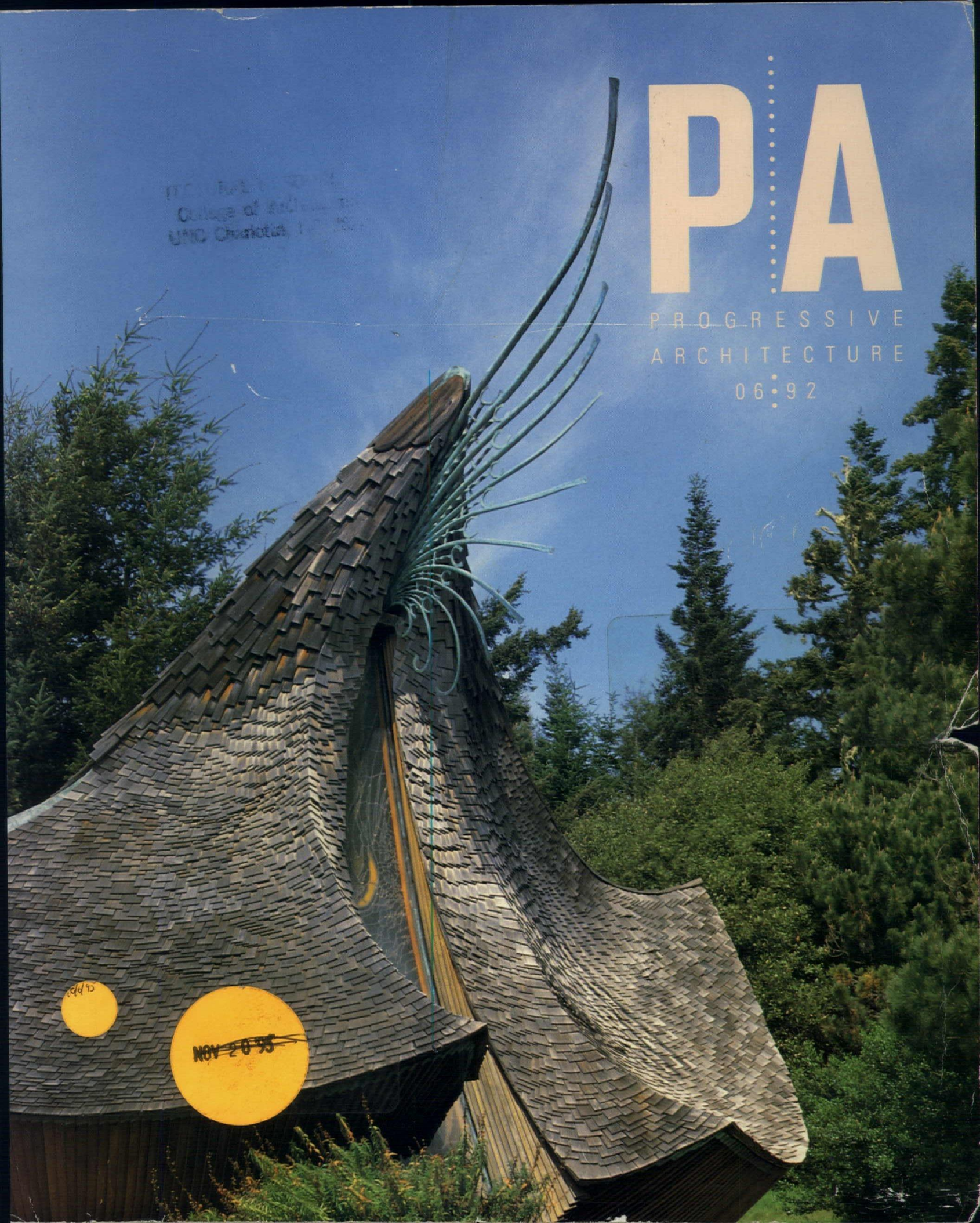

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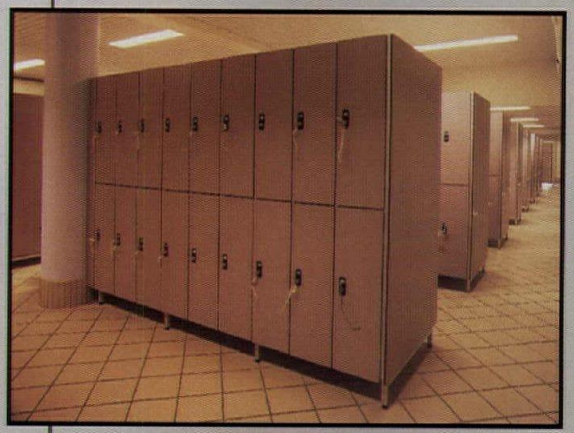

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Cover: *Sea Ranch Meditation Chapel, Sea Ranch, California, by James Hubbell (page 74). Photo by Alan Weintraub.*

Progressive Architecture June 1992

P/A

Design Editor in charge: James Murphy

Technics

Computer Focus Choosing a CAD System

P/A Annual Awards Program

Practice

Departments

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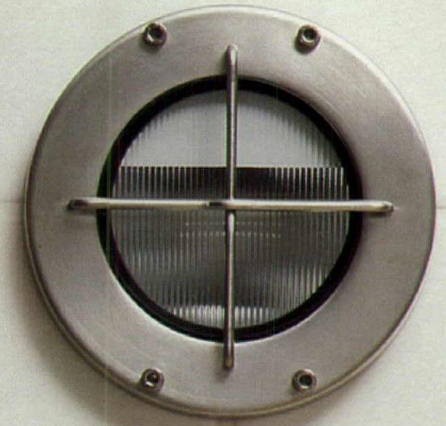

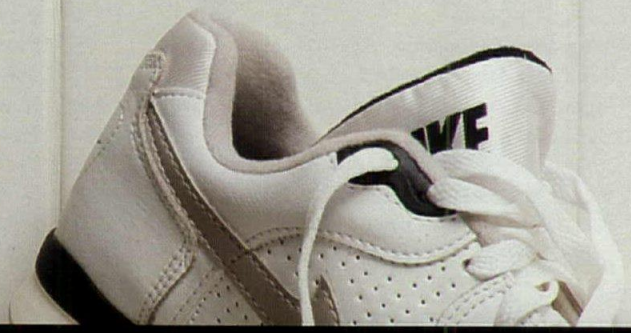

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Editorial
Awards Matter

Awards programs, which are proliferating, go beyond individual recognition – to set standards and indicate directions for the profession's work.

Awards for architecture are in the strictest sense nonessential; they are not required to get the job done. (Did Palladio receive any awards?) Yet in certain respects awards are central; they do much to determine who is known and for what – whose work influences the subsequent course of architecture.

This time each year P/A announces a major annual opportunity to win recognition from a jury of peers: the P/A Awards competition. And since next January's P/A will be the milestone 40th annual awards issue, we are planning to include some reflections on the winners over these four decades – those that have entered the canon of architectural landmarks and those that may have been overlooked in the intervening years.

At 40 years of age, the P/A Awards is already an elder presence in an ever-expanding family of prizes. Just this year, AIA has added new "awards of excellence" for work in interior architecture and urban design (see next month's P/A News Report), offering due recognition for important work architects do, but further complicating an already bewildering array of AIA honors.

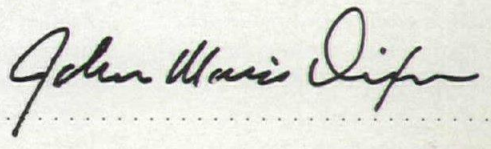
One area where awards have been proliferating is at the exalted, world's-best level. It was in 1979 that the Pritzker Prize was established by the Hyatt Foundation of Chicago as architecture's equivalent of the Nobel Prize – with $100,000 to the winner, as opposed to the honors-only distinctions of the AIA Gold Medal and the similar top awards of other nations. Dating from 1981 is the Wolf Prize in the Arts (based in Israel), which goes to architects every fourth year. They were joined in 1989 by the annual Praemium Imperiale (Japan), and this year by the biennial Carlsberg Prize (see page 27).

The task of identifying the most worthy among apples-and-oranges contenders from the world over is obviously challenging – the more so when three other juries are making the same kind of choice. It is clear, if not overtly stated, that each jury is under some pressure to honor architects not already chosen in a similar program. The two just-announced winners – Alvaro Siza for the Pritzker, Tadao Ando for the first Carlsberg – show jury intentions of reaching beyond the mainstream stars to recognize architects whose commissions have so far been relatively modest. Will the rivalry among these programs themselves tend to direct their prizes toward not-too-widely-known figures – with the dividend of providing some mid-career boosts? If so, will the medals of the national institutes such as AIA be reliable rewards for longer-term achievement?

The sponsors of the Pritzker Prize have just inaugurated an exhibition of winners that will travel for a decade, adding panels for each year's new recipient. We were gratified to read in the announcement of the new exhibition that it was inspired in part by a P/A Editorial I wrote in 1987, urging sponsors of awards programs to organize public events: "Whatever kind of event is staged, the main point is that some amount of money and imagination must be committed to publicizing these winners, if they are to be known to more than an informed few, if they are to have their intended effect on our levels of architectural expectation and achievement." We are gratified to know that our advice has been acted upon – and acknowledged.

Meanwhile, back at P/A, we have resumed the sponsorship of our own design competitions – not awards programs but calls for new designs to meet society's current needs. Our Affordable Housing competition, announced in January 1991, with winners published last June, has yielded an actual house by Abacus Architects of Boston, standing on a long-vacant lot in Cleveland; a full report on the finished house will appear in the August P/A. As this June issue comes out, P/A will be receiving entries (due June 19) for another competition, the New Public Realm, for which you have all been asked to conceptualize public works to address current needs. Winning proposals will be featured in the October P/A and exhibited in several cities.

And in September, P/A Awards entries are due. It's time now for you to choose which of your current commissions should be entered (announcement on page 15). This year, we particularly want to stress that this is not only a competition for self-contained buildings – brilliant though some of them may be – but equally for urban design proposals, research projects, prototype buildings, and remodelings. Do not rule out small-scaled urban interventions and research projects of a theoretical or technical (as well as behavioral) nature. Do not let stereotyped images of P/A Award winners unduly limit what you consider entering. Entries that deal with the full range of today's architectural challenges will enable our thoughtful jurors to exert a positive influence on architecture. ■



Announcement of the 40th P/A Awards competition appears on page 15. For the built results of an earlier P/A Awards winner, see page 92.

Views

Mostly Metrication

First, let me compliment you for Cecil Steward's guest editorial on Counter Recession (P/A, April 1992, p. 7). Hopefully, the AIA's efforts will help generate specific Congressional actions to implement his wish list of economic improvements.

Secondly, Architect Leslie Simmons' article on metrication (p. 47) is very timely, indeed. I hope that all architects will realize that metrication will take place and will help in the process. He might have added for recommended reading the *AIA Metric Building and Construction Guide*, published in 1980, which still serves as a practical source for understanding SI units.

Also, ASTM has published several metric standards which are periodically kept up-to-date, including the referred ASTM EO621 – now 1991. Others are EO577, *Guide for Dimensional Coordination of Rectilinear Building Parts and Systems*; EO713, *Guide for Scales for Metric Building Drawings*; and EO835, *Guide for Dimensional Coordination of Structural Clay Units, Concrete Masonry Units, and Clay Flue Linings* (now being reviewed for republishing). In addition to these specific construction-related standards, ASTM has published Standard E380 on *SI Practice*. Interested architects could help further development of these and new standards by joining ASTM committees.

Personally, I grew up using metric units and can vouch that they are much easier and more practical to use, especially as they are primarily in a decimal system and integrally coordinated. The metre/meter was somewhat more scientifically invented than "the one ten-millionth part of an imaginary line running from Paris to the North Pole." It was meant to be one ten-millionth "of the distance from the equator to the pole measured on a meridian" which, by coincidence, could run through Paris, where the prototype platinum-iridium bar is stored. Incidentally, this would make the approximate circumference of the earth 40 million metres and would justify a 400-degree full angle system, with 100 minutes and 100 seconds. Surveying instruments based on that system already exist and could be helpful in space calculations.

Thomas Jefferson was familiar with the metric system and promoted its use in the United States. Unfortunately, the only unit he managed to get established was the dollar with 100 cents. We architects can thank him for not having to bill for our fees in pounds sterling, shillings, and sixpence.

Eino O. Kainlauri, Ph.D., AIA
Professor of Architecture
Iowa State University
Ames, Iowa
Chair, ASTM Committee EO6.62 on Coordinating Dimensions for Building Materials and Systems.

[The *AIA Metric Building and Construction Guide* is out of print. The author points out that the *Metric Guide for Federal Construction* listed in recommended reading at the end of the article, includes an extensive list of references, including those cited in this letter. – Editor]

Metric Comparison Correction

In the table on drawing scales in the Technics Topics article on metrication (April 1992, p. 47), the ratio corresponding to $^1/_{16}$" = 1'-0" should read 1:192. This arithmetical error appeared in the source material for P/A's table.

Toronto Hospital Credit

Hospital Consultants for the Hospital for Sick Children in Toronto (March 1992, p. 92) – working with the Zeidler Robertson Partnership, Architects – were Karlsberger & Associates.

Further Goldman Sachs Credits

The consultant team listed in the credits for the Goldman Sachs Headquarters, London, by Kohn Pedersen Fox Associates (P/A, March 1992, p. 102) was incomplete. It should have read:

Trench Farrow & Partners, project managers; Ove Arup & Partners, structural; Flack + Kurtz Consulting Engineers, mechanical and electrical services; Gardiner & Theobald, quantity surveyors; The Gordon H. Smith Corporation and Emmer Hass Pfenninger, exterior walls; John Van Deusen & Associates, elevations; Shen Milson & Associates, acoustics; Flack + Kurtz Consulting Engineers, special lighting.

Gensler & Associates were interior architects for the fit-out of Goldman Sachs International's office areas.

Corrected credits for responsible individuals within the Kohn Pedersen Fox Associates office were listed in last month's Views (P/A, May 1992, p. 12).

Atlanta Library Credits

In the article on the Alpharetta Branch Library by Anthony Ames (April, p. 96), the following people should have been credited for working on the project: Clark Tefft, William Pantsari, Alan Brown, and the late J. James Strange.

International Show Sponsor

The News Report article in the reconstructed International Style exhibition held at the Buell Center at Columbia University, New York (April 1992, p. 26) should have indicated that the exhibition and catalogue were organized and sponsored by the Columbia Graduate School of Architecture, Planning and Preservation, with Terence Riley as curator. The Buell Center for the Study of American Architecture was not either sponsor or organizer.

Glazing Illustration Corrections

In the article on "Cool Daylighting" (April, p. 137), photographs 4b and 4c, which are labeled "Reflective Coating on Clear Glass" and "Selective Low-E Coating on Clear Glass" should have been reversed. ■

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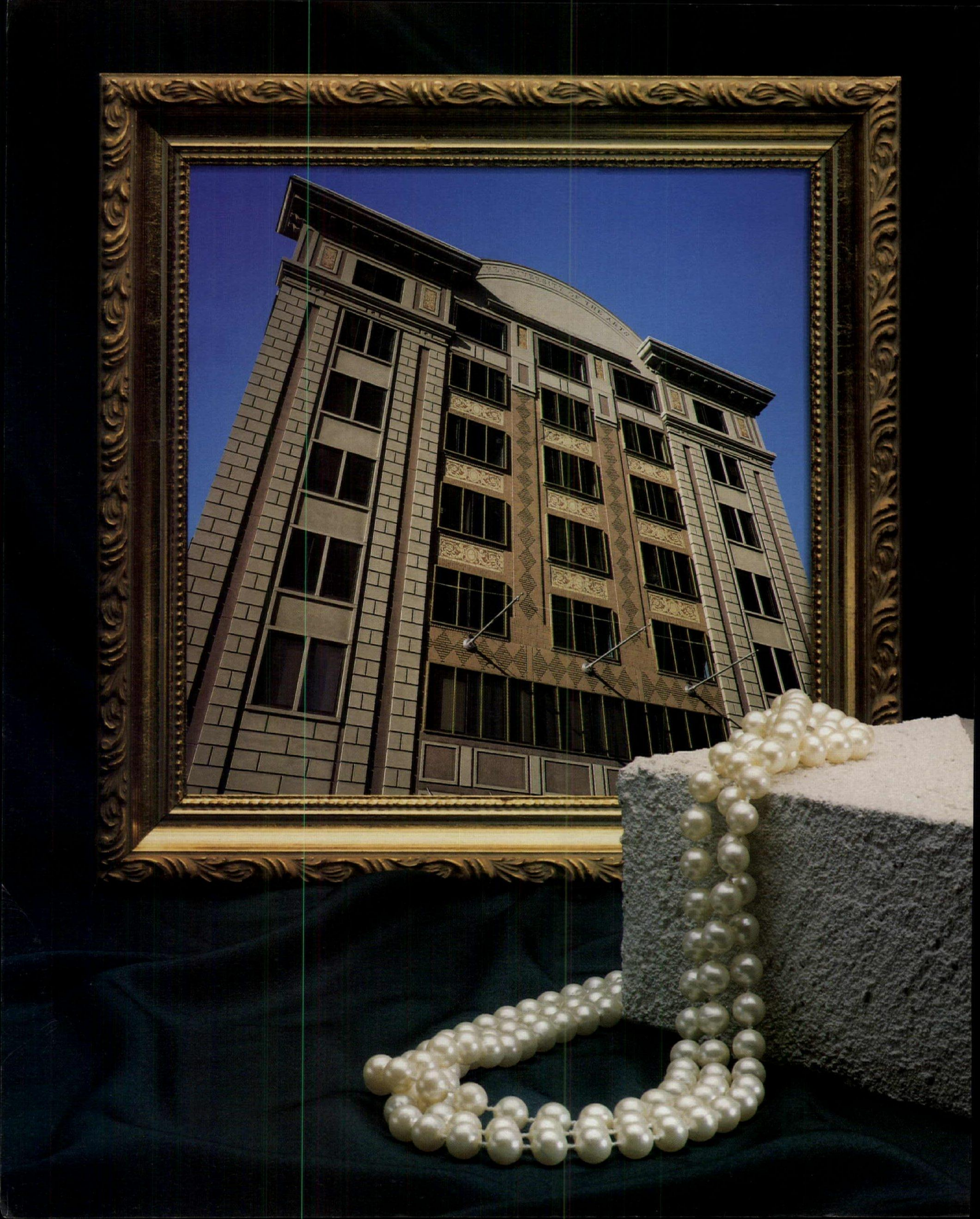

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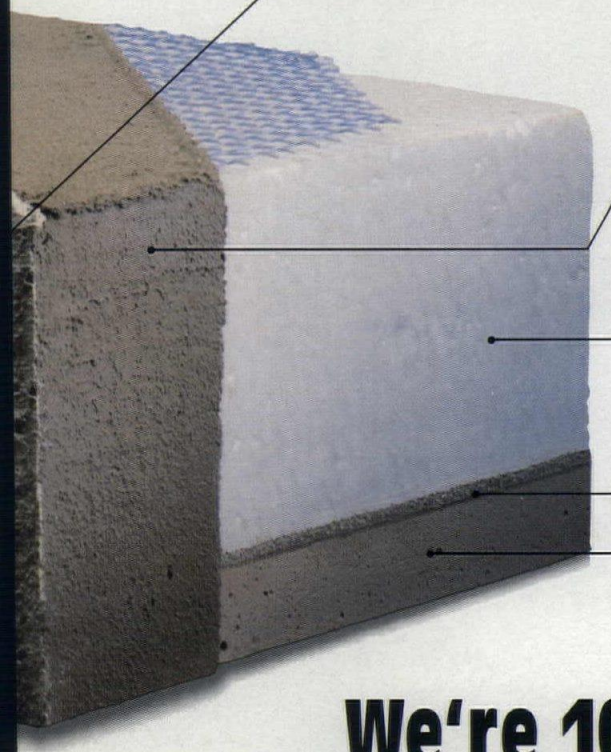

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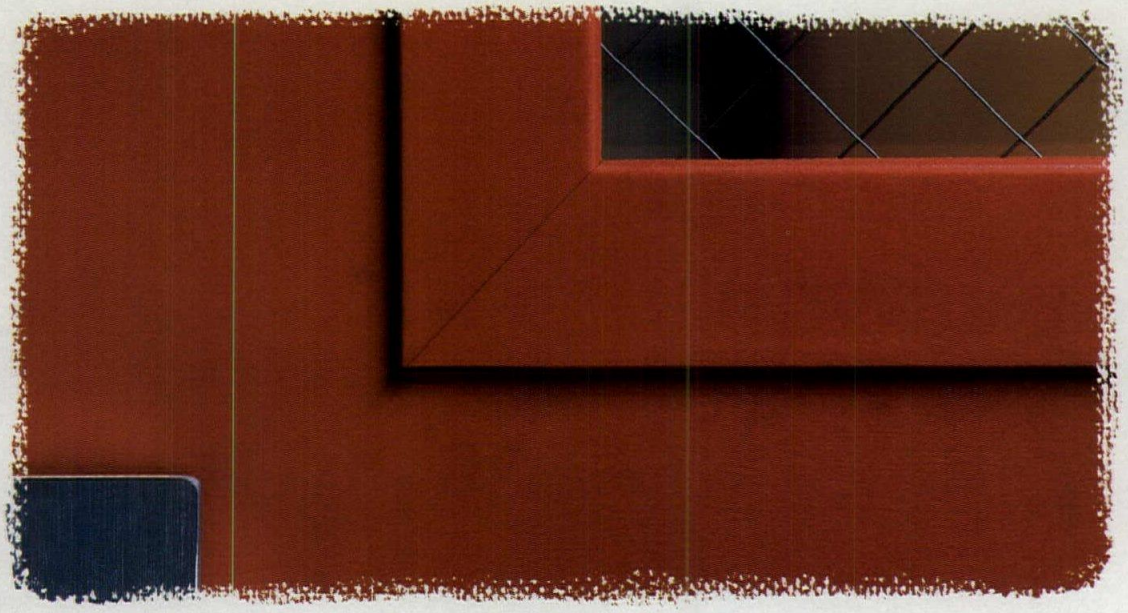

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Designations of first award, award, and citation may be made by the invited jury, based on overall excellence and advances in the art.

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Ada Karmi-Melamede, *AIA, IIA, Karmi Architects & Company, Tel Aviv, Israel.*

Urban Design

John Kaliski, *AIA, Principal Architect, Community Redevelopment Agency, Los Angeles, and faculty, Southern California Institute of Architecture.*
Alan Ward, *ASLA, Principal Urban Designer and Landscape Architect, Sasaki Associates, Watertown, Massachusetts.*

Research

John Carmody, *Architectural Researcher, Associate Director, Underground Space Center, University of Minnesota, Minneapolis.*
Ben Refuerzo, *Principal, R-2ARCH, Designers/Researchers, Los Angeles and New Orleans, and Associate Professor of Architecture, U.C.L.A.*

Judging

The judging will take place in early October 1992. Winners will be notified, confidentially, before October 31. Public announcement of winners will be made in January 1992, and winning entries will be featured in the January issue of P/A. Clients, as well as professionals responsible, will be recognized. P/A will arrange for coverage of winning entries in national and local media.

Turn the page for rules and entry forms.

DEADLINE FOR SUBMISSIONS: SEPTEMBER 11, 1992

Entry form: 40th P/A Awards Program

Please fill out all parts and submit, intact, with each entry (see paragraph 14 of instructions). Copies of this form may be used.

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I certify that the submitted work was done by the parties credited and meets all Eligibility Requirements (1-7). All parties responsible for the work submitted accept the terms of the Publication Agreement (8-9). I understand that any entry that fails to meet Submission Requirements (10-18) may be disqualified. Signer must be authorized to represent those credited.

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Eligibility

1 Architects and other environmental design professionals practicing in the U.S. or Canada may enter one or more submissions. Proposals may be for any location, but work must have been directed and substantially executed in U.S. and/or Canadian offices.

2 All entries must have been *commissioned, for compensation, by clients with the authority and the intention* to carry out the proposal submitted. In the case of design competitions, the submitted design must be the one the client in-tends to execute. (For special provision in Research category only, see Item 6.)

3 Prior publication does not affect eligibility.

4 Architectural design entries may include only buildings and complexes, new or remodeled, that are scheduled to be completed after January 1, 1993. Indicate *schedule* on synopsis page (Item 12).

5 Urban design entries must have been accepted by a client who intends to base actions on them. Explain *implementation plans* on synopsis page (Item 12).

6 Research entries may include only reports accepted by the client for implementation or research studies undertaken by entrant with intention to publish or market results. Explain basis of eligibility on synopsis page (Item 12).

7 The jury's decision to premiate any submission will be contingent on verification by P/A that it meets all eligibility requirements. For this purpose, clients of all entries selected for recognition will be contacted by P/A. P/A reserves final decision on eligibility and accepts no liability in that regard. Please be certain entry meets above rules before submitting.

Publication agreement

8 If the submission should win, the entrant agrees to make available further graphic material as needed by P/A.

9 In the case of architectural design entries, P/A must be granted the first opportunity among U.S. architectural magazines for feature publication of any winning project upon completion.

Submission requirements

10 Entries must consist of legibly reproduced graphic material and text adequate to explain the proposal, *firmly bound* in binders no larger than than 17" in either dimension (9" x 11" preferred). No fold-out sheets; avoid fragile spiral or ring bindings. Unbound material in boxes, sleeves, etc., will *not be considered.*

11 No models, slides, films, or videotapes will be accepted. Original drawings are not required, and P/A will accept no liability for them.

12 Each submission *must include* a one-page synopsis, in English, on the first page inside the binder, identifying the project and location, clarifying eligibility (see Item 4, 5, or 6), and summarizing principal features that merit recognition in this program.

13 To maintain anonymity, no names of entrants or collaborating parties may appear on any part of submission, except on entry forms. Credits may be concealed by any simple means. Do *not* conceal identity and location of projects.

14 Each submission must be accompanied by a signed entry form, to be found on this page. Reproductions of this form are acceptable. All four sections of the form must be filled out, *legibly*. Insert entire form, intact, into unsealed envelope attached inside back cover of submission.

15 For purposes of jury procedure only, please identify on synopsis sheet each entry as one of the following: *Education (including dormitories), Houses (single-family), Housing (multiple), Commercial, Industrial, Governmental, Cultural, Recreational, Religious, Health, Urban Design, Applied Research*. Mixed-use entries should be classified by the larger function. If unable to classify, enter *Miscellaneous.*

16 Entry fee of $90 must accompany each submission. (Canadian office please send drafts in U.S. dollars.) Fee must be inserted in *unsealed* envelope containing entry form (Item 14, above). Make check or money order (no cash, please) payable to *Progressive Architecture.*

17 P/A intends to return all entries intact, but can assume no liability for loss or damage.

18 Deadline for sending entries is **September 11, 1992**. All entries must show postmark or other evidence of being en route by midnight, September 11. Address is printed below. In order to be seen by the jury, submissions must arrive at P/A's offices by September 30; we recommend use of some form of guaranteed delivery, such as Federal Express or Express mail. P/A accepts no responsibility for entries that are lost or delivered after September 30. If hand - delivered, entries must be received at address below, 6th floor reception desk, by 5 p.m. on September 11.

Pointers for submission

- *Document site and surroundings with photos and drawings.*
- *For additions and remodelings, clearly indicate old and new.*
- *If design projects involved substantial research, explain it concisely.*
- *For research entries, indicate applicability to design.*
- *For urban design, clearly indicate how projects are to be administered and funded..*

Deadline: September 11.

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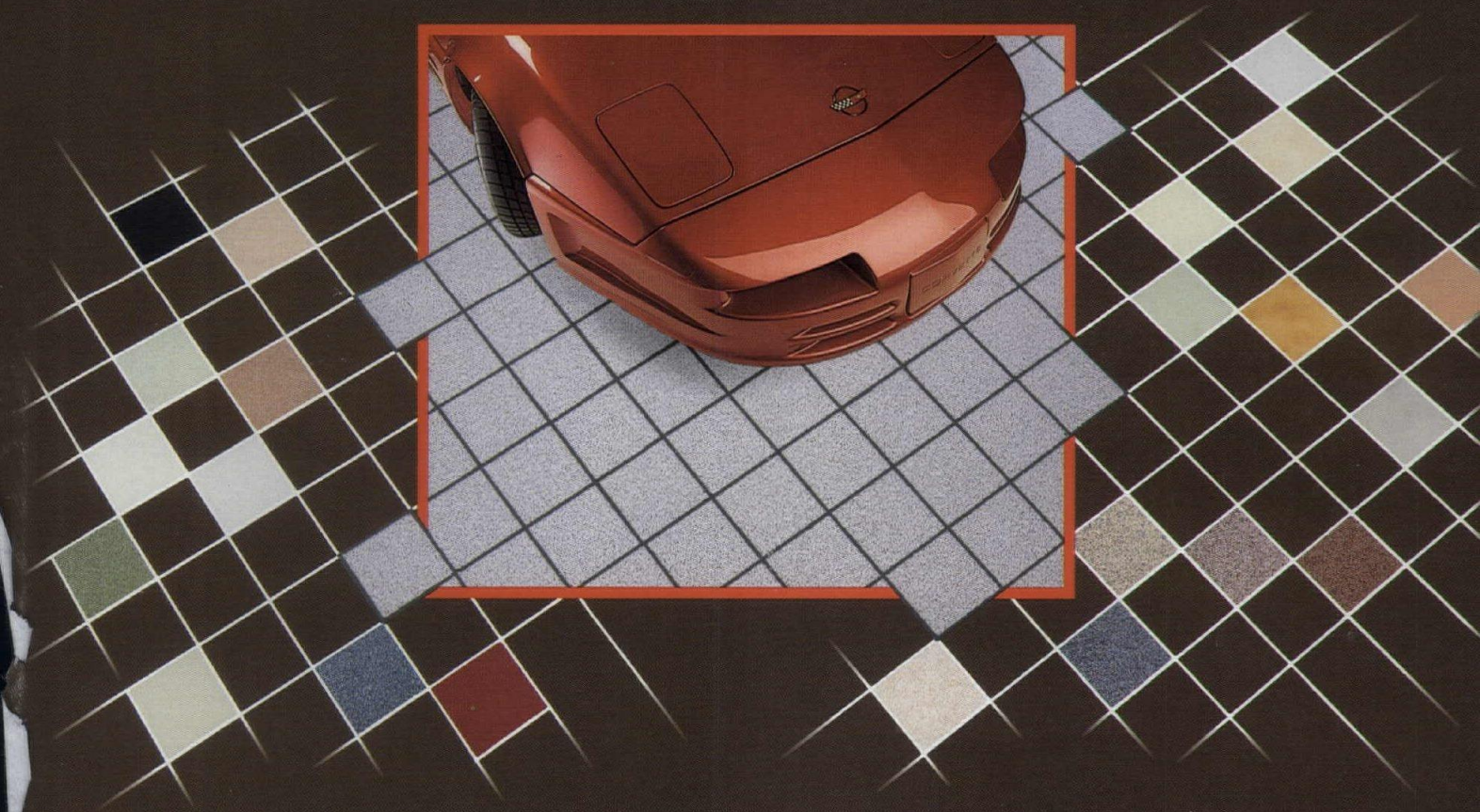

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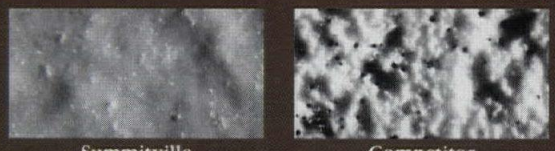

Summitville Competitor

The 30X magnification of the white, glazed tile surfaces illustrated above was performed after tile surfaces were abraded to simulate heavy traffic wear. Summitville's fusion of glaze to impervious body is far superior to traditional glazed tile pavers, resulting in increased glaze wearability and ease of maintenance.

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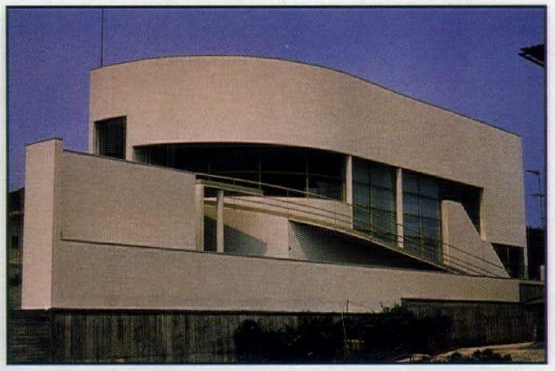
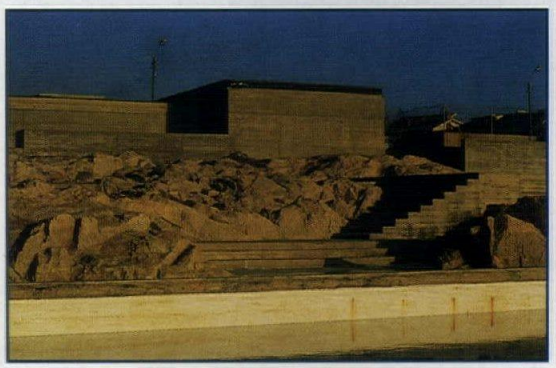




Teresa Siza

Pritzker winner Alvaro Siza (left) and three of his works in Portugal (clockwise from far left): swimming pools at Leca da Palmeira, housing at Evora, Borges & Irmao Bank.

Portuguese Architect Alvaro Siza Wins Pritzker

The mission of an international prize – be it the Pulitzer, Nobel, or the Pritzker – is to honor an individual who has enriched and expanded a profession, politics and fame notwithstanding. This year's Pritzker Architectural Prize jury did just that with its selection of the 15th Laureate, Portuguese architect Alvaro Siza. Siza has had his own practice for nearly 40 years in the northern coastal town of Porto, and has received many architectural awards, but his work is probably unfamiliar to most non-Europeans. He received the prize and $100,000 last month at the Harold Washington Library Center in Chicago.

Siza's "shapes, molded by light, have a deceptive simplicity about them; they are honest," reads the jury's citation. "They solve design problems directly. . . . That simplicity, upon closer inspection, however, is revealed as great complexity. There is a subtle mastery underlying what appears to be natural creations." Though his architecture cannot be easily categorized – it is at once, Modern, contextual, and romantic – Siza's projects reflect his innate understanding of the relationship between the natural and built worlds. In 1966, for example, Siza completed an all-concrete swimming pool complex in Leca da Palmeira, a town just outside of Porto. He set two pools and a changing pavilion amid the rocks of the Atlantic coastline as though they had been there since the beginning of time.

He uses a Modern vocabulary of geometric forms, manifested in concrete and glass, to produce a poetic synthesis of site, context, and structure. Siza's best-known work is the Borges & Irmao Bank in Vila do Conde, Portugal: a characteristically subtle modulation of circular forms, ramps, and stairs, for which he won the Mies van der Rohe Award for European Architecture in 1988.

Born in Matosinhos, a town near Porto, in 1933, Alvaro Joaquim de Meio Siza Vieira studied at the University of Porto School of Architecture from 1949 through 1955. In 1954, he opened his own office and built four private houses; they were the first of many residential commissions that would sustain his practice throughout the 1960s. In 1974, just after the Portuguese revolution, the need for social housing became a concern of the new government. The Bouca Quarter in Porto was his first commission for social housing, a building type he has come to be known for in Europe. In 1977, he was commissioned to design 1200 low-cost housing units in the Malagueira Quarter of Evora, Portugal. There, various courtyard-style units were configured to reflect the character of existing housing stock; in 1988, he received Harvard University's Prince of Wales Prize for his work in Evora.

After a second political change in the late 1970s saw the marginalization of architects who had designed social housing, Siza was forced to look outside of Portugal for commissions, entering competitions and renewing contacts he had made early in his career. He completed several social housing projects as well as private commissions for residences, banks, and corporations.

Work currently nearing completion includes new facilities at the Porto School of Architecture; a Teacher's Training College in Setubal, Portugal; a library for Aveiro University, Portugal; and a Meteorological Center for the Olympic Village in Barcelona.

Siza has taught at the Porto school since 1976; he has been a visiting professor and lecturer at

In Perspectives (page 108), P/A's Executive Editor Thomas Fisher considers a "multicultural architecture" for the 1990s.

Penn Station's revenge? Amtrak proposes a new gateway to New York. Furthermore . . . , page 164.

Pencil Points

The American Academy and Institute of Arts and Letters has announced the winners of its annual architecture awards. Norman Foster is the recipient of the Arnold W. Brunner Memorial Prize, a $5000 prize given to an architect "who has made a significant contribution to architecture as an art." Thom Mayne of Morphosis and former partner Michael Rotondi are the recipients of the Academy-Institute Award in Architecture, a $7500 award given to "American architects who show great promise through work characterized by a strong personal direction."

The AT&T building in New York, Philip Johnson's monument to Post-Modernism, may be altered if a proposal by the tower's new tenant, Sony USA, is approved by the City Planning Commission. Sony proposes to enclose the public arcade at the building's base to create space for retail shops and to enlarge the glass-covered pedestrian walkway behind the building. Gwathmey Siegel & Associates, New York, are the renovation architects; Johnson is a consultant.

Fred Koetter of Koetter, Kim & Associates, Boston, has been named the new dean of the Yale School of Architecture. Koetter, whose term begins January 1, succeeds Thomas H. Beeby.

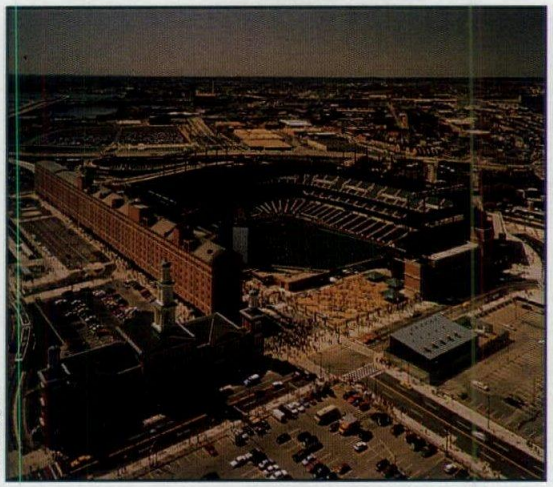
The AIA's 1992 Honorary Fellows are Donald C.R. Bailey, Cammeray, Australia; Nils Carlson, Stockholm; Vakhtang Davitaia, Tbilisi, Georgia; David W. Edwards, Ottawa; Inger and Johannes Exner, Arhus, Denmark; Sara Topelson de Grinberg, Mexico City; Shoji Hayashi, Tokyo; Alexandr P. Kudriavtsev, Moscow; and Vladimir Slapeta, Prague. Fellowship is awarded to foreign architects for "significant contributions to architecture and society on an international level."

Harvard's Graduate School of Design, the University of Pennsylvania, and at schools in Bogotá, Columbia, and Lausanne, Switzerland.

His low profile in international circles is, in part, self-determined. A recent visit to Siza's office revealed a man obsessed with his work. His sketchbook – full of ink-drawn wall sections, roof profiles, and random building elements – is evidence of an addictive hand; anxious requests for cigarettes ("Do you have American?"), evidence of a chain-smoker in action. His thoughts tend to revolve – rather adamantly – around issues of global architecture. "It is contamination which produces the evolution of architecture," he contends, adding that the international exchange that accompanies global design "improves flexibility of language" and "makes societies more secure, more free." **Abby Bussel** ■

Baltimore Hits Home With New Baseball Park

In what is arguably the most significant urban design intervention in America of the last decade, the new Oriole Park at Camden Yards opened in Baltimore in April. A crescendo of praise for the new stadium began over three years ago when the design for the facility was unveiled: an "old-fashioned" baseball-only park with irregular dimensions, exposed steel structure, and intimate seating that hugged a real grass field. The all-star firmament of baseball literati, from Roger Angell to George Will, instantly scored Camden Yards a winner, in league with Fenway and Wrigley.



Jeff Goldberg/Esto

Camden Yards: "authentically quirky" baseball in the city.

The completed structure has proved these early scouting evaluations to be correct. It is a great place to watch baseball. In contrast to the last generation of bland, symmetrical, suburbanized "multipurpose facilities" that pass for baseball stadiums in most cities, Camden Yards is authentically quirky. Located an easily negotiable ten-minute walk from the heart of Baltimore's Inner Harbor and downtown, the park is embedded in the city, drawing from and adding to its mercantile vitality.

