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In the light of the recent passage of Florida's landmark interior design title act, which was born in the spirit of cooperation between interior designers and architects, I found Carl Saper's guest opinion [ARCHITECTURAL RECORD, June 1988, page 97 et seq.] to be a sad and unnecessary digression into the old mindset of "us vs. them.

The passage of the Florida title act exemplifies the fact that architects and interior designers can work together in enhancing both professions' accountability regarding consumer protection. The cooperative manner by which the bill was passed should go far in exorcising the specter of a "turf" struggle. I believe that current efforts testify to a meaningful and growing awareness of the need for both professions' accountability regarding consumer protection.

The article in your June issue by Jerrold Sonet [RECORD, June 1988, page 48 et seq.] will likely do more to fire up a war of formidable opposition to licensing interior designers than it will to heal the present irritations. The article does nothing to encourage a spirit of compromise and is filled with caustic remarks and half truths. In the increasingly complex world of architecture, there is no question that interior design has become a special discipline, just as have sound control and acoustics, value engineering, architectural forensics, environmental quality and impact, graphics, built-in sculpture, and others. They are all related to architecture, and Continued on page 16

Corrections
Quoting the architect of the Dolben Library on page 90 of its July 1988 issue, RECORD got his words right but not, alas, his name. It's not Maybeck, but Joseph Maybank. For the same story, the photographer was Wheeler Photographics, Inc.

The drawing of Kohn Pedersen Fox's Interstate Tower in Charlotte, North Carolina, shown in the study on downtown development (RECORD, July 1988, page 106), was unfortunately printed backwards.

Through September 25

The Fairmount Waterworks, 1812-1911, drawings and watercolors by Frederic Graff, the designer of Philadelphia's famous facility; at the Philadelphia Museum of Art, Philadelphia.

Through October 18

What Could Have Been: Unbuilt Architecture of the '80s, drawings and models of recent projects; at the Cooper-Hewitt Museum, New York City.

Through October 22

"Deconstruction Zone," a temporary installation by Anita Margrill in the lot adjacent to the San Francisco Arts Commission Gallery; in San Francisco.

Through October 31


September 15 to November 17

An exhibit of the work of Thom Mayne and Michael Rotondi/MORPHOSIS; at ZAES (Art and Architecture Exhibition Space), San Francisco.

September 28-29


October 1-4

Pueblo Style and Regional Architecture: The Mystique of New Mexico, symposium and exhibit, sponsored by the University of New Mexico; in Albuquerque. For information: Dr. Wolfgang F. E. Preiser, Center for Research and Development, School of Architecture and Planning, University of New Mexico, Albuquerque, N. M. 87109 (505/977-6388).
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Photographer: Tom Bonner
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RECORD editor Mildred F. Schmertz, FAIA, has donned yet another hat: she has been named to the 11-member Landmarks Preservation Commission of the City of New York, the 23-year-old organization that's the forerunner of all American landmarks commissions—and one of the most prestigious. Her appointment is not only a boon to the preservation of distinguished structures in a city where architectural monuments are almost commonplace, but a satisfying acknowledgment that her accomplishments as a journalist and editor have been scrutinized and found to be exemplary.

In large part prompted by the demolition in 1963 of McKim, Mead and White's turn-of-the-century masterpiece, Pennsylvania Station, the establishment of New York's Landmarks Commission in 1965 sought "to designate, monitor, and preserve landmarks and historic districts ... because of their special historic, architectural, cultural, or esthetic qualities and value." Each commissioner, who serves without remuneration, is appointed by the mayor and approved by the city council only after a long and complete inquiry into the candidate's background, credentials, and special expertise for the job. The group is the policy- and decision-making body that designates landmarks "based on an evaluation of the special character, quality, and history of the property" under consideration.

Mildred Schmertz, who's been RECORD editor-in-chief since 1985, has all the right credentials for the job. Not only has she written in these pages, time and again, about worthwhile landmarks saved by the efforts of preservation-minded citizens and carefully, lovingly restored by like-minded architects, but on a private basis she has been involved with many community groups who also seek to save the best of the old. We are extremely proud to have such a person at the top of our editorial masthead. Congratulations, Mildred.

Ted R. Meredith, Publisher
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before the age of "titles" they were historically and traditionally part of the architectural profession. Interiors have existed in buildings for thousands of years, yet only in recent history has "interior design" become a specialty outside of the architect's office.

The statement that the interior designer is involved with public safety through the selection of materials used to embellish the walls, floor, and ceiling is absurd. Codes regulate the fire hazard and toxicity of materials in a building, and any individual involved in the selection process must abide by the codes in order to receive an occupancy permit. This is required even when the owner chooses to do his own interiors. Should we license the owners as well? Space planning, on the other hand, does involve life safety, but that case was not made by Mr. Sonet.

The statement that AIA documents limit consultants to structural, mechanical, and electrical is just not true. Many firms, utilizing AIA documents, work with multitudes of consultants. C431 is designed for use with any consultant services other than engineering. C727 is also available. C141 and C161 may be used with modifications. Mr. Sonet obviously is not familiar with AIA documents. He also suggests that the architect reverse his role and become the consultant to the interior designer. Most architects will not welcome that reversal.

While most architects, we believe, could support the licensing of interior designers, the task lies in drafting language that is proper and appropriate to describe the profession and its tasks so that there is no confusion with architecture.

The major fear of most architects is that the licensed interior designer will migrate to tasks beyond the limits of his education, experience, and examination, with little or no opposition from unsophisticated building departments. Once that is allowed to happen, the public will be at great risk. The "grandfathering" of 400,000 interior designers without proper credentials of education and experience and examination is dangerous and unacceptable.

Mr. Sonet would be best advised to read the comments of Mr. Sapers and to spend his time constructively in finding language and definitions of interiors practice that are acceptable to both professions. It is time to call for a cease-fire and to sit down together to find ways to heal the wounds.

Melvin S. Markson, FARA, FISA, AIA
Chairman, Interior Design Licensing Review Committee
Society of American Registered Architects
Lombard, Illinois

Your teaser in the July News about "deconstructivism" [ARCHITECTURAL RECORD, July 1988, page 55] elicits a familiar response within me, and perhaps in other readers.

Simply, this genre represents the best and worst aspects of the profession. The work is tantalizing, ingenious, provocative, fraught with thought, and two-dimensionally lovely. It is also cheap thrills, "wow" Shock Architecture, screaming for attention. In this way it dances the dance of uncomfortable innovation—on its own stilted, in its effect inspirational.

Too early, I guess, to tell if it passes the litmus tests of weather and use. I wonder how those commissioning and using the works feel about it once the photographers leave the site? Maybe your August issue will touch upon all of these thoughts. 

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Concluded Brodak, "The Carlisle Design A system is the only roof I know that could perform well under such design considerations. It was the perfect solution. Its fully-adhered roofing system allowed us to go wherever the roof went." Carlisle's roofing membranes include the standard EPDM and a new polyester reinforced EPDM. Both are available in designer colors—basic black Sure-Seal® or the innovative white-on-black Brite-Ply®.

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Interiors from every angle.

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Circle 37 on inquiry card
Society of Marketing Professional Services to present print and audiovisual awards

Awards for the best marketing programs in 11 categories will be presented at the SMPS annual meeting this month. (First prize in the advertising category in last year's program [photo] went to design-builders Sverdrup Corporation for efforts toward breaking into the interior-design market with the advertising campaign, "consider the occupant." )

"Marketing leadership," the theme of the meeting, which will be held Sept. 13 to 16 at the Fairmont Hotel in Dallas, will be addressed by keynote speaker Jack Morris Rains, currently the Secretary of State of Texas and formerly the president of architects Neuhaus & Taylor, now 3/D International.

Convention programs will be directed toward leadership in domestic and international markets, and topics will include the liabilities of marketing, the potential of marketing facilities-management services, and integrating marketing and technical staffs.

The 3,700-member SMPS is an international marketing organization for planning, construction management, and architectural-, engineering-, interior- and landscape-design firms. For information, contact Barbara Blake, Society of Marketing Professional Services, 801 N. Fairfax St., Suite 215, Alexandria, Va. 22314 (703/549-6117).

Better resolution of disputes on the way in federal work?

A House judiciary subcommittee has tentatively embraced the use of such dispute-resolution methods as mediation on architectural and engineering work for the federal government. The subcommittee cited increasing successful use in the private sector. Two bills have been introduced in the House and the Senate that would allow the Federal Mediation and Conciliation Service to step in when disputes arise (H. R. 3052 and S. 2274). But, proceeding with usual government speed, the subcommittee anticipates little action of its own until next year at the earliest.

Use of surety bonds increases for private construction

Surety bonds that protect against building contractor failure, long mandatory in public work, are found to be on the rise in private work as well, according to a joint survey of 4,500 design professionals, attorneys, and lending institutions by the Surety Association of America and the National Association of Bond Producers. According to SAA president Lloyd Provost, contractors have the highest failure rate of any business. And the situation would not seem to be improving.

Some 80 percent of respondents reported increasing loss frequencies and per-loss amounts and saw scarcely any better record for established contractors than for the unestablished.

Of the architects and engineers, 82 percent recommend surety bonds for private work. The survey is available from the SAA, 100 Wood Ave., S., Iselin, N. J. 08837 or NASBP, 6931 Arlington Rd., Bethesda, Md. 20814.

Better copyright protection to be extended abroad

Among the issues in the sweeping trade bill passed by the Senate in early August is action against countries that violate American intellectual-property rights, such as copyrights, and strengthening of the Trade Development Program. The House of Representatives passed an identical bill in July, and President Reagan indicated he would sign the measure.

Better international copyright protection has been of concern to architects and engineers in the past, and the International Engineering and Construction Industry Council has long advocated improving the trade-development program.

The bill will make it easier to get intellectual-property-rights protection from the U. S. International Trade Commission and will make it a violation of U. S. patent law to import into the United States that which is produced abroad, including architectural plans, by the unauthorized use of the American patent processes.

The development program basically provides grants to foreign entities and companies to buy American engineering and architectural services. Peter Hoffmann, World News, Washington, D. C.

Architectural Record September 1988 35
The assignment: design an audiovisual fitness center for a large insurance company in Hartford, Connecticut.

The media: WILSONART Color Quest® Decorative Laminates.

The design team: Laura Bordeaux, AFF, IBD and Mike Bartalotta, both of Hartford, Connecticut.

Bordeaux comments: "I wanted the center to be a complete departure from anything institutional; a playful environment, designed to motivate employees past the door and through their workouts. WILSONART Color Quest proved to be the perfect vehicle. It gave me the selection I needed. And the palette to color coordinate everything from the carpet to the clock’s secondhand."

The result: A happy, healthy insurance company.

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Construction-economy update: For the short-term, volume is going the wrong way

By George A. Christie

Just when the nation's economy got a new lease on life via the booming export market, 1988 brought a parting of the ways for its inwardly directed construction sector. Contracting for new construction fell sharply in the first quarter, and failed to rebound in the second.

There is no great mystery surrounding the cause of the construction market's weakness. Rising interest rates and the tight lid on federal spending are handicaps, but they are not directly responsible for the 1988 decline. The single biggest issue continues to be the backlash of the mid-1980s' "tax shelter" boom. After producing a five-year supply of offices and apartments in four hectic years of overbuilding (1983-1986), the market is still only part way into the process of digesting its extra year's output. And now, the threat of increased monetary restraint, if and when inflation worsens, adds an external dimension to the construction industry's essentially internal problems. Without monetary restraint, construction activity is already sagging under the weight of its surplus commercial buildings. With monetary restraint, credit-sensitive single-family houses would become vulnerable as well.

Geography is giving the construction market's downturn a special twist. The mid-1980s' building cycle began and ended at different times in various regions. The peak was reached first in the South Central (early 1985), next in the West (late 1986), then in the North Central (mid 1987), and finally in the East (late 1987). Through 1987 there was still enough support coming from the latter regions to carry last year's national total of construction-contract value to a higher level. Since the end of 1987, however, all regions have lapsed into decline.

The 1988 construction outlook has been a downer from the start. If anything, the situation has deteriorated, though slightly.

Last fall's Dodge/Sweet's forecast of a 3-percent decline of total construction-contract value in 1988 stressed the need for deeper cuts of office and apartment building as vacancy rates hung stubbornly high despite reduced building in 1986 and 1987. Contracting for all nonresidential building would be held to a 4-percent decline as industrial and institutional-building markets served as stabilizers. Similarly, total residential building, supported by single-family-housing demand, would be limited to a 2-percent decline. Public-works construction (less federal, more local) was expected to provide some additional stability. The result: a gentle letdown from the peak of a five-year expansion of the construction sector.

The previous version of this update (RECORD, April 1988, page 39) found things progressing pretty much as expected. Declines were evident in both nonresidential building and housing, while public-works construction was, indeed, holding even with 1987. One necessary modification, however, was an adjustment of institutional building, which has not come through with the expected gain this year. As institutional building turned negative, and with commercial building falling just a little faster than forecast, total nonresidential building was exposed to a bigger decline in 1988—7 percent versus the original forecast of 4 percent.

Housing was a judgment call in the previous update. Early 1988 housing starts were clearly below the 1,525,000 units forecast for the year. Yet, it could be argued that the sharp decline of interest rates that followed the Wall Street crash hadn't yet stimulated housing demand because potential home buyers were still in financial shock. Assuming that mortgage rates would remain below 10 percent through most of 1988, it seemed reasonable at the time that a delayed response would be forthcoming, so the original forecast of 1988 residential-building-contract value (−2 percent) was not changed.

For the most part, adjustments made in that update to the 1988 construction forecast were small ones (the single exception was commercial building). At that time, it was clear that total construction-contract value was heading for a somewhat steeper decline than the original forecast of 3 percent, perhaps closer to 4 percent. Now, mainly because the gamble on a spring recovery of housing starts failed to pay off, some further downgrading of the 1988 potential is appropriate.

There has been a weak volume of residential building through the first half of 1988

Hence, it seems highly unlikely that the full year's total will reach 1,500 million units, much less the original forecast of 1,525 million. To date (i.e., through May), 1988 housing starts, as reported by F. W. Dodge, have averaged only a little over 1.4-million units. More ominous is the second quarter, when some improvement over the weak volume of the early months was expected. Starts slipped even lower. From here, it would take a rate of just over 1.6-million housing starts in the balance of the year to bring the 1988 total to 1.525 million. That would be a minor miracle.

The shortfall of housing so far in 1988 has been confined almost entirely to apartments. First-half starts of multifamily units averaged just under 450,000 (annualized), a surprising 25 percent below the 1987 total. Surprising because, after sharp back-to-back declines in 1986 (−11 percent) and 1987 (−25 percent), apartment starts by then had Continued on page 39
Financial advisors recommend comparing the A.M. Best Company rating of financial strength when you select an insurance company. This rating is important to you as a strong indicator of a company's future performance and stability.

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reached a rate that was sufficiently below current demand to gradually work off the surplus created during the mid-1980s when starts soared to a peak of 850,000 units.

The revised 1988 estimate of 480,000 multifamily units (which implies a slightly higher second-half rate of building) means a reduction of between 15 and 20 percent from the 1987 total— the third double-digit decline since 1986! The consolation prize: faster absorption of vacant units, and an earlier recovery.

Single-family house building, originally forecast at 975,000 units in 1988 (5 percent below last year’s total), was exactly on target during the first half. In the spirit of “if it ain’t broke, don’t fix it,” this looks like a good one to leave alone. The risk is on the down side, however, as mounting inflationary pressures force interest rates up and housing starts down toward year’s-end. Experience, on the other hand, teaches that the year, a stronger second-half rate of building is in the offing.

Projections for nonresidential building remain on target
At 1.240-billion square feet ($83.4-billion contract value), the composition of this group of commercial, industrial, and institutional buildings has been altered slightly. First-half results revealed just a bit more strength in commercial building (stores/warehouses, but not offices) than was apparent before. More intriguing is the behavior of industrial construction so far this year. With unused manufacturing capacity disappearing rapidly under the pressure of export demand, plans for 1988 business capital spending have been revised upward, from an increase of 6 percent last November to 10 percent as of May. Through midyear, however, contracting for new manufacturing plants was running behind its 1987 total. Unless industry is investing exclusively in machinery and equipment this year, a stronger second-half rate of building is in the offing. Meanwhile, the outlook for institutional building, at -3 percent, has changed little either in total or in its main components.

Public-works construction appears to be fulfilling expectations of “no change” from 1987’s total contract value. It is worth restating, though, that this year’s $42.3-billion total consists of roughly half a billion less highway and other-transportation construction and much more environmental work (water-resources and waste-treatment facilities, etc.).

The evolution of the 1988 construction outlook has been a process of progressive downsizing—first in commercial building, then in housing—as new information became available. The direction was never in doubt, but what started off as a 3-percent decline in October subsequently became a

Continued on page 41

Architectural Record September 1988
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United States Gypsum Company

Circle 40 on inquiry card
1988 Regional Estimates
Dodge Construction Potentials

North-east

<table>
<thead>
<tr>
<th>Contract Value (in dollars)</th>
<th>Nonresidential Buildings</th>
<th>Residential Buildings</th>
<th>Nonbuilding Construction</th>
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<tr>
<td></td>
<td>Commercial and Manufacturing</td>
<td>One Family Houses</td>
<td>Transportation</td>
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<td></td>
<td>Institutional and Other</td>
<td>Multifamily Housing</td>
<td>Environmental</td>
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<td></td>
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<td>Nonhousekeeping Residential</td>
<td>Utilities</td>
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<td>$18,885 $16,600 -12</td>
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North Central

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<td>Total</td>
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South

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West

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<th>Contract Value (in millions)</th>
<th>Nonresidential Buildings</th>
<th>Residential Buildings</th>
<th>Nonbuilding Construction</th>
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</table>
|                            | Commercial and Manufacturing | One Family Houses | Transportation | $5,773 $5,800 - 
|                            | Institutional and Other   | Multifamily Housing  | Environmental | 2,721 2,900 + 7 |
|                            |                          | Nonhousekeeping Residential | Utilities | 733 900 +30 |
| Total                      | $20,863 $19,375 -7       | $22,557 $22,725 + 1  | $9,227 $9,650 + 5       |
| Nonresidential Buildings   | $13,016 $11,600 -11      | $22,557 $22,725 + 1  | Total Construction       | $62,348 $60,650 -3 |
| Residential Buildings      | 7,867 7,775 -1           | 7,362 6,675 -9       |                          |
| Total                      | $20,863 $19,375 -7       | $22,557 $22,725 + 1  |                          |

4-percent one in February, and is now at 5 percent.
Construction activity in two major regions, the Northeast and the West, will be declining approximately in line with the national trend (i.e., close to 5 percent). At the extremes will be the South (8 percent), where falling energy prices are handicapping the area's economic recovery, and the North Central (1 percent), which is benefiting most from the export boom.

