, architects and engineers contemplating CAD can take comfort in a narrowing price gap between micro- and mini-based systems. "You'll be able to buy a more competitive computer for architecture at a lower cost."

Meanwhile, the outlook for the widespread use of robots in construction remains far in the future. Stephen Purdy, Dataquest's associate director of its robotics industry service, says computer architecture and robotics "are worlds apart." He doesn't expect construction to embrace them soon. "That industry's mentality is slow to take on change."

David Garfinkel, World News, San Francisco

Tax credit program not always precise

In a misunderstanding over whether an exterior mural destroys a building's historic value—and its restoration's eligibility for a tax credit under ERA provisions—a section of Washington, D. C.'s biggest mural (on a building being renovated by architect James Bayley) has been painted over. The owners of the subject Lincoln Building, according to the Park Service, which certifies historic appropriateness, may have reacted too hastily because of the April 15 income tax deadline.

The painted-over part on the front (an embellishment of existing architectural features as seen in the photo) was one of three parts by Richard Haas that include the panel still existing on the south wall and another panel that had been planned but not executed for the north wall. The cover-up occurred because the owners, the Wynmark Development Corporation, feared they would lose a $412,000 credit.

Jerry Rogers, who administers the Park Service's tax credit program, recalls that the developers had inquired by phone "in general terms about a mural on the upper portion of one side of the building. But the final March review that included the front concluded that that part was inconsistent with the historic district." (It is by being part of a district that the building qualifies for its credit.)

Mark Griffin, one of the owners of Wynmark, said that as a result, there was "some question" whether his company would have received the tax credits with the front mural in place. He said that the Park Service urged him to appeal the denial of certification, but "we were not confident" of winning and therefore decided to cover instead.

Other Park Service representatives said, "We probably would have objected to the north panel as well, because of proximity to an historic house below." He acknowledged that part of the problem was due to the service's bureaucratic structure. "The service has to answer to the letter of the law." But, he added, staffers went to "great pains" urging Wynmark to appeal. "There was a good chance they would have won," he said. One third of such appeals are successful.

The significance of all this, according to a representative of the owners, is that the tax credit certification process is not always precise. *Peter Hoffmann, World News, Washington, D. C.*

Moderate optimism for hotel construction

Among predictions for 1985 by the U. S. Travel Data Center that may indicate a moderate increase in hotel construction are:

- Despite the strong dollar, the volume of foreign visitors is expected to increase by some 4 per cent over 1984, to 22 million.
- Rising room rates are expected to moderate—along with the introduction of such incentives to stay in hotels as amenity packages for business travelers, increased numbers of concierges and video conference centers.
- The number of riders on Amtrak trains is expected to increase by 5 per cent—as is automobile travel.
- Hotel occupancy rates should rise to 67.2 per cent, a 1.5 per cent increase.

For more information, contact the center at 1899 L Street, N. W., Suite 610, Washington, D. C. 20036.

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Computers: Where are we and where are we going on PCs?

By Eric Teicholz and Dan Smith

Are personal microcomputers—as opposed to the larger, more expensive minis and mainframes—the wave of the future for architects, engineers, and interior designers? Over the past year, RECORD has published articles by experts that argued that they indeed were (July 1984, pages 37-41), but also that, at least in their current state of development, they are not ready to give the most effective return on invested time and monies—especially in large firms (January and February 1985, pages 31 and 33, respectively). To set the record straight on just what PCs are currently capable of in two areas of principal concern to design professionals—computer-aided drafting and design, and database management—and what PCs are likely to be capable of in the near future, the authors have looked at both the current state-of-the-art and at up-and-coming developments that indicate that, yes indeed, despite current drawbacks, PCs are the wave of the future. C. K. H.

A recent study by our firm of some 200 architectural and engineering offices indicated an average of over 1.5 personal computers installed in the offices polled. Harry Mileaf, director of technology development of Sweet's, recently stated that he expects a 90 per cent penetration of PCs in design offices in the near future—in itself a "revolution of major importance."

Our study found that PCs are being used for word processing, specification writing, accounting/finance, project management, engineering and energy analysis, and computer-aided design and drafting. Let's focus on two aspects of this personal computer revolution—the use of PCs for CADD (the fastest-growing segment of CADD growth among architects, engineers, and construction contractors) and—in a second installment of this article—for database management (the manipulation and use of graphics along with related qualitative and quantitative information, otherwise known as "attributes"). In that second installment, PC-based database management systems (or DBMSs) will be explained, using as an example the capabilities of one such software package in dealing with Sweet's catalog data.

What the current figures mean, according to Dun & Bradstreet's subsidiary Dataquest, Inc., is that as of last December there were well over 15,000 PCs installed and in use for CADD applications. And the PC CADD annual growth rate is currently 63 per cent—significantly higher than the rate for CADD systems being sold on mini- and mainframe computers.

Through telephone interviews with the major suppliers, we estimate that between 10 to 15 per cent of all the current PC CADD systems are being sold to architects, engineers, and contractors. Other industry sources and a recent market study by us estimate that firms are buying PC CADD at twice the rate of other applications segments. The projections by Dataquest of future use are outlined in the box below.

The reasons most often cited for the substantial growth of PC use include:

• *Price.* CADD software systems for PCs have a starting price of about $1,000. Although it might cost as much as $10,000 or more in addition to put together the hardware for a complete single-user PC CADD system, most firms already own PCs that are used for word processing, financial or engineering analysis, and/or project scheduling.

• *Versatility.* Since PCs are increasingly being used for non-CADD applications, the flexibility of using PCs for CADD as well is particularly important to designers, since it has been estimated that they spend only about one-third of their time doing design and design-analysis tasks.

• *Ease of use and specialization.* PC CADD systems normally take less than a month to learn and use effectively. This compares with approximately three months for workstation-based CADD, and up to nine months for large systems. This ease of learning is due, in part, to the lack of advanced-applications software packages, such as are available on the larger systems.

• *Drafting decentralization.* The users of large multistation CADD systems are buying PCs to decrease the load on their centralized CADD facility. They are also using PCs for training and learning about CADD. These sales to firms that already have mainframes will accelerate, since many of the PC suppliers are beginning to offer database compatibility with the larger CADD systems.

• *Productivity.* It has been demonstrated that the current state of two-dimensional production drawing with many PC CADD systems is up to two or three times more productive than with manual methods.

There are other factors that will further stimulate the acquisition of PCs for CADD applications by architects, engineers, and contractors. For one, that market is of a size that makes it worthwhile for the major suppliers to develop "industry-specific" applications software. The largest CADD supplier, for example, has just announced the availability of a two-*and* three-dimensional drafting package costing $4,700. It is anticipated that other suppliers will shortly follow suit. This means that one of the traditional shortcomings of PC CADD, the inability to expand or grow a system, will be overcome.

Finally, the hardware capabilities of the newer PCs are at a point where it is reasonable to expect that powerful graphic database management systems will be developed so that geometric and nongraphic data generated within the CADD system can be accessed for other, nontechnical applications.

Estimated market for PCs with CADD software

	1983	1984	1985	1986	1987	1988
Shipments	3,000	8,000	12,000	17,400	24,400	34,200
Cumulative	6,000	14,000	26,000	43,400	67,800	102,000

With all these design firms buying PCs, here is what they can and will do

After comparing the major PC CADD systems to manual methods, we found that drafting productivity gains of 200 to 300 per cent could be realized. That is to say that those same working drawings could be produced two to three times faster with computer-aided drawing than with the traditional manual techniques. Additionally, some of the systems tested were quite responsive—even when operating

Continued

Mr. Smith is a principal and Mr. Teicholz the president of Graphic Systems, Inc., a Cambridge, Massachusetts-based computer consulting firm working in the areas of system evaluation, procurement and management. Mr. Teicholz is an architect, a former professor at Harvard, a lecturer at MIT on architecture and computers, and the author of A/E Computer Systems Update, Computer Graphics and Environmental Planning, CIM Handbook, *and the recent* CAD/CAM Handbook, *all published by McGraw-Hill.*

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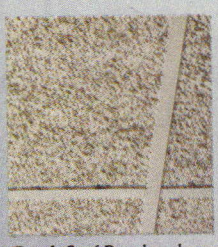

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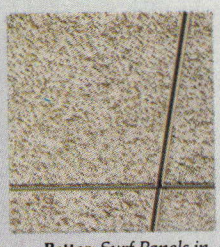

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Practice:
Comes the facilities manager

A design professional doing corporate work today will most likely find that the client is a facilities manager. Two points of view give insight into who you may be dealing with

By Ann Nydele

Further to ARCHITECTURAL RECORD's Round Table on the corporate architect (see January 1985, pages 35 through 47)...

Ads like the one below describe a new breed of corporate professional, who, architects find, is beginning to call the shots on corporate building projects to an often frustrating extent. Today's corporate facilities managers, some with staffs large enough to interact one-on-one with all the disciplines involved in a new building program, are responsible for some $1 trillion of corporate real estate. They are firmly in charge, at least as far as the architect is concerned, and are looking for answers.

Increasingly, the architect involved in corporate architecture finds that he or she is being subjected to a sometimes minute inspection of procedures, financial reporting and daily activities by these new corporate managers. For the "master" architect who is accustomed to dealing with the company's CEO, this can be unsettling. For others, it is creating a warp on the tradition that says the architect is in charge of the project. Yet, says one observer of the scene, architects should welcome facilities managers (if they are good ones), for the result will be a better building and one that is more responsive to the client's long-range needs.

Architects, however, are not so sure. So far, they have enjoyed the eruption of a massive construction and renovation industry in the wake of World War II business expansion, and endured the invention and almost overnight application of computer technology to their buildings. Now, this facilities manager phenomenon is creating a third major "revolution" in architectural practice.

One of two professional publications now serving facilities managers estimates its "universe" to be around 30,000 readers. That is, it finds there are 30,000 people in the U. S. who have a professional interest in facilities management. Other estimates are much higher. Whatever the numbers, a facilities manager's job can be complex—on any given day, investigating company operating costs, employee productivity, technology, building systems, or how well OSHA safety requirements are being met. When a new building program emerges, these responsibilities include managing the consultants involved—including the architects.

If it is a large corporation, there is likely to be a large, fully staffed facilities department that will maintain a day-to-day surveillance of architects and other consultants. An architect will monitor the architect; an engineer, the engineers; an interior designer, the interior designers, and so on. This is what makes architects feel uneasy, implicit as it is with the unvoiced charge that the architect cannot be trusted—as he always has been—with running the project himself.

Where, many design professionals are asking, did these people come from?

As corporations realize that their buildings may represent up to 40 per cent of total assets, the word *facilities* takes on a whole new meaning, in which providing space to workers is only one factor. The building becomes a part of the corporation's whole financial picture. Hence the new importance accorded its management and this new kind of manager. Once relegated to a basement operation, facilities managers are now involved with corporations' long-range strategic planning—a far cry from being a purchasing agent or the guy who moved desks around.

The changing relationship between architect and client has a parallel to the change in client perceptions and management techniques that occurred more than 30 years ago in major consumer-oriented companies. In the '50s, it was possible for an architect such as the late Eliot Noyes to find an imaginative CEO such as Tom Watson, Jr., and together they could institute a product design philosophy such as that at IBM—a philosophy that not only contributes significantly to the company's image and prestige but is a major part of the company's success.

Today, a product or packaging designer deals with a middle manager, with his or her own priorities and problems—in short, with the limitations of hierarchy. Design is no longer eased by executive fiat. The modern packaging designer, working for a multibrand manufacturer, reports to a brand manager. There may be an in-house director involved. The brand manager reports to a category manager, who reports to the marketing vice president, who reports to the president of the brand or division, who reports to...

Design consulting firms had some anxious moments as corporations experimented with in-house design and even in-house advertising groups. But as time went on, the companies found the maintenance of such departments too expensive and had to concede that they could not provide the continuous flow of ideas that the consultants could.

Something of the same sort is happening today, as new building programs exceed ad budgets in cost, and facilities management is assuming major significance in the over-all corporate financial management picture.

Who are facilities managers? "The creation of facilities managers," explains Gerald Hubbard, incoming president of the International Facility Management Association, "was to fill a void in corporations. Corporations had individual departments responsible for construction, which turned their product over to the building manager, and then individual departments that did their own space planning within the building, but there was no group responsible

Miss Nydele is a communications specialist for design professionals, an author and a freelance writer in the design field and a contributing editor to facilities management publications. She is based in New York City.

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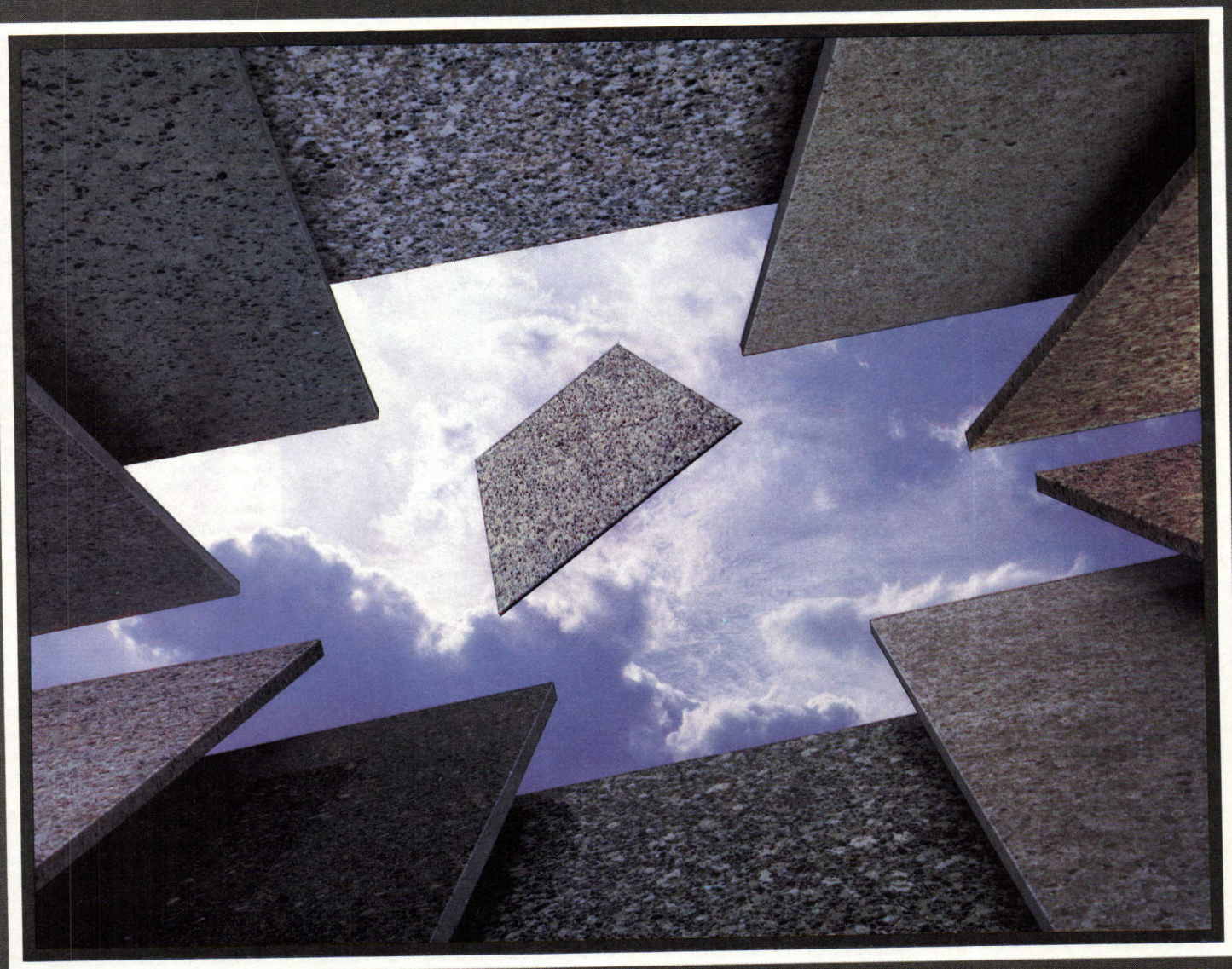

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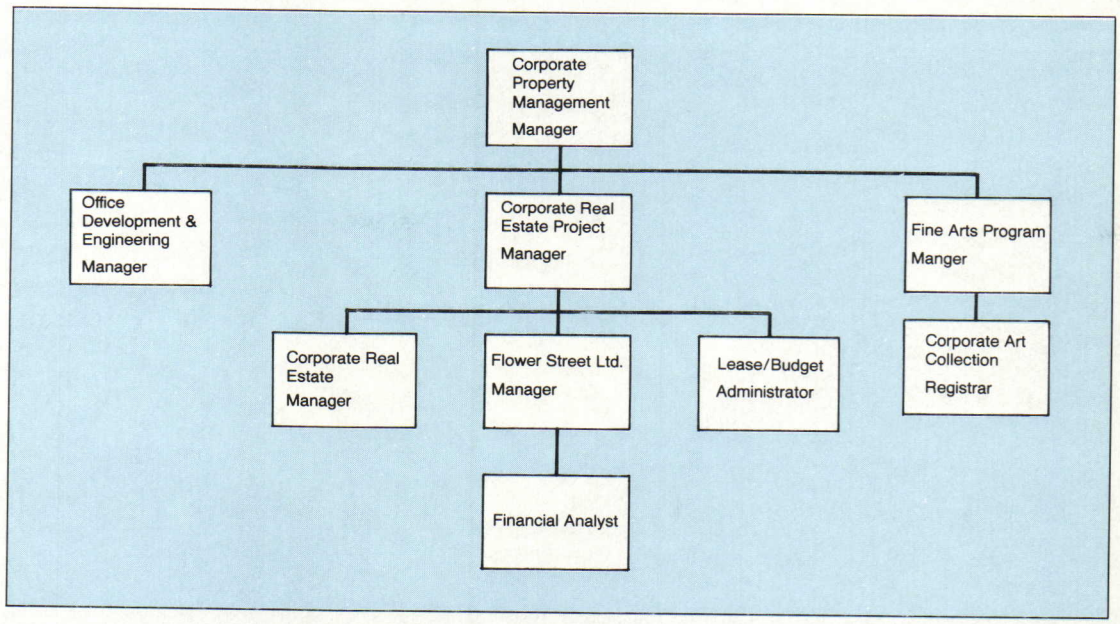
Facilities manager Ben Cubler, interviewed in the article, heads the Corporate Property Management division at ARCO. The division, as an illustration of how extensive such a function can be in a major corporation, is described in the chart below.



for the entire field of planning for corporate facilities needs, and that would, over a five-year plan, tie the facilities needs into the corporate strategic plan." Facilities managers, then, were born of the need to unite all these varied activities.

Just what, with all this varied background, do these people do?

Facilities management looks at the entire process of planning, construction, operations and maintenance of the building and its interiors, making sure, says Hubbard, that the result is conducive to employee productivity. Facilities managers today are responsible for several or all of a long list of items. Some of the categories include:

• *Real estate management*—buying and selling properties, site selection, maintenance, leasing of space for their corporation and leasing to tenants by their corporation, management of tenant space (where the corporation is the developer of the building), and financial planning in line with the corporation's strategic plan.

• *Building maintenance and security*—includes compliance with OSHA requirements, security and safety responsibility, day-to-day maintenance and operations and, to the point. . . .

• *New building programs*—supervision of design consultant selection process, supervision of design, general contracts and bids, and construction, creation of program specifications, financial reporting.

Subgroups within the facilities group can be a systems manager, responsible for the selection, installation, and operation of computer systems, a building maintenance manager, an art curator. (In many large companies, in fact, the art collection is seen as a major corporate asset. In Chase Manhattan Bank's world-wide offices, the collection under the supervision of Director Merrie Good has grown since 1959 to be worth over $13.9 million. This function, too, is being "professionalized," as corporate art curators organize.)

The changing expectations of these new corporate managers is radically affecting the role of architects for corporate facilities. Where there is a strong emphasis on accountability, financial reporting and management, the architectural firm with the largest staff, not only in size but in depth of expertise, will often be in an advantageous position (although the Round Table found this not universally true). In the interview process, it will be important for architects to understand clearly the client's philosophy on this, and consider whether the firm has enough clerical and administrative back-up to take on an elaborate reporting requirement. Witness. . .

The structure of one major corporation reveals how many work

One of the largest facilities management programs is that of the Atlantic Richfield Company. It was established about 10 years ago and now manages real estate holdings in excess of $1 billion. Running it, corporate property manager Ben Cubler reports to the vice president of information technology and corporate services. He, in turn, reports to the chief corporate officer who reports to the president. Thus, in the ways of corporations, does top management policy affect facilities management decisions.

Cubler is responsible for the facilities of the corporate staff, senior management and the 11 operating companies of ARCO, which call on his department when, among other things, they need assistance with a building project. He credits three very large moves—the relocation of ARCO's headquarters from New York to Los Angeles, the construction of a new building in Philadelphia, and the relocation of newly acquired Anaconda Copper from New York to Denver—as being the catalysts that inspired the centralization of facilities operations at ARCO within Cubler's department.

His full responsibilities include existing property management, an office development department along with an interior design group, and the real estate organization responsible for acquisitions, leasing, and operations. The latter does major leasing activity within ARCO, operates ARCO's headquarters, and acquires major office and research facilities for the entire corporation. Additionally, there is a subgroup responsible for that corporate art collection.

"We have two roles," Cubler explains. "We have a line and a staff role, but we are primarily staff—setting policy, direction and monitoring projects occurring throughout ARCO. When an operating company asks for our help in a building project, we assign people to that project as line personnel. Afterward they return to corporate staff status."

Here is how this large corporation handles the selection of design consultants

Like many other clients, Cubler's group tailors the selection of architects to a particular need. Says Cubler: "If you're doing a building where you want to have important identification and recognition, as we did with the Dallas ARCO Tower, we hire a 'world-class' architect. In Dallas, we wanted a design that would be internationally recognized, so we interviewed those kinds of architects for that building.

"The selection was made based on the reputation of the architect, but more specifically, as on all projects, on our evaluation of the people that the architect would assign to our project. We are really sensitive to that." Apart from the reputation of the principals, Cubler emphasizes that he looks for experienced people who have served their clients well, who understand project management, budgets and schedules, and "who can really relate to us." He cites chemistry as an intangible but important factor.

"We are very conscious of these things," he says, "because when you get a project that's going to span two or three years, as most do, and you work together as part of a project team, it is very important."

Typically, on a large project, he will have about six to ten of his people assigned, such as manager, engineer, architect, cost control engineer, scheduler, and administrator. "We administer the architectural program through the architect, and the building construction program through the contractor."

Cubler feels all this is necessary because, he says, architects are not good project managers. "They'll manage the process, but they don't manage the outcome nearly as well as our own people will. We ourselves spend a lot of time putting together a budget and schedules, and doing critical path forecasting as to where a project will be at a given time."

The architects may be responsible for the process of design, but ARCO's project management team is responsible for financial control. "The architects are, by contract, responsible for that, as well," says Cubler, "but we feel that a successful project means our managing budget, schedule, and the other goals we have."

Still, Cubler maintains that an architectural firm with a stronger project management track record than another would be favored in 80 per cent of the projects that are general purpose buildings. For small jobs, under 100,000 square feet, ARCO is likely to use a small, local firm with knowledge of the local building codes and with a good local reputation.

Next month, Miss Nydele will explore how ARCO handles its architects' activities and how one prominent architect responds to all this.

Glass-terpiece

The beautiful Collin Creek mall in Dallas' suburban Plano area is another evidence of Naturalite's expertise in glass skylights.

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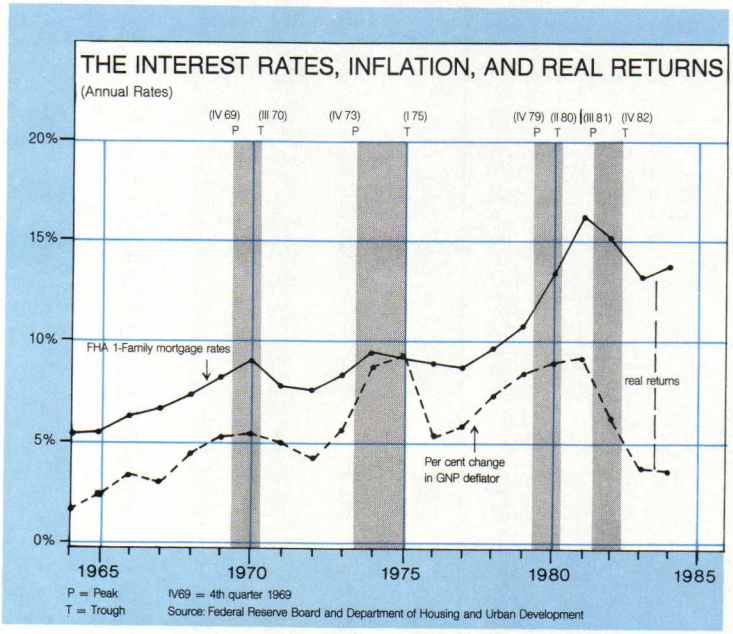
Finance: Whither interest rates and closely tied economic growth?

By Phillip E. Kidd

Since the middle of 1984, the economy has been on a roller coaster with alternating quarters of strong and weak growth. Major contributors to that uneven performance have been the level of interest rates and their abrupt up-and-down movements. In turn, interest rates are responding both to fluctuations in the demand and supply of credit and to investors' inflation psychology, both of which are interacting to create historically large real rates of interest.

Starting in 1982, there has been remarkable progress in reducing inflation. As seen on the graph at right, inflation is now at a level of under four per cent. That has not been seen since the mid-1960s. As a further encouragement, the outlook is for constrained price increases in 1985. Nevertheless...



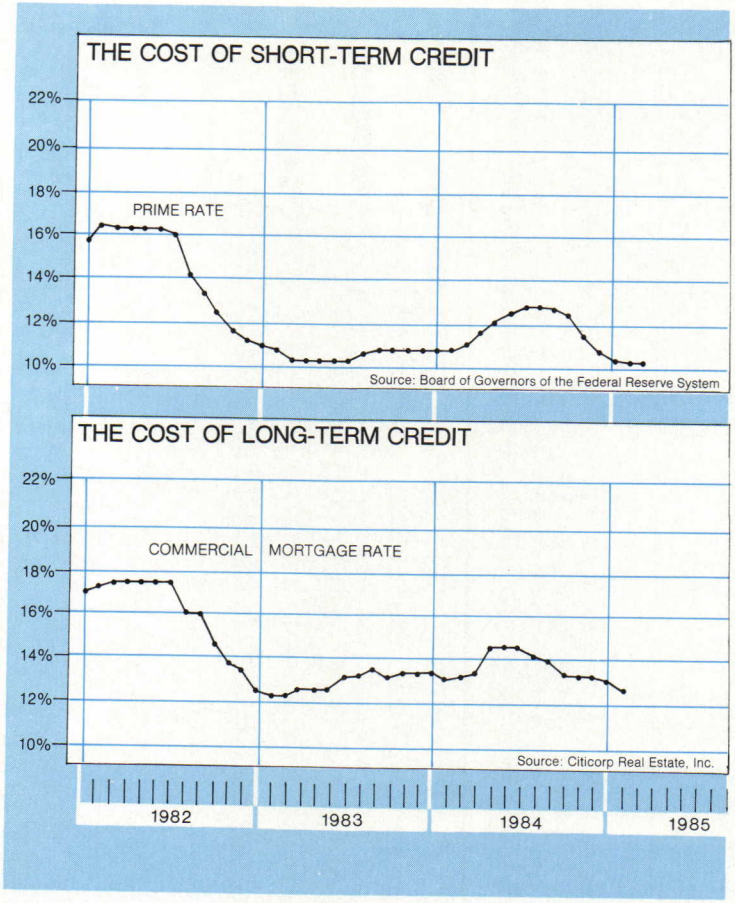
Interest rates, particularly long-term rates, remain exceedingly high

As a result, when nominal (or money) interest rates are adjusted for lower inflation, real rates are far higher than at any time since inflation took hold in the mid-1960s.

Those extraordinary real rates have become the financial community's hedge against a future resurgence of inflation. Despite recent trends, investors (individuals as well as financial institutions) are not convinced that there has been a lasting break in the inflationary spiral. They are clearly telling policy makers that it will take several more years of low price gains to eliminate their vivid memories of devastation to their stock, bond, and mortgage portfolios due to ever-increasing inflation in the 1960s and the 1970s.

Whenever there is the merest hint that inflation is rekindling because of either rapid economic expansion and/or fast money growth, investors rearrange their financial assets to protect those large real returns. That sends interest rates lurching upward, which slows the advance and eventually reduces the inflation threat. Then, investors become more aggressive. That sends rates downward, which stimulates the economy and sets in motion the next rise and fall in activity.

While investors want those high real interest rates as inflation protection, the highs exist because of the persistent mismatch between the potential demand and the available supply of funds. The facts are simple enough: As a nation, we do not generate sufficient internal savings to finance the huge backlog of long-term projects that overhangs the economy. Billions upon billions of dollars must be invested to regain our worldwide industrial competitiveness; to rebuild and to expand our vital infrastructure of sewers, dams, reservoirs, streets, highways, and bridges; to add large numbers of units to our housing stock; to supply our sizable social programs; and to improve our military might.



Whenever interest rates decline, businesses expand their bond and stock sales and home buyers take on more mortgage debt. Inevitably, those funding efforts collide with the enormous, prolonged, borrowings of government for social, infrastructure, and military spending. Soon interest rates stop descending and begin ascending, as credit demand overwhelms credit supply. Promptly, businesses and individuals curtail their long-term financing and the activity that it supports, awaiting the next reduction in interest rates. In stark contrast, government, unimpeded by the level of rates, continues to absorb billions of dollars from the financial markets. In effect, the current high levels of long-term rates by controlling private borrowing are acting as a governor on the economy, keeping it from sustained acceleration.

In retrospect, the economy is fortunate that nominal and real rates have not been higher. To an extent, surpluses of state and local governments have alleviated some of the strain on the financial markets from huge Federal deficits. Equally important have been the large inflows of foreign money (nearly $70 billion in 1984) that enlarged the domestic credit pool, helping to meet rising demands.

Now concerns are surfacing that foreigners, after two and a half years of substantial financial purchases, may gradually become satiated with dollar assets and slowly turn elsewhere for more of their investments. Next, state and local governments are already whittling away at their surpluses, either through proposed tax reductions or increased spending. During the second half, as these changes take shape and gain momentum, they will begin drawing money away from the money and capital markets, putting upward pressure on interest rates.

There are positive aspects to current shifts that will aid the domestic economy

When foreign demand for U. S. assets lessens, the dollar will inch downward against other currencies, invigorating the current sluggish revival of our export industries. Rising state and local expenditures will boost demand for domestic goods and services. Both actions will add jobs and expand earnings. With more money, consumers will either spend, increasing production, or save, helping ease pressure on interest rates.

Because these changes will occur at different speeds and react against such other economic forces as investor psychology and Federal deficits with different degrees of intensity, the uneven performance of the economy will continue in the second half. Mortgage rates will fluctuate within their present 12 per cent to 14 per cent band. Housing starts and retail construction, after a brisk second quarter, will struggle against advancing rates during the summer, before improving late in the year as interest rates slide to the low end of the range.

Mr. Kidd is a prominent economic consultant and former director of Economics Research of the McGraw-Hill Information Systems Company.

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The profitable professional: Be clear about your responsibility for cost estimates

By Larry F. Gainen, Esq.

Every design professional is well aware of the impact that inflation has had on the cost of construction in recent years. A direct result of rising costs has been a noticeable increase in the number of lawsuits against architects, engineers and interior designers for costs of construction that far exceed the estimates they gave clients during design. Courts are becoming more prone to assess liability against design professionals *when* they fail to properly advise their clients of the pitfalls in cost estimates.

Let's discuss three aspects of this situation: the legal ramifications to a design professional when a construction bid far exceeds his or her cost estimate; contract provisions that we recommend be included in design contracts; and, finally, a series of procedural suggestions that have proven useful to design professionals.

Why all the confusion about the designer's role in cost estimates?

Before focusing on the legal ramifications of cost estimates, a few preliminary observations are in order. It is worth repeating: You should always keep in mind that the cost of the project is extremely important to your client. Even though your discussions may center on design, quantity, and quality, and thus costs recede to the background, costs remain important. Clients usually have a fixed cost limitation for a project, and yet, for a variety of reasons, either intentional or not, may communicate only an approximate budget.

This disparity provides fertile ground for the development of future difficulties. Not only is a project's cost always significant to the client, but the client usually relies solely on the designers to estimate that cost. Clients tend to believe that designers are able to estimate costs with precision, and when the lowest bid on a project exceeds the cost estimate, clients often perceive that there has been a very significant design failure.

Clients often are unsophisticated about the design process, and do not understand the difficulty in estimating costs. In the programming and schematic stages of design, when the details are not worked out, cost predictions are based on gross figures (e.g., the project's area multiplied by some dollar value per square foot) and are little more than educated guesses. Even when the design progresses to more advanced stages, the designer still is not able to calculate costs with precision.

Clients often don't understand that it is the construction contractor finally chosen, and only the construction contractor—with his knowledge of specialized subcontractors, current labor and material costs, and his desired profit—who determines actual cost.

What can the designer's liability be when estimates are low?

Compounding this problem is the fact that professional liability insurance policies generally exclude from coverage any claim based on errors in cost estimates. The typical errors and omissions policy provides: "Notwithstanding anything contained in this policy to the contrary, the coverage herein shall not apply to claims or claims expenses for or arising out of . . . express warranties or guarantees, estimates of probable construction cost or cost estimates being exceeded."

While a clever attorney alleging a claim against a design professional for an inaccurate cost estimate will often frame the complaint to preserve the professional's insurance coverage for the benefit of the attorney's client, the professional will usually find that there is no insurance if such claims are established.

But even if the client doesn't sue for damages, a typical pattern is as follows: Upon completing the approved working drawings, the designer renders a written cost estimate of $300,000. The lowest bid submitted by any of the six potential contractors is $400,000. Outraged by the high bids, the client is unwilling to go ahead at that cost. Although the architect offers to redesign to bring the cost within the $300,000 estimate, the client refuses to materially alter the project, and contends that he is not obligated to pay the architect for his services because the plans and specifications are useless. Almost every architect has been, or likely will be, involved in such a dispute.

The key is the exact nature of the oral and written assurances to the client about costs

Clients generally require building and interior designers to provide some form of assurance about costs. These assurances are usually provided in one of two ways. The designer may simply have promised to prepare cost estimates. As we will see below, such an undertaking requires that cost estimates be prepared with due care. Alternatively, the designer may have assured that construction bids will fall within a cost figure. It is this latter situation, i.e., in which there is either an oral or written representation that a project can be built for less than a certain amount, that is fraught with danger. For in such a case, if the project cannot be built for a sum within the estimate, the designer may, at the very least, forfeit his fee.

In law, an assurance that a project can be built for a specific sum may be found to be a condition of the contract, which means that the client's obligation to pay the design fee is conditioned on the cost estimate being accurate. Thus, a major priority is that there be no assurances about costs that create a contractual condition. The designer must not promise that the project cost will not exceed the cost estimate.

While it might at first blush seem relatively simple to avoid making such assurances, this may prove easier said than done.

Typically, costs are discussed between a designer and a client at various stages of a project. Usually, a designer and client will agree that a certain figure was contemplated for a project and that the figure was a relatively firm one. When the lowest bid exceeds this cost estimate and the project must be abandoned, all too frequently the client contends that he was orally assured that, if the project could not be constructed within the estimated cost, he did not have to pay for the project's design or, in other words, the fee.

It is critical, therefore, to minimize the chances of the client successfully claiming that he had been orally assured that the project cost would not exceed an estimate. Although the concept of a client insisting on a fixed budget for the purpose of creating a contractual condition is a point you may not often consider, one of the important purposes of this article is to emphasize the risk of allowing such a situation to develop. It is important to fix your relationship, as it pertains to cost estimates, within the confines of the written agreement alone.