In right field, the stadium engages a 94-year-old, red brick former B&O railroad warehouse that the Orioles claim is, at 1016 feet, the longest building on the East Coast. With its linear insistence, the restored warehouse complements the bulk of the 48,000-seat stadium, whose height is reduced by depressing the playing field 16 feet below street level. An extension of Eutaw Street passes between the structures and forms the main entrance to the park from downtown. The gap also brings the city skyline into the stadium as a spectacular center-field backdrop.

The downtown location had worried some planners, particularly those concerned with traffic and parking. But the *Baltimore Sun* reported that approximately 35 percent of Camden Yards' customers took public transportation to the first game held at the park, an exhibition game between the Orioles and the New York Mets. This is nearly twice as many as traffic planners had expected, and many times greater than the figure at most stadiums.

Designed by Hellmuth Obata Kassabaum's Sports Facilities Group in Kansas City, Camden Yards grew out of a master plan developed by RTKL Associates, Baltimore, and Wallace, Roberts & Todd, Philadelphia. Representing the Orioles on architectural issues was Janet Marie Smith (P/A, Young Architects issue, July 1990, p. 95). Their plan for the 85-acre site at the edge of West Baltimore's clashing street grids anticipates the construction of a football-only stadium next door, should the city attract a new NFL franchise.

With so much right about the stadium, it is easy to overlook some of its less than successful details. The park's articulated stair towers, cast stone base, and veneered brick arches are obviously intended to relate compositionally to Camden Station, a historic structure at the head of the B&O Warehouse. Along Camden Street, the gesture can be understood, but as the elements are repeated and as the stadium turns, they appear less grounded and more arbitrary. The gabled pavilions at the top of the stair towers already seem out of fashion.

Inside the park, the main pedestrian concourse is nondescript. A cacophony of ductwork and piping above the underdesigned concession stands gives the space a residual quality. (In fairness, much of the large-scale advertising that is certain to enliven the space was not yet in place on opening day.)

But once in your seat, these concerns are literally left behind. You find yourself in a remarkable exterior room bounded in part by a colossal center field scoreboard and, in the distance, the skyscrapers of Inner Harbor. It is the presence of the city in the stadium that is, in the end, most dramatic. Camden Yards is a great place to watch baseball, but it is an even better place to affirm the possibilities of the city. **Donald Prowler** ■

Ando Wins First Carlsberg Architectural Prize

Japanese architect Tadao Ando has won the 1992 Carlsberg Architectural Prize, the first presented by the Denmark-based brewery, Carlsberg International A/S. The $225,000-prize, the most lucrative in the profession, will be given every other year "to a living architect or group of architects who have made an outstanding contribution to international architecture." The prize was presented in Copenhagen last month by Queen Margrethe II of Denmark.

Ando was praised for ". . . his reactive nature, his fear of impending chaos, his will to create a haven of calm, an artistic moment amidst the over stimulation of the senses and the hysterical search for the new that is the mark of late modernity." A two-stage process was employed to select the winner: a selection committee comprising architectural critics, writers, and historians recommended seven candidates to a jury of financial, cultural, and political professionals.

The selection committee included Hans Edvard Norregard-Nielsen, president of the New Carlsberg Foundation, Copenhagen; Kenneth Frampton, professor of architecture at Columbia University, New York; Peter Davey, editor of the *Architectural Review,* London; François Chaslin, editor of *L'Architecture d'Aujourd'hui,* Paris; and Toshio Nakamura, editor of *A+U,* Tokyo. The jury included Norregard-Nielsen, Carlo Ripa di Meana, EEC Environment Commissioner, Brussels; Hiroaki Shikanai, chairman and CEO of Fujisankei Communications Group, Tokyo; Simone Veil, member of the European Parliament, Paris; composer Andrew Lloyd Webber, London; and film producer/director Wim Wenders, Berlin. ■

Chikao Todoroki

Tadao Ando.

Calatrava Galleria in Toronto

The North American debut of Spanish architect/engineer Santiago Calatrava is reason enough to take notice of BCE Place (named for Bell Canada Enterprises), the most ambitious corporate development to show up in Toronto in a decade. Filling a 5.5-acre blue-chip site in the financial district, BCE Place is essentially two taut-skinned towers, skewed and angled to provide 12 corner offices per floor, and a large underground retail concourse.

Designed by Skidmore, Owings & Merrill, New York, in joint venture with Bregman & Hamann, Toronto, it is also a case study in current preservation practices, incorporating the restored remains of a dozen historic buildings. The finest of the lot, a 19th-Century bank, survives intact as the new premises of the Hockey Hall of Fame.

Calatrava's contribution, which originated with

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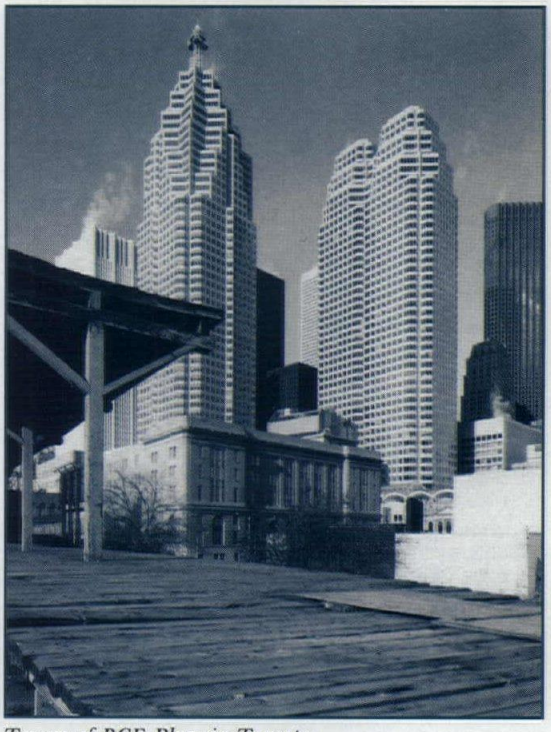
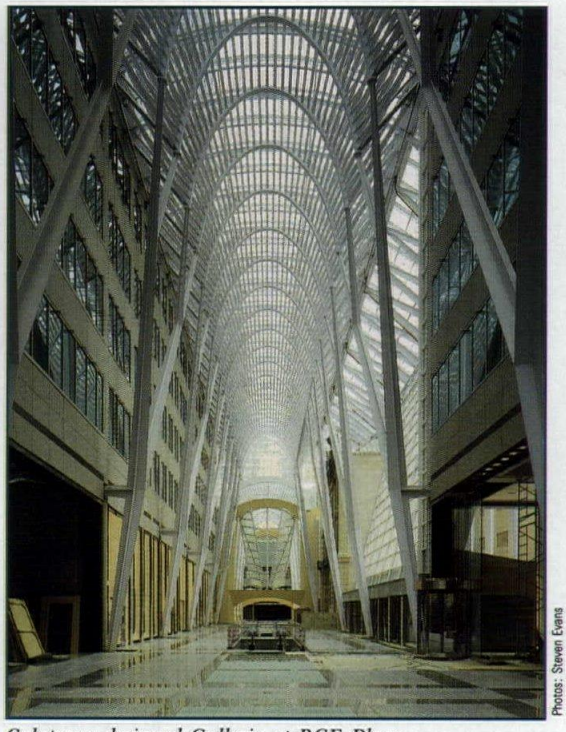


Towers of BCE Place in Toronto.



Photos: Steven Evans

Calatrava-designed Galleria at BCE Place.

Washington Report

Amidst continuing uncertainty about the domestic building economy, about 100 architects gathered on Key Biscayne, Florida, in May under auspices of the AIA International Committee to gauge global markets for design services.

The opportunities appear to be considerable: "As much as 60 percent of the world's wealth is embodied in real estate," said Michael Stein, a senior economist with Arthur Anderson, "and real estate development retains the highest productive capacity of any form of investment."

What's hot:

- Light industrial facilities and leisure complexes in Latin America (Mexico, Argentina, Brazil, and Chile), Southeast Asia (Korea, Singapore, and Malaysia), and Eastern Europe (Poland, Russia, Czechoslovakia, and Hungary).
- Office and hotel developments in some European cities (notably Berlin, Leipzig, Brussels, Milan, and Lyon).

What's not: virtually anything in London, Sydney, Madrid, Hong Kong, Montreal, or Toronto.

U.S. architects are hardly unfamiliar with overseas markets: Eugene Kohn of Kohn Pedersen Fox Associates, New York, and Bernardo Fort-Brescia of Arquitectonica, Miami, showed a remarkable array of projects in Portugal, Poland, Japan, France, Germany, and Luxembourg. There was much talk of foreign work being done by other prominent American firms.

Smaller U.S. firms are also working abroad, especially in the booming resort areas of the Caribbean and Latin America. One contingent seemed to be awaiting eagerly a post-Castro Cuba, anticipating a subsequent takeoff of building there.

One U.S. architect practicing in the Caribbean offered a well-intentioned entreaty against "parachute" buildings (those dropped in by foreigners without regard for where they're built). But his examples of buildings suited to their settings left one wishing that *their* parachutes hadn't opened.

The overall message was upbeat: American architectural know-how is in demand abroad for high-rise mixed-use develop-

(continued on next page)

Washington Report

(continued from previous page)

ments, medical facilities, and resort-leisure complexes.

But participants also expressed abundant concern over the near-term ability of U.S. architects to compete globally. The founding partner in a New York firm with large projects all over the globe said: "Anywhere we go now to compete internationally we see teams from Europe and Japan. Two years ago that wasn't true. And they're very, very good." He also lamented the inflexible, "prima donna" attitudes of some U.S. architects who blazed early trails abroad, suggesting that they may have soured foreign clients on American design professionals. Other speakers noted that foreign teams often arrive with project financing and influential government support.

For many reasons, architectural designs that are perceived as "American" seem poised to retain marketing advantages around the world; the problem is that U.S. architects won't necessarily be needed to produce what clients will accept as an American look and product. And the long-term involvement of more U.S. firms in foreign markets will require efforts to bolster existing leadership in building technology as well as design.

Even if the American architecture profession were able to unite behind such pursuits, it could probably not gain them alone; it may need to join forces with builders, engineers, and product manufacturers, many of whom have longer experience in foreign markets and wield greater economic influence.

The U.S. government could be a stronger advocate for American building products, design, and construction, in part through foreign aid for infrastructure and industry.

The conferees seemed to concur in the view that American architects seeking work overseas have to be well-versed in foreign cultures and practices while distinguishing themselves in the marketplace. They must also strive to overcome mistaken perceptions and to garner the support of their government. In short, they must do what their competitors have begun to do so well. **Thomas Vonier** ■

Galleria

(continued from previous page)

a one-percent-for-art program, is a splendid steel and glass structure that runs between the office towers, announced at the main entrance by a filigreed canopy that thrusts boldly over the street. Predictably known as the Galleria, the soaring space – 380 feet long and 85 feet high – is both public thoroughfare and urban room. In atmosphere, it is sheer poetry.

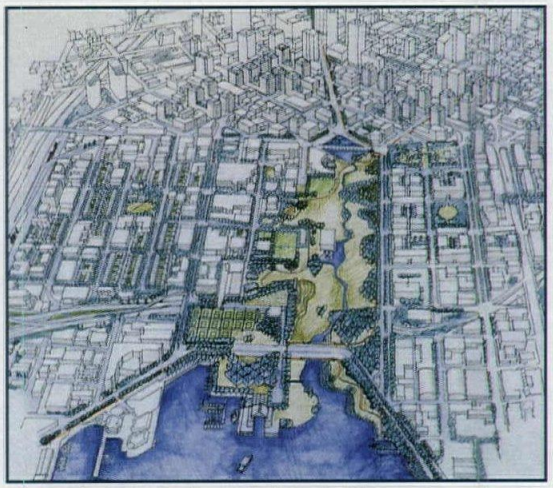
Calatrava detailed the elongated hoops of white painted steel that shape the Galleria to suggest trees and bowers, a reference to the Ontario landscape. The patterned granite floor is, he says, "in the tradition of the rest of the floors in this area." He admits that having to make accommodation in the gallery for the relocated façade of another Victorian bank was "for someone coming from Europe, strange." Yet thanks to his artistry, the ornate relic, complete with wrought-iron fence and balconies, has a dignified presence.

The second of Calatrava's assignments was an enclosed square leading from the gallery, its outer edges formed by the repaired fronts of Victorian shops and warehouses. Modeled on Henri Labrouste's Bibliothèque Nationale in Paris, the square is anchored by 16 steel columns supporting a vaulted roof of steel and glass, the whole surrounded by brick arches containing retail space. Calatrava engineered the transition between gallery and square as a brick arch holding an enormous pair of pivoting windows – "movable architecture," in his words – which will be set at different angles for a changing prospect. Other views might include performances and café-goers: it is intended that both of Calatrava's spaces be in use seven days a week. A posthumously executed plaza by New York artist Scott Burton is for outdoor pleasure. **Adele Freedman** ■

The author is design critic for The Globe and Mail *of Toronto.*

New Seattle Park, Neighborhoods Discussed

Seattle mayor Norm Rice has advanced a major planning proposal that would channel future growth into a series of newly created "urban villages" in underdeveloped parts of the city. At the same time, a self-styled "citizens' movement" is promoting a plan for redevelopment of a messy light industrial and commercial area between Lake Union and the downtown core, one of the target areas of the mayor's proposal. This plan, called Seattle Commons, has a very large park as its centerpiece.



Charrette-derived scheme for Seattle Commons.

The mayor is taking the stance – somewhat risky in Seattle – that the city should accommodate a larger than anticipated share of the region's population growth in coming decades, in order to discourage further sprawl and to encourage more efficient means of transportation and use of natural resources. He would ask the city's sensitive residential neighborhoods to accommodate only a limited amount of this growth in the form of carefully designed and modestly scaled infill housing. Most of the rest would go into new "pedestrian-friendly urban neighborhoods" of relatively high density that would become nodes in a local transit network. These new neighborhoods would be laced with open space and community facilities.

The Seattle Commons idea was floated last year by a local newspaper columnist whose principal domain is food. It was not a new idea: municipal plans from as early as 1911 have proposed a park in this general area. But Seattle has a soft spot for green space, and the idea caught on. The Committee for Seattle Commons proposes new housing along its park and some transportation improvements, making its plan consistent with the mayor's proposal.

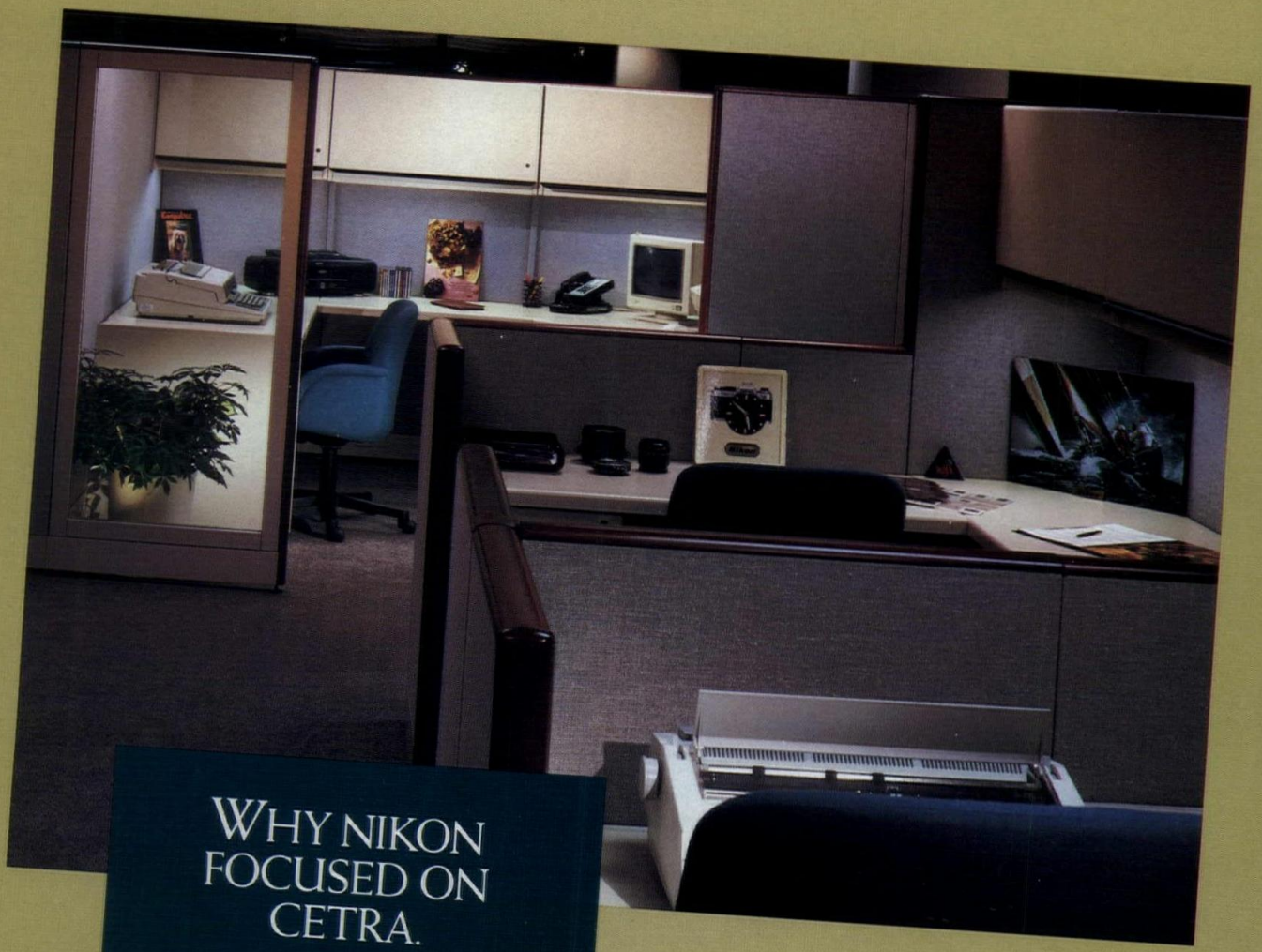
Both proposals were subjects of a mid-April charrette conducted by the University of Washington Department of Architecture. Four teams of students, faculty, and visiting professionals spent five days studying possibilities for a new neighborhood in the area of the proposed Commons.

Their work gave shape to the mayor's vision and produced some serious questions about the Seattle Commons plan: its park would end some eight blocks north of downtown, leaving a band of blight between the new neighborhood and the core. The charrette teams each carried their plans all the way downtown.

Only one of them accepted the Seattle Commons location for a major park. The others added open space to a park already planned for the south shore of Lake Union, or to the edge of downtown, or both. One spread smaller open spaces throughout the neighborhood in lieu of a large park.

The university's community charrettes, now in their fifth year, have had impact. Two years ago, the subject was the creation of a new neighborhood around the Kingdome, Seattle's football and baseball stadium, with some housing and retail space on platforms over the stadium parking lots. That area was another one targeted by the mayor's proposal in March. **Donald Canty** ■

(News Report continued on page 30)



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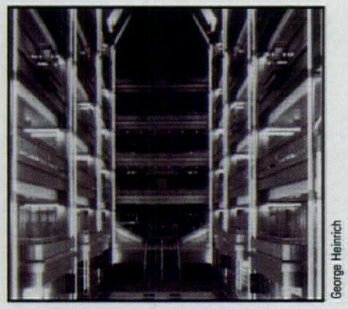
C E T R A G O E S E V E R Y W H E R E

IALD Lighting Design Awards

The International Association of Lighting Designers presented two Awards of Excellence and five Citations in its 1992 awards program. Award winners are:

- Jerry Kugler and Thomas Thompson of Jerry Kugler Associates, New York, for the Corning Headquarters Entry Exhibition, New York (interior design by Donovan & Green, New York);



George Heinrich

Atrium, 3/M's Building 275.

- Lauri A. Tredinnick and architect William Blanski of Hammel Green & Abrahamson, Minneapolis, for the atrium of 3M's Building 275, Maplewood, Minnesota.

Citation winners are:

- Patrick Gallegos of Gallegos Lighting Design, Northridge, California, for Puro Village, a theme park outside Tokyo (architecture by Murayama, Inc., Tokyo);
- Francesca Bettridge and Carroll B. Cline of Cline Bettridge Bernstein, New York, for the Ohrstrom Library, St. Paul's School, Concord, New Hampshire (architecture by Robert A.M. Stern Architects, New York);
- Craig A. Roeder of Craig Roeder Associates, Dallas, for Lee Memorial Hospital's Health Park Medical Center, Fort Myers, Florida (architecture by HKS, Inc., Dallas);
- Jonathan Speirs, Graham Phoenix, and Mark Major of Lighting Design Partnership, Edinburgh, Scotland, for a railway tower in Oslo (architecture by HRTB, Oslo);
- Leslie Wheel and Allen Leibow of WGFS Lighting Design, Culver City, California, for the Guam Okura Hotel (architecture by KSLW, Long Beach, California; interior design by Robert H. Egan, Seattle). ■

Corb's Furniture at Carpenter Center

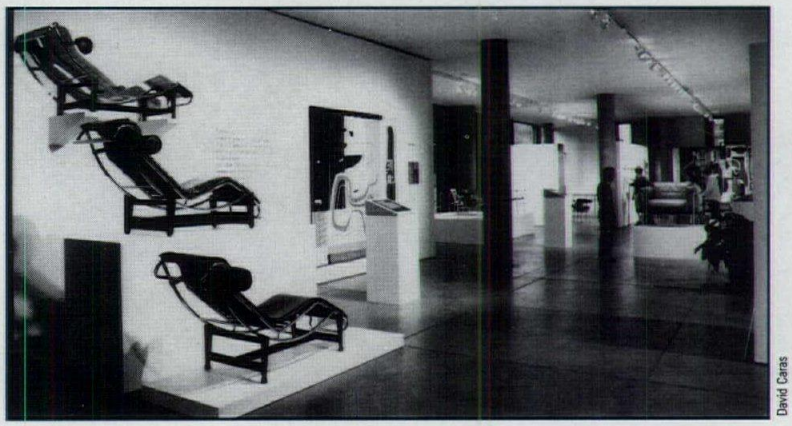
"A work of art should be able to withstand comparison with any manufactured object," said Fernand Léger. No doubt Léger believed what he said, but he also meant it to be funny. "A chair is in no way a work of art; a chair has no soul; it is a machine for sitting in," said Léger's friend, Le Corbusier. And he was dead serious.

Harvard's Corbusier-designed Carpenter Center for the Visual Arts has put together an exhibit of Le Corbusier's furniture design entitled "Le Corbusier Domestique: Furniture/Tapestries 1927–67." (All of the furniture dates from the 1920s.) To my mind, the show demonstrates how little Le Corbusier followed his own edict – which is just as well. The show includes, for example, the viscerally animal Camp Chair, of chromed steel and shaggy pony fur, and a huge table of heavy mitered steel tubes painted sky blue, supporting a glass top on four big black rubber suction cups. These pieces are no more machines than are Léger's paintings. But like those paintings, they are *about* the age of machines. Le Corbusier's doctrine and his industrial materials are foils to forms that are willful, fun, sometimes disturbing. The catalog essay, by Vincent Masucci, urges us to take Le Corbusier at his word, but the furniture refuses to go along.

You won't find this furniture on the shelf next to Breuer's chairs at the mall. The Breuer chair really is a machine, in that the mass-production process is designed into it. But very few of Le Corbusier's designs could be manufactured at all until Heidi Weber, with the architect's permission, modified them in the late 1950s. Even the now-famous "Grand Confort" Club Chair had never gotten beyond a few prototypes.

The exhibit ended a brief run in April, but it is expected to travel in Europe and the United States. **Jonathan Hale** ■

The author, an architect in Watertown, Massachusetts, writes frequently on architecture and design. His book, The Old Way of Seeing, *will be published next spring.*



David Caras

Corbusier furniture installed in his Carpenter Center at Harvard.

Virtual Reality Demonstrated

The Computer Museum in Boston recently presented a two-day demonstration of a prototype architectural design application using new virtual reality (VR) computer technology. Cosponsored by Intel and the Sense8 Corporation, "Designing a Virtual House" is the first interactive event in the United States to introduce practical applications of VR to the public.

Virtual reality, the immersion of a user's senses in a computer-generated world, is often considered the far-fetched dream of eccentric computer buffs and science fiction fans. Its manifestations in the public eye have been limited to movies (most recently, *The Lawnmower Man*) and video arcade games. To present more practical functions for this technology, the sponsors used Sense8's software to create a two-person VR station for the creation of building prototypes running on PC computers with Intel chip processors. The viewers donned helmets with separate view screens for each eye. As they turned or raised their heads, the screens smoothly reflected the shifting orientation. A joystick and a pointing wand were then manipulated to move walls, floors, and roofs in the "virtual world," and to change the appearance of different surfaces. This rudimentary two-person interaction is intended to represent an architect working with a client in the initial stages of a design project.

Any use of VR applications for this purpose is probably far in the future. But this demonstration illustrates that the technological underpinnings for VR already exist, and it may be only a matter of time before sytems and applications become refined for practical use. (Consider that many thought CAD tools would never penetrate the architectural marketplace.)

"Designing a Virtual House" was a one-time exhibition to promote the Computer Museum's permanent exhibition, "Tools and Toys: The Amazing Personal Computer," which includes a simpler single-person VR station. But Sense8 and Intel will continue to display similar applications at such events as the upcoming AEC Systems show in Dallas this month. **Larry Yu** ■

The author is a technical writer at Graphic Systems, Inc., in Cambridge, Massachusetts, and the Editor of the GSI Report on Real Estate and Facility Management Automation.

Interior Architects, Inc.
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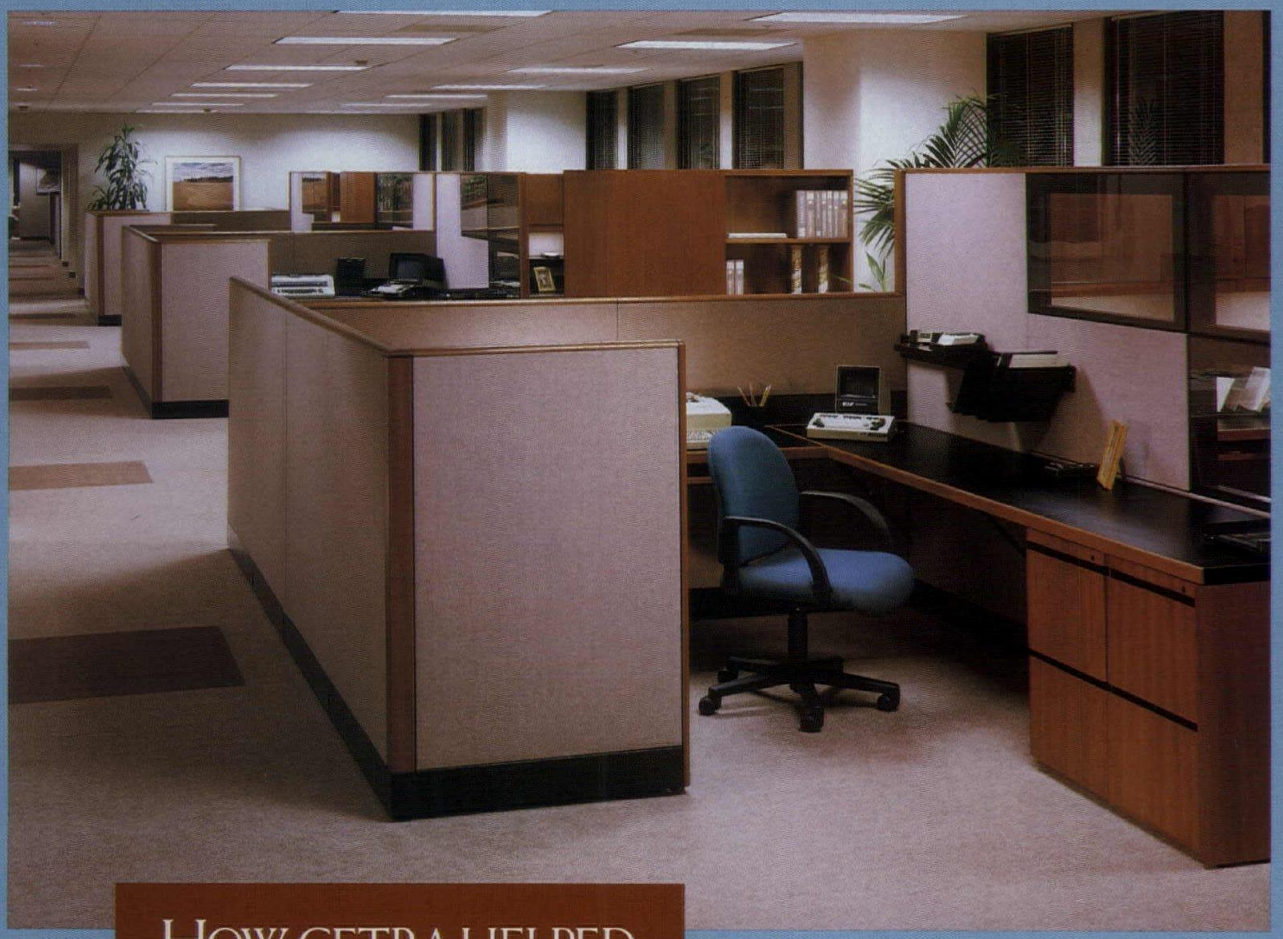

HOW CETRA HELPED SECURITY PACIFIC MAKE THE CORRECT CHANGE.

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C E T R A G O E S E V E R Y W H E R E

Calendar

Exhibitions

Work by Pritzker Laureates
Through June 30

Chicago. In an effort to expand the public's awareness of architecture and of the profession's most esteemed members, a 10-year traveling exhibition titled "The Art of Architecture" has been launched. Work by all previous Pritzker Architecture Prize Laureates, from Philip Johnson in 1979 to Alvaro Siza this year (see p. 25), is included in the exhibition's premier. Each year, the show will expand to include new honorees. Harold Washington Library.

William R. Ware
Through September 14

Cambridge, Massachusetts. "Drawings at Work: William R. Ware and the Origins of American Architectural Education" includes drawings by Ware, founder of MIT's Department of Architecture, produced in his partnership with Henry Van Brunt. English and French drawings collected by this influential educator and student drawings from the museum's own collection are on view. MIT Museum.

Eisenman/Gehry
June 6–August 8

Columbus, Ohio. This traveling exhibition of work by Frank Gehry and Peter Eisenman originated at the Venice Biennale last September. The architects were chosen by Philip Johnson to represent the United States. Riffe Gallery.

Louis I. Kahn
June 14–August 18

New York. "Louis I. Kahn: In the Realm of Architecture," a traveling exhibition organized by the Museum of Contemporary Art, Los Angeles, attempts to capture the essence of Kahn's work (P/A, Dec. 1992, p. 17). Museum of Modern Art.

Competitions

P/A Competition: The New Public Realm
Entry deadline June 19

Stamford, Connecticut. It is no secret that public facilities in the U.S. are in need of improvement, but little has been done to alleviate current conditions. P/A invites readers to address the problems and offer possible solutions in an ideas competition, "The New Public Realm." Entrants are asked to interpret public needs broadly – including buildings, open spaces, urban design, bridges, even public policy proposals – and to suggest how public and private funds might be used to realize their ideas. (See P/A, Apr. 1992, p. 59, for the competition program.) Contact The New Public Realm, P/A, 600 Summer Street, Stamford, CT 06904 (203) 348-7531 or FAX (203) 348-4023.

Berlin Parliament District
Registration deadline September 1

Berlin. With the decision to move its capital to Berlin, the Federal Republic of Germany has announced an international ideas competition for the planning of a new government district. The Spreebogen Parliament District in Berlin will accommodate facilities for the German Parliament, the Federal Chancellery, the Federal Press Conference, the Press Club, and the Federal Council. Queries in writing will be accepted until July 22. Contact Arbeitsgemeinschaft Wettbewerb Spreebogen, Paulstrasse 20c, 1000 Berlin 21, Germany 30-3941081 or FAX 30-3944050.

P/A Awards
Entry deadline September 11

Stamford, Connecticut. The 40th annual P/A Awards (see p. 15) recognize unbuilt projects in the categories of architectural design, urban design, and architectural research. Projects must be scheduled for completion after January 1, 1993. Winning entries will be featured in P/A's January 1993 issue. Contact Awards Editor, P/A, 600 Summer St., Stamford, CT 06904 (203) 348-7531.

(continued on page 34)

Garikes Wilson Atkinson, Inc.
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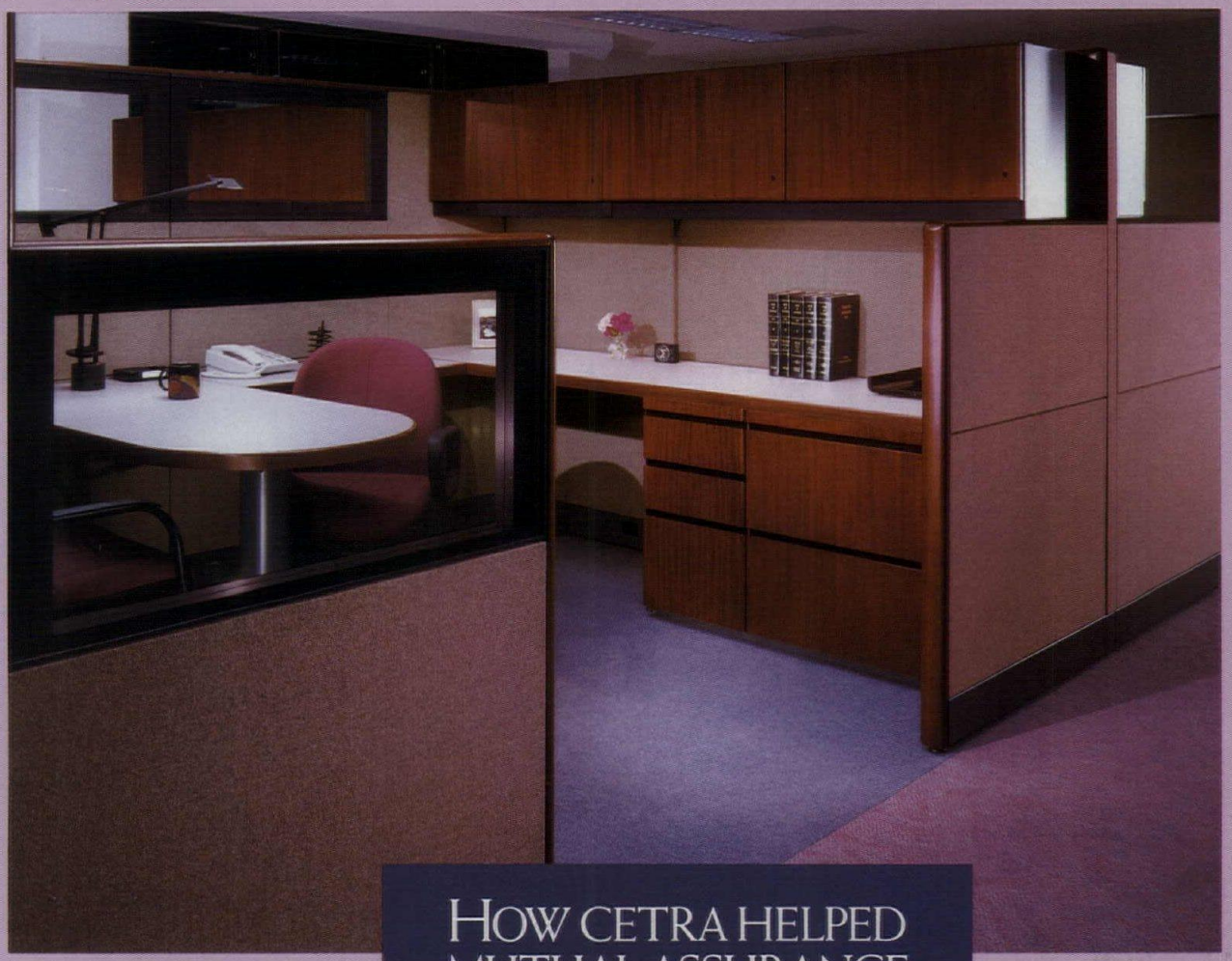

HOW CETRA HELPED MUTUAL ASSURANCE INSURE THEIR FUTURE.

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CETRA GOES EVERYWHERE

Calendar *(continued from page 32)*

Conferences

NFRC Meeting
June 24–27

Baltimore. The National Fenestration Rating Council's summer membership meeting will be held at the Hyatt Regency in the Baltimore Inner Harbor. Contact NFRC, 962 Wayne Ave., Ste. 750, Silver Spring, MD 20910 (301) 589-6372 or FAX (301) 588-0854.

CSI
June 26–28

Atlanta. The Construction Specifications Institute's 36th Annual Convention and Exhibit will be held at the Georgia World Congress Center. A preconvention program on June 25 will examine the host city. Contact Sandy Humphries, CSI, Convention Services Department, 601 Madison St., Alexandria, VA 22314-1791 (703) 684-0300.

SIGGRAPH '92
July 26–31 (conference),
July 28–31 (exhibition)

Chicago. The 19th international conference on computer graphics and interactive techniques will be held at McCormick Place convention center. Contact SIGGRAPH '92, Conference Management, 401 N. Michigan Ave., Chicago, IL 60611 (312) 644-6610 or FAX (312) 321-6876.

Burn Building Design
July 28–29

Hunt Valley, Maryland. The Burn Building Design and Construction Symposium will offer information for construction or refurbishment of burn buildings; site selection, environmental and safety concerns, and building and lining materials are among the topics to be discussed. Contact James Eicholtz (410) 628-3119.

Building Underground
August 2–5

Delft, The Netherlands. The 5th International Conference on Underground Space and Earth Sheltered Structures will be held at the Delft University of Technology. The subject will be examined in terms of planning, economics, law and politics, design and use, and construction. Contact Congress Office ASD, P.O. Box 40, 2600 AA Delft, The Netherlands. (31) 15 120234 or FAX (31) 15 120250.

IESNA Conference
August 2–6

San Diego. The annual conference of the Illuminating Engineering Society of North America will include educational seminars, technical papers, workshops, and a new product and services exhibit. Contact Valerie Landers, Meetings Manager, IESNA, 345 E. 47th St., New York, NY 10017-2377 (212) 705-7269 or FAX (212) 705-7641.

Post-War Americana
August 6–8

Los Angeles. Participants of "Driving In and Moving Out: Auto Mobility in Post-War America" will discuss "the transformation of the American cultural landscape and built environment after World War II, emphasizing the roles played by the automobile and the highway." The Society for Commercial Archeology is the conference sponsor. Contact H. Lee David, 4901 Murietta Ave., Sherman Oaks, CA 91423 (818) 788-3533.

Public Communication in the City
August 13–15

New York. "COMPLEXcity: The Competition for Communication in the Urban Environment" is the title of the Society of Environmental Graphic Designer's 1992 national conference. Participants will discuss advanced graphic technologies, the history of billboards, media communications, and the art of public spectacles in the context of projects in both American and international cities. Contact SEGD, 47 Third St., Cambridge, MA 02141 (617) 577-8225 or FAX (617) 577-1769.