Quarterly measures of 1988 contracting show that the steepest drop has already taken place
That happened in the first quarter when contracting slipped 5 percent from last year's final quarter. But, although the rate of decline slowed to only 1 percent in the second quarter, the fundamentals haven't changed. Commercial building remains overdeveloped, public-works programs are capped, and housing is vulnerable to rising interest rates.
For at least three reasons, the odds are against a recovery of construction contracting in 1989. The surplus of office and apartment space, which is currently depressing these markets, will not be fully absorbed by the end of 1988. Public-works construction will remain under a tight lid. And interest rates will be rising.
The first two of this trio of handicaps are merely extensions of familiar conditions that brought about the 1988 downturn, and there is now quick fix. The third, higher interest rates, could be an additional layer of trouble for the construction sector in 1989.
Ironically, the harder the export boom drives the economy's industrial sector, the riskier the situation becomes for the construction industry. With industrial-capacity utilization at 88 percent and unemployment at 5 1/2 percent, there is only a small reserve for continued economic expansion before inflation crosses the 5-percent threshold. Mid-1988 measures of inflation were scary enough to make nervous bankers boost the prime rate half a point, but, so far, the Federal Reserve has been willing to go lightly on the monetary brakes.
How much inflation will the Fed tolerate? It is difficult to imagine that 5-percent inflation would not draw a strong response from the central bank, even at the risk of economic stagnation. Perfect fine-tuning would call for dampening 1989 demand just long enough to let capacity catch up. This is probably asking more than the blunt tools of economic policy-making can accomplish.
Nevertheless, it is prudent to expect that the Federal Reserve will be bearing down harder by the end of 1988, and that interest rates will be rising in 1989—perhaps significantly. For the construction industry, 1989 could be the year of maximum stress.
How much more decline lies ahead? A minimum of three conditions must be met before the construction market reverses itself. A better supply/demand balance must be restored to the high-vacancy markets (offices and apartments); interest rates must be low enough to stimulate the credit-sensitive markets (single-family housing and institutional building); restraint on public projects must not be so severe that it offsets the turnaround of private-sector construction once it begins to take hold.
Of course, these three conditions will not fall into place simultaneously, nor is it necessary that they do. Enough improvement in the environment for construction to have occurred before the end of 1989 to look for signs of renewed expansion of construction contracting in 1990.
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Practice: A fresh look at liability with strategies for protection

By Carl M. Sapers

Discovery, has become so costly that most defendants caught in its jaws abandon all hope—even if they ultimately win, they lose. Some suggest application to the legislature for relief. Doctors, suffering an equivalent problem, have generally failed in obtaining protective legislation, notwithstanding they are a more potent force in the community than architects. Some suggest that architects establish their own liability-insurance companies, but this nostrum wrongly implies that the cost of insurance is a result of bungling by existing insurance carriers when the truth is that insurance costs have risen with increased exposure to liability. Some suggest that owners who engage architects should agree by contract to indemnify architects from liability or, at worst, limit their own recovery against their architect to the fee paid or another stated dollar sum. As long as there are more architects than architectural commissions, seeking such contractual clauses is tilting at windmills.

Client claims are inescapable but can be less painful

Currently, some 60 percent of all claims are brought by owners directly against their architects, and it is the first part of my general theory that it inheres in the professional's relationship to his client that he cannot insulate himself from such claims. As my architect, you have a fiduciary duty to me to render decisions on my behalf, free of negligence. If you fail in that duty, you must be prepared to respond in damages. Note, precisely because you are a professional furnishing services that require the broad exercise of discretion, the law does not hold you to the more exacting standard that you always be right, but only that you faithfully perform without negligence. It is inconsistent with that fiduciary role for the owner to be without redress if the architect performs faithlessly. But to say that 60 percent of the claims are inescapable is not to say that they need enrich the legal fraternity. Here, arbitration, mediation, and other forms of alternate dispute remedies less expensive than litigation, must be employed so as to avoid wasteful expense. In fact, I believe that a dispute between client and professional should never reach a public courtroom.

By alternate dispute remedies, I do not necessarily mean the usual American Arbitration Association system. In much of the country, that system offers a pale imitation of litigation, particularly when the association and the local law permit both extensive discovery and multiparty arbitration. It is also true that in some parts of the country the panel from which the AAA chooses its arbitrators comprises all too often superannuated lawyers, architects, and contractors who are delighted to make extra income by proceeding in a dilatory fashion with the dispute at hand.

There are clearly ways of streamlining the process so as to make it less expensive, productive of a fairer and a more consistent result, and less disruptive of the professional relationship between you and your client. In my judgment, the American Institute of Architects has an obligation to its membership to work with the AAA to achieve at least the following improvements in the existing arbitration system:

- Establishing panels of experienced developers, architects, and lawyers to compose three-person arbitration panels to hear all disputes between owners and architects.
- Developing further a pre-arbitration procedure involving mediation and regulating such discovery as is absolutely essential (but no more); and
- Persuading reluctant insurers to embrace arbitration and to appoint attorneys skilled in its uses rather than permitting arbitration only reluctantly and appointing attorneys more comfortable with litigation.

The ability of two parties to a contract to fashion their own form of dispute remedy is now beyond doubt. Moses H. Cone, Memorial Hospital v. Mercury Construction Corporation (103 S Ct 927, 1983) and cases that have followed show a specific application of the new federal substantive law of arbitration. The thrust of the recent legal development in this area is that the federal courts will respect and enforce specific agreements between two parties on how they plan to settle future disputes. The historic resistance of many courts to arbitration can no longer impair contractual understandings.

I am concerned with a new subset of owner claims against architects in an area that seems to be developing at a prodigious rate. These are claims brought by an owner's property-damage insurer under its subrogated right set forth in its insurance policy with an owner. The current AIA standard form includes a waiver of subrogation during the construction phase only. These suits, typically modest in the amount of the claim but expensive to defend, arise after the construction phase is concluded. Two years after substantial completion, a pipe bursts. The owner is paid by the property-damage insurer, and the property-damage insurer seeks recovery from others: the mark is inevitably the owner's architect. A very modest amendment to the standard form that provides for a permanent waiver of subrogation between owner and the architect would seem to deal with this problem effectively and fairly.

Continued on page 44
Contractor claims are another matter
The second part of my general theory concerns approximately 25 percent of the claims against architects—and clearly the most expensive and fastest growing part. These are claims by contractors, subcontractors, and their bonding companies. These are the most expensive claims because they invariably arise in multiparty litigation. They can be avoided if the owner, in his contractor contract, insists such potential claims be forbidden.

A typical clause in the owner-architect agreement under Article 15, Other Conditions or Services, might read:

The Owner agrees that it will include in its agreement with any Contractor and/or Construction Manager the following clauses:

15.1.1 The Owner and the Architect have acknowledged that nothing in the Architect's engagement implies any undertaking by the Architect for the benefit of or which may be enforced by the Contractor, its subcontractors, or the surety of any of them; it being understood that the Architect's obligations are to the Owner and that, in performing such obligations, the Architect may increase the burdens and expense of the Contractor, its subcontractors, or the surety of any of them.

15.1.2 The Contractor agrees to execute a separate letter agreement with the Architect which provides that (i) neither the Contractor, nor its subrogee or surety (collectively 'the Contractor'), will bring any civil suit, action or other proceeding in law, equity, or arbitration against the Architect or the officers, employees, agents, and servants of the Architect, for or on account of any cause of action which the Contractor may have arising out of or in any manner connected with the Project.

Unlike efforts to restrict the owner's right to recover against his professional architect, which I consider inconsistent with the architect's professional undertaking, restricting claims by the contractor against the architect is wholly consonant with the architect's fiduciary relationship. An architect cannot be expected to advance and defend his client's interest in relationship to the contractor if he is forced to protect himself against the potential claims by the contractor often arising specifically from the ardor with which he protected his client.

I believe that owners can be persuaded to accept this proposition and to insert in the contractor contracts covenants not to sue the architect.

Incidentally, with such covenants, you are not exposed to courtroom litigation as the forum for resolving construction-industry disputes. Your only potential disputes are with your client, and those will be settled privately in alternate dispute-remedies out of the courtroom.

Thirty years ago such covenants were unnecessary. The contractor's recovery was against the owner only, with whom he was said to be in "privity of contract." But in 1958, a federal court in California, where courts have often expanded plaintiff actions, held that an architect could be sued directly by a contractor who suffered economic loss at the architect's hands (United States v. Rogers & Rogers, 161 F. Supp. 132, S. D. Cal. 1958).

State after state followed and now a majority of American jurisdictions allows contractors and subcontractors to sue architects higgledy-piggledy.

But the proposition is still not free of doubt. This whole line of cases afflicting the architectural profession springs, in fact, from the decision of Judge Cardozo (Glanzer v. Shepard, 233 N. Y. 236, 1922). In that case, Judge Cardozo allowed a purchaser of beans to sue the weigher of
beans directly when the latter's certificate overstated the weight by 11,854 pounds. The judge acknowledged that the bean purchaser might be thought of as the third-party beneficiary of the contract between the seller and the weigher, which resulted in the weigher issuing his weight certificate upon which the purchaser relied; but he preferred, he said, to reach the goal more simply:

The defendants, acting not casually nor as mere servants, but in the pursuit of an independent calling, weighed and certified at the order of one with the very end and aim of shaping the conduct of another.

Cardozo concluded that the bean weigher owed the same duty to the plaintiff as he owed to the party who employed him. To cite Glanzer, as modern courts do, to support contractor suits against architects is to turn Cardozo's proposition on its head. For surely no one familiar with the construction industry could claim that the contractor as the "end and aim" of the owner's contract with his architect. The architect does not owe the same duty to the contractor as to his client. Indeed, his client duty may compel him to make life most uncomfortable for contractors.

The architect in this respect is like every other professional fiduciary; his duty of unalloyed loyalty to his client excludes his assuming a duty to contractors.

Regrettably, none of the handful of cases holding architects liable to contractors has analyzed the issue in terms of the architect as a professional; fortunately, most of the cases considering the application of Glanzer to lawyers have turned on precisely that point. Accordingly, it is useful to review those cases when dealing with the practical policy considerations at stake. The only cases finding a lawyer liable to a party other than his client are those in which the third party was clearly the beneficiary of the undertaking of the lawyer: The lawyer has negligently prepared a will or permitted its execution without complying with the law or loses a case for a credit agency in collecting a claim. But in all other circumstances, except cases of fraud, no third-party recovery against the lawyer has been permitted.

Even California has resisted the attempt to expand the lawyer's exposure. In the leading case of Goodman v. Kennedy, 18 Cal. 3d 235 (1976), the court affirmed that privity of contract was not essential to recovery, but then held:

To make an attorney liable for negligent confidential advice not only to the client who enters an action in reliance upon the advice but also to the other parties to the transaction with whom the client deals at arm's length would inject undesirable self-protective reservations into the attorney's counseling role. . . . The result would be both 'an undue burden on the profession' and a diminution in the quality of the [the client's] legal services.

As two recent cases have held, a lawyer has no duty to his adversary beyond courtesy; any other duty would interfere with the undivided loyalty an attorney owes his client.

Before the reader despairs that only lawyers receive justice at the hands of our courts, take heart from the fact that two important courts, within the year, have denied contractors claims against architects. One of these courts was applying New York law and concluded, in substance, that Judge Cardozo would doubtless have reached the same conclusion were he alive today. So architects, by the covenant not to sue, may avoid contractor claims and may, by more effective advocacy, defend such claims even in the absence of such covenants.

All of this general theory is based upon the conviction that most architects still practice in the traditional role of fiduciary, preferring their client's interests over their own. Such architects should be held accountable to their clients for breach of trust or negligence only and should not under any circumstances be held accountable to contractors, subcontractors, or their sureties for their economic loss.

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Brooks's bosky promenade

As a surprise to its retiring president, Hamilton College, in Clinton, N. Y., held an invited competition for the design of a pedestrian way linking its historic center (dating in part to the 18th century) to a formerly separate campus erected in the 1960s. Described by the architect as both "direct and picturesque," Turner Brooks's premiated scheme begins at the newer campus (upper left in plan), descends through a grove of trees (below left), bridges a small pond (top), passes through an existing barn, marks a thoroughfare with two "ceremonial huts" (left), and ends at a corner of the loosely organized central quadrangle of the old campus. Though follylike, the overscaled arches and heavy rusticated bases of Brooks's new elements suggest a moody Mannerism; he says the materials are derived from the "rusty stone" of existing campus structures. Other participants were Deborah Berke; Barbara Littenberg, of Peterson, Littenberg; Rodolfo Machado, of Machado & Silvetti; and Werner Seligmann. Schematic design is in progress.

Nixon archive comes home

Initially proposed for a site near the former western White House at San Clemente, the Richard Nixon Presidential Archives is now to be in Nixon's hometown, Yorba Linda, Calif. The 45,000-sq-ft museum, theater, and library, designed by Langdon Wilson Mumper Architects, surrounds a reflecting pool that anchors an axis through formal gardens to a knoll occupied by the restored wood-frame Nixon birthplace. A U-shaped structure of southwestern sandstone with limestone trim and tile roof, phase I of the complex will open in early 1990.
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**News briefs**

**Fall Market** at the International Design Center, New York, will feature a day of programs for facilities managers. Beginning October 5, and running through October 8, the exposition of furnishings and design products will also spotlight items introduced at the recent Milan Furniture Fair. Concurrently... *Designer's Saturday* will host a variety of events related to its member's product exhibitions in Manhattan and at the IDCNY. A seminar on deconstruction in architecture will be moderated by Michael Sorkin and include Aron Betsky, John Whiteman, Anthony Vidler, Peter Cook, and Oon Copjec. The journalistic reconstruction of House and Garden—now HG—will be discussed by Martin Filler, an editor of the magazine. The Central New Jersey chapter of the AIA, said to be the only all-architect sponsor of affordable housing in the U.S., is commissioning a second residential complex. The chapter's not-for-profit architects Housing Company has successfully run a 123-unit senior citizens project in Trenton, since nine years ago to designs of Brecher Qualls Cunningham. The 600-room Shenandoah Grand Hotel, by Centerbrook Architects, will anchor such diverse attractions as a frontier village, zoological exhibits, and a museum celebrating Native Americans at Explore, a new "destination" park planned for western Virginia. Visible from the nearby Blue Ridge Parkway, an 11-story central mass will create an iconic image for the 1,000-acre public-private venture, which is planned as a counterweight to eastern Virginia's Williamsburg. A two-story heavy-timber post-and-beam rooftop loggia, reminiscent of early national-park resort lodges, takes advantage of area-wide views; the lobby uses native fieldstone. Curved three-story bedroom wings extend from the central block to embrace the entry and form a courtyard. The resort will begin receiving visitors in 1992.

**A center of learning**

The 600-room Shenandoah Grand Hotel, by Centerbrook Architects, will anchor such diverse attractions as a frontier village, zoological exhibits, and a museum celebrating Native Americans at Explore, a new "destination" park planned for western Virginia. Visible from the nearby Blue Ridge Parkway, an 11-story central mass will create an iconic image for the 1,000-acre public-private venture, which is planned as a counterweight to eastern Virginia's Williamsburg. A two-story heavy-timber post-and-beam rooftop loggia, reminiscent of early national-park resort lodges, takes advantage of area-wide views; the lobby uses native fieldstone. Curved three-story bedroom wings extend from the central block to embrace the entry and form a courtyard. The resort will begin receiving visitors in 1992.

Linchpin of a new master plan, a 200,000-volume central library at St. Joseph's College in Patchogue, N. Y., will help organize the heterogenous spaces of the campus. In the plan developed by Bentel & Bentel Architects/Planners (geared for completion next summer), a new trellis system will extend from the brick-masonry structure, forming a series of quadrangles. An entrance portico and tower look down upon an outdoor amphitheater, and the interior focuses on a central hall, lit from above by skylights and defined by a monumental colonade.
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The Franklin Institute's stern Neoclassical visage has faced Philadelphia's monumental Parkway since the 1930s. Now an 84,500-sq-ft addition to the science museum, the Futures Center (1), will fill out the back of the site, previously occupied by the tail section of a Boeing 757. Instead of inspecting airliner viscera, visitors will, by May of 1990, ascend a curving ramp to exhibits depicting the place of science in the 21st century. Architect is Geddes Brecher Qualls Cunningham.

NCNB Corporate Center (2), designed by Cesar Pelli & Associates with HKS, Inc., will culminate (at 870 ft) in a filigree of silvery rods. Rising from a dark granite base, applied beige-granite piers become progressively thinner—and vertically proportioned glazing correspondingly widens—at higher floors. The mixed-use project in Charlotte, N. C. [RECORD, July 1988, pages 104-107], will include a hotel, performing-arts center, and glass-enclosed public plaza.

Expansion of the Little Theater (3), in Chattanooga, Tenn., will take advantage of its riverfront site in a competition-winning scheme by Schwartz-Kinnard, Architects, with John Meder, Architect. Patrons can enter from a boat basin past new housing, a fountain, and an outdoor amphitheater. The existing theater will be surrounded by a new lobby (facing the river), a new horseshoe-shaped auditorium, and an experimental space.

Pittsburgh Corning Glass Block Design Award winners included Perry, Dean, Rogers & Partners for the Sealey G. Mudd Chemistry Building at Vassar College (4) [RECORD, March 1986, pages 137-145], George E. Brewer for a vacation home, and students at the University of Texas School of Architecture for a conceptual project, dubbed "The Inhabited Wall."

Despite recent zoning changes that restrict the bulk of buildings in midtown Manhattan, 712 Fifth Avenue, an office building designed by Kohn Pedersen Fox with Schuman Lichtenstein Claman and Efron, will rise 53 stories, dwarfing a nearby 18-story hotel (left in drawing).

With less than 10,000 sq ft on high floors, the tower will, nevertheless, be considerably slimmer than other recent midtown towers. Landmark structures on Fifth Avenue are to be restored as part of the project by Beyer Blinder Belle, to open in December of 1989.

Competition calendar

• Winners of the Rome Prize Fellowship pursue independent study supported by a stipend at the American Academy. This year's deadline is November 15. Applications may be obtained by writing to the Fellowships Coordinator, American Academy in Rome, 41 East 65th Street, New York N. Y. 10021-6508.

• "Fairfield 2000" is soliciting new models for low-cost housing. Submissions for the competition are due November 15. Information: Fairfield 2000 Affordable Housing Competition, 500 Summer Street, Stamford, Conn. 06906.

• Exemplary projects featuring the manufacturer's tile will be honored in the Ceramic Flooring Design Contest. The deadline is February 1, 1989, and details can be obtained by writing: Design Contest, American Olean Tile Company, Box N, 1000 Cannon Avenue, Lansdale, Pa. 19446.
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A new old-fashioned village in Maryland

The Kentlands, Andres Duany and Elizabeth Plater-Zyberk have carried forward the urban planning ideas embodied a few years ago in their design for Leaside, Fla.—a traditional village scale and tempo meant for pedestrian sociability rather than automotive isolation. Developed in joint venture by Joseph Alfandre and Melvin Simon & Associates, the suburb will constitute a 352-acre enclave within Gaithersburg, Md., and will include 1,600 residential units (detached houses and apartments), 900,000 sq ft of office space (much of it above street-level shops), and 1.2 million sq ft of retail space. Much of the last will occupy a three-department-store mall, an element whose size vastly exceeds the architects’ ideal but one that both the city and the builders see as essential to the development’s profitability. The plan will try to tame the mall by placing it within walking distance of the housing.

The Kentlands was planned in a seven-day charrette engaging many experts, among them a CAD operator who could alter plans quickly to incorporate the other experts’ input. G. M. A.