Whatever must be said about costs before signing the contract, stick to its wording thereafter

There is a principle of contracts known as the parol evidence rule. It provides that courts will not give effect to prior or contemporaneous oral agreements that contradict a subsequent written agreement, intended to be the final expression of the parties' understanding. The situation of the lowest bid exceeding the cost estimate *must* be comprehensively provided for in any design professional's contract

Continued

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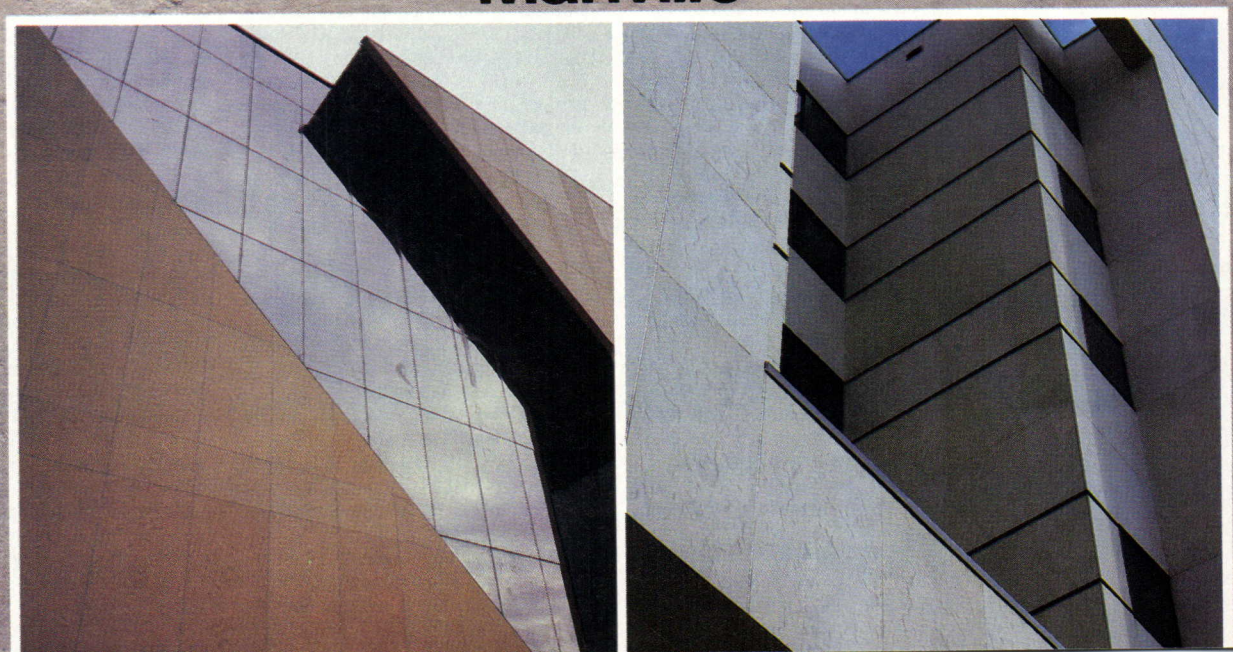


to avoid the substance of any prior discussions on cost taking precedence. *And* it is equally important not to make any subsequent oral assurances with respect to cost that contradict the contract language.

In the typical example used above, the lowest bid exceeded the cost estimate by $100,000, or 33 per cent. Assuming that an accurate cost estimate was found to be a condition of the owner's obligation to pay for design services, such a deviation between the estimate and the bid would, in most jurisdictions, be held to be a non-fulfillment of the condition, relieving the owner from his obligation to pay for those services. Moreover, some courts would permit the client to recover all prior fees.

What is often overlooked is that the architect could be liable for any consequential (related) damages suffered by the client as a result of the inaccurate cost estimate. While there have been few cases in which the client sued the architect to recover damages, potential liability does exist.

A typical case shows how easy it is to slip into a position of liability

Our firm recently handled a lawsuit in which an owner alleged that he purchased a building relying on the architect's preliminary estimate of the cost of renovating the structure within a figure that would provide feasible and suitable office space for the owner's use. When the lowest bid came in at three times the architect's cost estimate, the renovation was abandoned. The owner sought recovery of the interim fees he had paid the architect *and* damages for the loss sustained in purchasing the building as well.

In this case, the owner sold the building at a profit while action was pending. But if the building had been sold at a loss, the architect's alleged lack of care in preparing the estimate would have taken on critical significance.

There are also a number of other legal defenses against such a claim depending on the specific facts of the case. In this particular lawsuit, it could be argued that the cost of the project exceeded the preliminary cost estimate because the owner ordered excessive post-estimate changes in the design and refused to negotiate a reduced cost with a bidder who wanted to complete the project. Also the cost was increased because of structural conditions discovered after the estimate. Nevertheless, the case provides insight into a common situation where the architect faces potential exposure for consequential damages.

Even if a cost estimate is not a contract condition, proceed on them with care

There must be due care in every aspect of professional services, including estimating costs. A design professional is held to the standard of care of others practicing in the community. If his cost estimate has been negligently made, he could be required to forfeit his fee and be liable for damages on a theory of malpractice. If there is no representation in a contract that a cost estimate will be accurate, the standard that will apply is due care. There can be a larger discrepancy between the cost estimate and the lowest bid before negligence can be found.

A case recently decided by New York's Court of Appeals reinforces this principle. The court held in *Pipe Welding Supply Company* v. *Haskell, Conner & Frost,* that an architect could not be found negligent based solely on an inference of malpractice arising from a large discrepancy between the architect's estimate and the lowest bid. Rather, the court stated that the plaintiff had to introduce expert testimony in support of the allegations of malpractice and to specifically demonstrate how the defendant deviated from accepted architectural practices in his method of estimating the costs of the project. Since the court found that the plaintiff had not met this burden of proof, it held that the architect was entitled to a fee. Had the accuracy of the architect's cost estimate for the project been found by the court to be a contract condition, the architect would have lost the fee, and could have been held liable for damages simply because the cost estimate was erroneous.

Here are some protective provisions that should be included in the design contract

The agreement should provide for periodic payments. If payments have already been made by the client at the time the lowest bid exceeds the cost estimate, it improves the chances that a court would find the understanding of the parties to be that the client would have to pay in any case.

Interim payments have been held to be inconsistent with the creation of a non-payment contract condition.

Another provision that should be included in the agreement is an integration clause, which states that this written agreement represents the entire understanding of the parties, and supersedes all prior negotiations and agreements. The purpose is to protect against the client asserting that there was a separate oral agreement to create a fixed cost limitation. Integration clauses, while not foolproof, are difficult for a client to overcome.

In order to circumvent such a clause, the client usually has to prove fraud, duress or mistake, which is extremely difficult to do.

The design professional should also include a provision stating that the cost estimate represents his or her best judgment as a professional, but that the estimate does not constitute a warranty or representation that bids will not vary from the estimate, no matter how carefully prepared.

There is a clear advantage to incorporating a clause providing that any statement of cost is only an "estimate." Such a provision will add immeasurably to the argument that there is no fixed limitation on the cost as a contract condition. Moreover, a review of recent cases shows that there is a judicial appreciation of the use of the word "estimated" in a contract.

Although estimates cannot be made cavalierly, courts generally grant wider latitude than for firm statements.

The design agreement should also provide that, if a project budget or fixed limit on construction cost is exceeded by the lowest bid, the owner must cooperate with the designer in revising the scope and quality of the project to reduce the construction cost. The contractual provision should impose this obligation on both parties.

It recognizes that both parties want the project to be built, not abandoned, is fair to both parties, recognizes the professional relationship, and probably will reduce litigation.

No matter how careful the agreement, the potential for problems exists

Accordingly, what follows are some suggestions, unrelated to particular contractual language, that we have found quite useful.

Many architects, engineers, and interior designers, especially if they are less experienced members of their professions, are fearful of even raising the possibility that estimates could be exceeded by costs. Many are wary of discussing the matter for fear of losing a commission. First and foremost, you should forthrightly discuss the potential situation of possible overruns and strive to reach an agreement on how the problem, if it arises, will be addressed. Then the agreement reached should be reduced to writing.

It is a business truism that problems are only exacerbated when they are pushed into the background.

When the agreement is reduced to writing, the provision relating to the low bid exceeding a cost projection should be pointed out and explained. A full discussion of these important provisions concerning cost figures is critical to the establishment of a true meeting of the minds.

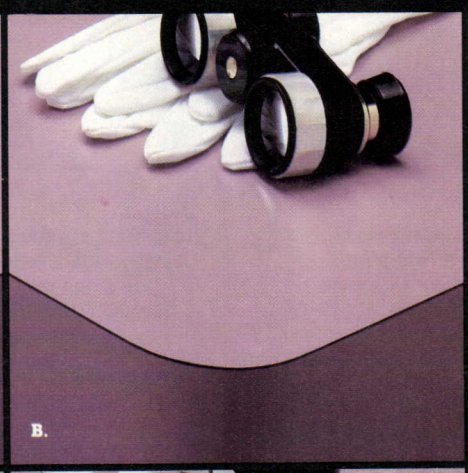
Problems tend to be minimized when they are anticipated and discussed openly.

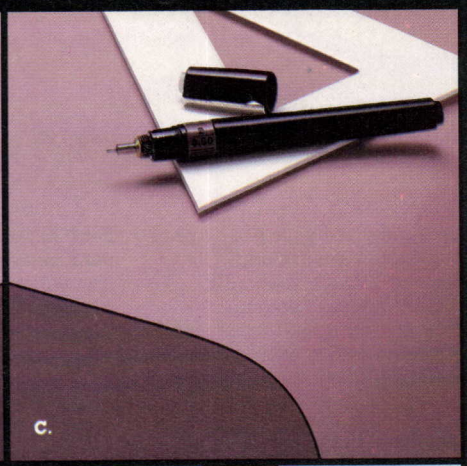
If the client is more interested in low cost than in quality design, we suggest sending a separate letter to him that explains the difficulty in estimating costs, and suggests that a detailed cost projection be obtained (at the owner's expense) from an experienced cost estimator. Such a letter can remove a good deal of the pressure for making low estimates, and reduces further the chances of forfeiting a fee.

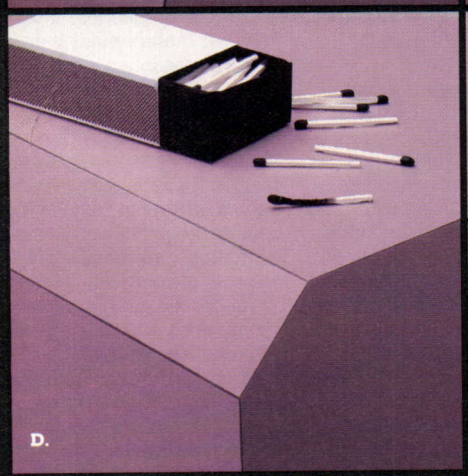
We counsel all of our designer clients not to make extravagant promises regarding what can be built within a given budget. If the project cannot be built within the budget, this should be discussed frankly with the client. Although this may result in losing a commission, it is more desirable than being embroiled in expensive litigation.

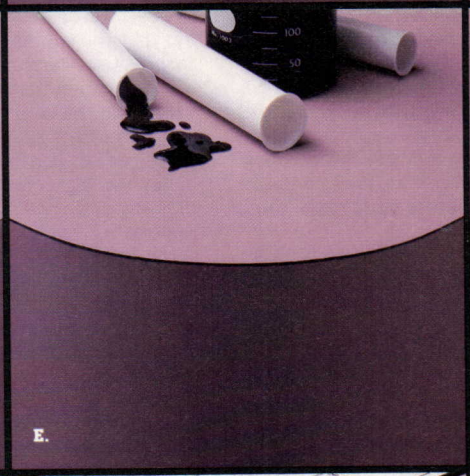
The client should be told how cost projections are made, and should strive to educate himself on the accepted procedures. It is likely that there will be an insulation from liability even if the cost estimates are substantially incorrect.

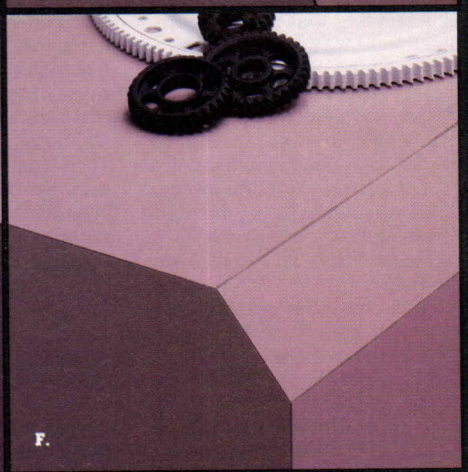
Finally, the client must constantly be kept aware, in writing, of any changes in the project that affect costs. Additions to the project scope should be recorded. Careful records of all conversations should be kept and all conversations about costs should be memorialized in writing, with copies sent to the client.

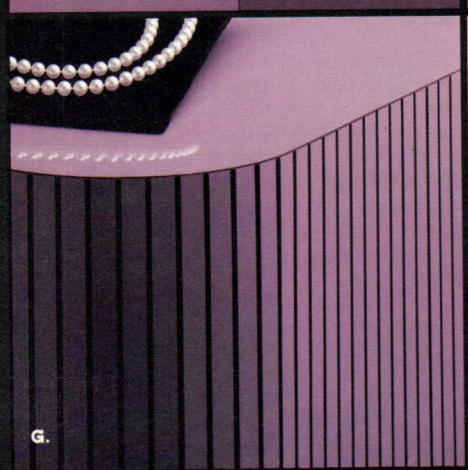


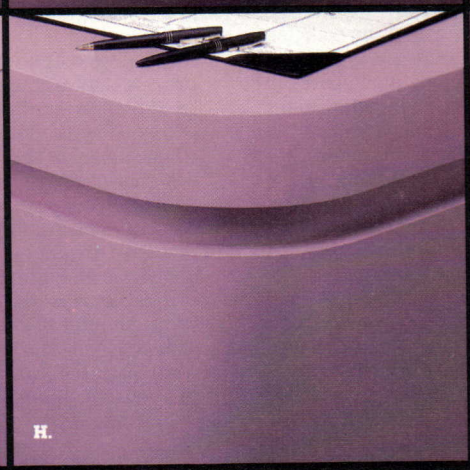


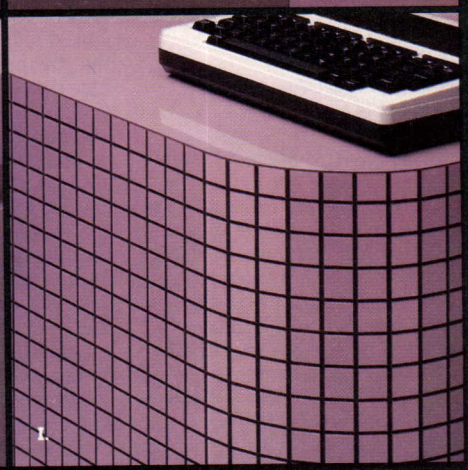












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Architectural education: What are students concerned about?

As current president of ASC/AIA, Thomas Fowler sums up the educational and future and highly practical concerns of architectural students, and reports on a streamlining of their organization effected at their last national convention

By Thomas Fowler, IV

Thomas Fowler, IV, is president, Association of Student Chapters/AIA. He received his B. Arch. degree from New York Institute of Technology in January 1984. While in school, he worked at LeGendre Johnson McNeil Architects and Planners. He studied in Rome in the summer of 1982, and won the Alpha Rho Chi Medal for excellence throughout his college years.

If you speak with students nationally, there is a perception that the market is flooded with too many graduates in architecture. Students, today, also have a very serious but idealistic outlook toward the practice of architecture. But they lack some of the vital information needed to get the most out of their education. For instance, most don't even *know* how many students are in architecture, or what their career options really are.

There are currently 35,000 architectural students in accredited schools nationally (approximately 4,500 graduating every year), 15,000 interns, and a guess of about 70,000 registered architects in the country. Those numbers are somewhat deceiving, since all graduates and architects are not practicing in the typical architect role. But I really question whether we have *enough* in any category. If you take the total number of architects and compare it to the number of lawyers (250,000) or accountants (500,000), we don't have *nearly* enough! More and more graduates are seeking and finding options in related fields of architecture—but are enough students exposed to these options in school? In a country where architects do only a fraction of the building, it is imperative that we have more graduates infiltered into all facets of society, to help improve all the built environment.

I think it is important to go beyond the "surface problems" of the profession that are constantly reiterated: too many students in architecture; architectural education is too pluralistic; the public does not understand good design; clients get in the way of doing good architecture, and so on.

It is also important to go beyond the "surface assets" of what is *good*. Academically, architectural education is one of the best of the liberal arts educations one can get—in terms of a good general knowledge of *many* things (you might say that you become a jack-of-all-trades). It also is great, because you are taught to think, not just to memorize. By a logical analytical process, you learn to solve complex problems and to come up with a series of alternative solutions. I think most would agree it is a good academic education—but what about its value as a professional education? Are architectural students well prepared to create architecture?

Students addressed these issues at their last convention

Architectural education is extremely pluralistic: there are as many philosophies of teaching architecture as there are schools of architecture. No two schools teach in the same manner. Yet there is one element that schools of architecture have in common: they seem to lose sight of the fact that architectural education should be practical. Don't get me wrong, I think it is wonderful to intellectualize about architecture, but there must be a point where we draw the line and start learning how to be better professionals.

Architectural students recently took up this issue at Forum '84, the annual architectural student national convention, held last November in Ann Arbor, Michigan. At the opening session, David Maister, an associate professor at the Harvard Business School, gave an extremely provocative talk on "What's Wrong with Professional Education?" And after his talk, the five presidents of the collateral architectural organizations—NAAB, ACSA, NCARB, AIA and ASC/AIA—reacted with a panel discussion moderated by Louis Marines, executive vice president of the AIA. The panel was wonderful because we actually discussed some *solutions* to problems—and shed some new light on ways of *thinking* about architectural education, instead of just reiterating problems.

The major educational issues Maister addressed were: professional schools' lack of sensitivity to clients; their emphasis on academics rather than practical aspects; anti-business bias; confused esthetics and ethics; and too much attention to knowledge instead of skills.

Maister first discussed deficiencies that all professional schools (law, business, etc.) have, then went on to talk specifically about architectural education.

Maister faulted school faculties for not giving students the "whole" picture, and not taking time to remove personal biases from what they teach. Students are not being told what else they need to be a good professional besides being a good "designer." He felt that some of the extremely important traits a person needs to succeed are not emphasized in school: organization, care, drive, character, willingness, and being articulate in writing and speaking.

He stated that one of the major problems of architectural education is that very few "marketable" skills are taught. Because of this, professionals are extremely patronizing to clients. One should be taught to listen and to learn that "people don't care how much you know until they know how much you care!"

He also felt that the value structure in education is wrong. Students either think that the best professionals are the ones that win prizes, or they are at the other extreme of only being concerned about getting just enough education to pass the exam—yet there is so much more! One needs to realize that the quality of work is in the client's eyes: because of the ambiguity that surrounds "design" excellence, clients tend to understand good design as good service—to understand the process of design and not the product. Also it is critical that the client understand the entire scope of what an architect actually does: "One must learn to serve society by serving clients."

Maister's mention of problems doesn't solve them, but I think his approach sheds fresh new light on some of the deficiencies—for students. And for once, it was great to look at architectural education in context with other professional schools. Students applauded Maister's simplified and understandable approach to the problems. One student said, "He painted a clear picture of what else we need in education." And another said he felt that "Maister spoke on behalf of students nationally" in regard to the need to learn ways to become a better professional.

Education is often too much of a mystery

Few students going into architecture have a clear picture as to what they are actually going into. Misguidance often starts at the high-school level with a counselor's advice that, to be an architect, all one needs is to be good in math and science. And even after entering architectural school, often it is still not clear what architecture really is. Architectural education is similar to a puzzle: as you go through your academic education, you pick up the pieces, and you don't know how they fit until you have graduated from school and actually try to start putting the entire puzzle together.

The very nature of how an architectural school fits into the university campus fosters a notion that the process is a mystery. The architecture building is too often isolated physically and socially from the rest of university life. Many times the buildings are on the other side of campus, away from other disciplines. And if the school is related to other disciplines, it is quite isolated socially: students often say they only have time for designing. Students have a very idealistic misconception of how to become "great architects." There is more to being an architect than just being the great designer. The technology of building is rapidly becoming more

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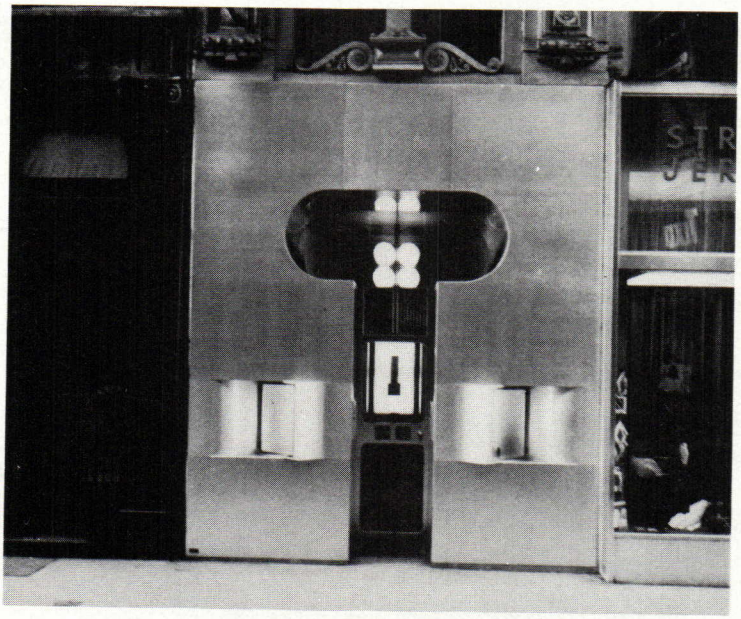
Hans Hollein is named 1985 Pritzker Prize laureate



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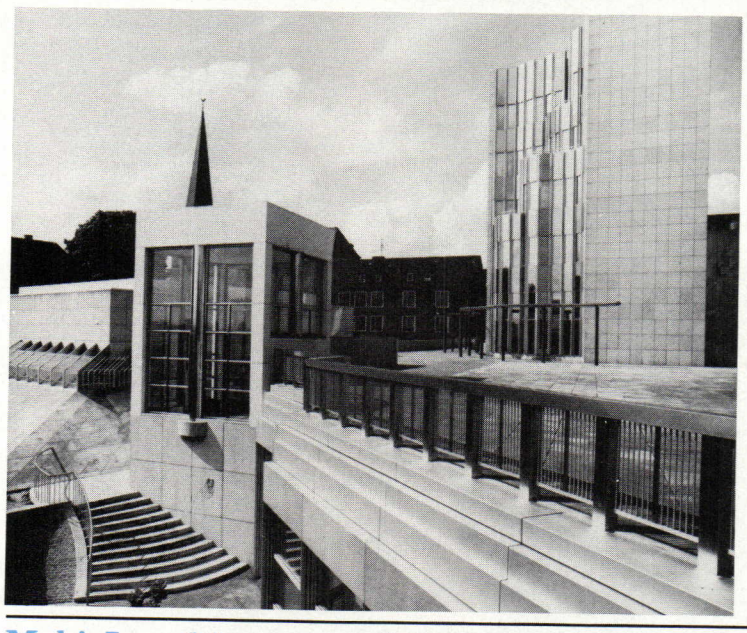

Austrian architect Hans Hollein has been awarded the seventh annual Pritzker Architectural Prize. Established in 1979 by Hyatt Foundation chairman Jay A. Pritzker and considered the architectural equivalent of the Nobel Prize, the award consists of a tax-free grant of $100,000 and a bronze sculpture by Henry Moore. Hollein is the third non-American architect to receive the Pritzker. Other winners have included James Stirling of Great Britain and Luis Barragán of Mexico, in addition to Americans Philip Johnson, Kevin Roche, I. M. Pei, and Richard Meier.

During acceptance ceremonies held at the Museum of Modern Art in New York, Hollein characterized his own work as "sometimes lonely and misunderstood, sometimes praised and followed." The Pritzker jury called him "an architect who is also an artist, . . . one who with wit and eclectic gusto draws upon the traditions of the new world as readily as upon those of the old."

Hollein was educated at the Academy of Fine Arts in his native Vienna, and he did graduate work in the United States at the Illinois Institute of Technology and the University of California at Berkeley. He began his rise to international prominence with his first independent commission—the 12-foot-wide Retti Candleshop in Vienna (1965, top left), where craftsmanlike detailing led to series of designs for elegant shops. Hollein's larger-scale works include the Municipal Museum Abteilberg in Mönchengladbach, West Germany (1982, bottom), current projects for a museum of modern art in Frankfurt and a cultural forum in West Berlin, and a major traveling exhibition on Viennese culture, entitled "Dream and Reality," which opened in March.

Maki, Isozaki are examined in new exhibition

A traveling exhibition of recent buildings by Japanese architects Fumihiko Maki and Arata Isozaki is on view from May 23 through June 30 at the Japan House Gallery in New York. The show focuses on three projects by each architect that represent major commissions for public architecture in Japan, Europe and the United States. Interestingly, Maki and Isozaki are presenting the same three building types—a gymnasium, a museum, and a mixed-use commercial/arts complex—and their work ranges from completed structures to projects in the construction and planning stages. Maki's buildings are the Fujisawa Municipal Gymnasium outside Tokyo (left); the Wacoal Media Center, an art and theater complex in Tokyo commissioned by a Japanese manufacturer of lingerie; and the National Museum of Modern Art in Kyoto, currently under construction to house a city-owned collection of Japanese and Western art. Isozaki's buildings include the Tsukuba Center Building, a civic complex located in a new town near Tokyo; the Museum of Contemporary Art in downtown Los Angeles, now nearing completion; and sports facilities for the 1992 Olympic Games in Barcelona. An illustrated catalog will accompany the exhibit.

Taisuke Ogawa

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Competition calendar

• Wilsonart and the American Society of Interior Designers seek entries to their third annual competition for interior projects that utilize the manufacturer's decorative laminates. Cash prizes totaling $36,000 will be awarded in residential and contract categories. Entry deadline is May 24. For information contact Jan L. Gelb, 1985 ASID/Wilsonart Competition, c/o McKone & Co., 2700 Stemmons Frwy., Suite 800, Dallas, Tex. 75207 (1-800/433-3222).

• The American Institute of Steel Construction has announced its biennial Architectural Awards of Excellence program for steel-framed buildings designed and constructed in the United States during 1983 or 1984. Older buildings that have undergone major rehabilitation using structural steel are also eligible. Entry deadline is June 1. For information write AISC Competition, 400 North Michigan Ave., Chicago, Ill. 60611.

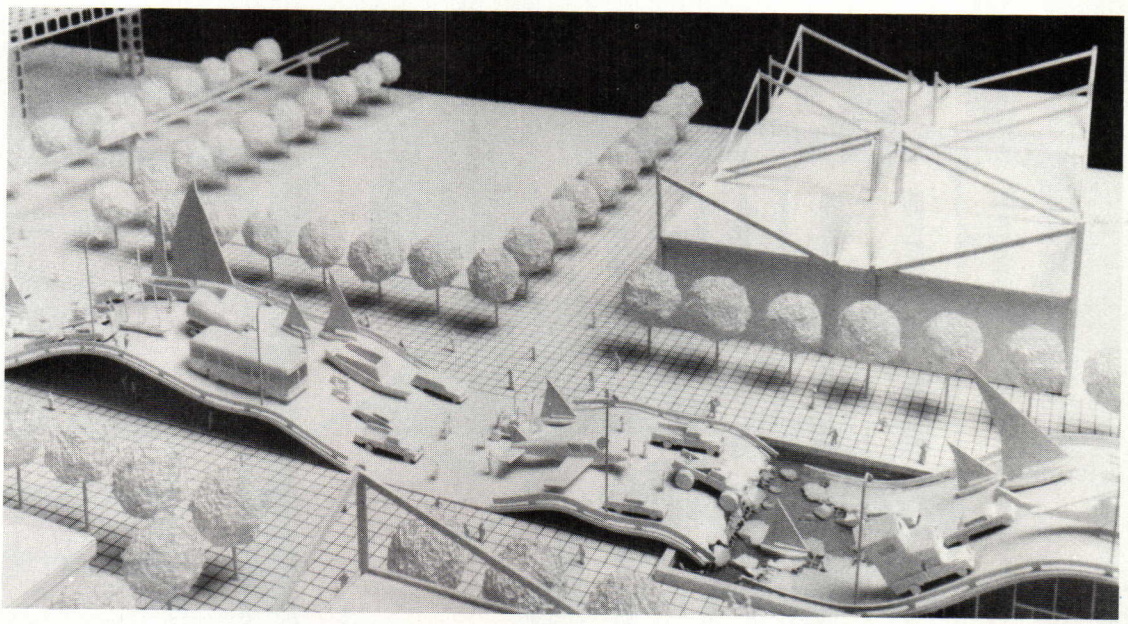
• The Arizona Historical Society has issued a call for entries to a competition for the design of the new Arizona Museum, proposed for an 11-acre desert site in Tempe. Cash prizes totaling $18,000 will be awarded. Registration deadline is June 17. For information and registration forms contact the Design Competition Administrator, Arizona Historical Society, 1242 North Central Ave., Phoenix, Ariz. 85004 (602/355-4470).

• *Builder* magazine has announced its fifth annual Builder's Choice awards program for excellence in the design of new and remodeled housing and light-commercial buildings completed between June 1, 1983, and June 1, 1985. Winning entries will appear in the October 1985 issue of the magazine. Entry deadline is June 21. For information contact *Builder*, 655 15th St. N. W., Suite 475, Washington, D. C. 20005 (202/737-0717).

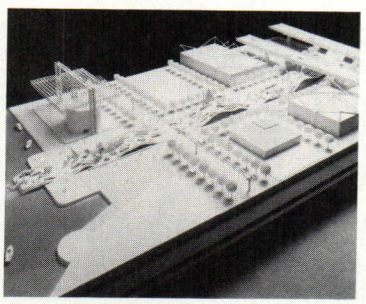
• The Prestressed Concrete Institute seeks entries to its annual awards program for excellence in design using precast prestressed concrete. Buildings and bridges completed in the last three years or substantially completed by the August 1 entry deadline are eligible. For program prospectus write PCI, 201 North Wells St., Chicago, Ill. 60606 (312/346-4071).

• The International Association of Lighting Designers is sponsoring its third annual design awards program for permanent indoor or outdoor lighting installations completed since January 1, 1983. Winning entrants will be honored at an awards dinner, and their projects will be displayed in IALD exhibitions. Entry deadline is September 20. For information contact Marion Greene, IALD, 30 West 22nd St., New York, N. Y. 10010 (212/206-1281).

Comic strip



When it comes to creating a memorable architectural image, no one does it better than SITE Projects. Officials of Expo 86, the world exposition that will open next year in Vancouver, knew this when they selected the idiosyncratic New York firm to interpret the fair's theme of transportation and communication. SITE's contribution to the fair will be a 711-foot-long, four-lane boulevard that emerges from the waters of



False Creek and undulates its way along a central plaza flanked by more traditional national and corporate pavilions before terminating abruptly at the guard rail of a city viaduct. Dubbed Highway 86, the project will be encrusted with a traffic jam of land, sea, and air vehicles that reflects, according to SITE co-founder James Wines, "an ambivalent feeling about current technology."

Doing justice to downtown Birmingham

A bit of architectural historicism is about to rise in the center of Birmingham, Alabama. Plans for the new U. S. Courthouse call for a stepped seven-story tower sheathed in green glass and set on a two-story limestone-and-granite base that echoes the proportions and materials of existing neoclassical Federal buildings across the street. Architects for the structure are Kidd/Plosser/Sprague.

A new flagship on New Haven's harbor

Followers of postwar renewal projects in American cities know that during the early 1960s New Haven—for better or worse—set the standard for the redevelopment of fading downtown business districts. While the Connecticut metropolis continues to battle its suburbs for a fair share of the business dollar, an ambitious mixed-use project is under way on a 60-acre site along the city's shorefront. Called the Long Wharf Maritime Center, the complex will comprise office, hotel, and retail facilities in a series of copper-roofed, brick-and-glass structures meant to recall the city's earlier harborside architecture. A 600-slip marina and a landscaped pedestrian promenade overlooking Long Island Sound should complete the nautical theme. Architects for the development are Clark Tribble Harris & Li.

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West Week 1985: Innovation is tempered for the corporate suite

If there is one word that sums up West Week 1985, the Los Angeles furniture market and design symposium held in late March, it is *conservative*. To be sure, there were some crowd-pleasing goings-on at the Pacific Design Center: Robert Venturi attracted the kind of standing-room-only audience usually reserved for movie stars, Steelcase unveiled a handsome new show room designed by Orlando Diaz-Azcuy of Gensler Associates, and the mall-like interior of the PDC itself was enhanced considerably by the huge balloons created by Israeli architect Doron Gazit. Still, both the products exhibited and the general tone of the event were, though not exactly reactionary, certainly reflective of the over-all tendency in current architecture and design toward a pluralism palatable to even the most straitlaced corporate executive. Throughout the PDC it

Adrian Velicescu photos

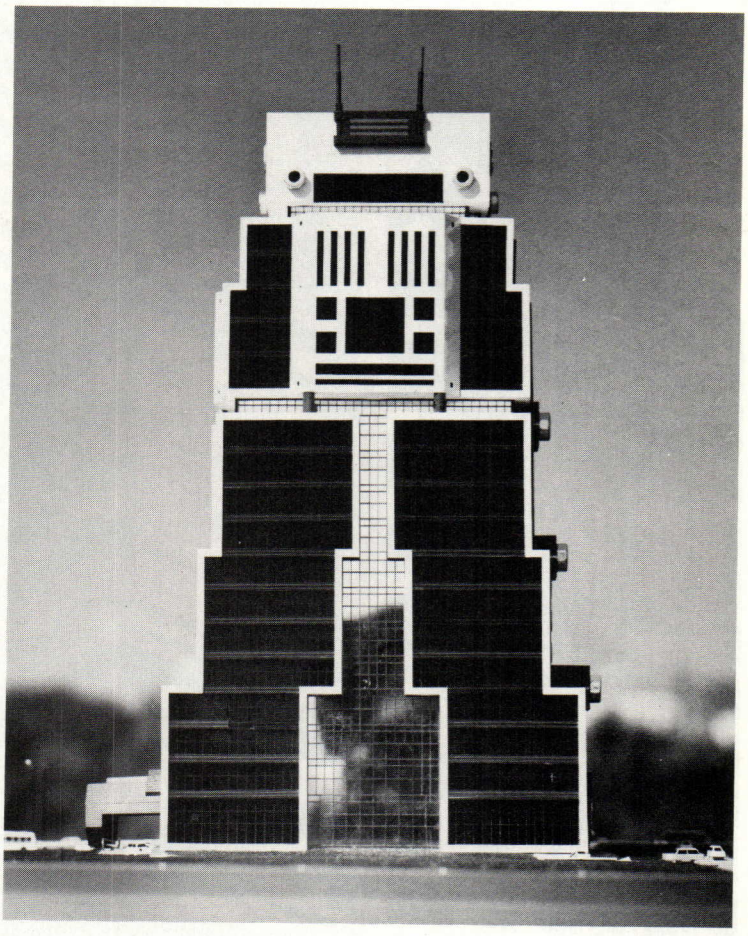
was difficult to pigeonhole either designers or their wares into specific categories of Modern, post-Modern, or Memphis, and there seemed to be a conscious, perhaps economically motivated, effort by manufacturers to appeal to the broadest possible market. While the absence of anything radically different may have alienated some fashion-hungry observers, many viewed the current hiatus in trendiness as a welcome move in the direction of old-fashioned craftsmanship. (RECORD's coverage of new products unveiled at West Week begins on page 168.)

Not surprisingly at an event that was more revisionist than revolutionary, the program of West Week speakers sponsored by both the PDC and the alliance of 32 contract manufacturers known as PDC2 was headed by conservative spokesman William F. Buckley, Jr. (below left), whose comments to an audience of corporate executives pretty much echoed the goals of the current Reagan administration—i.e., reduce the role of centralized government by eliminating the deficit, lowering taxes, and creating a cabinet post responsible solely for doing away with Federal red tape. *Time* magazine architecture critic Wolf Von Eckardt (bottom left) had his own solution for lowering America's trade deficit—better product design to match the Japanese—and he blasted current corporate design as "kitsch for the rich and less than the best for the rest." To elevate what he called the "fourth-world" status of American corporate design, Von Eckardt urged the formation of a national design council and design center in Washington, D. C.