PLEA 92
August 19–22

Auckland, New Zealand. "Architectural Responses to Climate Change" is the theme of the tenth international PLEA (Passive and Low Energy Architecture) conference. Contact PLEA 92, Centre for Continuing Education, Private Bag 92019, Auckland, New Zealand (64) 9-373 7999 or FAX (64) 9-373 7419. ■

Project	DuPage County Court House
Location	Wheaton, Illinois
Architect	Hellmuth Obata & Kassabum, Inc. (HOK)
	Wight & Company
Lighting	HOK Lighting Design Group
Fixture	P-ID MOD-66, R-D MOD-66
Photo	John Miller, Hendrick-Blessing

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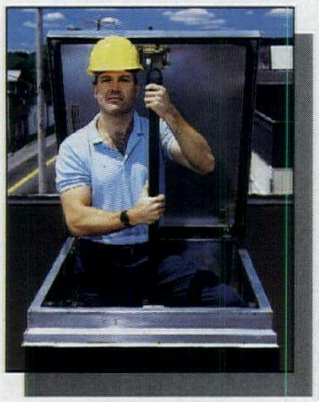

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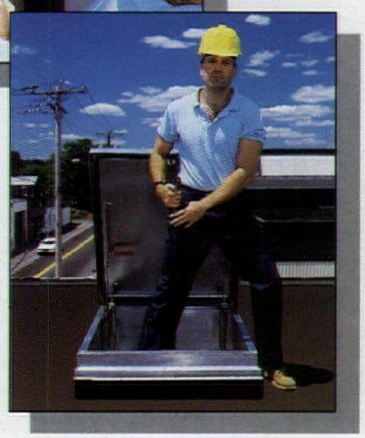

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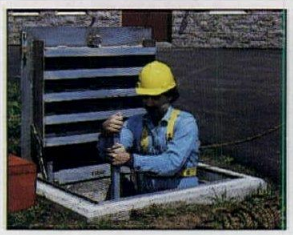

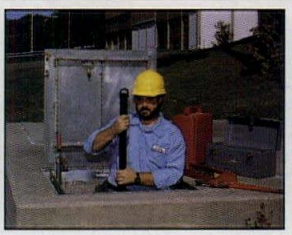

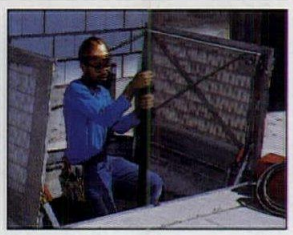

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Technics
Measuring and Documenting Existing Buildings

Historic American Buildings Survey deputy chief **John A. Burns, AIA,**

describes procedures you can put into practice.

For more than a decade, architects have been moving away from new construction to working with existing buildings, and to do this work, they have had to adapt procedures and techniques usually reserved for restoring historic structures. One of the most important steps in this process is establishing accurate dimensional information on existing conditions.

Every project with an existing building requires a search for documentary records and the "original" drawings. If records or drawings are found, they must be carefully reviewed to verify if they are complete, accurate, and reliable, and will meet the needs of the project at hand. Sooner or later, however, every architect is forced to measure and draw a building because no adequate drawings exist.

Measured drawings are based primarily on physical evidence, but may rely on other sources for information. Documentary sources, for example, can provide evidence of former conditions and may help in the interpretation of the physical fabric. Citations to the sources are key features in any measured drawing; these include whether dimensions are from original or as-built drawings, alteration drawings, hand measurements, or were scaled from photographs.

Planning Measured Drawings

Measured drawings may require differing levels of detail and annotation, depending on the ultimate use of the drawings. Measured drawings prepared for restoration work will require extensive dimensions and annotations to record all the historical and conditional information, while those intended for maintenance purposes may need little more than material indications and dimensions for calculating gross areas needing treatment. Measured drawings can also serve as the "last rites" for a structure slated for demolition by recording all its salient features. Drawings intended to serve as protection from catastrophic loss must be detailed enough to allow the exact replication of a building, should it be destroyed.

The architect must establish conventions for measuring and accuracy before commencing the field work, especially if several people or teams will take the measurements and produce the drawings. Part of the decision of what – and how – to measure is determined by what type of information is essential to the final drawings (see sidebar). After the type of information required in the measured drawings has been decided, the source of the measurements needed to produce those drawings must be determined. Once the type and quantity of drawings to be made (including their level of detail, scales, accuracy, and sheet layout) has been decided, the planning of the field work can begin.

Gathering Information

Field Records. Field records are the assembled raw material for producing measured drawings. They contain all the detailed information on methodology, dimensions, and notes made at the time of recording. They are a primary resource and are invariably more comprehensive than the dimensions and annotations applied to the finished drawings. A completed measured drawing cannot be more accurate than the field records from which it was produced.

Field work should be thought out in advance to organize the recording efficiently and to minimize the chances for mistakes. The field notes must be accurate and comprehensive records of the structure being documented; they must be carefully annotated and neatly labeled so that others can understand and interpret the information. Hasty or sloppy field work invariably includes errors and omissions that cause repeated trips to the site or flaws in the final drawings.

Sources for Measurements. Dimensions for measured drawings normally come from three sources – documents, hand measurements, and photographs. Documents may include original or alteration drawings, old views, published accounts, previous surveys, and specifications. Hand measurements are taken with tools and techniques of varying sophistication, including taping distances, surveying, and by measuring and then counting repetitive materials (vertical courses of cladding, for example).

Photography offers a wide variety of information gathering capabilities. Most field photographs are 35mm images, ideally with a scale stick in the field of view. Color print film is the most convenient to use unless you need the archival stability of black-and-white film. Field photographs supplement the field measurements and are invaluable for double-checking accuracy. They are inexpensive in relation to their usefulness. As a rule-of-thumb, the less accessible a site is for checking measurements, the more field photographs you should take.

Some photographs can be used to produce accurate measurements, although cameras document

Measuring Practice

What Information is Needed?

How much of the building needs to be measured and drawn?

What level of accuracy is needed in the measurements? Dimensions to the nearest inch are adequate for site plans but inadequate for details, where measurements to the nearest $1/16$" or $1/8$" would be appropriate.

To what extent do deformities need to be measured and drawn? Can or should the building be made orthogonal in the drawings?

What kind of detail is required in the finished drawing? This will determine the scale of the drawing. At the common scale of $1/4$"=1'-0", the smallest distance that can be accurately drawn is about 1".

How many dimensions and annotations are necessary?

What drawing sheet size is appropriate? For planning purposes, the size of a drawing in inches can be determined by dividing the building dimensions in feet by the denominator of the scale (4 for $1/4$" scale, 8 for $1/8$" scale, etc.; this only works for inch scales where the numerator is 1, and not for $3/16$", for example).

What Information is Available?

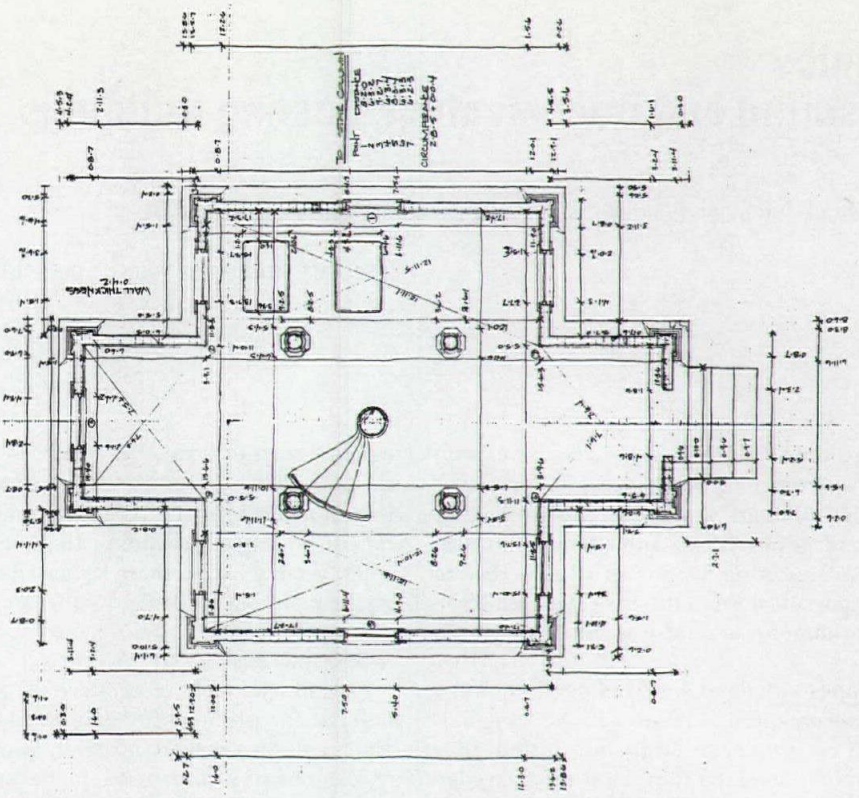
Do any drawings exist or must they be produced?

If drawings exist, are they useful to the current need?

If measurements must be taken, what tools and expertise are needed and available to produce them? If special equipment such as scaffolding, cherrypickers, and electronic surveying equipment are needed, can they be used to meet other project needs?

Does the structure itself, its size, condition, use, and accessibility, dictate the manner in

(continued on page 40)



1 *Typical field notes of the Michigan Island Light Station. Note the convention adopted for writing dimensions and diagonal measurements to check for squareness.*

(continued from page 39)

which it can be measured? Are there safety concerns that need to be addressed? Generally, measuring should be done by two-person teams.

Planning

Establish type and number of measured drawings to be drawn.

Develop methodology for taking measurements, including quality control checks.

Assess site constraints. Are floors level? Are rooms square? What about access and lighting? Are there safety concerns?

Measuring

Sketch the areas to be measured and establish the locations for the principal reference points and overall dimensions. The sketches will become the basis for the field notes.

Establish datum lines and planes as points of reference for taking measurements. Locate them in relation to each other and note on sketches.

Begin by locating major points in relation to each other and any datum lines/planes. Take major dimensions. Record both in field notes.

Double-check accuracy of initial measurements because all subsequent measurements will rely on them.

Systematically take and record measurements to fill in the necessary dimensions for each drawing. Periodically tie your measurements back to the principal reference points or datum lines/planes to assure continued accuracy.

Measuring Tips

You cannot assume that rooms or buildings are square or that floors are level. Taking diagonal measurements and checking levels will allow you to determine if there is any distortion.

(continued on next page)

only what is in their field of view; objects hidden by foliage or projections are not measurable and must be recorded in some other manner. Special photographic techniques have been devised for documenting buildings and are discussed later.

Obtaining Measurements

Documentary Sources. The easiest way to obtain measurements is to find a source that has already made them. Part of the basic research should be a search for drawings, specifications, building permits, and other sources of dimensional information. If you find sources, you must assess the reliability and accuracy of the dimensions and their usefulness to the current project. Who produced the measurements and for what purpose? Do the drawings represent the structure as it was actually built and exists today? If not, how and why are the drawings different? Are some, but not all, of the drawings reliable?

You must verify the information by comparing it to the structure itself. Check dimensions in both directions on a drawing to make sure there is no differential distortion: paper will elongate or shrink differently along the grain than across it. Prints made by wrapping the drawing and print paper around a tubular light source – the method found in most blueprint machines – will be elongated in the direction of travel. For a 4-mil-thick drawing sheet and a 2"-diameter light source, the elongation would be approximately $^{5}/_{32}$" in 3', or 8 scale inches at $^{1}/_{4}$" = 1'-0". Thicker drawings will have greater elongation and thinner drawings will have less. Some large-document copiers can elongate or compress drawings to remove distortions, a capability that can save many hours of redrawing. Drawings can also be digitized or scanned into a CAD drawing and any distortions corrected within the CAD program.

Hand Measuring

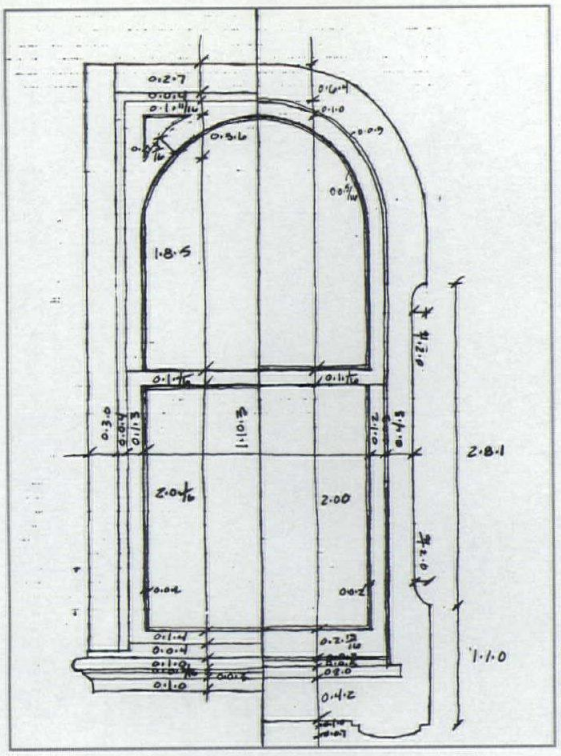
Hand measuring can be highly accurate when done with careful planning and execution. The number of drawings, their accuracy, scale, and sheet layout should be determined before planning the measuring because those decisions help to determine the best way to measure a structure.

Hand measuring records only that which is consciously measured and written down, making a methodical, systematic approach essential. Errors of omission and commission otherwise will be difficult to avoid. Proceeding in a systematic manner not only gives organization to the measuring, but will highlight errors when they do occur. You should plan more than one way to obtain each measurement; direct measurement, calculations from other points, and trigonometric calculations are examples. This ensures that all dimensions will be verifiable.

The number of people required to measure a structure will vary. Three people make up an ideal team – with two to measure and one to record the dimensions – but two can also serve, with one person measuring and the other recording the dimensions. For one person to measure anything other than small features or details is difficult and invites error. Large structures are documented more efficiently with several three- or two-person measuring teams rather than one large one.

How to Proceed. Hand measuring can be broken down into a three-step process of planning, measuring, and checking (see sidebar). After the principal dimensions have been accurately determined, repeat the process at the next higher level of detail, until the entire structure has been measured with enough detail to produce the planned drawings.

Tools for Hand Measuring. The most common tools for hand measuring are a retractable steel tape stiff enough to extend across openings or up



Daniel J. Lind, HABS

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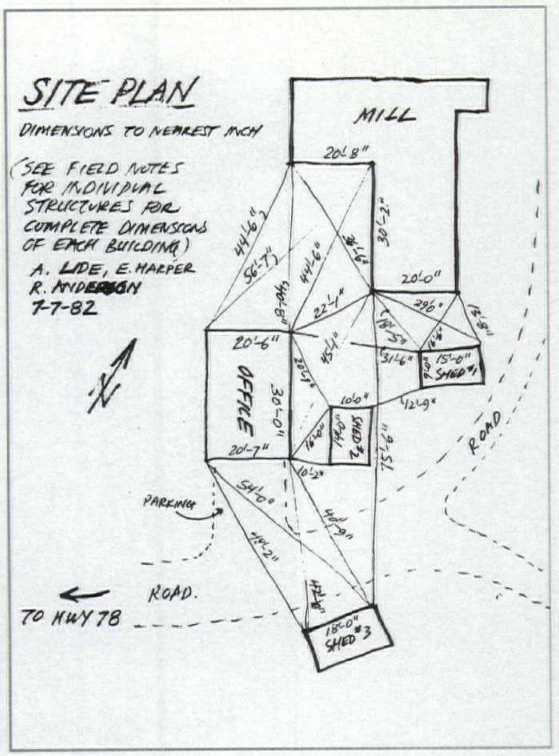


Richard K. Anderson, HAER

3

to ceilings (a 1'-wide, 25' tape is recommended), a 100' steel tape, a 6' folding carpenter's rule, a plumb bob or similar weight and string, a carpenter's square, a spirit level, graph paper, a large clipboard, and several colored pencils. Accurate measurements can be made and recorded with these simple tools and a knowledge of geometry. Stakes, nails, tape, and chalk lines can be used to mark reference points and lines, but make sure not to damage important features. Additional equipment might include a conventional or electronic distance measuring (EDM) transit, a profile gauge, large calipers, magnetic compass, scale stick for field photographs, flashlight, and ladders or scaffolding. Safety equipment such as hard hats and safety ropes and harnesses should be used as needed.

Several other types of hand measuring tools are used by the Historic Amercian Building Survey (HABS) and the Historic American Engineering Record (HAER). Telescoping measuring poles allow one person to measure heights up to 26' with a direct readout of the dimension in feet, inches, and eighths of an inch. They can also be used horizontally, are 4'-2" long when collapsed, and weigh four pounds. Although made of nonconducting materials, they nevertheless must be used with extreme caution around power lines.

Another measuring tool is similar to an oversized folding carpenter's rule, but with numbers that read vertically so that it can be used as a scale stick in photographs. Marking one side of any folding rule in alternating black and white 1' increments increases its usefulness as a scale stick.

Yet another tool is a telescoping fiberglass rod with an oval cross section that is 4'-8" long but that extends to 25'. It has gradations marked 1" on one side and alternating red and white 1' increments on the other.

Electronic distance measuring instruments use sound to measure distances up to either 60' or 150', depending on which model you purchase. One limitation is that for irregular surfaces such as a coffered ceiling, you cannot be certain what surface the instrument is measuring to.

Establishing Datum Lines and Planes. The first step in hand measuring is to establish datum lines and planes from which to take measurements. In some structures it may be possible to use the floor as a datum plane, if it is level. You can determine whether a floor is level by walking on it and by seeing if a marble rolls when placed on it. If the floor seems to be level, you should check it more carefully with a carpenter's level or by using the techniques described in the following paragraphs.

An advantage to using floors as datum planes is that it reduces the number of vertical measurements that must be recorded, because you only measure up from the floor instead of both up and down from the datum (you must add the two dimensions from an intermediate datum plane to determine vertical heights). Another consideration is whether the floor level changes from room to room or from wing to wing. Even if all the floors are level, elevation changes may make a common datum plane desirable.

If the floor is level, a convenient height for measuring is waist level. It does not require you to stoop and is high enough to pass across most window openings. If the floor is not level, you must establish a datum plane independent of the structure; for most small structures, you can use a taut string leveled with a carpenter's spirit level. The longer the level and the tighter the string, the more accurate the level line will be. The level should be at least 2' long for optimum accuracy. The string should be tight enough to remove visible sags, which you can

2 *Window detail of the Michigan Island Light Station. Note the juxtaposition of interior and exterior elevations.*

3 *Field notes of the Barnwell Chair Factory showing triangulation to locate relative locations of different on-site features.*

(continued from previous page)

Establish datum lines and planes as points of reference for the measurements.

Cumulative or running measurements are more accurate than consecutive measurements because they use a common zero point and thus do not relocate the tape after each measurement.

The tape must be held taut when making measurements. Temperature, tension and wind can affect the accuracy of taped measurements by causing the tape to stretch, shrink, or sag.

Make sure you know where the zero point is on the tape. It is not always at the end.

Horizontal distances must be measured with the tape held level. Use a plumb line to measure points displaced vertically.

Triangulate to features on inclined or curved surfaces from fixed points.

Remember that the minimum distance from a point to a line is always in a direction perpendicular to the line, so that if you set the end of a tape at the point and swing it near the line, the minimum measurement is the true dimension. Similarly, the distance from a point to a plane follows the same geometric rule.

Be careful of errors in transcribing dimensions. Use a standardized system of notation to reduce errors. For instance, the dimension 1'-8" is similar to 18" both visually and literally.

The use of surveying instruments and other measuring tools can both speed up the measuring and increase the accuracy.

Checking

Block out the major dimensions in a drawing while still in the field, then check how the component parts will fit into the overall drawing.

The preliminary drawings ideally should be produced in the field to be certain of the field measurements.

John A. Burns, AIA, HABS/HAER

4 *A photogrammetric image of Old Faithful Inn in Yellowstone National Park. Notice the black-and-white targets placed in the field of view. The distance between targets was measured as part of the survey control. When placing targets in photographs, you must be able to determine the center of the target from different distances.*

5, 6 *These two photographs record the Golden Gate Bank in San Francisco, damaged in the 1989 Loma Prieta earthquake. The color image is from a perspective-corrected 35 mm transparency and the black-and-white image is from a 2 1/4" x 2 1/4" photogrammetric camera negative. While the color image most closely resembles an orthogonal elevation drawing, the distorted photogrammetric image can actually produce a more accurate drawing because of the precision of the optics and the reseau grid superimposed on the negative.*

HABS and HAER Documentation

Since its inception in 1933, the Historic American Buildings Survey, and, since 1969, the Historic American Engineering Record, have had consistent standards concerning the quality, size, and format of documentation, as well as its reproducibility. The uniform format and reproducibility are what sets the HABS and HAER documentation collections apart from most others. Those two characteristics make the HABS collection easily accessible to users.

The National Historic Preservation Act, as amended in 1980, directed the Secretary of the Interior to develop "... a uniform process and standards for documenting historic properties by public agencies and private parties for purposes of incorporation into, or complementing, the national historical architectural and engineering records within the Library of Congress." These standards derived from existing HABS and HAER standards. The Secretary of the Interior's *Standards and Guidelines for Architectural and Engineering Documentation* were published in 1983 as part of the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation.

(continued on next page)

observe by sighting along the string. A small bubble level designed to hang on a string is significantly less accurate than this method. A chalk line can be used, but it may leave a permanent mark on some materials. By repeating the process, you can carry the datum line around a structure to establish a datum plane. Periodically tie back or relate subsequent datum lines to the first datum line to check accuracy.

A water level, consisting of a water-filled tube with transparent ends so that you can see the water level in the tube, is a way to demarcate a horizontal datum plane that can be carried from room to room and even from the interior to the exterior of a structure. Advantages of water levels are that they are accurate and flexible in that they can go around corners and through openings. They are also inexpensive and can be homemade. One problem with the technique is that if some water spills, you must both reset the level to compensate for the lost water and clean up the mess.

Hand Measuring Conventions

All measurements are assumed to be made in either horizontal or vertical planes. Vertical measurements can be made most accurately by using a plumb line to assure the verticality of the tape. When taking horizontal measurements, keep the tape level and taut to avoid sags (surveyors use a standard of 20 pounds of tension when taking measurements with steel tapes). If you are using a transit to sight in a datum plane, the minimum dimension read in the scope as you swing a tape from a point to the scope sightline is in a direction perpendicular to the datum plane.

When direct horizontal measurements are not possible, inclined dimensions can be taken and converted to horizontal dimensions using trigonometry. Horizontal measurements made with one end of the tape higher than the other will actually be measuring a longer distance because of the inclination of the tape. It may be easier to measure inclined distances by breaking the slope into a series of stepped horizontal measurements. Vertical alignment of the tape at each step can be assured by using a plumb line.

The simplest form of surveying is triangulation, a technique suitable for hand measuring. Any point on a site can be located accurately by establishing its distance from two other points. An entire site can be measured by using a series of triangles and measuring the distances along their sides. To assure accuracy, you must periodically tie back to known points.

Triangulation is particularly effective for flat sites, but is less so for sloping or hilly sites. The compensation for inclined measurements must be calculated using either the angle of inclination or the difference in height between the two points being measured. Both calculations are simple trigonometric functions. This technique is especially useful for site plans and irregular structures.

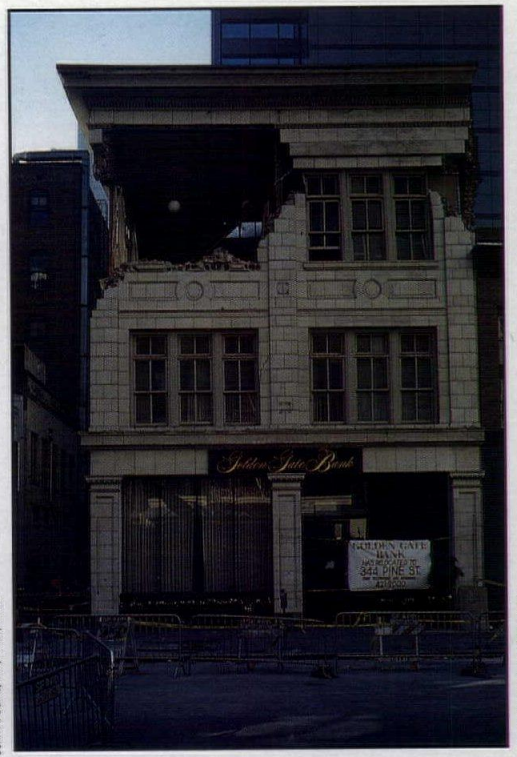
Obtaining Measurements from Photographs

Measurements obtained from photographs can offer certain advantages over other methods of measurement. Photographs are generalized, that is, they record information without constraints; everything seen by the camera is documented. Photographs also include information on condition and texture of surface materials.

Field photographs should include a scale stick or measuring tape to give approximate scale to elements in the view. Another technique, especially useful for irregular features such as stonework or log walls, is to place a grid of known dimension over

John A. Burns, AIA, HABS/HAER

5



John A. Burns, AIA, HABS/HAER

6

the subject being photographed. Such a grid can be made from a rigid frame of pipe, 5' square, with a string grid at 1' intervals. Objects in or close to the plane of the tape or grid can be scaled with sufficient accuracy for many purposes. Objects in front of or beyond the plane of the tape or grid are either enlarged or diminished according to their displacement from the plane.

Architectural Photogrammetry

Architectural photogrammetry combines principles of photography and geometry in a method in which scaled drawings can be obtained from photographs. The process makes use of photographs taken from known locations to create an optical model that can be scaled in all directions. With all photogrammetric measuring, some dimensional information in the field of view must be known, whether measured targets or objects of known dimensions. These known dimensions, along with the optical characteristics of the camera and its location in relation to the subject and other camera locations, are together known as *survey control*. The survey control, analogous to the field records for a hand-measured structure, is necessary to produce accurate dimensions from the photographs. There are several kinds of photogrammetry, varying in technique, accuracy, and expense.

Rectified Photography. Rectified photography uses optical means to rectify or correct a photograph so that one plane of the subject is recorded without distortion. Because its accuracy is limited to one plane, rectified photography is best used for flat façades and room elevations. The rectification can be either in the exposure of the negative or in the printing process. If you have access to a darkroom, the latter is easier.

Stereophotogrammetry. Stereophotogrammetry is the most accurate and widely used type of photogrammetry. Two or more overlapping photographs are taken with a photogrammetric camera at successive camera positions or stations, normally with the axes parallel. The locations of the camera stations are carefully measured in relation to the building, specifications of the camera are noted, and some points and dimensions are established on the structure or in the space before it (this is the survey control).

The products are photographic stereopairs that, when placed in a plotting machine, present the illusion of a three-dimensional optical model. The same principle can be seen in a child's Viewmaster. Using the survey control, this model can be accurately measured and points can be plotted on a drawing at any desired scale. A draftsman then joins these points to produce a measured drawing in standard orthographic projection.

Analytical Photogrammetry. An analytical photogrammetric technique called reverse perspective analysis uses ordinary contemporary or historical photographs, sometimes in conjunction with contemporary photogrammetry. It is extremely useful for making drawings of damaged or demolished structures. It combines the use of one or more photographs for which the camera position can be determined with geometric calculation of the major dimensions of the structure. Accuracy depends on the quantity and quality of photographs available and the number of known dimensions. The process is easier if the historic photographs can be combined with contemporary photogrammetry.

Convergent Photogrammetry. A further deve-lopment in architectural photogrammetry came with the increased capabilities of desktop computers. There are several photogrammetric systems that use convergent film images (produced by semi-metric

(continued from previous page)

There are four HABS/HAER Standards, covering the content, quality, materials and presentation of the documentation:

Standard I: Content. Documentation shall adequately explicate and illustrate what is significant or valuable about the historic building, site, structure or object being documented.

Standard II: Quality. Documentation shall be prepared accurately from reliable sources with limitations clearly stated to permit independent verification of the information.

Standard III: Materials. Documentation shall be prepared on materials that are readily reproducible, durable and in standard sizes.

Standard IV: Presentation. Documentation shall be clearly and concisely produced.

Recording Historic Structures, from the AIA Press, is the basic guide for creating architectural and engineering documentation to the standards of the Historic American Buildings Survey and the Historic American Engineering Record. While the primary focus of the book is the production of HABS and HAER documentation, architects will find its contents useful for compiling architectural and engineering documentation for other purposes as well.

SUMMARY

PERFORMANCE STANDARDS OF THE HISTORIC AMERICAN BUILDINGS SURVEY/HISTORIC AMERICAN ENGINEERING RECORD (HABS/HAER)

(SECRETARY OF THE INTERIOR'S STANDARDS FOR ARCHITECTURAL AND ENGINEERING DOCUMENTATION, *FEDERAL REGISTER*, SEPTEMBER 29, 1983, PP. 44730-44734)

STANDARDS	I. CONTENT				II. QUALITY				III. MATERIALS				IV. PRESENTATION			
REQUIREMENTS	"DOCUMENTATION SHALL ADEQUATELY EXPLICATE AND ILLUSTRATE WHAT IS SIGNIFICANT OR VALUABLE ABOUT THE HISTORIC BUILDING, SITE STRUCTURE OR OBJECT BEING DOCUMENTED."				"HABS AND HAER DOCUMENTATION SHALL BE PREPARED ACCURATELY, FROM RELIABLE SOURCES WITH LIMITATIONS CLEARLY STATED TO PERMIT INDEPENDENT VERIFICATION OF INFORMATION."				"HABS AND HAER DOCUMENTATION SHALL BE PREPARED ON MATERIALS THAT ARE READILY REPRODUCIBLE FOR EASE OF ACCESS; DURABLE FOR LONG STORAGE; AND IN STANDARD SIZES FOR EASE OF HANDLING."				"HABS AND HAER DOCUMENTATION SHALL BE CLEARLY AND CONCISELY PRODUCED."			
CRITERIA / **LEVEL**	I	II	III	IV	I	II	III	IV	I	II	III	IV	I	II	III	IV
A. MEASURED DRAWING	FULL SET OF MEAS. DWGS.	SEE PHOTOS BELOW	SKETCH PLAN	INVEN-TORY CARD	MEASURED DRAWINGS ARE TO BE PRODUCED FROM RECORDED, ACCURATE MEASUREMENTS. THOSE PORTIONS DRAWN FROM EXISTING DRAWINGS OR OTHER SOURCES SHOULD BE SO IDENTIFIED AND SOURCES LISTED.				INK ON TRANS-LUCENT MATERIAL	8×10" PHOTO-COPY	INK ON BOND PAPER	INK ON INVENTORY CARD	ADEQUATE DIMENSIONS ON ALL SHEETS			
									INK ON ARCHIVALLY STABLE MATERIAL				MECH. LETTER-ING OR EQUIVA-LENT		SKETCH PLANS SHALL BE NEAT AND ORDERLY	
									19×24" OR 24×36"	8×10" PHOTO-COPY	8½×11"	INVEN-TORY CARD				
B. PHOTOGRAPHS	LARGE FORMAT PHOTOGRAPHS EXTERIOR & INTERIOR			35mm B&W	PHOTOGRAPHS SHALL CLEARLY DEPICT THE APPEARANCE OF THE PROPERTY AND AREAS OF SIGNIFICANCE. ALL VIEWS ARE TO BE PERSPECTIVE-CORRECTED AND FULLY CAPTIONED.				PRINTS SHALL ACCOMPANY ALL NEGATIVES				DUPLI-CATE PHOTOS WITH A SCALE STICK	MIN. OF ONE PHOTO WITH A SCALE (PRINCIPAL FACADE)		
	LARGE FORMAT PHOTOCOPIES: — SELECT EXISTING DWGS — SELECT HISTORIC VIEWS								MUST BE ARCHIVALLY PROCESSED, NO R/C PAPER							
									4×5" OR 5×7" OR 8×10"			35mm FILM				
C. WRITTEN DATA	HISTORY AND DESCRIPTION IN NARRATIVE OR OUTLINE FORMAT		ONE PAGE SUM-MARY	INVEN-TORY CARD	BASED ON PRIMARY SOURCES		SECONDARY SOURCES MAY PROVIDE ADEQUATE INFORMATION		CLEAN COPY FOR XEROXING				TYPEWRITTEN ON BOND			TYPED ON INVEN-TORY CARD
					INCLUDE: — METHODOLOGY — NAME OF RESEARCH & DATE OF RESEARCH — SOURCES — FRANK ASSESSMENT OF SOURCES AND THEIR LIMITATIONS				ARCHIVAL BOND REQUIRED							
									8½×11"							
D. OTHER	OTHER MEDIA CAN AND HAVE BEEN USED. CONTACT HABS/HAER OFFICE BEFORE EMPLOYING A MEDIA OTHER THAN THOSE SPECIFIED ABOVE.															
TESTS	INSPECTION BY HABS/HAER OFFICE STAFF. DOCUMENTATION NOT MEETING HABS/HAER STANDARDS WILL BE REFUSED.															
COMMENTARIES	KIND AND AMOUNT OF DOCUMENTATION SHOULD BE APPROPRIATE TO THE NATURE, AND SIGNIFICANCE OF THE BUILDING, SITE, STRUCTURE OR OBJECT BEING DOCUMENTED.				THE PRINCIPLE OF INDEPENDENT VERIFICATION IS CRITICAL IN ASSURING HIGH QUALITY OF HABS/HAER MATERIALS.				BASIC DURABILITY PERFORMANCE STANDARD IS 500 YEARS.				HABS/HAER ARE MOST WIDELY USED OF SPECIAL COLLECTIONS AT THE LIBRARY OF CONGRESS.			

Robert J. Kapsch, HABS/HAER

7 PERFORMANCE SPECIFICATIONS FOR HABS/HAER.

cameras and computer software with mathematical algorithms) that extract dimensions from the images by digitizing from photographic enlargements. The output from the system are DXF files that can be recognized by computer-aided-drafting programs such as AutoCAD.

One of the programs, PhotoCAD, runs as a pull-down menu within AutoCAD. A major advantage is that convergent systems are significantly less expensive than glass-plate photogrammetry. With somewhat compromised accuracy, ordinary cameras can be used to produce photographs that can be digitized into drawings. **John A. Burns, AIA** ■

The author is deputy chief and principal architect of the Historic American Buildings Survey/Historic American Engineering Record, where he specializes in historic building construction and documentation technology. He is a member of the AIA's Committee on Historic Resources and edited Recording Historic Structures, *published by the AIA Press.*

Recommended Reading

Guide to Recording Historic Buildings, International Council on Monuments and Sites (ICOMOS), Butterworth, Stoneham, Massachusetts (800) 366-2665, 1990, 80 pp.

Handbook of Field Surveying, Research and Education Association, Piscataway, New Jersey (908) 819-8880, 1983, 347 pp.

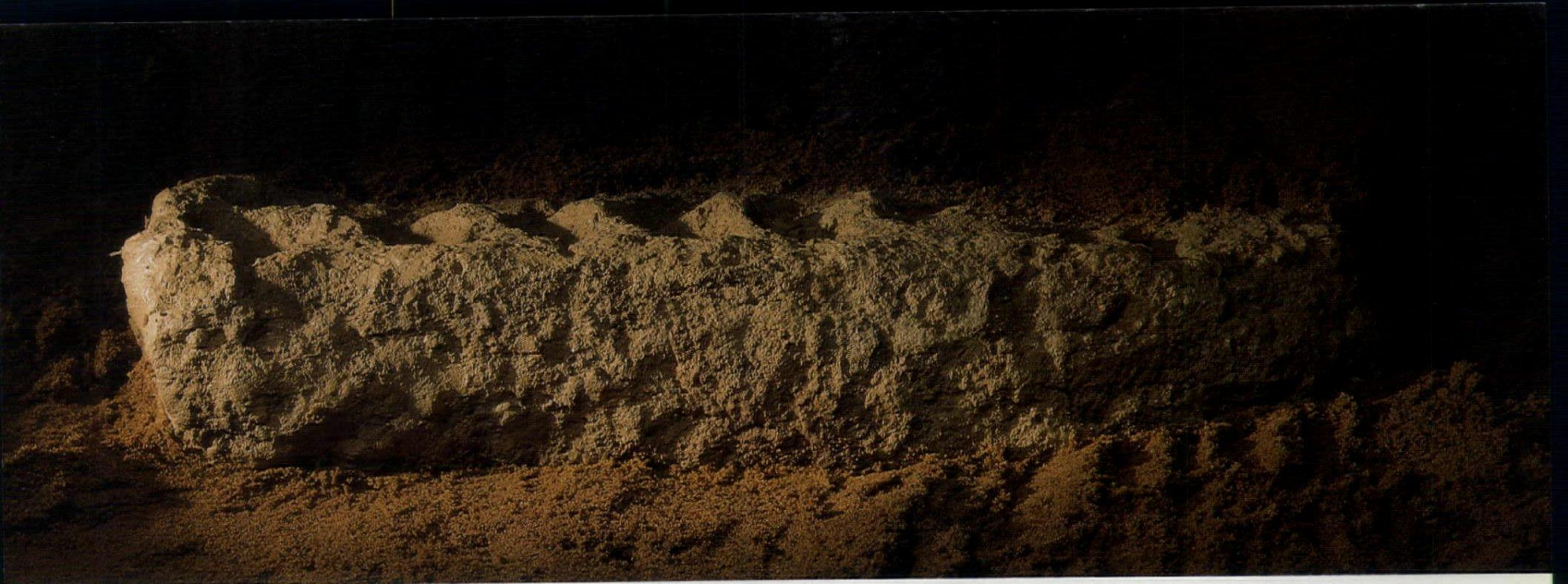
Manual for the Preparation of "As Found" Drawings, R. Patterson, British Columbia Heritage Trust, Victoria, B.C. (604) 356-1046, 1982, 20 pp.

Measured Drawing for Architects, R. Chitham, Butterworth, Stoneham, Massachusetts (800) 366-2665, 1980, 119 pp.

Recording Historic Structures, J. Burns, editor, AIA Press, Washington, D.C. (800) 457-3239, 1989, 260 pp.

Surveying an Older House: Inspection Checklist, C. Strelka, BPN 47, National Research Council Canada, Ottawa (613) 993-2463, 1984, 13 pp.

Surveying Fundamentals, J.C. McCormac, Prentice-Hall, Englewood Cliffs, New Jersey (201) 767-5937, 1990.



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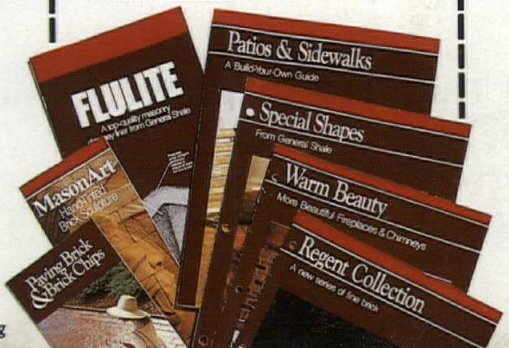

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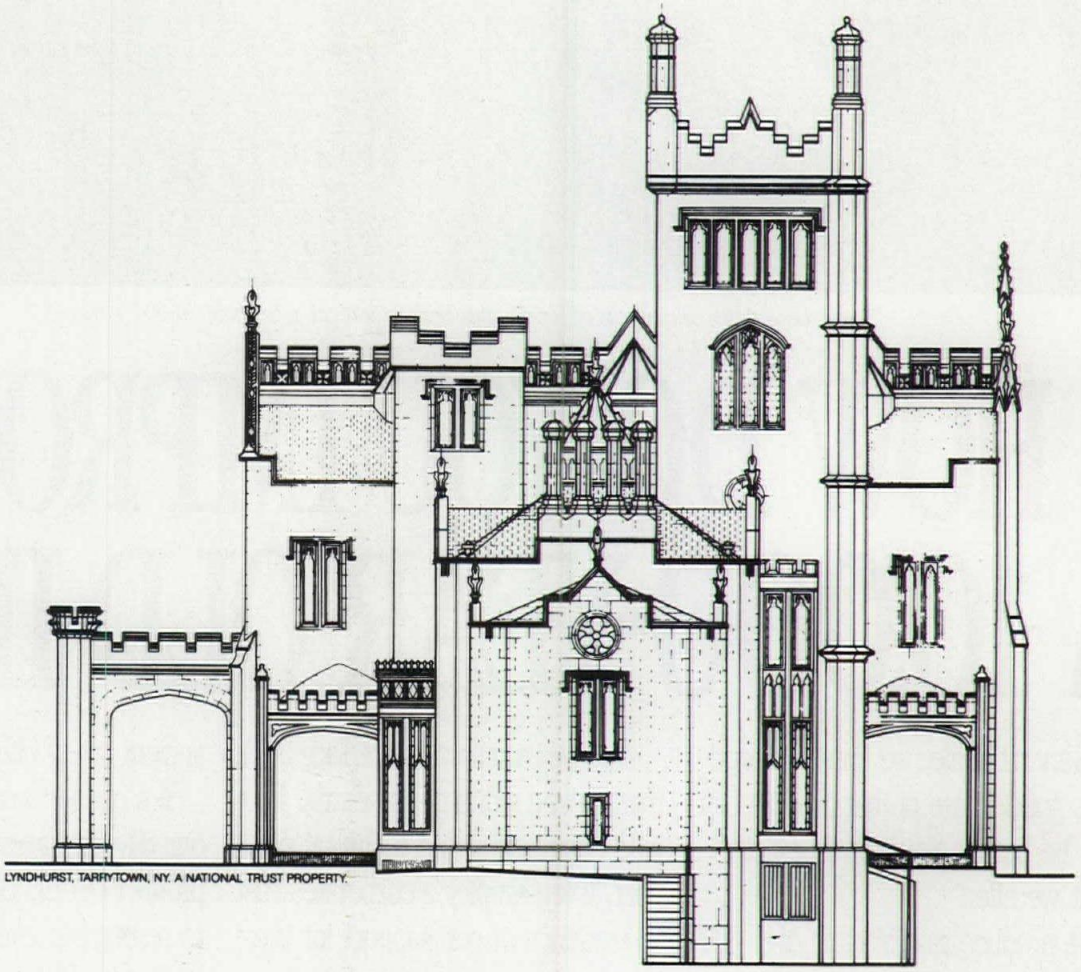

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Technics Topics
SS/BV Walls: Discussion

Five masonry experts discuss P/A's February article, "Steel Stud/Brick Veneer Walls," and the author responds.