For Yokohama, octorad

With the downscaling and Postmodernization of architecture in this country, Modernist architects seem to be turning to the Far East in order to develop megastructures and experiment with structural geometry. For Minata Mirai 21, a part of Yokohama’s consciously futuristic waterfront redevelopment, Hugh Stubbins and The Stubbins Associates designed a two-phase project. The first phase consists of a tapering star-shaped form—the bottom two thirds office space, the top third a hotel (left in perspective). Phase two calls for a smaller, less flamboyant office tower—a symmetrical shape that Stubbins calls an octorad, formed by the enclosure of eight radial points around a rather squashed circle. The project, scheduled for 1992 completion, will cost about $400 million. G. M. A.
It's a single store with 222,250 square feet of space. And with everything from a supermarket on one side to a hair salon on the other, it's no wonder they call it "a mall without walls." Hypermart USA is a joint venture of Wal-Mart Stores, Inc. and The Cullum Company. Located outside Dallas
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It's already a huge retailing success. But the real success story began well before they opened the doors. Because just building the structure was a major undertaking in itself—an undertaking Vulcraft was proud to be part of.

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On this project, we worked especially closely with the structural engineer to design the most economical bay spacing possible. Because on a job of this magnitude, every cost efficiency meant tremendous savings. Furthermore, throughout construction, we came through with 100% on-schedule sequential deliveries, making sure there were no expensive delays. This kind of planning and dependability are exactly why Wal-Mart has come to Vulcraft with so many jobs. And why you should be in touch with us, too, no matter what kind of spaces you need help with.

So contact any of the plants listed below, or see Sweet's 05100/VUL and 05300/VUL. You'll find that the possibilities are wide open.
1. Founders Pavilion, Hospital of the University of Pennsylvania, Philadelphia; Geddes Brecher Qualls Cunningham Architects; Merit Award. The jury cited "the rich and innovative development of [the] exterior wall and open space" in this new 16-story multiuse hospital wing, which relates to the varied scale of adjacent buildings and connects with wings built at different times. The 450,000-sq-ft addition houses medical, psychiatric, and intensive-care beds, laboratories, a cafeteria, dining rooms, and support areas.

2. Carousel House, Philadelphia; Richard Conway Meyer, Architect; Honorable Mention. Program areas are contained in rectangular pavilions united by a circular punched-aluminum screen in this recreational facility serving persons with a wide range of disabilities. A "sensitive development of space and use of natural light" in the articulated roof and skylight forms distinguish spaces dedicated to individual activities.

3. The Library for the Academy of the New Church, Bryn Athyn, Pa.; H2L2 Architects; Honorable Mention. A curved colonnade embraces an existing circular drive, tying this new 102,000-volume academic library to other buildings on a small campus. The glazed- and ground-faceted block arcade is set away from the brick-clad main volume of the building. Although the facility won praise for its "overall architectural quality," jurors took particular note of the "pleasant light" in the reading rooms, provided by a band of skylights at the apex of the shed roof.

4. Seattle Art Museum; Venturi, Rauch and Scott Brown with Olson/Sundberg Architects; Honorable Mention. The projected 154,000-sq-ft facility will be set back from its primary street front to maintain waterfront views and face an outdoor terraced stair that navigates the two-story drop across the site ("innovative," said the jury). The museum's name will be incised in the facade of vertically fluted limestone piers to create a civic-scale presence on a site eventually to be surrounded by skyscrapers.

AIA Merit Awards were presented to four projects and Honorable Mentions were presented to three others in Philadelphia. The three Chicago-area jurors, Gerald Horn, of Holabird and Root Architects; Tannys Langdon, of Langdon-Woodhouse Architects; and Ralph Johnson, of Perkins & Will Architects, chose the winners from among 68 entries.
Boathouse, St. Andrew’s hool, Middletown, Del.; Richard Conway Meyer, architect; Merit Award. Extolled jurors as “a jewel, sensitively led and in complete harmony with its site,” this project will simultaneously replace a deteriorating shell-storage structure and reclaim a small plot in a larger pond that had previously been used for sewage treatment. A small gully is bridged by the wood-framed structure, allowing upper-level access to a club room with a skylight for viewing crew races.

6. Chestnut Hill College Student Activities Center, Philadelphia; Kieran, Timberlake & Harris, Architects; Merit Award. The client asked the architect to transform an underused basement space in a historic building at a small women’s college into a student activities center accommodating both daytime and evening social activities. Jurors were impressed by the imposition of a new gridded ordering system in the ceiling that, using inexpensive means, reorganized the space and disguised an existing maze of pipes and conduits.

7. Federal Philadelphia, the Athens of the Western World; Benjamin H. Latrobe’s vision of Philadelphia in 1800—and provides an armature within which to view diverse types of objects: paintings, prints, silver, textiles, architectural woodwork, and household furniture.
There's not much that's typical about this office building.

Except, maybe, the relentlessly red Pella Windows.

The owner wanted an alternative to the typical office building around Tucson.

The architect said that playfulness had been left out of today's architecture.

And from the beginning, Pella's custom color was the logical choice for carrying out the design.

Needless to say, this 70,000 square foot office building stands out in a neighborhood of predictably severe granite and glass offices. Williams Center features rounded corners, the playful juxtaposition of unusual shapes, and a dashing color scheme of red and white. You can't miss it.

In fact, the main entrance is easily recognized. It's under what appears to be a giant red metal water slide. Inside, however, the mood changes. Visitors and tenants reach their offices after passing through a charming courtyard with waterfall, meandering pool, lush vegetation, waterside seating, and contemporary sculpture.

The building's shape is the logical outgrowth of a desire to give all tenants a sense of place, regardless of how much or how little space they have. Small tenants aren't stuck with just a carved out portion of a rectangle. Here, tenants can even choose spaces with higher ceilings, or two-story spaces.

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CERAMIC TILES: 
A BIOGRAPHY 
OF MAN

Ceramic tiles evolve from the richest heritage of any of the decorative arts. Flowing from one culture to another until they encircled the globe, ceramic tiles have chronicled the development of man for more than 10,000 years.

The earliest tiles tell a tale of primitive societies, giving life and color to cultures of which we would otherwise have no knowledge. As the art of ceramics adapted, later tiles bear the stamp of the great civilizations of Babylon, ancient Egypt, and ultimately Greece and Rome.

The history of Italian ceramic tiles is rooted in the Middle Ages and intertwined with man's quest to combine function and form. As Italy's early artisans merged into guilds, they quickly elevated Italian tiles to the status of an art form as well as a building material. Fed by the rich artistic developments of the Renaissance, the aesthetic value of Italian tiles came to rival decorative statues and sculptures, and began to grace palaces, churches and public buildings throughout Europe.

Today, the soul of the modern ceramic tile industry continues to reside in Italy. The unparalleled synergy between Italian technology and design produces a lasting medium that offers architects and designers the opportunity to record the aesthetic values of modern-day man.

The following pages highlight a few of the possibilities inherent in today's Italian tiles. Explore their potential. Examine the strategy, the innovations and the technology that make today's Italian tiles so vibrant and essential.

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Photos
Cover: Sant’ Agostino's QEMT Line
From top left:
Courtesy of Italian Tile Center

Tile Italia is produced by The Delos Company, Ltd.
700 Forest Edge Drive, Vernon Hills, IL 60061.
ITALIAN TILES
LEAD BY DESIGN

The Italian ceramic tile industry is unquestionably big business with sales of $2.7 billion in 1987 alone. But tile is also art to the Italians. Although the industrial evolution of Italian tile technology may impose higher production requirements and more stringent controls, Italian manufacturers nurture their creative development at all costs.

"In a country with the artistic legacy of Italy, style is in the blood," explained Anthony Bogo, president of the Atlantic Trading Company.

"Trends premiered in Italy can be expected to influence the world's architectural and design community for years to come. From traditional styles to fantasy tiles, Italian manufacturers consistently produce the freshest, most original designs," emphasized Bogo, whose company represents some of Italy's most design-oriented manufacturers.

The Power Behind the Designs

Always innovative, ever avant-garde, the best Italian manufacturers combine clay from the magic hills that surround the Sassuolo Valley with the style that effervesces from Milan.

Milan is the power behind Italian design. Milan pulses with a creative character that is the envy of New York, Paris and London. Milan is home to such international fashion designers as Valentino, Missoni, Gucci, Armani, Fendi and Ferragamo.

The world looks to Milan for style that transcends the fetters of passing fashion and establishes a link with the quintessential elements of pure design.

Possibly the biggest style story of the decade is the growing interaction between Italian tile manufacturers and the design community of Milan.

In their quest for fresh interpretations of color, scale and line, Italian manufacturers employ some of the best known names in the world of the decorative arts—architects, designers, artists, sculptors and painters—to further the genius of Italian tiles.

Such companies as Ceramica Vogue, Gabbianelli, Ceramica Bardelli and Cedit have long been attuned to the heartbeat of Milan. Ceramica Vogue's Frammenti collection, a series of screen printed and hand-painted tiles with a Picasso-like look, are the work of Maria Luisa Brighenti, who is also the designer behind several of the intricate collections of Gabbianelli.

The growing interaction between tile manufacturers and the design community of Milan is the style story of the decade.

Original Designers 6R5, the studio famed for its work with housewares, furniture and small appliance designs, is the stylist behind some of Ascot and Candia's most innovative lines. While not a household name in America, Studio 6R5 is often credited with the advent of Eurostyling and its work is readily recognized in their designs for Panasonic of Japan, Germany's Villero...
As the Milanese influence radiates north, the impassioned sculptor Carlo Zauli, whose works are permanently on display in London's Royal Albert Museum, directs the creation of LaFaenza's Selezione Architettura collection.

In a joint venture with Rex Ceramiche, Trussardi translates his international work with furniture, autos and fashion into a collection of uniquely textured tiles that simulate delicate fabrics and exotic reptile skins.

Iris' current contribution to the designer tile trend is the Klee line, a collection featuring geometric designs in relief and refined colors reminiscent of the artist's paintings.

Elsewhere in the Sassuolo Valley, the heartland of Italy's ceramic tile industry, the Milanese influence can be seen in tiles with neo-modern designs, minimalist geometrics or elaborate graphics in slight relief. For the most demanding customers, there are hand-painted or silk-screened tiles done in intricate florals or abstract designs.

In the broadest sense, the Milanese style has spawned an emphasis on moldings, polishing and porcelains. The unparalleled success of the fully vitrified porcelains from Fiandre has companies scrambling to duplicate its fabled Ceramic Granite™ line. The unusual hues and mirror-like finish of Opaline Keramik™'s porcelains account for the all-out emphasis on mastering the intricacies of highly polished production.

For versatility and drama, the ceramic moldings of Accenti and Expresions di Vetri Murano top the list. The best are gently sculptured ceramics with intricate and imaginative designs or luminous Venetian glass inserts in brilliant jewel-like tones. These versatile feature strips, which promise to be increasingly appealing to American designers, can form colorful accent bands or find a home framing mirrors, doorways, even accenting other designs.

The power of Italian tiles stems from the symbiosis between Italian style and design. Nowhere in the world are thousands of years of architectural styles blended as masterfully as in Italy. Nowhere in the world are the choices as great, the styles as varied and the designs as fresh. Italian tiles reflect the spirit and the passion of those gifted to create.

Nowhere in the world are the choices as great, the styles as varied and the designs as fresh.
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TECHNOLOGY AND DESIGN MAKE ITALIAN TILE KING

Italian tiles are the undisputed leader of the world’s ceramic tile industry. In 1987, Italy produced a total of 3.8 billion square feet of ceramic tile, or 35 percent of the world’s output. According to Assopiastrelle, the Association of Italian Ceramic Tile and Refractories Manufacturers, Italy produced more than twice the square footage of second-place Brazil, and nearly three times that of third-place Spain.

Currently, more than 360 Italian companies manufacture ceramic tile, with scores more involved in support industries such as design, distribution, raw materials and equipment manufacture. Combined, their efforts place ceramics high on the list of post-war economic miracles that have enabled Italy to overtake Great Britain as the fifth major industrial power in the Western world.

Tile is fashion that sparkles with style and stands in testimony to the purest elements of good design.

More than 100 countries actively import Italian tiles in spite of their domestic production. Why? The synergy between Italian technology and design makes Italian tile king.

**Italian Style and Design**

Tile is fashion, as the Italians have always known. Fashion, not in the sense of mere fad, but fashion as a means of self-expression, a personal art form that sparkles with style and stands in testimony to the purest elements of good design.

The fabric of Italy’s national heritage is woven with a devotion to the principles of good design. The Coliseum, the Sistine Chapel and the works of Michelangelo recall its ancient roots. A walk down Via Montenapoleone, the Champs Elysees of contemporary Milan, confirms Italy’s modern allegiance.

It is no coincidence that many of the great names in today’s fashion circles are Italian. Milanese designers pose the first serious challenge to the Paris couture in more than a century. Since tile has always been fashion to Italians, it was an eminently logical step for Italy’s great tile houses to mesh with its renowned couturiers in their quest for ever more innovative designs.

The Piemme tile company was perhaps the first, commissioning Valentin who created murals, hand-painted and bas-relief tiles in damask, floral prints and tiny patterns as intricate as fabric. Now, other name designers such as Missoni, Krizia, Ferre, Oleg Cassini and Laura Biagiotti are also designing tile. The companies emerging as the style leaders include Ceramica Vogue, Asco Candida, LaFaenza, Gabbianelli and Cedit. Together, they give form to the imagination through a virtually limitless array of tile patterns, colors and textures.
Italy introduces its new designs each summer at the ceramic tile exposition in Olgoma. Although the new season's colors, styles and patterns are as closely guarded as any couturier's designs, only Italy has the technical capabilities to take a unique drawing-board idea into full-scale factory production.

**TECHNOLOGY & INNOVATION**

Italian innovations have introduced the world to terracotta styles which require almost no maintenance; porcelains that are harder than natural granite; and glazed tiles that virtually defy abrasion.

Although other countries have begun domestic manufacturing in response to burgeoning demand, their technology, equipment and often even their technicians are consistently Italian. Italy is the world's standard.

Each year, Italian tile manufacturers such as Iris, LaFaenza and Marazzi spend millions of dollars on research and development. "Research and development are vital components in maintaining Italy's superiority in international markets," explained Donato Grosser, marketing and management consultant Assopiastrelle.

Italian technology is continually in ferment: pioneering new products; cross-pollinating the benefits of one tile with another.

Monocottura: The Revolutionary Process

As the name implies, monocottura tiles undergo a single pass through the kiln. Unlike double-fired (bicottura) and thrice-fired tiles in which the shaped raw material, decoration and glaze are added in separate steps, all the elements of monocottura tiles are fused in a single process.

The advantage is not merely the elimination of a manufacturing step. Monocottura tiles demonstrate higher glaze/body adhesion, higher mechanical resistance and greater overall durability. In other words, monocottura technology offers improved performance without sacrifice to design.

As a result, monocottura is now the tile of popular choice. Double-fired tiles account for only about 15 percent of U.S. imports and are used primarily on walls and in light traffic areas such as residential bathrooms, according to Assopiastrelle's reports.

Italy's current research centers on producing modular tiles that fit together like pieces of a jigsaw puzzle; polishing techniques that generate tiles with a mirror-like shine; ever more extensive color palettes; and on the fusion of various materials into ceramic tiles.

Italian technological experiments with firing temperatures, glazing, oxides, glass and other raw materials ultimately produce tiles with better colors, better performance and ever more powerful designs, for the heart of the Italian tile industry is the marriage between technology and design.
TILE AMERICAN STYLE

The pharaohs decorated their pyramids with tile; the Chinese adorned imperial palaces; and Americans, well, until recently Americans relegated ceramic tile to the bathroom.

Today, ceramic tile is finally coming of age in America. According to reports published by the U.S. Department of Commerce, the use of ceramic tile has nearly doubled in less than a decade, soaring from 549.8 million square feet in 1978 to 958 million square feet in 1986, the last year for which complete figures are available.

Preliminary figures for 1987 place total U.S. consumption at an estimated 998 million square feet, according to Martin Philips, executive vice president of Economic Industry Reports, Inc., a New York company specializing in economic projections for the ceramic tile industry. "In 1997, we're projecting that the consumption of ceramic tile will increase more than 70 percent, ranging from a low of 1,720 million square feet to a high of 1,975 million square feet."

Currently, more than half of the ceramic tile used in the United States is imported, and the bulk of it is Italian. "Italian tile is a near-perfect product," explained architect Frank Key of Dallas-based Sullivan Key Merrill Architects.

"The inherent value of ceramic tile lies in its durability and low maintenance requirements, as well as its style."

"The advent of the great American shopping mall changed our perception of tile," explained architect Stephen Casey of Pittsburgh-based UDA Architects. "For large public spaces and high-traffic areas where time, cost and maintenance are important considerations, ceramic tile offers the optimum solution."

With the advent of single-fired monocottura tiles and advances in glazing technology, Italians are producing low maintenance tiles that are nearly impervious to staining, scratching and other forms of wear.

As a building material, tile offers a great deal of style for the price, according to Key. When Sullivan Key Merrill was commissioned to turn an old warehouse into the focal point of the Dallas Contract Design District, they turned to ceramic tile. "Beauty may be priceless, but financial people still want a budget," Key joked. "With ceramic tile, you can use color, scale, even tile..."
IS VERSATILE

Ceramic tile is definitely out of the room and kitchen and into rest-

nants, offices and high-end spaces. Tiles are equally at home unifying public spaces in hotels and hospi-

tals as decorative items adding artistic interest to dining rooms and es, according to Loretta C. Fulvio Louis-based Hellmuth, Obata & baum, Inc.

It offers countless creative solutions. Tile can be mixed, matched, patterned or polished. Tile gives life and to elegant offices, luxury rooms and sophisticated industrial settings. Tile adds personality to the re-
corporate image of McDonald's fast food chains. Tile directs traffic flow in hospitals, hotels and terminals. Tile makes a state-
ment exterior cladding or a paver.

Americans tend to be more comfortable with pastels, earth tones and high-traffic areas. Tile gives the imagination by encouraging interplay between sizes, colors.

IS IN TILE

Americans tend to be more comfortable with pastels, earth tones and high-traffic areas. Tile gives the imagination by encouraging interplay between sizes, colors.

Unlike Europeans, Americans have a tendency to think tile is forever, notes Mario Adriani, president of Forms and Surfaces, Inc., the American agent for Cooperativa Ceramica D’Imola. “Even people who will readily strip wallpaper and replace furniture wouldn’t dream of changing their tile.”

With resale a prime concern, the residential market seems to prefer neutral colors. “Seventy percent of our residential sales are in beige, bone and white,” Adriani reports. “However, we’re seeing a definite trend toward feature strips.” Feature strips, narrow tile bands with colorful or dramatic designs, add a touch of personality while the room remains basically neutral.

“Feature strips make a design statement without dominating the environment,” according to Adriani.

Another time-honored favorite, the terra cotta look, is also experiencing a resurgence, reports LaFaenza’s Mario Lenz. “While cotto has been warming the floors of chateaus, villas and other historic buildings for centuries, the best of today’s tiles eliminate the heavy main-
tenance and elaborate installation re-
quirements of traditional cotto.”

Where the drama of pure design is the desired effect, ceramic mosaics are leading the way. The sophistication of Italian technology is producing an array of tiles so modularly sized they fit together like a jigsaw puzzle, explained Ceramica Vogue’s Giampaolo Bedeschi.

The trend toward tiles that duplicate marble, granite and other natural stones is expected to remain strong. “Italian faux tiles offer a lot of style for the dollar,” explained Walter D. Arnold III, AIA, of Dallas-based ABV & Associates.