Other speakers addressed topics that ranged from the global problem of population control (Jonas Salk optimistically projected that the earth's population will stabilize at 10-12 billion over the next 8,000 years) to the use of artificial, or "controlled," lighting (architect Richard Peters lucidly revealed how he utilizes the three-pronged approach of focal glow, ambient luminance, and sparkle and brilliance in his lighting designs).

Somewhere in between these two extremes architects addressed many of the problems—and potentials—of contemporary urban design. Jon Jerde dismissed much recent urban architecture as mere "diagrams of business deals trying to occur," and he illustrated how one might bring back the "communal experience" to American cities by showing three of his firm's ongoing urban renewal projects in Los Angeles, San Diego, and Bellevue, Washington. Responding to a question on what he would do to improve Los Angeles, Moshe Safdie indicated that he would build up the city into more densely settled nodes connected by modes of transit other than the freeway. Interestingly, while L. A.'s proposed rail transit system still faces enormous obstacles before getting into the ground, a heartening, if ad hoc, urban design trend noticed by many is the continuing evolution of the PDC's West Hollywood environs into a bona fide pedestrian area, developed to the point that visitors to West Week were actually seen *walking* from the Blue Whale to nearby restaurants and shops. (Excursions on foot to the new Esprit store, designed by Joe D'Urso, became an unofficial West Week activity.) As an urban experience, Melrose Avenue may not yet be Madison or North Michigan, but it certainly seems to be on its way. *P. M. S.*

High-rise, high-tech



Visions of those clever robots currently so popular among children must have been dancing through the heads of architects Sumet Jumsai Associates during their design of the new Bank of Asia headquarters, currently under construction in Bangkok. According to the architects, the 21-story, reinforced concrete and glass curtain-wall robot emerged only after the firm rejected as boring the idea of designing the building as a huge capital letter A, which would have referred to the bank's corporate logo. The current design calls for giant octagonal nuts and similarly shaped porte cocheres along the setback sides of the 300,000-square-foot structure. Appropriately, the financial institution plans to give out robot piggy-banks to its customers when the building is finished.

New market facility has designs on Dallas

The latest in a seemingly endless stream of regional contract design centers will soon break ground in the burgeoning mart district of north Dallas. Taking their cue from the successful Pacific Design Center in Los Angeles, architects Rossetti & Associates have organized the structure's 350,000 square feet of inside and perimeter show-room space around a barrel-vaulted atrium. Unlike the famous Blue Whale, however, the six-story Dallas facility will boast a facade clad in aluminum panels and articulated on the south elevation by deeply recessed windows that will shade interiors from the bright Texas sun. A 420-foot-long ground-floor colonnade and landscaped forecourt will link the structure to the adjoining Dallas Decorative Center, an existing complex housing the show rooms of residential interior manufacturers.

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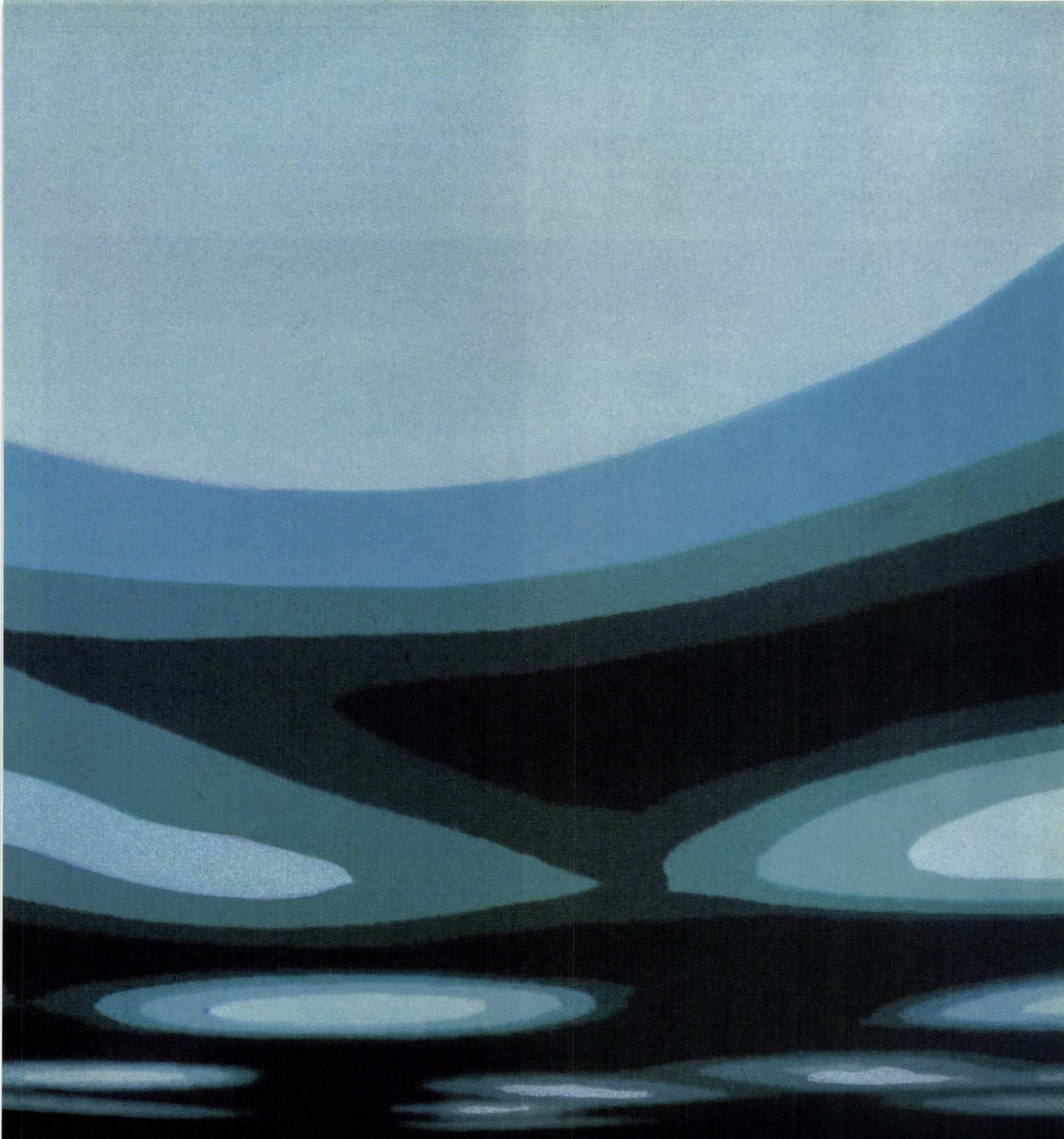

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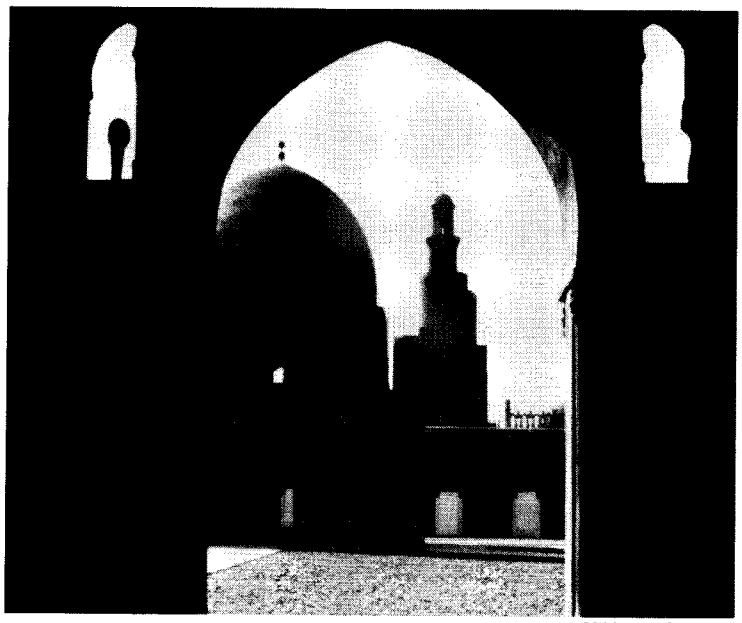
Coping with Cairo: A study in urban decline

Last November, the Aga Khan Award for Architecture sponsored a five-day international seminar titled "The Expanding Metropolis: Coping with the Urban Growth of Cairo." Almost 200 architects, planners, and other professionals gathered to analyze the problems of this troubled place, to study what is being done, and to propose alternative strategies for a city whose growth and development appears to be almost out of control. RECORD *executive editor Mildred F. Schmertz, who was there, reports.*

"Cairo is a sick city, and a very sick city at that. It is infected with a number of diseases that have become chronic and endemic. This is due to the failure to exercise prudence and to foster immunity, and negligence in curing the first signs of any disease, so that now the very life of this city is in danger. Cairo suffers from indigestion, diarrhea, vomiting and blocked arteries, as well as an acute allergy caused by the pollution and noise. Physicians have long been at loggerheads to prescribe a remedy, for each tried to cure the disease of his specialization while disregarding the side effects on the other diseases. It is regrettable, indeed, that remedial operations were only applied whenever some parts of the city, owing to fatigue and exhaustion, were on the verge of collapse. However, once some outward signs of recovery appeared, the doses would be suspended and the city would suffer a severe relapse. Then a few sedatives would be quickly administered but, as experience has proved, they would fail to exterminate the disease."
Salah Zeitoun, Architect



Mosque of Ahmad Ibn Tulun (877A.D.) *Mildred F. Schmertz*

Cairo is no longer a city, if being a city is to have an urban form and structure. Cairo has become a great sprawling glob that is eating itself up. Tourists who come to see the pyramids must surely sense this, if only because of the length of time it takes the tour bus to get from the Hilton to Giza. But a visitor who actually tries to *walk* in Cairo—from the TWA ticket office across Midan El Tahrir to the Egyptian Museum perhaps—will suspect, if he makes it, that Cairo's traffic police are untrained in the basics of vehicular and pedestrian control, that its motorists are not required to pass a driver's exam, that the traffic lights do not work and that the automobiles, trucks and buses converging upon him from every direction are not following routes that any urban traffic planner ever consciously devised. Such suspicions are indeed facts, among hundreds of deplorable truths, that were straighforwardly presented at The Aga Khan Award for Architecture's recent five-day international seminar, convened to examine problems created by Cairo's unprecedented expansion, and to search for timely solutions.

Attending the conference were His Highness the Aga Khan, the Prime Minister of Egypt, and the Governor of Cairo. There were approximately three times as many Egyptian participants as foreign experts, indicating that Egypt has its own very well developed architectural and planning intelligentsia, and that the Third World is becoming less dependent upon European and U. S. expertise.

Those participants who now bear direct responsibility for doing something about Cairo discussed their difficult task with uncommon honesty. Failures were admitted. In most instances, new programs were carefully presented and thoughtfully questioned, rather than intensively sold to the audience. The range of problems discussed included all with which environmental planners traditionally contend: the Cairo region's population explosion, insufficient housing, loss of arable land, inadequate transportation and other municipal services, the rapid decay and loss of the medieval Islamic sector's magnificent architectural heritage, and, finally, the social inequities that underlie a great city's potential collapse.

Too many people, too little housing, too much sprawl

Due to high birth rates and the immigration of rural people to the city, the population of the Greater Cairo Region has increased from about 3 million in 1955 to 12 million at present. By the year 2000 it is expected to reach about 16.5 million. Although major efforts are being made to redistribute rural immigrants to other urban centers, 73 per cent of the total at any one time come to Cairo and Alexandria because these cities have a concentration of jobs in government administration, industrial production, and services. Two successive Cairo master plans have attempted to cope with this pattern of growth by proposing that it be directed elsewhere and by calling for the provision of housing for the new arrivals. (Neither the first master plan, prepared in 1956, nor the current one, updated in 1971, has been effective, because each lacked a method of implementation and had no force in law.) Other factors contributing to the housing shortage include the decay and collapse of housing in the older city, failure to replace it, the effect of rent controls in discouraging housing maintenance and new construction, and the increasing disparity between the cost of housing and the ability of poor and lower-middle-income people to pay for it. A housing unit of 40 square meters is beyond the means of 60 per cent of Egyptian families. In Cairo, the housing shortage has reached 299,000 dwelling units. To catch up, 56,000 units must be built every year, a task the private sector can hardly accomplish without public-sector support, since returns from housing are far lower than from other forms of investment.

From the mid-1950s to the mid-1960s, Egypt built low-cost housing on a large scale. The program declined in the '60s and came to a halt in the '70s. Late in his rule, President Anwar Sadat granted ownership to the tenants of these units after they had become overcrowded, badly deteriorated, unhygienic, and structurally dangerous. These conditions occurred because the tenants had illegally subdivided and added to their quarters to make room for relatives or to rent out space. Conditions were such that the housing authority soon abandoned all attempts at maintenance.

Homeless families find shelter in mosques and in Cairo's vast cemeteries, which house an estimated 500,000 inhabitants in tombs. These are of the mausoleum type, varying in size from humble to grand. In addition to the burial chamber, each tomb has one or two rooms intended for brief visits by the bereaved and a tiny yard enclosed by a fence. Dwellers in this centuries-old city of the dead have no piped water, sewerage, or solid-waste collection, but they do have their own shops, street vendors and public markets, and they rent and sublet to each other.

The cemeteries, however, cannot accommodate all the homeless, so most of Cairo's rural immigrants or dispossessed live in informal or squatter housing. Some such neighborhoods are within the city but most are on the fringes. These subdivisions are illegal because they are built on land to which the builders and renters have no ownership rights and/or they ignore licensing and code requirements. These districts have narrow streets, tiny lots, septic or holding tanks for sewage, little or no electric power, and lack garbage collection and basic public services. The units usually consist of a reinforced concrete skeleton with brick infill, for which the average family pays about 30 per cent of its income. Of all of the housing units recently built in Greater Cairo, 84 per cent are informal.

These squatter sites are steadily encroaching upon the fertile farmland that borders the Nile. This is occurring in part because the poor have nowhere else to go, but also because industries providing jobs are beginning to locate there. Less than four per cent of Egypt's land is arable. From 1977 to 1982, 7,413 acres were lost to urban encroachment. Unless this trend is reversed, disaster looms, for Cairo is expanding into Egypt's primary source of life and will eventually destroy it.

Too many vehicles, too few surfaced roads

Accident rates in Cairo are among the highest in the world, surpassing Great Britain and the United States by at least 20 times. Because sidewalks, where they exist, are covered with parked cars, pedestrians walk in the streets, ducking autos, motorcycles, and animals drawing small carts. Sixty per cent of the city's secondary and tertiary roads are unsurfaced, causing flooding, silting, and blockage of sewer lines. Children running barefoot in the muddy waste-infested streets are prey to disease and infections. The design of the transportation system caters principally to private automobile owners who, including their families, constitute only 15 per cent of the population.

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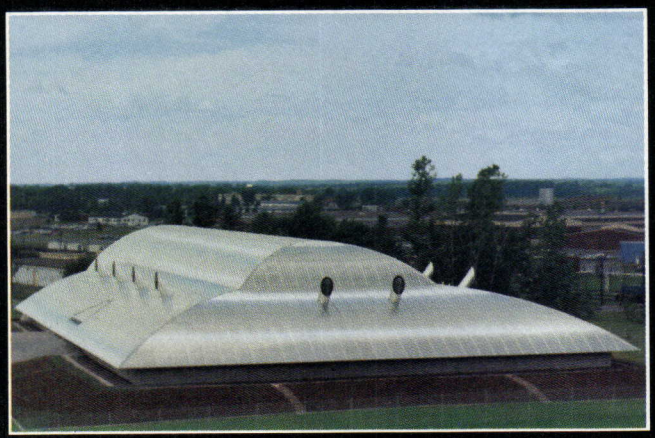

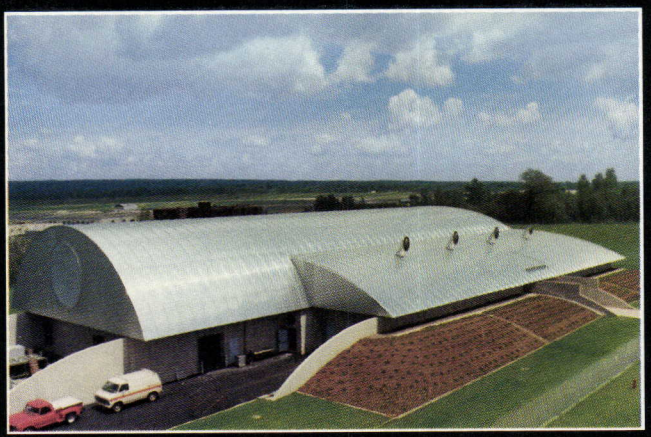

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Not enough sewerage, piped water or solid-waste collection
More than one-half of the households in the city are either without solid-waste collection or are very poorly served. At least 300 tons of solid waste per day are simply left in the streets. In the center of the city existing water and sewerage facilities are unable to meet the needs of an ever-growing population. Where they exist, services are operating from 25 to 50 per cent beyond their designed capacities, resulting in seepage of water from broken mains and blocked sewer pipes, thus raising the water table and causing buildings to crack and collapse. The water's high sulfuric-acid content hastens this process. This problem is especially severe in the medieval Islamic sector, exacerbating the housing shortage (older dwellings are falling down at an alarming rate) and threatening the continued existence of Cairo's splendid architectural monuments.

The domes and minarets may vanish, too
Harvard architectural historian and Islamic scholar Oleg Grabar reminded the seminar that "no other city in the Muslim world possesses the wealth of architectural monuments found in Cairo. . . . In the world at large Rome alone matches in numbers and perhaps surpasses in variety the richness of Cairo." In Professor Grabar's words, these fine mosques, mausoleums, madrasahs and houses, built from 1000 to 1800 A. D., "shape the configuration of the living city, for instance in the delineation of its streets and passageways, as well as of the eternal city of the dead, for the vast cemeteries of Cairo were an integral part of the metropolis. . . . What still operates today is what I would like to call the rhythmic power of the monuments, whereby minarets (more accurately called towers) serve as a visual relay leading from one place to the other, domes indicate that value is given to a certain place, and elaborate gates request of the passerby that he stop and enter or at least look."

Currently efforts are being made to restore these monuments, but much of this work consists of repairing surfaces and applying paint. The major problem, rising groundwater, has yet to be dealt with. On the positive side, however, cleaning and sprucing up the monuments, creating gardens, and opening museums nearby is forming a public constituency for them. Crowds are now enjoying mosques that were once attended only by the neighborhood faithful and the rare architectural scholar.

The Governor of Cairo promises to improve the service infrastructure of the old city and may launch a scheme with the aid of the World Bank for the rehabilitation of a major sector. Rehabilitating the entire medieval city of Cairo, however, in the manner of such districts as Le Marais in Paris or the Casbah in Algiers, would not be feasible for two reasons. First, such a solution implies gentrification, thereby reducing even further the availability of housing for the poor. Second, old Cairo, a city of over 1.5 million, is too large for such an approach. And there are more than 600 architecturally important structures punctuating its crooked streets, too many to renovate to a uniformly high standard. It was suggested at the seminar that new uses must be found for most of the monuments, justifying their repair and adequate maintenance. Great architectural treasures could be restored to a higher standard.

Few new solutions were offered at the conference
This is not necessarily a criticism. The conference participants called for familiar Third-World planning strategies that have yet to prove successful. But who is to say that such efforts won't work this time, given the desperateness of the situation, the growing sophistication of Egypt's planners, and (it is to be hoped) a strong intention on the part of the country's political leaders to establish a comprehensive environmental policy that can be implemented before it is too late.

The most important strategy Egypt must follow is to shift its urbanization to desert sites, a program that includes the construction of new towns, satellite cities and new settlements, all to be built on reclaimed desert land. (Since most desert land is publicly owned, there are no land-acquisition costs.) New towns, such as Sadat City and the Tenth of Ramadan, are intended to provide employment, housing, and infrastructure far enough away from Cairo to discourage commuting there for work. Satellite cities are similar, but closer to Cairo's center to take advantage of its infrastructure. New settlements are areas of predominantly residential development near existing employment. They are meant to replace informal or squatter developments, and will have an initial target population of 200,000 to 300,000.

In the late 1970s five satellite towns were proposed to divert rural migrants from Cairo and to attract industry. The first, called the 6th of October, is to the west of the city and is planned for 350,000 inhabitants. The second, known as the 15th of May, is to the south and will have 150,000 inhabitants. El Obour to the north and El-Amar and Badr to the east will each have 250,000 inhabitants. The initial phases of the first two towns are under construction (the 15th of May now has 30,000 inhabitants), but the latter three are still in the planning stage. In spite of financing difficulties, the rate of growth of these satellites is considered satisfactory by their advocates, who remind critics that such start-ups are slow wherever in the world they are attempted.

It was proposed at the seminar that the public sector, governmental agencies and universities could bring jobs and population to the satellites by transferring some of their activities to them.

The seminar's experts made the excellent and by now very familiar recommendations that are so rarely adopted: namely that housing costs be reduced by encouraging self-help, using indigenous materials and appropriate technology, lowering land and financing costs, and designing efficient dwelling units. The planners also proposed that the Greater Cairo Region itself be divided into fourteen homogeneous sectors, providing specialized economic bases within each of them, thereby improving the capacity for self-sufficiency in each sector and decreasing their linkages to the central area.

Fundamental social inequities are the problem
At present, unfortunately, housing being constructed in Cairo consists entirely of high-rise luxury apartments, some of which are not occupied but held for speculation. Many remain incomplete and boarded up, awaiting the removal or adjustment of rent controls. It is common for upper- and upper-middle-income people to own more than one apartment for investment.

If, as sociologist Dr. Janet Abu-Lughod, pointed out, "one may think about the long process of Cairo's history as a set of alternating periods during which social inequalities increased and decreased and then increased again," there is no question as to which period this city is in today. What are the implications of socio-economic inequality for coping with urban problems in Cairo? Dr. Abu-Lughod thinks there are several. First, if housing construction does not keep pace with population growth, serving only the low-occupancy needs of the well-to-do, there will be social unrest. Second, land speculation by the wealthy will continue and will cause, among other disasters, the abandonment/destruction of the historic heritage of the older Islamic city as long as so much of this district's property remains on the open market. The surplus capital of Egypt's rich has always been invested in land. The real and underlying reasons for the rapid degradation of the old city are that its housing and the land underneath are being held for future large-scale development. In the meantime, let the houses fall down (or just the upper floors—ground levels of old buildings are still maintained by their landlords for more profitable industrial or commercial use). Dr. Abu-Lughod has no hope that expensive patching and *cordons sanitaires* around clusters of monuments will do more than temporarily extend their life. The living heritage of the old city, found in its fabric of houses and workplaces, will vanish. Today, at least one-half of the resident labor force of the old city commutes out for work and one-half of those employed in the district commute in. Eventually, without a drastic change in planning policy, everyone will commute in, but it will be a different kind of place.

Dr. Abu-Lughod warned the seminar that conservationist schemes are bound to fail if they ignore the underlying economic and social causes of the destruction of old districts. "Like the issues of abandonment in many other cities, it is not only the age and obsolescence of the structures that lead to their loss; it is the speculative intent of their owners. The highest priorities are for policies that keep the local economy viable and remove the possibility of speculative profits. Cities in which social justice and equity are the governing goals are cities in which distributive efforts are continually made to raise the floor of life for the poor, even at the expense of lowering the ceiling for the privileged."

The poor, who are packed in the old city, crowded in the cemeteries, and paying 30 per cent of their incomes to live in outlying squatter settlements, will eventually be heard from. The young people are said to be frustrated and angry. There is hope, however, that if the Egyptian government at the highest levels decides to reverse the country's tragic inequities, environmental planning might begin to work.
Mildred F. Schmertz

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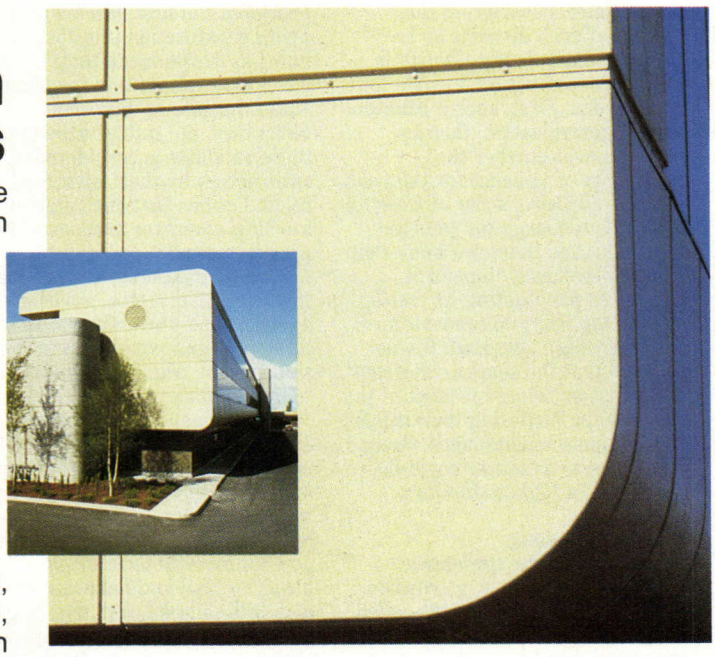

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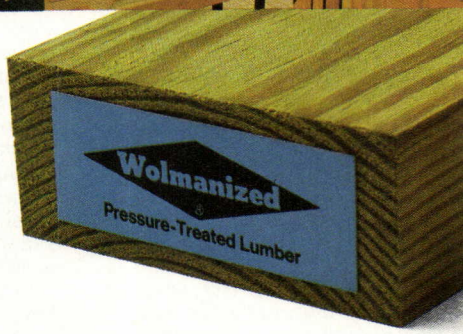

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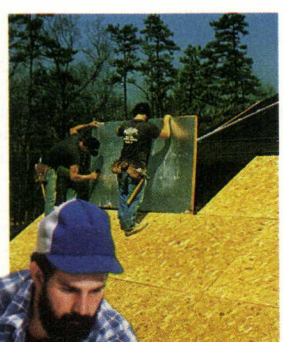

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Small centers for shops

Main Street, U. S. A.—that erstwhile, smaller-city mecca for shopping and enjoyment, as well as for most business transactions—has been diminished or eclipsed by the enticing glitz of the new regional shopping centers. Seldom, now, are the downtowns the gregarious focus for Saturday night movies, window-shopping or drugstore social encounters.

Many city governments and citizens, however, as well as realtors and developers, are turning toward restoring populated liveliness to the heart of the city—for while office building construction has continued in most places, shopping and entertainment have been siphoned off to the suburbs. Rather than try to compete head-on with the totally new, air-conditioned brightness of the malls, a lot of towns are looking closely at what remains of the special character of their downtown and its heritage as a hub of activity and transport.

This study presents four centers for shops, each of which has, in its own way, helped revitalize a portion of its downtown area. Though quite different, they have a number of elements in common. Each is a restoration, preservation or compatible addition—and one is an archeological "find." All share a considerable appeal for tourists, as well as local inhabitants. Each has a plaza or court to draw activity—plus some added facility to augment income and consumer traffic, be it restaurants, housing, offices, or an adjoining and successful shopping village. Brightleaf Square, in Durham, North Carolina, is an adaptive use of two old warehouses with shops, restaurants and offices. The Spanish Village addition in Carefree, Arizona, expands the life of an ongoing shopping court with additional stores. The dilapidated New Market Theater in Portland, Oregon, takes on new life for shops and offices. And, below the center of Jerusalem, the unearthed Roman/Byzantine main street of shops is restored to merchandising with historical displays and housing above. Are there pointers here for other cities to ponder on?

Herbert L. Smith, Jr.

Brickwork bonanza

Brightleaf Square
Durham, North Carolina
Ferebee, Walters & Associates, Architects
Shun Kanda, Design Architect

Conceived as a catalyst and focal point for the redevelopment of part of downtown Durham, the adaptive reuse of these forceful and exuberant twin tobacco warehouses has, indeed, turned fading nostalgia into a revitalized commercial neighborhood.

The two buildings were built between 1900 and 1904 for the American Tobacco Company to store, age, and ferment tobacco for cigarettes. Their architect, Albert F. Hunt, expressed the tenor of the era and the industry with an ornamental melange of intricate brick dentil moldings, arches, corbels, and cornices, and some 72 elaborate chimney crowns. The long-range impact has put the buildings on the National Register of Historic Places. The wood post-and-beam interiors were carefully planned for processing and distributing the tobacco leaves, and each building was divided into four two-story bays, separated by 18-inch-thick brick fire walls. Everything had been kept structurally sound and well-maintained by Liggett & Myers—a split-off, successor firm of the American Tobacco Company—prior to acquisition by SEHED Development Corporation in 1980.

In creating the new Brightleaf Square center, architects Ferebee, Walters & Associates' and Shun Kanda's careful renovation and conversion preserved the buildings' original visual identity and architectural integrity—while injecting a warm, spirited ambience for the new uses as high-quality shops, restaurants, and offices. Perhaps one of the main appeals is in the adaptation of the loading dock area between the buildings to make a landscaped pedestrian courtyard, with seating and colorful pennants, flanked by arcades and covered walks.

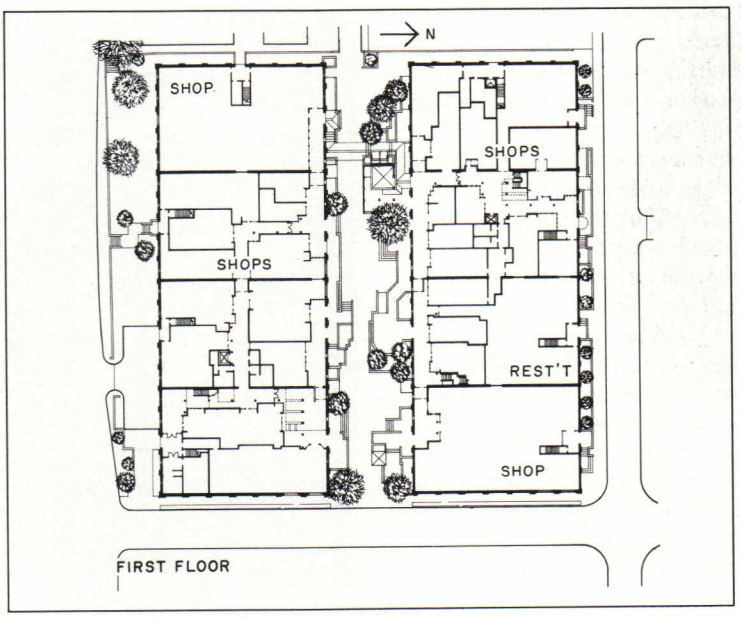
The interiors of the buildings were also kept as intact as possible, with strong and textured structure and materials exposed by removing the existing white lead-based paint and get to the original finish. To make the floor plans workable, the original, thick fire walls were cut through at intervals, and an internal arcade was created in each building to encourage entry and circulation from the surrounding streets, as well as from the central courtyard. Tenant spaces were painstakingly fitted to preserve all the closely spaced original octagonal columns. Several tall atriums with stairs were created to lead to the second floors. Each building also has an elevator and ramps for the handicapped. One of the buildings has both floors devoted to shops, with a few occupying two levels. The other structure has the second floor devoted to rental as offices. All interior designs for tenant spaces must be approved by the architects, to assure that spaces are kept light and bright, and that new construction does not compete with the existing red brick and pine. All-in-all, it is a remarkable and viable work of urban renewal.

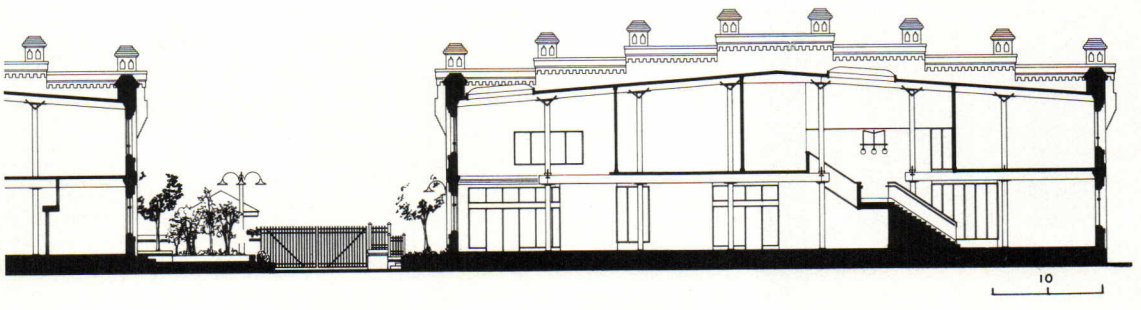
Rick Alexander & Associates photos

The imposing solidity and brickwork fantasies of these two turn-of-the-century tobacco warehouses (left) have been adapted to create a spirited center for specialty stores, offices, and restaurants. The original space between the buildings for loading docks has been transformed into a welcoming pedestrian street (photos above and right), replete with open arcades and covered connecting walk to unify the project.

Internal atriums and arcades (photo right) help draw customers from entrances on streets around Brightleaf Square, as well as from the central pedestrian way. To increase activity in the complex, the second floor of the North building (right in plan), has been devoted to rental office space. In the South building, a couple of the larger stores run the full two-story height (photo opposite). The buildings' original structure and materials were used as a strong design feature to unify the diverse rental spaces, and simply cleaned and left-exposed—brick walls, wood beams, and columns, spline-joined decking, thick heart-pine flooring. For hard use, the floors were given a urethane finish. Shapes of the tenant spaces were worked around the existing octagonal columns, which are spaced at eight-foot intervals. The original and dramatically high ceilings were retained, and new ducts for the hvac system were left exposed and painted dark brown.

Brightleaf Square
Durham, North Carolina
Owner/developer:
SEHED Development Corp.
Architect and engineer:
Ferebee, Walters & Associates
Design architect:
Shun Kanda
Landscape design:
Hooker-Paton Associates
General contractor:
George W. Kane, Inc.

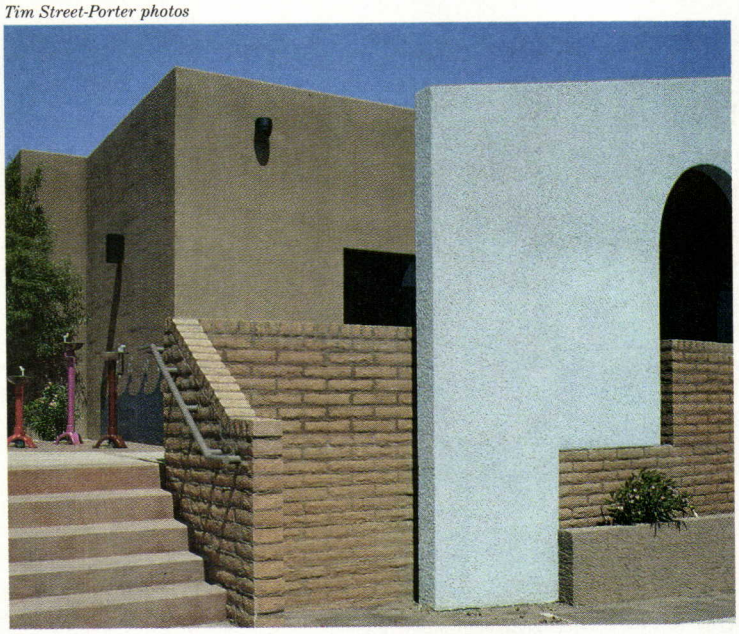




Spanish Village Addition
Carefree, Arizona
Fred Linn Osmon, Architect

de Chirico charisma

Tim Street-Porter photos



The soft colors of the arcaded facade of this little addition to an existing shopping "village" stand in high relief to the light brown stucco of the simple row of shops behind (photos opposite). There are six multipurpose shops, plus an office and small store room (see sketch at right). In the center is a tiny "courtyard" with a "fountain" made of drinking-water stands backed by painted "waves" (photos above).