In February, P/A published the recommendations of the Canada Mortgage and Housing Corporation (CMHC) and the Brick Institute of America (BIA) for brick veneer cladding on steel stud backup (SS/BV). While the recommendations of CMHC and BIA are as "official" as such guidelines can be, there are many masonry consultants and building failure investigators who disagree with both.

To round out our coverage of this controversial topic, we've invited five experts to comment on the February articles. Their responses reveal three general states of mind: 1 SS/BV systems can work, given proper structural design, detailing, and field supervision, 2 the system has inherent flaws that must ultimately result in failure, 3 the precautions required to make such systems work are so costly as to lose the competitive edge of steel studs over masonry backup. Author Trestain's reply concludes the discussion.

An error on our part misrepresented illustrations in the article by Tom Trestain and Jacques Rousseau; corrections appeared in our April Views column. We regret any confusion this may have caused readers. Note: all numbers in parentheses refer to literature citations in the April article by Trestain and Rousseau.

Kenneth Labs

Why Predicted Failures of SS/BV Walls Have Not Occurred

Brick veneer/steel stud walls have been used in the U.S. since the 1960s. Since the early 1980s, much controversy has arisen regarding their design. Most of this controversy focuses on the contention that the brick veneer is significantly stiffer than the metal studs, so that the brick will attract most of the wind load, will overstress, and may crack. Further, the contention supposes that the screws anchoring the brick veneer wall ties to the studs may corrode and impair the structural capacity of the wall ties. Advocates of this contention have predicted spectacular failures of such walls. This prediction has not been fulfilled.

"However, the vast majority of failures are similar to failures that occur in other brick masonry wall systems."

Failures *have* occurred in SS/BV walls. However, the vast majority of failures are similar to failures that occur in other brick masonry wall systems because of 1 lack of expansion joints, 2 lack of a proper flashing and weephole system, 3 use of improper materials, 4 poor workmanship in construction, and 5 poor details.

The predicted flexural cracking of properly designed and built SS/BV walls under wind loading has not occurred to any significant extent. There are three explanations for this.

1 The ordinary relative-stiffness method of analysis generally used to design SS/BV walls under wind load overpredicts the actual flexural bond stress in the wall because this method does not include the beneficial effects of boundary conditions inherent in the wall, namely, a) the horizontal expansion joint between the top of the brick veneer and the bottom of the shelf angle, b) the difference in height between the usually taller brick veneer and the shorter steel studs, and c) the flexible spring property of the metal ties.

2 When these boundary conditions are accounted for in the design, the flexural bond stress levels in a SS/BV wall under 10' tall with a wind load of 25 psf will not only be below the cracking stress level, but will also be within "allowable stress" levels when flexible ties are used.[1]

3 The predicted corrosion of wall tie screws and associated wall failures has not occurred to any significant extent because SS/BV walls are drainage-type walls where a cavity behind the veneer prevents water that has penetrated the veneer from wetting the wall tie screws. **Ian R. Chin**

The commentator is a principal of Wiss, Janney, Elstner Associates, Engineers, Architects, Material Scientists, Chicago.

1 "Influence of Tie Flexibility, Relative Length, and End Boundary Condition on Brick Veneer/Metal Stud Flexural Bond Stress," I.R. Chin, N.V. Krogstad, and C.B. Monk, Jr., in *Masonry: Materials, Design, Construction, and Maintenance*, STP 992, ASTM, Philadelphia (215) 299-5585, 1988, pp. 96–117.

The Need for an Engineered Systems Approach to SS/BV Walls

Why is there such reluctance to treat SS/BV walls as an engineered system? Designers are advised to follow charts and guidelines that are discredited and revised too frequently, empirical relationships and rules-of-thumb that at best apply only to typical conditions, and/or computational shortcuts that cannot be justified on the basis of structural behavior. The collective experience of the industry may someday permit a simplified approach to the structural design of SS/BV walls, but not yet. Occasional adverse structural behaviors that are now being "discov-

Tech Notes

***Exterior Insulation and Finish Systems: Performance of EIFS Worldwide*, the first meeting of its kind, is being sponsored by ASTM Committees C-11 and E-6 and trade and government groups. It will be held September 21–24 in Washington, D.C. Contact Laurel O'Brien, ASTM, Philadelphia (215) 299-5524.**

***Mold and Mildew in Hotel and Motel Guest Rooms in Hot and Humid Climates* describes causes, construction, architectural design, and HVAC systems in the first design publication to tackle this persistent problem. Proceedings of the roundtable, *Mildew and Moisture Control*, are also available. American Hotel and Motel Association, Washington, D.C. (202) 289-3194, 130 pp., $200, 164 pp., $100, respectively.**

Harry Parker's *Simplified Site Engineering* has been released in a second edition. Chapters cover math, surveying, horizontal and vertical curves, cut and fill, drainage and grading, levelling, and contours. J. Wiley, Somerset, New Jersey (908) 469-4400 x2497, 178 pp., $45.95.

***The Quiet Indoor Revolution* by Seichi Konzo chronicles residential HVAC systems in a superbly illustrated first-hand account by a researcher who engineered many important developments in the field. A must for energy-efficient design enthusiasts and a should-read for students of architectural technology. Small Homes Council, Champaign, Illinois (800) 336-0616, 416 pp., $43.95.**

ered" are predictable and avoidable. The result is a design process mired in controversy and media shoot-outs.

As with any structural system, engineering methods using standard techniques and tools can and should be used in the design process; this would help eliminate the controversy, motivate suppliers to research and publish appropriate mechanical and other data about their products, and make it possible to design atypical configurations and the areas around wall penetrations in a rational manner. For example, an indeterminate analysis would show how significant is the stiffness of the stud and of the ties in determining the stresses in the brick. Excessively soft ties essentially uncouple the veneer from the studs at pre-cracking loads, and no reasonable limit on the flexibility of the stud is effective. Arguments about $L/360$, $L/720$, or $L/2000$ at service loads are irrelevant if the ties are too soft or slack. If an accurately modeled tie cannot be made to work during an analysis, it does not belong in the wall.

"Excessively soft ties essentially uncouple the veneer from the studs at pre-cracking loads..."

Establishing acceptable brick stresses focuses attention on the difference between cracking behavior and safety. Engineering analysis shows that uniform tie spacing is not optimal and does not result in uniform tie forces. The usual differences in stud and brick span lengths can be addressed only by an indeterminate analysis. Three-dimensional analysis would show the important effect of the deflections of knee wall framing and suspended shelf angles, and would show the importance of doubling or tripling studs and increasing the number of ties at openings.

At this time, we have sound guidance for detailing SS/BV with respect to the rain screen concept, cavity properties and drainage, corrosion control, thermal and vapor control. Unfortunately, guidance for the structural design and detailing of the system is not as well developed and available. SS/BV walls can be viable systems and have a place in the market. But, until our experience with the system grows, and its in-service history becomes better understood, we should stop depending on an empirical structural design approach.

Robert J. Kudder

The commentator is a principal and structural engineer with Raths, Raths & Johnson, Inc., Structural/Architectural Engineers, Willowbrook, Illinois.

Unresolved and Unresolvable Problems

Why are authors Trestain and Rousseau advocating the use of the SS/BV wall system? The answer is perhaps that Mr. Trestain provides structural engineering services to the steel stud industry and wrote the article for CMHC. Mr. Rousseau is an employee of CMHC. CMHC is a government-owned corporation that owns buildings with SS/BV walls, provides mortgage guarantees on buildings with SS/BV walls, and has provided advice to the industry on the design and construction of them.

Perhaps CMHC is reluctant to discourage the use of SS/BV walls after having allowed, participated in, and encouraged the use of the system over a number of years. Perhaps CMHC now finds it difficult to admit that there are large numbers of SS/BV walls in various stages of failure all across Canada. Numerous design and construction problems remain unresolved with the SS/BV system. Many are discussed in detail in the authors' references, but the problems themselves are not discussed in the article.

Rain Screen. The CMHC research report, *Test of Full Scale Brick Veneer/Steel Stud Walls to Determine Strength and Rain Penetration Characteristics* by Drysdale and Wilson (11) demonstrates that the open rain screen fails if a perfect air barrier is not provided; failure results in a dramatic increase in rain penetration through flexural cracks in the brickwork.

As a result of our firm's investigations of masonry wall failures, we are of the opinion that it is unrealistic to rely on the rain screen principle to control the penetration of wind-driven rain into the steel stud backup wall. Irrespective of whether or not the brick veneer is cracked, wind-driven rain will pass through the brick veneer and transfer across the cavity by the brick ties and mortar droppings.

The authors recognize the need for a water-resistant barrier on the exterior of the steel stud backup wall, but negate this acknowledgment by suggesting the use of a wrap-around brick tie that slices through the water-resistant barrier. They even acknowledge the entry of water into the backup wall by requiring drainage holes and flashing to be installed at the bottom track to direct water out of the wall system.

Failure Due To Moisture. Proponents of SS/BV systems fail to realize that such systems are more susceptible to moisture-related failure than brick veneer having a masonry backup wall. The research performed for CMHC by Suter Keller Inc. (9) and by Drysdale and Kluge (10) demonstrate the rapid rate of corrosion and subsequent failure due to moisture. Failures we've investigated reveal that window openings within SS/BV walls create a significant water leakage problem. The authors ignore this detailing difficulty.

"...it is unrealistic to rely on the rain screen principle to control penetration of wind-driven rain in to the steel stud backup wall."

Quality Control During Construction. Owners generally do not pay designers and contractors sufficient fees to properly supervise and inspect SS/BV construction, so such walls are usually not built exactly as intended. When SS/BV walls fail, contractors and designers alike are sued by the owner. The long-term beneficiaries of SS/BV wall systems are failure investigators and the legal profession.

James W. Cowie, PE and **Michael J. Wilson, PE**

James Cowie is president and Michael Wilson is the Toronto office manager of J.W. Cowie Engineering Ltd., Consulting Structural Engineering, Halifax, Nova Scotia.

Air Leakage and Vapor Transmission Deserve Attention

Our Canadian neighbors have thoroughly investigated problems with SS/BV wall systems and are right on track with their conclusions. If full consideration of such results is given to implementation in the design and inspection during construction, economics will dictate consideration of other back-up systems for the exterior wall, or possibly even other types of wall systems.

For climatic conditions similar to those of the Upper Great Lakes region, the most misunderstood – or at least underrated – design and construction recommendation is the importance of utilizing an open rain screen system, with its required air barrier located on the warm side of the insulation. The Canadian Building Code explicitly spells out this requirement, whereas the model codes in the U.S. are silent on such a fundamental issue.

Air leakage into the exterior walls of humidified, pressurized buildings without an adequate air barrier subjects the entire exterior wall assembly to a hazardous environment. Air leakage through openings introduces vastly more moisture than vapor transmission through materials. Physical investigation of one exterior wall system revealed frost buildup on the back of the facing brick wythe considerably in excess of $1/8$". High internal moisture contents are associated with museums, libraries, wet laboratories, and natatoriums. Portions of buildings containing computer centers and printing/copying areas may also have localized high moisture areas.

When warm, moisture-laden air from the interior of a building escapes into a SS/BV assembly, condensation with its many related moisture problems results. Highly touted corrosion is only one concern: degradation of other materials within the wall system, or even the more visually

dramatic spalling of face brick may result. Unsightly efflorescence or wetting of interior finish

"If full consideration of such results is given to implementation in the design and inspection during construction, economics will dictate consideration of other back-up systems..."

materials may also occur. All-masonry exterior walls remain a viable means of achieving economical and trouble-free long-term performance.

Lynn R. Lauersdorf, PE

The commentator is a project manager with the Division of State Facilities Management, State of Wisconsin, Madison.

SS/BV Walls: Recipe for Failure?

I suppose that if all the authors' recommendations for materials, design, construction, and maintenance were meticulously followed, SS/BV wall systems might have some chance of survival. However, the BIA says that they have a great deal of potential for problems, and recommends inspection with every change of season, or at least annually.[1] Trestain and Rousseau further recommend caulked movement joints in masonry to keep the water out; BIA says half of that material has a life expectancy of less than 10 years.[2]

Trestain and Rousseau advise using tight air barriers, yet test results indicate that even at very low rates of air leakage, significant amounts of moisture can accumulate in a SS/BV wall.[3] The authors allow using adjustable masonry ties "at the outer limits of adjustment"; but, adjustable tie eccentricity of 1¼" reduces tie strength by 90 percent, according to the Dur-O-Wal Corporation. The approximate EI structural analysis method espoused by Trestain and Rousseau ignores tie stiffness and was thoroughly discredited 10 years ago in research sponsored by the brick and steel stud industries.[4]

Trestain and Rousseau also recommend limiting masonry deflection to $L/720$. To do so requires that stud deflection be reduced to a lower value, because of tie flexibility, but no guidance is given. In the same issue of P/A, BIA suggests limiting stud deflection to $L/600$. Both are wrong. Limiting stud deflection to some portion of the span is not a valid design method.[5] It is not valid for several reasons, not least of which is that the load on the stud is not uniform. Linear elastic analysis is the appropriate way to design such a system.

Trestain and Rousseau see nothing wrong with masonry cracks, if their width midway through the brick is held to 0.25 mm, which they say is consistent with the limits for reinforced concrete (of 0.3 mm). They neglect to say that this crack width half-way through the brick produces a crack 0.5 mm at the brick face; it is at the face that concrete crack width is measured. Wind-driven rain penetrates cracks 0.1 mm in width. Of course, the authors would argue that this is of little concern to those who have a rain screen. But the SS/BV veneer is inevitably breached by mortar droppings

"...as typically designed, built, and maintained, SS/BV walls can become life threatening."

on wall ties, which also penetrate the building paper, sheathing, and insulation. That path provides access to water and the rusting of metal studs.

This discussion could continue with additional refutation of the Trestain and Rousseau article. Suffice it to say that I have been consulted on 21 SS/BV failures in nine states and in Canada: that experience leads me to conclude that as typically designed, built, and maintained, SS/BV walls can become life threatening.

Clayford T. Grimm, PE

The commentator is president of Clayford T. Grimm, PE, Inc., Consulting Architectural Engineer, Austin, Texas.

1 *Technical Note* 28B, BIA, February 1987, p. 9.
2 *Technical Note* 7F, BIA, February 1986, p. 1.
3 "Canadian Research on the Brick Veneer/Steel Stud Wall System," Sutter *et al, 5th North American Masonry Conference,* Univ. of Illinois, June 1990, p. 1296.
4 *Performance Evaluation of Brick Veneer with Steel Stud Backup,* Arumala and Brown, Clemson Univ., April 1982.
5 "Crack Probability in BMV/SS," Grimm and Klingner, *5th North American Masonry Conference,* Univ. of Illinois, June 1990, p. 1323.

Response by T.W.J. Trestain

Both Jacques Rousseau and I are grateful for the interest shown in the SS/BV article. It is obvious that the controversy surrounding this wall system has not subsided.

Reply to I.R. Chin

Mr. Chin notes correctly that many steel stud failures are "similar to other failures that occur in other brick masonry wall systems," with the steel stud unfairly shouldering the blame. In Canada, for example, detractors of SS/BV have made much of the Alderney Manor apartment building failure in Dartmouth, Nova Scotia (13, 18). In this famous steel stud "failure," the original steel studs were the only items left intact to serve in the rebuilt walls.

Mr. Chin also notes that a detailed indeterminate analysis of SS/BV walls indicates that a 10' high wall with a 25 psf wind load will not crack. This result is not consistent with the computer studies done at McMaster University as part of the CMHC-sponsored research (5, 8); the CMHC work shows that cracking in walls of this height is probable but not certain. The uncertainty is primarily a result of the large spread in ultimate flexural tensile stresses for brick, namely 30 – 130 psi (5).

I would also caution designers about Mr. Chin's optimistic appraisal of the corrosion performance of SS/BV ties fastened with sheet metal screws in pull-out type connections. These connections may be corrosion-sensitive and should be avoided.

Reply to R.J. Kudder

While I sympathize with Mr. Kudder's desire for better structural analysis of SS/BV wall systems, the complexity of a complete analysis may be unmanageable in routine design.

Sophisticated computer analysis programs exist for SS/BV systems. CMHC sponsored McMaster University's development of a three-dimensional finite element program that models the two-way plate action of the brick, various boundary conditions (including corners and intersecting shear walls), openings, the effect of lintels, and the propagation of flexural cracks in the brick; it also

"Flexural cracks should be regarded as a fact of life in SS/BV systems."

includes experimentally derived stiffnesses for typical top and bottom track details and brick ties (8). These are all important variables that need to be included in a complete analysis, but is a complete – and expensive – analysis necessary for design?

I believe that our article's simplified approach is adequate. The uncracked brick condition is examined in only an approximate way, in order to estimate the maximum load on the ties. In spite of the simplifications, it does give reasonably accurate and conservative tie loads when compared to elaborate computer analyses. The design of the steel stud backup is based on the conservative assumption that the brick, once cracked, sheds all the wind load onto the studs, and the studs, in turn, are conservatively analyzed as an all-steel system. Flexural cracks should be regarded as a fact of life in SS/BV systems.

The structural problems associated with "excessively soft ties" that "uncouple the veneer from the studs at pre-cracking loads" can be overcome by using robust ties with the strength and stiffness characteristics recommended in the article. Inhibiting veneer cracking, however, is not the role of tie design: its role is to minimize veneer movements

(cracked or uncracked) and, ultimately, to keep the brick on the building. Ties should be strong and stiff, even though stiff ties can cause the brick veneer to crack at lower loads.

Reply to J.W. Cowie and M.J. Wilson

Mr. Cowie has argued for several years against the use of SS/BV systems, based on his own research and experience rehabilitating buildings. I agree with some of his and Mr. Wilson's criticisms, and with some I do not.

Messrs. Cowie and Wilson argue that "the open rain screen fails if a perfect air barrier is not provided; failure results in a dramatic increase in rain penetration through the flexural cracks in the brickwork." This conclusion is not supported by the research that they quote (11).

"The important consideration is to ensure that the elements in the wall can resist wetting and can dry out."

There is evidence that at least one of the tested walls had a poor air barrier but still allowed about the same amount of water to penetrate the veneer both before and after cracking.

Good quality (not perfect) air barriers are still important [see P/A, Aug. 1990, pp. 47–52 for a discussion of *relative airtightness* in rain screen wall design]. For the tested wall above, the amount of water penetrating the veneer was greater in both the cracked and uncracked cases than in cases of walls with better (but not perfect) air barriers.

Messrs. Cowie and Wilson also seem to equate moisture penetration with failure. This is not correct. Moisture penetration has to be expected with these walls (and any other rain screen wall), including the occasional wetting of the backup wall system. The important consideration is to ensure that the elements in the wall can resist wetting and can dry out; in some climates wetting is rare, while in others it is more frequent.

Penetrating the water-resistant exterior barrier with brick ties is criticized. I believe that the disadvantage of these penetrations is more than offset by the improved air circulation through the barrier and the ability of the inner wythe to dry out, should it get wet. Drainage holes in the bottom track are an additional defense in the exceptional circumstance of water accumulation in the bottom track.

Messrs. Cowie and Wilson also argue that SS/BV is more susceptible to moisture-related failure than is brick veneer having a masonry backup wall. For badly built SS/BV walls, this statement is correct. However, as discussed in the article, with proper design, detailing, and construction, corrosion problems can be avoided.

I share the concern raised with respect to quality control during construction, but a number of projects have been undertaken following the recommendations of the article under "Shop Drawings and Field Review."

Reply to L.R. Lauersdorf

Mr. Lauersdorf argues that SS/BV walls, when properly built, will no longer be cost-competitive with brick veneer/concrete masonry walls. I believe there is always a tendency to overestimate the cost of building things right. For example, one of the more controversial CMHC recommendations (from a cost standpoint) is the requirement for a minimum steel stud thickness of 18 gauge (0.0478"), instead of the more common 20 gauge (0.0359"). Assuming 6" studs at 16" O.C., the extra steel cost is modest, about $\$0.28/ft^2$. In any event, the marketplace will decide if Mr. Lauersdorf is correct.

Mr. Lauersdorf also appears to be arguing that if SS/BV is built badly, with no attention to moisture migration through the wall, then concrete masonry as a backup is a better alternative. I agree with this conclusion, but with the caution that concrete masonry requires the addition of a troweled-on or torched-on membrane to serve as an air barrier [see P/A, Sep. 1991, p. 50 for an example]. It is worth noting that unreinforced concrete masonry can have very unreliable flexural strength and requires its share of field review during construction to ensure proper performance.

Reply to C.T. Grimm

Like Mr. Cowie, Mr. Grimm has a long history as a SS/BV abolitionist, and some of his criticisms have been helpful. He was one of the first to recognize the problems associated with poor detailing in these walls, especially with respect to brick ties. I do not, however, agree with all of his criticisms.

"Occasional condensation should be anticipated in designing SS/BV walls, and need not be harmful..."

He notes that "test results indicate that at very low rates of leakage (through air barriers), significant amounts of moisture can accumulate in a SS/BV wall." This conclusion is only partly supported by the CMHC-sponsored testing (10). In tests with the recommended 1" exterior insulation, with deliberate imperfections in the air barrier, with typical indoor humidity, and with winter conditions outside, no condensation whatsoever was observed in the wall system. Under more severe conditions with high indoor humidity, a small amount of condensation occurred on the inside of the exterior insulation with no condensation on any of the steel components.

Occasional condensation should be anticipated in designing SS/BV walls, and need not be harmful; if the exterior barrier on the steel studs has adequate vapor permeability, the wall will dry out.

I agree with Mr. Grimm's criticisms of the adjustable brick tie with the single wire pintle. The tie he is referring to was intended as an example of an especially poor tie. Because of an editorial error by P/A, it was identified otherwise. The wrap-around and bayonet ties, however, perform very well, even at their outer limits of adjustment.

The approximate EI analysis that was "thoroughly discredited 10 years ago" provides useful, but limited, results, as discussed in the article and above.

The article does not recommend limiting masonry deflection to $L/720$, as indicated by Mr. Grimm, but rather to limit the stud deflections to $L/720$ under full wind load. This may mean that – with flexible top and bottom track connections and flexible brick ties – the veneer deflections will exceed $L/720$, but this increased deflection is offset, in an approximate way, by the post-cracking residual strength and stiffness in the brick veneer (which is ignored).

In any event, the $L/720$ derivation outlined in the article was seen as a rational – albeit approximate – solution to the problem of controlling crack widths. The $L/720$ deflection limit was derived in this approximate way only because efforts to come up with an empirically based deflection limit were unsuccessful, in spite of a two-year effort (7).

Mr. Grimm's statement that $L/720$ crack widths "provide access to water and the rusting of metal studs" is also not supported by the CMHC-sponsored testing program. From several full-scale tests that included the simultaneous application of wind and rain, with the cavity pressurized, the researchers concluded that (11) "increased vulnerability of the system to excessive leakage and moisture damage as a result of flexural cracking has not been demonstrated." **Tom Trestain, PE** ■

The author is principal of T.W.J. Trestain, Structural Engineering, Toronto, Ontario.

Related Reading

"Steel Stud/Brick Veneer Walls," T. Trestain and J. Rousseau, P/A, Feb. 1992, pp. 113–116.

"Brick Institute Recommendations," Trimble, P/A, Feb. 1992, pp. 117–118.

"Brick Veneer Correction," T. Trestain, P/A, April 1992, pp. 9–10.

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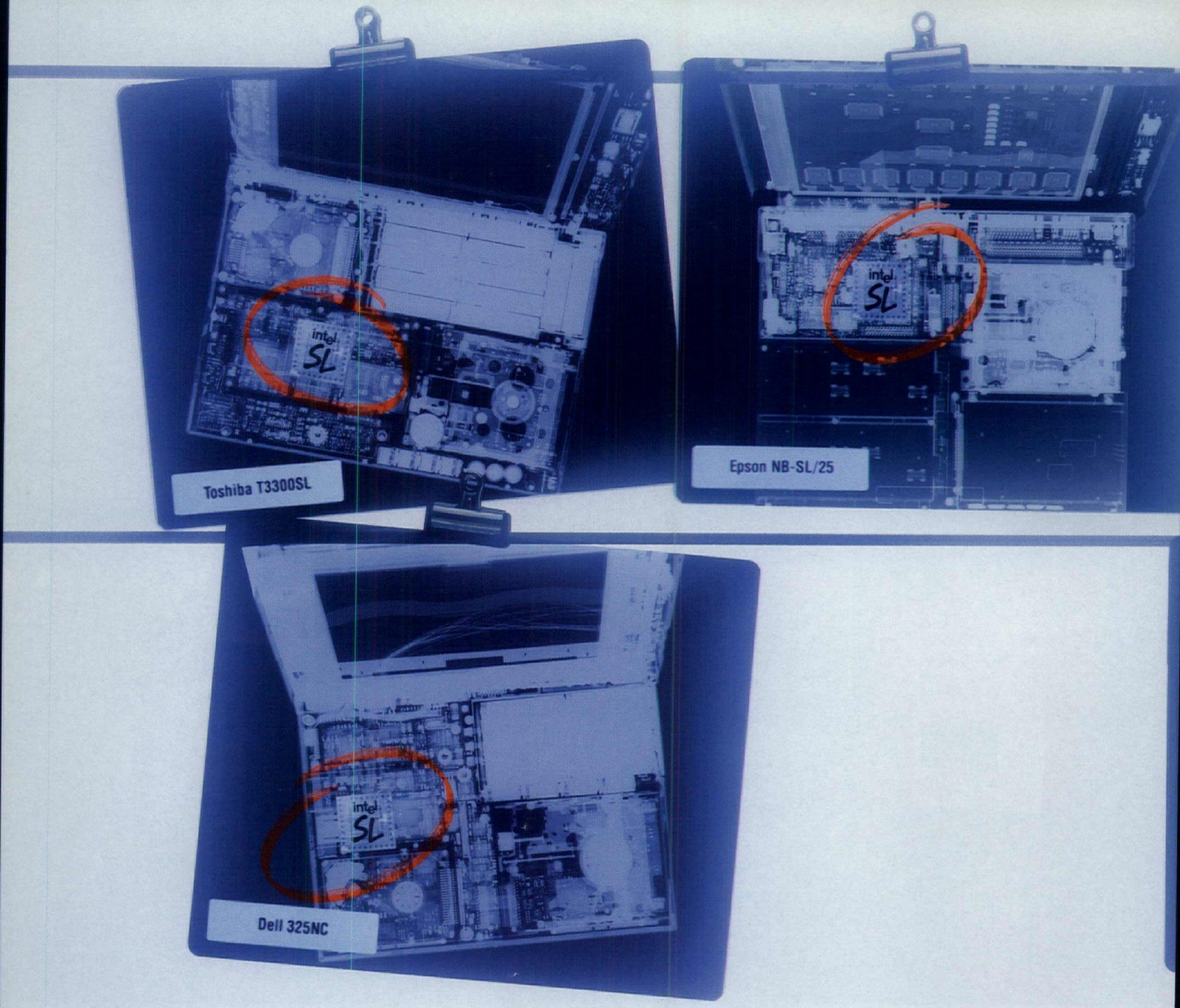

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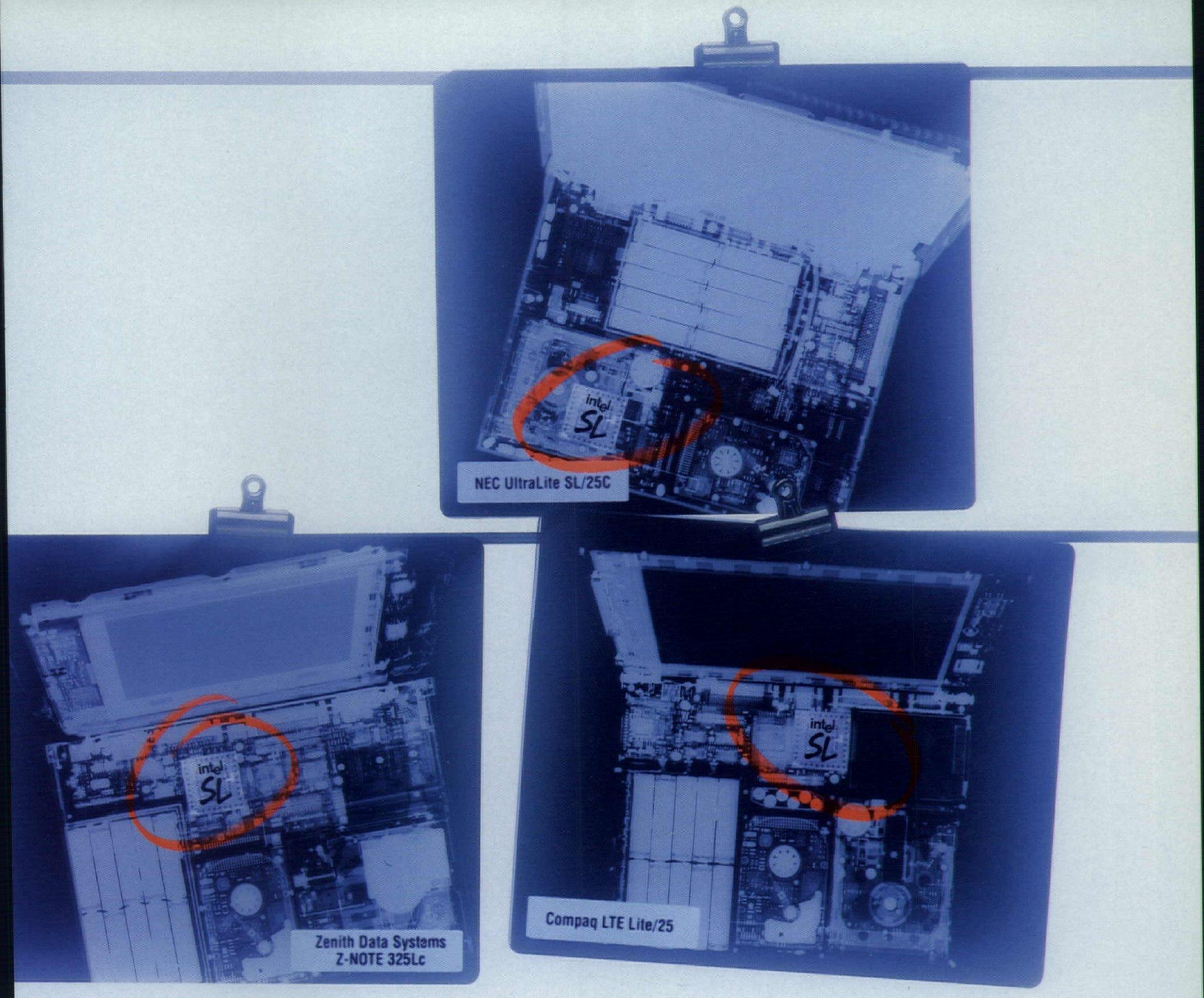

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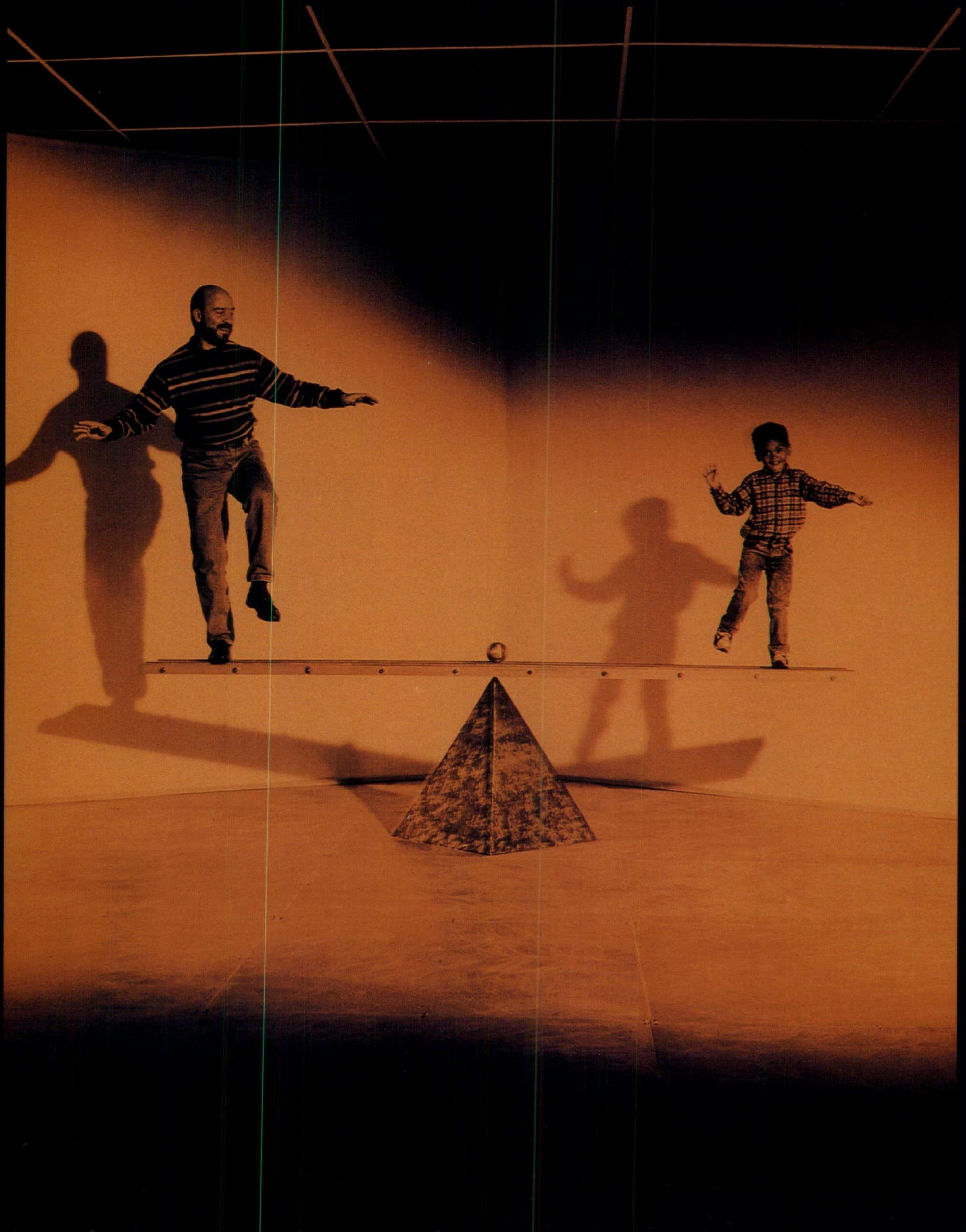

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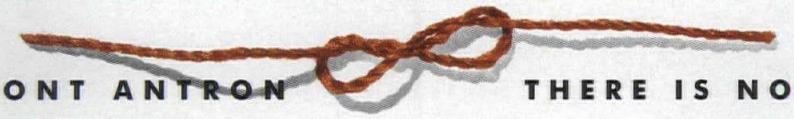

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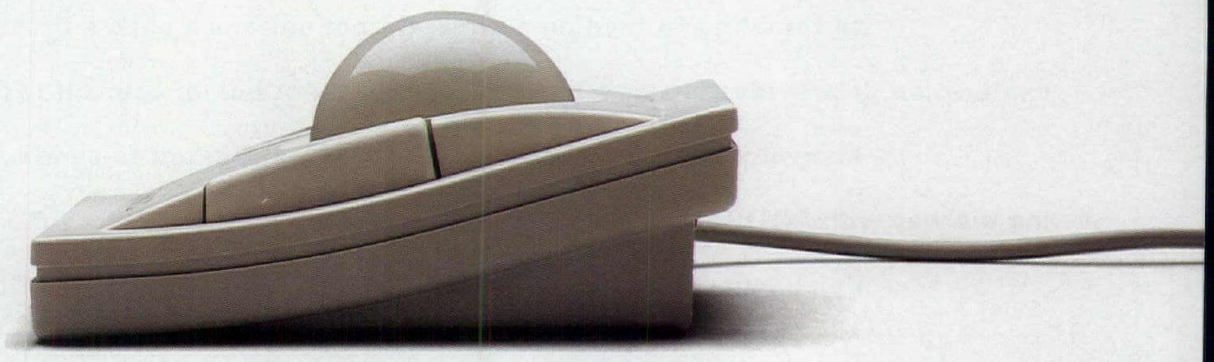

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Practice

Robert Gutman discusses the benefits of improving your most important asset: your own knowledge.

Management: Developing Your Assets

With so many architects having fallen on hard times, firms have an understandable tendency to concentrate on the financial condition of the practice. This may easily lead them to overlook the fact that the most precious asset any professional controls is knowledge of the discipline and the skill to apply it effectively. Over the long run it is more important to maintain the value of this asset than the office, the furniture, the computer hardware, or even the bank account. Financial capital is, of course, indispensable for surviving through a recession. But if professional skills are not kept up to date, money is of limited usefulness in obtaining new clients, holding onto repeat business, keeping your job, or advancing up the career ladder.

David Maister, a leading analyst of the professional services industry, points out how much knowledge and skill behave like many other business assets. Such assets naturally tend to depreciate in value with the passage of time, and this certainly happens in architecture. The building scene is dynamic and changes continually. New program types are invented constantly. One effect of the recession is that clients are becoming more alert, more selective, and also more precise in their demands. Design styles and consumer taste preferences are endlessly revolutionized, and new building materials and technologies keep coming on stream. Will your firm be able to keep up with these changes? Can you be as effective in the profession 10 or 20 years hence as you are today? The answer is clear: not unless you involve yourself continuously in some program of professional self-development and improvement.

The problem of professional development arises at all stages of an architectural career, whether you work in a large firm or as a solo practitioner. If you are an associate or a principal in a firm, and you are in your 30s or 40s, your task will be to preserve the skills you already possess and to expand them. At the same time you are holding onto your job, you should make sure that the firm gives you assignments that match your career needs. Remember that in this profession, the projects you spend your time on every day become the core of your personal development program. If you can't convince your supervisors to give you the work that will advance your knowledge of the field, then either you have to try to move to another firm (a difficult step always and especially so in the current labor market) or you must continue your professional development outside the office.

Many young architects I know are returning to school on a part-time basis to broaden their knowledge base. Some of them hope their firms will foot the bill, and several large firms do provide this support to the staff they are anxious to keep. However, if you cannot get this assistance, go ahead and spend your personal funds for the purpose. I repeat: your competence is your most valuable professional asset. Expenditures to maintain and improve it are the best investment you can make.

Professional development is a special problem for solo practitioners. Because they work on their own, solo practitioners cannot benefit from the intellectual give and take that is commomplace among team members in larger firms. If you are a solo practitioner, you might try cooperating with other architects, sharing office space and equipment, joint venturing as often as possible, and becoming an active participant in the learning activities available at nearby educational institutions and AIA chapters.