In the faux category, Fiandre is without peer. Fiandre’s Ceramic Granite™ line duplicates the look and feel of natural granite and is available in a wide variety of colors and sizes, including a new 16-in. x 16-in. tile.

Another important design trend is the three dimensional look. Experiments with relief, color, shading and contrast have introduced new forms of ceramic art such as the Evoluzione line from Iris, the Overline Series from Candia, the QEMT and Miraaggio collections from Sant’Agostino.

For the more daring, there are intricately patterned tiles which form dramatic murals, distinctive geometrics or delicate free-flowing designs. Perhaps the best of these are designed by La-Faenza, Candia, Ascot and Cedit.

No matter what the project, no matter what the constraints, Italian tiles offer countless creative solutions. With a seemingly endless array of colors, sizes and styles, Italian tiles give form to the imagination and encourage the creation of distinctive signature designs.
Introducing Match. A revolutionary, new glazed ceramic tile developed in Italy to maintain its beauty on floor areas of the most concentrated traffic and harsh use. Manufactured by an innovative firing process which solves the problem of microscopic glaze craters which in the past have made ceramic tile floors difficult to maintain. The unique properties of Match increase abrasion resistance. A thick glass glaze is solid color throughout and easy to maintain. Available in 12 vibrant and subtle colors in smooth and nonskid surfaces. Its luster, durability and beauty can’t be Matched.
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The glittering potential of the U.S. ceramic tile market beckons Italian manufacturers like a modern-day siren. Europeans, who have long known the secret of tile's economy and versatility, utilize an average of 15 square feet per capita with Italian architecture leading the way at 30 square feet per capita. While the United States currently averages only three square feet of ceramic tile per capita, the figure is steadily rising.

Italian manufacturers see the United States as a major growth market, confirms Danato Grosser, marketing and management consultant for the Association of Italian Ceramic Tile and Refractories Manufacturers. “With American ceramic tile consumption at such a low level, an increase of even a few percentage points translates to millions of square feet of tile.”

Lured by the tremendous potential of the U.S. market, many Italian tile manufacturers are positioning themselves to capture a share of the anticipated growth. Their strategy: blend their heritage of technology and design with a native's understanding of American market conditions.

Currently, more than 100 Italian companies sell tile in the United States. However, 60 to 70 percent of the business is done by approximately 20 companies. Some of these manufacturers have local agents who develop distribution systems; some rely on company salesmen who spend four to five months each year in the United States.

The most far-sighted companies have established American subsidiaries, many with domestic manufacturing facilities. Two of the leaders in this field are American Marazzi Tile, Inc. and La FaenzaAmerica, Inc. Their strategy is to blend their heritage of Italian tile technology and design with a native's understanding of American market conditions and trends.

**American Marazzi Tile, Inc.**

Marazzi Ceramiche of Sassuolo, Italy was perhaps the first to establish an American subsidiary. Recognizing the U.S. potential for its superior glazed product line, as well as the problems inherent in importing large quantities of tile from Italy, Marazzi Ceramiche identified domestic manufacturing as its key to the American market.

In 1982, American Marazzi Tile, Inc., a wholly owned subsidiary of Marazzi Ceramiche, began manufacturing tiles in Sunnyvale, Texas. “Domestic manufacturing dramatically increases our flexibility, which translates to quicker deliveries and lower costs for our customers,” explained Janis Etzcorn, communications manager for American Marazzi.

Aided by the expertise of the Italian operation, which is universally acknowledged for the superiority of their glazes and colorants, American Marazzi began producing 8" x 8" glazed floor tiles less than six months. “Additional kilns will be added in the future,” Etzcorn noted, “and at that time we will introduce an additional size.”

While Marazzi Ceramiche manufactures tile for 50 countries on five continents, American Marazzi concentrates solely on the American market, “which gives us the flexibility to create color styles and patterns only the American market demands,” Etzcorn stressed.

With Marazzi Enduro™, a new, extremely wear-resistant glazed tile and additional lines, American Marazzi offers the American architectural and design community the benefits of Italian tile technology and the convenience of local manufacturing.

**La FaenzaAmerica, Inc.**

La Faenza, S.p.A., a company renowned for technical innovations in the artistry of its designs, also identified the subsidiary route as the most effective means of entering the American market. Given the extent of La Faenza's production...
The scope of LaFaenza's commitment to the American architectural and design market is demonstrated in its Selezione Architettura and Cotto Faenza lines. Cotto Faenza, which offers the warmth and ambiance of traditional terra cotta without the elaborate maintenance requirements, was developed primarily for the American market. "With the LaFaenza/LaFaenzaAmerica formula, architects and designers have ready access to the company's full range of colors, sizes and styles," Friedman added.

Despite the diversity in their product lines, both of these companies identified a domestic operation as their key to the American market. Each has carved its niche by combining the technical and design expertise of its Italian heritage with a native's understanding of the unique needs and constraints of the American market. Although their specific strategies may differ, these companies share a common goal—to provide American architects and designers with selection, service and guaranteed availability.

Their goal: provide American architects and designers with selection, service and guaranteed availability.

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SPECIFYING THE RIGHT TILE FOR THE JOB

by Jess McIlvain, AIA, CCS, CSI

All ceramic tiles are not created equal. The wide variety of tiles available in the American marketplace necessitates that architects and designers understand certain basic technical distinctions in order to match a tile’s performance characteristics with project requirements.

Tiles manufactured for bathroom walls, for example, would be disastrous as an exterior cladding, just as flooring tiles for a residential kitchen will not endure on the floors of commercial kitchens. Failure to adequately consider the characteristics of a specific type of tile is a common cause of installed tile failures.

Fortunately, the American National Standards Institute (ANSI) A137.1 - the “Standard Specifications for Ceramic Tile,” which includes American Society for Testing and Materials (ASTM) test procedures, provides a standardized system for evaluating a tile’s key characteristics. ANSI A137.1 makes it possible to compare one tile with another and provides a realistic benchmark for predicting on-the-job performance in such critical areas as ease of installation; degree of maintenance required; and how well it will look and perform over the life of the structure. Tiles meeting requirements of ANSI A137.1 are classified as “Standard Grade.”

HOW THE STANDARD WORKS

Independent testing laboratories can readily establish any tile’s performance characteristics through a series of tests specified in ANSI A137.1. Although nine to 11 separate tests are usually performed, there can be more. These tests measure the physical and technical properties that will determine tile performance.

Which of these characteristics is most important depends on the application for which the tile is being considered. When you’re planning an exterior job, a tile’s water absorption rate becomes vitally important. However, if you’re considering tile for the flooring in an industrial facility, its breaking strength would become a key factor.

Remember, however, ANSI A137.1 establishes only the minimum performance level a tile must meet in order to be in compliance. Most Italian tiles produce results much higher than these minimums, ensuring that they will perform as well as or better than required.

THE TESTS

Architects and designers can readily investigate any tile before recommending it merely by requesting a copy of the tile’s test results from the manufacturer or distributor. Although Italian tiles are thoroughly tested at every stage of development, the finished product is also evaluated against standards established by the Comite Europeen de Normalisation, the European equivalent of ANSI. For compliance in the American market, Italian manufacturers who are significant suppliers also have their tiles retested according to American standards.

The tests that are usually of greatest interest deal with water absorption, durability and dimensional accuracy. Color uniformity and porosity may also be important considerations.

Water Absorption

Water absorption (ASTM C373) is a critical factor in both stain- and frost-resistance. Generally, the lower the absorption rate, the more resistant the tile is to staining. In impervious tiles, such as porcelain tiles, material that might permanently discolor the tiles is more likely to remain on the surface, where it does less damage and is less difficult to remove.

ANSI A137.1 water-absorption requirements are highest for porcelain tiles, requiring them to absorb no more than 0.5 percent. Within the porcelain tile category, however, be aware that for some tiles such as Fiandre’s Ceramic...
Granite series, absorption can be as little as 0.04 percent.

ANSI A137.1 places quarry tile and glazed wall tile on the other end of the water-absorption spectrum. An absorption rate of 5.0 percent is permitted for quarry tile while 18.0 percent is acceptable for glazed wall tile.

Natural clay and shale fall somewhere in between, depending on whether or not they're glazed and the density of the clay body used in the tiles.

Resistance to repeated freezing and thawing (ASTM C1026) is related to moisture absorption, although it is determined by a separate test. When tiles freeze and thaw, they expand and contract. This can induce crazing, cracking, spalling or bond failure in tiles not designed for use under these conditions. The key point to remember here is that the more moisture a tile absorbs, the more freeze/thaw conditions can affect it. Hence, the lower the tile's absorption rate, the more it's suited for exterior uses in freezing climates.

**Breaking Strength**

Superior breaking strength is a significant indicator of a tile's ability to handle tough commercial environments, an important consideration where heavy equipment and rolling loads are a factor.

The breaking-strength test (ASTM C648) measures the amount of pressure a tile can bear. While ANSI A137.1 requires a minimum of 250 for most types of tiles, some tiles can withstand much greater pressure than others.

Porcelain tiles, for example, would normally be stronger than many non-vitreous tiles. Most Italian porcelain tiles perform well above the 250 pound minimum. At the other end of the spectrum, glazed wall tiles are only required to perform at a minimum of 90 pounds.

**Dimensional Accuracy**

The thickness-range test (ASTM C499) examines the edges of the tiles for uniform dimensions. Specifically, ANSI A137.1 requires the thickness to be controlled within 0.030 and 0.050 of an inch for various types of tiles.

Uniformity of thickness is important for aesthetic as well as practical considerations, especially in floor tiles. Tiles with substantial variations in thickness are likely to result in uneven floors with lippage between tiles.

From a practical standpoint, uneven floors have the potential for liability problems should someone trip on the edge of a high tile. In addition, if the tile has uneven edges, the higher edges will chip or break when subjected to heavy commercial traffic. To avoid these problems, extra man-hours and dollars may be required in an attempt during installation to adequately build up the low points and cull out tiles with excessively uneven edges.

From an aesthetic viewpoint, the use of uneven tiles can create shadows or waves in the resulting installation.

The facial-dimensions test (ASTM C490) measures the uniformity of a tile's surface. The test gauges both the tile's thickness (as described above) and how precisely the tile conforms to its specified length and width. Even seemingly insignificant size differences between pieces can require extra care and man-hours during installation. If sufficient care is not taken, unsightly variations in the width of grout joints may be noticeable when the project is finished. Tiles which meet or exceed specified requirements provide neat, even grout joints.

Many Italian tiles exceed facial-dimension requirements specified in

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To evaluate tile, follow this simple rule of thumb: the higher the product's ratings, the better its performance.

ANSI A137.1 and can be installed with narrow grout joints. Under certain conditions on walls, they can even be installed with the edges butted together to create a groutless look.

In this category, ANSI A137.1 is most strict for glazed wall tiles, permitting no more than 0.6 percent variations within a given lot of tiles. It permits a range of up to 1.5 percent for a test lot of paver tiles.

**Warpage (ASTM C485) and wedging (ASTM C502)** can create similar problems with aesthetics, safety, installation and maintenance. Warpage means that the dimensions of the tile are not equal on all four sides (keystone shaped), while the term warpage is used when a portion of the tile is concave or convex.

ANSI A137.1 requirements range from an acceptable maximum of 0.4 percent of the algebraic averages of all edge warpages and all diagonal warpages for glazed wall tiles to 1.5 percent along any edge or 1.0 percent on either diagonal for each of the quarry tiles in a test sample.

Warpage of paver tiles and ceramic mosaic tiles falls in the middle with the warpage of each tile in the sample not exceeding 1.0 percent along any edge or 0.75 percent on either diagonal.

On wedging, ANSI A137.1 sets a maximum of 0.6 percent for each glazed wall tile in the sample, and up to 2.0 percent for both glazed and unglazed ceramic mosaics.

Remember though, ANSI standards establish only the minimum level to which a tile must conform. Certain Italian manufacturers such as Ceramica Vogue have gone to great lengths to produce a new generation of glazed mosaic tiles that meet the far higher warpage and wedging standards of other categories.

**MODULAR TILE**

Many designs used by creative architects and designers call for several sizes of tiles to produce exciting layouts and patterns. In order for such designs to work, tiles have to be manufactured on a modular sizing system.

Frequently, tiles from several sources are used to create designs. Unfortunately, tiles from different manufacturers (and all too often from a single manufacturer) may not be made to the same module, i.e., 6” x 6” tiles may not fit within 12” x 12” tiles and have grout joints of the same width. In some cases, two 6" tiles are larger than one 12" tile. Such irregularities would destroy designs where these two tiles are mixed.

Some Italian manufacturers have mastered the technique of producing modular sized tiles. Regardless of whether the design calls for 2” square tiles, 6” or 12” square tiles, they would fit and work perfectly together to create patterns with uniform grout joint and continuity between modular tile sizes.

This concept works for any size tile, as long as they fit within the modular concept. Ceramica Vogue, for example, is an Italian manufacturer that takes great pride in the modularity of its products. Architects and designers can readily mix and match tiles from any of Ceramica Vogue's lines.

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**Jess McIlvain** is a leading independent consultant on installation of ceramic and marble tiles and causes of installation failures. He is a registered architect and corporate member of the American Institute of Architects; member of ASTM; a professional member of the Construction Specifications Institute; and a Certified Construction Specifier.

He is listed in the American Bar Association Register of Expert Witnesses in the Construction Industry. He is a construction arbitrator for the American Arbitration Association and serves on various construction industry committees.
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Reviewed by Aaron Betsky

David Van Zanten's clear premise and crisp prose mirror his French academic classicist perfection in the work of four eminent figures: Félix Duban, Isidore Labrouste, Louis Duc, and Alphonse Vaudoyer. Van Zanten sees these 19th-century figures as the founts of modern architecture, synthesizing novations in esthetic thought and engineering for new situational and imaginative contexts.

Other historians—most notably Neil Levine, Robin Hoodon, and the late Donald Egbert—have recently chronicled the Beaux-Arts tradition, but Van Zanten's contribution is twofold. First, he traces the careers of these four architects and reveals how their varied emphasis on issues that architects still address today: the importance of history, the unification of an edifice context, and the potential for architecture to be politically subversive.

While at the Ecole des Beaux-Arts, all four had won the coveted Grand Prix (for highest student achievement in accepted academic architecture), enabling them to live and travel in Italy. Having arrived in Rome at the height of the Romantic movement, the four laureates embraced this spirit of rebellion and sought to free themselves from the stifling influence of Quatremère de Quincy, the pupil of the Orders, and yet, the new sensibility they espoused was gradually put in service of the Academy. For example, Labrouste, for example, documented the temple of Hera at Paestum, concentrating on “primitif” Greek elements at the expense of heroic, but more acceptable, Roman ones. Vaudoyer, like other contemporaries, sent a subtle landscape and a minaret-like dome to Levante antecedents—short a Mediterranean architecture didactically reaching out to the newly important colonies and referring “to the whole history of architecture in a single symphonic composition.”

Van Zanten's cathedral of Marseilles integrated a basilican plan with a Byzantine vaulting system. The “minaret-like” domes refer to Levantine antecedents—short a Mediterranean architecture didactically reaching out to the newly important colonies and referring “to the whole history of architecture in a single symphonic composition.”

Duban is quoted as saying, “Fiction should occupy the primary place in architecture. . . . Was not the Greek temple a legend in stone?” One could say that Van Zanten is analyzing the structure of this literature, if not its content or context.
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Schindler reassessed

By Judith Sheine

Last year Rudolph Schindler would have been 100 years old, an occasion virtually obscured by the simultaneous celebration of Le Corbusier’s centennial. Schindler would not have been surprised. Architect of the Lovell Beach House (1925-26), one of the key buildings of the 1920s, he never achieved the large commissions or the recognition conferred upon his more famous colleagues Le Corbusier, Walter Gropius, Mies van der Rohe, and Richard Neutra.

In an attempt to breathe new life into Schindler’s contributions, the UCLA Graduate School of Architecture and Urban Planning last spring staged “Schindlerfest: The Emirnas, The Exhibition, The Colloquium, and The House Tour.” Orchestrated by Lionel Larch, the 10-week-long event appraised Schindler’s writings and the buildings in his adopted city from a contemporary perspective.

Recognition was slow in coming to Schindler. Though cognized as incorporating important principles of International Modernism, the Bevil Beach House was passed over in “The International Style” exhibition organized at the Museum of Modern Art by Henry-Russell Hitchcock and Philip Johnson in 1932. In his face to David Gebhard’s 1971 biography, Hitchcock cites his own earlier critical statement of Schindler’s work: “There is certainly immense vitality... but this vitality seems general to lead to arbitrary brutal effects.” He then goes to “make some redress” his earlier assessment of Schindler, but apart from noting an appreciation of the Lovell, the effect is at best to win him with faint praise.

Schindler first left Vienna in 1914 to go to Chicago, where he worked in the office of Frank Lloyd Wright. He came to Los Angeles in 1920 to supervise construction of the Barnsdall (Hollyhock) House and remained to practice as an artist/builder on his own. Unlike his one-time partner and fellow Viennese, Richard Neutra, Rudolph Schindler was not an effective self-promoter; his commissions were mostly residences and smaller commercial buildings, not highly visible projects that received wide exposure. He made very few drawings or models, particularly in his later years, often designing from rough drawings as he built. However, as his writings demonstrate, Schindler was certainly not humble about his work. With a clear eye toward posterity, he saved virtually every document associated with his practice, even letters and receipts.

Schindler consciously set himself apart from other Modern architects in his theories about what he called “space architecture.” These concepts, initially articulated in a 1912 manifesto written in Vienna, were later expanded in a 1934 article. In contrast to other practitioners of the International Style, whom he criticized as mere “functionalists,” obsessed with “the ideal of perfection... the machine,” Schindler viewed architecture as an “art dealing with a new medium (space)” that could “serve as a vehicle for human expression.” He called upon the profession to take advantage of developments in steel-frame and reinforced-concrete construction, allowing the flow of space to become visible by lightening walls and reducing the depth of spans.

While Le Corbusier, for example, accepted the conventional concrete frame and sculpted it to the spatial possibilities he saw, Schindler viewed structure as something that could be played down so that space would really...
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be the architecture. Later, in a 1946 article, he wrote of rationalizing his design ideals through the use of a proportional system based upon a four-foot module called a “space reference frame,” which could be divided into smaller components to regulate the rhythm of the architect’s “space relationships.” He adapted the module to common U.S. wood-frame construction in the hope that his system would find universal application. (Schindler also described his principles in RECORD [May 1947, pages 143-46].) A datum at the standard floor height of six feet eight inches was established so that the tops of doors and glazed penings could align with it, and door lengths could be identical throughout. Above the datum, the roof (whether flat or sloped) would float on clerestories at various levels to differentiate space.

Schindler experimented continually with building technology: innovative tilt-up ab concrete walls were erected—his own King’s Road House of 1921–22, and an early kind of slip form system (called “slab-cast”) as used in the Pueblo Ribera Court, in La Jolla, of 1923 and the How House of 1925. The Schindlerfest exhibition, organized under the joint direction of Lionel March and a former Schindler employee and early champion of the architect, who first brought him to broad public attention in her book Five California Architects (1960). August Sarnitz, of the Otto Wagner Archive in Vienna, author of R. M. Schindler Architekt: 1887-1953 (published this fall in English), examined Schindler’s Viennese origins, including the influence of Otto Wagner and Adolf Loos, and looked at his early career in America. Lionel March discussed research on the How House, which he owns. Barbara Giella, an architectural historian who teaches at the City College of New York, appraised the work of the 1930s, focusing on the Walker House, a 1935 Schindler design in which she grew up. David Gebhard, of the University of California-Santa Barbara, concluded the session with a talk on the late houses of the 1940s and 1950s. He addressed issues implied in Schindler’s work but never fully realized, owing to the architect’s untimely death in 1953.