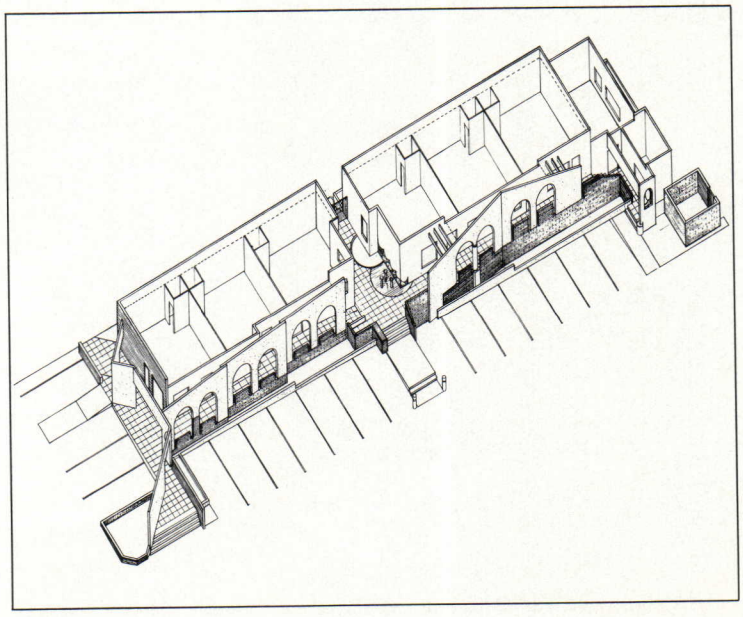
Remember back—before enclosed, air-conditioned shopping-mall emporiums—when shopping centers were often a "theme" motley of shops of varying quaintness, ranged around an open, landscaped court? Spanish Village, to which this is a new addition, is an existing and still ongoing example. Architect Osmon describes the original complex as a "funky collection of buildings done in a Spanish 'bric-a-brac' style. Part of my take-off was probably the images of de Chirico. I tried for an image that was commercial, related to the other buildings, yet was unique and contemporary."

This appealing little strip of shops is a colorful and eye-catching solution that Osmon dubs a kind of "Mexican peasant surrealism." The colors used for the stucco walls and the base of slump block echo those of the existing buildings. The basic structure consists of two straightforward "boxes," containing six shops, an office and a little storage room. They are fronted by a shaped and angled "billboard" facade that creates a somewhat surreal arcade to help draw people visually from the existing buildings. The darker, brownish color of the main structure throws the light pastels of the arcaded facade into high relief. Parking spaces are framed by its wings.

At the center of the two blocks of shops is a passageway that allows pedestrian flow to some other shops beyond. It suggests a small court or patio, with bougainvillea vines and a constantly bubbling "fountain"—whimsically made of three heights of drinking fountains, backed by a wall mural suggesting waves of water. Osmon comments that, "I opted for drinkable water at different heights to serve children, old folks with back problems, and in-betweens."

Simple as the project is, it gives due consideration to climate and energy concerns. Though the generally hot, dry weather makes Carefree a magnet for tourists, the summer sun can be formidable. The main facade, which faces east, uses the billboard-like arcade to shade and protect the shop display windows. The western wall at the back is windowless to serve as a fire wall, and it is shaded by neighboring two-story buildings across from the shopping village. The building is well insulated, and the roof is painted silver to reflect the heat. High-efficiency, packaged air-conditioning units are placed on the roof. Interior blinds are also provided for all windows.

Each shop contains 500 square feet, and has its individual toilet. The design of the addition was not intended to encourage the sale of typical souvenirs, but to complement the original shopping village and cater to reasonably affluent tourists and residents by merchandising such items as glassware, clocks, cosmetics and the like. Its saucy uniqueness should lend that appeal.



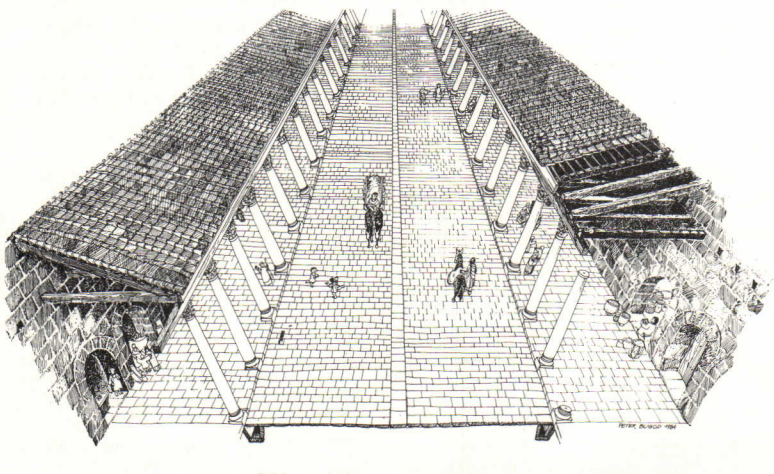
Spanish Village Addition
Carefree, Arizona
Owners:
The Spanish Village Company
Architect:
Fred Linn Osmon, Architect
Engineer:
Semmens & Associates (structural)
Contractor:
R & C Planet Construction Company

GROUND LEVEL → N

The Cardo
Jerusalem, Israel
Peter Bugod, Esther Niv-Krendel
and Shlomo Aronson, Architects

Main Street, Jerusalem

By Michael and Julie Seelig



In this Byzantine retrofit, shops, housing, and restaurants add vitality to Old Jerusalem. Spurred by a sixth-century mosaic (left) showing a colonnaded street of shops straight through the city center (see sketch), the buried remains of the right-hand half were found, and restored (see photos). Vancouver city planners, Michael and Julie Seelig—now in Jerusalem—give this report. H. L. S.

When the Company for the Reconstruction and Development of the Jewish Quarter announced an architectural competition in 1971 for the reconstruction of a portion of the Jewish Quarter in the Old City of Jerusalem, it received a unique proposal. The authors of the scheme suggested a complete archaeological excavation of the entire Jewish Quarter down to bedrock, thus unearthing a history of 5,000 years layer by layer. Only after this task had been completed was new construction of modern living quarters to begin.

The dramatic proposal, which would have been an archaeologist's dream, was rejected since it did not address the immediate issue of needed reconstruction for modern-day living—in an area of historical treasures with great significance to the three major monotheistic religions. Furthermore, although the proposal would have resulted in great historical and scientific discoveries, it was totally out of keeping with the way things have been occurring in Jerusalem for millennia. Traditionally, each civilization controlling the city has built on the ruins of previous civilizations. Undisputed evidence of this fact came to light recently during a dig at the foot of the Temple Mount, where 25 layers of civilization were discovered. In Jerusalem, there is a delicate balance between the temptation to put archaeology and history first (and turn the area into a never-ending dig) and the temptation to leave the past alone and begin a new layer, as has been done so many times before.

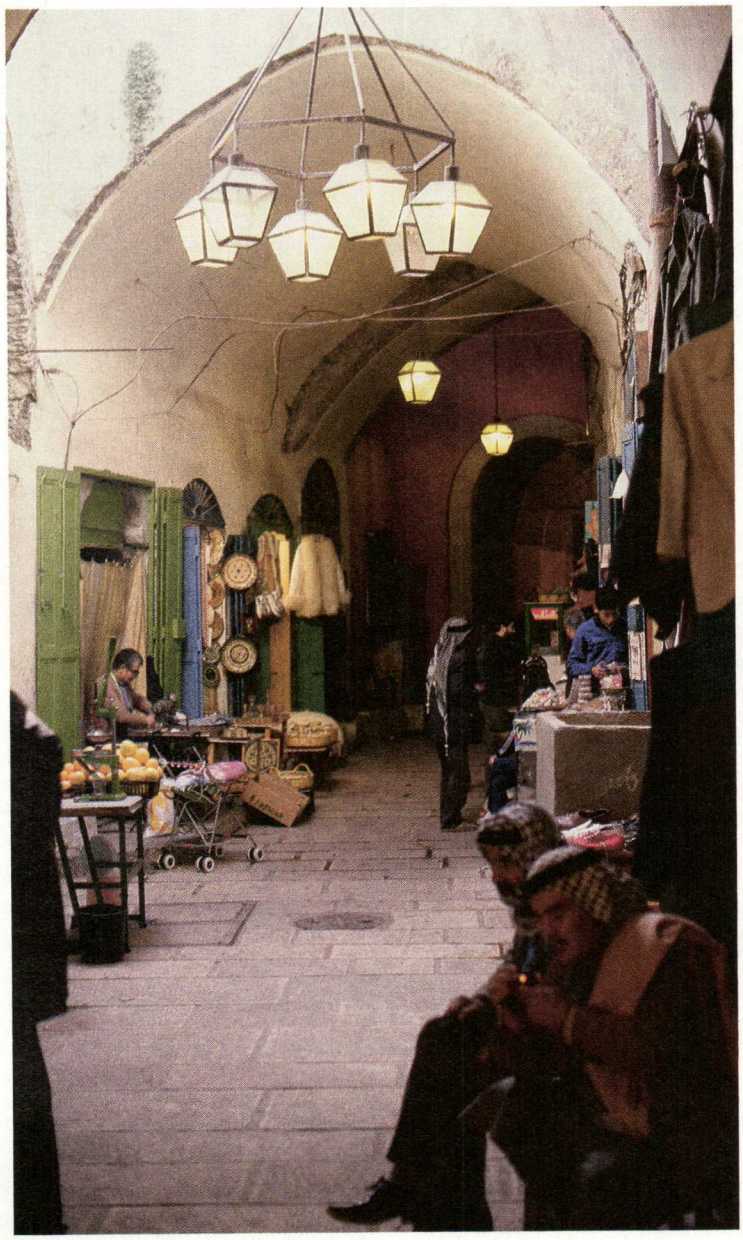
The Jewish Quarter restoration

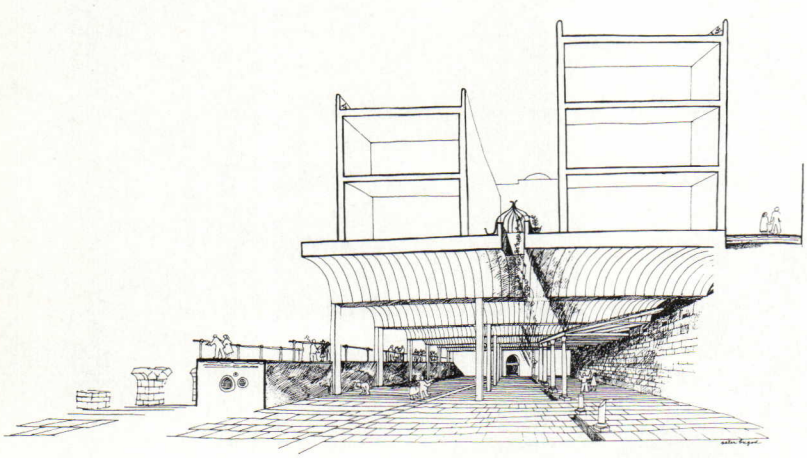
During the Hasmonean period (second and first centuries B. C.) and up until 70 A. D., this small area of approximately 22 acres within the Old City walls was an architectural showpiece, with exclusive residences and villas occupied by the aristocracy and the temple priests. For the 800 years from the mid-12th century until it was destroyed in the 1948 war, the same area was the center of Jewish life in Jerusalem. Soon after Jerusalem came under Israeli control in 1967, a major effort was launched to reconstruct the ruins of the Jewish Quarter and to turn it into living quarters once again. Several projects were undertaken, including residences, religious boarding schools, stores, and workshops, and soon the area took on a new life.

The 1971 architectural competition mentioned above called for proposals to reconstruct the border section of the Jewish Quarter located between the Street of the Jews and the paralleling Habad Street, from the transverse junction where David Street extends into the Street of the Chain, and up through the center of Old Jerusalem to the Habad Synagogue. The original program called for a center with hotels, residences, and shops—with the stipulation that a Crusader building and the Habad Synagogue within the area be preserved.

The Cardo and its shops

The architects of the winning design—Peter Bugod, Esther Niv-Krendel and Shlomo Aronson—managed to combine a respect for history with a desire to move ahead and build. They studied the history of the area and were especially struck by the Roman tradition of constructing a "Cardo" (literally, a heart) in their cities. The Cardo was a major boulevard with porticos and shops on either side. A sixth-century mosaic map of Jerusalem, that was found in 1897 in Madaba, Jordan, depicted the Cardo running from what is known today as Damascus Gate in the north towards Zion Gate in the south. Yet there were no signs of the old Cardo except for the arrangement of three Arab bazaar streets leading from Damascus Gate to the David Street





junction with the Street of the Jews and Habad Street. These bazaars followed the same route as depicted on the Madaba map.

From these clues the architects assumed that part of the original Cardo was located in the project area, and planned to restore the area as a commercial extension of the existing bazaars—with the original Cardo, if discovered, incorporated in the design.

Based on test holes at the site, the architects, assisted by architect-archaeologist Yohanan Mintzker, suspected that the original Cardo was about two meters below the existing level of the Street of the Jews. By 1976 the first paving stones, the drainage canal, and the bases of the western side of the colonnades of the Cardo were discovered. The archaeological team, headed by Professor Nachman Avigad, found that this part of the Cardo was Byzantine, not Roman, constructed by Emperor Justinian in the sixth century. It connected the Church of the Holy Sepulcher to the Nea Church, which Justinian built at the southern end. It was an impressive boulevard, 72 feet wide, with a central roadway of 36 feet and a colonnade of 18 feet on each side.

Architectural challenges and solutions

There was no end to the challenges which the architects faced. First, they needed to work closely with the archaeological team. The archaeological discoveries necessitated substantial changes in the construction program. The insistence of the client that the residential units above the Cardo be completed first, while the archaeologists wanted to excavate the area prior to construction, was only one of many conflicts. The architects assumed not only the role of designers but also that of diplomats, constantly proposing compromises. The architectural solution developed by the team included:

- A construction program "from the top down" was devised to complete the residential units early. A superstructure to carry the residences was built, enabling archaeologists to continue work while construction of the units above took place.
- The reuse of the ancient Cardo as a series of attractive shops was combined with a museumlike display of archaeological finds. The Cardo forms a continuation of the bazaars lined with small shops to the north.
- A distinct separation was made between the Cardo—the public commercial area and archaeological site—and the residential units constructed on the platform above it.
- Preservation and incorporation of some existing structures into the newly created residential complex was carried out.
- Adherence to the scale and architectural vocabulary of the surrounding area was kept throughout.

The project is 180 meters long (590 feet). It was divided into eight sections treated as separate units for design and construction purposes. This method was especially useful since archaeological finds in different parts of the project often required construction crews to move quickly from one section to the other.

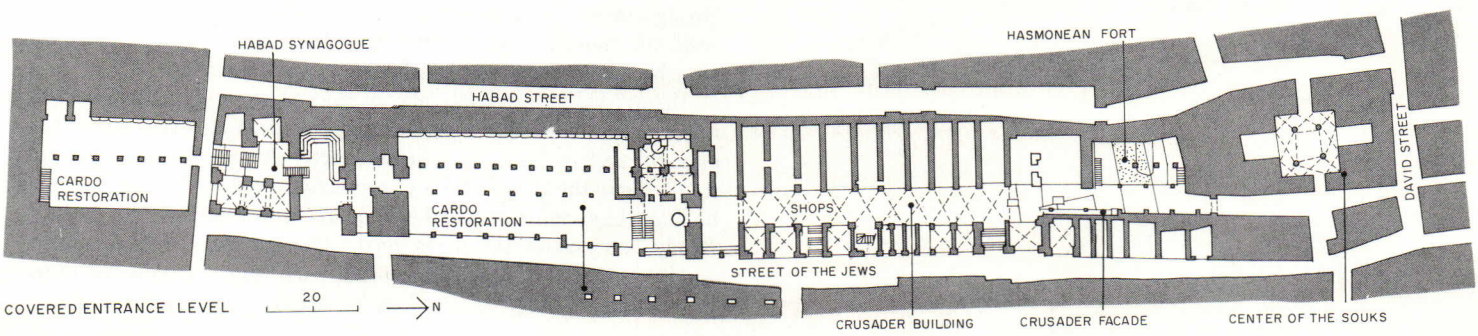
The Cardo is accessed primarily on the eastern side, from the lower-level Street of the Jews. It has modern shops set into the old vaults, and an array of archaeological displays. These include portions of the walls of the city from the Israelite and Hasmonean periods, a great hall and facade of a Crusader building, and an exposed section of the Cardo, serving an open courtyard.

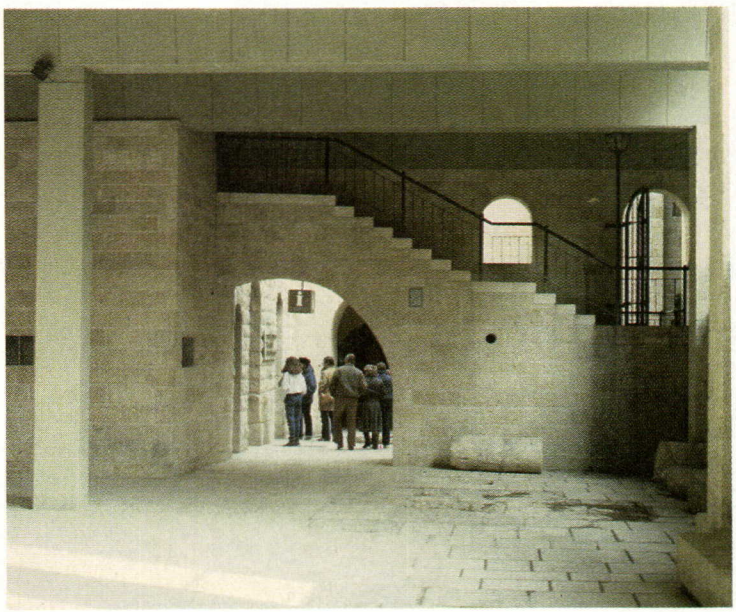
The housing complex above the Cardo consists of 37 apartments,which are reached primarily from the elevated and quiet Habad Street. Entrances to the apartments are from an inner courtyard that sits directly over the Cardo and provides natural lighting by openings to the Cardo floor below. The apartments vary in size and configuration and include both restored structures and new construction.

The Cardo project epitomizes the conflict that architects face when working in the Old City of Jerusalem: the urge to discover and expose as much of history as possible versus the need and desire to reconstruct

In this "urban renewal" project in Jerusalem's Jewish Quarter—at a point where it abuts the Armenian, Christian, and Moslem ones—the up-and-down levels of terrain and exposed layers of many cultures all combine in a viable "new" area. As can be seen in the section, the difference in street levels gives immediate access to both the Cardo shopping-street level, and the housing built on a platform above.

The covered Cardo street includes the antiquities shown on the previous page, as well as elegant shops set in Crusader vaults (photo below), which lead directly into already-existing Arab bazaars or souks (photo at left). Other elements from other eras are incorporated into the project as usable structures or as museum displays—as can be seen in the plan of this level below.





The age-old custom of providing for living over the shops solves a lot of problems in this renewed area at the very heart of Old Jerusalem. Not only does it provide some much-needed housing for the crowded city, but it adds potential for more, custom for the shops below—where quality merchandise is offered to create more than just tourist appeal. It also assures a 24-hour population and liveliness for the area. Though the levels are connected, a sense of separation and privacy is given to the apartments by placing their main entrances off the quiet, upper-level Habad Street (top photo above). Direct access from the lower Street of the Jews is by stairs—such as the one shown above, where the restored Cardo leads through a small open court into the shopping street.

the area for present-day living and enjoyment. The solution provided here is a compromise of great sensitivity and practicality—incorporating the archaeological finds with modern living quarters.

Serendipity also played a role, as it does occasionally in architecture. The discovery of half of the real Cardo was a fortuitous find—a type of archaeological serendipity that can only occur in a city with the layers of history that Jerusalem possesses. The architects had the flexibility to incorporate their finds into their preconceived designs—an attitude important for architects working on historic buildings or on any type of renovation project. Three of the major decisions that contributed to the project's success were:

1. Unlike the past practice where many archaeological discoveries were maintained purely as museum-like displays, it was felt that it was not necessary or desirable to do this in a densely populated area like the Old City of Jerusalem. The decision to incorporate the Cardo with newly constructed apartments followed naturally from this viewpoint.

2. The bold decision to reconstruct the original Cardo and put it back to present-day use as a modern shopping street proved again that there need be no conflict between important archaeological discoveries and new construction. It showed that when old ruins are reconstructed and put to use, they will help enrich their modern surroundings. There is no doubt that in the Cardo just as many visitors are drawn to the shops and coffee houses as to the archaeological displays.

3. The decision to separate physically the access to the public shopping street from the entrance to the private residences was fostered by the difference in elevation between the two streets bounding the project—and therefore was almost a foregone conclusion. This turned out to be an important key to the project's success, since residences are seldom compatible with tourist attractions.

Beyond the lessons it provides on the relationship between architecture and archaeology, the Cardo project gives some insights into the design process itself:

Precedent: From the outset, the architects relied heavily on the history relevant to the specific design project. The historical research they undertook relating to the area, specifically the study of the Madaba map, led them to believe that the original Roman Cardo may have been in the area. This belief was the source of the inspirational idea of building a market street similar to the ancient Cardo to join with the Arab bazaars to the north.

Context: The architects were most attentive to what is special about the Jewish Quarter and its adjacent areas. The consideration of the bazaars to the north and the desire to join them to the new project were of great importance in the decision to design a shopping street. The odd forms, shapes, and sizes of both old and new residences in the area inspired the design of the housing units above. The scale of the buildings surrounding the project also helped dictate the scale of the new project. Thus, consideration of context in this project brought about an evolutionary change in the area which, although noticeable, is still in keeping with the atmosphere of the Quarter.

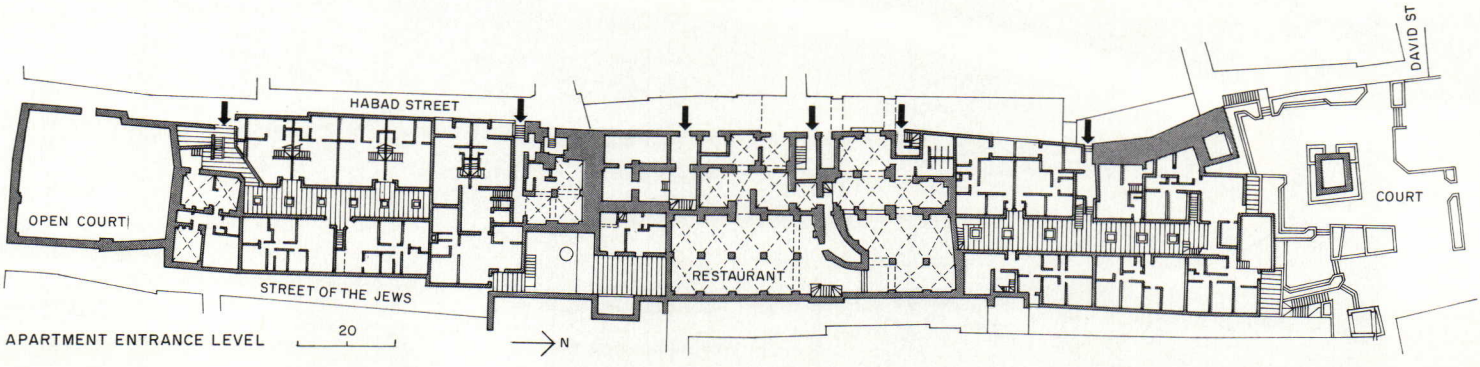
Order: The Cardo project demonstrates the strong sense of order which guided the architects. The linear continuation of the bazaars into a new shopping street could be termed the binding force. But beyond a strong sense of physical order, there is a distinct social order. The residents, mostly religious Jews, have their own territory and can turn their backs on the secular hustle of shops and tourists.

Values: Values come into play in any design project. In this case it is important to understand that in Israel today almost every citizen is an amateur archaeologist. As a local reporter, Abraham Rabinowich, put it, "To dig in the Holy Land is to rummage through the family attic. The findings may seem dusty and commonplace to outsiders, but to the family. . . the connection is personal." The personal commitment the architects displayed toward the nation's heritage is a reflection of these values, which became the guiding force in the design of the Cardo.

As can be seen in the plan (below) of the apartment-entrance level off Habad Street, the 37 units vary widely in size and configuration. Some restored buildings are mixed with new construction, but all adhere to the scale, materials, and architectural vocabulary of the area—most notably, the use of the traditional Jerusalem stone. Inner, open courtyards at each side of the project give added access, views, and light to the apartments—as well as provide light-well openings to the shopping street below. At the center, a big Crusader hall has been restored as a restaurant; and at each end is an open plaza to relieve the sense of crowded density in the area. On the upper floors, as can be seen in the photo below, terraces and small roof gardens give a spectacular view over the famous historic landmarks of the Old City.

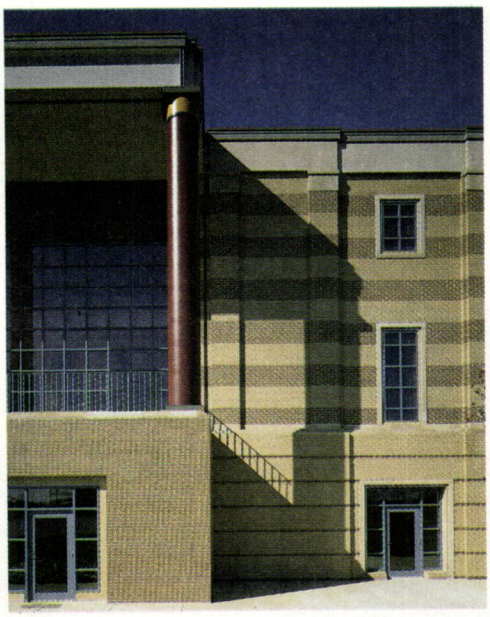
The Cardo Development
Jerusalem, Israel
Client:
The Company of the Restoration and Development of the Jewish Quarter
Architects:
Peter Bugod, Esther Niv-Krendel (competition scheme with Shlomo Aronson)

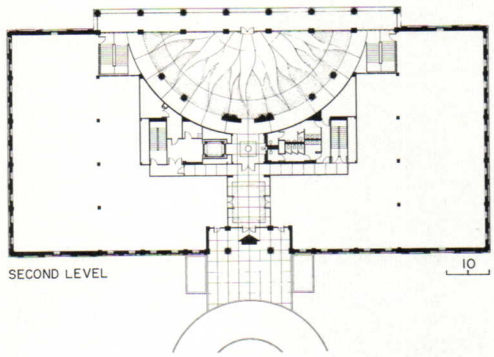
Engineers:
Dr. S. Rosenhaupt and M. Finkelstein (structural); M. Quatinsky (electrical); Tushia Inc. (sanitary)
Archaeological excavation:
The team of Professor Nachman Avigad
Contractor:
M. Lifshitz Limited

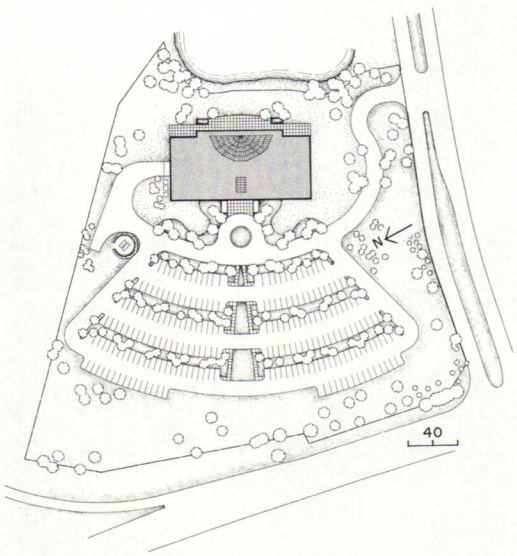


A villa in a park

Offices for the American Academy of Pediatrics
Elk Grove Village, Illinois
Hammond Beeby and Babka, Inc., Architects







If the developing Northwest Point office park, with its trees and plantings, ponds and meandering roads, is an oasis in the ticky-tacky desert of light industry skirting Chicago's O'Hare airport, its lushest growth to date is the headquarters designed by Hammond Beeby and Babka for the American Academy of Pediatrics. For the academy, whose former quarters in Evanston divided the staff among a '50s-Colonial office building and charming but too-cozy townhouses that were being eyed covetously by Northwestern University, the move represented an opportunity both to consolidate and better accommodate its own operations and to better serve a peripatetic clientele of visiting physicians participating in its extensive program of meetings and seminars. The new location, only minutes from the airport and nearby hotels, was ideal; the site itself, idyllic: a wedge-shaped knoll that faces a forest preserve and overlooks a large retention pond to the rear (a vista now marred by an unprepossessing near neighbor).

The client's brief to the architects was to trace an envelope around a program previously prepared by space planners Griswold, Heckel & Kelly Associates (an atrium was the only specific space request added), and to do so on a fast-track schedule allowing but three and a half months from commission to construction. At a literal level, this was an open invitation to produce yet another of the slick but safely anonymous office structures that seem to have been extruded onto the landscape (atriums and all) like so many widgets from the same ponderous press. Happily, Hammond Beeby and Babka are not given to literal readings and so declined the invitation, presenting instead a highly individual '80s-Classical villa that crests the rise of the site with a commanding presence that avoids pomposity—a fitting image for the physician/scholars who constitute the academy.

From parking areas bermed to near-invisibility, staff and visitors approach the building by way of a formal circular drive giving on to a portico with a meticulous military-blue-framed curtain wall fronted by a pair of massive, venetian-red, latter-day-Tuscan steel columns perked up by gold capitals. Crowned by a barrel-vaulted skylight, this colorful machine-honed assembly is set off by a tautly symmetrical pilastered brick facade, banded in chocolate and mocha, which descends the exaggerated sidewise slope from entry to grade via a base striated with chocolate-brick string courses that give the effect of rustication. At the rear of the building, the base is pulled forward in a formal terrace punctuated by strongly rhythmic Venetian windows that provide views of the pond from ground-floor meeting rooms. Above it is a broad porch, a much-expanded version of the entry portico, which contributes color and textural contrast as well as a marked degree of articulation to a building that for all its surface richness is in essence a masonry box.

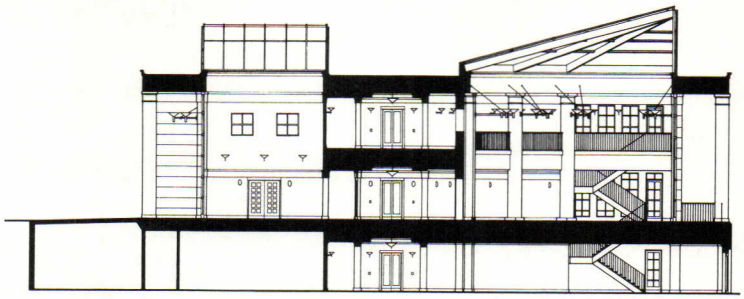
The pillared and balustraded porch is the outward extension of the not-quite-semicircular, two-story, skylight-capped atrium that serves as the academy's reception hall and principal organizing space. Contrary to usual practice, though, it is neither an introductory nor a bridge space. Instead, the entry sequence progresses from the portico to a vestibule that rises two stories to the skylight vault, then leads through a modest low-ceilinged foyer before the full expanse of the atrium and the scene beyond are disclosed by a story-high portal. Similarly, while the atrium facilitates circulation, it conceals rather than reveals the building's inner workings, making it possible to cluster core elements around its curve and to free surrounding areas for work spaces, which it enriches not as an ever-present focal point but as a source of views and vistas to be enjoyed as people move through and around it.

The parti which, though straightforward, unfolds its spatial secrets slowly; the play of arc against angle; the appliqué of stylized high-tech "orders" on a no-less-stylized "classical" facade; the flawless rendering of metal and masonry—all speak without a false note of both the architects' early immersion in Miesian discipline and their more recent eclecticism. The ensemble may trace a discursive trail forward (and backward) from Schinkel . . . but Mies is in the details. *Margaret Gaskie*

With its bold two-foot-diameter steel columns guarding the glazed aluminum grid that screens the vestibule, the recessed portico at the entry to the American Academy of Pediatrics (photos below and preceding pages) is prelude to the much larger porch at the rear (lower photo below), where the same columns march across much of the facade. In both cases, the striking colors and slick materials of these discrete metal-and-glass constructions are poised (to their mutual enhancement) against a classical masonry facade designed brick by brick to achieve a richly detailed background of vertical pilasters and horizontal banding set off by the subtle contrast of limestone at belt course, frieze, and door and window frames. Following the slope of the site, the building falls away from two levels at the entry to three at the rear. The main, or entry, level (plan far left) and the upper level embrace the atrium, which is framed by work spaces rimming a central core. On the lower level, meeting rooms are concentrated on the east to enjoy a view across the pond; library and cafeteria are tucked in opposite corners; and service areas burrow below grade on the west.

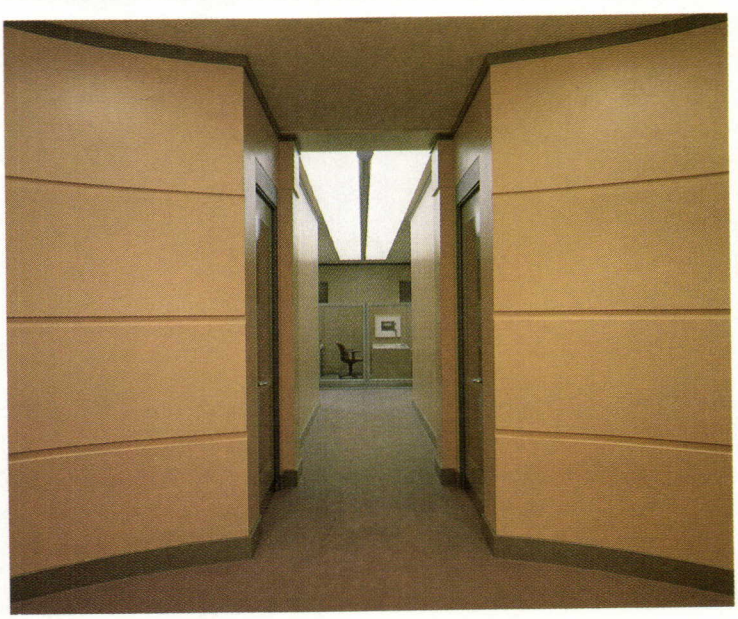
Within the atrium, where two-story columns describe a wide arc behind the blue metal window grid, the vocabulary of porch and portico is expanded by a metal-framed skylight fanning outward from the peak of the glazed pediment that caps the curtain wall, and by a terrazzo floor emblazoned with a sinuous sunburst mosaic in muted tones recalling those of the columns. Otherwise sparsely furnished, the

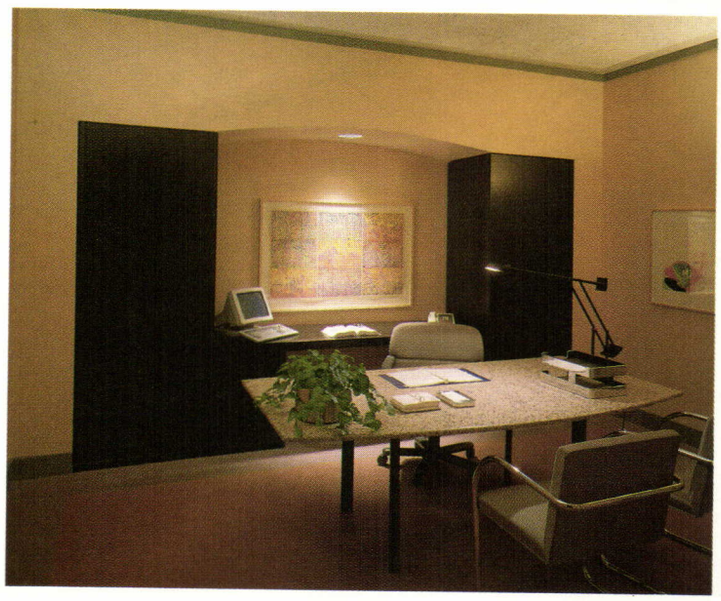
space focuses on a stainless-steel-topped, marble-slab reception and communications center that doubles nicely as a serving bar on the frequent occasions when the atrium is used for entertainment. In a reprise of the exterior treatment, the contrasting elements are set against a rich but reticent backdrop, here rendered in a gray-white palette, with echoes of the moldings and profiles that ornament the brickwork of the outer facades. The curve of the atrium's inner wall, emphasized by a gallery tracing the arc between open stairs at either end, is broken at the center by an out-scale portal flanked by pairs of engaged columns and topped by an oculus that overlooks the atrium from an upper-level lobby.