Is there a time when architects can stop worrying about the quality of their professional knowledge? Not so long as they wish to remain active. However, it is important to realize that many different skills contribute to the success of practitioners and firms, and some of these can be demonstrated more easily by older architects. In many firms, for example, senior partners and principals on the verge of retirement function effectively as elder statesmen. They arbitrate disputes with clients, they are good at resolving problems of internal firm management, and their established record of past performance can be of great help in winning and keeping clients. Yet even these skills can be augmented if senior architects take the time to learn more about current trends in the building industry, new management ideas, and strategic planning theories. At any age or stage in professional life, managing your assets is the clue to your performance.

Robert Gutman ■

The author is on the faculty of the School of Architecture at Princeton University.

Practice Points

How can design help heal patients in hospitals? According to *ÆSCLEPIUS*, a new newsletter published by the Healthcare Design Press, circulation corridors that enhance patients' social networks help them "experience less stress and have higher levels of wellness." The newsletter is $48/year for three issues; call (510) 370-0345 or FAX (510) 228-4018.

According to the *Schinnerer Liability Update*, a public contract may be unenforceable, even after the work has been performed, if the required appropriation of funds was not made by the agency with the authority to do so. Call (301) 961-9800 for newsletter information.

The National Society of Professional Engineers is objecting to recommendations made by the National Council of Architectural Registration Board (NCARB) in its *Model Handbook for Building Officials on Architecture and Engineering Laws*. They feel the *Handbook* suggests that engineers should have a subordinate role to architects in the building design process.

***The Americans with Disabilities Act Facilities Compliance Workbook*, developed by Evan Terry Associates, P.C., provides a step-by-step approach that can help facilities managers and architects identify ways to make existing and new buildings comply with ADA requirements. The looseleaf binder, which will be updated periodically, costs $150 from John Wiley & Sons (212) 850-6000.**

William Lohmann discusses what American firms, working in other countries, can expect regarding drawing and specifications standards.

Specifications: The Impact of International Practice

The increasing amount of architectural work outside the United States, although a boon to American firms in difficult economic times, has not developed without effort. U.S. firms have encountered not only cultural and language differences, but radically different codes and contracting methods. They have had to explore and tap foreign product sources and to adapt familiar documentation techniques to local requirements, a process that differs in every country.

But communication can be established. Many American firms work with a local architect, since foreign professionals are more familiar with their own building codes and construction practices. Such an association is required by law in the Netherlands and Japan, for example. Specialty consultants, such as the quantity surveyor in the United Kingdom and the German practitioner who prepares the *ausschreibung* and *vergabe*, offer a key to the unique bidding and contracting processes in their countries. Larger firms have also placed foreign architects on their staffs, a definite plus in the shop drawing review process.

Construction drawings for foreign projects seem to pose fewer development and coordination problems than specification documents. Many American firms have conquered metric dimensions and, with technical translators, can produce effective bilingual documents. Standard drawing sizes and new formats can be learned.

Specification content can be a bigger problem. The American concept of tight quality control, expressed through written documents, is almost unknown in many parts of the world. Most projects are built in accordance with local reference standards, such as the German DIN and British BSI standards, many of which are incorporated into regional and national building codes. But project-specific requirements are often minimal, and American architects find themselves without the extensive requirements for submittals, visual mockups, shop inspection, and stringent fabrication and installation tolerances that are routinely specified in this country. Supplements must be prepared to add necessary information to the reference standards.

Although language is still a potential barrier, English translations of foreign standards are becoming more widely available, and publications of the British Standards Institution (BSI) and American Society for Testing and Materials (ASTM) are acceptable in surprising places, such as Singapore, Hong Kong, and Saudi Arabia. Efforts have also begun to consolidate similar standards in broader market areas. The emerging European Common Market standards are a prime example, and the International Organization for Standardization (ISO), with the participation of the American National Standards Institute (ANSI), is working toward worldwide standards in many areas.

As part of its work, the Ad Hoc International Implementation Committee of the Construction Specifications Institute (CSI) is establishing a liaison with standards-setting organizations in other countries. CSI is also working, through ANSI, for adoption of Masterformat as an ISO standard. Both the American Institute of Architects and CSI are represented in the Building Specifications Group, which is developing a consensus format for European specification documents.

Whether prepared in the United States or abroad, construction documents for foreign work must be presented in standard local formats. Their credibility and acceptance depend on it. Just as the CSI Masterformat is now integral to the American and Canadian construction process, other formats have been adopted elsewhere. "*STABU Bestekssystematiek Voor de Woning - en Utiliteitsbouw*" is established in the Netherlands. In the United Kingdom, specification documents are based on the "Common Arrangement of Work Sections for Building Works." And the "*Standardleistungsbuch* (STLB)" is generally accepted in Germany. In the absence of a standard format in countries like Mexico and Russia, clients are often amenable to the use of Masterformat. Unfortunately, useful cross-reference documents for foreign standards have not yet been published.

Because they are tested and familiar, in-house master specification documents still form the most reliable basis for foreign work, but they must be modified. Metric conversions are easily added to the English dimensions. Outline specifications, frequently used to record materials and systems, can be maintained as foreign language masters or translated after editing. The same is true of selected specification sections, particularly Division 01 sections relating to submittals, substitutions, and quality control requirements. Curtain wall, glazing, sealants, and other technical sections also can serve as useful references.

A firm can create its own cross-reference documents for foreign work by preparing a master bilingual table of contents based on the section numbers and titles of the foreign format. Applicable Masterformat numbers and titles are listed under each foreign heading, and a second document rearranges the foreign headings in the Masterformat numerical sequence. Similar master bilingual documents enable the use of ConDoc keynoting principles on the drawings, an invaluable aid to specification development and the learning process.

Technical construction jargon often complicates translation efforts. As in this country, some words like "foot" have several meanings. Translation may suffer in both directions. On a recent project in the Netherlands, an English translation contained the phrase "...after the tender is awarded, he is no longer able to make valid remarks." One hopes the meaning was more clear in the original Dutch document.

William Lohmann ■

The author is Vice President, Specifications, at Murphy/Jahn in Chicago.

Nancy Hubbard and **Robert Greenstreet** describe the effect statutes of limitation have on the keeping and discarding of project records.

Law: Keeping the Record Straight

Each construction project entails a considerable amount of paper work generated throughout the design and construction processes. Drawings, specifications, letters, forms, invoices, certificates, and contracts collectively provide a legal profile of each job and become the primary source of investigation should any questions or problems subsequently arise. The high risk of litigation mandates that as full a record of each project as possible be maintained. After all, a legal dispute is likely to be decided several years after the fact by persons unfamiliar with the intricacies of the construction process or the project in question. The documentation will therefore be a major determinant in assessing the architect's actions and/or omissions, so no pruning or thinning out of the records is advisable.

While preservation of all records would thus seem to be a logical strategy, the simple space demands created by the storage of bulky files and associated documentation can lead to severe space shortages as cardboard boxes, cardboard tubes, and filing cabinets begin to take over offices, homes, and garages. A question then comes necessarily to mind: "Just how long do I have to keep this stuff anyway?"

The answer lies in the statutes of limitation or repose enacted in each individual state. To provide some limit to the threat of legal action, legislation mandates that legal action be brought within only a fixed number of years. This period varies in each state, both in its duration and for various areas of law – negligence, personal injury, etc. But evolving judicial opinions in the past decade have made the protection afforded by limitation statutes less reliable as a source of protection.[1]

While the period of limitation is clearly established in each statute, the point at which it begins has been the subject of much debate. Some states have held that the period starts at substantial completion of a project, while others hold that it commences at final completion. The end of the architect/client relationship has been held in some instances to be the point of commencement, although the date at which the construction fault occurs has also been argued, with some success, to be the point from which that relationship begins. Most problematic is the precedent used in some states where the limitation period is deemed to begin when the fault is (or should have been) discovered. In this case, the protection provided by the statute of limitations or repose becomes much less effective, as an aggrieved party has the entire period of time to file suit after discovery of the fault. In reality, this means that liability can span an indefinite period of time, extending beyond the architect's working life into retirement and, in several cases, death. While posing staggering problems of liability, this also suggests that records of each project need to be maintained indefinitely, and not destroyed after a certain period of time, as had become the habit in many practices in the past.

A number of states have tried to bring some relief for the situation by the enactment of "longstop" statutes. These extend the period of limitation to possibly 10 or 15 years to allow an aggrieved party a "day in court," but specify a fixed starting, and therefore, expiration date. Only 20 states thus far have "longstop" statutes, and even in a state that has adopted this degree of protection, the extended period within which accurate and complete documentation needs to be maintained can still entail substantial storage problems. Some strategies for records management are therefore advisable.

One strategy involves limiting the number of unnecessary copies. The availability and relatively low cost of copier technology has compounded paper-based records problems by filling files with a third more paper than is necessary, and by making the identification of the "copy of record" for legal purposes very difficult for office personnel, accountants, and legal counsel.[2] For photocopies to be used as evidence, they must accurately reproduce the original, as poor quality copies are worthless. Older copying processes produced copies that deteriorate over time, and fax copies on thermal paper have short life spans.

While the new technologies for date storage, be they image-based (microform: film and fiches), magnetic (computer disk and tape), or optical technologies, may save space and facilitate access, they have not yet been accepted as appropriate media for long-term or permanent storage. Also the courts have been reluctant to admit into legal record documents stored in the newer media. Microform images are the exception, under the guidelines of the Uniform Photographic Copies of Business and Public Records as Evidence act,[3] the Best Evidence Rule, and the Business Records Exception to Hearsay Rule.[4]

Records management falls into four stages: creation, active use, retention, and disposition. Most offices deal with only the first two stages, and tend to ignore the requirements of the last two, based on the notion of "out of sight, out of mind." Unfortunately, the last two stages are critical to the long-term well-being of the business itself.[5] Controlling document production, particularly by avoiding unnecessary copies, and streamlining active use through computer indexing and accessing can benefit the first two stages. Managing the last two should be a priority in any architectural firm.

Inactive files may be retained on-site, preferably in a centralized location for control and accessibility. However, considerable space and equipment are required. In small offices, the rent for the storage may be excessive, and in large offices, the space might be better utilized. Off-site storage in public warehouses, moving company storage, and the typical garage or attic are possibilities. However, such facilities have limited returns on cost: access hours are limited, personnel travel adds expense to retrieval, and records are not protected from humidity, insects, vermin, theft, or damage. Commercial records centers may be available; these offer storage materials such as file boxes, retrieval and pick-up and delivery services, and are climate-controlled and designed for fire protection. Many will dispose of expired documents on a prearranged schedule.

The disposition of records is a

critical issue in records management. Having the right records when needed is important; destroying the right records at the right time is equally important. For example, the Manville Corporation retained records which legally could have been destroyed. When the company was sued for asbestos-related claims, the records were subpoenaed and information was taken out of context to demonstrate that Manville knew about the dangers of asbestos.[6] Keeping documents beyond legal requirements allows the possibility that, in future litigation, all documents will have to be made available for discovery. The legal costs involved could be disastrous for an office; the potential for use of adverse evidence could be even more disastrous. Proof that a business has an established retention and disposition schedule and follows it carefully would support the claim that the business was not destroying records selectively to avoid legal action. The Federal and state governments provide publications on record retention regulations, and lawyers specializing in information law should be consulted when retention and disposition schedules are prepared by a practice's business administration.

Nancy Hubbard, Robert Greenstreet. ■

Dean Robert Greenstreet and Professor Nancy Hubbard teach law and practice in the Department of Architecture and Urban Design at the University of Wisconsin - Milwaukee.

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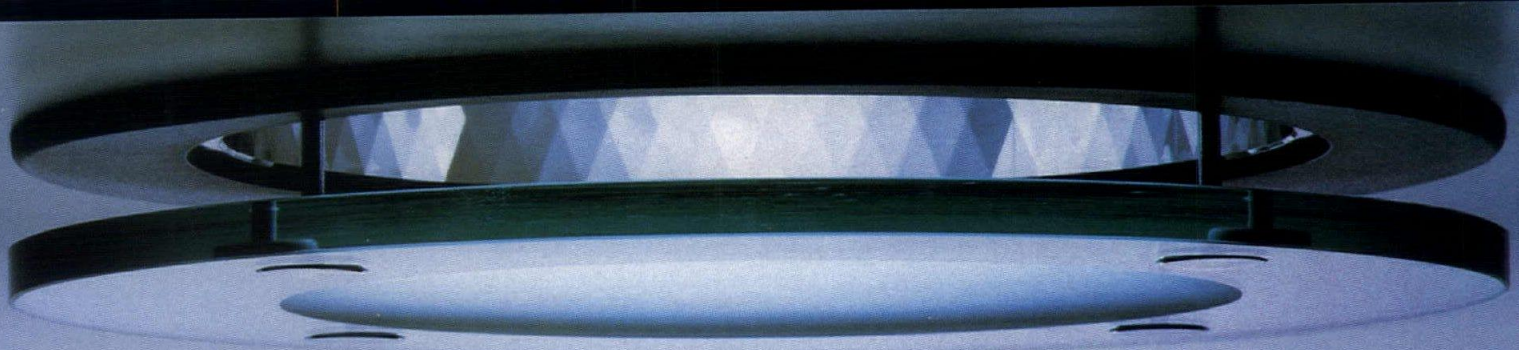

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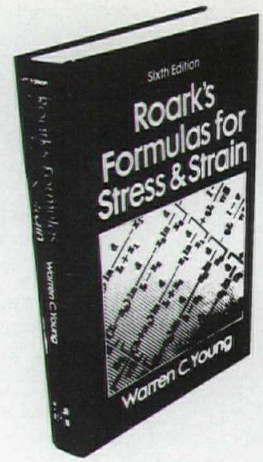

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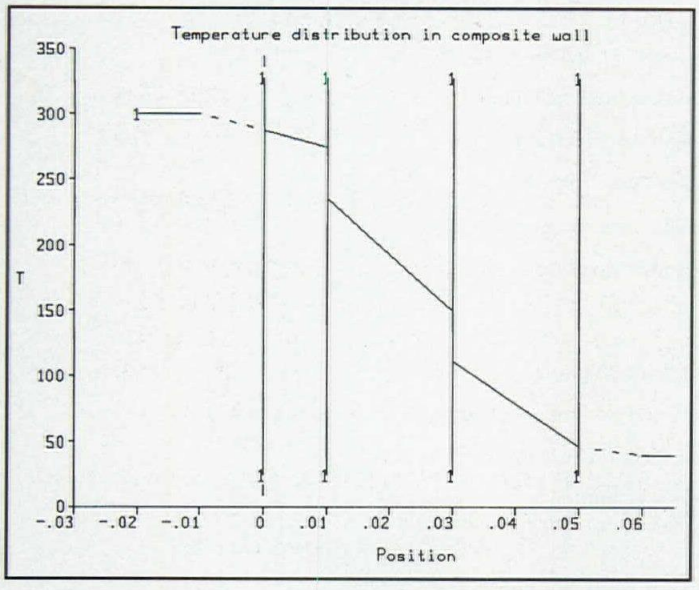

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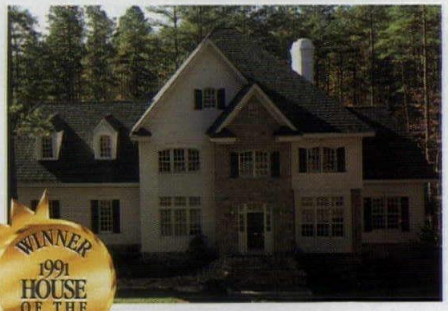

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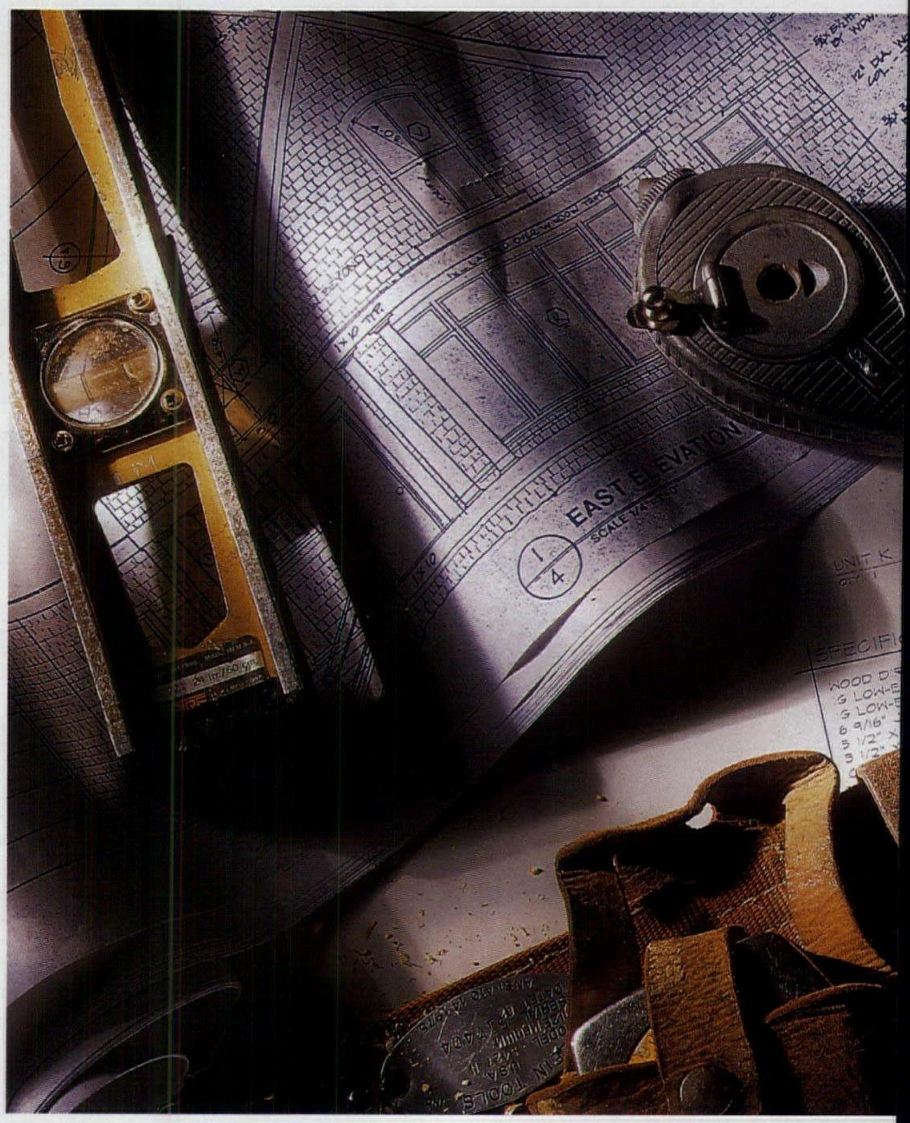

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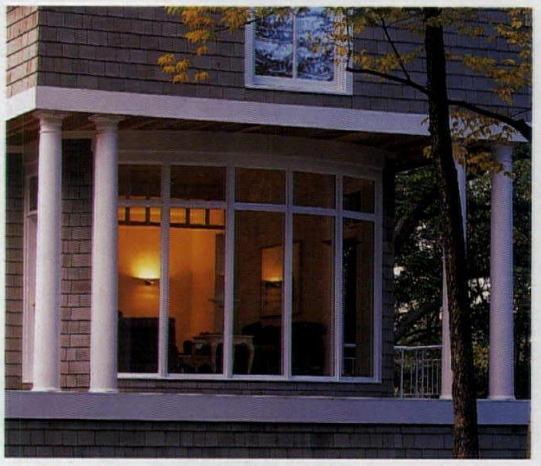

Yet Marvin didn't stop there. Next, they turned their attention to a soaring, 10-lite window that was also part of the plans. And by suggesting a reduction of just three inches in the overall height of this 18 ft. unit, they were able to save Waters & Bonner and the homeowner over $400.00.

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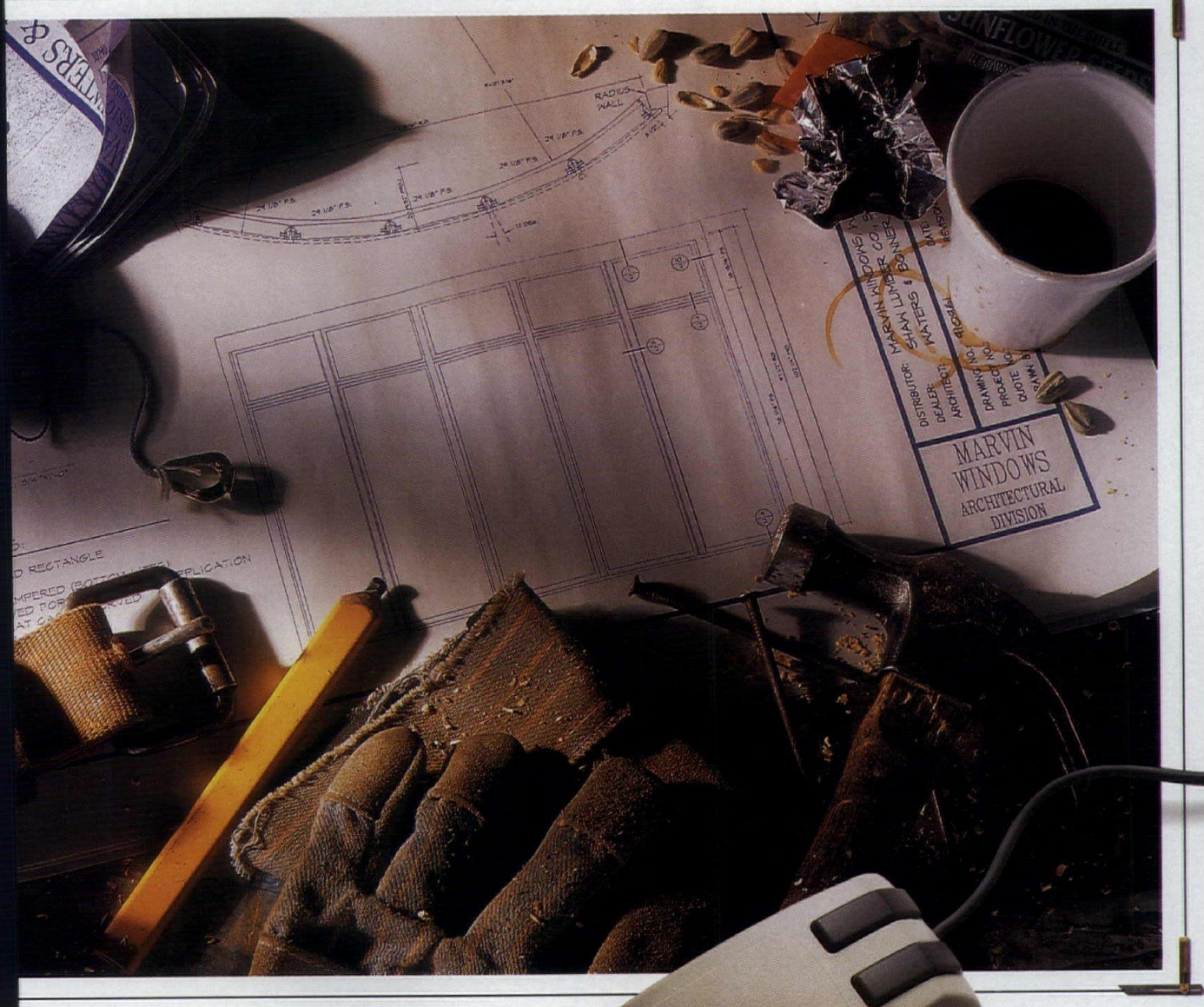

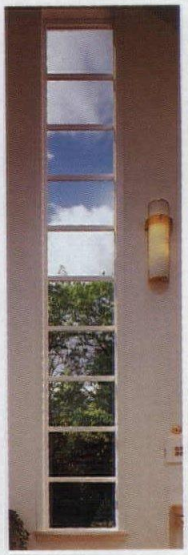

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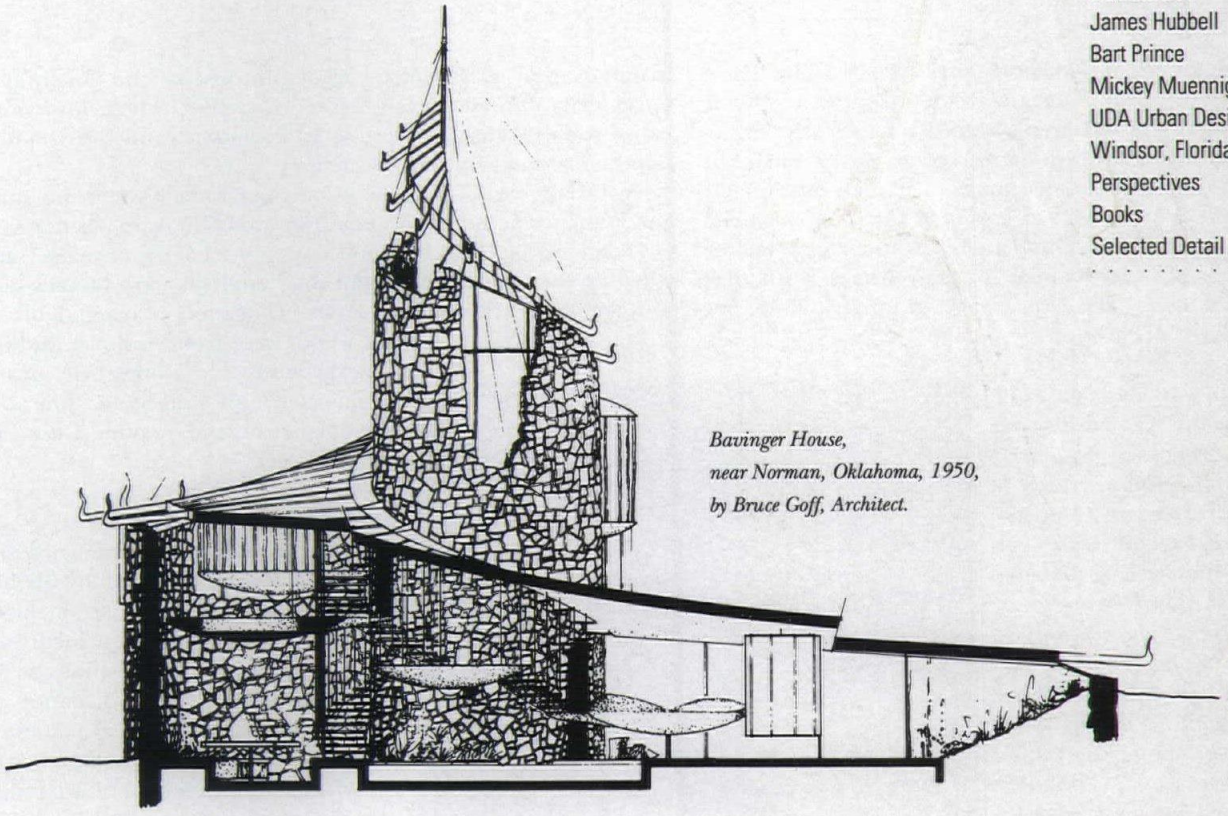


Bavinger House,
near Norman, Oklahoma, 1950,
by Bruce Goff, Architect.

There are two groups of design articles in this issue –

one focusing on organic architecture and the other on traditional town planning.

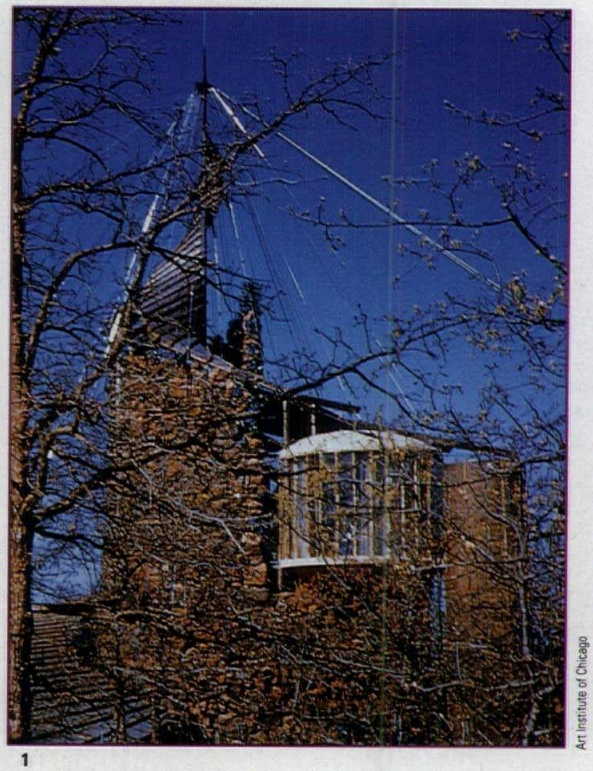
Although they may seem unrelated, these two movements are, in some respects, opposite sides of the same coin. The urbanity of one is matched by the anti-urbanism of the other, the historicism of one by the expressionism of the other, the emphasis on community in one by the emphasis on personal freedom in the other. Both are integral parts of the architectural culture in this country, a subject analyzed in two critical essays in Perspectives.

A Breed Apart

Turning their backs on the architectural establishment, a group of architects are building on the organic teachings of Bruce Goff.

In their own lifetimes, the American architects Louis Sullivan and Frank Lloyd Wright were hardly embraced by the mainstream of their profession. While Wright's and Sullivan's influence has clearly permeated the architectural mainstream in more recent years, a small but loyal group is also centered on the teachings of the late Bruce Goff (1904–1982), a Wright admirer who took Wright's ideas in aesthetic directions Wright never pursued. These architects, practicing mainly in the West and Midwest, work in what for convenience's sake has been called an organic style, paying heed to Wright and Sullivan, but especially to the eccentric genius Goff.

Born in Kansas and raised in Tulsa, Oklahoma, Goff began working in an architect's office at the age of 12. On his own (he never attended college), he discovered Wright, Gaudí, and Mendelsohn. After producing a volume of Art Deco and Modern-inspired work in the 1910s and 1920s (Tulsa's Boston Avenue Church being the most prominent example), he developed an increasingly personal design vocabulary that built on Sullivan's and Wright's "organic" ideas. In 1946, he went to the University of Oklahoma to teach, and a year later became chairman of the School of Architecture. Under Goff, Oklahoma had a school unequaled, before or since, in its commitment to the organic philosophy. After he left the school in 1955, associates such as Herb Greene continued to employ his approach for a while (Greene then carried an evolving version on to the University of Kentucky), but the school eventually returned to a more conventional program. Recently, though, Oklahoma established a "Bruce Alonzo Goff Professorship of Creative Architecture," which has brought Bart Prince, Ralph Rapson, Joseph Esherick, and Gunnar Birkerts to the University.



Art Institute of Chicago

1

Goff never had a formal relationship with Wright, but he knew Wright's work very early (by 1917, according to Goff biographer David G. DeLong), and was well acquainted with him personally. But because he never worked under Wright, he was able to mature creatively on his own and to escape the cultlike devotion that entrapped many Taliesin alumni.

The clearest difference between Goff's work and Wright's is Goff's more imaginative exploration of three-dimensional geometry: he used circles, triangles, stars, and (in the well-known Bavinger House of 1950) logarithmic spirals as ordering devices. Goff also tended to be even less influenced by mainstream architecture than Wright was, looking more often to art and especially to music.

Many know Goff best, though, for his eccentric, ad hoc use of materials: coal, glass cullet, carpet (not just on the floor), airplane parts, even dime-store ashtrays as ornament. These idiosyncrasies cause some to dismiss Goff as an eccentric, and overshadow the importance and genius of his method.

At Oklahoma, Goff strove to encourage creativity in his students. San Francisco architect and educator Fred Stitt, who was not enrolled at Oklahoma but "hung around there for a couple of years," says that when he first arrived, he found that "students were literally dancing with joy when they left their classes." Goff exposed his students – most of whom were from ordinary Midwestern backgrounds – to avant-garde music and Asian art, and sought to "liberate the genius," as he said, quoting Gustav Klimt, "within them."

Keepers of the Flame

Goff's Oklahoma school is now spoken about in legendary terms by his former students, many of whom are members of the Friends of Kebyar, an incorporated non-profit group that functions as a kind of clearinghouse for information about organic work. ("Kebyar," a Balinese word describing the process of flowering, was Goff's name for a school of art and architecture he planned to establish.) Friends of Kebyar publishes a newsletter and a quarterly journal that documents work of members and other sympathetic architects, among them the design-build team Jersey Devil, William Bruder, Canadian Douglas Cardinal, the Hungarian Pecs Group and Imre Makowecz, and a number of Japanese architects. The organic hall of fame also includes – besides the Sullivan-Wright-Goff triumvirate – Fay Jones, John Lautner, Gunnar Birkerts, Antoni Gaudí, Lloyd Wright, and Eero Saarinen.

Judging from Friends of Kebyar's publications and their conferences, one conviction that seems to be held by all involved is that both mainstream and "avant-garde" architecture (as defined by the architectural media and academia) are on the wrong track. A good deal of what bonds these architects together is a common disdain for what might be called the Eastern architectural establishment, which they view with suspicion, contempt, and what some might even view as paranoia. FOK members are full of stories about persecution, especially by architectural educators, and suppression of their message, especially by the media; P/A in particular has been vilified more than once in FOK pages. Most, though, have never sought the attention of the architectural mainstream, and practice as far away from it – both philosophically and geographically – as possible.

Corson Hirschfeld

2

Ron Forth Photography

3

The Bavinger House in Norman, Oklahoma (1), a spiral volume built around a central mast, is Bruce Goff's most celebrated work, and a winner of the AIA's 25-Year Award. Cincinnati architect Terry Brown is inspired by Goff's use of non-orthogonal form; he describes Goff's buildings as feeling "like someone is hugging you." For an exhibition on organic work at Cincinnati's Contemporary Arts Center, Brown built a free-standing structure (3) to demonstrate that "what is peculiar to organic work is the necessity to insert your body into the architecture." Another Brown project, a "Place for Tea" grafted onto a Cincinnati house (2), shows the influence of both Wright and Goff, and Brown's desire to establish a "sincere relationship between two-dimensional pattern and three-dimensional form."

"The 'urban question' seems to be of little importance to most organic practitioners, who have as little use for cities as Wright did."

One exception is Cincinnati architect Terry Brown. Raised in Iowa and schooled at Iowa State and Washington Universities, Brown went on to New York's Institute of Architecture and Urban Studies – about as Eastern establishment avant-garde as was then available – and worked for Robert A.M. Stern and Venturi, Scott Brown & Associates before returning to the Midwest and pursuing an organic career. "Perhaps it was naïve of me to believe that there was substance in what we perceive as being avant-garde architecture," he says. "But I didn't find that the passion was architecture. The passion was self-promotion."

But What *Is* Organic Architecture?

It's easy to see what organic architects believe they are not, but defining just what they are is difficult. Even talking about organic architecture as a "movement" or a "school" elicits protests from most of the people identified with it. First, no one is completely satisfied with the word "organic." Fred Stitt worries that people associate it with "compost piles and organic groceries"; others think that it causes people to make inaccurate biomorphic connections. Still, the word is the most accepted shorthand term.

Second, they say, they are individuals whose work is extremely varied; talk of an "organic style" is poison to people with such a strong distaste for the word "style" as architectural historians use it. Those protests aside, though, there are definite visual similarities in the work, more specific than the loose set of organic tenets would suggest. Many of these similarities are traits the work has in common with that of Goff, especially the baroque, idiosyncratic use of ornament.

The reluctance of many organic architects to talk about their work at all is also frustrating to those eager to establish definitions. Bart Prince is not alone in saying that his buildings should speak for themselves. But the most inclusive description of organic architecture says simply that it is a process of design where a building is generated from within: the requirements of program, together with (usually) some kind of geometry-based system and an indefinable spark of creativity, determine the overall form. The external appearance of the building, instead of being a separate concern, is the natural result of the process. This description, though, could easily be applied to the International Style, which, despite the contempt in which the corporate version is held by organic adherents, had an undeniable liberating influence on both Wright and Goff.

Another more specific characteristic of organic work is its emphasis on experience and sensation: what it's like to walk through a building. Terry Brown says of his work, "You have to go into the architecture to understand it. It's not very picturesque from a photography standpoint." In Brown's view, the experiential nature of the work is part of the reason it is not frequently published.

Fred Stitt, a founder of the two-year-old San Francisco Institute of Architecture, which he hopes will combine practical training with organic inventiveness, is not afraid to define what he considers organic. His list of characteristics includes a highly specific relationship to sites and clients (an organic architect "makes design features of [clients'] own idiosyncrasies"), an incorporation of musical ideas, and the use of geometric modules. To these he adds a kind of wild card, "invention or creation": organic architects are more prone to use new materials and reinvent building types, he says.

But judging by the kind of work that Friends of Kebyar members admire or produce, Stitt's list is best applied on an "or any of the above" basis. Geometric modules, for example, seldom appear in the work of James Hubbell (page 74); Hubbell meets the "invention" criterion better than any other. Architects happen into the organic canon via any number of connections. And while most in the organic circle are music buffs, the extent to which music overtly influences their work varies greatly.

A characteristic Stitt forgot to mention is structural expression, which is an important part of organic work. If one had to classify the organic movement as either Gothically or Classically inspired (though such a distinction is misleading), the Gothic would win out, at least in the Goff camp. Where Le Corbusier was transfixed by the Acropolis, Goff (and Gaudí) drew from the Gothic cathedrals of Europe, with their elaborate exposed and expressed structure. Organic architects like James Howard Fox of North Carolina often employ novel structural solutions, and clearly display them in their finished product.

Does an organic approach mean that buildings have to look like Goff's otherworldly creations? Most organic architects think not. Fox says that "even if you're doing a Colonial house, the process is the same." San Francisco architect Donald MacDonald, who studied at Oklahoma just after Goff left, designs buildings in San Francisco that look surprisingly conventional for someone who considers himself part of the fold. MacDonald, though, faces obstacles his brethren rarely encounter. "I have to operate in one of the toughest cities in America," he says. "I try hard to follow my roots, but when you hit the building envelope, the outer skin is permeated by opinions."

MacDonald's urban practice is an exception. Most organic architects do not work on urban commissions, for precisely the reasons MacDonald describes. The dearth of urban organic work inevitably leads to questions of its appropriateness to the city: Can an organic building be a good neighbor? Does concern for "context" preclude organic expression? A few examples are frequently cited: Gaudí's buildings, tucked into the gridiron of Barcelona, Wright's Guggenheim Museum (which succeeds largely by contrast) and V.C. Morris Gift Shop (which hides its expressionistic interior behind a blank street wall). MacDonald has designed two apartment buildings in San Francisco that echo the undulating rhythms of Gaudí's Barcelona work. But the "urban question" seems to be of little importance to most organic practitioners, who have as little use for cities as Wright did.

Teaching the Organic Ethic

One aspect of the profession that organic adherents are eager to reform is architectural education. Many harbor bitter memories of their own schooling, and think that the current system breeds architects who are unable to tap their creative power. Terry Brown recalls giving intuitive compositional exercises – a hallmark of Goff's educational method – to a freshman studio at Miami University of Ohio.

4

Tom Bonner

James Howard Fox.

5

James Howard Fox.

6

The Shinenkan Pavilion at the Los Angeles County Museum of Art (4), funded by organic architecture patron Joe Price, is perhaps the most visible organic monument in the country. Goff produced a schematic design before his death; Bart Prince completed the project. James Howard Fox's Vaughn Gazebo in North Carolina (5) uses a radial structure centered on a 50-foot utility pole; the whole is wrapped in a fieldstone enclosure. Fox's Pearson House (6), also in North Carolina, is raised above its neighbors – for access to the view – by means of four steel tube frames.

"Even talking about organic architecture as a 'movement' or a 'school' elicits protests from most of the people identified with it."

The next quarter, he gave the same problem to a senior studio at the University of Cincinnati. "The seniors couldn't do it. It was really a painful process for them to call on their intuition."

This view is consistent with the movement's non-intellectual – if not anti-intellectual – tradition: neither Wright nor Goff had a formal architectural education. School, the line of thinking goes, should give students the technical tools and teach students to "trigger their own intuition," in MacDonald's words. At the least, it should not destroy the creative spirit, the way they believe conventional education does.