In these talks and the discussions that followed, differences emerged among Schindler scholars and enthusiasts, particularly over the quality of the early versus the late work. Some participants reaffirmed Hitchcock’s assessment that Schindler’s late work was eclectic and arbitrary, whereas others argued that the spatial continuity between rooms (“space units”) became ever more sophisticated in the late work. (In the Tischler House of 1949, for example, a shed roof sheathed in translucent fiberglass panels rises directly from the datum, uniting all of the living and sleeping rooms in one large but subtly differentiated space. Structure and materials seem to dissolve until only a pure bubble of space remains perched on the hillside.) Visitors to 10 extant Schindler houses, organized by Beata Inaya, a Schindler client, culminated the Schindlerfest.

With the general resurgence of interest in Modern architecture and increasing media attention paid to the current Los Angeles architectural scene, it was perhaps inevitable that Schindler’s late works should be compared to recent projects by contemporary California architects such as Frank Gehry. Though Schindler’s architecture does incorporate the same inexpensive Southern California materials that have become Gehry’s signature, Gehry’s fascination with sculptural mass and extroverted composition is opposed to Schindler’s concern (and his indebtedness to Wright and the Viennese) for facilitating spatial expression and rational proportional systems.

Perhaps the happiest consequence of the Schindlerfest was a new awareness on the part of current and potential owners of the importance of Schindler buildings. While a few houses are in near-perfect condition, many have been insensitively altered or remain in a tragic state of disrepair (the Pueblo Ribera Court, for example, is now nearly unrecognizable). In re-evaluating these artifacts, the Schindlerfest sparked hope that the legacy of R. M. Schindler might be preserved in the future for the waves of “space architecture” enthusiasts that are sure to come.
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“Only connect!” exhorted the writer E. M. Forster, in the epigraph to a novel probing the gulfs of misunderstanding and solid ground of sympathy that shape the paths of human relationships. The same maxim could serve as a thematic heading for the collection of projects that follows in this issue. One way or another, each article deals with an effort to build some kind of bridge—figuratively in most cases, and literally in the design shown below and on pages 114-117.

The new Pavilion for Japanese Art at the Los Angeles County Museum of Art, conceived schematically by the late Bruce Goff and realized by Bart Prince, links esthetic traditions that sometimes seem a world apart, sometimes neighbors. At the same time, the consummation of Goff and Prince’s highly original design validates a bold leap of faith on the part of enlightened clients. The result is a work of art in its own right (see cover and pages 92-99).

Spanning cultural and generational gaps has always been the charge of America’s primary and secondary schools—even if the methodologies and forms for achieving that goal have varied considerably over time, and been the subject of continual debate. This month’s Building Types Study (pages 100-113) reflects on major trends in schoolhouse design, from the postwar baby boom up to the boomlet now under way. The controversy of the moment centers on whether to press on with innovative planning ideas or return to the well-tried prototypes one architect sums up as “bells and cells.”

Another would-be cultural connection that stirs its share of philosophizing and argument is the Olympic Summer Games, taking place this month in Seoul. Unlike earlier host cities that found their elaborate Olympic villages to resemble costly bridges to nowhere once the games were over, the Korean capital specifically commissioned facilities adaptable to future use by its own citizens. A report on the multipurpose new town designed by Boston-based architects Woo & Williams charts the complex evolution of this ambitious undertaking (pages 118-127). The news from Korea comes in two segments: part two (pages 128-135) analyzes the Olympic stadium domes designed by engineer David H. Geiger in a world-class feat of structural creativity.
House of the tranquil mind
Pavilion for Japanese Art
The Los Angeles County Museum of Art
Bruce Goff, Preliminary Design
Bart Prince, Architect
Between 1978 and 1982 Bruce Goff sketched preliminary plans for a unique gallery of Japanese art, but he died before completing the design. A six-year collaboration among a generous patron, a talented disciple, and an expanding Los Angeles museum has turned

“Simplicity is considered by some a virtue,” wrote Bruce Goff in 1957, “but it may only disguise the absence of anything important; complexity is sometimes considered confusing, when in reality this is only a matter of first appearance.” Throughout a long career that began in 1916 when the 12-year-old Goff entered an apprenticeship with the Tulsa firm of Rush, Endacott & Rush and ended with the architect’s death in 1982, he consistently masked some surprisingly straightforward notions about program and interior space with elaborate geometries and complicated structural mannerisms. Given the highly personal character of his buildings, most of which are single-family houses inaccessible to the public, scattered across the Great Plains and Southwest, Goff has addled historians attempting to determine his position among his architectural contemporaries. As David De Long observes in a monograph recently published by the Architectural History Foundation, Goff’s artistic temperament, like Frank Lloyd Wright’s, was based on “an expression of individual choice unfettered by concerns of taste or style.” The Kansas-born architect, geographically and philosophically isolated from the intellectualizing of Bauhaus-trained peers, believed that “each time we do a building, it should be the first and the last .... Artists who attempt to create a ‘manner’ or ‘style’ by endless variations on a theme ... usually have only one song to sing.” If a few critics still dismiss Goff as an aberrant footnote to the history of 20th-century architecture, most have come to view his oeuvre in a more favorable light, using terms such as “characteristically American” or “romantically idiosyncratic” to describe Goff’s 450 commissions and 147 realized designs.

Above all else, Goff enjoyed the unwavering loyalty of his clients and students, two of whom are responsible for guiding the architect’s last project—and the largest commission of his independent practice—to completion. Scheduled to open late this month, the Pavilion for Japanese Art, in Los Angeles, is a remarkable collaboration among Goff, who drew up a schematic plan and elevation for the 32,100-square-foot building shortly before his death; Joe Price, Goff’s major patron and one of this country’s most discerning collectors of Japanese art; Bart Prince, the Albuquerque architect and Goff protégé who prepared working drawings for the pavilion and supervised its construction; and the Los Angeles County Museum of Art, the ambitious cultural institution on Wilshire Boulevard for which the pavilion is only the most recent component of an ongoing expansion. [RECORD, February 1987, pages 110-119].

Joe Price met Bruce Goff in 1951 while studying electrical engineering at the University of Oklahoma. During the 1950s, Price’s family began using some of the wealth it had accumulated through the manufacture of oil and gas pipeline to commission works of architecture, including the celebrated mixed-use tower in Bartlesville, designed by Frank Lloyd Wright in 1952, that bears the family’s name. While Joe’s father, Harold, Sr., and brother, Harold, Jr., continued to employ Wright for the design of their own houses, Joe turned to Goff for a series of residential commissions, erected in Bartlesville between 1956 and 1978. Around 1963 he also began acquiring Japanese art in earnest, mainly painted screens and scrolls of the Edo period (1615-1868). Twenty-five years later, scholars generally consider Price’s 900-work collection—the bed Shin’ enkan, or “house of the tranquil mind,” after the studio of the 18th-century painter Ito Jakuchū—to be the finest group of late Edo-period paintings outside Japa...
In 1976, Price approached the Metropolitan Museum of Art in New York to discuss the possibility of donating his collection, and commissioned Goff to draw up a preliminary redesign of the Met's existing Japanese galleries. Although the museum's trustees apparently liked Goff's scheme of varied floor levels and suspended canopies, they balked at his choice of materials—a characteristically unorthodox combination of composition board, textured plastic, and other synthetic finishes—and in 1978 the project was dropped. (The Met eventually turned to its own master-plan architect, Kevin Roche, who designed the comparatively conventional, Sackler Galleries for Asian Art that opened last year.) Over the next five years, Price investigated several other likely places to house his collection, including university museums at Harvard, Stanford, and Princeton. When he finally chose the Los Angeles County Museum of Art in 1983, Price based his decision on a feeling that "in Southern California, I simply found an interest in the Orient, specially Japan, that was lacking elsewhere."

While his patron searched for an appropriate site, Goff was busy preparing a series of proposals for a freestanding pavilion, suitable for virtually any location, that would incorporate a major gallery for exhibition of screens and scrolls as well as a separate housing art-storage and study areas. From the outset, both rice and Goff sought to create a museum where, in Price's words, "the art itself would be the client." Toward that end, Goff turned to the Japanese architectural device of the tokonoma, an intimate alcove used in traditional teahouses and residences for artistic presentation of a single hanging scroll or flower arrangement. Goff devised an ingenious system of three two-story-high double-sided tokonomas, linked by a continuous ramp set within an open volume defined by curved walls. In order to avoid illumination by artificial spotlights, Goff proposed sheathing the pavilion in nonbearing walls of faceted fiberglass panels whose milky translucence would allow varying amounts of natural light to enter the pavilion according to the time of day, like visually recalling Japanese shoji. This basic concept, articulated in the form of a schematic plan and elevation, was all that existed when Goff died. It was left to Price to work out the pavilion's structural intricacies—particularly its elaborate roofs, which are suspended by stainless-steel cables from curving steel box beams attached to reinforced-concrete columns, and its structurally independent, stiltsed system of interior ramps and viewing platforms. Even, too, the younger architect had to address a significant change in the building's program (in addition to the Shin'enkan section, the pavilion must accommodate LACMA's existing Japanese holdings), and he had to adapt the structure to its specific location in Hancock Park, at the northeast corner of the CMA complex (Goff's design had been, of necessity, site-specific)—all the while struggling to keep his mentor's original intentions intact.

As an academic exercise, one can speculate on how Goff might have completed the pavilion had he lived through its final design and construction. How, for instance, would he have joined the pavilion to the museum's Times Mirror Central Court to the west, a problem that Price solved by means of an elevated curving walkway (photo top right)? How would he have handled the fired addition of a third story to incorporate commodious t-­wing galleries devoted to the exhibition of three-dimensional works of art? How would he have designed the pavilion's elaborate security and fire-protection systems and deal with the seismic considerations that accompany any building project in Southern California. For example, two circular reinforced-concrete towers housing the pavilion's main stairwell and elevator are sheathed in green-quartz aggregate installed with steel ties and wire meant to ensure positive attachment during an earthquake. The exterior overhead walkway connecting the two towers—a visually expressionistic tour de force—also functions as a seismic stabilizer.
objects not part of the Price collection (opposite)? How would he have dealt with the budgetary and esthetic compromises that inevitably accompany projects of this type? Although Price gave LACMA $5 million toward construction expenses, the building will eventually cost nearly $13 million, and certain cost-cutting measures were necessary. The use of gray-green exterior stucco, for example, was at least partly dictated by budget. Prince would have preferred ceramic tile; what would Goff have specified? Such speculation, however, is moot. As built, the pavilion is an unqualified triumph, not only for its stylistic originality but also for its functional success as a museum. On initial inspection, the pavilion’s formal expression exhibits a mixed bag of historical precedents, ranging from the upturned eaves of traditional Japanese temples and gates, to the soaring cantilevered roofs of Eero Saarinen’s TWA Terminal and the futuristic coffee shops that proliferated throughout the country, but especially in Los Angeles, during the 1950s and ’60s. And yet, this building does not easily lend itself to conventional art-historical analysis, reflecting instead Goff’s lifelong goal, first stated in 1933, of producing "architecture not of the past or future, but for the continuous present." Consistent with this line of reasoning, the pavilion appears deliberately enigmatic: from the outside its translucent panels give virtually no clue to what is going on inside. That aura of mystery and surprise, so characteristic of Goff’s work in general, is heightened by the fact that the building has no obvious front or rear elevation. It resides at the edge of the primordial La Brea Tar Pits like some lazily kinetic architectural Möbius strip, encouraging the observer to circle slowly and contemplate the eerie timelessness of its setting. (Ironically, given that Price had not yet settled on Los Angeles when Goff prepared his preliminary design, the pavilion’s blend of Oriental serenity and American expressionism seems an apt metaphor for a city whose cultural identity incorporates both Western and non-Western impulses.)

Once inside, visitors typically ascend to the building’s top level in a half-round elevator, tour the west-wing galleries, and begin a dimly lit downward passage of ethereal beauty, nearly impossible to depict in words or photographs, through the east-wing tokonomas back to ground level (pages 98-99). Knowing that they were destined to be compared with Wright at the Guggenheim Museum, Goff and Prince deftly solved the principal drawback of Wright’s famous spiral—viewing art on an incline—by positioning a level observation platform in front of each tokonoma. Unlike the Guggenheim, moreover, where the ramp essentially makes the building, the LACMA pavilion’s circulation and viewing system is a freestanding element inserted into a three-story shell. The platforms stop three feet short of the tokonomas, allowing humidified air and the sound of moving water from a plaza-level fountain to circulate freely throughout the three-story-high space. If the east wing has any built progenitor, it is probably less the Guggenheim than Goff’s own best-known work, the 1950 Bavinger House, whose combination of floating stairways and suspended living platforms set into a single volume seems a residential variation on the pavilion’s underlying theme. In the end, however, as Price had initially envisioned, the pavilion’s profounder spiritual wellspring might be the singular beauty of the art exhibited inside. Far from the studio of the painter Jakuchū, Goff and Prince have created another memorable house of the tranquil mind. Paul M. Sachner
The Pavilion for Japanese Art comprises east and west wings connected at the plaza level by a lozenge-shaped lobby (plans opposite). The east wing (pages 98-99) is devoted to a regularly changing exhibition of Edo-period screens and scrolls mounted on three two-story-high tokonomas. The west wing houses a variety of three-dimensional objects from the museum’s permanent collection, including large Buddhist sculpture, netsuke, archeological materials, ceramics, lacquers, metalwork, and kimonos. Around 30 objects are on display at any one time, primarily in a 3,300-square-foot gallery located on the wing’s upper level (photos below). An adjoining 1,100-square-foot gallery (not shown) accommodates woodblock prints and small objects in vitrines. A third gallery and bookstore occupy the plaza level, while curators’ offices, a library, and art-storage facilities are situated on the ground level.
Framed in steel and clad in stucco, the 40-foot-high tokonomas in the pavilion’s east wing terminate in wood ridges (opposite). Painted screens up to 24 feet wide have been installed on the concave side of each tokonoma, where they can be viewed either close-up or at a distance (below left and bottom). Vertical scrolls are displayed on the convex side, where a more intimate view is afforded (below right). Curving acrylic rails and a three-foot space separate viewer from art, eliminating the need for protective glass.

Pavilion for Japanese Art  
The Los Angeles County Museum of Art  
Los Angeles, California  
Architects:  
Bart Prince, architect; Bruce Goff, preliminary design  
Engineers:  
Engineering Associates

(structural); Hayakawa Associates (mechanical/electrical)  
Consultant:  
Project Control, Inc.  
(owner’s representative)  
General contractor:  
Kajima International, Inc.
The winds of change buffeting school curricula have not spared architectural form. While the prevailing back-to-basics movement in pedagogy is encouraging a revival of traditional layouts ("bells and cells," architect Earl Flansburgh terms them), communities are pressuring school districts to include more facilities for shared use. And the clamor for specialized areas—especially for computers—persists, even when necessary funding is unavailable. Districts that were closing schoolhouses a few years ago must now contend with dramatically increased enrollment, both from population shifts and from the ongoing "baby boomlet." RECORD editor Herbert L. Smith asked partners in three firms—each with several decades of school-design experience, and each a respected innovator in the field—to discuss the ways in which planning for primary and secondary education has changed since the widespread experiments of the '60s and '70s. Earl Flansburgh's firm was founded in 1963, and has been responsible for the design of some 90 schools. Bill Brubaker, a partner in the Chicago office of Perkins & Will, has guided the design of more than 50 facilities since that firm's inception in 1950. Paul Kennon spoke for CRSS, a practice with nearly 1,000 such projects to its credit. On the following pages we present commentary on past and current trends from these seasoned experts, and offer a look at their responses to new challenges. To broaden the perspective, we also show how a relatively young firm, Reyna Caragonne Architects, has brought a traditional program up to date for typical budget-wary clients. James S. Russell

The diagrams above represent planning schemes underlying the three built projects included in the design portfolio that follows.

1. Capital High School, Santa Fe, New Mexico; Perkins & Will with Mimbres, Inc., Architects
2. Gardendale Elementary School, San Antonio, Texas; Reyna Caragonne Architects
3. Arlington Elementary School, Lawrence, Massachusetts; Earl R. Flansburgh + Associates, Inc., Architects

Building Types Study 657: Schools
This scheme assembles separate associative design elements, which have been arranged to take advantage of specific site conditions. Loftlike classroom and office pavilions (upper right in plan) focus on an axis with distant mountain views, and specialized pavilions for theater, music, and sports (left and upper left in plan) are organized around a landscaped courtyard. The blocks are united by architectural elements that are both familiar and responsive to the hot desert sun: towers and arcades associated with local civic buildings mark the skewed gymnasium wing (left in top photo), performing arts wing (center in photo), and entrance to the academic wing (model). The enclosure of the two large courts will allow graceful additions as the current student population of 800 gradually swells to an anticipated 1,300.
RECORD: The late 1960s and '70s were times of educational change and re-evaluation. Architects were concerned about designing flexible schools that would not become obsolete. How have curricula and facility priorities changed since then?

Earl Flansburgh: Flexibility was achieved by such architectural elements as open-plan classrooms with operable partitions (suitable for team teaching), and conference rooms and specific project areas related to clusters of classrooms. Now, with renewed interest in basic education in mathematics, science, English, and history, we don't see this interest in flexibility. There is less emphasis on enrichment of these basic subjects, and programs in art and music are less sophisticated. The reasons for this are primarily economic. With the increased cost of education (teaching salaries and building operations above all), there is less left over for these items, now considered "frills."

Paul Kennon: We still need to be open to the convertibility of spaces because of sophisticated equipment, utilities, and wiring. Teaching methods and enrollment levels are by no means fixed.

RECORD: Though schools have always functioned as community facilities, the aging of our population has made such shared use an ever higher priority. How have you responded?

Bill Brubaker: The "community school," serving the needs not only of students but also adults, is indeed a timely concept. Among the public uses that can be offered are cultural activities, day-care, and health and social services. Even adults without children can participate and have a stake in the success of schools, and it is hoped that this will translate into greater support through tax dollars and volunteer work.

EF: A major design requirement for recent auditorium projects has been the accommodation of the client community's town meeting. And today there are many neighborhood-based drama clubs and musical organizations—at the same time that similar school activities have excited less public interest.

PK: Education will increasingly draw on the resources and expertise within the community. We are working together with IBM and the Poughkeepsie, New York, school district, for example; and Indiana University and AT&T have created a new teaching and learning center for high schools throughout the state. With education a lifelong process, it is worth exploring the amalgamation of facilities on one site, from nursery school and K through 12 to community college and continuing education.

RECORD: How do today's design programming priorities differ from yesterday's?

PK: We find we have to use system techniques to get schools built quickly to tight budgets, as at the Brea-Olinda High School (right and opposite).

EF: Fieldhouses used to be popular in high schools and we designed and constructed several. Today only a basic gym is typically programmed in public schools. In independent schools, however, large athletic and physical education spaces are still a high priority. The growth of women's athletics has effectively doubled the outside field requirements for all schools, and increased indoor space for physical education. Gone are the days when the visiting team used the girls' locker room.