In designing the academy's work spaces and offices for staff and visiting physicians, interior planners Griswold, Heckel & Kelly followed where possible the themes established by the architects' exterior treatment as well as their schemes for the atrium and other public spaces. Waiting rooms adjoining office areas, for example, echo both the curve of the atrium and the "rustication" of the building's base (photo lower right), while the game is carried a step farther in small vaulted and columned gazebos (photo right) that introduce niches housing pantries and copying equipment. More subtly, the ex-officer's-blue curtain wall grid reappears often in such interior spaces as the library (top opposite) and the boardroom (lower right opposite), and other ground-floor meeting rooms. In the latter, openings in the corridor wall repeat the exterior fenestration pattern, and the window effect is heightened by neon strips sandwiched between the white plastic panes of the grid. Because the academy wanted work spaces with a flexibility and expansiveness denied in its previous quarters, private offices are pulled inward around the central service core and the building perimeter is reserved for open-plan work spaces. In a typical office (lower left opposite), stock cabinetry framed by an arched recess mimics costlier custom built-ins.

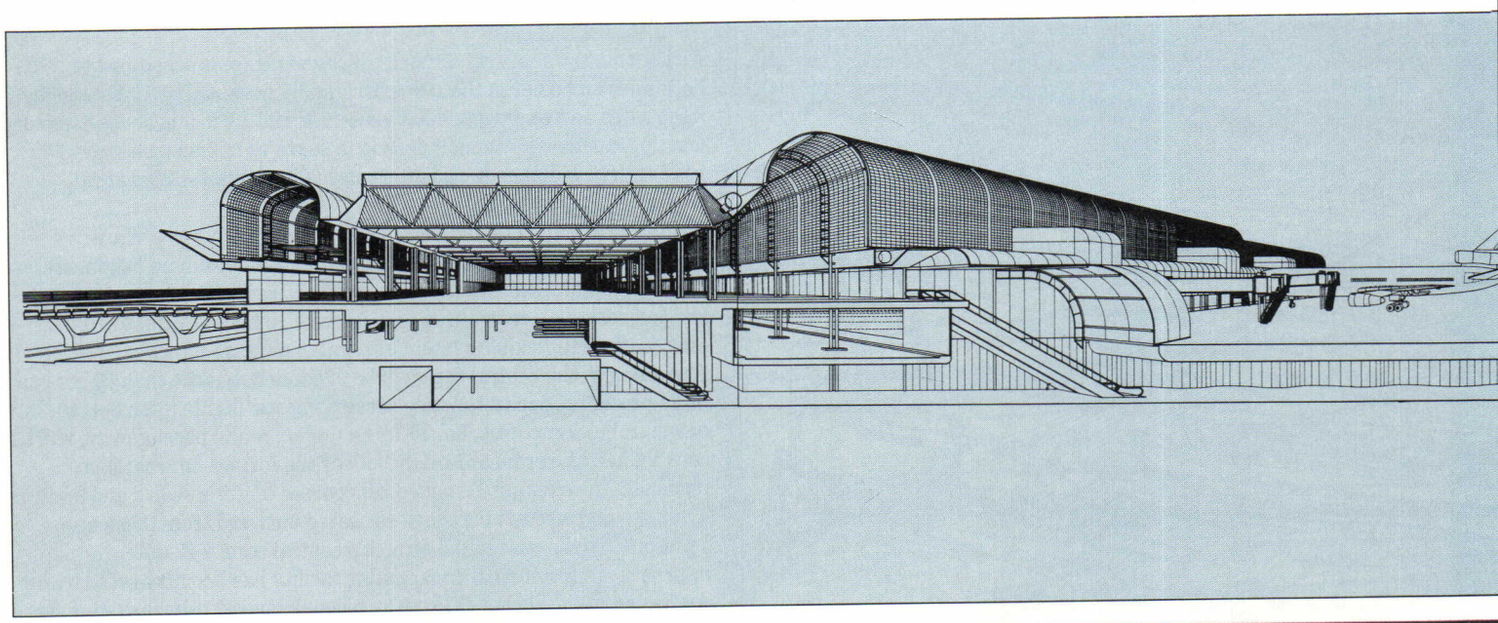
Offices for the American Academy of Pediatrics
Elk Grove Village, Illinois
Owner:
American Academy of Pediatrics
Architect:
Hammond Beeby and Babka, Inc.—Charles G. Young, project architect
Interior designer and space planner:
Griswold, Heckel & Kelly Associates, Inc.—Christopher Pekarek, Miles Morehouse, principals-in-charge; Jorge Romero, senior designer
Engineers:
Gullaksen Getty & White (structural); Walker (civil); Essam Ammar & Associates (mechanical/electrical)
Consultants:
Rolf Campbell & Associates (landscape); E. J. McCormick (roofing); Lyle Yerges (acoustical)
Developer:
Equity Associates Inc.
General contractor:
Schal Associates

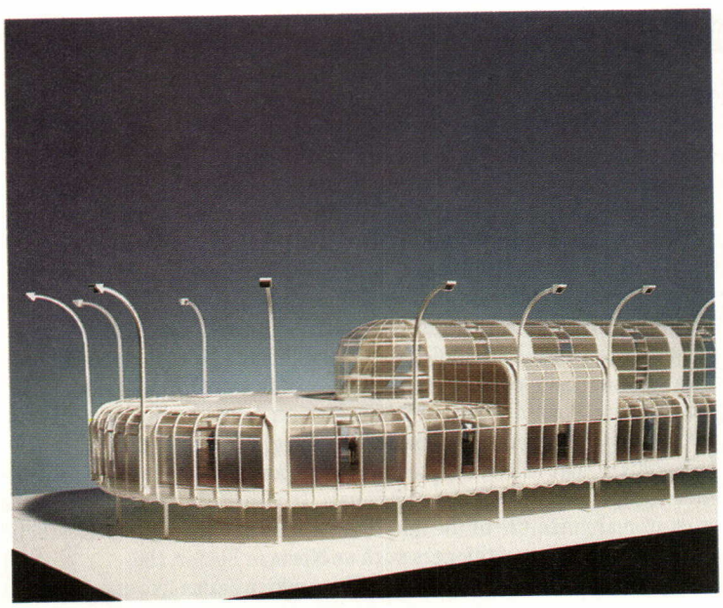


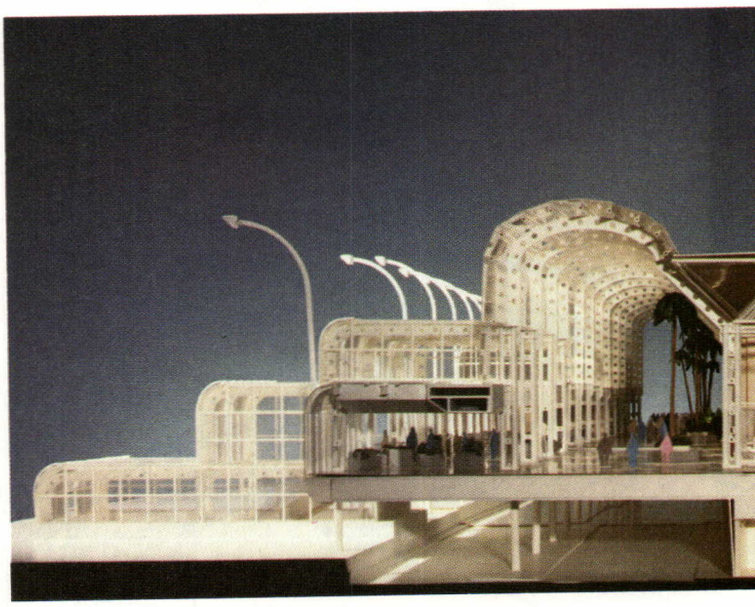


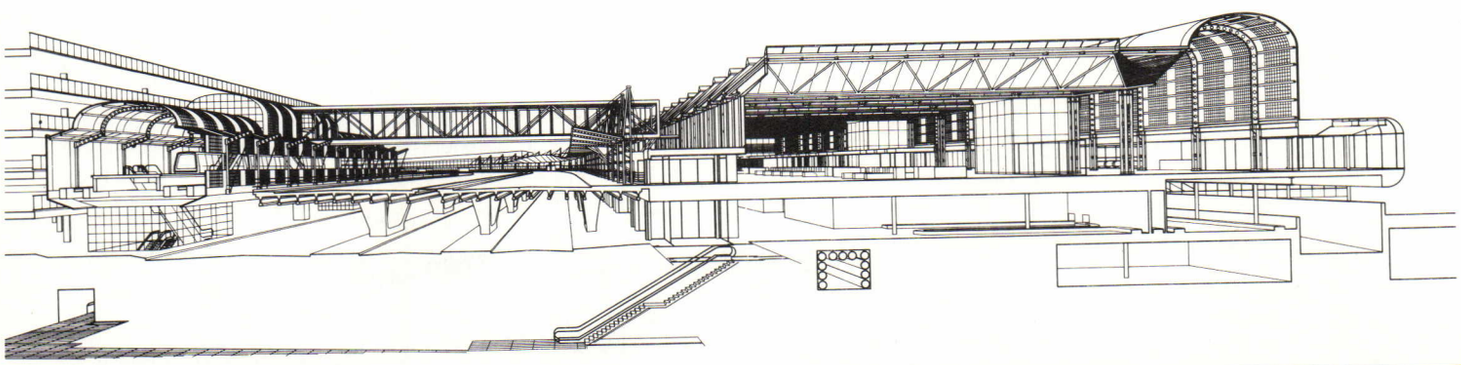
United Airlines Terminal 1 Complex
O'Hare International Airport
Chicago, Illinois
Murphy/Jahn Architects

In designing Terminal 1, Murphy/Jahn adopted a planning method used at Atlanta's Hartsfield Airport of parallel concourses, allowing for two-way aircraft access (see plans following pages). The resulting United Airlines terminal and satellite, located 815 feet apart, are connected by an underground passageway with moving sidewalks and adjoining baggage-handling facility. The complex is linked to the rest of O'Hare by a people-mover station, originally adjacent to the terminal (left of top section), now separated by a roadway and pedestrian bridge (left of bottom section). The terminal is entered under a suspended cable canopy (right of middle model photo) through the ticketing pavilion. Covered by a 120-foot-long folded truss roof with skylights, this column-free space is illuminated by

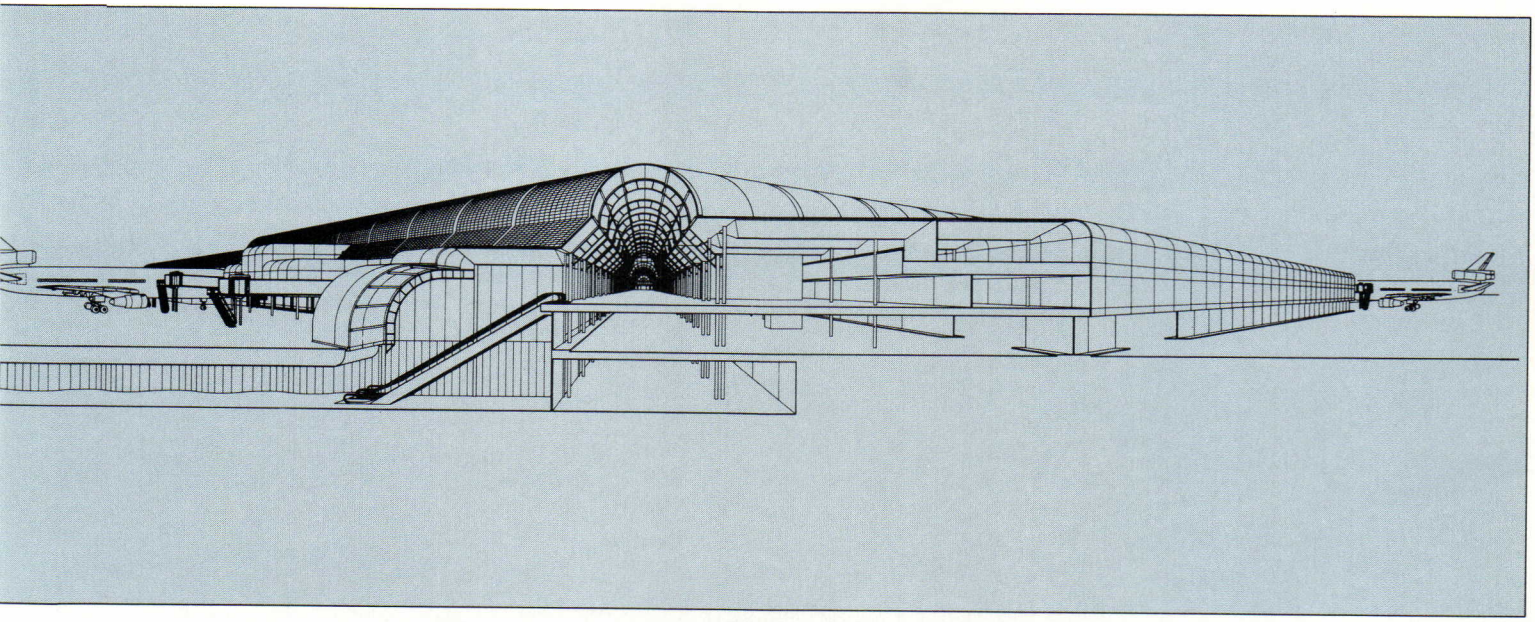


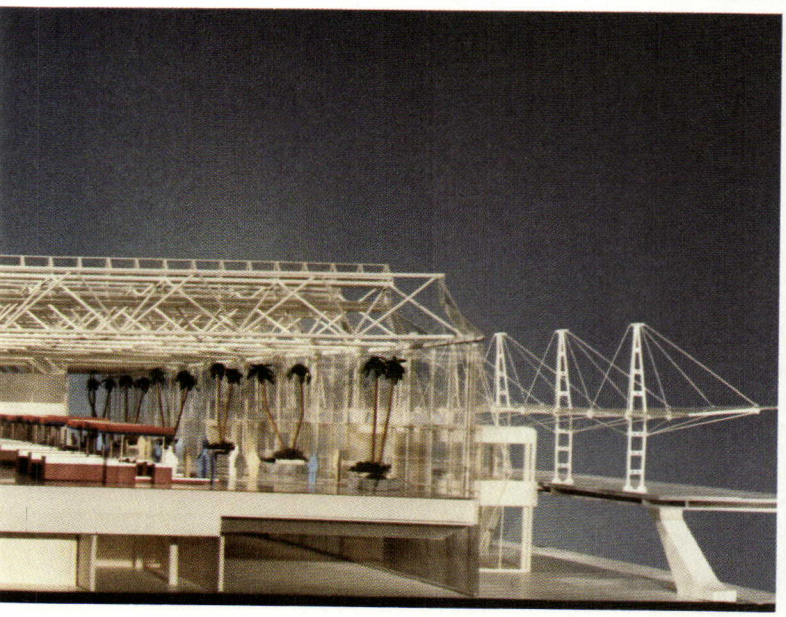


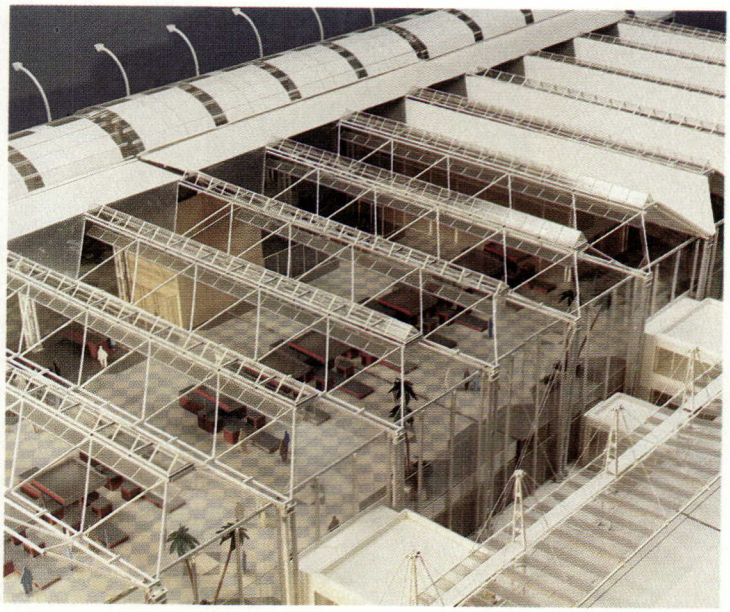


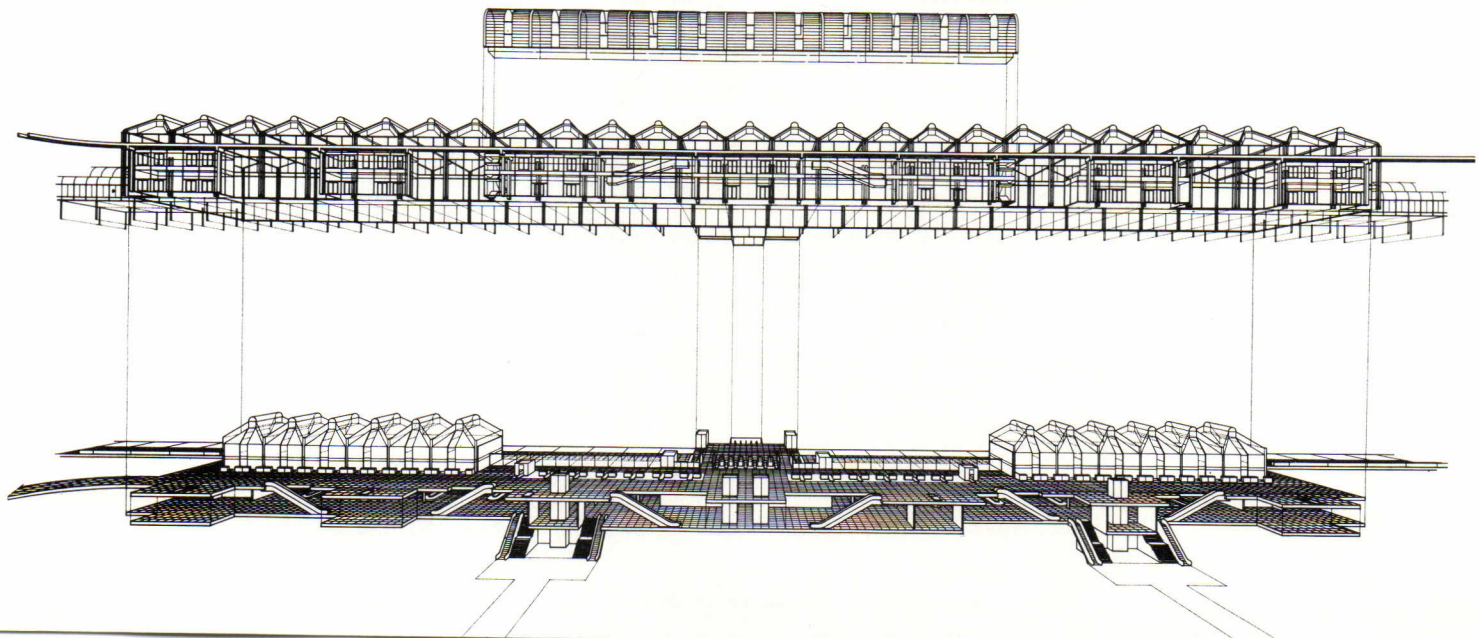


daylight filtered through a series of V-shaped diffusers (model photos, exploded section). From the ticketing pavilion, passengers enter the 1,500-foot-long barrel-vaulted concourse to 16 gates and waiting rooms, which wrap the ends of the terminal (left model photo). The satellite is entered via escalators down through the underground pedestrian walkway (see sections). The 30-foot bays of the concourses are clad in tinted, fritted, and clear insulating glass and aluminum panels that curve under the raised floor of the terminal (left photo). In a Miesian gesture, the curtain-wall mullions are expressed on the exterior. Outdoor lighting standards are designed to complement the terminal's rounded profile (left photo).

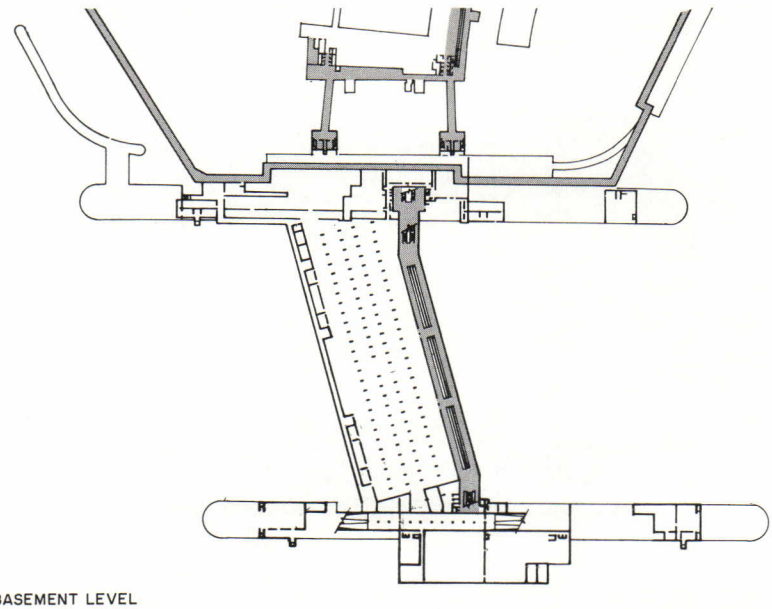








Murphy/Jahn's design for the United terminal and satellite is intended to create a sense of light-filled, architectural grandeur appropriate to the public scale of the complex. "Very few architects have looked at airports as architecture, rather than as glorified corridor systems," notes project architect Martin Wolf. For inspiration, the architects have turned to the cast-iron structures of the mid-19th century in developing an exposed-steel structure of clustered columns, punched web beams and vaults, a high-tech vocabulary that recalls Foster Associates' Renault Centre. "This complex is like a railroad station from the last century converted into a streamlined airline terminal for the 21st century," claims Wolf. Although the satellite is lower in elevation than the main terminal to allow control-tower views over its roof, both structures are organized along barrel-vaulted concourses that terminate in half-domed waiting areas (photos and upper level plan, opposite page). The 50-foot-wide, terrazzo-paved concourse in the main terminal (photos below) is entered from the trussed roof ticketing pavilion (shaded portion of lower level plan below). Both concourses and stepped, vaulted gate areas are skylit with a combination

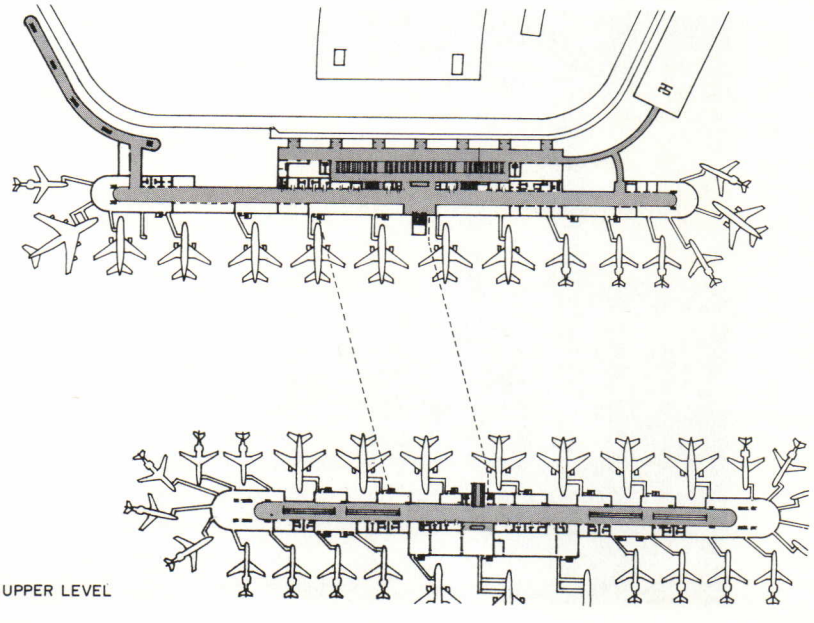


BASEMENT LEVEL

of glass and ceramic frit panels (fired with an opaque grid pattern) and 10-foot clear glass strip in the center of each bay, a cost-effective and low-maintenance alternative to the original proposal for glass block. This system of daylighting, designed to consume 50 per cent less energy than conventional methods, is augmented by indirect, artificial illumination in the gate areas.

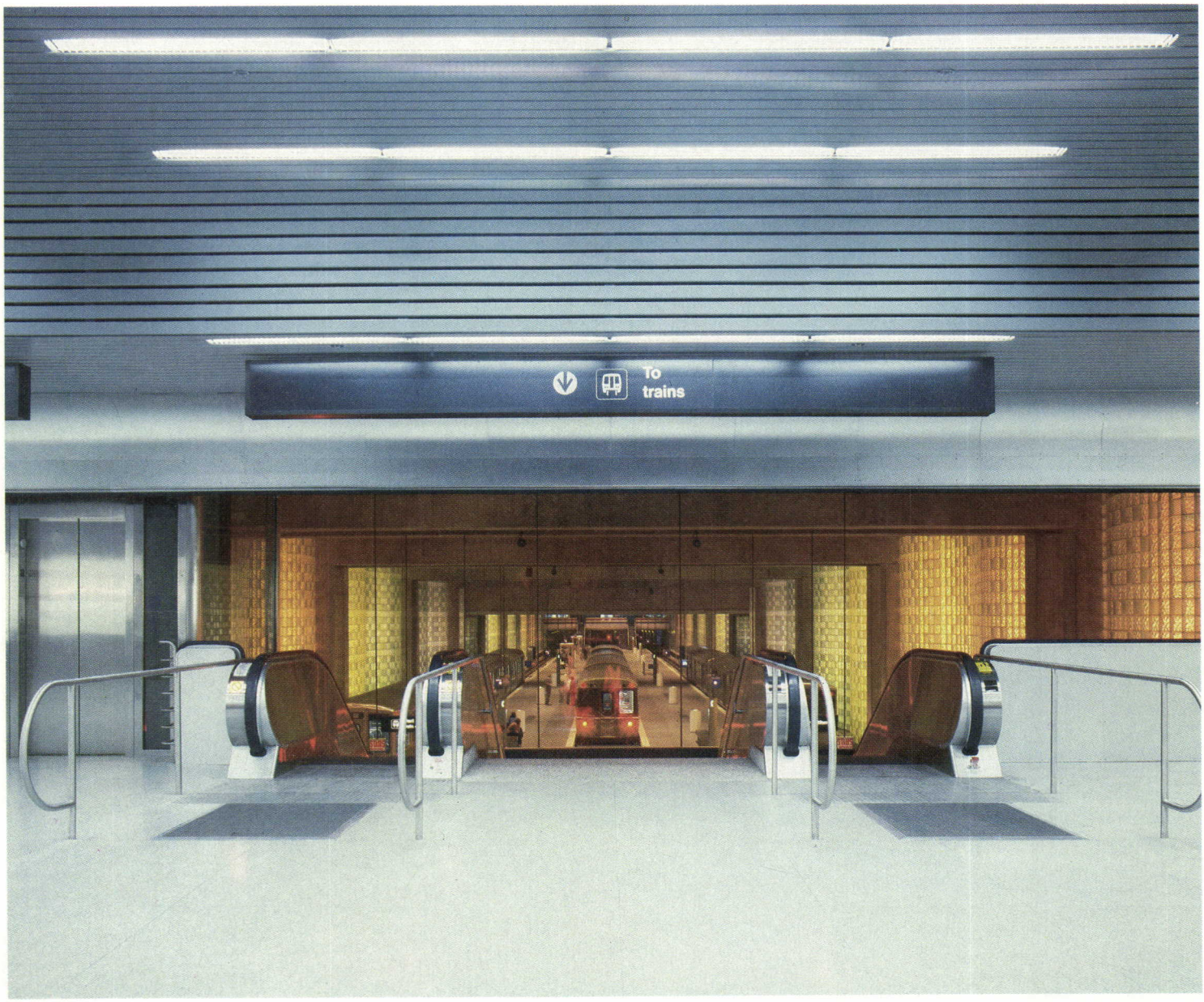
United Airlines Terminal 1 Complex
O'Hare International Airport
Chicago, Illinois
Architect:
Murphy/Jahn—Helmut Jahn, principal-in-charge; Martin Wolf, project architect; Brian O'Connor, project director; Jon Pohl, project manager; Sanford Gorshow, job captain

Engineer:
A. Epstein & Sons
Consultants:
O'Hare Associates (supervising); Lev Zetlin Associates (structural); Cosentini Associates (mechanical); Sylvan R. Shemitz & Associates (lighting)
Construction manager:
Turner Construction Company



O'Hare Rapid Transit
Extension Station
Chicago, Illinois
City of Chicago, Murphy/Jahn,
Associated Architects

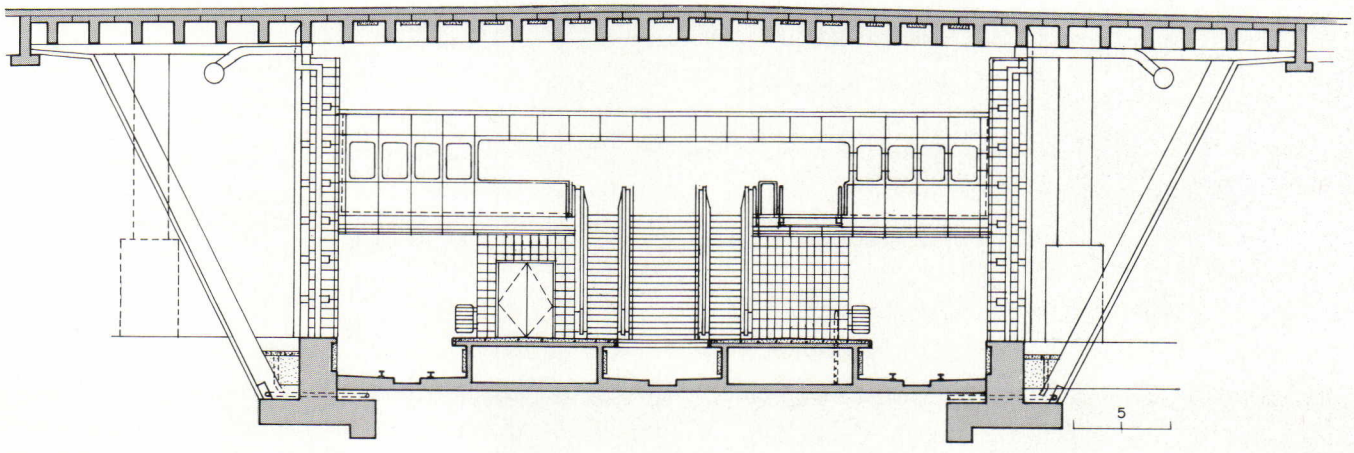
The O'Hare station, located beneath the parking garage at the center of the airport, terminates a rapid-transit line that extends from the Chicago Loop. Opened last September, it sets a colorful, glowing precedent for Murphy/Jahn's subsequent airport projects. The spacious (70 feet wide by 30 feet high), column-free platform is achieved through a sprayed-concrete, open-cut excavation and post-tensioned girders erected around the garage caissons. Its bermed structure is covered by undulating walls of translucent glass block, their serpentine forms "dictated by acoustical requirements, to soften the noise from the trains," explains project architect James Stevenson. Backlit by high-pressure sodium lamps, the glass block reveals painted walls behind, colored in a subtle gradation from red to violet —"a metaphorical transition from earth to sky," according to the architects. This change in color is underscored by a shift in block patterns that become more transparent toward the pedestrian concourse above the platform. The resulting kineticism of light, color and pattern highlights the movement of trains and passengers within the station in contrast to the brightly lit, gray-toned concourse



above (top photo, opposite page). The transition between the station and concourse is marked by a stainless-steel paneled wall above the escalators, designed in elevation to simulate an airplane (photo and section below). Throughout the station, stainless-steel-covered benches, railings, and platform carrels repeat the material sensibility of the subway cars.

O'Hare Rapid Transit Extension Station
Chicago, Illinois
Clients:
City of Chicago, Department of Public Works
Architect:
City of Chicago, Bureau of Architecture; Joseph Casserly, city architect

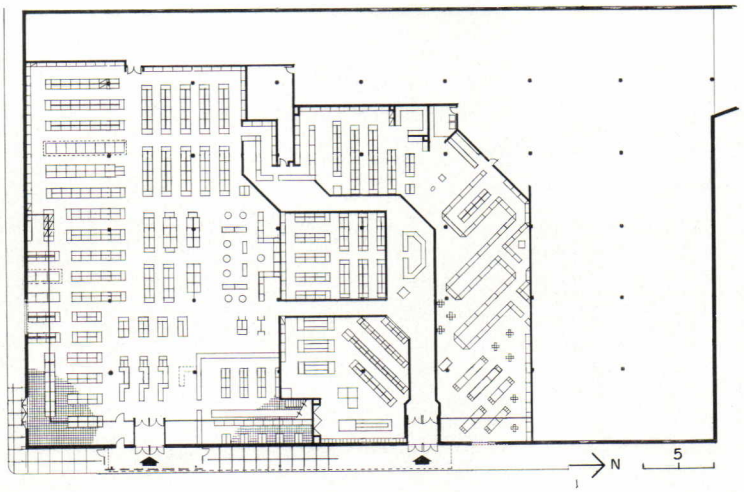
Associate architect:
Murphy/Jahn—Helmut Jahn, principal-in-charge; James Stevenson, project architect
Consultants:
Murphy/Jahn, Dolio and Metz Ltd. (mechanical); Alfred Benesch & Co. (structural); W. B. Dolphin & Associates (electrical); CHA Design Inc. (lighting)

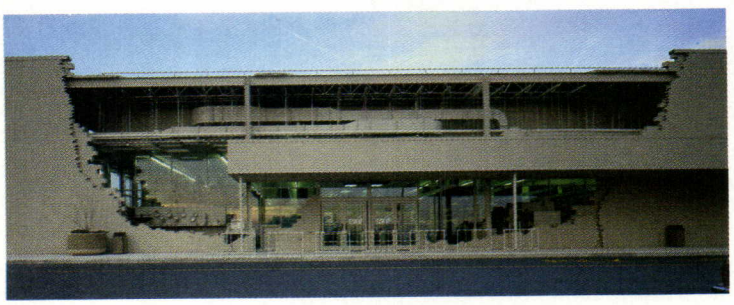


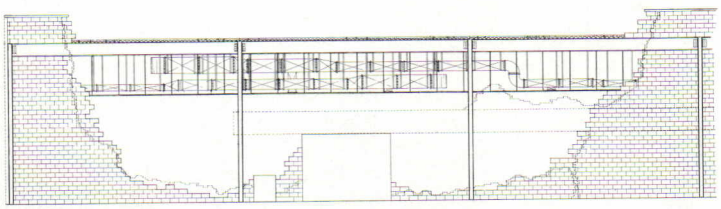
Inside/Outside Building
Milwaukee, Wisconsin
SITE Projects, Inc., Designer

Good-by to all that

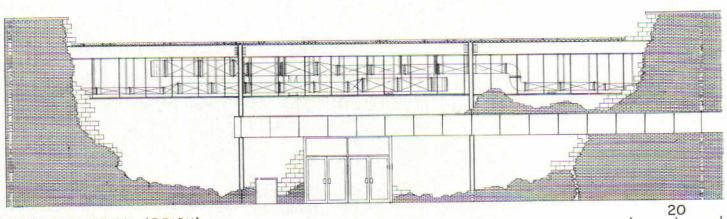
Beyond the twilight zone of SITE's *"ghosted" inside/outside periphery, the display and storage areas of the 52,000-square-foot Milwaukee show room follow the client's formulaic layout. The materials and construction techniques laid bare in the process of "unbuilding" are also standard. A monochrome coating of epoxy paint heightens the phantasmagoric transformation of familiar suburban prototypes into a disarming enigma, like the set for some elaborate* Candid Camera *skit. (Best regrettably vetoed* SITE's *plan to render the store logo in grisaille as well.) Unwary shoppers encounter glassless doors that will not open, (opposite), merchandise buried under mysterious gray fallout, and a roof that admits* all *of the elements. Snow, icicles, and the play of sunlight create serendipitous esthetic effects overhead.*







EAST ELEVATION (CONCRETE BLOCK)



EAST ELEVATION (BRICK)

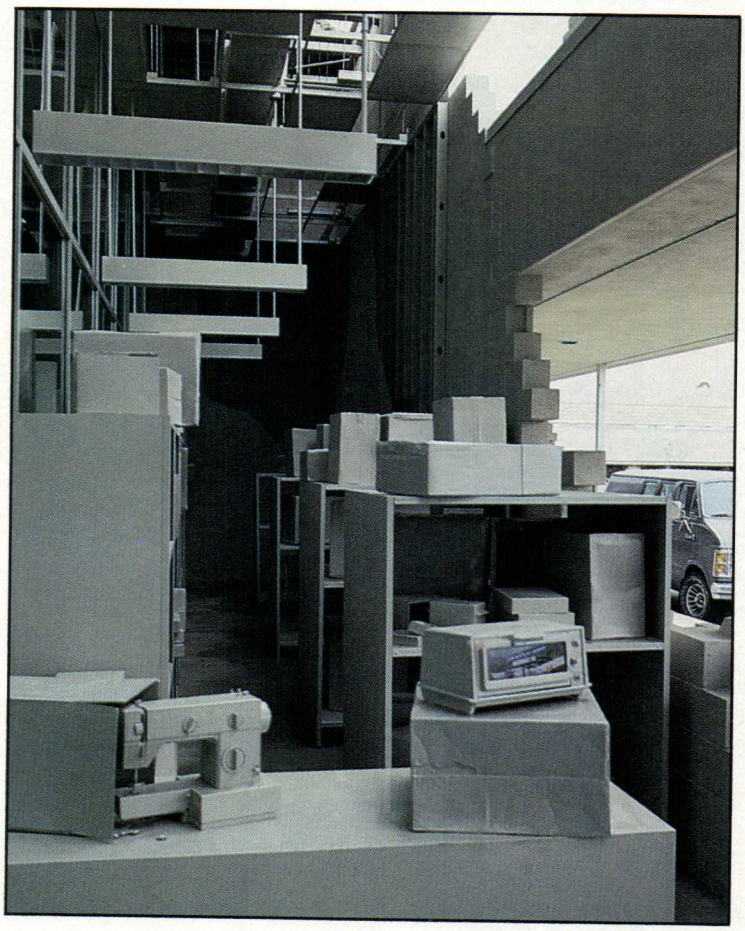
Now and again an architecture student from Sweden or Italy shows up at the New York office of SITE Projects, earnestly presenting a white brick to be autographed. The young pilgrim has invariably snatched his relic from the rubble-strewn "Indeterminate Facade" of SITE's Best Products show room in Houston, a structure that has been artfully ruinous since the day it opened 10 years ago. Along with the Peeling Project of 1971, the Houston store inaugurated an eight-part series of "unbuilt," buried, or overgrown Best show rooms that have made the catalog retailer's basic brick box an internationally known theme-with-variations (RECORD, March 1977 and March 1984). Though SITE's latest box, the Inside/Outside Building in Milwaukee, has barely been out of the wrapper six months, it already holds a special place in the sequence, since it may well mark the end of the line (it may also, incidentally, be the likeliest target for architectural souvenir hunters since the Indeterminate Facade). Budget cuts and a corporate shift of focus at Best currently preclude new commissions for "special" show rooms, and SITE, in any event, is eager to explore different territory: "We don't want to make *Rocky IX*," says principal James Wines. Not that the Inside/Outside Building is itself a perfunctory sequel. On the contrary, whether viewed as sculpture, architecture, or cultural commentary—or, more aptly, as a phenomenon embracing all of the above—this is the most complex and engrossing of all the Best schemes.