In constructing the program for the San Francisco Institute of Architecture, which currently offers a two-year Master of Architecture degree, Fred Stitt says he determined that "if you looked at a typical school of design and did everything directly opposite to what they do, you'd come up with a much better result." Stitt's program, he says, encourages student experimentation and allows for experiments that don't work. SFIA's curriculum includes design, history, and technology classes that are integrated; students studying adobe houses in history class learn the technology and design in adobe at the same time. History classes do not ignore the European tradition, but do try to be more inclusive. Design instructors include a number of visiting lecturers from the rolls of the organic movement. The school, currently in its third year of operation, has about 70 students.

Many other organic architects teach, but tend to be on their own in academic environments that are not always supportive. Former Goff student Dean Vollendorf teaches at the University of North Carolina, Charlotte, where he has brought in James Howard Fox, John Lautner, Bart Prince, and others for visiting studios. Robert Faust, another Goff alumnus, teaches at Auburn University, where for several years he ran a "vertical studio" that taught Goff-inspired compositional techniques to third-, fourth-, and fifth-year students.

All-American Architects

The term "American School," which has been applied to organic work, sounds too broad or vague to describe the Wright/Goff axis, but in many ways it is especially appropriate. Both Wright and Goff represented values associated with the American character such as self-sufficiency, the rejection of tradition, free expression, and a passion for the land. Wright was an admirer of such American thinkers as Emerson, Thoreau, Whitman, and Jefferson. (What was Broadacre City, if not a scaled-down version of Jefferson's nation of enlightened farmers?) Clients drawn to organic architects, like Wright's and Goff's, tend to be self-made, middle-class people building homes, or, as Bart Prince puts it, "pretty normal people... seeking something beyond the ordinary." The sites are almost always rural or perhaps suburban, the situations uncomplicated by client/user relationships and political requirements.

As for the architects themselves, they come closer to fitting Goff's personality type than Wright's. While their designs are flamboyant, their demeanor is unassuming. (They are, as a group, the *nicest* architects you could meet.) In some ways, they epitomize the "strong, silent type" of Western movies: they don't talk too much, they almost invariably work on their own, and, like Goff, they rarely market their services. Clients come to them through word of mouth or upon seeing their work; it is presumed that they know what they're getting. Says Stitt: "They don't feel part of the mainstream on any level. They don't tend to join the AIA.... They tend to behave like outcasts." In their rejection of the compromises imposed by collective effort, these architects represent an American individualism that some might say is disappearing, drowned in the social and cultural soup of an increasingly urban and interdependent nation.

That is not to say that design review boards, NIMBYism, and other features of urban politics are necessarily incompatible with the organic movement. James Hubbell's community center in Tijuana (page 76) demonstrates an effort to put organic principles to work in an inclusive public process. Christopher Alexander, whose philosophy (if not his aesthetic) is sympathetic to the organic movement, has worked in a similar way (P/A, July 1991, page 100). Furthermore, some urban organic works do break through barriers of taste and philosophy: Bart Prince managed to realize Goff's schematic design for a Japanese Art Pavilion at the Los Angeles County Museum of Art (P/A, Nov. 1988, p. 33) despite having to negotiate a maze of bureaucracy.

Donald MacDonald, too, persists in trying to reconcile his philosophy with the demand for public participation. Using what he calls the "MacDonald Block-Model Method," he involves the public in the design of a project in the schematic stage, so that the completed project is not then subjected to change and compromise. Still, he holds to the organic belief that "in the end, the best architecture comes from the efforts of one individual and a very good client."

That belief, immortalized in the Wright and Goff legends and in Ayn Rand's hero-architect Howard Roark, may always keep these architects on the fringes of a profession whose center is increasingly defined by collaboration. They will no doubt spawn another Wright or Goff some time, and their ideas may slowly and unconsciously enter the mainstream. But by and large, they remain a breed apart. And that's all right with them. **Mark Alden Branch** ■

Further Reading and Information

The Friends of Kebyar's quarterly journal profiles organic architects both in the United States and abroad. It comes with membership in the Friends of Kebyar ($30 annually), as does the bimonthly newsletter, a compilation of lively member correspondence and news about organic work of the past and present. Contact Circulation Manager, 7430 SW Canyon Drive, Portland, Oregon 97225 (503) 292-2684.

Bruce Goff's work has been documented in two books: David G. DeLong's *Bruce Goff: Toward Absolute Architecture* (Cambridge, Mass., MIT Press, 1988), and Jeffrey Cook's *The Architecture of Bruce Goff* (London, Grenada, 1978).

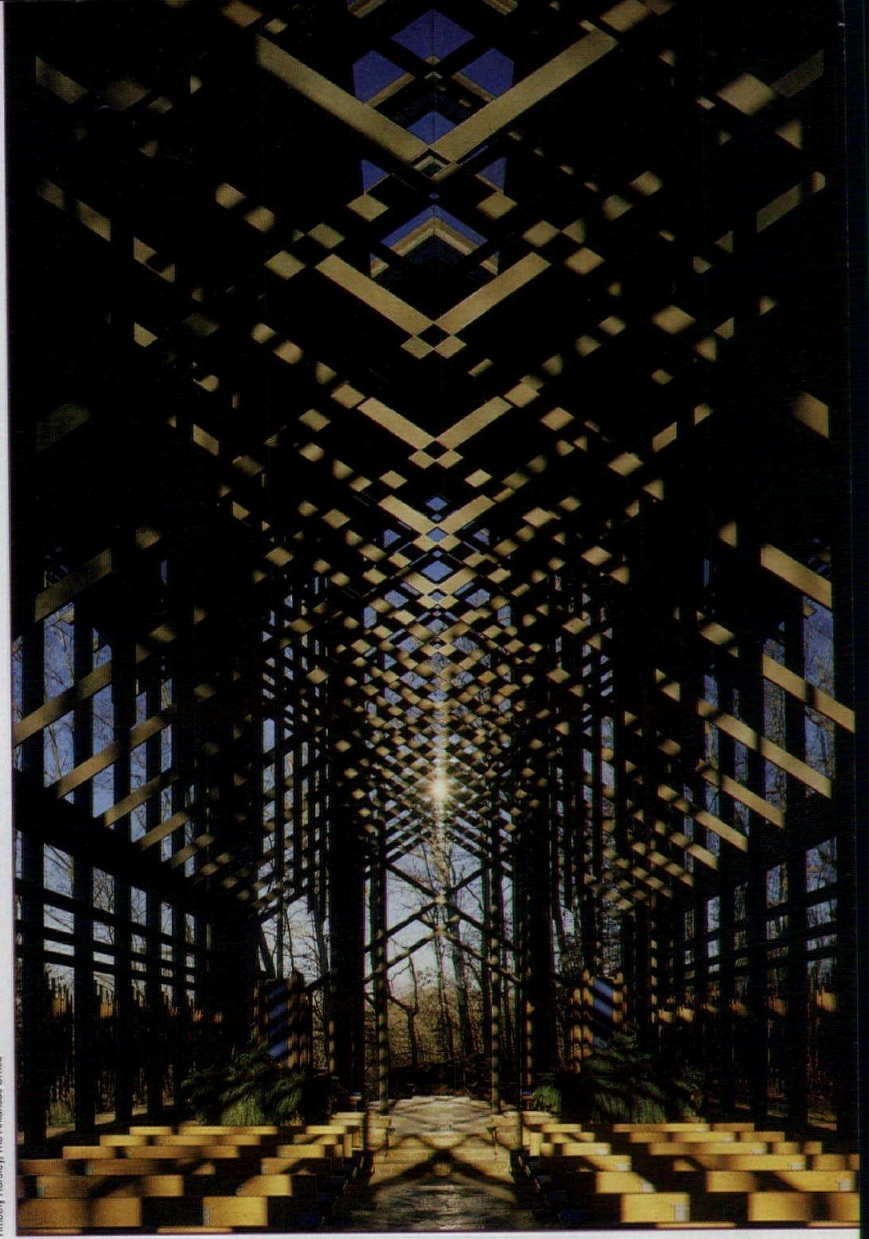
Those interested in the San Francisco Institute of Architecture can contact SFIA Information Offices, Box 749, Orinda, CA 94563 (510) 254-9397.

Julius Shulman

7

Henry Bowles

8



Timothy Hursley/The Arkansas Office

9

Henry Bowles

10

Kendrick Bangs Kellogg, who practices in the San Diego area, traces his design lineage to the "curvilinear and irregular" landscape designs of Frederick Law Olmsted, a cousin of his grandfather's. Kellogg frequently uses curvilinear and radial forms in his work, as seen in the Yen House (7). Fay Jones, who once taught under Goff at Oklahoma, uses more conventional plan types, but shares the organic interest in structural expression, as seen in his celebrated Thorncrown Chapel (9). Donald MacDonald, practicing in restrictive San Francisco, managed to imbue his Broadway-Vallejo condominiums (8, 10) with an urbane, Gaudiesque organicism.

Things In Motion

1

Artist James Hubbell has created a place of meditation at Sea Ranch that seems virtually kinetic; a school for the impoverished in Tijuana is a work in progress.

Inspired by drawings of winged forms, the Sea Ranch meditation chapel resembles a fluttering object that has alighted in the meadowland between the ocean and the coastal mountains, a UFO that was summoned here and may one day take off again. For now, it is cradled in a stonework base; a stone path surrounds it and merges with other stone formations that trail off into the earth. The summoners, Betty and Robert Buffum, commissioned the chapel from artist James Hubbell and dedicated it to the memory of Kirk Ditzler, the amateur artist/naturalist son of friends and neighbors at the Sea Ranch. Hubbell used the young friend's drawings as a basis for his design.

The chapel is, of course, at rest, but because it is small – only 360 square feet – the viewer walking around it can experience it as if it were in motion. The four roof planes collide like waves; the perspective is never the same from one footstep to the next. Three stopping points, like rests in a musical composition, occur where the roof eaves lift to accommodate windows and doors. The fourth opening is a long slit filled with stained glass which, near the roof's peak, emits a feathery bronze sculpture that suggests sea spray.

2

Hubbell is not only an artist, but a master craftsman who designs buildings as habitable sculptures. He also views the design process, particularly of public buildings, as a collaborative effort and involves his co-workers in it according to their abilities. Since Sea Ranch was too far from his San Diego home to allow constant supervision, he sought and found a contractor, Tambe Kumaran, who had trained with temple carpenters in Japan and had built boats; Kumaran assembled a team of talented artisans. Skill was at a premium, because what Hubbell provided his crew to work with were 1/4-inch engineering drawings done for building permit purposes and a small, take-apart teakwood model. He expected his team to plot the construction process, but he also participated during periodic visits to the site.

After pouring a 6-inch concrete slab foundation, and building foundation walls of 12-inch filled concrete block, the crew faced the major challenge of constructing the roof, which had four major planes, each with its own undulating surface. An A-frame of primary rafters and beams was erected; the rafters were anchored to the sill plate of the concrete block wall with joist hangers. To achieve the curves of Hubbell's model, the workmen strung ropes and 3/8-inch rebars across the plane of the roof rafters and studied the results with model in hand from distant vantage points. Often they had to tear out and re-do their work, but if capturing the form was difficult, it was only a preview of the challenge of creating the smooth shingled surfaces that Hubbell wanted.

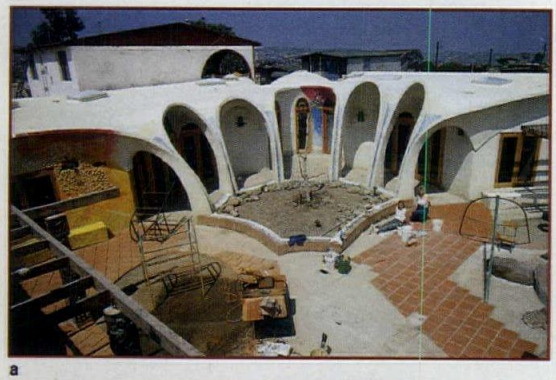
Outrigger rafters were added to the common roof rafters and built up in places with thin strips of wood to produce smooth curves; the eaves were thickened with layers of shingles. According to the foreman, Tim Carpenter, laying the shingles to reflect the curving roof planes was an unpredictable exercise that had to be redone when the patterns, which had a life of their own, collided. The upper part of the roof was clad with redwood cut on site into tapered boards of various sizes.

(continued on page 78)

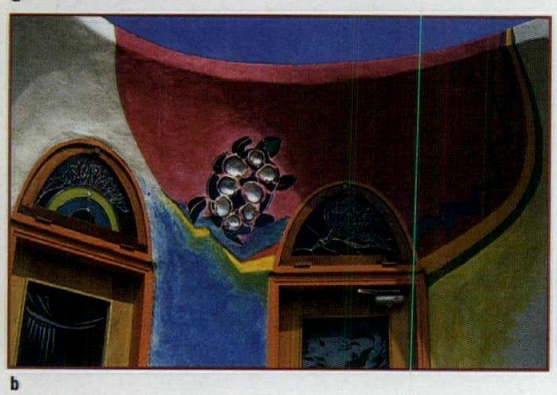
The building might easily have biological origins. Sweeping roof forms part where tall (1) or low (2) stained glass windows seem to grow, emanating from the low stone base.

Across The Border

At home in the collaborative world of craftsmen, Hubbell believes that the best way to learn an art is by watching others make decisions and mistakes. To assist this kind of education he helped establish the Ilan-Lael (Hebrew for "a tree belonging to God") Foundation, in 1982, which has the goal of creating a bridge between the poet and the pragmatist, the thinker and the doer. One of the foundation's projects, a school for impoverished children in Tijuana, Mexico, is a collaboration with the Americas Foundation, which has developed the educational program for which Hubbell is designing the buildings. The preschool, where 205 children are



a James Hubbell



b James Hubbell

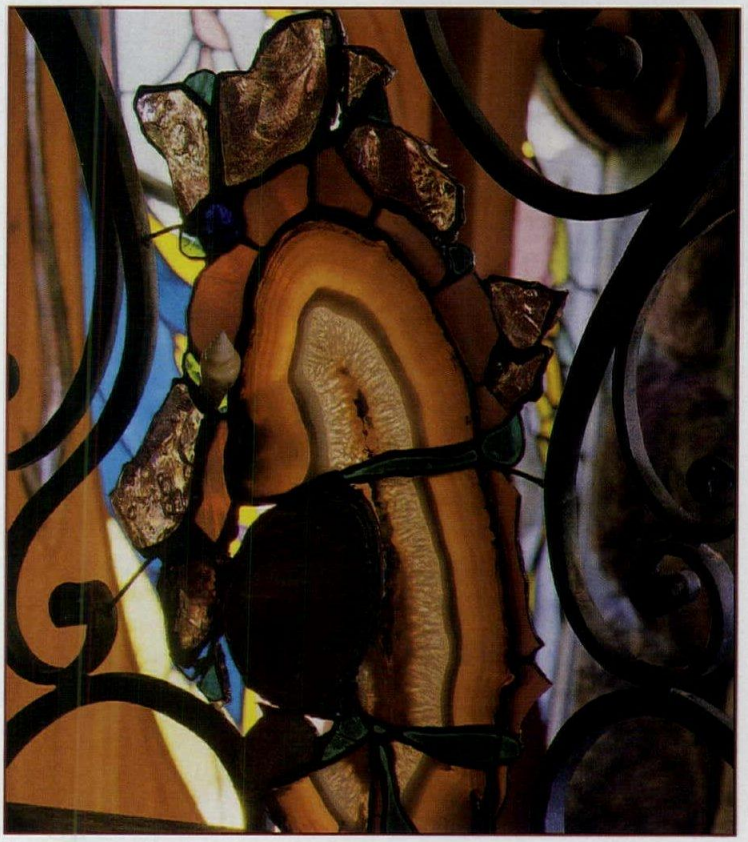
enrolled, started construction two years ago, and the primary school, which will serve 800 students, is nearing completion.

Another building for the school will be a training center for those who wish to apprentice at the school and learn a variety of building crafts. Volunteers came from near and far to participate in the previous building campaigns, performing a variety of tasks including welding pipe into a truss for the concrete shell roofs of the buildings.

Although Hubbell has a pragmatic approach to working with people of varying levels of skill, he believes in pushing all of them to surpass themselves.

Seen from the entry doorway (3), the tiny chapel interior just seems to grow out of the irregular datum of stone. Hubbell created a ceramic fountain near the entrance, a metal lighting fixture, the stained glass (4), and elegant teak and glass entrance doors (5). Copper sheets were hammered and pushed into the contours of the siding where it joins the roof. At the school in Tijuana for the Ilan-Lael Foundation, volunteers performed various duties, including forming pipe trusses for the shell roofs (a). Like Hubbell's other work, the school is decorated in various ways, including episodes of mosaic (b).

3

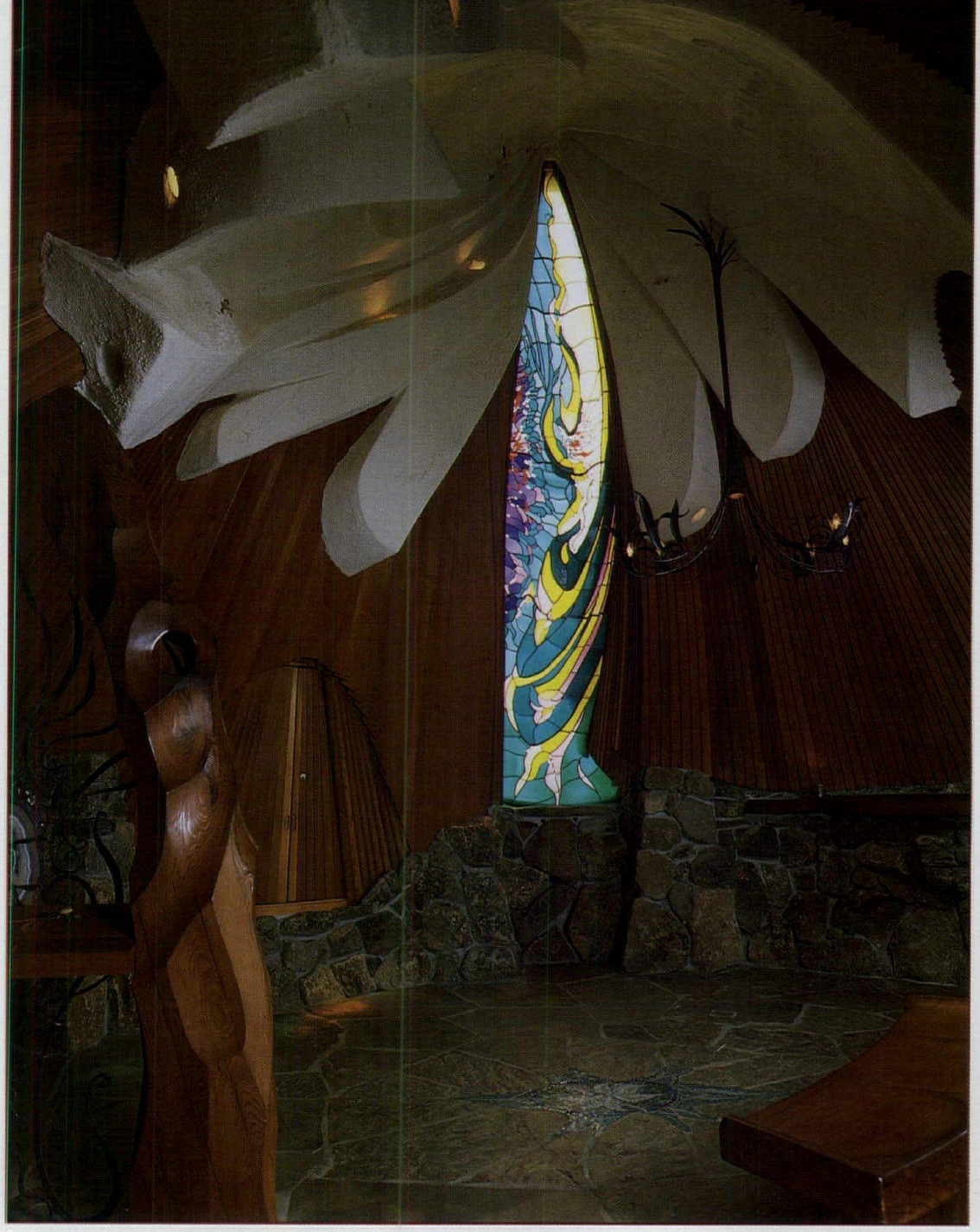


4

5

The form taken by the plaster ceiling (6) seems to emulate an inverted flower, hovering over the space. Mosaic work appears to seal up a fissure-like opening in the center of the stone floor, and subtle, delicate patches of it intervene in places between the top of the stone wall and the slats above. Representing a traditional Japanese tokonoma bashira, *a striking sculpted redwood post rises from the floor to the ceiling (6, 7).*

Project: *The Sea Ranch Chapel, Sea Ranch, California.*
Designer/interiors: *James T. Hubbell, Santa Ysabel, California.*
Coordinating architect: *Donald P. Jacobs.*
Client: *Betty Buffum and Dr. Robert Buffum.*
Site: *gently sloping area of about three acres of coastal meadow, with pine forests to the rear of the site.*
Program: *nondenominational 360-sq-ft community-use chapel for small services such as meditation, memorials, or weddings; to have no formal altar, and remain uncluttered to allow seating for up to 40 people.*
Structural system: *concrete slab, concrete block walls, and wood frame shell.*
Major materials: *wood, stone, glass, and copper.*
Mechanical system: *two small electric space heaters.*
Consultants: *Dan Cole, structural; Tambe Kumaran, mechanical; George Wickstead, FASLA, landscape.*
General contractor: *Kumaran Construction Company.*
Costs: *not available.*
Photography: *Alan Weintraub, except as noted.*



6

(continued from page 75)

Cladding the surface between the roof and the stone base walls also presented problems. Wood was desirable, but Hubbell had told his team that they should not try to force materials into place, and the curvature of the area between the eaves and the stone base suggested a lot of bending. By using green redwood 2x4s milled diagonally into a beveled shape, the workmen were able to push the flexible members into the right place. The bevel made each piece fit smoothly, avoiding the problem that flat pieces have of bending unevenly. The siding dried in place, creating a permanently molded shell.

The same lapstrake siding was used on the interior, but Hubbell decided to cap the space with a feathery light-colored plaster sculpture. He also made the elegant metal lighting fixture that hangs from the ceiling and the glass and metal screen that shields a corner near the entrance as well as the stained-glass windows and the teak and glass entrance doors. A single redwood pillar and contoured redwood benches were carved by sculptor Bruce Johnson from Hubbell's designs. Set on the stone wall near the entrance is a ceramic fountain made by Hubbell that suggests a set of wings folded protectively around the miniature metal and mosaic water source.

As exemplified in the chapel, Hubbell's favorite media are stained glass, ceramics, metal, and plasterwork, all of which he has incorporated into free-form structures that flow out into their sites, embracing rock outcroppings and vegetation. Hubbell's goal in architecture is to create structures that physically comfort and instill in their users an emotional attachment to the gifts of the earth. Trained at the Whitney Art School in New Haven and at Cranbrook Art Academy, Hubbell has many executed works of sculpture and stained glass that are independent of his building projects. At the beginning of his career he worked with architects of the organic persuasion, such as Kendrick Bangs Kellogg and Sims Bruce Richards, in the San Diego area.

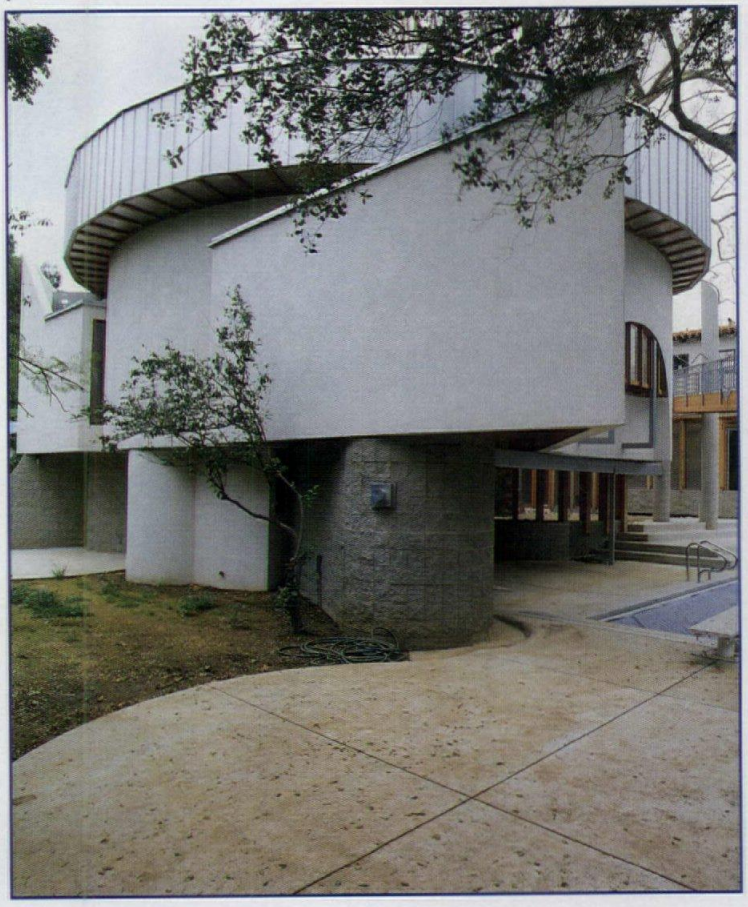
When he and his wife began building their handmade house in the mountains in 1958 – he has since built other houses – Hubbell wanted to retreat from the world. But in the last 20 years, his world has expanded with his desire to engage others in the work of building with nature, a process that Hubbell believes involves continually entering chaos to create order. **Sally Woodbridge** ■

The author is P/A's Bay Area correspondent.

Art Wrapper

Bart Prince's finesse with daylight and flowing spaces yields a household sanctuary for modern art.

1



2

The Mission Style house's low-key entry (1) is a cue to the curvaceous spaces within (3). The second-floor gallery, as seen from the opposite end of the lot (2), is more imposing, albeit more reductive.

To call Bart Prince's buildings "organic" is to make them one-liners: they defy labels as readily as they flout architectural norms. Cues from nature, such as climate and topography, have a modest impact on his design, but its true wellspring is a singular imagination. The term *Gesamtkunstwerk* (total work of art) seems more apt for Prince's one-of-a-kind environments: each is a synthesis of structure, space, and ornament, tailored for clients who want to defy convention. To those who don't share Prince's renegade sensibilities, the work might seem overbearing or merely curious. But those attuned to his aesthetic (all of Prince's clients seek him out) are proud to have these high-powered buildings speak on their behalf.

To some, the total work of art's virtue – its comprehensive design – is its liability. As Modernists, we prize innovation, while debating the problem of design overload, where the architect's vision no longer liberates clients, but stifles them instead. At the turn of the century, when the signature designers of the Secession style won acclaim in Central Europe, Adolf Loos countered that anonymity is the essence of Modernity. Others – Expressionists and Organicists among them – upheld creative bravura as the essence of 20th-Century architecture. Their nonconformist buildings augured a humane culture that could defy industrial homogenization. Prince carries their banner of countercultural design, if not their political agenda. Neither an activist nor a self-promoter, he focuses on designing good buildings "for our own time and our own problems." Revamping the nation's culture does not come up in conversation with Prince. Maintaining a design discipline does: his search for optimal proportions, materials, and spatial strategies is wrapped in a design process that eludes explication.

The Spence family, who commissioned the South Pasadena addition featured here, had no doubts that Prince should be their architect (see sidebar, p. 82). But most of us are closer to mainstream Modernism by training and inclination; we have to suspend a few paradigms to get in sync with Prince's aesthetic. I learned to approach his buildings without concern for precedent (and with the presumption that novelty is in itself beneficial). Their unabashed vigor can be

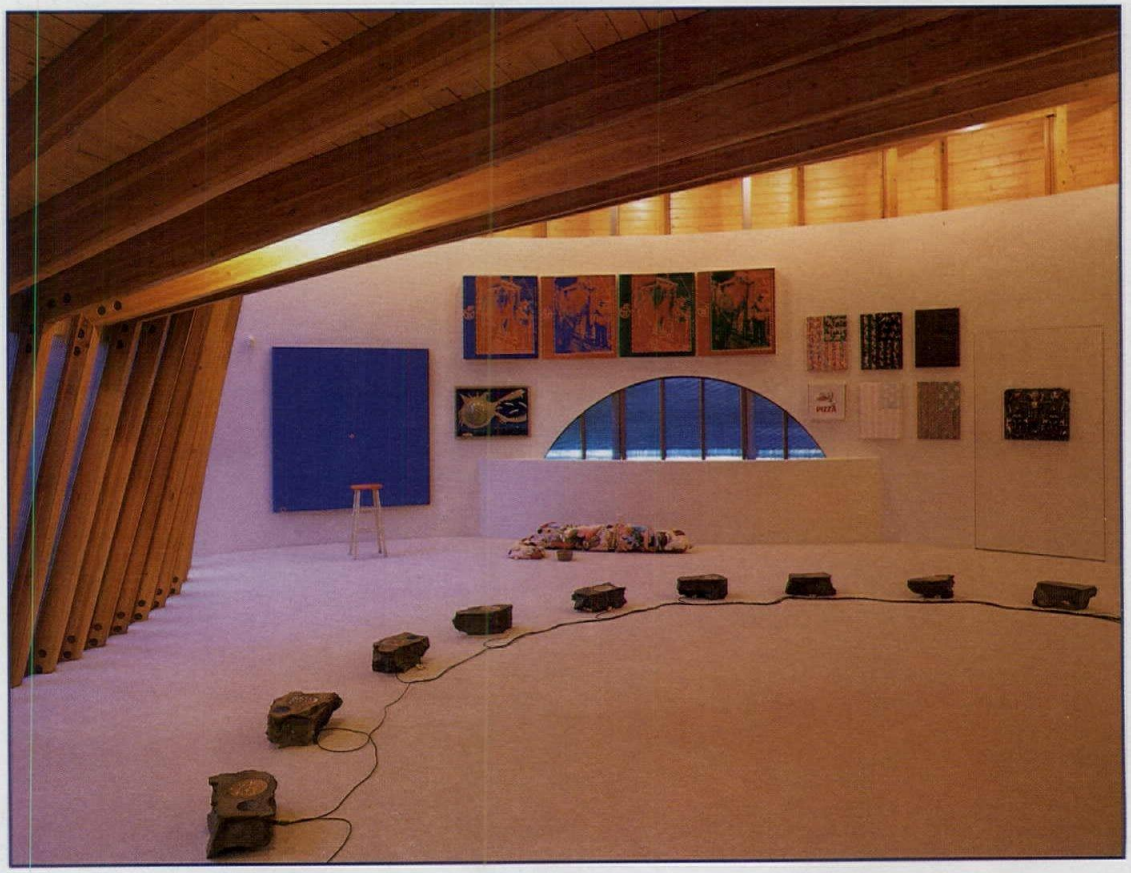
"Organic": the Clients View

"A museum director we know was amazed that we were able 'to get Bart to do what we wanted,'" said Judy and Stuart Spence. Their fellow art collectors assumed that Prince would upstage the works of art that the Spences had gathered over 25 years. They had no such fears, and said "We felt like he got it" when Prince showed his first (and only) design proposal for the addition. They're still enchanted with it.

Ostensibly, their collection – conceptual art in various media – would be at home in a minimalist, abstract building. But the Spences dismiss most cutting-edge architecture in Los Angeles as "condescending." However, when friends drove them past Prince's house and studio in Albuquerque, New Mexico, they understood his work intuitively. Upon meeting Prince, the Spences knew that he would be their architect; his spaces simply felt right, without relying on a theoretical agenda to be understood. Recalling their visit, Judy Spence describes Prince's architecture as having "a feeling of being completely acceptable, as if to say 'you're fine ... let's have a chat.'"

The Spences wrote a long letter with their thoughts on a redesigned and enlarged house. Displaying the art was a prime concern: "This is stuff we live with because we can't live without it." In an analogous way, they consider Prince's addition a synthesis that transforms the entire house, even though the new flowing spaces are juxtaposed with the orthogonal rooms of the existing Mission Style house. To the Spences, the composite is organic because it implies "an organism that comprises the structure and the people who live in it...you can't have one without the other."

It's commonly assumed that Prince's bold buildings are the work of an architect who imposes his will on the client. But the Spences assert that they had no encounters with a "design ego" on the project. And they feel that Prince gave them an ideal space for living with art. Their enthusiasm is genuine: the Spences said that they *had* to work with Prince – testimony that "organic" sympathies transcend style. The resonance between the Spences and their house has a deeper source.



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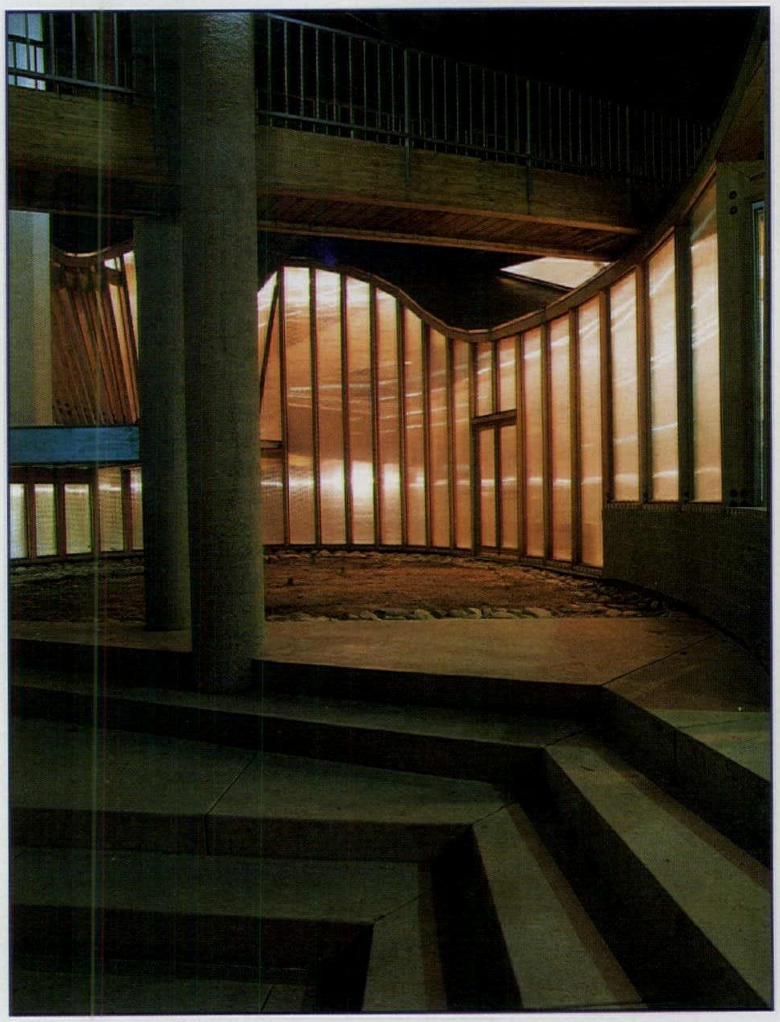
Project: *Spence House renovation and addition, South Pasadena, California.*
Architect: *Bart Prince, Architect, Albuquerque, New Mexico.*
Client: *Stuart and Judy Spence.*
Site: *a 13,000-sq-ft lot with a 50-year old house in an established neighborhood.*
Program: *all existing spaces in house reworked; two-car garage added, as well as new entry, hall gallery, recreation room, and living room/art gallery. 2554 sq ft existing; 3077 sq ft new construction.*
Structural system: *Annex has spread footings beneath masonry bearing walls on first floor; frame walls, glu-lam beams, and roof decking for second floor.*
Major materials: *exposed split-face concrete masonry unit walls, first floor; drywall with stucco, second floor.*
Mechanical system: *in-floor gas-fired hot water radiant heat throughout annex, with forced air cooling system on second floor.*
Consultants: *August Mosimann, Engineering Associates, structural.*
General contractor: *Judy and Stuart Spence; Lance Mellenbruch, project foreman.*
Cost: *witheld.*
Photos: *Alan Weintraub.*



5

6

quite moving if one simply flows with the experience they offer. Instead of looking for an intellectual agenda, I sought a spatial idea executed without inhibition. This is architecture that seems to breathe a life force. Maybe "organic" is an apt term for it, after all.

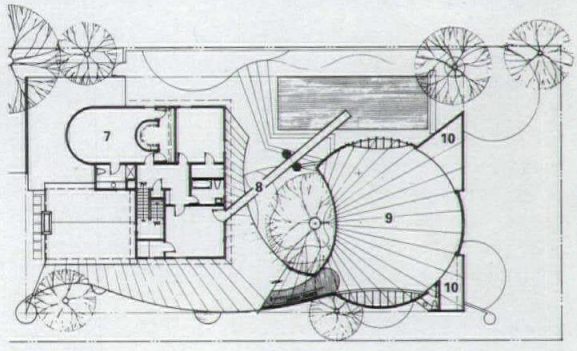
In the Spence addition, Prince shows that his work can be more accommodating than I had presumed. Its best feature, a semicircular living area/gallery, is both a serene art space and a potentially comfortable family room (furniture is yet to be installed). Like Prince's earlier work, the new construction is a composite of swelling volumes, but without the spikes and encrusted surfaces that were once pro forma (see pages 84 and 85).

The stucco façades of the Spence addition are as austere as those on the existing Mission Style house. But the older structure is in repose, while Prince's design seems to be in motion, even restless. It attempts too much for the cramped site. The art gallery is wrapped around a prized sycamore tree and proportioned to hold large paintings and a circular sculpture with a 22-foot diameter. The resulting envelope swells ominously when seen from the swimming pool, hovering over the precious outdoor spaces that remain. Conversely, the inner façade that encircles the tree is quite graceful, particularly at night, when it becomes a luminescent backdrop to the pool. But to walk around the pool is a challenge: the steps are steep and the patio is cramped.

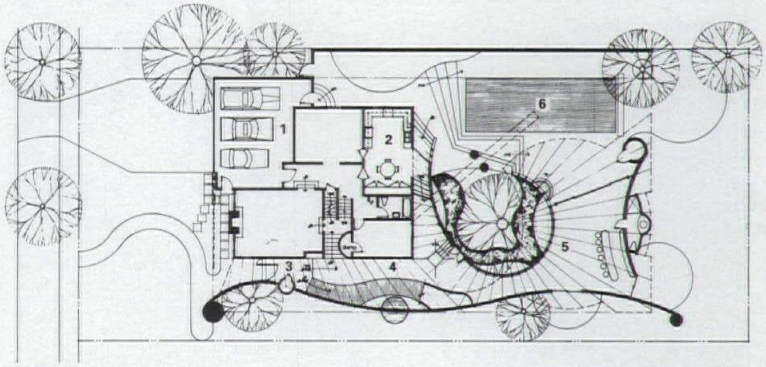
The inside/out relationship is less fluid than it appears. The semicircular living/gallery space is a retreat from the outdoors, rather than an extension of it. Nontransparent ribbed glazing makes it impossible to distinguish figures outside (the clear glass that was specified proved too costly). Moreover, the glazed wall area was limited to provide even illumination and the requisite surface area for the collection. While this rendered the cylindrical exterior a looming figure, it also yielded a serene interior. The curve of the wall is ample for the Spences' collection, and the glazing is a membranous filter that highlights the undulating roof. It's a gracious place to dwell on art.