BB: Because educational needs and programs change, buildings for education should allow both for change within and for graceful external expansion. Some schools may have to be designed with future adaptive reuse in mind. For instance, a school located on a busy corner might be developed for easy

Cost-conscious facilities bring town and gown together

Classrooms cluster around a courtyard at the top of a ridge a 263,000-square-foot complex. Sports and performing-arts facilities used year-round for academic programs are also shared by the local community. These dual-use elements are separated from the academic quadrangle and cascade down the sloping site, accessible via a tree-lined pedestrian way (plan). Owing to cost and time restraints, the design firm's construction arm adapted tilt-concrete-wall technology normally reserved for warehouses.
conversion to commercial use. Urban schools have very different needs from suburban ones: their sites are smaller and they often face heavily trafficked streets and have multifloor neighbors requiring a contextual response. We now have three prototype schools underway in New York City, where we’re dividing the program into three- and four-story townhouse-like units.

**EF:** Libraries today are similar in some ways to those of a decade ago but also different in many ways. The library is still the center of the school, but the librarian’s jurisdiction over the computer is fading. The personal computer—now almost 10 years old—has become just another piece of standard equipment in the classroom. Many students have some computer skills as do many teachers. The rise of the personal computer has also eliminated the over-complicated mainframe computer system.

**BB:** We don’t yet know how big an effect computers will have on school design in the future.

**PK:** Schools must address new needs. We may soon be providing such “smart building” technologies as accessible floors and fiber-optic cables.

**RECORD:** In the ’60s we saw straightforward massing, usually with flat roofs. Now we see more complex forms, greater use of color, and historical recall. Is this just knee-jerk Postmodernism?

**BB:** First of all, regionalism is a rediscovered trend in school design. We are learning to recognize the natural logic of many local building traditions. The Santa Fe High School (pages 100-101) and our prototype schools in New Mexico (pages 106-109) attempt to benefit from regional values.

**EF:** We’re seeing simple interiors, reflecting a basic educational program. Exterior educational symbolism has replaced interior educational flexibility as a driving force for academic buildings.

**BB:** Pitched roofs create more spatial interest. People appreciate great spaces as a relief from the sameness of classroom, office, laboratory, and corridor spaces. A dining room or library can be seen as a spacious commons or as an atrium. Stark corridors can be developed as “student streets.” These kinds of focal points give students a sense of place.

**PK:** In high schools we have to look at wider corridors for better crowd control. Crowded conditions may even lead to physical violence. Code-mandated widths are not enough. But corridors can do double duty by being attractive to encourage socialization as well as security.

**RECORD:** We hear more than ever from politicians about the importance of education. Are we going to see greater richness in the programs? Will the form of facilities continue to change?

**BB:** There is a revived interest in school design nationwide. New facilities are needed not only in growing parts of the South and West but also in established communities. Local population shifts are occurring; many old buildings are either functionally inadequate or too costly to maintain.

**EF:** In some respects we will probably be dealing with a different teacher and a different faculty. For generations our society benefited from the highly intelligent “young ladies” who chose teaching as an appropriate career. But the social-studies teacher of the ’50s is today’s bank vice president. Sadly, we are not attracting imaginative people to the field. It took the launching of Sputnik to make postwar American society aware of the shortcomings of our teaching in mathematics and science. The threat of Japanese technical and manufacturing superiority may be this generation’s Sputnik.

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**Open classrooms retain their appeal for an independent curriculum**

Glenwood School
Dallas, Texas
Earl R. Flansburgh + Associates, Architects

The concept of “project areas” accessible from series of flexible classrooms lies at the heart of this design for an independent K-12 school. Sliding or folding doors enable these spaces to alternate as separate teaching units or open-plan clusters, according to changing requirements. Individual offices for teachers and curriculum coordinators adjoin each three-four-classroom group, along with a complement of conference areas serving smaller classrooms. At the client’s request, Flansburgh’s campus plan stresses the individual...
Activities of the lower, middle, upper schools, while giving entire complex a institutional, informal character in harmony with the surrounding residential neighborhood. The shared utilities of library, gym, and use hall help to provide a living community focus for wood's three main ions—and take fullest utage of a relatively restricted site. Outdoor activity is, linked by open paths as as covered walkways, urage the enjoyment of recently landscaped grounds.
Inventive regionalism sparks a prototype for the desert

For an arid terrain in southeastern New Mexico, where typical buildings are often colorful, but very unassuming and practical, architects Perkins & Will have developed this budget-conscious, prototype elementary school that translates simple concrete block and bar joists into eye-catching structures for about $50 a square foot.

An early decision was made to keep the schools small-scale and complete in themselves, according to Ralph Johnson, the architects' design principal for this project. Thus, instead of one big, campuslike elementary school to accommodate all of the expected student population, three identical facilities were repeated about a quarter of a mile apart—one each for grades K-2, 3-4, and 5-6. Compatible groupings were one object of scheme; another was utilizing limited land parcels readily available on the periphery of community.

And, as each school shares some facilities with the public, they give the bonus of neighborhood centers and oasis-like focal points. Each school encircled by a low, native-rock wall to separate irrigated, planted areas adjoining the

Desert View Elementary School
Sunland Park, New Mexico
Perkins & Will,
Design Architects
Mimbres, Inc.,
Project Architects
ding from the surrounding d-blown, sandy desert.

te school plan is simple, but
tly zoned and arranged
nd courts. Walkways are
led by translucent fiberglass
s and canvas awnings.
rooms are repetitive
dard sizes, off double-loaded
dors, flanking the shared
ities: administration, library,
ntia, and a multipurpose
. The scale and massing of
abled pavilions housing the
wo areas—together with a
ulptural entrance
—signal their added use
umerous community
ions. The other areas are
shed-roofed, off clerestoried
spines.

The varied fenestration—
ranging from tiny windows to
entire gable ends—helps give
the building a much larger,
grander sense of scale than its
relatively modest size would
ordinarily evoke. Similarly,
integral color in the concrete-
block bearing walls and the
bright paint of the exposed steel
structure give a festive elegance
to the forthright materials.

It all adds up to a strong
associative regionalism for the
desert climate, without
depending on direct recall or
stylistic historicism.
The cooling interplay of light and shade evident indoors and out in this prototype desert school will be strengthened when landscaping matures within the encircling stone walls. All interior spaces are air-conditioned. The concrete block, metal roofs, and steel structural members are left exposed as finishes inside and out.

**Desert View Elementary School**
Sunland Park, New Mexico

**Owner:**
Gadsden Independent School District

**Design architect:**
Perkins & Will—Ralph E. Johnson, design principal; James Toya, project manager; Elizabeth Fakatselis, Jerry Johnson, Mark Romack, Stuart Royalty, Carolyn Smith, project designers

**Project architect:**
Mimbres, Inc.—Kestutis Germanas, Sam Jamron, project architects

**Engineers:**
Mimbres, Inc. (structural); Bridgers & Paxton, Inc. (mechanical); Tierra Del Sol (electrical)

**Consultants:**
Cervantes P. E. & Associates (site engineering); Gordon B. (specifications)

**General contractors:**
Wooten Construction Co. and Snider/Chapman Construction Co.
A sprightly add-on scheme copes with renewal and growth

Among those re-exploring variants of the standardized plan approach, Reyna Caragonne Architects has developed a simple add-on scheme. Given the desired time- and cost-savings, their project is perky, colorful, and appealingly scaled. The basic unit is a no-nonsense plan of 10 standard classrooms flanking a double-loaded corridor, and fronted by a lateral corridor (top photo far right) from which entries and future classroom expansion can be added. All corridors are double height and, together with the resulting interplay of pitched roofs, give a much needed variety in spaces and forms. The units are designed to be separated by three-sided interior courtyards, with the fourth side closed by decorative lattice fencing. The lattice alone is used to form a court for the end unit (photo bottom right). Each classroom has access to a court for outdoor recreation and instruction, and for natural light and ventilation through operable windows if desired. (The units are also air conditioned.)

For this school, a master plan was developed to gradually replace and expand an existing facility (see plot plan far right with the old structures.)

Gardendale Elementary School
San Antonio, Texas
Reyna Caragonne Architects

110 Architectural Record September 1988
Excessively demolished as new its are added. The first phase own here consists of one ssroom unit and a kitchen and ing facility; future plans call more classrooms and a small nistration wing.

The basic structure is steel me, with metal studs, wood ses, and prefinished ding-seam metal roofing.

Eors are finished with xo, glass block, and glazed utural clay tile. The cost was per square foot.

t to date, two other San onio schools have also built of the classroom units to nd existing facilities.

Gardendale Elementary School
San Antonio, Texas
Owner:
Edgewood Independent School District
Architect:
Reyna Caragonne Architects—
Elias Reyna, partner-in-charge; Alex Caragonne, architect;
Debra Dockery, project architect
Engineers:
Robert Harper (structural); William Dorbant (mechanical/electrical)
General contractor:
Wes Lockeridge & Associates
Varied textures and subtle color enrich a conservative plan

Never one to be daunted by changing attitudes or restrictions, Earl Flansburgh (while obviously regretting that a return to traditional "bells and cells" is replacing the imaginative school planning encouraged in the 1960s and early '70s) has perceived a somewhat compensating new interest and concern with the quality of the architecture itself. However, Flansburgh's increase in "architectural richness" is by no means that of applied ornamental pastiche or fashionable cliché, but is the result of carefully studied massing, detailing, colors, and textures of the materials.

In plan, the K-8 school is approximately a "T" shape, separating older and younger students. At the juncture, by the main entrance, is an indoor amphitheater (bottom photo above) on the first floor, and a library (photo bottom left) on the second level. The top floors are basically standard-sized classrooms off double-loaded corridors. There are specialized rooms for arts and crafts, science labs, industrial-arts shops, and home economics. Of usual are facilities for a computer center and an audiovisual production studio.

Arlington Elementary School
Lawrence, Massachusetts
Earl R. Flansburgh +
Associates, Inc., Architects
though the school has a few small conference rooms, Flansburgh notes that the numerous project spaces and conference areas of earlier years are gone, partly the result of changes in teaching techniques, partly from a sharp reduction in the number of teacher aids and specialized support personnel.

Architect:

Earl R. Flansburgh + Associates, Inc. — Earl R. Flansburgh, principal-in-charge; Joseph Diviney, associate; John Cannon, Daniel Perruzi, design associates; David Hocker, contract documents; Ned Collier, William Lim, design team; Gary Larson, landscape

Engineers:

R. G. Vanderweil Engineers, Inc. (mechanical/electrical); David Berg Associates (structural)

Consultants:

Bolt, Beranek & Newman (acoustics); Hanscomb Associates (costs)

General contractor:

R. W. Granger & Sons, Inc.
The Bridge at Concourse
Atlanta
Scogin Elam and Bray
Architects
Defying gravity

With probably unwitting irony, some real-estate image-maker gave the name Perimeter Center to a northern outgrowth of Atlanta where slick new colossi loom above a still-sylvan landscape like the shards of an exploded city. The phenomenal disconnectedness of the ambiance makes it symbolically appropriate that the developer of an office-hotel complex there, called Concourse, should have decided to erect a bridge as an outdoor focal point. The client explained to architects Scogin Elam and Bray that the bridge was functionally nonessential; to get from one part of the compound to another, it's easy enough to skirt the manmade lake at its core. The crossing was meant instead to be "a piece of jewelry" to adorn a conventional background. Scogin Elam and Bray enthusiastically seized the opportunity to contemplate the very essence of "bridgeness," and given the premise that this particular bridge embodied a desire to connect two points rather than a necessity, they were free to stretch their thinking far beyond the usual pragmatic boundaries. "We considered everything from natural stone bridges, water bugs, and lily pads to constructivist assemblages," Mack Scogin recalls; "at one point we came up with sailboats that would take you from one side to the other." In the end, they fused different concepts into a multifaceted structure that, as they describe it, makes traversing the bridge a stimulating "mind-game." The most obvious riddle is a boulder jutting through one side of an open pavilion at the midpoint of the span. As if to intensify the effect of solid matter flouting gravity, the parapet opposite the rock sprouts cantilevered screens that hover above the water like dragonfly wings. A subtler enigma arises from the schizoid structure implied by webs of cables anchoring one half of the bridge and outsize trusses rising above the other: both tectonic systems are in fact purely decorative, since the footpath is a self-supporting single span. The esthetic tension between the symmetry of the bridge elevation along its major axis and the asymmetry of its transverse section are both palpable as one climbs either ramp and meets an upright pole mounted beside the rock, right at the center of the narrow footpath, where it forces one to squeeze by on either side. In part, this duality reflects the nature of the site: an intimate cove on one flank, the open lagoon on the other. But it also counters the blandness of its built environs with a welcome reminder that paradox, whimsy, and surprise are worth enjoying along the way, no matter where one is headed. This is a folly in the best sense of the word. D. B.
The single-span structure of the 50-foot-long bridge is steel with concrete abutments. Metal members are finished with automotive paint. (“It's actually the paint flecked with metal that they use on BMWs,” says Scogin. “We thought it was the perfect contextual element.”) In character with the thematic paradoxes at the heart of the design, everything is not what it appears to be. The giant trusses and the tension cables borrowed from suspension-bridge technology are actually nonfunctional, as are most of the outsized stainless-steel bolts on the abutments (only six bolts are structurally necessary); the midspan pavilion is plywood detailed and painted to simulate metal. Of the boulder meant to allude to natural bridges, Scogin reports: “We originally had this vision of plucking a great rock from some creek bed in the area—massive granite that had been touched by water for thousands of years. But no one would give or even sell us one. We ended up buying lava rock from Hawaii.” Ambiguous scale relationships between the rock, other bridge components, and people walking through enhance a playful composition.
Since Pierre de Coubertin revived the idea of an international athletic competition at the turn of the century, the Olympic Games have grown to enormously affect the physical design of host cities, eclipsing world's fairs in their scale and impact. During the last two weeks of this month, the 1988 Games will be staged in Seoul, Korea, a developing country that has utilized the premier sports event as a catalyst for long-term national and metropolitan improvements. One of the most significant examples of these civic investments is the Olympic Village, a 165-acre residential development south of downtown Seoul that lies adjacent to the sports park. During the Games, the complex will house
Seoul Olympic Athletes' and Reporters' Village
Seoul, South Korea
Woo & Williams, Architects

Thousands of athletes and, later this year, it will be converted to a new town for more than 25,000 residents. The architect commissioned by the city of Seoul to design this high-density development is Woo & Williams, a Boston firm selected over other entrants in a design competition. In creating a mix of residential towers and support facilities, such as the athletes' dining hall pictured above, the architects incorporated elements of Korean tradition within an unusual combination of public and private spaces. The innovative result not only serves as a model for future development in Seoul, but offers both East and West lessons in urban design that will long last the '88 Olympics.
When the 24th Olympic Summer Games draw to a close next month in Seoul, the biggest winner may turn out to be the host city itself. Despite its recent political and economic upheavals, Seoul has spent the last seven years intensely preparing for the international event, constructing new cultural facilities, public amenities, and city services. The area to benefit most from these civic improvements is the Chamsil district south of the Han River where the Games are being staged. Once a far-flung suburb of the capital, the district has grown into a thriving commercial subcenter of Seoul, triggered by the government's investment in civil works associated with the Olympics.

The actual site of the events, designed by a team of Korean architects and planners, comprises 600 acres of parkland with five indoor venues for swimming, fencing, gymnastics, cycling, and weightlifting, completed earlier for the 1986 Asian Games (bottom of site plan, left). To the east of this Olympic Park, a vast complex of 5,540 housing units and communal facilities will accommodate 13,000 athletes and 7,000 reporters, and after the Games, become a permanent community (plans, opposite). Seizing upon the rare opportunity to build such a new town, the city held an international design competition in 1984 in search of fresh alternatives to the monolithic towers that crowd the Seoul skyline. In awarding the commission to the Boston-based firm of Seoo & Williams, the capital gained not only gracious accommodation for its visitors, but an environment that encourages a continuation of the spirit of social harmony underlying the Games.

"We used the occasion of the Olympics to rethink the nature of large-scale housing in Seoul," explains Korean-born architect Kyu-Sung Woo, whose previous experience in housing design includes a winning scheme for the 1975 Roosevelt Island competition in New York City and a 30-acre inner-city development in Columbia, South Carolina. Woo explains that the organization of the Olympic Village is rooted in its irregularly shaped site, which he likens to an island surrounded by wide boulevards, hilly parkland, and a greenbelt. Impelled by the geometry of an existing 'Y'-shaped stream, the architect arranged the athletes' housing in a radial pattern that conforms to the bowl-shaped terrain and is linked to a centrally located park, public plaza, and commercial building placed on axis with the Olympic Park's promenade. (This candy-cane-shaped structure was used as the athletes' dining hall during the Games and then converted into a shopping galleria.) The fan-shaped arrangement is reinforced in elevation by a gradual increase in building height as the blocks step up from the center of the site to form a protective wall against the enfolding hills. In contrast, the southern portion of the site, which will house reporters covering the Games, is divided into smaller blocks densely arranged in an orthogonal pattern parallel to the adjacent boulevard.

Although the heart of the Olympic Village appears deceptively simple in plan—like a section cut from Ebenezer Howard's Garden City—walking through the complex reveals a much richer variety of public and private spaces, framed by vistas that open up to the distant mountains. The apartment towers throughout the Village are repetitive in form, but distinct precincts are created by the asymmetrical arrangement of buildings within the complex. Woo proportioned the blocks according to the dimensions of the Manhattan grid, but scaled down the American prototype with midblock pedestrian passageways, underground...
garages, restricted surface parking, and vehicular circulation that prevents through traffic. While the stepped towers evoke the monumentality of the 1976 pyramidal Olympic Village in Montreal, the tree-lined streets, front yards, and planted interior courtyards in Seoul recall the parklike setting of Munich's 1972 'Olympic Games in the Green.'

Woo acknowledges the influence of these prototypes, but credits Korean architectural precedents as a more profound source—though his sensitivity toward regional design is not expressed in obvious visual mimicry. Instead, he articulated the apartment towers in a straightforward Modern idiom, deferring to Asian precedents in siting and unit organization. The introspective character of traditional Korean courtyard houses, for example, is evidenced in the way apartments focus on communal gardens and play spaces positioned at the centers of the wedge-shaped blocks. In response to a local preference for south-facing living quarters, the architect inserted deep, two-story balconies into the duplex apartment blocks, allowing sunlight to penetrate every unit regardless of the building's orientation. This unusual solution was not initially well received by the majority of apartment purchasers, however. Most Seoul high-rise dwellers are familiar with the concept of a duplex unit and, as Woo asserts, culturally, there's less desire in Korea for housing diversity."

While the post-Games success of the Olympic Village has yet to be judged—permanent residents will move in beginning this December—its impact on Seoul's metropolitan development promises to be significant, as planners and policy-makers from the Pacific Rim nations concluded at a conference held in the capital last June. Organized jointly by the Massachusetts Institute of Technology's East Asian Architecture and Planning Program and Seoul National University's Graduate School of Environmental Studies, the four-day event was intended to evaluate the long-term effects of the Olympics on the physical design of previous host cities such as Melbourne, Tokyo, Montreal, Mexico City, Los Angeles, and on the future character of Barcelona, which is now preparing for the 1992 Games.