The setting for the Milwaukee project is a typical suburban commercial strip, and the building program and materials could virtually have come from a catalog. As always, though, the very ordinariness of these ready-mades became raw material for SITE's artistic invention and a mundane foil to its surrealist imagining. Extending the themes of fragmentation and inversion that informed three earlier Best show rooms, SITE has cut away jagged openings in the building's outer shell—at some points chipping only a narrow fissure to reveal a glimpse of concrete block beneath brick veneer, elsewhere punching vast cavities to expose metal studs, lath, cement plaster, and ductwork. The installation of a thermal glass wall 10 feet behind the unglazed facade creates ambiguous "interior" recesses, simultaneously inside and out, which appear to be stocked with Best's standard display furniture and goods (opposite and overleaf). The "products" on view, many of which are in fact simulacra cast in metal, have been coated in the same dun-colored paint that uniformly covers the exterior, intensifying the contrast between a ghostly mercantile limbo and the animate emporium within. Sample wares bisected by the magical glass screen are ashen-gray on one side, "living color" on the other, to reinforce this weird duality.

Depending on the beholder's temperament, the tableau *en grisaille* can suggest Sleeping Beauty at the Mall or The Last Days of Suburbia. "We've been working with narrative architecture a long time, using construction as a sort of biography of a building," Wines explains. "Other narrative artists take a subject from life and abstract it through a graphic process to such an extent that the source is lost. Our idea is that the story is already there *in* the building." There is, of course, no single story line here, but rather a skein of many strands. Beyond the obvious philosophical dialectic between reality and illusion, more tenuous allusions to the "deep" and "surface structure" of linguistics, or an implicit valediction to consumer culture, there is a wealth of whimsical details that relieves the portentous gloom. And apocalyptic symbolism aside, this assemblage of masonry and metal is a marvelous spectacle, a 1,000-foot-long public sculpture that is as engaging seen from across the highway as it is nose to nose with a cast-aluminum Ken Doll. Bemused, irate, or charmed, the public *has* responded to the art. After the predictable double-take, many normally law-abiding citizens voice an almost irresistable urge to walk away with the sculptural merchandise; several vandals with hacksaws actually have. "In the dialectic between the real and the unreal," says Wines, "a lot of people seem to have decided that the unreal is better." *Douglas Brenner*

Russell B. Phillips

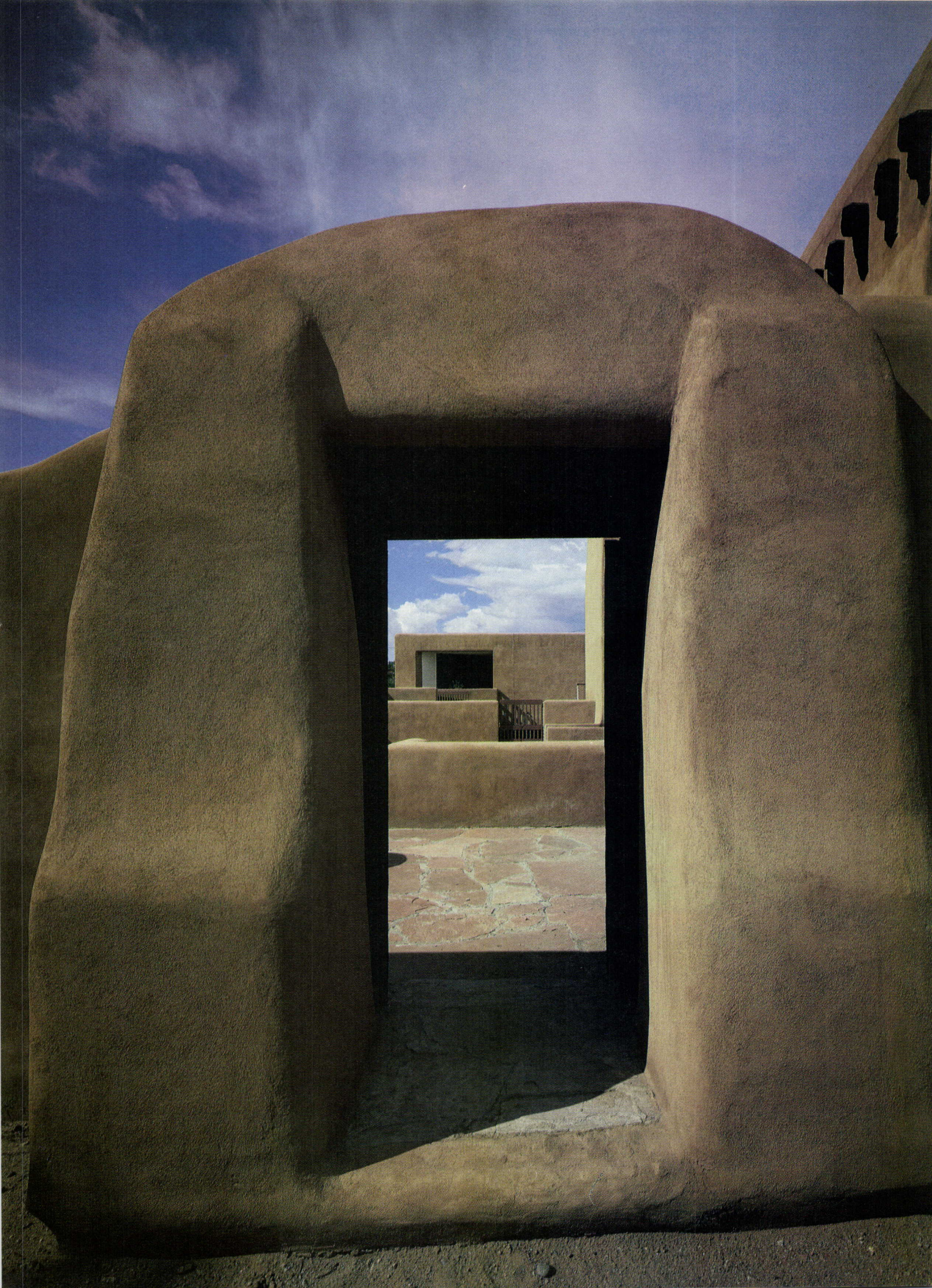
SITE photos, except as noted



Russell B. Phillips

As nearly as possible, the display furniture and 800-odd "products" installed between the masonry facade and the thermal glass wall of the "building within a building" replicate actual Best interiors. Project architect Joshua Weinstein compiled a checklist of some 2,000 items, and their customary showroom locations, from which the design team abstracted a profusion of intricate still lifes. For weatherproofing and all-around durability, many objects had to be cast in bronze or aluminum. Sculptor Gene Olson and 14 assistants at Mettle Works in St. Paul, Minnesota, worked a total of 4,500 man-hours, fabricating rubber molds and casting through the traditional lost-wax process. Ultimately welded in place, these objets d'art comprise a household inventory ranging from woks to lawn sprinklers, mantel clocks, and doll furniture. Their fidelity to the originals—and their surrealism—is most telling when "real" and "unreal" are juxtaposed, as in the tableware and toy departments (opposite) or alongside the customer pick-up counter (near left center), where a spectral sewing machine, toaster oven, and cartons (aluminum under gray paint) wait perpetually to be carried home. A few ambiguous artifacts, such as a child's bicycle (opposite bottom left), actually cross the boundary.

Inside/Outside Building
Milwaukee, Wisconsin
Owner:
Best Products Co., Inc.
Designer:
SITE Projects, Inc.—
James Wines, principal;
Joshua Weinstein, project architect
Associated architect:
Keeva J. Kekst Associates
Engineer:
John W. Bowes & Associates (structural);
V. A. Lombardi & Associates (mechanical/electrical)
Arcade display:
M. F. I. Inc.; Mettle Works—Gene Olson, sculptor; Creative Services International, Inc.
Lighting consultant:
Incorporated Consultants Ltd.
General contractor:
Hunzinger Construction Co.



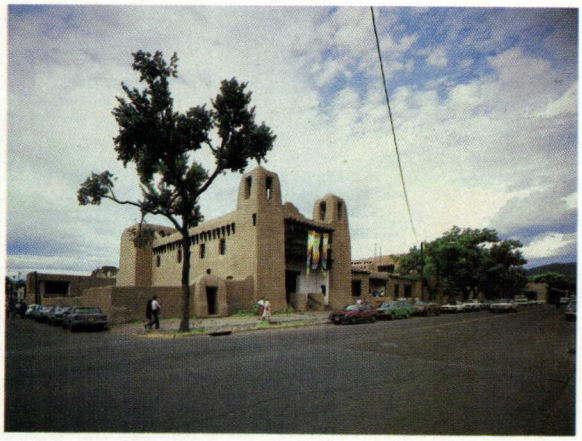
In deference

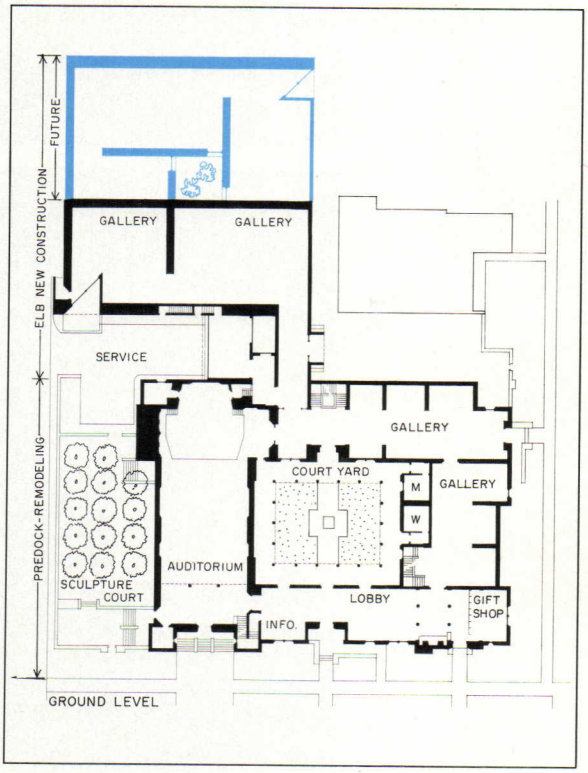
Museum of Fine Arts/Museum of New Mexico
Santa Fe, New Mexico
Edward Larrabee Barnes Associates, addition
Antoine Predock Architect, renovation

The air of freedom and tolerance that has long made Santa Fe an oasis for outcasts and artists does not extend to matters architectural. And though some may find fault with the city's save-but-one-style mandate, the rigid policy toward building design (which dictates not only the forms and materials but even the cornice-line of all new construction) is a local tradition that is not without its reward. The powerful Historic Styles Committee, current warden of Santa Fe's remarkably consistent vernacular mien, traces its moral roots as far back as 1915 when, in response to the area's burgeoning artistic community, the Second State Legislature agreed to help fund an art museum, provided that the building be "substantially a replica" of the New Mexico Building at the 1913 Panama-California Exposition in San Diego. While the heavy hand of a state legislature would probably be unwelcome on the drawing board of any self-respecting contemporary architect, architects I. H. and W. M. Rapp—recipients of the museum commission—were happy to oblige; but then the Rapp brothers were, after all, being mandated to imitate their own work in San Diego, which itself was an almost archaeological reproduction of the historic Mission Church at Acoma, with additional borrowings from churches at the San Felipe and Cochiti pueblos. That the museum was neither original in design nor authentic in construction (stucco over brick instead of adobe) was of no concern, as the replica of the reproduction looked at home.

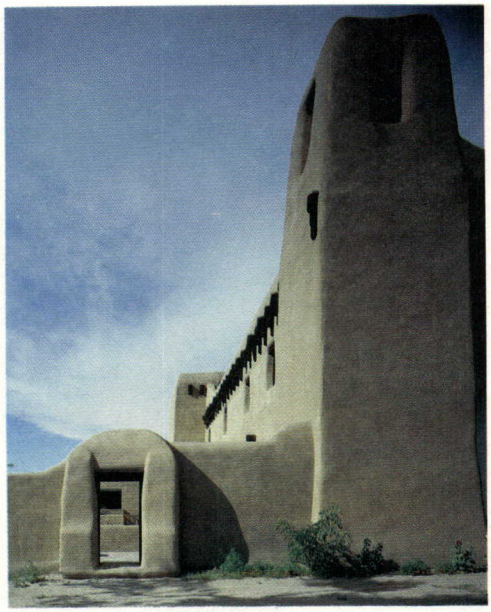
If decades of New Mexican sun endowed the museum with a patina of venerability, it also riddled the building with cracks and leaks. Add to that the growing demands of Santa Fe's constantly expanding community of artists, and the staff's vain attempts to meet those demands with ad hoc modifications, and by the early '70s Santa Fe was the not-so-proud home of a deteriorated, inadequate, and abused museum that stored the bulk of its collection in a basement affectionately known as "the dungeon." Fortunately, however, the museum's Board of Regents counted one Nathaniel Owings among its members, and though Owings was retired from architectural practice, he still prided himself in wielding the kind of influence that made Skidmore, Owings & Merrill the firm it is. At Owings's recommendation, Edward Larrabee Barnes was summoned to Santa Fe. After reviewing the New York architect's portfolio, and duly noting his experience at the Walker Art Center in Minneapolis and the Scaife Museum in Pittsburgh, and his penchant for quiet, restrained architecture, the board confirmed Owings's recommendation. Barnes was presented with a two-part program that called for the renovation of the 1917 building and the construction of a 13,000-square-foot addition. In compliance with a museum request, Barnes selected Albuquerque-based Antoine Predock as his joint-venture partner.

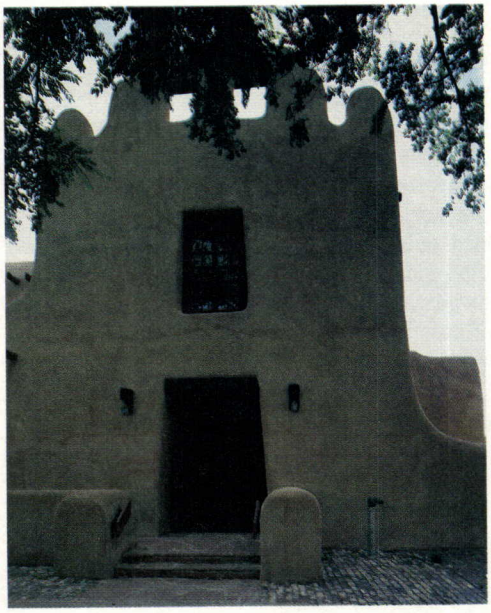
The fact that there is nothing overtly spectacular about Predock's renovation or Barnes's addition proves not that the two architects were having an off day, but rather that both designers understood and respected the job they were invited to do. The Rapp brothers could have asked for no more respectful treatment of their contribution to Santa Fe's cultural life than Predock's meticulous facelift, which ranged from completely re-roofing and re-stuccoing the old museum to reinstating its natural lighting system and reproducing the hand-painted beams, or *vigas*, that project through to the exterior. The building was made accessible to the handicapped, double-glazed and insulated to comply with current energy standards, and the basement was completely redesigned to free curatorial, library, and staff functions from their cramped, dungeon-like gloom. If much of Predock's work is invisible—prompting more than one viewer to puzzle over what's new and what's old—Barnes's addition appears to aspire to a similar goal. To date the new building is only half complete—awaiting the demolition of an adjacent structure—but the simple stucco box with the slightly battered walls and gently rounded cornice, deferentially lodged behind the old museum, is architecture reduced to a barely audible whisper. Which is precisely the volume Santa Feans prefer. *Charles K. Gandee*

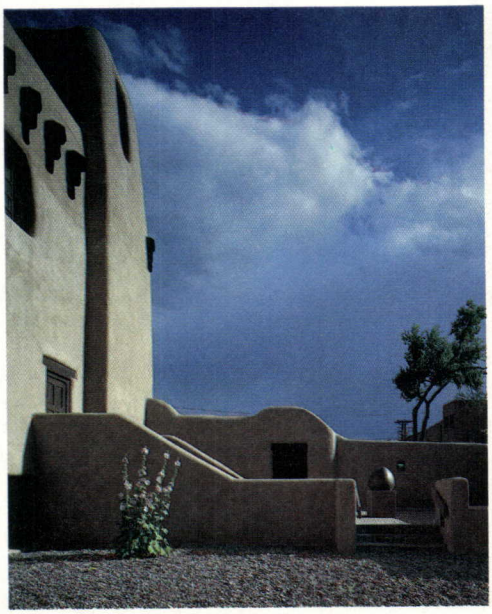


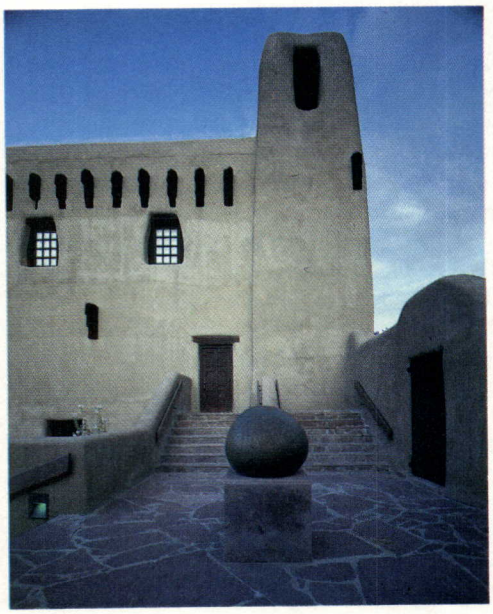


Despite an extensive $2.7-million building program, the Santa Fe Museum of Fine Arts still presents the same indigenous face architects Rapp and Rapp gave it in 1917 (top). Looking through the Palace Avenue gate (facing page), however, one glimpses the new addition deferentially half-hidden behind the now-renovated museum.









Of the many qualities to be admired in the Rapp brothers' Santa Fe museum, perhaps the most welcome is the building's informal relationship with nature. In contrast to the hermetically sealed rooms of contemporary museums (dictated by conservation requirements), the windows and doors are always open in Santa Fe, with visitors and breezes free to drift in and out between the galleries and the central courtyard (plan previous page). In an effort to extend that tradition, architects Predock and Barnes transformed a parking lot at the western edge of the museum site into a walled-in sculpture court (photos above); by cutting doors into the adjacent museum auditorium they also made the terraced plaza (adorned with a Juan Hamilton sculpture) an open-air lobby for intermissions.

As museum-goers move from the old galleries (facing page) to renovated rooms (above) and on to the newest spaces (top), they will notice a gradual decline in textural richness; yet each of the galleries adheres, in its way, to the traditional local palette of mud floors (here concrete), white-washed walls, and wood ceilings. Predock's renovation work ranged from simply peeling off decades of abuse and refinishing time-ravaged materials and details to replacing the museum's 1917 state-of-the-art natural lighting system (perennially leaky glass-block skylights in gallery alcoves) with laminated, protective glass. The subtle grid in the integral-color concrete floor was deepened and new wood slats were introduced to the corridor ceilings (above) to humbly recall the grand, hand-painted vigas *in the lobby (facing page). Though Barnes's new gallery addition is more introverted and insular than Santa Feans are accustomed to, the controlled environment enables the museum to host traveling shows.*

Museum of Fine Arts/
Museum of New Mexico
Santa Fe, New Mexico
Owner:
State of New Mexico
Architect:
Edward Larrabee Barnes Associates (new gallery addition)—Dimitri Sarantitis, project architect; Antoine Predock Architect (renovation)—Geoffrey Beebe, project architect
Engineer:
Randy Holt and Associates (structural); Coupland Moran and Associates (mechanical); UHL *and Lopez Engineers, Inc. (electrical)*
General contractor:
John R. Lavis General Contractors, Inc.

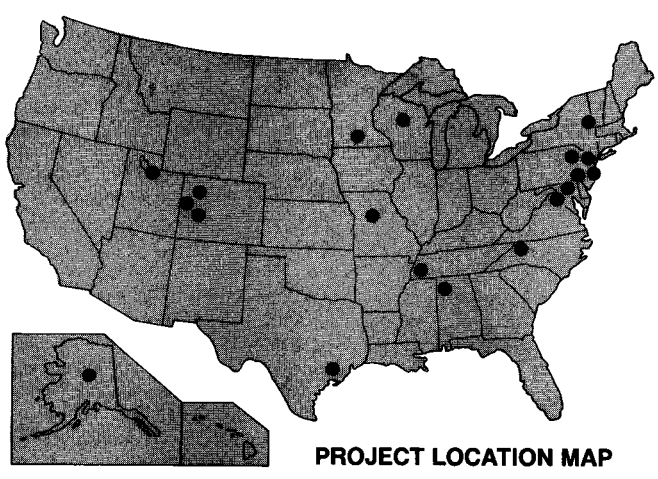
Building with the sun

The Department of Energy's passive solar energy program for nonresidential buildings—now five years old—is a landmark in architectural research. It has demonstrated that readily available technologies, synthesized through intelligent design, are capable of yielding civic and commercial buildings that use about 60 per cent less energy than the average U. S. building, need cost no more than conventional buildings to construct, and, perhaps most important, are found by users to be highly satisfying environments in which to work, learn, and play. These results should establish a new generation of advanced building design—good news for architects and owners alike. For the architect, the technology presents an exciting challenge for greater compositional unity insofar as the key to successful passive energy building design is not so much in the individual parts as in the *formula* that relates those parts. Owners can look forward to lower operating costs—and for some owners on tight budgets, low operating costs can make the difference between having or not having a facility. Through this program, the Federal government has exercised a leading role in the development of a more enlightened built environment while putting it within the economic grasp of a larger user group. It is a role in which the government should be encouraged to continue. We all stand to benefit from the relevant, thoughtful, and well-executed research exemplified by the program.

The program was launched in 1979 with the submission of preliminary design proposals from 400 architect/engineer teams. The buildings they proposed were to be built in any event; involvement in the DOE program meant an additional commitment by the design team and client to use passive solar techniques and to participate in evaluating the effectiveness of the completed project. In return, the DOE provided technical assistance. From this large pool of applicants, the DOE selected 40 to award money for fees to cover the cost of incorporating a passive solar system into each design. With this done, a technical jury then judged that 23 of the original 40 were acceptable for the next phase: design development with the assistance of an accomplished solar design consultant. Of the 23 designs that were fully developed, 21 were constructed—or retrofitted in the case of existing buildings—as part of the program. These projects are sited throughout the contiguous U. S. and Alaska and support a variety of commercial uses (banks, office buildings, retail stores), semipublic uses (airports, community centers), and public uses (elementary schools and a library) (see table and map at right). Though the clients of the buildings were responsible for construction costs, the DOE provided auxiliary funds for energy-related features when first costs exceeded the conventional counterparts (the financial subsidy never exceeded 10 per cent of the total construction budget). Of the completed buildings, 19 went on to the final stage of the program: the instrumented collection of one year's performance data, and a survey of users' response. To date, nine buildings have completed all data monitoring.

The buildings that have emerged from the program are all outstanding energy performers. Furthermore, they are sensitive studies in pleasantly lit interiors. Though united in these characteristics, the projects are remarkably diverse in their energy technics, spatial configurations, and their over-all style. The four projects shown in this article are representative of the range. There is in this seemingly unrestricted, though firmly grounded, freedom of expression a subtle lesson that serves to dispel any myths about passive solar buildings necessarily being hybrid forms that stand outside the architectural esthetic mainstream. If anything, the projects point toward the potential enrichment of a given architecture when it more purposefully engages itself with the natural environment. With the creative efforts of the many talented architects and engineers involved in the program, the DOE has clearly demonstrated that designing with nature does more than just make good economic sense for nonresidential architecture. *Darl Rastorfer*

	Heating			Cooling					Daylighting			
	Sunspace/Atrium	Mass Floor	Mass Wall/Water Storage	Earth Contact	Natural Ventilation	Forced Vent./Night Flushing	Shading Mechanisms	Evaporation/Radiation	Windows (More Nat. Light)	Light Shelves	Clerestories/Skylights	Sunspace/Atrium
Two Rivers School Fairbanks, Alaska			●						●			
Abrams Primary School Bessemer, Ala.			●				●				●	
St. Mary's School Addition Alexandria, Va.		●	●			●					●	
Bleke Ave. College Ctr. Glenwood Springs, Colo.	●	●	●			●	●		●	●		
Princeton School of Arch. Princeton, N. J.					●				●	●	●	
Mt. Airy Public Library Mount Airy, N. C.		●	●		●	●			●	●	●	
Johnson Controls Branch Salt Lake City, Utah		●					●		●	●	●	
Geffer Store Addition Wassau, Wis.	●	●				●	●		●	●	●	●
Princeton Prof. Park Princeton, N. J.	●				●		●	●	●	●		●
Wells Security State Bank Wells, Minn.		●	●				●		●	●	●	
Community Church Columbia, Mo.		●	●		●	●	●	●	●	●	●	
Shelly Ridge Girl Scout Ctr. Philadelphia, Pa.	●	●	●	●	●	●	●		●		●	
RPI Visitor Info. Ctr. Troy, N. Y.	●	●	●		●		●				●	●
Essex Dorsey Senior Ctr. Baltimore, Md.		●			●		●		●		●	
Comal County Health Ctr. New Braunfels, Tex.		●	●		●	●	●		●			
Gunnison County Airport Gunnison, Colo.			●			●	●		●	●	●	
Walker Field Terminal Bldg. Grand Junction, Colo.		●			●	●					●	
Phila. Municipal Auto Shop Philadelphia, Pa.					●		●			●	●	
Toulatos Greenhouse Memphis, Tenn.		●	●	●	●		●		●		●	



PROJECT LOCATION MAP

Otto Baitz

DOE's passive solar program for commercial buildings

While most architects have been actively interested in passive solar design for housing, many have been slow to adapt passive design concepts to commercial buildings. This may be explained by a number of factors: 1) a lack of reliable data on real passive solar commercial buildings; 2) designers' relative inexperience with large-scale passive design; and 3) the greater financial risk associated with incorporating new approaches into large building projects. As described on the preceding pages, in 1979 the Department of Energy began an investigation of the potential of passive solar energy in larger-scale buildings. Its objective was to build a body of practical information on the design, construction, and performance of nonresidential solar buildings. The following text was adapted from the program's design and performance overviews, compiled and edited by Burt Hill Kosar Rittelmann Associates, architects who have long been deeply involved in energy conservation. The complete versions of these and other program documents are available through the AIA Foundation, Washington, D. C.

The 19 buildings completed so far all showed major savings in energy usage

Final performance monitoring is now being completed, but one year's measured energy consumption is available for nine buildings, all of which were new construction. As a group, these nine buildings used 47 per cent less energy than calculations show their base-case counterparts would have used, and about 60 per cent less energy than average U. S. commercial buildings. (Base-case buildings are the nonsolar equivalents that owners would have built had they not been selected for the DOE program. All base cases reflect the owners' budgets and the standard construction practices in their areas.)

The most important performance observation is that all of the primary functions—heating, cooling and lighting energy—were reduced by large amounts. In particular, instrumentation showed that in the 30 per cent of designs with major emphasis on daylighting, daylighting strategies were not accompanied by increases in cooling or heating energy usage. Similarly, solar heating strategies were not accompanied by increases in cooling energy usage. This observation applies in particular to cooling energy in the fall months when one might expect solar apertures to collect unwanted heat gain from the low, southwest afternoon sun.

All of these observations help dispel the notion that non-residential buildings, due to their internal cooling loads, are poor candidates for passive design, especially solar heating and daylighting. A possible reason why daylighting designs incurred no cooling penalties—and in fact actually reduced cooling needs—is that auxiliary lighting energy (and therefore associated heat gains) was 16 per cent lower in summer months than in nonsummer months since daylighting efficiency (90-150 lumens/watt) is generally higher than that of artificial (25-100 lumens/watt for fluorescent sources).

How then, does energy reduction translate into lower operational costs?

Unfortunately, there is no national database on annual operating costs by building type equivalent to what R. S. Means and F. W. Dodge collect on construction costs. Nevertheless, some data do exist, and it is quite good for some specific building types. Where data could be found, they showed that passive solar buildings cost significantly less to operate than conventional buildings.

The actual energy cost data (as opposed to energy consumption) from the nine fully documented buildings were taken from monthly gas and electric bills. They have been computed on a per-square-foot basis but have not been normalized by heating or cooling degree days to reflect regional climate differences. Comparative data were taken principally from four sources, depending on the building type in question: DOE's *Building Data Book*; information compiled by the Building Owners and Managers Association and the American Institute of Architects Foundation, both of whom track actual operating costs by building type and location; and base-case buildings, which were real or realistic buildings selected by the architect and reviewed by DOE to represent conventional design.

Of the nine buildings studied to date, *all* fell significantly below comparative data. The largest saving was 80 per cent, the smallest was 11 per cent, and the average saving was 47 per cent below conventional design. In absolute terms, passive solar commercial buildings have very low annual energy costs. All nine buildings studied fell below $1.00 per sq ft per year for total energy costs. Five of nine fell below 50 cents per sq ft per year for utilities. The lowest cost building—a church Sunday school and community center—cost only 15 cents per sq ft per year for utilities—for a total annual utility bill of only $806.

Well-insulated envelopes were a given; next most important strategy was daylighting

Daylighting resulted in significant cost and energy savings while contributing significantly to user satisfaction. The prominence of daylighting as a design resolution to energy efficiency is a response to high electricity costs in nonresidential buildings. Measured in Btus, lighting energy may be secondary to heating and cooling, but the cost of delivering light is two to three times greater than the cost of delivering heated or cooled air. For the buildings in the program, approximately 55 per cent saving over base-case lighting energy use was achieved. Six types of daylighting solutions were used: windows in walls, light shelves, clerestories, roof monitors, sunspaces, and skylights.

Successful daylighting designs shared a number of characteristics, the most important being distribution. If daylight was well distributed, a visually comfortable and largely glare-free environment was attained. In the most successful design solutions, glare and contrast were controlled by prohibiting beam daylighting from directly entering an occupied space. Light was admitted into the space high on the wall plane or at the ceiling plane. A number of smaller roof apertures (clerestories and roof monitors) were used rather than a few large openings. And, all roof monitors were designed with south-facing glazing. (Perimeter lighting through the combination of windows and light shelves proved expensive and did not demonstrate greater energy saving than did overhead lighting systems.) In most buildings, daylight provided ambient or background illumination, with artificial lighting used to provide task-specific lighting. In two buildings, however—the Mt. Airy Public Library and Wells Security State Bank—daylight also provided the majority of the required task lighting.

Artificial lighting was integrated with daylighting in all projects. The most successful integrations occurred when: 1) switching of any kind was unnecessary for extended periods (e.g. whole days); 2) variations in distribution of daylight could be supplemented according to need in the space by zone switching; 3) zones were laid out parallel to the daylight source rather than perpendicular to the daylight source; and, 4) multilevel switching could supplement available daylight in stepwise manner.

Contrary to popular belief, evidence suggests that manual controls for artificial lighting can be operated successfully from an energy standpoint by building occupants. Special studies carried out by Lawrence Berkeley Laboratory concluded that in the two buildings that were studied in depth, users operated manual lighting controls in a more energy-efficient manner than simple automated control systems would have. One reason for these results is that occupants were satisfied at illumination levels lower than those that industry standards recommend (and that automated control systems would call for) even when they had the option to increase those lighting levels. Although this is insufficient evidence on which to draw definitive conclusions, it does indicate that occupants can use lighting controls effectively under some conditions.

No less important, daylight is a principal contributor to the increased amenity of passive buildings. Fewer than 5 per cent of occupants complained about "too dim" or "too bright" conditions, across all buildings and types of daylighting design. The many spontaneous comments about the delightful qualities of the daylighting attest to user satisfaction with this aspect of the buildings.

Using thermal mass as an energy saver requires sophisticated design techniques

Despite the fact that passive solar buildings are often thought of as depending on high-mass solutions, the buildings in the DOE program could be divided into three groups, each using a different type of thermal-mass solution. Some high-mass buildings, such as the Mt. Airy Public Library (see following pages), distributed large amounts of thermal mass to store, delay, and diffuse heat energy throughout the building. Another group of buildings used localized thermal mass (such as Trombe walls), where the location of the mass was designed specifically to supply the heating/cooling energy needs of a particular area of the building. An example from this group is the Shelly Ridge Girl Scout Center (overleaf). The third group of buildings used low mass-design solutions appropriate to their timing of occupancy and climate. Wells Security State Bank (following pages) exemplifies this technique.

Analysis of energy, economic, and occupancy issues has shown that high-mass construction is not necessary to achieve significant energy saving. Furthermore, high-mass solutions often resulted in problems. Acoustically, the exposed hard surfaces of thermal storage material are not good sound absorbers. There are often irregularities in the timing and

amount of heat delivery to a space from high thermal mass. And finally, the integration of mechanical systems and high-thermal-mass systems are not well understood.

Moderate amounts of well-distributed mass are apparently sufficient to solve most thermal problems and save energy. Such solutions require modest additional construction costs over conventional design.

Low-mass buildings can be high performers too. The Wells Security State Bank, for example, uses little energy while providing comfortable conditions for building occupants. As this building had a daytime occupancy pattern, it required early-morning warm-up. This design took advantage of immediate direct-gain strategies for heating.