Philip Arcidi ■

1 NEW GARAGE
2 REMODELED KITCHEN
3 NEW ENTRY
4 HALL GALLERY
5 RECREATION ROOM
6 POOL
7 REMODELED MASTER BEDROOM
8 BRIDGE
9 LIVING/GALLERY
10 ART STORAGE

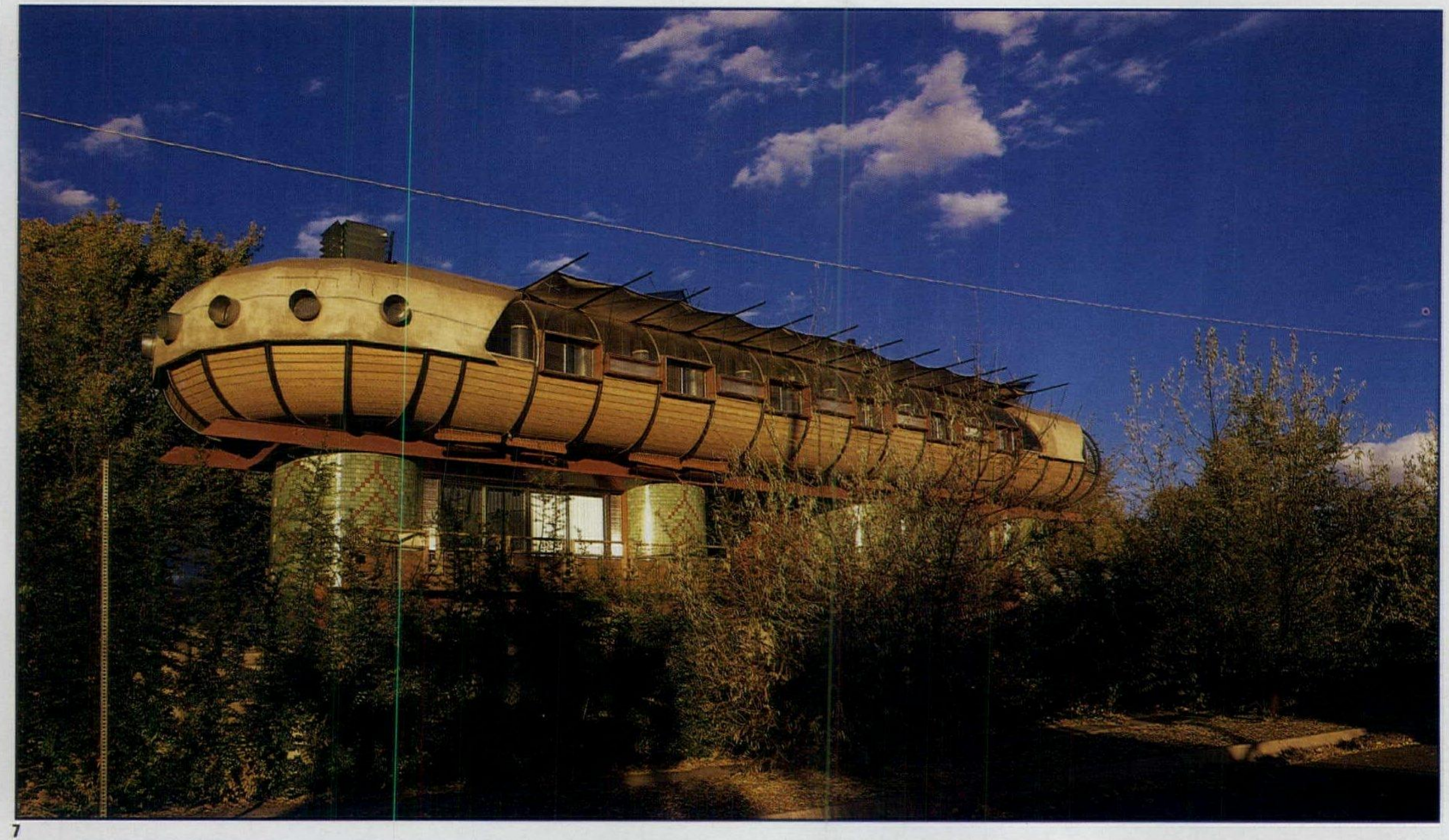


SECOND FLOOR PLAN



FIRST FLOOR PLAN

"In Fear and Favor of Ritual," a circular sound sculpture by George Stone, is surrounded by the Spence's wall-mounted works of art (4). The contours of the envelope become glowing sculpture by night (5, 6); the wall's slope reflects the angle of a towering sycamore.



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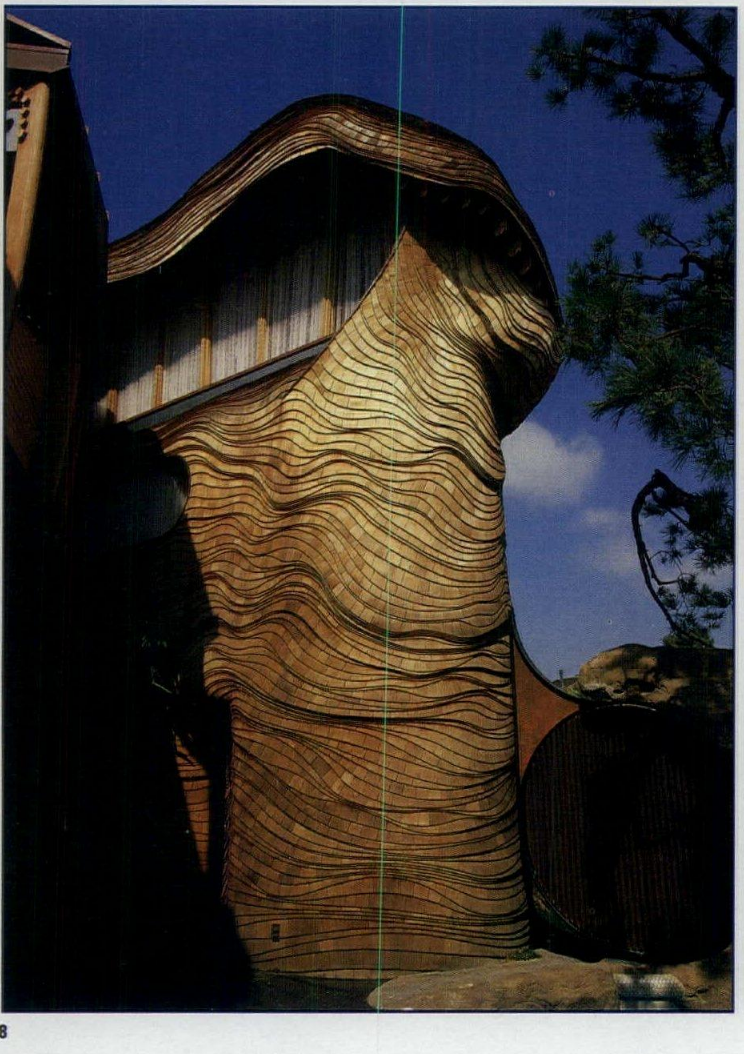

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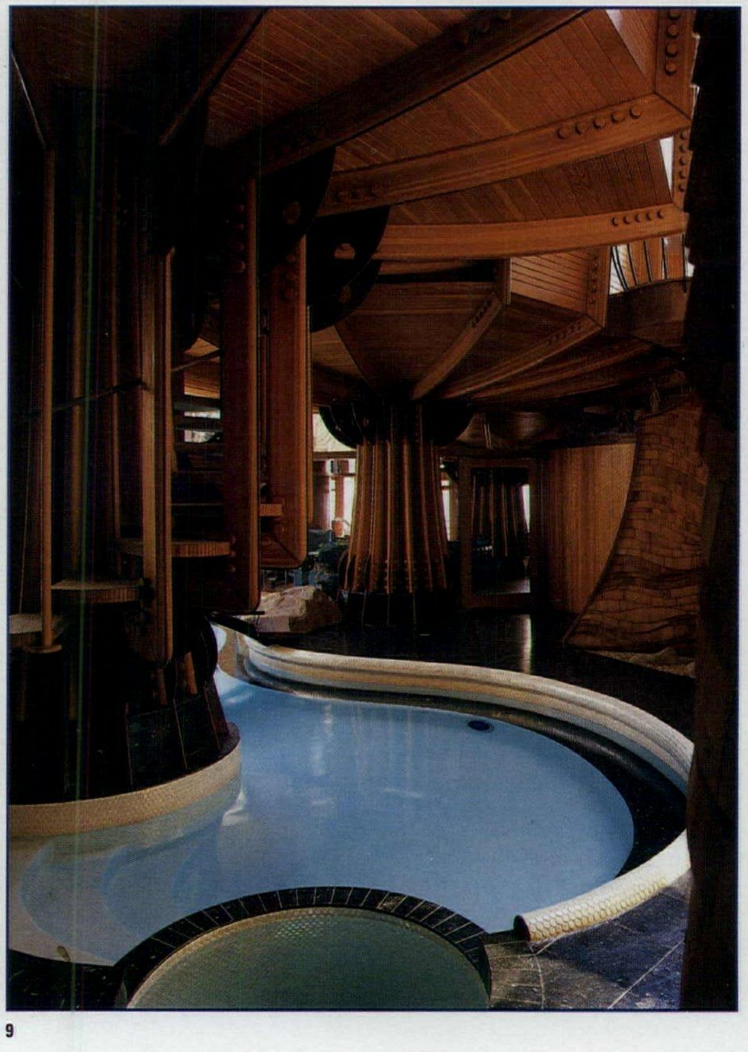

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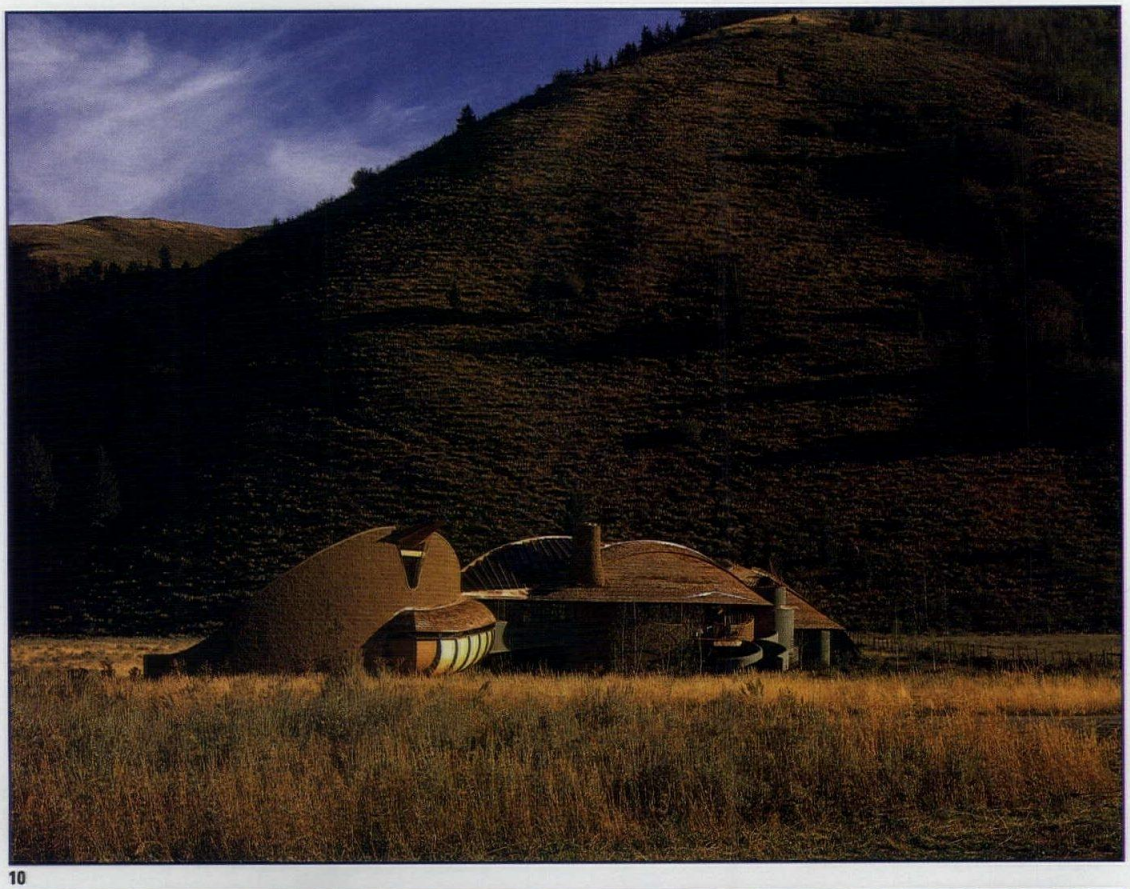
Photos: Alan Weintraub



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11

Photos: Alan Weintraub

In Bart Prince's house and studio (1983–1984) in Albuquerque, New Mexico (7), the architect's exuberance is matched by his finesse with a broad palette of materials. Multicolored cylinders clad in ceramic tile support the tube-shaped living quarters. With spikes of rebar, mesh awnings, and wooden rollshades, they seem to bristle in their neighborhood of utterly conventional houses.

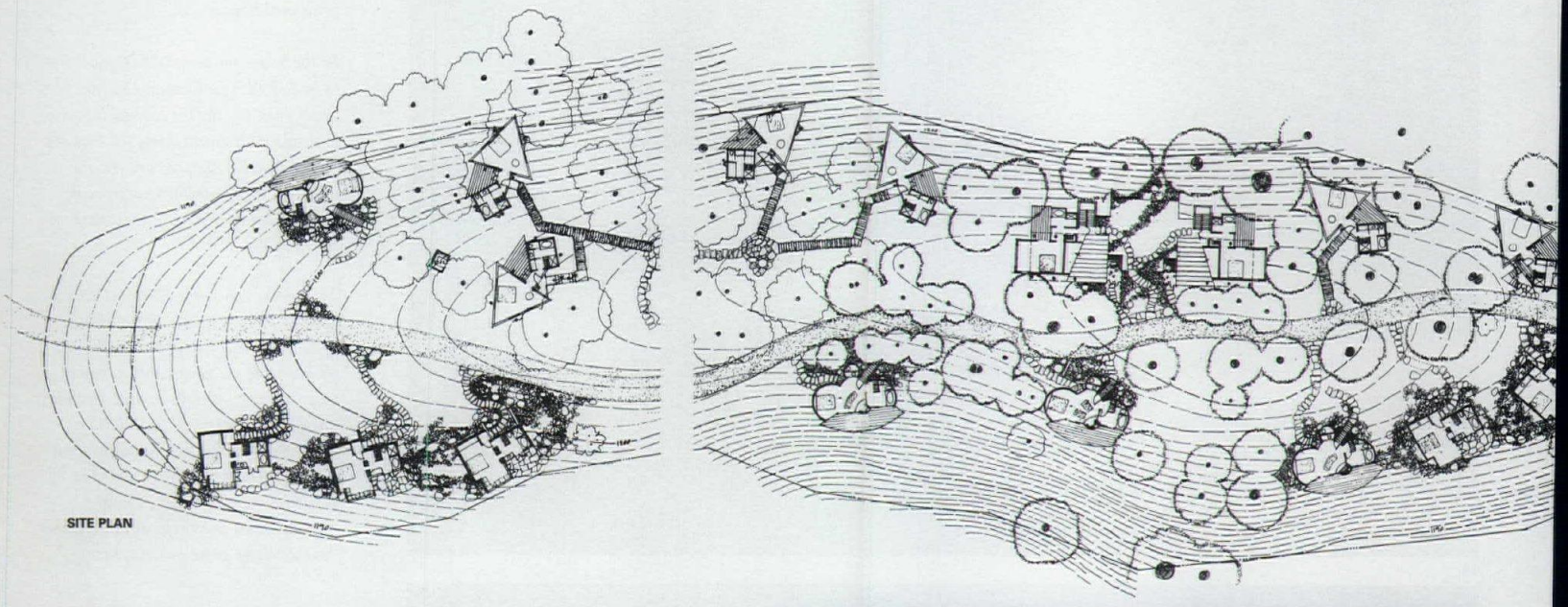
In the house for Joe and Etsuko Price (1984–1989) in Corona Del Mar, California (8, 9), the clients' largesse matched their enthusiasm for Prince's comprehensive architecture. Inside and out, it is a writhing organism, with an air of luxury that borders on the indulgent.

In a recent house for Henry Whiting (1988–1990) in Sun Valley, Idaho (10, 11), the conspicuous display of earlier years no longer seems important; glazing, structure, and materials have become more controlled. The biomorphic enclosure speaks for itself without ornament. When asked if reductiveness is a trend, Prince responds that he is exploring it further "without any great philosophizing."

Above Big Sur

In this lodge at Big Sur, California, Mickey Muennig

reveals the environmental consciousness behind organic architecture.

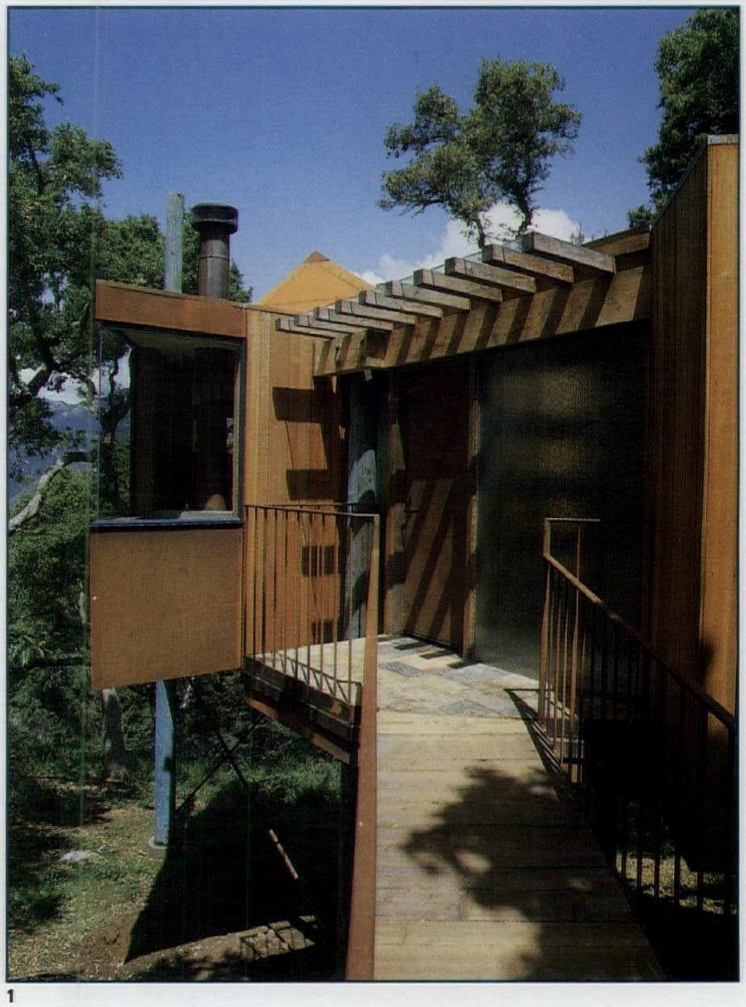


SITE PLAN

Mickey Muennig's 30-unit Post Ranch Inn is a scattering of 21 cottages and small buildings along an ocean-front slope in Big Sur, California. The program called for a reception lodge, a free-standing restaurant, and guest buildings containing one to six units each. The seeming casualness of the site plan reflects the extraordinary constraints placed upon architecture in this protected stretch of coastline 140 miles south of San Francisco; buildings must not disrupt trees or alter the silhouette of the landscape, and they must be concealed as much as possible. These constraints require an architect who can respect the landscape while making memorable forms.

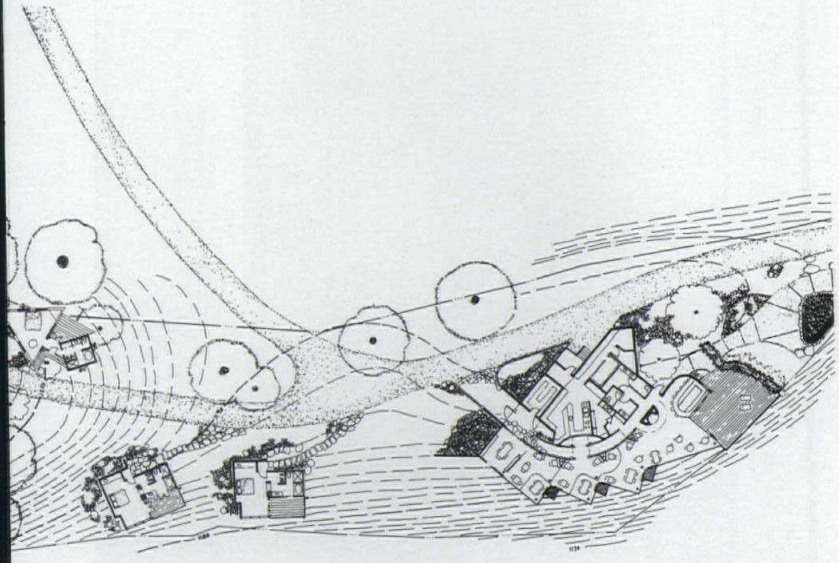
Such demands are second nature to Muennig, who has lived and worked in Big Sur for more than 20 years. The Post Ranch Inn, in fact, is one of those happy occasions when the special abilities of an architect fit the particular challenges of a project. Muennig's mature style has been formed by Big Sur. He has had to grapple not only with tough zoning and political issues, but with difficult terrain: most construction sites slope, and often only 30 percent or less is buildable. This constraint has led Muennig, a student and follower of Bruce Goff, to prune back the sprawling Goffian vocabulary into one or two simple geometries, both in plan and section; his own house in Big Sur could be described as a glass-and-timber cone set upon a stone drum.

Muennig's elevations sometimes appear contrived on paper, where the overt geometries can look willfully simple. Yet his simple shapes are convincing as built forms that hold their own in a natural landscape, without seeming aggressive or self-aggrandizing. At the Post Ranch Inn, the "tree-house" guest units are triangular in plan and have pyramidal skylights; Muennig says their triangular shapes make it

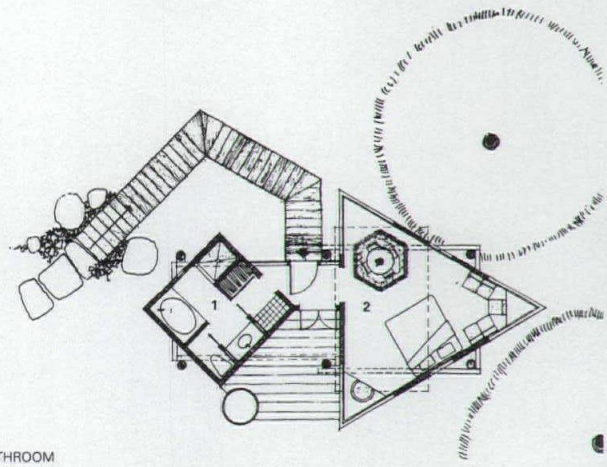


1

The Post Ranch Inn consists of a scattering of 21 buildings along a wooded ridge (site plan above). The "tree-house" guest units (2) are raised on poles to minimize their impact on the surrounding forest; their triangular shape also eases their placement among the trees. Elevated stairs and ramps lead to glass entrance vestibules separating the bathrooms from the bedrooms (1).



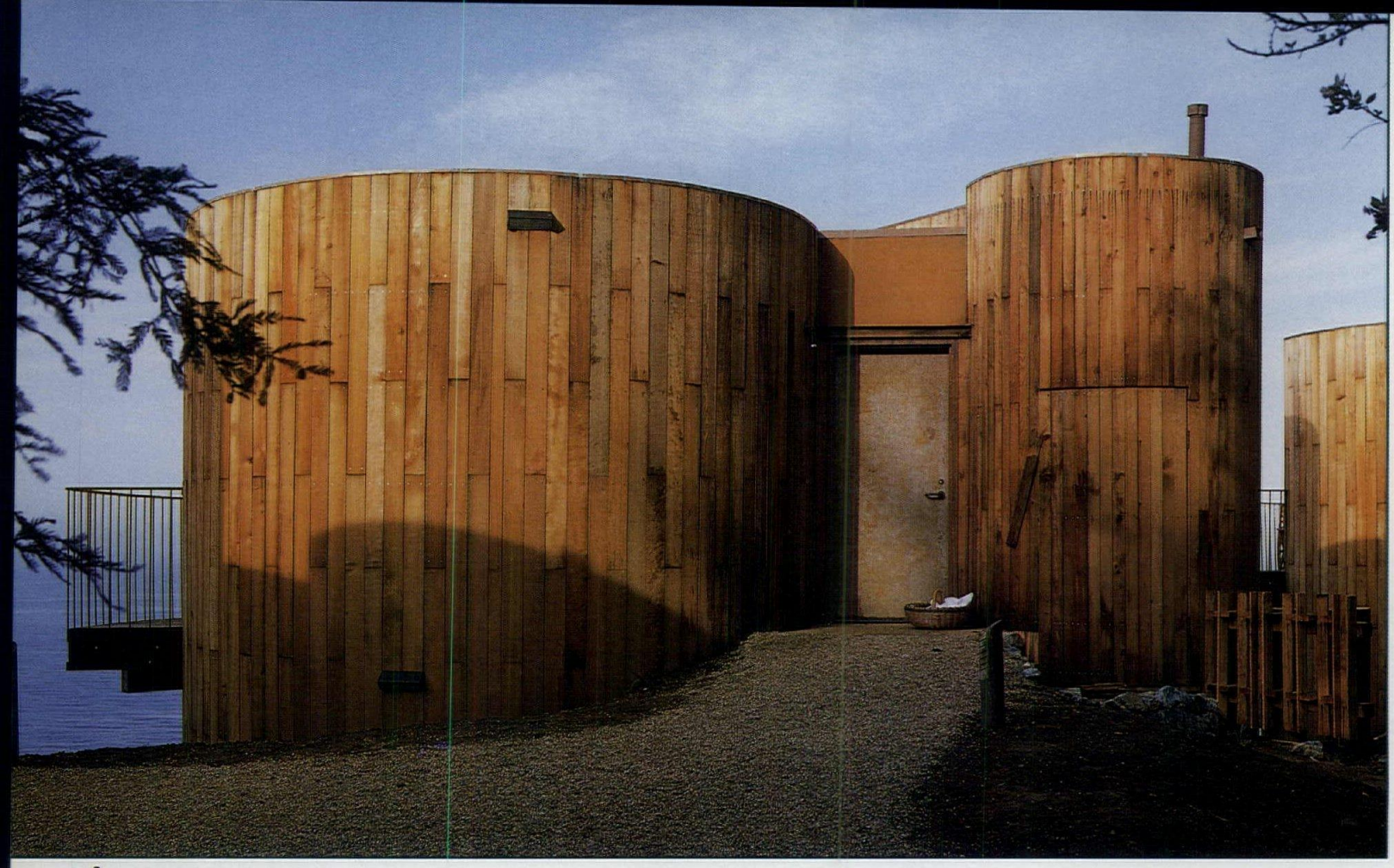
N 40'/12m



1 BATHROOM
2 BEDROOM

TREE-HOUSE GUEST UNIT

10'/3m



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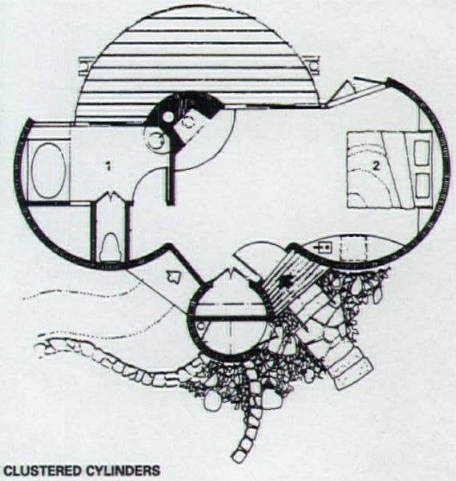
easier to insert the buildings among existing trees. The six-unit buildings, which Muennig calls the "butterfly" buildings, resemble giant melon slices propped upright.

Architectural decisions that may seem eccentric at first glance follow the logic and form of the landscape. The fan-like shape of the upper lodge, which contains a small restaurant, closely follows the contour of the coastal bluff. The floor of the restaurant steps down twice, to conform to the topography, and Muennig responds by stepping up the ceiling height wherever the floor descends. Like the treehouse units, the restaurant stands on "stilts": the passage of air under the building helps it withstand the strong, unpredictable ocean winds.

Materials are both sumptuous and rough hewn, as befits a luxury resort where closeness to nature is a selling point. The sinks are handthrown ceramic bowls; many of the units are wood-lined, with furniture designed by Muennig. Indian slate, which has wide variations in color, is used in both the restaurant floor and as tiling for spas in guest rooms. Corten steel is found throughout the project, from restaurant seating to light sconces in guest rooms. (The developer created on-site metal-working and wood-working shops.) Bathroom counters are of flame-finished granite. And standard, factory-made steel doors, which Muennig specified to be purchased in an unfinished state, were allowed to rust and then covered with a wax-based finish – an ingenious touch.

Structural ingenuity is key to organic architecture, and the Post Ranch Inn has several examples. At the reception lodge, two curved roof forms appear to lean against each other; in fact, each is an independent frame structure. In the berm-covered units, Muennig devised an arch-shaped ceiling strong enough to deflect the 200 psf load

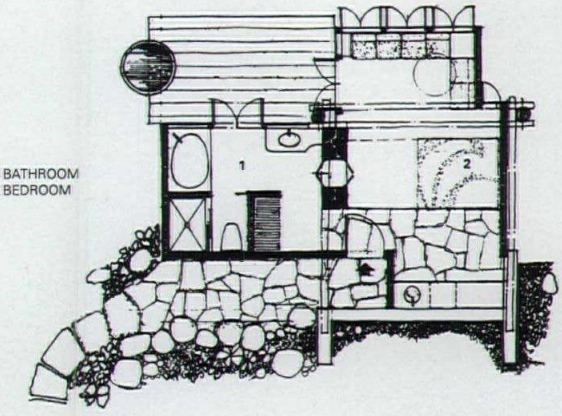
Some guest units are housed within clustered wood-clad cylinders (3), while others occupy the space beneath earth-covered arched roofs (4). Typical features include fireplaces, exposed wood surfaces, built-in furniture, and glass doors leading to private terraces or balconies (5, 6).



1 BATHROOM
2 BEDROOM

GUEST UNIT OF CLUSTERED CYLINDERS

10'/3m

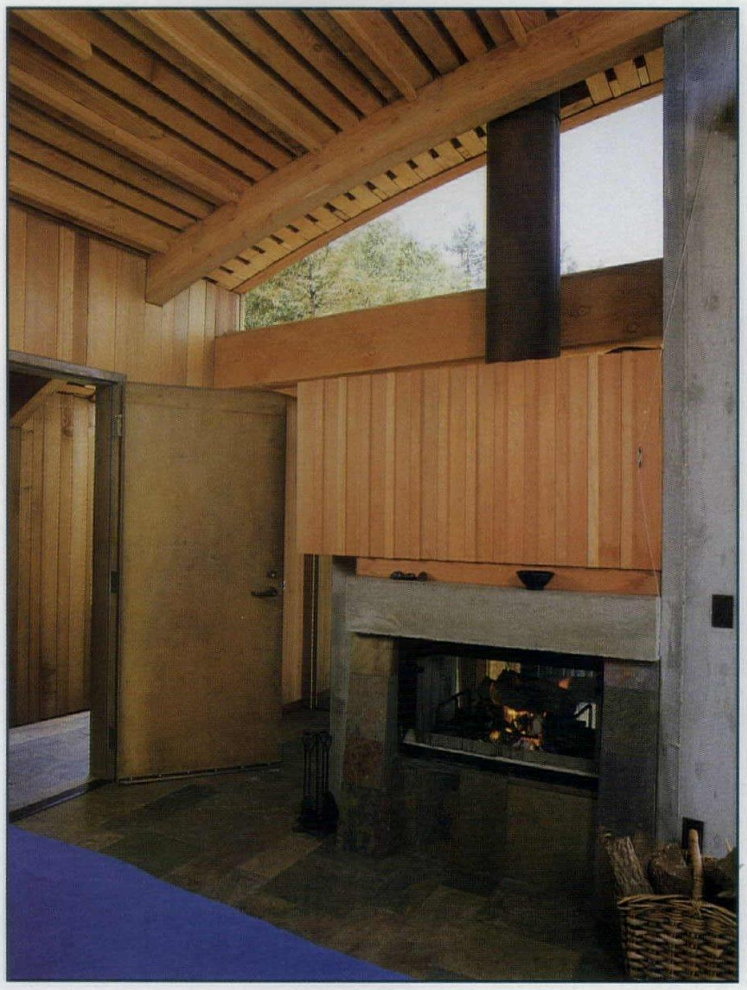


1 BATHROOM
2 BEDROOM

EARTH-COVERED GUEST UNIT

10'/3m

4



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The fan-shaped upper lodge (7), which contains a small restaurant (8), employs the same forms and materials used elsewhere at the inn, including a pole structure, large areas of glass, wood-and-steel cladding, and angular shapes. Like so many of the guest units, the lodge focuses on the view; its floor steps down the slope as its roof steps up. Mickey Muennig's own house at Big Sur (9, 10) shows his liking for natural materials and simple geometrical forms. In this case, he has placed a glass-and-wood cone, containing a sleeping loft, on top of a stone-and-concrete drum enclosing the living and eating spaces.

7

Project: *Post Ranch Inn, Big Sur, California.*
Architect: *Mickey Muennig, Architect, Big Sur.*
Client: *Michael Freed, Myles Williams.*
Site: *98 acres between Highway 1 and the Pacific Ocean with a 1000-foot-long ridge covered with redwood, oak, madrone, and bay trees.*
Program: *30-room 19,000-sq-ft resort containing a lodge, restaurant, library, and spa, with remote parking.*
Structural system: *concrete footings, pole construction, concrete and all-weather-wood retaining walls.*
Major materials: *exposed concrete, redwood boards, weathering steel cladding, slate floors, wood deck (see Building Materials, p. 158).*
Mechanical system: *passive solar with electric heat pumps in rooms, gas-fired heating and air conditioning in lodge.*
Consultants: *Bruce Neeb, landscape; Janet Freed, interiors; David Messmer & Associates/ Carter Engineering, structural; Lee & Associates, mechanical; Haro, Kasunich, foundations.*
Contractor: *Bill McLeod Construction.*
Photos: *Alan Weintraub.*

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required by code; the ceiling is a sandwich of 4x4s alternating with 2x6s. The result is structurally sound and aesthetically appropriate for a wood-lined cabin. "It's a fairly economical way of doing a roof," Muennig adds.

As a student of Goff, Muennig is a spiritual descendant of Frank Lloyd Wright and his philosophy of designing with nature, although you could argue that Muennig is a good deal more cooperative with nature than Wright, who rarely allowed nature to have the last word. The Wright/Goff patrimony survives in Muennig's crystalline geometries, his painterly use of materials, even in the Wrightian flavor of the lettering on his drawings.

Like many of the Friends of Kebyar, Muennig studied with Goff at the University of Oklahoma and later worked in his office. Unlike his exemplars, however, Muennig is light on ideology. Asked about his "philosophy of design" at a recent talk at UC-Berkeley, Muennig acknowledged that he "didn't know what to say. I forgot to develop a doctrine." He added that he likes "to empty myself before starting a project, and work without preconceived ideas," and that he is most comfortable working in natural surroundings with a client who suggests some antecedents – such as a Greek hillside village or a Tuscan house – as points of departure.

Beyond structure or materials, it is the landscape that seems most to attract Muennig. More than 20 years after taking up residence in Big Sur, he says he still must "cover the windows to get any work done." Standing on the main road at the Post Ranch Inn, he points downslope to some sod-covered roofs, overgrown with wild grass and wildflowers. "You almost don't see the architecture," he says with approval. **Morris Newman** ■

The author is P/A's correspondent in Los Angeles and Senior Editor of California Planning and Development Report.

Neighborhoods by Design

In planning commissions for a variety of residential areas, Urban Design Associates is establishing or reestablishing a sense of traditional community.

Tom Bernard

1

Randolph Neighborhood, Richmond, Virginia

When a decaying urban neighborhood covering 76 acres in Richmond, Virginia, was cleared beginning in the late 1960s, the expectation among its relocated residents was that their home, known as Randolph, would be quickly rebuilt for their return to a better life.

It didn't happen that way. Instead, Randolph suffered the typical sins of urban renewal – evident here, as in so many cities, by the sight of empty blocks grown tall with weeds from years of apparent inaction. But city-building takes time. Now, more than 20 years after the bulldozers rolled through, the urban design for Randolph that won a citation in the 1983 P/A Awards program is complete enough, with 300 of a projected 600 housing units occupied, to declare its first signs of success.

The designers – UDA Architects, of Pittsburgh, whose résumé includes a history of planning and urban design with open citizen participation – came to the project in 1979 after an earlier master plan for the site was ruled invalid by HUD. Active in the redevelopment effort was a community of "absentee citizens," as they called themselves, who formed a planning committee that pressed city agencies for action. While the Richmond Redevelopment and Housing Authority was poised to pepper the site with clusters of public housing organized around central courtyards and surrounded by parking lots, the community pushed to rebuild Randolph in a way that reflected past traditions and anticipated a new generation of upwardly mobile residents. For the most part, the community prevailed, yielding the sort of results that are more common these days in theory than in practice: a new residential development that achieves a mix of income groups and housing types.

"Our basic battle cry was 'build neighborhoods with streets and front yards and back yards and porches,'" says UDA principal Raymond L. Gindroz. "The idea was to blur the distinction between the subsidized and market-rate houses by developing the streets and sidewalks."

As a starting point, UDA studied the stable, early 20th-Century neighborhoods bordering Randolph for cues that could be duplicated or modified to give the new streetscape a native character and charm. UDA's analysis generated a master plan based on Richmond's traditional model of short

2

residential blocks, and incorporated elements such as on-street parking, street trees, rear service alleys, formal parks and landmarks, and a pattern book of building façades.

The plan called for new public open spaces at key locations. The largest of these, Idlewood Park, provides recreational facilities such as a swimming pool and tennis courts and serves as a buffer between Randolph and the busy expressway that defines the northern edge of the neighborhood. Two smaller parks designed for the area deftly accommodate shifts in the city's street grid. On the premise that parks can be places of danger as well as pleasure, one of the small parks has been blocked politically. But the other, which has all the makings of a quiet urban refuge, provides a welcome place for informal conversation and establishes a new landmark that anchors one end of the development. Gazebos in each of the completed parks are placed on axis with approaching streets, extending the reach of Randolph as far as the eye can see.

The foundation of the neighborhood's urban design is a pattern of houses fronting on the street, with porches and small yards. Within these restrictions, the plan allows for several house types, including single-family detached houses, attached two-family houses and duplexes, and townhouse-style units. Setbacks are strictly enforced to control the proportions and the continuity of the street wall. And regular rows of trees have been planted along the sidewalks, although many years will pass before these streets can be called shady.

UDA's design analysis also revealed that the richness and variety of nearby streets is due primarily to variations in materials, surface texture, and landscaping. In plan and form, the nearby houses are largely repetitive. Following this tradition, UDA designed a pattern book of house types for Randolph that can be altered by substituting new façades, porches, gables, and dormers. While builders and buyers are free to choose among the inventory of options (with certain restrictions on how close identical buildings can be built), the similarities in window proportions, materials, roof slope, and general height provide the consistency needed to hold the pieces together.

Even at that, the first efforts were not totally successful. Room for interpretation within the general guidelines resulted in houses completed with

Builders in the Randolph Neighborhood have developed house façades (1) based on a pattern book drawn up by UDA; layouts behind these fronts are not prescribed. The neighborhood plan stresses front porches and front yards bordering traditional streets (2), with service access through back alleys; UDA and the city's housing and redevelopment authority failed to get approval for proposed planting strips along the curbs and traditional street lighting, smaller scaled and more closely spaced than the types actually installed.

RANDOLPH NEIGHBORHOOD SITE PLAN

1 MARKET-RATE FOR-SALE HOUSES
2 SECTION 8 SUBSIDIZED HOUSING
3 PUBLIC HOUSING
4 RESTORED HISTORIC HOUSES
5 IDLEWOOD PARK
6 RANDOLPH PARKLET
7 ALLEN PARKLET

3

An aerial view looking west (3) shows most of the neighborhood, with a depressed expressway separating it from downtown and the historic Fan district. Randolph Park (foreground) is one of two "parklets" inserted at shifts in the street pattern. UDA's architectural designs (4, drawing from P/A January 1983 awards issue) were followed in the conversion of abandoned "cold-water flats" remaining on the site (5) into townhouses for sale (6).