In addressing the urban impact of the Seoul Olympics, Hong-Kang, a research director for Korea's National Housing Corporation and master planner of the Olympic Park, addressed both the positive and negative consequences of staging the Games in a developing country like Korea. "Improved urban services, increased public amenities, and accelerated real-estate development are in themselves a desirable outcome of hosting an event," he noted, but warned that "they will contribute to widening disparity between Seoul and other regions, further acting capital and people to the city." Furthermore, he contended, the city's decision to construct the Olympic Village in Chamsil district will further entrench the surrounding gangnam area south of the Han River as "a middle-class haven shadowing its counterpart [to the north]." Nevertheless, in weighing the opinions of his fellow participants, Kang concluded that the urban-design benefits associated with hosting the Games outweigh the drawbacks. "The lasting effect is to be felt not by the nature of investments made so far, but by future actors who will do with them." In the case of Seoul's Olympic Village, Kyu Sung Woo and Jack Williams have set the lead. Deborah E. Dietsch

Seoul's 185-acre Olympic Village consists of housing units for 13,000 athletes (top plan, left) and 7,000 reporters (top plan, right). After the Games, the visitors' support facilities will be converted to commercial uses and four new schools, designed by local firms, will be built at the periphery of the new town.

Deborah E. Dietsch
In the athletes' section of the Olympic Village, radiating blocks flank an existing Y-shaped waterway that is spanned by nine bridges designed by Woo & Williams and structural engineer Waclaw Zalewski (below). Since local zoning prohibits mixed-use buildings, the architects relegated public functions to interstitial spaces between the residential towers; for example, they located the main recreational facility and a commercial block behind the central shopping arcade (bottom). At the fork of the
stream, they clustered pines around a stone sculpture by Korean artist Yongjin Han (below and opposite, top) to form a park. Landscaping within the Village includes rows of ginkgoes and sycamores that accentuate the forced perspective created by the wedge-shaped blocks (bottom). To underscore the stepped formation and orientation of the concrete towers, Woo & Williams, aided by painter Mi Ae Moon, specified a palette of light colors for exteriors that subtly changes tone with the shifting sunlight.
The residential towers of the Olympic Village are organized into three-, four-, and five-bedroom apartments according to two basic types: duplexes (top plans) and one-level units (bottom plans), which constitute 80 percent of the complex. Woo varied the types with a rhythmic articulation of projecting and setback forms, including triangulated stair towers in the blocks of one-level units (bottom photo). Spacious balconies amplify southern exposure for double-height living rooms in the duplexes (top plans) and private gardens flank street-level apartments (top left and opposite). Inside each block, communal courtyards built over underground parking garages provide surface parking and landscaped recreation areas (middle left), which are accessible from midblock pedestrian passageways (opposite).
The focus of the Olympic Village is the athletes' dining hall, which will soon become a shopping center for permanent residents. Its candy-cane shape embraces a ceremonial plaza with flags of the 161 nations participating in the Games. Inside the building, colonnades step back to create an effect Woo compares to "an Oriental painting with graduated layers of mountains" (opposite).

Seoul Olympic Athletes’ and Reporters’ Village
Seoul, South Korea

Architect:
Woo & Williams—Kyu Sung Woo, principal-in-charge; J. Pablo Molestina, Celine Larkin, Du Nam Choi, project architects; Gene Park, Samuel Isenstadt, Laura Lesniewski, Anne E. Cook, project team

Associate architect:
Ilkun Architects and Engineers—Il In Hwang, In Seok Kim, Kwan Young Choi, principals; Won Hyung Lee, Sang Jin Han, Whee Kon Kim, project managers; Kwang-Yup Chang, Bong-Soo Kim, Young Woo Kim, Kwan Seok Kim, Young Lee, Byung Cheul Choi, job captains

Affiliated architects:
Kun Won Architects; Woo Yang Architect & Associates; Kerl Yoo (coordinating); Pyung Ho Kim (supervising)

Engineers:
Chang Nam Lee, Who Kwan Lee (structural); Waclaw Zalewski (structural concept); Moo Ae Engineering (mechanical); Iljin Electric (electrical); Soe Han Engineering (civil); Vanessa/Hangen (traffic)

Consultants:
Oswald Nagler (open spaces); Seoann Landscape Architects (landscape); Powell Associates (lighting); Harvey Bryan (energy); Miae Moon (color); Hussey & Lindsey Associates (food services)

General contractors:
Sambu Construction; Hanshin Construction; Sam Ho Inti; La Construction; Kung Yang Construction; Shin Sung Corp; Korea Shipbuilding and Engineering; Daewoo Corp; Hanbok Kunup Construction; You One Construction; Jung Woo Development; Miryang Construction; Life Housing and Development
Structural gymnastics for the Olympics

The calculated spring, poetic line of flight, and perfect balance characteristic of an Olympic gymnast are appropriately embodied in the cable dome that will look down upon the gymnastic competition in Seoul. With equally fitting elegance, another 1988 summer Olympic event, fencing, will take place in a second stadium enclosed by a similar dome (section of gymnastic stadium, above; in photo this page, fencing arena is to the right of the gymnastics stadium). These roof structures, also known tensegrity domes, are the first of their kind ever realized. The designer, engineer David H. Geiger, based his structural system on the theoretical work of R. Buckminster Fuller, whose well-known fascination with tensile forces in nature led him to devote much of his later life to investigating man-made forms which the presence of compression could be dramatically reduced and replaced by intricately connected networks of tension. He called such structural configurations “tensegrity,” meaning tensional integrity, a phenomenon he described as compression elements becoming “small islands in a sea of tension.” Geiger was led to his re-evaluation of Fuller’s pioneering work...
Basing his design on R. Buckminster Fuller's tensegrity principle, New York engineer David H. Geiger has developed the first tensegrity domes ever constructed. Referred to by Geiger as cable domes, these roofs span two of the stadiums to be used during the 1988 summer games in Seoul.

course of searching for a stadium roof enclosure that would as economical as an air-supported structure while accommodating an insulated fabric membrane. The breakthrough took theory into practice occurred when Geiger overcame structural redundancies inherent in Fuller's triangulated configuration (a comparison of Fuller's and Geiger's tension images appears at right). In Geiger's approach to tensegrity, continuous tension cables and discontinuous compression posts laid out radially so that the three-dimensional flow of force is simplified, thereby making the cable dome statically determinate. With this configuration, low-profile curves are possible, bringing with them the advantages of lower wind uplift; drifting of snow, and therefore lower snow loads; and small surface area, thus reducing fabric costs.

Geiger has designed and overseeing construction of two other cable domes: a 3-by-304-ft elliptical dome at the University of Illinois, a 680-ft-dia circular dome for the municipal stadium in Tampa, Florida. Darl Rastorfer

1. Corridor
2. Lobby
3. Seeding room
4. Broadcasting room
5. Batteries
6. Athletes' waiting room
7. Locker room
8. Training room

Fuller's tensegrity dome
Geiger's cable dome
The cable dome and its membrane

David H. Geiger's patented cable dome achieves its span by means of continuous tension cables and discontinuous compression posts. Loads are carried from a central tension ring through a series of radial ridge cables, tension hoops, and intermediate diagonals until they are resolved in a perimeter compression ring (illustrations at right). With this configuration, the dome behaves like a series of paired cantilever trusses not quite touching at the center. One of the system's advantages is that, as the length of span increases, the weight, 2 psf, remains constant and the cost per sq ft increases very little. All that is needed to accommodate increased spans is the addition of another module defined by its tension hoop. The Seoul gymnastic stadium's 393-ft-dia dome required three tension hoops set 47.5 ft apart. The 295-ft-dia dome over the fencing stadium required a two-hoop configuration.

The membrane that covers the dome (section and plan details, opposite page) comprises four independent layers. The outermost is a high-strength fiberglass fabric with a silicone coating on both sides. Beneath this is an 8-in. insulating layer of fine, silky fiberglass enclosed in polyester bags. Six inches beneath the insulation is a Mylar vapor barrier. Two feet below the Mylar is a silicone-coated acoustic liner made with an open-weave, fiberglass fabric. The thermal performance of the membrane system is R10; its overall light transmission is 6 percent, which enables the sun to meet most daytime lighting needs (photo at right).
Lacing the dome together

Construction of the cable domes began by laying in place, on the ground, the tension ring and 16 ridge cables that are made by threading 0.6-in. steel cable through the top casting for each compression post (bottom right photo, opposite). Although this assembly could have been lifted into place by tightening the ridge cables at the compression ring, the erection subcontractors for the stadium chose to lift the tension ring by crane to the top of a temporary support tower (top left photo). With ridge cables spanning from the reinforced-concrete compression ring to the supported tension ring, the strands of the outermost tension hoop were laid in position on the ground with the bottom castings for the compression posts in position. The bottoms of the posts themselves were then bolted to the castings, and the hoop and posts were lifted and attached to the castings of the already erected ridge cables (bottom left photo). The two-strand diagonals, which run from the top of the compression ring to the bottom of the posts, were then tensioned, pulling the hoop into final position (the second step in diagram sequence at right).

Thirty-two workers were stationed in baskets at the bottom of the compression posts (middle left photo) to operate the jacks for tensioning the diagonals—two men at each of the 16 ridge cables. The workers had to apply tension in perfect unison to raise the hoop to a level position. The process of laying out the hoop and posts, lifting them into position, and lacing them into the network with diagonals was then repeated for each hoop until the entire network was in place (third, fourth, and fifth steps in diagram).

Roof erection steps:

1. Hang tension ring, then hang posts and hoop cables
2. Tension first diagonal to 69 kips
3. Tension second diagonal to 84 kips
4. Tension third diagonal to 65 kips
5. Tension fourth diagonal to 4 kips
The fabric cladding was installed by attaching it to aluminum castings that cover the ridge cables. The castings have threaded metal studs (bottom right and left photos) that match holes in the outer fabric layer. This was the first layer to be installed in the four-layer system. Starting from the tension ring, the layer was unfurled from a roller held in position by a crane (middle right photo). Once unfurled, the fabric was bolted to the castings with a stainless-steel nut. The casting to which the outer layer was attached also has three attachment panels that match the three layers of inner fabric—the top and bottom of the 8-in. insulation bag and the vapor barrier below (these layers were installed from the inside). Finally, the acoustical liner was attached to the vapor barrier with a zipper. With the four fabric layers in place, valley cables were installed and tightened to stress the fabric.
As a roofing system, the waterproofed fiberglass fabric must be carefully sealed at its construction seams. These seams occur at the 16 ridges that define the 16 fabric segments. Seams are formed with a silicone adhesive that requires no heat to effect a tight bond. At the points where the fabric is attached to the structure, silicone rubber gaskets were incorporated as a water barrier. Expanded foam insulation and flaps of silicone-coated fiberglass fabric cover the gaskets and nuts (section details, page 131). The outer lip
of the dome, which rests on the compression ring (lower photo), was sealed and flashed for water tightness. The lantern in the center of the dome, as illustrated in the photo of the fencing stadium, below, is part of the facility's ventilation system. Fans installed in the tension ring pull air up and vent it through the lantern.

Architects:

Sree Group of Korea (gymnastics stadium); Dong Eun Architects and Engineers in joint venture with Hong Ik University (fencing stadium)

Engineer:

Geiger, Gossen, Hamilton Engineers, PC (stadium uses)—David H. Geiger, principal-in-charge; Paul Sen, project manager; David N, project engineer/computer operations

Contractors:

Ssang Yong Construction Co. Ltd. (general contractor for gymnastics stadium); Korea Shipbuilding & Engineering Co. (general contractor for fencing stadium); Woo Chang Construction Co. (erection subcontractor for gymnastics and fencing stadium domes)
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Software reviews for architects

By Steven S. Ross

Micro CADAM Cornerstone 1.3

A microcomputer adaptation of Lockheed's mainframe CADAM program so popular among equipment designers particularly federal aerospace contractors. The micro version can use mainframe files directly even preserving mainframe file protection, even in networks made up entirely of microcomputers. Unlike mainframe CADAM, which is 3-D, Cornerstone is a 2.5-D* CAD program that shows orthographic and ometric—but not true perspective—views.

**equipment required:** IBM AT or PS/2 (Model 50 or larger) or compatible, 640K, 1 megabyte floppy or 1.44 megabyte hard-shell floppy drive, hard disk, 80287 processor chip (80857 on the 1/2 Models 70 and 80), PC-DOS MS-DOS 3.0 or higher, and at least one serial port (for the null modem). A mouse and serial adapter cables are needed with the software. XXX with AT&T 6300 color and nochrome systems, EGA, A, IBM Professional Graphics adapter, IBM 5879, Hercules nochrome, and various graphics accelerator cards from ist 10, Bell & Howell, Matrox, heus, and VMI. Supports jumpers from Calcomp, Houston *ruments, HP, IBM, Buing, or can produce Computer graphics or HPGL files for ting by various graphics ices. Supports all major ter families.

**for:** CADAM, Inc., 1935 N.
2 Vista St., Burbank, CA 912.2995 for Cornerstone DXF translation software, X0 for key control box

Ross is a prominent user consultant and a "star contributor to RECORD.

(unnecessary unless there's a mainframe user around who's used to having it), $1,500 for mainframe-micro data transfer software, $500 for Geometry Interface Module that allows interface with finite element modeling, bill of materials processing, and so forth. There's 60 days free telephone support for Cornerstone, after which the fee is $550 per year. All software upgrades sent for $600 per year ($550 per year for additional units at the same site).**

**Summary**

**Manual:** The three manuals (installation, user guide, training) are well organized, but occasionally fail to provide needed information about step-by-step procedures. This should be no problem for users familiar with computers or mainframe CADAM. Others will have many calls. We installed the system on an IBM AT clone in less than 30 minutes, and had it running in another hour. In contrast, an architect and an architecture student with some computer experience, working separately, were unable to manage the task. The installation manual, for instance, assumes the hard disk is designated drive C and that users know how to copy and rename DOS files. Jumpers had to be reconfigured on a Summagraphics tablet. Cornerstone recognized its security copy-protection device only if it was attached to COM1. And on and on....

**Ease-of-use:** Fair. As is typical of systems adapted from mainframe programs, commands are often cryptic. On the other hand, the command structure is not as hierarchical as some other mainframe programs, and most commands are accessible by hitting the F1 key and using the mouse to point and shoot. Drawing speed is acceptable, even with a standard EGA graphics card. The range of available "tools" (points, circles, and so forth) for creating an image on-screen is acceptable. There's no on-line help.

**Error-trapping:** Excellent for the installation program, fair for Cornerstone itself. Errors tend to be nonfatal, in the sense that users can usually go back one step and cancel an action. All changes are written to the disk as soon as they are completed, so even a power failure will not destroy a drawing—only the one element being added.

Sometimes, the addition of a new element overwrites and erases something already on the screen. Hitting the F3 key refreshing the screen display, restoring all the details. The on-screen redraw can be stopped by pressing the CONTROL and BREAK keys at the same time.

The documentation suggests that each "group" be considered something like a filing cabinet containing all the files from a specific project or functional area. A "user" is a drawer within the cabinet, where specific collections of models are kept. Each drawer and its associated data are a "model." The documentation suggests that the models be considered like file folders in a particular drawer.

The metaphor is a good one. And it must be grasped from the very beginning. That's because getting into Cornerstone...
New...
SuperProject Software
What The Experts Have To Say:

Aerospace: "SuperProject is the best. Earned Value Reporting and Work Breakdown Summarization give me complete project control and the graphics make impressive presentations." Barry Feeley, Technical Manager, Ford Aerospace.

Construction: "The familiar SuperCalc® and 1-2-3 menu system makes it really easy to learn and use. It handles multiple projects, networking and flexible reporting very efficiently. SuperProject's graphics make impressive presentations." Barry Feeley, Technical Manager, Ford Aerospace.

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The SuperProject® Family—Plus, Expert and Expert/2—is the most advanced PC project management software available. The smallest to the largest and most complex projects imaginable are easily handled thanks to its virtual memory management skills.

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<table>
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<th>PLUS</th>
<th>EXPERT</th>
<th>EXPERT/2</th>
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<td>Yes</td>
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Software reviews continued from page 145

...and a user. That's mentioned on enough in the guide to actually get a user into the program. The manual first. There, the "start," starting process - practice. This requires two select a command, and the new model, select START, and the menu. To pick a model on to execute it. Models of existing models in a specific model-or drawing. Descriptions can attach notes to models, in general, counts as an independent of one another-one isn't adding something, for instance, to a wall that's just been moved. Even on a single computer, models and groups can be password-protected. This makes Cornerstone particularly useful for offices with mixed practices, such as architecture and mechanical or civil engineering. All this is quite different from most DOS-based CAD software that can be connected to a mainframe or minicomputer. Such software usually requires that the DOS file name conventions be used everywhere. AutoCAD, for instance, is limited to eight characters per drawing name, even if transmitting the file to a central computer. The downside: Normal DOS commands like COPY cannot be used to back up copies from the hard disk to a floppy. Instead, the less familiar BACKUP command is used to move a group of files, issuing commands from within Cornerstone's menu structure. Use a network to link personal computers using Cornerstone and avoid most BACKUP matters entirely. CADAM recommends Locus Computing Corporation's PC-Interface for this. PC-Interface links personal computers using MS-DOS or PC-DOS to a "server," a personal computer or minicomputer using UNIX (or XENIX or ULTRIX, both brand names for specific UNIX operating systems). The personal computers that act as terminals can use either DOS or UNIX commands. Each terminal must have its own copy of Cornerstone. Because models are compact, they move through the network quickly. That makes the RS-232 ("serial") cable a fairly good substitute for an Ethernet network with Ethernet cards. The RS-232 cable can be connected to a serial port that costs as little as $20. An Ethernet card costs $500 to $1,000. As in most networks of this type, only one user at a time can access a given group of files—or models. The idea is to protect the integrity of each model, so that one user isn't adding something, for instance, to a wall that's just been moved.

In contrast, files can be almost any size in AutoCAD and similar software, but the largest files are difficult to manipulate and to transfer, so most practitioners break them up anyway.

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Even on a single computer, models and groups can be password-protected. This makes Cornerstone particularly useful for offices with mixed practices, such as architecture and mechanical or civil engineering. All this doesn't mean much if Cornerstone is difficult to draw with. It isn't difficult to use. But it is different. To move around the screen to see part of the drawing that's off the screen edge, for instance, go into WINDOW mode, move the cursor to a point that will be the new center of the screen "window" to view the drawing through, and select the point. The effect is of moving the screen, as if it were a narrow porthole, over a fixed image—rather than of moving the drawing underneath a fixed screen.

To move in on a section of a drawing, select two diagonally opposite corners. That's conventional enough, but the box being formed by the corners doesn't show on-screen as an outline while it is being defined. A library of standard shapes can be created, but each is actual a little model that must be called to the screen. In basic Cornerstone, one cannot use a digitizing tablet with specific spots defined for primitive shapes to insert into a drawing at the flick of a digitizer puck-button.

Views can be quickly switched to see all sides of a three-dimensional object, but only one view appears on screen at a time. (Well, actually, one can combine a bunch of views on one drawing, and reduce the screen image to see all the views at once, but the views are independent of one another—one isn't updated automatically as another is modified.) Models can be combined with different colors, as can groups of specific objects within models.

---

User can further enlarge and home in on a roof detail in the HOUSE option (top), and then turn the enlarged image (bottom). Redraw is fast, only a few seconds with standard EGA card and 256K of EGA graphics memory for this operation.
It only looks like a pen plotter.