Natural ventilation seems obvious and simple; but data show (again) that it must be carefully designed
For cooling, natural passive ventilation was used as an integral part of the space-tempering strategy in a number of the DOE case-study buildings. It is not possible to know quantitatively how well the natural ventilation systems performed. Some problems have, however, been identified. A number of assumptions about the paths that interior ventilating currents would take in order to cool and/or ventilate the space effectively were found to be inaccurate. Particularly, expectations were not substantiated when currents were assumed to turn corners or travel along indirect pathways to create comfortable conditions and save energy. Care must be taken to assure that shading devices do not obstruct apertures intended for air flows. Manually operated ventilation-control strategies can work and are particularly effective when they are familiar, close to the affected user, and simple to understand and operate.

The most efficient case-study buildings integrated passive systems with conventional systems
All the buildings in the program integrated passive heating, cooling, and daylighting techniques with conventional hvac and lighting systems. Since passive and conventional systems usually shared the requirements for maintaining space comfort and adequate lighting, the highest energy savings were realized where the integration of those systems was carefully thought through by the designers and managed well by the building occupants. In particular, the best ones were designed to avoid competition between passive and conventional systems intended for the same purpose. If artificial lighting systems are not controlled to be dimmed or shut off when adequate daylight is available, the energy-saving potential will be lost, and worse, the spaces may overheat or experience high electrical-demand charges. Similarly, mechanical heating systems that maintain comfort by providing short bursts of high-temperature air may overpower the radiant heat provided by Trombe walls or other passive heating devices. This is particularly true since the conventional systems are controlled by thermostats that respond to dry-bulb temperature, while the passive systems may rely on steady flows of a moderate quantity of radiant heat. Mechanical cooling systems should also be considered when juxtaposed with natural ventilation systems or techniques making use of building mass and circulation of cooler night air. In most projects, this interface did not prove to be problematic. In fact, in many projects the mechanical heating or cooling systems were shut off for large portions of the year because the passive techniques were capable of maintaining adequate space comfort.

It is noteworthy that manual controls were sometimes more energy conserving than automated devices. This was particularly true in those buildings where users perceived a greater level of control of the interior environment. Frequently, this resulted in the users voluntarily setting temperature or lighting conditions below those normally assumed by building designers.

For maximum savings, passive strategies must be easy to understand—and to use
Most project teams spent a considerable amount of time during the design process to refine the passive techniques that would be used in the buildings and to make them as simple as possible. This proved to be time very well spent. Those projects that made use of simple solutions and did not place unusual requirements on building occupants for successful operation were well accepted, performed satisfactorily, and did not prove difficult to maintain. In fact, in many cases the building maintenance personnel responded very favorably to these buildings because they were easy to understand and operate.

By contrast, some techniques were used that required daily adjustment or used complex motorized controls. These proved frustrating to building personnel and were sometimes maintenance problems. For example, a few projects used operable insulating shades that did not prove durable enough for use in commercial applications. They required substantial maintenance on the part of building personnel, and usually resulted in the devices being used less regularly over time. People proved willing to perform routine operations provided that they were easy to understand, the effects could be seen or felt, and the operations were not disruptive to other building operations. Adjustments that were necessary only on a seasonal basis were usually well accepted. For example, when Trombe wall vents needed to be adjusted only in the spring and fall to accommodate the change from the heating to the cooling season, they did not usually prove to be a problem. In a few projects, multiple mechanical distribution devices with sensitive construction tolerances were used; these almost always proved to be problems.

The program reaffirmed that occupants are often the most complex elements in commercial buildings. In buildings where occupants and maintenance personnel could easily understand the reason for the inclusion of passive features and the way in which they were intended to operate, few problems existed. When people either misunderstood or disregarded the passive elements in the building, problems inevitably arose. In some projects, for example, occupants placed plants and books on the light shelves, compromising their function as daylighting devices. In other projects, it was the routine response of building users to turn on artificial lights even when they were not needed. This was most easily overcome by orientation sessions in which the designers explained the intended use of the building and building occupants became comfortable with the way in which the passive systems were intended to operate. When a level of confidence and trust developed on the part of building occupants, daylighting and passive heating or cooling devices were well accepted.

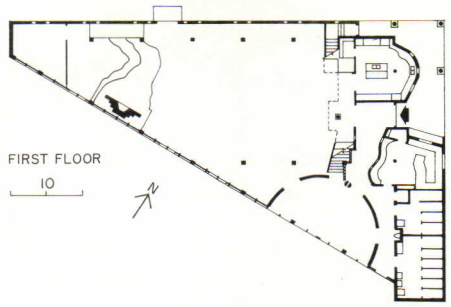
Case-study buildings did not cost more to build than conventional buildings of the same type
Although a great deal of time has been spent in the past trying to isolate the incremental increase in first cost of solar buildings or components, it can easily be argued that, in the end, it is the total cost of a building that is of most concern to owners. Once a building budget is established, it is the goal of the design team to bring in a building that meets the owner's needs within the budget prescribed. The choice of specific building elements is left to the design team. It is their responsibility to trade off various building elements to arrive at a cost-effective solution.

In this context, then, it was decided that the most valuable analysis of passive solar construction costs would be a comparison of total passive building costs (per sq ft) to typical conventional building costs. The cost per sq ft of each passive solar building was computed from actual construction documents. This cost was then compared to a range of typical building costs (for similar building types) according to statistics compiled by either R. S. Means, F. W. Dodge, or both. The comparison was done for the actual year in which the building was built, to reduce any inflation effects, and was adjusted for building size and region where possible. In all, comparative data were available for 13 of the 15 new buildings completed in the commercial building program.

Of the buildings studied, 10, or 75 per cent, fell within or below the range of typical costs for conventional buildings of the same type. Specifically: two buildings fell below the range of typical costs; four buildings fell within the range of typical costs but *below* the median for either Means or Dodge; four buildings fell within the range of typical costs but *above* the median; three buildings fell above the range of typical costs. Of the three buildings that fell above the range of typical costs, all fell within the owners' budget expectations. Although a comparison to national average figures cannot account for specific building characteristics or amenities, the fact that three-quarters of the passive solar buildings in the program fell within a reasonable range of first costs for comparable buildings indicates that passive solar buildings need not cost any more to construct than conventional buildings.

Finally, the building occupants seemed to like the energy-conserving buildings
Construction and operation costs aside, over-all satisfaction among users was high with all buildings in all seasons of the year. In fact, the popularity of some buildings led to longer hours of operation and significantly increased occupancy levels. Most users liked the appearance of the buildings and felt that the solar design had a positive effect. Satisfaction with lighting was consistently high among the wide variety of daylighting solutions. Daylighting was used in 100 per cent of the designs. Users spontaneously mentioned their delight in the daylighting.

Shelly Ridge Girl Scout Center



Otto Baitz photos

Girl Scouts in the Philadelphia area can now earn solar-energy and conservation merit badges. This new merit badge was developed at the Shelly Ridge Girl Scout Center, where children learn about passive solar systems, active solar collectors, and a variety of energy-conservation techniques first-hand.

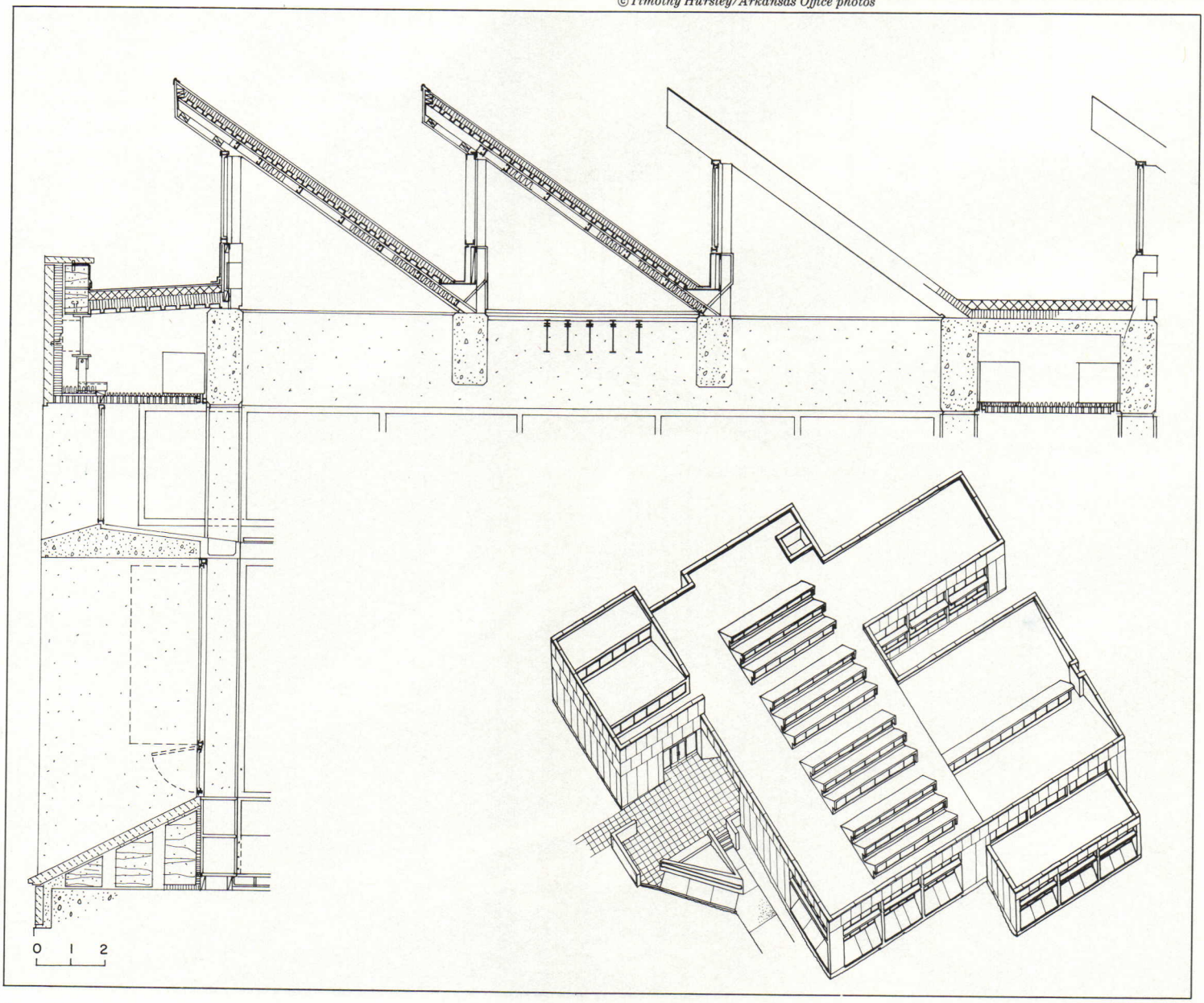
The form of the center derives from earth/sun geometries, prevailing winds, and existing structures on the site. The building required a major solar exposure for heat and light. The design that resulted has a two-story southern exposure combining thermal mass and glazing (see photos bottom left and right). A 4-in.-thick brick wall 860 sq ft in area, integrated into a structural timber grid, provides the optimum interior mass for the short heat lag appropriate to the early morning and late afternoon uses the building supports during the school year. Set into and above the masonry wall are 960 sq ft of clear glazing. The glazing above the wall is of double thickness and is equipped with insulating shades to control heat loss and to darken the room for audiovisual functions. The smaller windows set lower in the solar wall for light and view are triple-glazed. A system of crank-out awnings shades the solar wall in the summer.

The northwest and northeast sides of the building are shorter and lower to shed the prevailing winter winds. These factors, plus the need to relate to the access road, the utility network, and the other buildings comprising the master plan, led to the triangular plan. The main central space, rising two stories, is open to accommodate large groups and allow for even ventilation and heat distribution. It is surrounded by smaller support areas: office, kitchen, storage areas, and lunch rooms. A multipurpose sleeping loft was added to the space above the support areas.

Shelly Ridge Girl Scout Center
Philadelphia, Pennsylvania
Owner:
Girl Scouts of Greater Philadelphia
Architect:
Bohlin Powell Larkin Cywinski
Solar design consultant:
Burt Hill Kosar and Rittelmann Associates

Mt. Airy Public Library

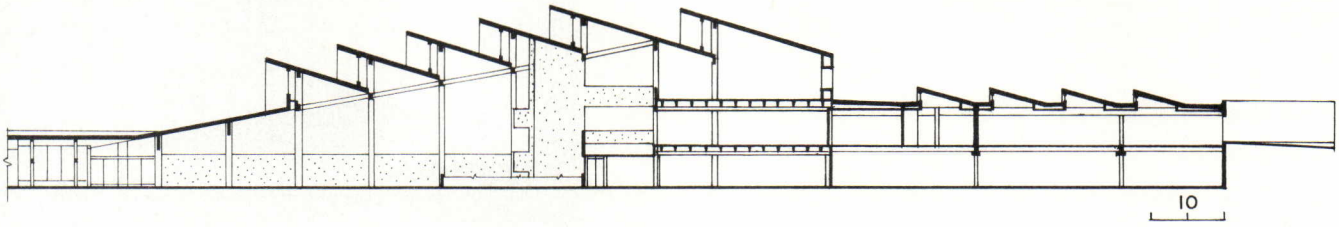
©Timothy Hursley/Arkansas Office photos



Located on a south-sloping site near City Hall, the library serves a North Carolinian community of 7,000. Since it is primarily a day-use facility, the design team determined that an effective daylighting system would be the best energy-conservation technique. In providing the desired levels and quality of light, a clerestory system was used that admits glare-free, diffuse light to all major library areas. In addition, the library has south-facing windows for side lighting and views (see section and axonometric). A typical window unit in the south wall has a light shelf above the viewing frame that reflects sunlight onto the ceiling, thus distributing diffuse light to adjacent areas. The light shelf prevents direct-beam illumination of any of the interior areas. Although more than half of the heating requirement comes from the sun through the apertures, glare and "hot spots" in the well-insulated building (and the adverse effects of light on the books) are avoided by baffles that absorb the ultraviolet light and scatter the sun's direct rays before they reach occupied spaces. Auxiliary conventional building systems include fluorescent and task lighting and five air-to-air heat pump units.

Mt. Airy Public Library
Mt. Airy, North Carolina
Owner:
City of Mt. Airy Board of Commissioners
Architect:
J. N. Pease Associates
Solar design consultant:
Mazria/Schiff and Associates

Walker Field Terminal



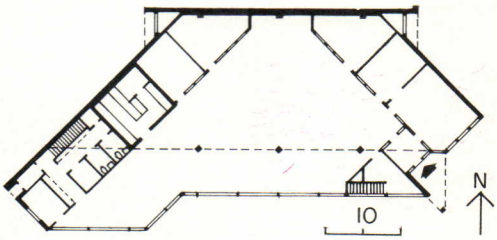
Dave Marlow photos

With 5,600 heating degree days per year, intuition suggested that space heating would be the primary energy problem for this airport terminal in the Rocky Mountains. However, preliminary analysis showed that lighting was a more important factor from the standpoint of cost. Therefore, the design team developed a clerestory strategy effective in providing solar gain for both lighting and heating.

Because of large diurnal temperature swings during most of the year, the terminal's structure was carefully designed to effectively store and distribute solar heat. Thermal mass was used in the form of masonry interior walls, stairs, and expansive tile floors. The hvac system is specifically designed to circulate solar heat. Ductwork at the top of the clerestories captures stratified solar heat to redistribute during the heating season, or vent during the cooling season. The venting system can also be used to reduce the summer air-conditioning load by bringing in cold night air to precool the building mass. An evaporative cooling system works with the night ventilation to meet any remaining cooling need.

Walker Field Terminal
Grand Junction, Colorado
Owner:
Walker Field Airport Authority
Architect:
John Porter & Associates
Solar design consultants:
Jan Kreider & Associates;
Phillip Tabb Architects

Security State Bank



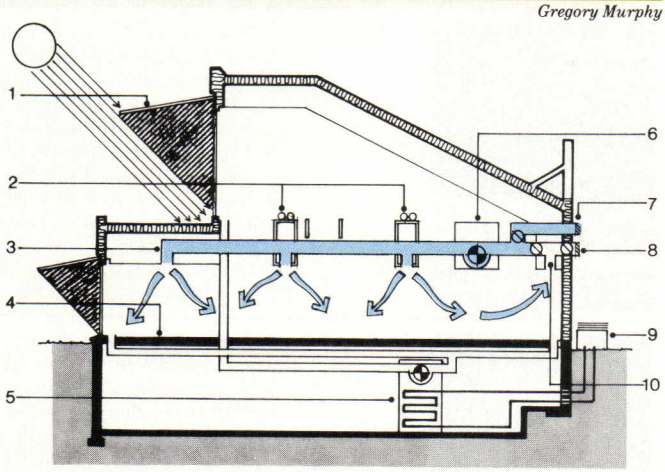
Gregory Murphy

As an energy performer, this bank in a small agricultural town in Minnesota functions like a thermos-bottle, retaining heat in the winter and rejecting it in the summer. Heavy insulation and tight construction account for most of the savings for heating and cooling. But the big difference between the Security State Bank and its conventional rivals is the daylighting system: The building is designed to use less than one-tenth of the energy for lighting of what comparable buildings would use.

Clerestory windows provide most of the task and ambient lighting. A baffling system of two 3- by 5-ft box beams spans the length of the building and houses the hvac ducts and the back-up fluorescent lighting system. A smaller, lightweight baffle grid is suspended between the larger baffles to further diffuse the natural light.

Although the cooling system is not passive, it provides maximum control and economy of operation. The thermos-bottle effect, coupled with the reduction in undesirable solar gain by the awnings, allows the use of 100 per cent outside air far into the normal cooling season. For the high cooling season, a high-volume, high-velocity economizer system was installed. This economizer fan and high-velocity duct system is "piggybacked" onto a conventional direct-exchange air-conditioning unit and standard-volume multizone air handler.

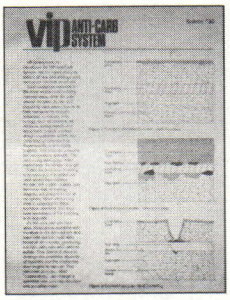
Security State Bank
Wells, Minnesota
Owner:
Security State Bank
Architect:
Eugene E. Hickey & Associates
Solar design consultant:
John Weidt Associates



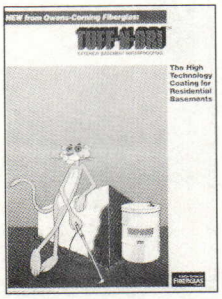
1. *External shading device*
2. *Photocell-controlled ambient*
3. *High-velocity air supply*
4. *Concrete floor*
5. *Multizone air handler*
6. *High volume fan*
7. *Fresh air inlet*
8. *Relief air outlet*
9. *Dehumidification and supplementation*
10. *High-velocity air return*

Product literature

For more information, circle item numbers on Reader Service Card

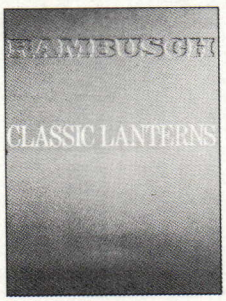


Concrete protection
The *Anti-Carb* system, a line of five acrylic-based products designed to repair and protect new and existing steel-reinforced concrete structures, is described in a 2-page flier. The corroding carbonation that occurs when gases and moisture in the air react with calcium hydroxide in the concrete is discussed. VIP Enterprises, Inc., Miami.
Circle 400 on reader service card

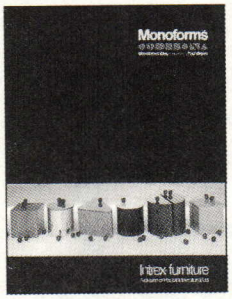


Basement waterproofing
A 6-page color brochure features *Tuff-N-Dri* polymer-composition coating, designed to bridge shrinkage cracks in basement foundations. The coating's adhesion to concrete, water vapor permanence, and low temperature flexibility are reviewed. Owens Corning Fiberglas, Toledo.
Circle 401 on reader service card

Product information system
The *Showroom Online* product information system, which consists of a standard IBM PC and two display screens, is described in a 6-page color brochure. The system has a database of 400,000 interior furnishing products that can be retrieved and displayed on the screen. Showroom Online, New York City.
Circle 402 on reader service card



Lanterns
A 16-page color catalog features eight hanging lanterns in various historic styles designed for interior applications. Photos of each line are accompanied by a listing of dimensions and available finishes. Lantern photometric curves are included in the literature. Rambusch, New York City.
Circle 403 on reader service card



Tables
The *Monoforms* line of low tables designed by Paul Mayén is featured in a 34-page color catalog. Photos of the drum, split-drum, oval, cubic, hexagonal, and triangular tables available with wood veneer, polyester resin, and polished aluminum finishes are shown. Intrex Furniture, Div. of Habitat International Ltd., New York City.
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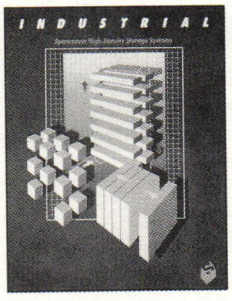
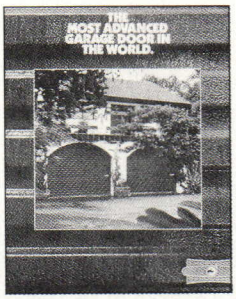


Industrial storage system
The manufacturer's vertical storage and retrieval systems are reviewed in a 16-page color brochure. Hand- and electronically controlled systems for offices, supply rooms, receiving areas, and record storage are shown and described. A diagram of a typical mobile carriage unit is included. Spacesaver Corp., Ft. Atkinson, Wis.
Circle 405 on reader service card

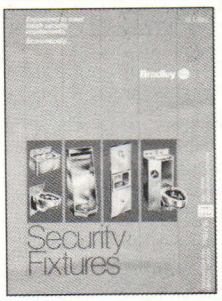
Reinforced cement panels
Glasweld cladding and fiber-reinforced cement curtain-wall panels are described in an 8-page color catalog. Wind-load resistance and additional performance data are reviewed. A diagram of a panel installed in a typical aluminum curtain-wall system is included in the literature. GII Corp., Reading, Pa.
Circle 406 on reader service card



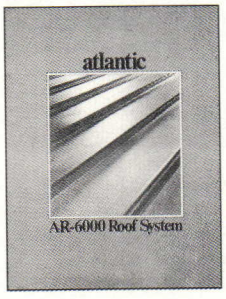
Garage door
The manually operated or remote-control galvanized steel curtain *Roll-A-Door* garage door is featured in a 4-page color brochure. Photos of several different models, which can fit square or rounded openings up to 18 ft wide, are shown. Porvene Roll-A-Door, Santa Fe Springs, Calif.
Circle 407 on reader service card

Kitchen and bathroom fixtures
A line of Danish-designed kitchen, bar, and bathroom fixtures and fittings is featured in a 4-page color brochure. Several 12- and 15-in.-dia self-rimming sink basins, available in stainless steel, satin, or mirror finish, and in a selection of enamel colors, are shown. ABBAKA, San Francisco.
Circle 408 on reader service card

Hardwood flooring
A line of hardwood parquet and plank flooring is featured in a 16-page color brochure. The manufacturer's *Squar-Edge* construction, said to eliminate the need for on-site sanding, is reviewed. The grade, panel size, and wood species of each pattern are listed in the literature. Masonite Corp., Warren, Ark.
Circle 409 on reader service card



Security fixtures
A 44-page catalog reviews the manufacturer's line of security lavatories, lavatory/toilet combination units, drinking fountains, toilets, service sinks, showers, and security accessories. Diagrams show dimensions of each unit. Charts list specifications and optional features. Bradley Corp., Menomonee Falls, Wis.
Circle 410 on reader service card



Roof system
The *AR-6000* standing-seam roof system, intended for buildings with low-profile roofs, is featured in a 4-page color catalog. The system's panels are secured by concealed clips, which are said to reduce heat transfer. Photos and diagrams are included. Atlantic Building Systems, Inc., Atlanta.
Circle 411 on reader service card
Continued

Product literature *continued*

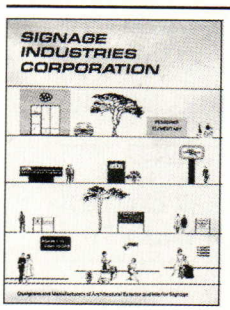
For more information, circle item numbers on Reader Service Card

Luminaires
The manufacturer's *Aktra II* cut-off luminaires for outdoor lighting applications are featured in a 4-page brochure. Housing, reflector, ballast, lens, and mounting specifications are reviewed. Diagrams of typical light distribution patterns are included. Wide-Lite, San Marcos, Tex.
Circle 412 on reader service card

Fire sprinkler system
The *BlazeMaster* fire sprinkler system, made of the manufacturer's own brand of thermoplastic, is featured in a 6-page color brochure. Photos and information on the handling, storage, and installation of the pipes and fittings are included in the literature. BFGoodrich, Chemical Group, Cleveland.
Circle 413 on reader service card

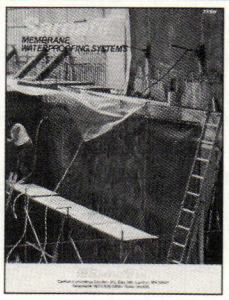
Modular furniture
The *Con-tour Group* of modular furniture is featured in an 8-page color brochure. Cushioned seating, tables, planters, trash receptacles, and display cases with precast concrete bases are shown in several configurations. Shōgun International Corp., Chicago.
Circle 414 on reader service card

Precast concrete
A 12-page color brochure reviews the thermal efficiency, structural elements, and available surface finishes of the manufacturer's exposed aggregate precast concrete. The components of the anchoring system are described in the literature. Photos show sample installations. Mo-Sai Institute, Inc., Salt Lake City, Utah.
Circle 415 on reader service card

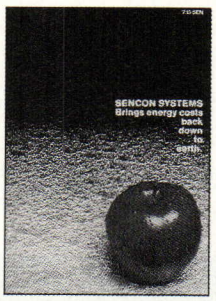


Signage
The manufacturer's line of signage is featured in a 16-page catalog. Acrylic-faced, backlit, and custom-plated exterior-mounted signs, and post or panel directional and informational signage for interior and exterior applications are shown. Signage Industries Corp., Greensboro, N. C.
Circle 416 on reader service card

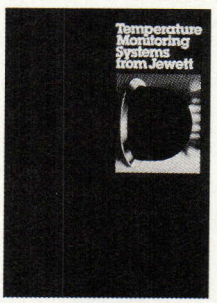
Steel framing systems
Structural and screwable steel framing systems are reviewed in a 28-page catalog. Tables list joist spans and maximum allowable concentrated loads, permissible loads for standard flange studs, and combined axial and wind loads for Cee and standard- or wide-flange studs. Western Metal Lath Co. La Mirada, Calif.
Circle 417 on reader service card



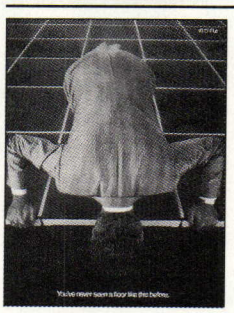
Membrane waterproofing
The manufacturer's reinforced PVC waterproofing membranes, designed to protect foundations, tunnels, and other below-grade structures, are featured in a 4-page color brochure. Diagrams show construction details of single- and double-membrane systems. Sarnafil Inc., Canton, Mass.
Circle 418 on reader service card



Exterior insulation system
The *Sencon* expanded/extruded polystyrene exterior insulation system is described in a 16-page color brochure. The system's hard-coat cement finish is said to eliminate air infiltration and moisture penetration and minimize interior temperature fluctuations. Sencon Systems, Inc., Northbrook, Ill.
Circle 419 on reader service card

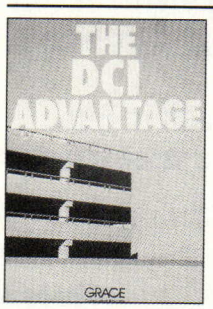


Temperature-monitoring systems
A 6-page brochure describes the manufacturer's line of temperature monitoring and power monitoring systems. Specifications and warning ranges for each monitor are discussed in the literature. Diagrams show system components. The Jewett Refrigerator Co., Inc., Buffalo, N. Y.
Circle 420 on reader service card



Access flooring system
The *Access 2000* flooring system is featured in an 8-page color brochure. The system's 24-in.-sq reinforced-concrete raised floor panels are designed to hide hvac and electrical cables and are said to eliminate the hollow sound or flexing of less rigid floor systems. Floating Floors, Inc., Toledo.
Circle 421 on reader service card

Monorail
The electric *Monorack*, designed to provide access to terraced housing, and detached houses or remote camps on sloped sites, is featured in a 6-page brochure. Track design and routing are described. Diagrams of the three vehicle types are included. Von Roll Habegger of America, Inc., Watertown, N. Y.
Circle 422 on reader service card



Corrosion inhibitor
An 8-page color brochure describes the advantages of the manufacturer's *DCI* calcium-nitrite-based concrete corrosion inhibitor. Product test results and suggested applications are reviewed in the literature. W. R. Grace & Co., Cambridge, Mass.
Circle 423 on reader service card

Ask a roomful of architects about rubber studded flooring, and you'd better be prepared to take some abuse.

A lot of architects have strong feelings about rubber studded flooring. And who can blame them? They've been victimized by inferior products that failed to stand the test of time.

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They tried and tried, but they barely scratched the surface.

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They poured sulfuric acid on it. Lysol and table salt. Hydrogen peroxide and soda pop. Twenty-four hours later, Endura showed no visual or physical changes. Damp mopping made it glow.

When it comes to rubber studded flooring, be specific.

Anaheim Stadium was. When they wanted to reduce the frequency of injury due to slips and falls, they specified Endura – 200,000 square feet of it. (And not a single fall has been reported since.)

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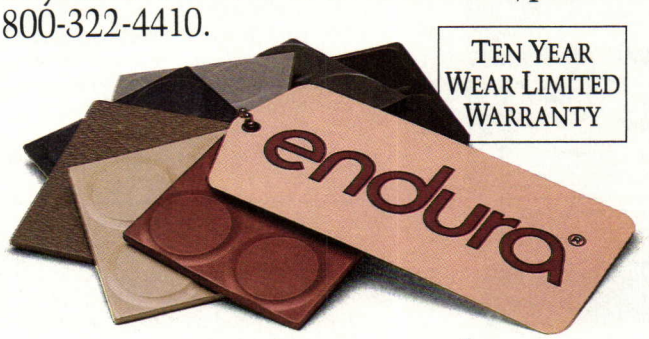

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Neocon Space # 1055

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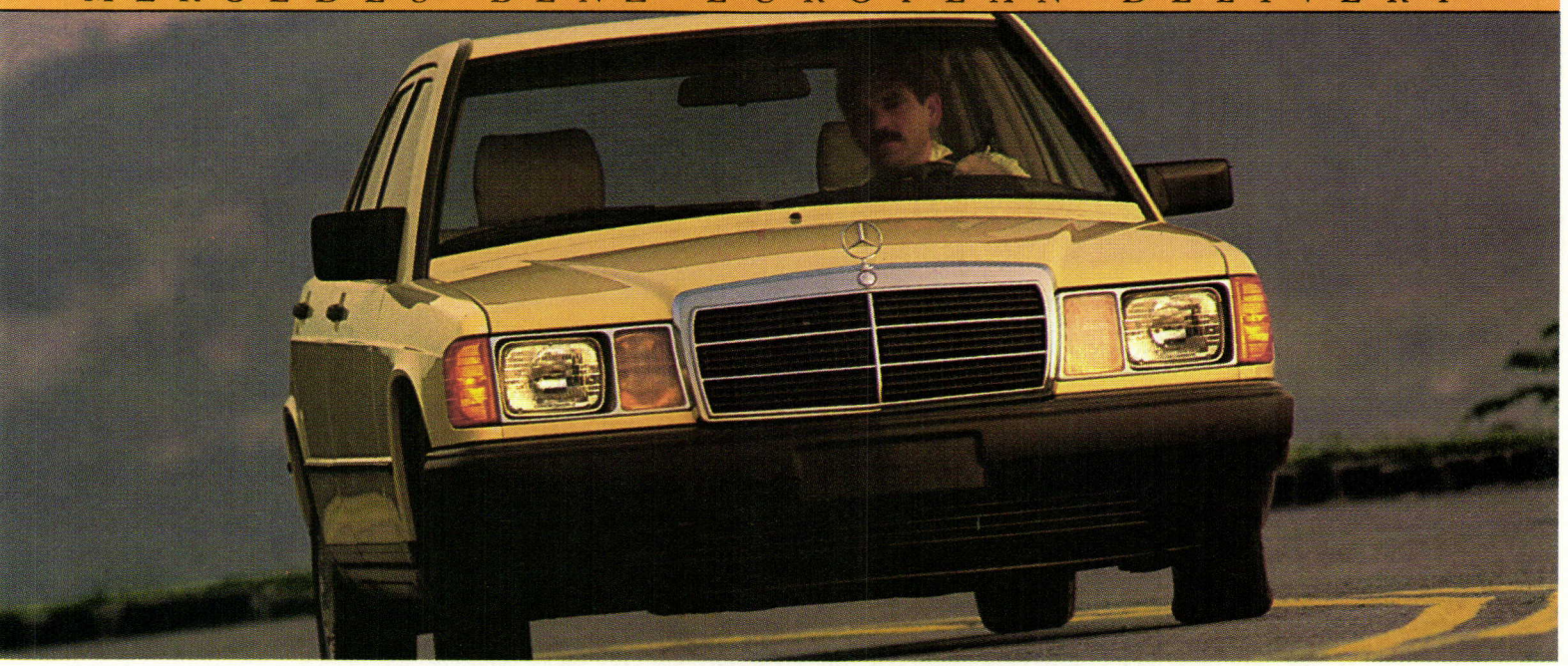

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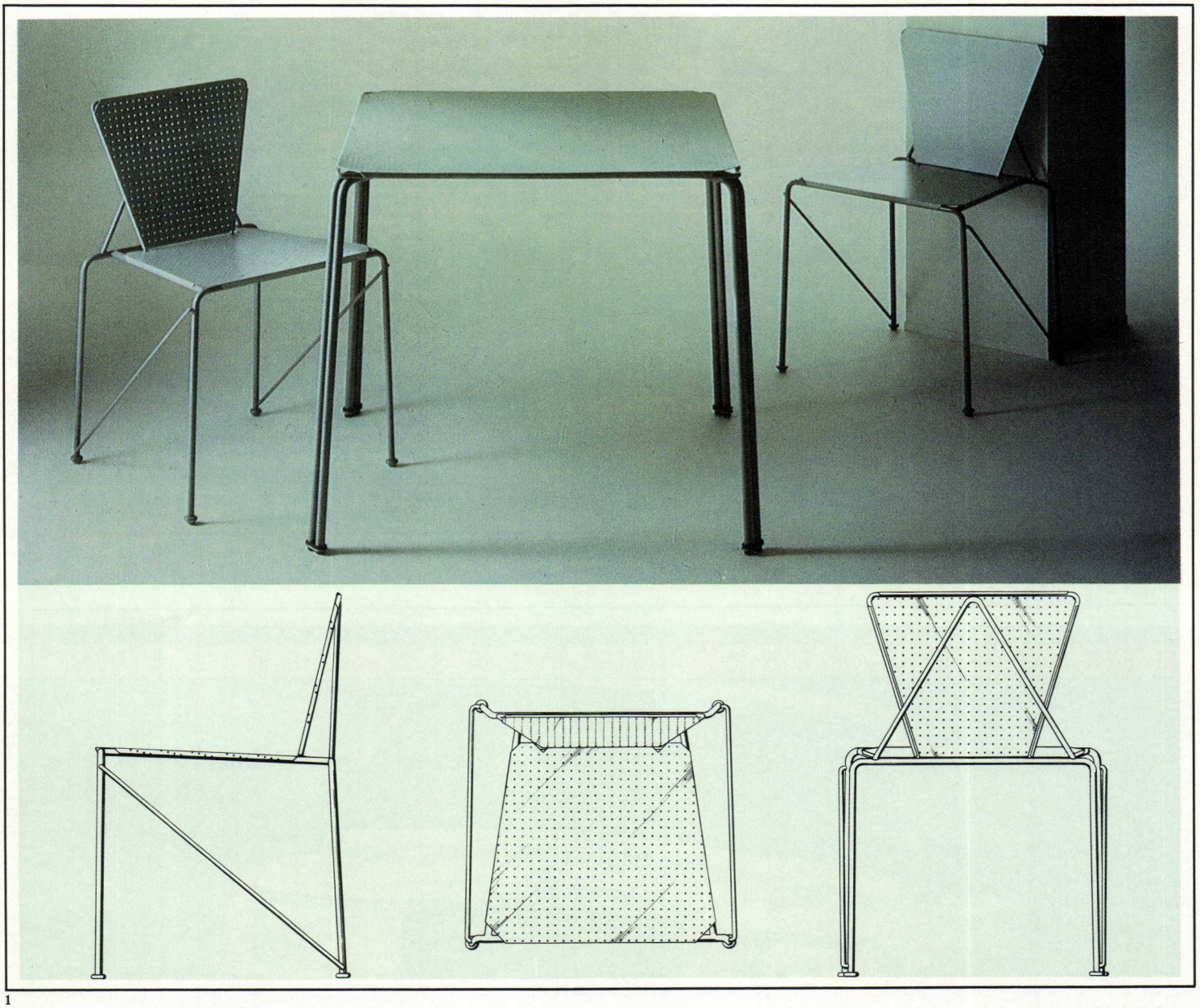
New products

Studio Azzurro



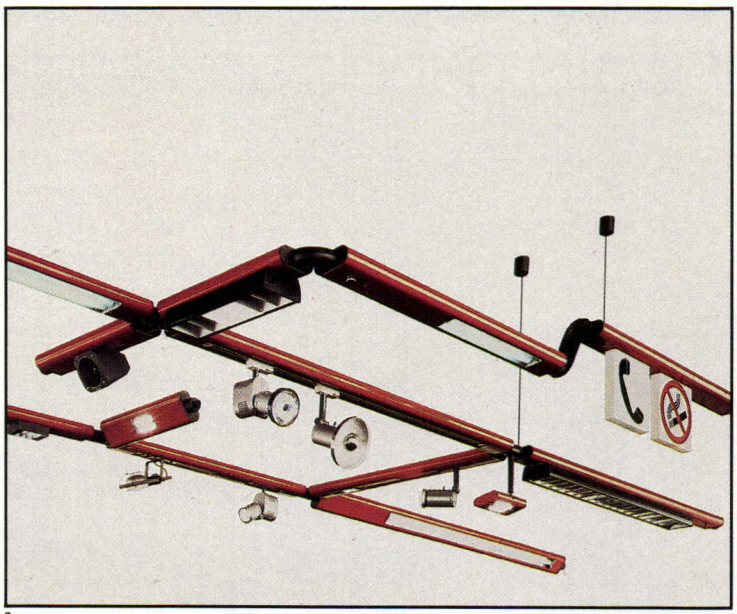
1

West Week 1985
During late March the nation's contract furniture manufacturers, invited speakers, and the design press converged on the Pacific Design Center in Los Angeles to join with local designers for West Week 1985. Some 12,000 professionals and students spent three days touring showrooms and attending lectures at one of the contract industry's "big three" markets—which also include NEOCON in Chicago and Designer's Saturday in New York. Although the schedule makes it difficult for manufacturers to unveil truly new products every four months, many did introduce additions to existing collections or promoted the first regional showing of products introduced earlier in Chicago or New York. Several such items are featured on these pages.