But look again. It emulates pen plotters, reading popular 906/907 and HPGL data formats. It comes in pen plotter widths — 24 and 36 inches. And you can use it with your favorite CAD packages, such as AutoCAD, VersaCAD, or MICRO CADAM.

But the Versatec 8500 series is like no pen plotter made. It is more reliable, because it plots with electrons, not pens. It's faster, plotting D or E size drawings in less than a minute. It can plot an unlimited number of vectors, variable line widths (to ½ inch wide), dashed lines, or text without reducing speed.

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Circle our readers' service number or call toll-free 800/538-6477* for a free product application brochure.
The Seleris board keeps VersaCAD happy by generating its own signals—but also keeps track of what the plotter is doing. We couldn't fool it.

Dimensions can be noted in ANSI or ISO style. Features can be annotated, and the notes can be of any size, attached to any point in a model. A model can be up to 20,000 measurement units from one side to the other. This causes no great problems when modeling a mechanical object, but it can be a problem with a building and site if it is all handled as one model. If the units are set to inches (a reasonably convenient unit for sizing everything from a structural beam to a bolt), there may not be enough room for recording the contours of a large site.

Cornerstone’s DXF translation utility can move drawings back and forth between it and programs such as AutoCAD and VersaCAD that can read DXF files. As with all such translations, however, the DXF file can contain only information common to both CAD packages that will use the drawing. AutoCAD supports user-defined x styles and a large library of units, for instance. Cornerstone yes not. Both the latest AutoCAD and Cornerstone use Seleris to support apin lines, but the lines are converted to multi­
gyn polylines when assembling in either direction. In general, Cornerstone, as an object-oriented CAD system, has potentially stronger database actions than layer-based stems like AutoCAD. But AutoCAD and other three­
dimensional CAD packages have more sophisticated drawing capabilities. Cornerstone has easily the best customer support setup we’ve encountered. The system is robust by a bizarre phone tem that mimics a black hole. One point, seven consecutive e-mail messages were left without response.

Seleris PC

An add-in board and software for buffering and controlling plotters from IBM PC, AT, and IBM-compatible computers. The system installs and works smoothly. Extra Sel-Net boards that plug into the Seleris PC allow up to nine computers to be networked to a single plotter. Equipment required: IBM PC, XT, AT, or compatible with available 8-bit full-length slot. The software reroutes plot data to the board as if the board were a COM or serial port, but the board does not interfere with existing serial ports in the computer (there can be up to three normal COM ports along with Seleris). Compatible with CalComp, Houston Instrument, HP, Ioline, Zeta, Western Graphic, and other plotters. Listed as compatible with AutoCAD, VersaCAD, MEGA CADD, Cadkey, CadVance, DataCAD, Generic CADD, Lotus Freelance Plus, Personal Designer, FastCAD. We tested it successfully with Drafax and an HP plotter as well. Vendor: Western Automation Laboratories, Inc., 1700 North 55th Ave., Boulder, CO 80301. 303/449-6400. As tested, with one plotter port and 512 kilobytes of memory, $695. Various configurations available, up to eight ports and 4.5 megabytes of memory ($4,295), with another 4 megabytes of memory costing $2,685. The expansion options are all add-ons; expansion does not require throwing away existing boards.

Summary:

Manual: Excellent. Minor technical updates are handled with a documentation file on disk and some insert sheets. Ease-of-use: Good. The board installed in the normal way. It comes with up to 2 megabytes of buffer memory installed, and can hold up to 8.5 megabytes for groups of really big plots. The memory chips are the kind that plug into the board edgewise; they are easier to handle than the older chips with two rows of pins to insert. Software installation is easy, too. In fact, configuration files for the most common mixes of plotter and CAD software are already on the disk.

Error-trapping: Good. We were able to test the board and the software only one-on-one (one computer, one plotter). But we tried everything to confuse it: Unplugging cables, turning the plotter off in the middle of a plot, changing the number of regular COM (serial) ports, rigging a 30-foot-long cable between the board and the plotter. Nothing froze the system, nothing caused data loss. The Seleris PC board comes with both 9-pin and 25-pin sockets—and a warning to use only one or the other.

Computers have been getting faster. But pen plotters, limited by the speed that ink can flow from a pen point onto plotting media, have just about reached their theoretical limits. There’s also the matter of how fast data can be sent do normal serial cable. For various reasons, 9,600 bits per second is now the top rate plotters will accept.

All this creates an obvious production bottleneck. The first solution was to put a buffer—extra memory—inside the plotter itself. But data can still get to this buffer no faster than 9,600 bps. A better solution is a separate little disk drive attached to the plotter. Plot files can be put on a disk and the disk carried to the plotter. Computer mavens derisively call this “sneaker net,” but it offers a cheap, practical solution when the layout of the office allows it.

Another approach is software that reserves a part of normal random-access memory (RAM) as a buffer space. The plot file is read off the computer’s disk to the buffer in pieces, and the buffer sends it on to the plotter. While all this is going on, the computer can be used for drawing or any other function. There are two big problems: First, this slows the computer down a bit. Second, some software, most notably AutoCAD, needs all the RAM it can get. There’s a little problem, too: Some CAD software, most notably VersaCAD, likes to keep close track of what the plotter is doing. If the plotter doesn’t send signals back, saying it is still operating, VersaCAD stops plotting. Some buffer software blocks the signals.

The Seleris board sidesteps all the problems. It keeps VersaCAD happy by generating its own signals—but also keeps track of what the plotter is doing. We couldn’t fool it. It accepts data internally on the computer’s “bus” (the printed-circuit that connects the sockets into which the boards fit to the computer’s brains) at almost 120,000 bps. Once the transfer is completed, the board, not the computer, manages the transfer to the plotter at 9,600 bps. The board uses its own memory and its own processing power, so the computer can be used for other things in the meantime.

Are there better solutions? Super-fast electrostatic plotters, for one. But they are still super-expensive. In the meantime, consider the Seleris approach if “sneaker net” isn’t practical.
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Computers: Paving the way to new architectural services in facility management

By Eric Teicholz

Because corporations have up to 25 percent of their assets tied up in existing physical facilities, architects are increasingly offering help in managing them to their design clients and other corporations. Architects in this role are automating because a client may insist on it or they feel it will help them compete. What they are finding, however, is that it is necessary to perform the new functions efficiently.

Efficient performance in facility management can offer profitability that is at least as good as that for traditional design services. Furthermore, it can help secure additional design plans, maintenance of furniture inventories, and the evaluation of long-range plans. There is an indication, however, that demands are rapidly increasing for furniture and equipment inventories, and as-built plans, to be used in cost accounting.

A report by the International Facility Management Association found corporations change the use of more than 34 percent of their space each year. (This change is called a churn rate.) And the percentage is increasing. The IFMA survey reported that churn was caused by a number of factors, including those listed in the table below.

<table>
<thead>
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<td>Company growth</td>
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<td>Corporate reorganization</td>
<td>43%</td>
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<tr>
<td>Department rearrangement</td>
<td>35%</td>
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<tr>
<td>Moving to a different facility</td>
<td>24%</td>
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<tr>
<td>Projects</td>
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<tr>
<td>Consolidation</td>
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<tr>
<td>Downsizing</td>
<td>15%</td>
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<tr>
<td>Automation</td>
<td>10%</td>
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Not all facility-management work is work that all architects wish to offer updating services but who have not done the original design or, for some reason, have not kept track of construction-phase changes must, of course, factor the costs of creating the digital floor plans into their fee.

Long-range space planning offers the greatest potential for architects in facility management

Most long-range space forecasting models currently employed by corporations are relatively unsophisticated. Forecasting is done, for the most part, by holding interviews with department heads.

Architects know that planning for expansion and change are

Continued on page 157
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There is a way in which high churn rates, even when the changes are small, can benefit architects—if the service can be sold properly.

Computers continued from page 151

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Kid stuff
The boomlet in baby-boomers' babies may be reflected in the number of product introductions for the school, day-care, and dormitory markets. Some members of the class of 1988:

1. Tables and chairs
Brian Kane's Rubber Children's Furniture Group for Metro includes armless chairs in three sizes: preschool, youth, and adult, with matching-height round or square tables. The welded-steel frames are encased in textured rubber tubing to prevent impact injuries; seats are beechwood in a natural finish or any of 24 textured colors. Field-installable options include a vival tablet arm and a perforated steel book rack that mounts under the seat.

Metropolitan Furniture Corp., 3200 San Francisco, Calif.
circle 300 on reader service card

2. Junior lounge
Suggested for day-care, library, clinic waiting rooms, child-size fa and chairs are cushioned in retardant foam covered with moisture-barrier liner. Each el-spring seating core carries a 0-year warranty. Tables in a 'ber of sizes, shapes, and colors can be ordered at any sight. Nemschoff Chairs, Inc., 3oygan, Wis.
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3. Dormitory unit
Components, such as a pullcomputer keyboard shelf, have been added to the Uni-Tec dormitory furniture line. This lof bed/desk/sha/wardrobe is made of oak, finished in a catalyzed varnish.

ays Furniture Co., Inc., 3oygan, Wis.
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1. Molded bathtub

The Princeton is the first tub made in Americast, a new manufacturing process in which a metal tub shell covered with porcelain enamel is fitted onto a rigid structural composite mold. The new tub is much lighter and easier to handle than cast-on units, but retains the superior abrasion-resistance of a porcelain finish. The molding process also permits more precise details, such as a tile ledge, beveled headrest, and an integral shelf extending back to the wall in the 34-in.-wide model styled. Americast tubs are available in 11 colors and white. American Standard Inc., Scotch Plains, N.J. Circle 303 on reader service card

2. Ceramic tile

Heavy-duty commercial tile, Terra Powers come in 8- by 8-in. 12- by 12-in. sizes, with a diffused cushion edge. The tile is a slightly abrasive glazed ash, and comes in 10 colors, ranging from light gray and its adjoining colors to brown and denim. American Olean Tile, Bensalem, Pa. Circle 304 on reader service card

3. Resilient flooring design kit

Flooring design kit, the Spec I takes one-in.-sq pieces of vinyl tile in 29 colors and celled textures, as well as color feature strips and a layout. The designer can rearrange chips in any desired combination of colors and pattern patterns, simulating final flooring pattern to scale out schematic drawings. Co., Tuscali, Ala. Circle 305 on reader service card

4. Beechwood chair

Vico Magistretti fits his Pratolina chair as an interpretation of a smaller-scale 18th-century model. Made line-stained beechwood, torta may be ordered with a or tea-colored frame, and a yellow, violet, or black seat. Inc., New York City. Circle 306 on reader service card

5. Fluorescent lighting control

A photo-sensor tuning control that works with electronic fluorescent lighting ballasts, the XO/ATC automatically links lamp output to available daylight, maintaining a specified light level throughout the day. XO Industries, Inc., Mountain View, Calif. Circle 307 on reader service card

6. Screw-in fluorescent

The DULUX EL is said to combine the energy-saving and long-rated life of a fluorescent bulb with the installation convenience and color values of an incandescent lamp. The compact bulb has a built-in electronic ballast, and provides even light distribution from any burning position. The 20W DULUX EL bulb is equivalent to a 75W incandescent. Osram Corp., Montgomery, N.Y. Circle 308 on reader service card

7. Aluminum-framed storefront

A stock-length, screw-spline storefront with no-extra-charge customizing options, the Mor:Front system comes in four low-profile mullion styles, nine paint colors, and four anodized finishes. Exterior face caps and mullions may be specified in different factory-applied colors; ribbon window, 9-ft butt-glazed, and standard storefronts are provided by the framing system. Vistawall Architectural Products, Terrell, Tex. Circle 309 on reader service card

8. Office system

The Orion office has a high-tech look, with a square post design said to facilitate reconfiguration and provide a wrap-around appearance to the panel fabric. Accessories, such as pen holders, signage, and hanging files, clip onto either the panel frame or a panel-mounted bar. Rosemount Office Systems, Inc., Lakeville, Minn. Circle 310 on reader service card

More products on page 168
Timeless design meets modern ingenuity.

Now you can include the elegant style of authentic true divided lites in your best architectural designs—without giving up comfort or practicality.

The natural wood windows and patio doors in the Georgetown™ Collection by Caradco are available with insulated glass and 1 1/4"-wide muntin bars or single pane with 3/8" muntin bars. Caradco has combined this timeless look with the latest technology and energy efficiency.

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Circle 94 on inquiry card
Custom light fixtures
A color brochure illustrates architectural applications of custom fixtures, including lobby uplighting sconces, pole-mounted lights, and several types of chandeliers. Appleton Lamplighter, Appleton, Wis.
Circle 400 on reader service card

Electronic access control
A new Dentco II two-wire system lets the user program different security levels for each of many doors from a central station. Keycodes are entered by card or pushbutton combination. Detex Corp., New Braunfels, Tex.
Circle 401 on reader service card

Exterior pavers
Pressed concrete pavers with wear surfaces of marble, granite, and porfido are offered in sizes up to 20- by 20-in. A brochure describes sand-bed and pedestal-mount installations. Verona Marble Co., Dallas.
Circle 402 on reader service card

Single-ply roofing
Technical data sheets explain the advantages of the Sarnafil PVC membrane as used in mechanically attached, fully adhered, and IRMA systems. Sarnafil, Inc., Canton, Mass.
Circle 403 on reader service card

Site furniture
Benches, planters, and other site furnishings in wood, metal, and fiberglass are presented in a 1988 architectural catalog. Woodcrafters of Florida, Jacksonville, Fla.
Circle 404 on reader service card

NFPA codes
Circle 405 on reader service card

Molded composite sink
Introduced in a color brochure, the Sculptura sink is made of a new, integrally colored composite; the bowl bottoms have a crinkled finish to prevent damage to dishes. Elkay Mfg. Co., Oak Brook, Ill.
Circle 406 on reader service card

Space-saving stair
A color brochure explains how pre-engineered alternating-tread stair designs improve user safety and save floor space; prices for wood, steel, and aluminum stairs are listed. Lapeyre Stair, Inc., New Orleans.
Circle 407 on reader service card

Light-diffusing walls
Architectural catalogs describe the energy-saving and light-transmitting values of the Kalwall fiberglass panel system, and picture the system used in built projects. Kalwall Corp., Manchester, N. H.
Circle 408 on reader service card

Office design hotline
Circle 409 on reader service card

UL-listed cedar shingles
A folder describes how red-cedar roofing products are pressure-treated to meet the long-term fire-resistance standards of UL-790. Red Cedar Shingle & Handsplit Shake Bureau, Bellevue, Wash.
Circle 410 on reader service card

Carpet performance
A technical brochure describes the Zeftron certification program, which provides the carpet specifier with test results that predict long-term carpet performance. BASF Corp., Fibers Div., Williamsburg, Circle 411 on reader service card

For more information, circle item numbers on Reader Service Card
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Note: Last date coupons can be accepted through 1990's summer job listings is November 20, 1988.

Positions Vacant

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A 40-page color catalog gives performance and dimensional data on a full line of home appliances, including space-saving washers, dryers, and refrigerators. The Kelvinator Appliance Co., Columbus, Ohio. Circle 413 on reader service card

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Food service equipment
A brochure on Ruscraft sinks, tables, cabinets, and counters explains how the stainless-steel subassemblies can be economically customized for any size commercial kitchen. Ruslander & Sons, Inc., Buffalo. Circle 415 on reader service card

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A color catalog explains the Easy Arch system, said to facilitate the construction of true arches, eyebrow and low-rise arches, passages and doors, cased openings, and nooks. Stretch Forming Corp., Murrietta, Calif. Circle 417 on reader service card

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Playground equipment
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Curved wall panels
A folder shows how Curvall flexible fiberboard panels easily conform to curves with a radius as tight as 30 in., without scoring, wetting, or other preparation. Domtar Gypsum, Oakland, Calif.
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Door hardware
A colorful 16-page catalog covers the Omni Group of wood, metal, and nylon doorpulls, described as well-designed and moderately priced for general applications. Forms + Surfaces, Santa Barbara, Calif.
Circle 419 on reader service card

Glass doors
The Classic 1 entrance, said to be adaptable to a range of opening requirements and hardware options, is introduced in a 4-page color folder. ACI Glass Products, Farmers Branch, Tex.
Circle 422 on reader service card

Heat generation
An 8-page brochure explains how the compact design of monotube-coil commercial steam boilers offers substantial savings in weight, space needs, and energy costs over standard units. Clayton Industries, El Monte, Calif.
Circle 420 on reader service card

Tables
A 12-page color brochure highlights appearance, shape, and functional details of the Tempest line of tables for conference, office, school, and dining areas. Howe Furniture Corp., Trumbull, Conn.
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Ergonomic pull-up

The Sensor Chair is now available in a sled-base model, for use as side or conference seating. The Sensor line also comes in new shell colors and a wider range of patterned upholstery fabrics. Steelcase Inc., Grand Rapids, Mich.

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pen-plan system

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Circle 312 on reader service card

Play castle-in-a-kit

Swedish-made Hags Play structures are constructed onsite of pressure-treated wood and corrosion-resistant metal fasteners; the expandable component system can be installed on any type of terrain with minimal ground preparation. Already used in playgrounds in New York City, the equipment is said to combine safety, play value, creativity, and durability. Group BB, Inc., Pompano Beach, Fla.

Circle 313 on reader service card

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Circle 97 on inquiry card Architectural Record September 1988 169
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Open the door just 5° and this new Dor-O-Matic opener continues to open the door . . . automatically!

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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 92-99
The Pavilion for Japanese Art
Bart Prince, architect
Translucent panels: Kalwall.
Tile: American Olean.

Pages 106-109
Desert View Elementary School
Perkins & Will, design architects
Products. Locksets: Best.

Pages 110-111
Gardendale Elementary School
Reyna Caragione Architects

Pages 112-113
Arlington Elementary School
Earl R. Flansburgh + Associates, Inc., architects

Pages 114-117
The Bridge at Concourse
Scogin Elam and Bray Architects, Inc.
Coating on steel and wood components: DuPont.

Pages 128-135
Cable domes for fencing and gymnastics stadiums
Silicone-coated fiberglass fabric: Dow Corning.

Architect John Minden on sound Minden control with laminated glass.
"We knew this site had a severe traffic noise problem. But we wanted this to be a quality development. So did our client. "We considered a triple glazing system. But it just didn't have enough sound control. Our glazier recommended laminated glass, so I called Monsanto to get more information.
"They sent me their Acoustical Glazing Design Guide, and the software to go with it. That helped me get the configuration I wanted. "Virtually, the only complaint I've heard so far is that the installers can't hear each other through the windows.

John Minden, AIA
GMS Architectural Group
Bellevue, Washington

Circle 98 on inquiry card
Laminated glass. Because Victorian Apartments wanted high style, not high decibels.

It's an increasingly common problem. A site so noisy you're not sure you can make it habitable. Let alone marketable. So you're stuck, between the need for sound control on one hand and the need for good architecture on the other.

The solution: windows of laminated architectural glass with Saflex® plastic interlayer, like these being installed in the Victorian Apartments.

Laminated glass lets you put in the windows you want, and block out the sounds you don't. All at a cost that makes sense.

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We mechanically attach the scrim-reinforced, Stevens Hi-Tuff membrane to your roof deck with tough, corrosion-resistant fasteners. Then we cover the fasteners with the next layer of membrane. And then we fuse the two layers together with a hot-air welder. The result is a single, roofwide sheet of rubber.

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