1. The *Tux* collection of indoor and outdoor chairs and tables—manufactured by Bieffeplast of Italy, available in Los Angeles and New York City through Furniture of the Twentieth Century and GHI Inc., and formally introduced at West Week—was designed by British architect Paul Haigh. Haigh's intention was to create "polemic" furniture suitable for mass production. Toward that end he utilized the symbolism of industrial manufacturing—a tradition inherited from the Bauhaus—while exploiting the expressive potential of materials and structure. The epoxy-coated tubular steel frame of the chair and table, for example, is exposed at the corners to reveal the mass-producible skeleton and create a sleek, high-tech look. Computer-generated perforations taper along the edges of the chair seat and back, showing that the latest technology can also inspire new forms of decoration.

Although Haigh's interest in production clearly affected his designs, he credits the manufacturer for isolating him from the manufacturing process itself, an involvement that he claims would have surely led to his "death" as a furniture designer. In this case, the standard four-year lapse between design and mass production was cut in half so that the collection was available just two years after Haigh's initial sketches—a time span more in keeping with the spontaneity of his design.

Several changes or additions have been made to the *Tux* collection since production began last fall, including the introduction of armchairs. Miniature bolts now connect the table top and chair seat and back to the frame, because users in restaurants or other public installations liked the clip-on sheet-steel trays so much, it seems, they were walking off with them. Future *Tux* chairs, moreover, can be specified with the name of a café emblazoned with perforated lettering on the backrest. These new possibilities please Haigh, who claims, quite seriously, that "this stuff is all in good fun." GHI Inc./ Furniture of the Twentieth Century, New York City.
Circle 300 on reader service card



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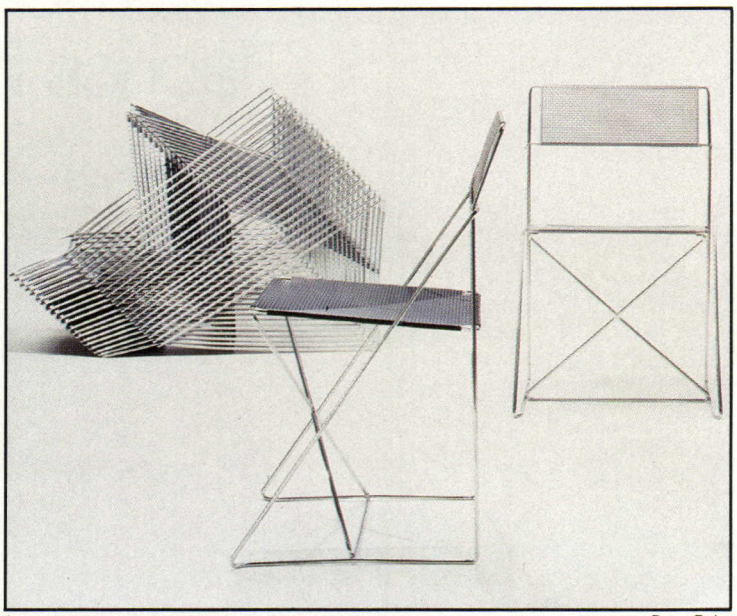
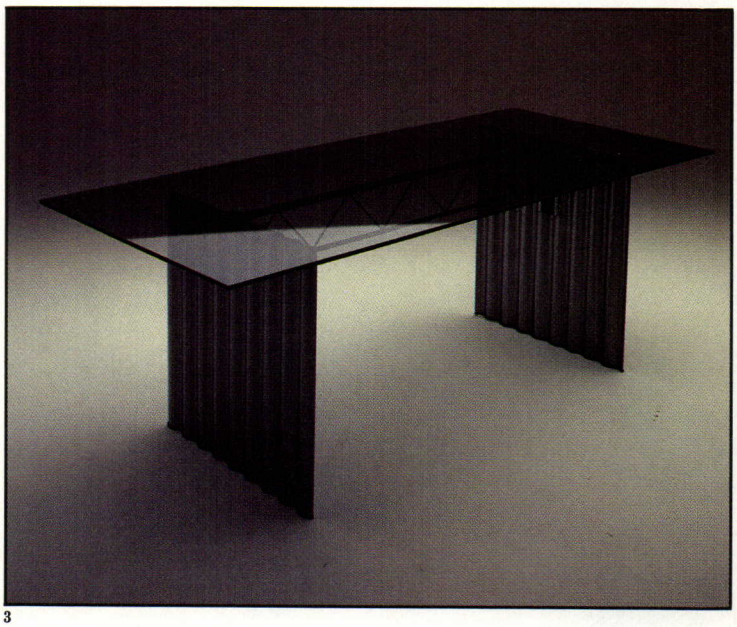


4

Peter Paige



3

5

2. The *Aton Modular* lighting system introduced by Artemide is intended to provide light and electrical power where and as it is needed. Designed by Ernesto Gismondi, the suspended modular components are intentionally exposed so that the source of light is seen as both a functional and decorative system. The extruded aluminum tubes, available in white, black and red, or with an anodized aluminum finish, are hung from the ceiling by steel wires and contain fluorescent or halogen modules with diffusers, dowsers, or grilles and attachments for spotlamps, speakers, signage, and clocks. The modules can be joined by a selection of two-, three- or four-way connectors, including thermoplastic pipes, cables, and ceiling-mounted attachments. Artemide, Inc., New York City.
Circle 301 on reader service card

3. The *Squiggle* series was shown during West Week by the Los Angeles-based firm of Ron Rezek Lighting + Furniture. The series includes desks with or without secretarial returns and a conference table (shown) that features pedestals fabricated of 1/8-in.-thick corrugated aluminum—a reference to corrugated sheet metal that is now receiving widespread acceptance as an indigenous, California material, thanks to Venice architect Frank Gehry. The desk and table frames are bonded with a plastic skin and are connected by a folded steel beam. The glass or laminate table tops rest on the frames. A raceway, designed to conceal wires, is attached along the front edge of the desk. Ron Rezek Lighting + Furniture, Los Angeles.
Circle 302 on reader service card

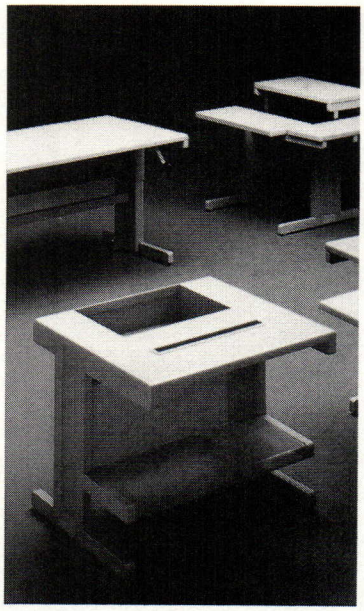
4. The *Network* stacking chair designed by Danish architect Niels Jorgen Haugesen for ICF is intended for both indoor and outdoor use. The frame is constructed of chromium-plated solid bar steel, and the seat and back are made of black, gray, or white epoxy-coated perforated steel. The chair is 19 1/2 in. wide, 17 1/2in. deep, and 30 1/2 in. high. ICF, Inc., New York City.
Circle 303 on reader service card

5. Three new two-way stretch fabrics are now available from Knoll Textiles. *Fife, Flex,* and *Oslo* can be specified on the manufacturer's *Diffrient* line of pneumatically adjustable office chairs. All three fabrics are 45 in. wide, are made of wool, silk, nylon, and lycra combinations, and are available in a selection of colors. Knoll Textiles, Div. of Knoll International, New York City.
Circle 304 on reader service card
West Week products continued on following pages

Another Original by **Vicrtex...**

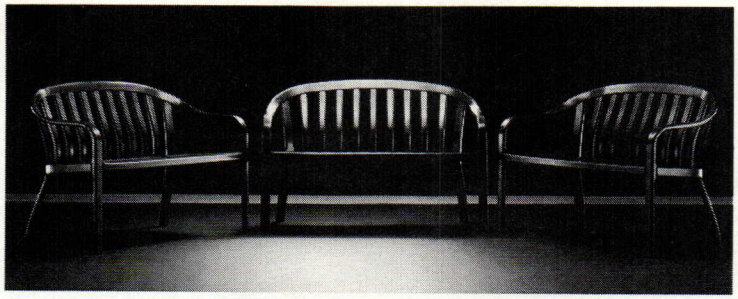
A revolutionary concept in coordinated fabrics for walls, panels and seating

Continued from page 169

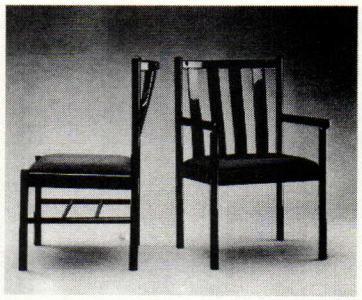


Computer-support furniture
The manufacturer's line of computer-support furniture includes CRT tables with either single or double adjustable surface tops, a printer table, an articulating keyboard shelf that can be attached to freestanding or panel-supported work surfaces, and a mobile pedestal. Shaw-Walker, Muskegon, Mich.
Circle 305 on reader service card

Chair
The *Duo* chair was designed by Werther Toffoloni and is constructed of solid beechwood. The chair is available in two models: one features a backrest with vertical wooden dowels, and the other has a padded, bentwood panel that is upholstered on both sides and doweled into the backrest frame. Atelier International, New York City.
Circle 306 on reader service card



Bench
The *Courthouse* bench is the newest addition to the manufacturer's chair collection of the same name. The two-seat, walnut bench is 50 in. long, 23 1/2 in. deep, and 33 1/2 in. high and is available in a selection of finishes. The Gunlocke Co., Wayland, N. Y.
Circle 307 on reader service card



Chairs
Bridgehampton side and armchairs designed by Davis Allen are additions to the manufacturer's *American Furniture Classics* collection. The chairs are constructed of beech and are available with upholstered or woven cane seats. Stendig International, New York City.
Circle 308 on reader service card
Continued on page 175

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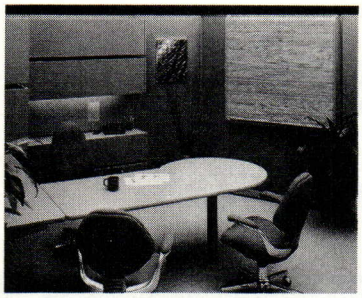
Continued from page 173

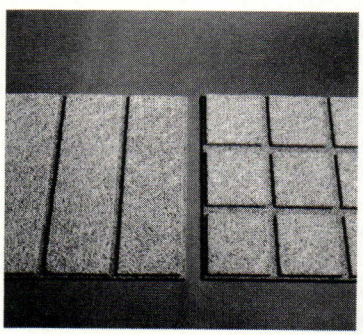


Work surfaces
The manufacturer introduced two new *Convergent Work Surface* configurations at West Week. Designed to support electronic equipment or to be used for conferences, the work surfaces come in D- and P-shaped units with half-round ends. Several widths and lengths are available. Haworth, Inc., Holland, Mich.
Circle 309 on reader service card

Sofa
The *Oxford* collection of furniture intended for public lounge areas and executive offices includes an armchair, a two-seat sofa (shown), and a three-seat sofa. The units have hardwood frames supporting polyurethane foam cushioning. Monel Contract Furniture Inc., Oakland Gardens, N. Y.
Circle 312 on reader service card

Furniture
The *Zapf Collection*, named for its designer Otto Zapf, includes two armchairs and sofas, a settee, and coffee and end tables. The *His* and *Her* armchairs and sofas have slightly different scales intended to be visually compatible and to fit people of different sizes. SunarHauserman, Norwalk, Conn.
Circle 313 on reader service card
Continued on page 177

Wash fountains
The manufacturer's line of *Sanispray* stainless steel and aluminum wash fountains are prepiped and preplumbed. The wash fountains are available in six sizes accommodating three to eight users at round, semicircular, and corner units. Intersan, Tempe, Ariz.
Circle 310 on reader service card



Acoustical ceiling panels
Linea and *Linea Plus* are the manufacturer's two newest acoustical ceiling tile patterns. Both lines are available in sizes ranging from 2 by 2 ft to 2 by 8 ft and can be specified in a beige or white finish. Tectum Inc., Newark, Ohio.
Circle 311 on reader service card

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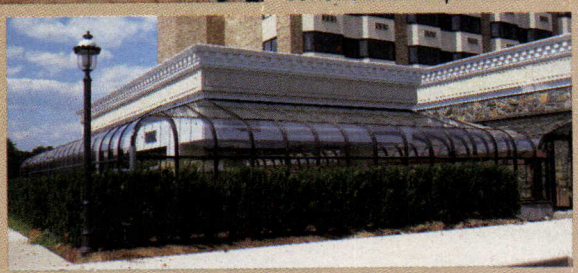

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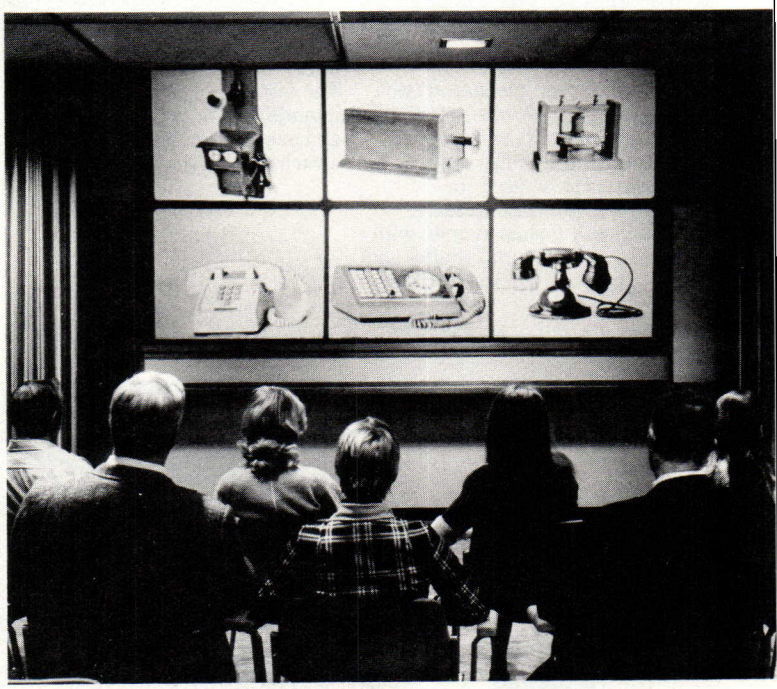

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Designers of the Harvard University Science Center, the Gulf Oil Building in Pittsburgh, the National Bank of Detroit's Renaissance Center offices and the Wisconsin Telephone Company headquarters (above) all have one thing in common. They specified Da-Lite projection screens.

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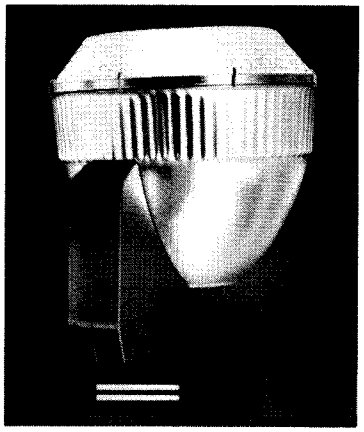
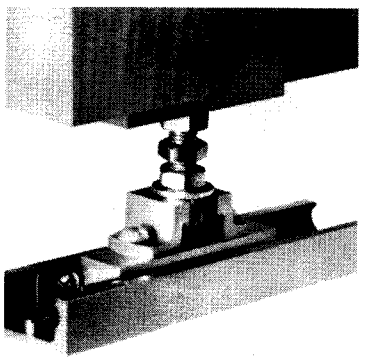
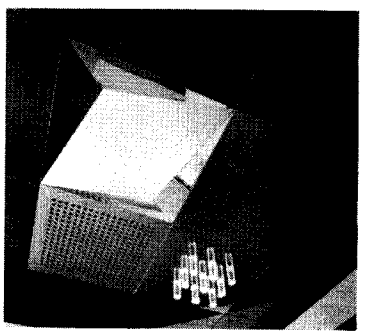
Continued from page 175



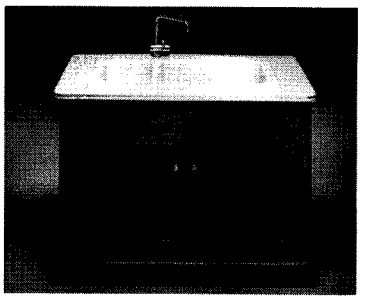
Light fixture
The manufacturer's 100W metal halide *Mini-Hyliter* is intended for low-ceiling industrial, commercial, and institutional applications. The fixture has a die-cast aluminum housing and is 14 3/4 in. deep. The lens is available in molded acrylic or polycarbonate. Guth Lighting, St. Louis.
Circle 314 on reader service card



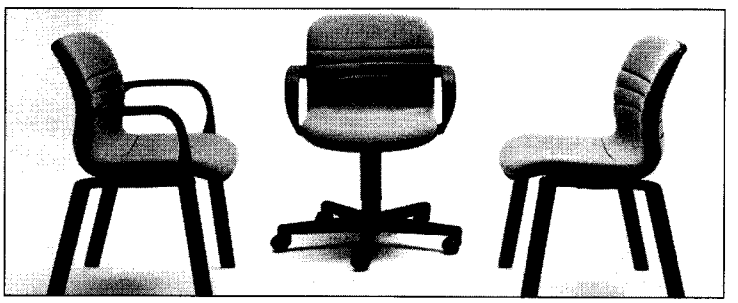
Sliding-door hardware
The manufacturer's *Series 5000* sliding-door hardware is intended for commercial, institutional, industrial, and residential applications. The line includes movable walls, partitions, and sliding glass doors. Five models are available, and all feature continuous ball-bearing action. Grant Hardware Co., West Nyack, N. Y.
Circle 315 on reader service card



Ceiling panels
New additions to the manufacturer's *MirraPlane Group* of ceiling panels include flat mirrored panels with round or square perforations or acrylic rod lenses and faceted panels in a number of designs. The perforated panels come with acoustical backing for sound absorption. Integrated Ceilings, Inc., Los Angeles.
Circle 316 on reader service card



Sinks
A double-basin kitchen sink is made of *Corian*, which is said to resist staining and chipping. Single-bowl and bar sink models are also available. The sinks come in under-mount and top-mount models. DuPont Co. Wilmington, Del.
Circle 317 on reader service card



Office seating
The *Simbio* line of office seating includes executive, manager, operator, and guest chairs. The chairs are available with a five-point star or four-leg base and have a one-piece polyurethane shell. Two control buttons adjust the position of the chair. Castelli Furniture, Inc., Bohemia, N. Y.
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Continued on page 179

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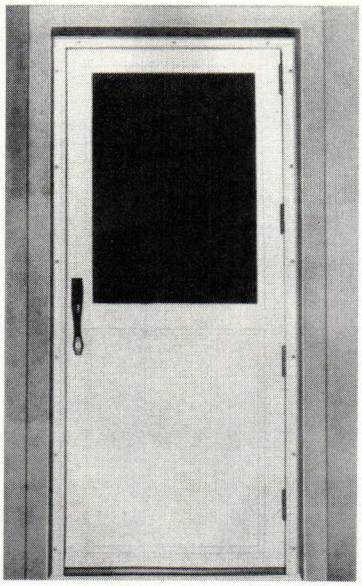
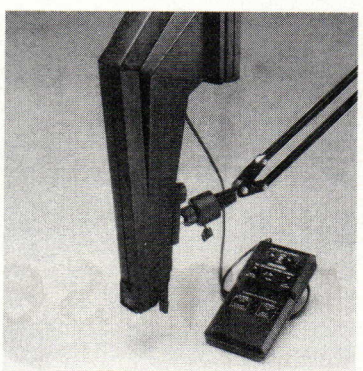
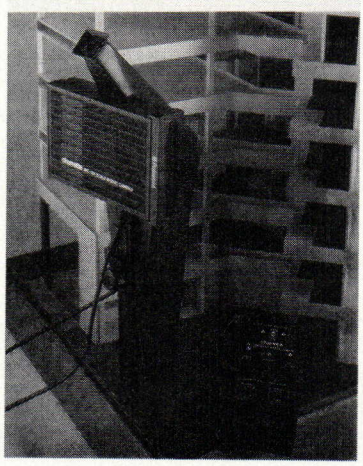
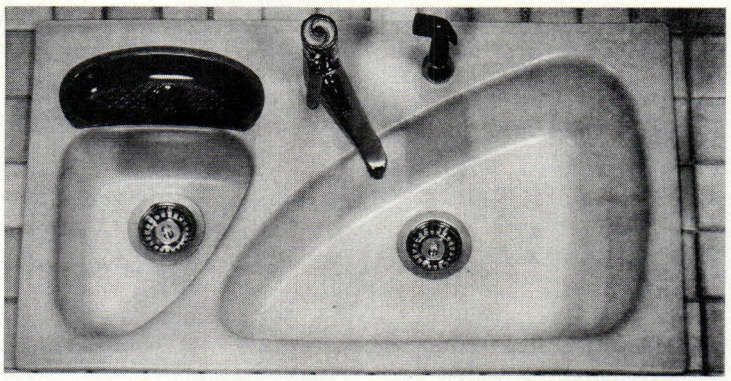


Screen doors
The manufacturer's line of aluminum and steel screen doors is intended for heavy-traffic areas. The doors are constructed of .125-in.-thick aluminum extrusions and can be specified with a selection of wire meshes. Single- and double-leaf models are available. Kane Manufacturing Corp., Kane, Pa.
Circle 319 on reader service card

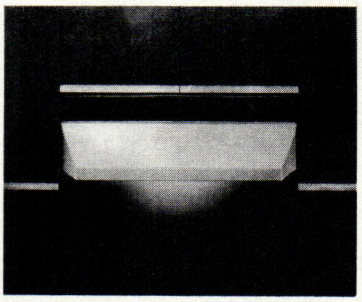




Model camera
The new *Scale Model Camera* allows architects and designers to take interior photographs of their scale models. An extension arm can be positioned inside small models and a hand-held electronic control module monitors camera functions. Black-and-white photographs are produced on Polaroid film. Charrette Corp., Woburn, Mass.
Circle 320 on reader service card



Kitchen sink
The *Splendor* self-rimming double-basin ceramic kitchen sink is a recent addition to the manufacturer's line of plumbing fixtures. The main basin is 20 by 35 in., and the entire unit is available in five colors. Villeroy & Boch, Pine Brook, N. J.
Circle 321 on reader service card



Range hood
The manufacturer's *88000 Series/ Microtek* range hood can be installed ducted or duct-free. The unit features *Heat Sentry* fire protection, has an electronic blower memory, and is available in a selection of sizes and colors. Broan Manufacturing Co., Hartford, Wis.
Circle 322 on reader service card
Continued on page 181

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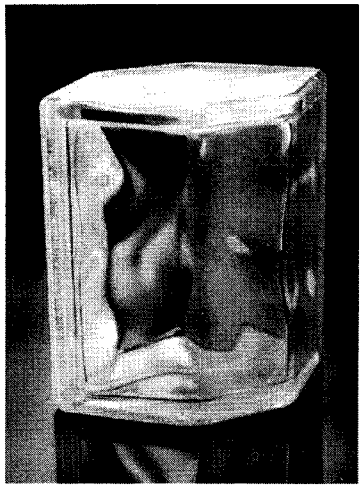
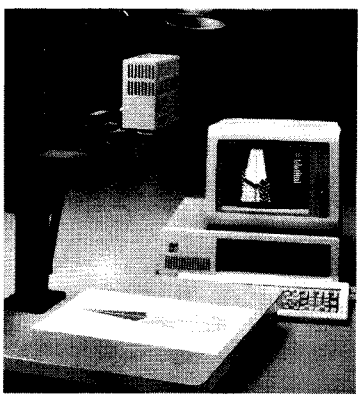
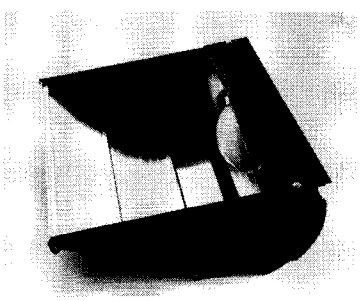


Glass block
Hedron, a new hexagonal-shaped glass block, has been introduced by the manufacturer. The blocks are designed to form the corners of *GlassBlock* panels, walls, and partitions and are available with two levels of light transmission and visibility. Pittsburgh Corning Corp., Pittsburgh.
Circle 323 on reader service card



Digitizing camera
When the manufacturer's *CAD/camera* is pointed at a drawing, it can enter the lines from the image into the computer for future editing. The unit can be used in combination with the manufacturer's microcomputer-aided drafting software. Autodesk Inc., Sausalito, Calif.
Circle 324 on reader service card



Indirect lighting
The *Pan-A-Lux* series of indirect lighting lamps have a segmented, extruded reflector that directs a controlled wash of light at the ceiling. The housing is made of glass-reinforced polymerized gypsum. Metal-halide, high-pressure-sodium, and tungsten-halogen lamps can be specified. The Rambusch Co., New York City.
Circle 325 on reader service card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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 110-113
Brightleaf Square
by Ferebee, Walters & Associates
Pages 110-111—Wall- and pole-mounted lights: Prescolite. Banners: Sharon Sudduth. Storefronts: Hallmark Woodcraft. Pavers: Cherokee Brick. Windows: Pritchard Paint & Glass Co.
Pages 112-113—Downlights: Prescolite. Mercury vapor lighting: NL Corp. Exit signs: Yorklite. Stairs: Custom, fabricated by Hallmark Woodcraft.

Pages 114-115
Spanish Village Addition
by Fred Linn Osmon, Architect
Pages 114-115—Masonry paint: DeerO. Wall lights: Halo. Step lighting: Prescolite. Water fountains: Oasis. Slump block: Superlite Building Products.

Pages 116-117
New Market Theater
by SERA Architects, P. C., AIA
Page 116—(top) Storefront windows: Tom Benson Industries. Entrance: Briteview Doors. Bronze poles: Cipco. (middle) Upward-acting doors: Windsor Door. Paving: Ironrock. (bottom) Skylight: New England Pacific. Paints: Miller Paint.
Page 117—Tube lighting fixtures: Gardco. Tables and chairs: Lowenstein. Glass railing system: Custom by architects. Sprinkler heads: Master Fire Control. Smoke alarms: AUTH. Column marblizing: Glidwall.

Pages 124-131
Offices for the American Academy of Pediatrics
by Hammond, Beeby, Babka
Pages 124-127—Curtain wall: Marmet. Glazing: Cardinal Glass. Entrance: Ellison Bronze. Door pulls: Brookline. Brick: Hanley Brick. Pole lights: Kim Lighting. Railings: Arlington Steel. Metal frame exterior doors: Engineered Erection. Exterior acrylic urethane: Degraco.
Pages 128-129—Atrium glazing: Cyro (Exolite). Terrazzo flooring: J. Carretti. Sconces: Visa. Reception desk: Fabricated by Carrara Marble. Stainless steel counter: Illinois Range Co. Lounge seating: Custom, fabricated by Interior Crafts; Knoll International. Paints (throughout): Sherwin Williams. Air diffusers: Krueger Mfg. Co.
Page 130—Tile: Celotex Ceiling Products. Carpet tile (throughout): Interface. Partitions: Knoll International (Zapf System). File cabinets: Storwal International. Planters: Architectural Objects. Locksets: Sargent. Hinges: Stanley. Closers: Norton.
Page 131—(top) Pendant light: Atelier International. Custom shelving: Barsanti Woodworking Corp. Lay-in lighting: Keene. Table and chairs: Knoll International. (lower left) Wall sconces and recessed lighting: Lightolier. Desk light: Artemide. Custom cabinets: IIL International. Desk

Continued on page 230

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Project Architect position open with growing NorthEast firm. Qualified person should have degree and reg. coupled with 5-8+ yrs. exp. in the supv/coord. of comm., inst., and ind. projects from schematics phases through complete production and successful conclusion. Ability to lead staff and maintain client liaison a must. Firm offers excellent long term prof. and persl. growth. Contact our reps in conf. at: G. Marshall Assoc. — P.O. Box 66083 — Chicago, Il. 60666.

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Senior Designer needed for West Coast firm. Qualified person must have degree and reg. along with proven exp. and reputation in the dsn. of major hotel, office and ed. facilities. Ability to conduct presentations, sketch and assume key design role for the firm is essential. Highly visible position offers excellent comp. and future growth. Contact our reps in conf. at: G. Marshall Assoc. — P.O. Box 66083 — Chicago, Il. 60666.

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Project Architect req. by dsn firm in the South-East. Degree and reg. preferred along with 5+ yrs. exp. in the supv/coord. of comm. inst and indust. projects from schematics through production completion. Ability to supv. staff and production process along with client liaison a must. Contact our reps in conf. at: G. Marshall Assoc. — P.O. Box 66083 — Chicago, Il. 60666.

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POSITIONS WANTED

Architect — with 23 years experience in India, Middle East, Caribbean. Experience in Housing, Schools, Office Buildings, Laboratories, Apt. Hotels. Interested in immigrating to United States/Canada. Willing to relocate anywhere, Reply Murthy G. K. Nori, Westmoorings Ltd, 6 Victoria Avenue, Port of Spain, Trinidad, West Indies.

DESIGN COMPETITIONS

National Design Competition. The Arizona State Historical Society will conduct a one-stage design competition June 8 through September 24, open to all architects registered in the United States; for the proposed $7.5 million Arizona Historical Society Museum. It is the intention to engage the services of the winner for the development and construction of the selected submission. Additional prize awards are: $10,000, First; $5000, Second; $1500, Third; Fourth; and $500 Fifth. Jurors include Joseph Esherick, FAIA; Hideo Sasaki, FASLA; Barton Myers, AIA, FRAIC; and Paul Zygas, Ph.D. Roger Schluntz is the Professional Advisor. Funding for the competition is provided by the National Endowment for the Arts. Request registration forms ($35) from the Arizona Historical Society, Competition Administrator, 1242 North Central Avenue; Phoenix, Arizona 85004 (Telephone: 602-255-4470).

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Continued from page 227

Manufacturer sources

base, chair and pull-up seating: Knoll International. Desk top: Custom, Carrara Marble. Rug: Kemos. Graphics: Van Straaten Gallery. (lower right) Sconces: Atelier International. Pendant fixtures: Visa. Downlights: Lightolier. Conference tables: Fantoni. Seating: Sunar-Hauserman. Upholstered chairs: Interior Crafts. Fabric: Ward Bennett/Brickel Associates. Wall table: Custom, fabricated by Barsanti Woodworking Corp. Wall fabric: Boris Kroll Fabrics.

Pages 132-139
Chicago-O'Hare International Airport Development Program
by O'Hare Associates/Murphy/Jahn, Architects
Pages 138-139—Elevators, escalators: Montgomery Elevator Co. Moving walks: Westmont Industries. Terrazzo flooring: Marbelette. Acoustical ceiling: Decoustics. Illuminated signage: Arrow Sign Co. Hollow glazed brick: Hanley Brick Co. Phone kiosk: King. Glass block: Pittsburgh Corning Corp. (Essex and Decora). Trash containers, benches: Fabricated by Chicago Ornamental Iron Co. Rubber flooring: Norament. Lighting: General Electric Supply Co. Paints: Sherwin Williams.

Pages 140-145
Inside/Outside Building
by SITE Projects, Inc., Designer
Pages 140-142—Paint: Benjamin Moore; Tnemec; Sonneborn. Steel work: James K. Miller Inc. Entrance, pulls: Kawneer. Storefront windows: Glass Systems. Signage: Tyson Sign Co. Exterior arcade display: M. F. I.
Pages 143-145—Suspended ceiling: U. S. Gypsum. Light fixtures: G. E.; Columbia; Peerless; Lithonia; Lightolier. Casework: StoreCraft. Interior signage: Off The Wall. Display panels and shelving: Streeter.

Pages 146-151
Museum of Fine Arts/Museum of New Mexico
by Edward Larrabee Barnes, Associates, addition
Antoine Predock Architect, renovation
Pages 146-148—Stucco: U. S. Gypsum (Oriental). Windows and doors: Custom by architects. Stair lighting: Prescolite.
Page 151—Lighting: Edison-Price. Polished concrete flooring: Schofield Integral Color. Paint: Wellborn. Drywall: U. S. Gypsum.

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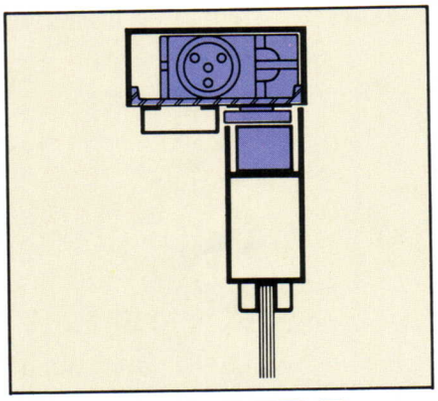

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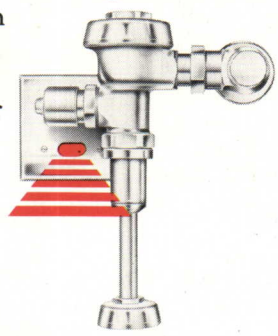

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