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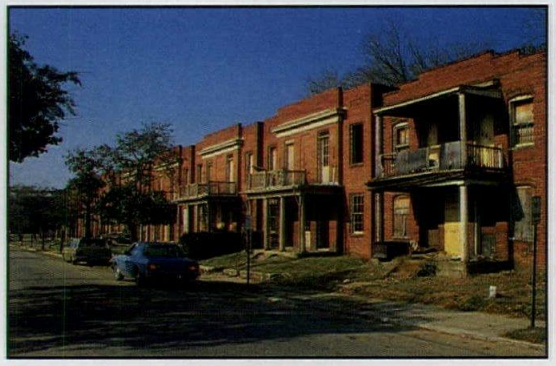

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second-rate trim, poorly executed porches, and dark window frames that "disappear" from the façades. UDA quickly redefined its scope of services to include complete construction documents of the building façades, leaving only the floor plans to the whims of the contractors.

Sales momentum was slow to build in Randolph, because the area carried the stigma of its past. Initial efforts to sell lots and houses (none built on speculation) relied heavily on low-interest mortgages from the state housing development authority. But now that a critical mass of new houses has accumulated, half of the houses are being sold at market rate with conventional financing – often to young black professionals.

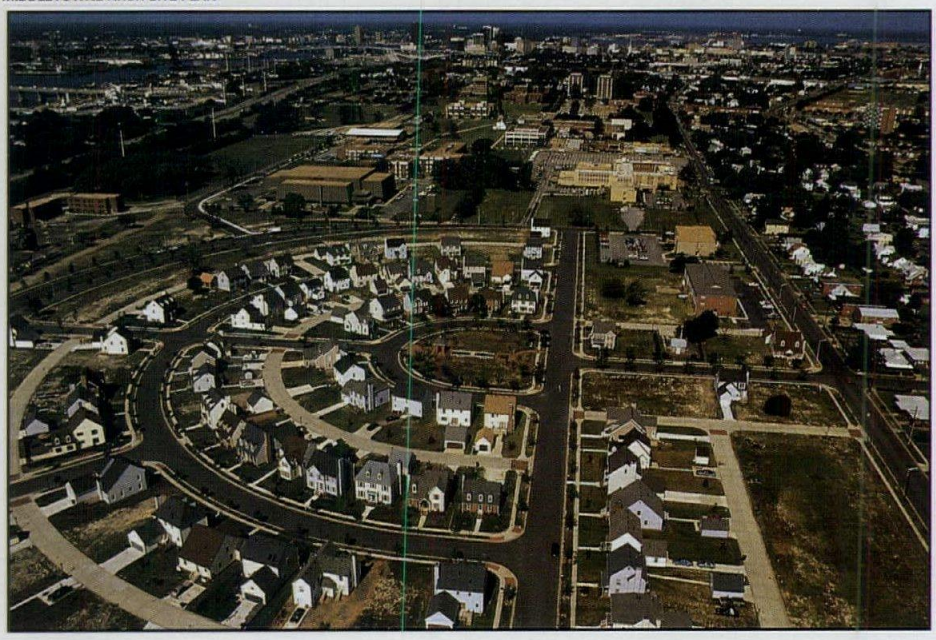
Today the overriding impression of Randolph is one of stability, with a steady rhythm of porches along its residential streets; the required number of subsidized units were built unobtrusively on the fringes of the site. But, in some cases, single-family houses sold at market rate share a back alley with subsidized housing units. "It's kind of a breakthrough," says Gindroz, who is optimistic about the prospects of Randolph but suffers no Pollyanna complex.

"You are not going to solve either affordable housing or the rebuilding and stabilizing of communities with this kind of focused effort," he notes. "Therefore, when you do have the money and resources, you need to build in such a way that the new life you are putting in can flow into areas around it as directly as possible, and to get the individual investment of homeowners to respond." In Randolph, the foundation of strong community values – and the contribution of urban designers who are able to listen – has helped to make that happen. **Vernon Mays** ■

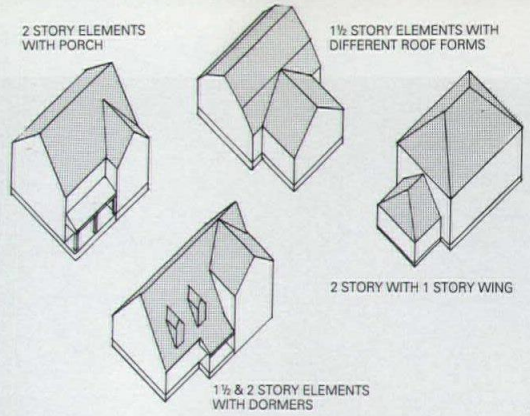
The author, a former senior editor at P/A, is editor of Inform, *the architecture and design magazine of the Virginia Society AIA.*

Project: *Randolph Neighborhood, Richmond, Virginia.*
Architects and Planners: *UDA Architects, Pittsburgh (Raymond L. Gindroz, David Lewis, James Morgan), master planners for neighborhood, site planners for public housing and Section 8 projects, architects for renovation of historic buildings, for housefronts of pattern book houses, and for two parks.*
Client: *Richmond Redevelopment and Housing Authority (Robert Everton, Director of Planning and Community Development; T.K. Somonath, former Deputy Director for Development; Michael Zitzow, current Deputy Director for Development).*
Site: *76 acres, near downtown core .*
Program: *100 public housing units, 200 Secion 8 subsidized rental units, 20 subsidized rehab units for sale, and 300 affordable units for sale – prices $60,000–$75,000.*
Consultant: *Stuart Patz of Hammer Siler George, economics.*
Photos: *Tom Bernard.*

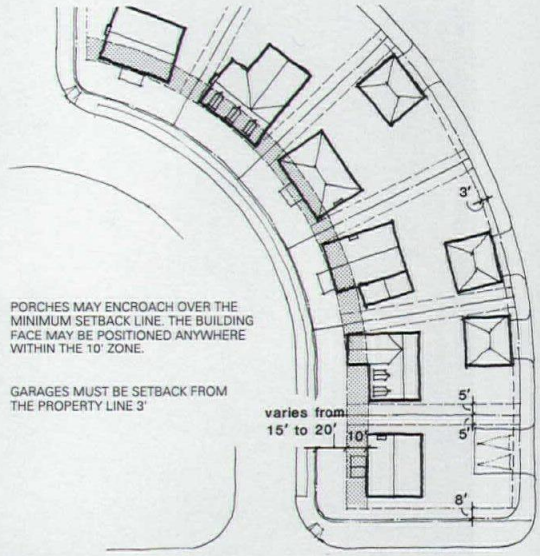
MIDDLETOWNE ARCH SITE PLAN



7
The circular geometries of Middletowne Arch's plan (above), based on historic precedent in Norfolk, helped convince builders and housebuyers who recalled the area as the site of dilapidated "temporary" public housing. An aerial photo looking west (7) shows completed houses around a central parklet. The variety of house forms on a completed street (8) is given coherence by strict guidelines on such details as window proportions and fascias.



TYPICAL HOUSE FORM COMBINATIONS



SETBACK GUIDELINES

1 PHASE 1 HOUSES
2 HAYNES TRACT NEIGHBORHOOD
3 NORFOLK STATE UNIVERSITY
4 BALLANTINE BOULEVARD
5 LAKE LIBERTY

N ↑ 400'/120m

Middletowne Arch, Norfolk, Virginia

An unusual, almost conflicting, set of circumstances faced UDA Architects in their design for Middletowne Arch, a new urban development backed by the housing and redevelopment authority in Norfolk, Virginia. The 110-acre site, within yards of an interstate highway and adjacent to Norfolk State University with industry nearby, had contained a low-income project. Yet the market – middle-class black and white home-buyers – was conservative.

And the solution was inspired. Vowing to give the homebuyers the suburban classicism they wanted, yet determined to do the "builder colonial" better than most builders, UDA developed a series of design guidelines based literally on precedents set in the historic district at nearby Williamsburg. The results are remarkably consistent, well-proportioned, and detailed for what are essentially "production" houses built by a variety of independent contractors.

Detailed standards for the houses include building massing with minimum 8-on-12 roof pitches, high eave details, and rules for composing one- and

8

two-story building volumes. Materials and colors are selected from a specified palette; exterior trim details are selected from a menu of standard elements. Each house sits on a brick base a minimum height above grade. And while brick is offered as an optional material for the façades, aluminum, vinyl, or wood siding is acceptable, as long as it conforms to correct lap and trim specifications. Perhaps the strongest emphasis is placed on window proportions, which require that second-story windows be smaller than first-floor ones.

Remarkably, says UDA principal Ray Gindroz, the developers have embraced the guidelines as a marketing tool and a source of confidence that they can build a quality house and know their competitors will too. Sale prices are a bit higher than anticipated – $95,000 to $130,000, which is moderate for Norfolk – and construction is a year ahead of the projected pace.

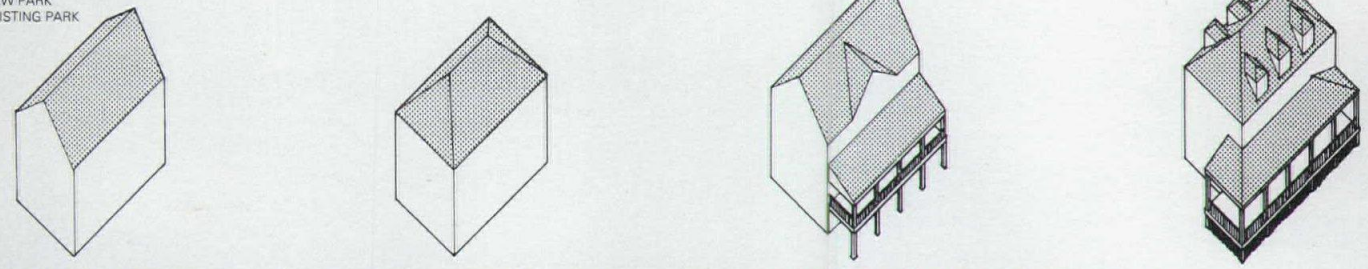
In its master plan for the site, UDA adopted a street pattern identified locally with Norfolk's most prestigious neighborhood – historic Ghent, where fashionable residences line semicircular streets laid out two centuries ago. The new houses follow the curves of the street, which contribute to the visual interest of the area even though the district, with landscaping typified by young trees and dwarfish shrubs, has the unavoidable feel of a subdivision-in-progress. Ultimately, the plan calls for some 280 houses placed within lots and along setback lines that also follow Norfolk traditions. Garages or concrete parking pads are placed behind each house and are reached by an alley, eliminating the need for curb cuts in front and making for sidewalks that belong to the pedestrian and the tricyclist.

Consistent with their work in Randolph (see previous pages), UDA wove the street pattern of the adjacent residential neighborhood into the new development and created a visual connection between the two with a small park and gazebo at the center of the arch. By including a second-phase development, now beginning on the eastern portion of the site beside a man-made lake and new park, Middletowne Arch becomes the largest single-family community under construction in Norfolk – strong testament to the confidence of the Norfolk Redevelopment and Housing Authority in risking innovation. **Vernon Mays** ■

Project: *Middletowne Arch, Norfolk, Virginia.*
Urban Designers: *UDA Architects, Pittsburgh (Raymond L. Gindroz, principal-in-charge; David Lewis, Donald K. Carter, James P. Goldman, principals; Rob Robinson, Paul Ostergaard, Yong Lee), urban designers for master plan, site plan, and design guidelines.*
Client: *Norfolk Redevelopment and Housing Authority.*
Site: *110-acre former public housing site, adjacent to expressway.*
Program: *houses for sale; Phase I, 188 sites, 80 houses built, 13 sold; Phase II, projected 116 sites, lake construction started; price range $90,000–$140,000.*
Consultant: *Stuart Patz of Ramco/Patz, economics.*
Photos: *Tom Bernard.*

PINEWELL-BY-THE-BAY SITE PLAN

1 OCEAN VIEW AVENUE
2 EXISTING PINEWELL NEIGHBORHOOD
3 RESTORED DUNES
4 BEACH ACCESS WAYS
5 NEW PARK
6 EXISTING PARK



HOUSE TYPE GUIDELINES: SIMPLE MAIN VOLUME, GABLED OR HIPPED ROOFED, WITH PORCH SEPARATELY ARTICULATED AND WIDE DORMERS OR NARROW DORMERS, HIPPED OR GABLED.

Pinewell-by-the-Bay, Norfolk, Virginia.

Part of a master plan for a 7.5-mile stretch of Chesapeake bayfront, this project is meant to expand the middle-income stability of an adjoining neighborhood onto an 11-acre waterfront site once occupied by an amusement park. The plan extends existing streets into the site and offers public access to the beach at three points. The project will have 67 detached houses and 6 townhouses, with a price range of $140,000–$500,000. Design guidelines for these buildings are based on study of coastal towns from New Jersey to South Carolina and on discussions with local residents and agencies. Tall and narrow for least obstruction of neighbors' views, the houses have main living levels elevated over garage-service bases to assure views beyond a band of rebuilt dunes and to minimize damage from coastal flooding. Tiers of porches, reached through wide openings, will yield maximum views and

(continued on next page)

UDA Projects and Principles

Certain themes developed in the Randolph neighborhood in Richmond are reflected in subsequent urban planning projects by UDA. First among them is the need to build a neighborhood, rather than the series of self-contained projects proposed earlier for the Richmond tract; this involves reallocating the acreage that would have gone to shared parking lots and green spaces to individual front and rear yards and to streets that form small city blocks – with a few well-defined public parks.

The process of returning to this traditional urban pattern from the development standards of earlier decades is, of course, far from simple. In Richmond, it was only after studies showed that the projects previously proposed could not be marketed that UDA was commissioned, in 1980.

Norfolk's exceptionally enlightened redevelopment and housing authority – which has been making good use of its combined mandate – was ready by the time UDA was commissioned in 1986 to accept tradition-based planning. Most of the site had already been a public housing project, with World-War-II-era wood buildings that had deteriorated beyond repair. Middle-class blacks in an adjoining neighborhood pressed for the site's reuse for middle-income houses, rather than for industry.

The process for developing these plans, and others by UDA, involved extensive community dialogue. Community participation in planning had been a foundation of UDA's efforts since the firm was founded in 1969. In both cases, plans and architectural guidelines were based on what potential residents actually wanted, and occupancy of completed units has borne out these preferences.

Some of the projects that have followed Randolph and Middletowne Arch indicate the diversity of situations to which UDA's neighborhood planning principles are being applied. At Pinewell-by-the-Bay on Norfolk's beachfront (this page), an Urban Land Institute study had recommended middle-income development to help retrieve the Chesapeake Bay waterfront for residential uses and stem the spread of honky-tonk amusements (which were causing after-midnight traffic jams); for this site, UDA (in association with Jonathan Barnett) contributed a plan that combined high density with an effective orientation of houses to the water and dis-

tinctive site-specific architectural character.

In the schemes for Crawford Square and Church Square, UDA shows how the firm can deal with the circumstances of Northern industrial cities. (Previous work in the firm's own city of Pittsburgh includes the 215-unit "village" that expands the Shadyside neighborhood onto long-vacant acreage.) Crawford Square in Pittsburgh (page 100) is to be a 500-unit neighborhood, with a wide variety of incomes, that will form a highly visible extension of the sprawling Hill District – immediately adjoining the downtown core – and is intended to contribute to the whole district's revitalization. Church Square (page 101) is planned for a portion of the Euclid Avenue corridor east of downtown Cleveland, where vast vacant tracts alternate with major institutions and churches; a new shopping and office development would be combined with townhouses and apartments in a scheme that is meant to establish an image for a much wider area.

UDA sees its work as part of a larger movement to apply the lessons of traditional urban development to planning today, which includes the efforts by Duany & Plater-Zyberk and others (see "Reordering the Suburbs," P/A, May 1989, pp. 78–91). UDA's projects, however, are not "greenfields" suburban or resort communities, but carry both the social and the bureaucratic burdens of urban neighborhoods that have failed; on the positive side, they can benefit from the input of vocal resident groups, and authentic precedents for their residential architecture are near at hand.

Commenting on the related work of Duany & Plater-Zyberk (see pages 102–107), UDA partner Ray Gindroz observes that they have done a great service to planners by stressing the need to wrest control of codes from the engineers and lawyers. ("The engineers have been putting their standards into codes and the lawyers maintaining it's the only safe thing from a legal standpoint.") Gindroz is concerned that the current recession, which is depressing the market for new suburban and resort developments of the sort Duany & Plater-Zyberk have been planning, may be misread by developers as discrediting such tradition-based planning concepts. It would be sad, indeed, if the traditional principles revived in the 1980s were victims of the general disillusionment with that decade's values. ■

John Morris Dixon

(continued from previous page)

breezes for the living spaces. Setbacks are established to give as many houses as possible at least a glimpse of the bay. With multilevel porches overlooking narrow side yards, the houses recall the building pattern of Charleston, South Carolina, but those completed to date (9) have the simpler details of vernacular beach houses.

Planners: *UDA Architects (Raymond L. Gindroz, principal in charge; David Lewis, Donald K. Carter, principals; Rob Robinson, Paul Ostergaard, Yong Lee) with Jonathan Barnett.*

Client: *Norfolk Redevelopment and Housing Authority, with houses by individual builders following design guidelines.*

DESIGN GUIDELINES: SUGGESTED DESIGNS FOR SPECIAL FAÇADE ELEMENTS

CRAWFORD SQUARE SITE PLAN

1 PROTECTORY PLACE
2 CENTRE AVENUE
3 CRAWFORD STREET
4 ST BENEDICT CHURCH
5 PHASE 1 RENTAL APARTMENTS AND TOWNHOUSES
6 FOR-SALE HOUSES

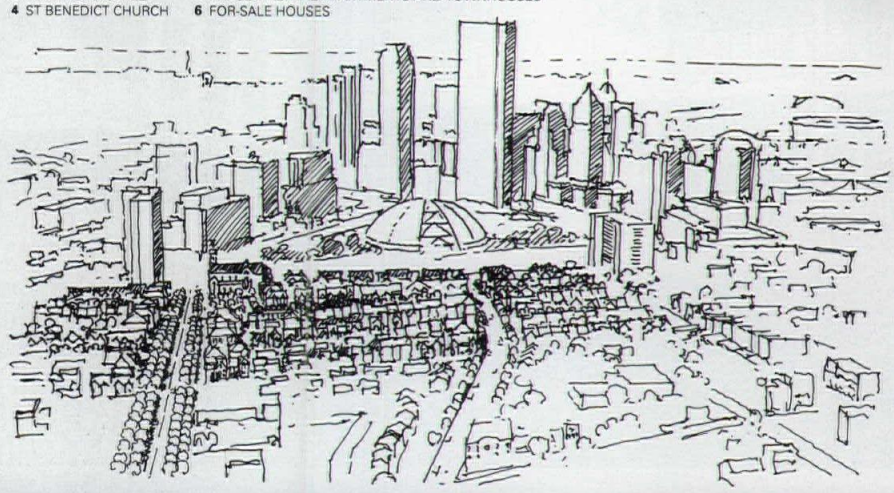
N ↗ 400'/120m

Crawford Square, Pittsburgh.

Located at the edge of downtown in UDA's home city, this 18-acre development would serve to reconnect the vast Hill District, of which it is part, to the downtown core (10). Since expressways and parking lots around the circular Civic Arena block east-west contact, the planners have developed a revised street grid that makes strong connections to the north and south. The new Protectory Place would form a new north-south spine. A choice was made not to redevelop the area with its original mix of rowhouses, tenements, and neighborhood retail, but to give it the all-residential quality of "a good Pittsburgh neighborhood." The planned 350 rental units and 150 houses for sale are intended for an economically mixed population with a wide range of incomes (house prices, $85,000–$140,000, with some assistance to qualified buyers; rents, $350–$900). Whether containing apartments, townhouses, or single-family houses, all buildings would be two-to three-story structures, with front and back yards (11); each street would have its carefully adjusted scale. Design guidelines specify materials and colors, as well as elements such as bay windows, dormers, and fences. UDA is doing architectural design for the 203 first-phase rental units; Tai & Lee are designing the first 40 houses for sale.

Planners/urban designers: *UDA (Raymond L. Gindroz, partner in charge; David Lewis, Donald K. Carter, James P. Goldman, partners; Stephen Casey, Michael Zanolli, Andy Fortna).*

Clients: *Urban Redevelopment Authority of Pittsburgh and McCormack Baron Associates.*



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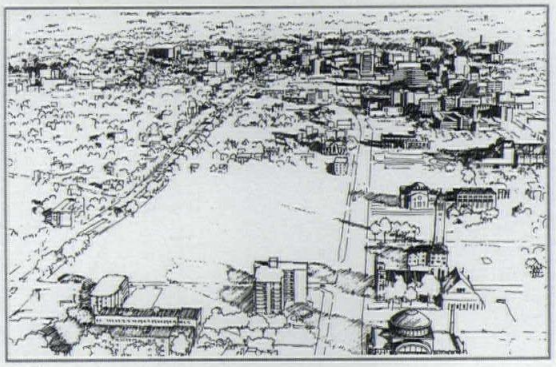
CHURCH SQUARE SITE PLAN

1 EUCLID AVENUE
2 CHESTER AVENUE
3 EAST 79TH STREET
4 EAST 89TH STREET
5 RETAIL CENTER
6 TOWNHOUSES
7 CONDOMINIUMS
8 COMMUNITY BUILDING

N ↑ 400'/120m



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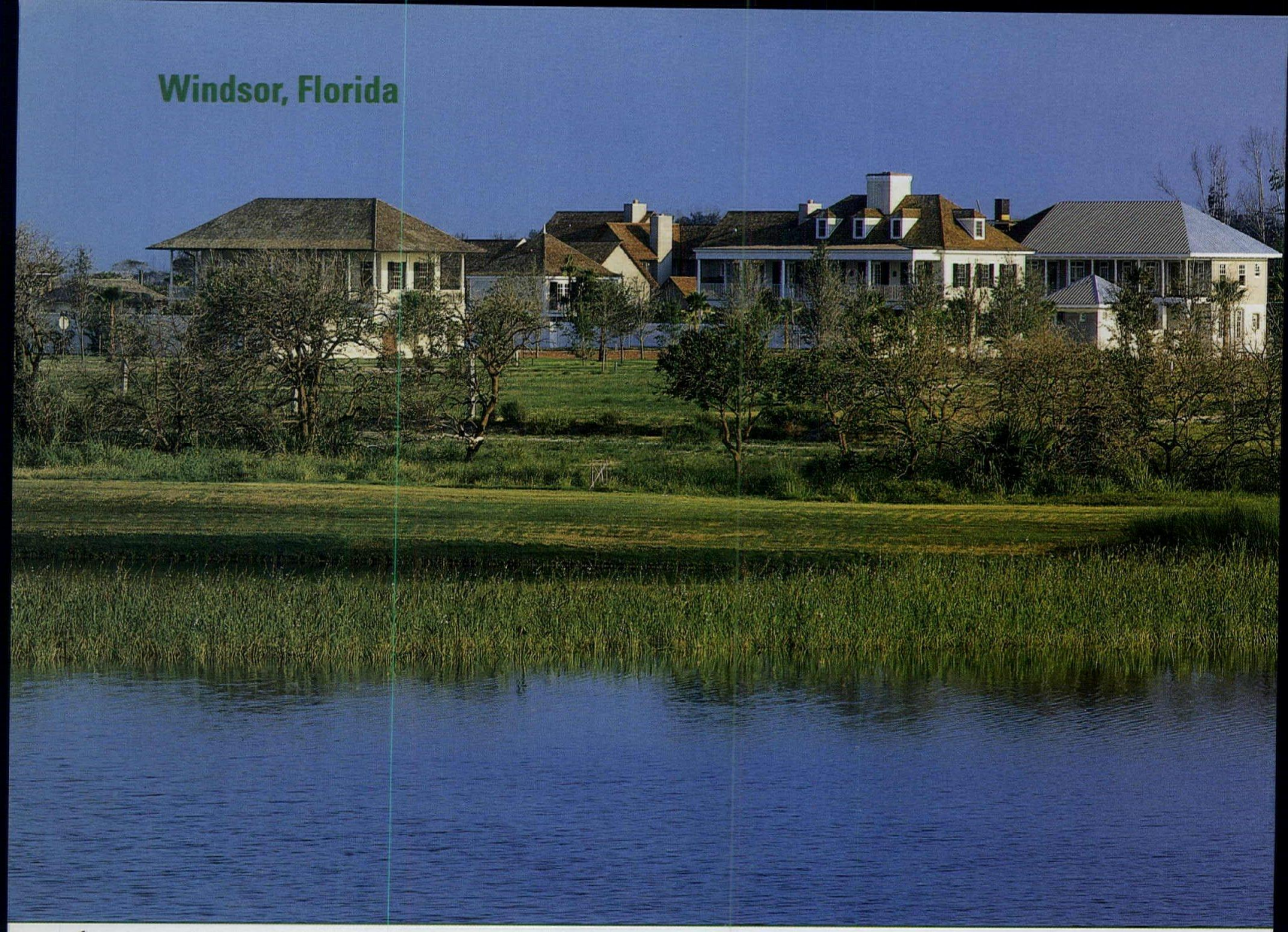
14

Church Square, Cleveland.
A 20-acre mixed-use development at Euclid Avenue and East 79th Street is proposed as the first step in a much larger concept plan for revitalizing an area extending from East 77th to East 89th Street along the Euclid corridor (12, as it is, 13, as proposed), which leads from downtown to the University Circle cultural hub. A 100,000-square-foot retail and office complex would have a strong presence on the avenue, and the blocks to the east would be developed with townhouses on side streets (14), apartments along Euclid Avenue. This major artery would be restored to its "past glory," which has left a legacy of institutional and religious structures; to the north, a sinuous new east-west street would be inserted, as well as a park strip lining Chester Avenue. The initial development would offer 200 units of market-rate townhouses and condominiums. UDA is serving as urban designers for the community development plan and the design guidelines, architectural consultants for the shopping/office center, and architects for the residential structures.
Urban designers: *UDA (Raymond L. Gindroz, principal in charge; David Lewis, Donald L. Carter, James P. Goldman, principals; Barry Long, Paul Ostergaard, Sherry McKibben, Bob Robinson, James Morgan).*
Client: *Noah, Inc., Cleveland.*

Windsor, Florida



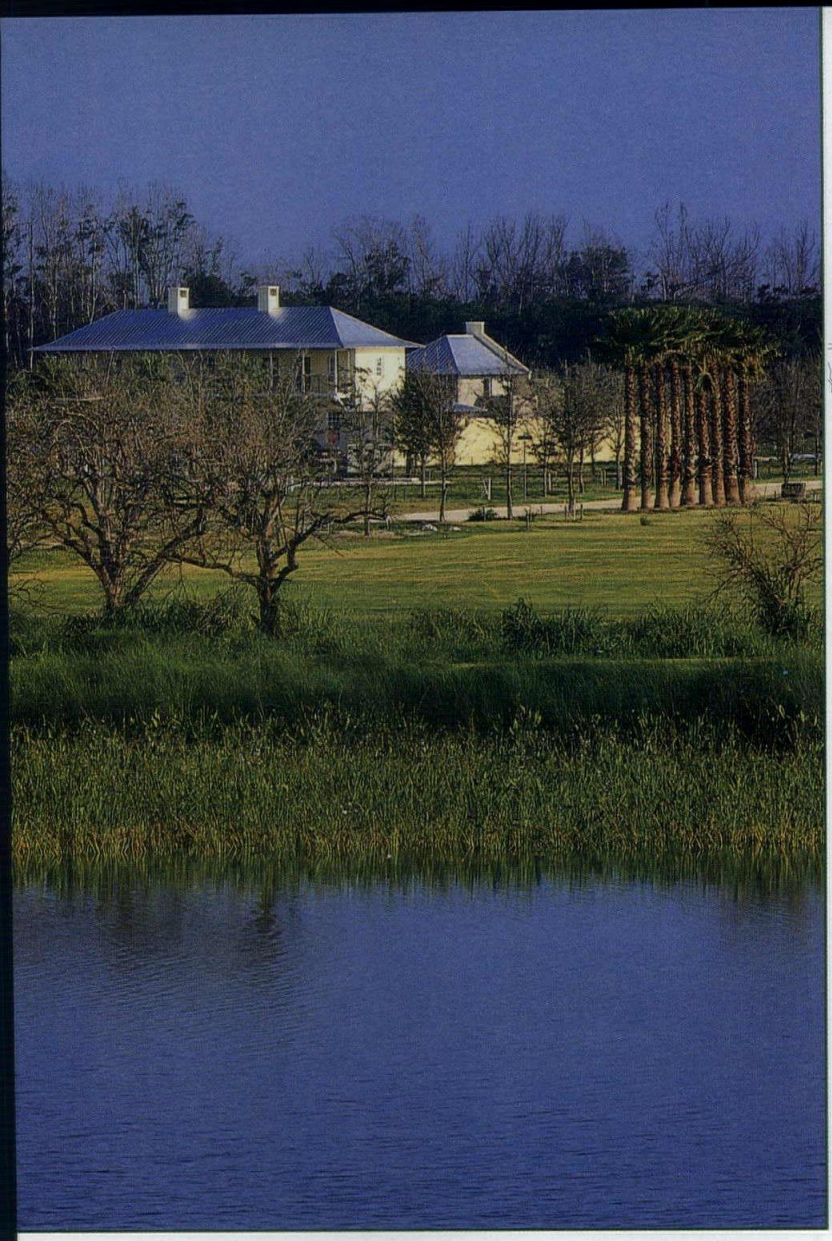
1

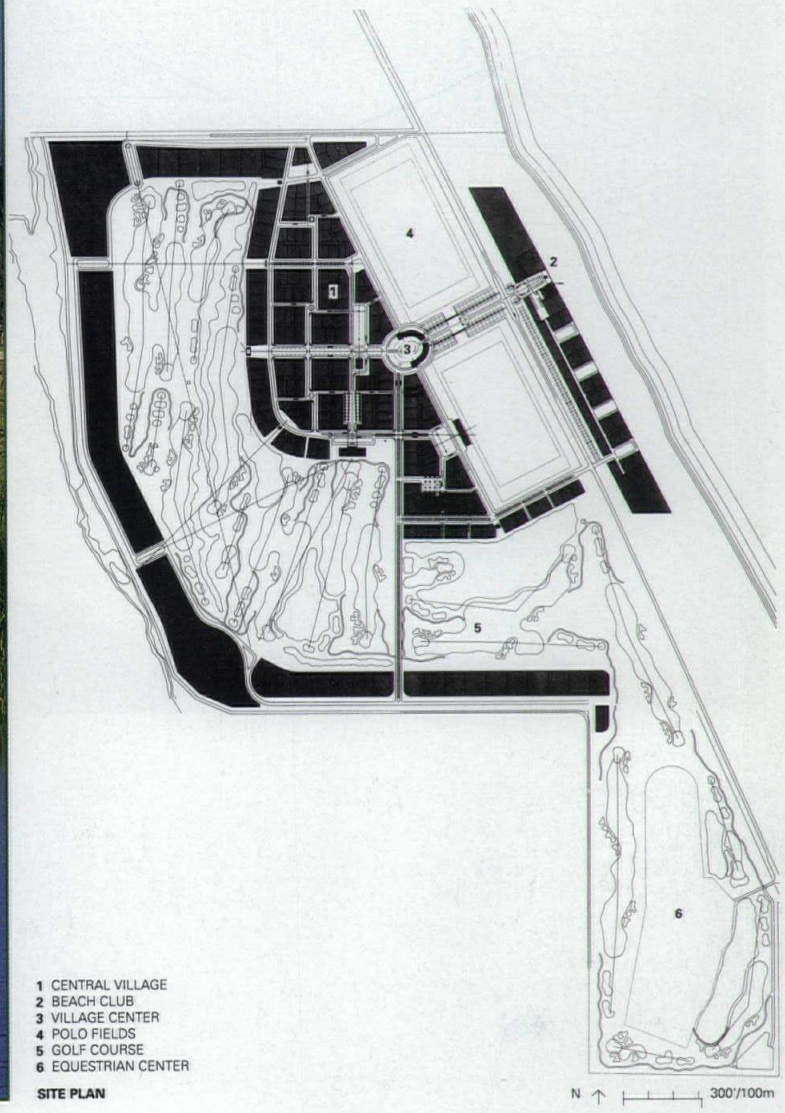
This new town by Duany & Plater-Zyberk challenges common assumptions about property rights and about the artistic license of architects.

You might think, as you approach the white fence and symmetrical guardhouses of Windsor, that it is just another private retirement and vacation community jostling for space along Florida's eastern coast. And in some ways, you would be right. Like other developments in the area, Windsor features a golf course surrounded by expensive houses rendered in a regional style of hipped roofs, wide eaves, and stuccoed walls. But don't be fooled by the superficial likeness. Windsor departs radically, not only from what is around it, but from what many people have come to expect from suburban communities. Behind Windsor's seemingly conservative demeanor is a place imbued with the spirit of social reform.

You see this as soon as you pass the guardhouses. The typical "picturesque" development in this part of Florida has winding streets and widely spaced houses set amidst fairways. In contrast, Windsor, designed by town planners Andres Duany and Elizabeth Plater-Zyberk, has a separate "core" golf course, designed by Robert Trent Jones, Jr., and a compact village of 300 house lots set within a tight grid of streets, with two divided boulevards extending out from an oval "village center." It looks like a miniature version of 18th-Century planned communities such as Washington, D.C., and Annapolis, Maryland – although, like Washington in its early years, lots at Windsor have been developed in a scatter-shot fashion. There is, accordingly, too much space among the houses that have been built so far, denying the sense of compression inherent in the original plan.

Contrary to the monotony of the neighboring suburbs, Windsor





SITE PLAN

offers "a catalog of open space and street relationships," says architect Scott Merrill. The major cross street, for example, enters one open space at its corner, another along its long side, a third along its short side, a fourth through its long axis, and a fifth through its short axis. "This results," observes Merrill, "in a richness of experience," which is true, although that richness is very studied and Classical in nature. If town planners can be roughly divided between those who have a taste for the particularized form and accretive growth of Medieval cities – Camillo Sitte, Christopher Alexander, perhaps Leon Krier – and those who prefer the axial composition and geometrical order of the Baroque city – Werner Hegemann, Elbert Peets, perhaps Colin Rowe – then Duany & Plater-Zyberk must be counted among the latter.

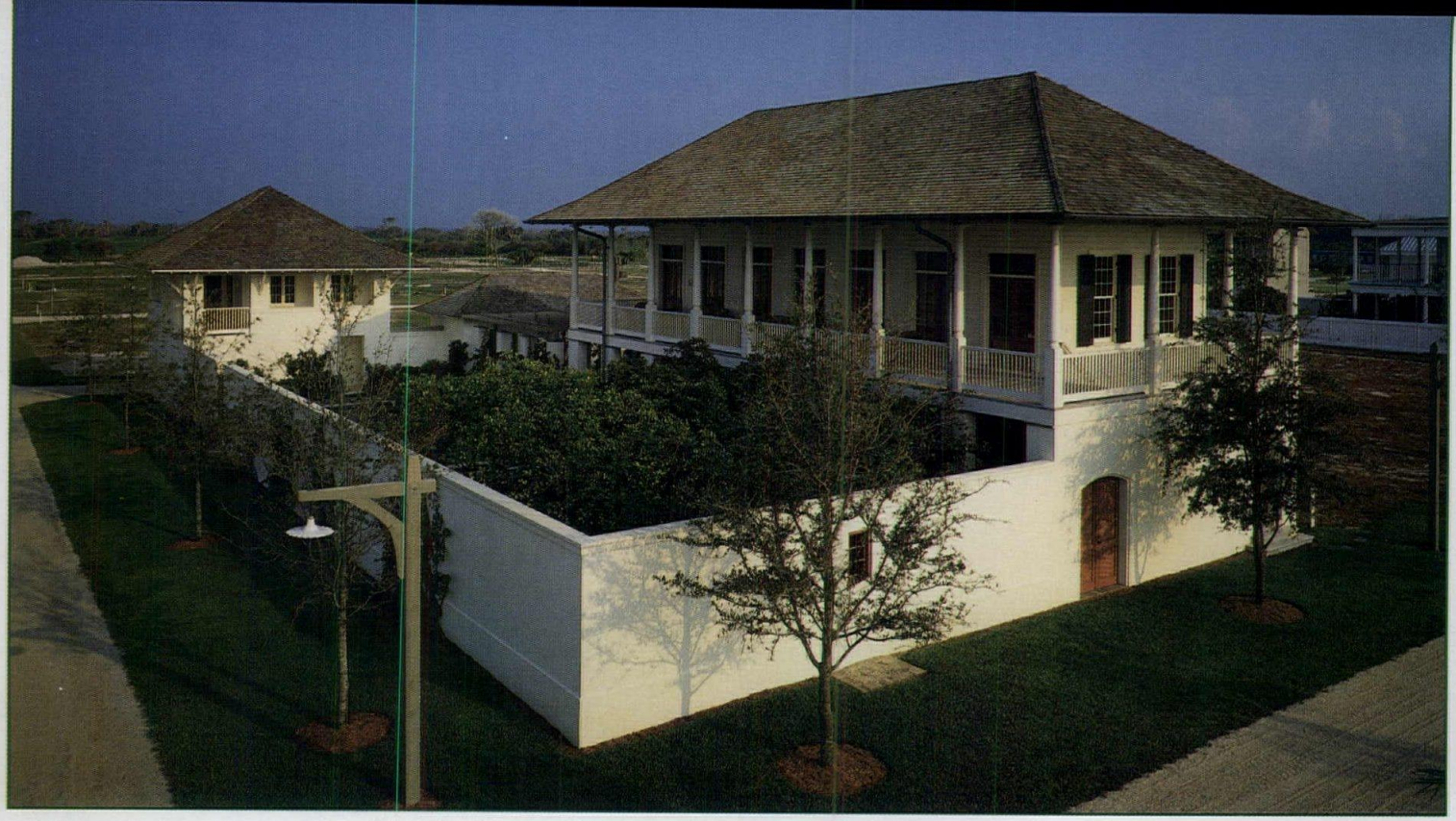
Zoning and the Idea of Property

This affinity for the Baroque – for what Henry Millon has described as "the subordination of individual elements to invigorate the whole" – is even more evident in the zoning and design codes Duany & Plater-Zyberk have written for Windsor. The zoning code, for example, specifies not only the height and setbacks of buildings, but the type of houses allowed at particular locations, the maximum depth of certain parts of a house, even the required amount of open space within each lot. Likewise, the design code's requirements go beyond the allowance of certain wall and roof materials to such details as the spacing of balusters, the size of piers, and the depth of arches.

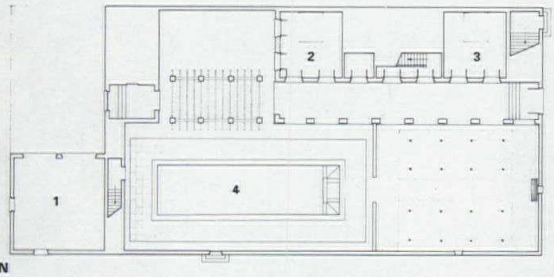
Implicit in these codes are some very large questions about what a city should be. Duany & Plater-Zyberk, for example, have argued that most modern zoning codes are functionalist tracts developed mostly by engineers concerned mainly with traffic circulation, who have given little or no thought to the social, environmental, or aesthetic aspects of urban life. The latter are what the Windsor codes concern themselves with, matters such as privacy (each house, for instance, must have an internal courtyard and high walls out to the street edge) and sociability (over half the land area is devoted to community open space and recreational facilities). If anything, the Windsor codes may go a bit too far the other way in terms of accommodating automobile traffic; the general lack of sidewalks and the narrow streets may prove inconvenient for pedestrians and cars when all 300 houses are occupied and the golf club is fully used.

But Windsor's codes do more than question our assumptions about zoning. Duany & Plater-Zyberk are challenging the very idea, widely held in this country since at least the Civil War, that people have a

Although only a fraction of the 300 houses planned for Windsor have been built so far, a view of the village center from the adjacent golf course (1) already shows the distinctive character of the place. The design code has produced houses that have a family resemblance, with hipped roofs, stuccoed and clapboarded walls, and high porches and balconies. And yet the code also allows a variety of architectural vocabularies, from Georgian to Arts and Crafts. The site plan (above) indicates the extent to which Windsor departs from the typical retirement and vacation community, with its tight grid of streets focused on an oval village center and surrounded by public open space.

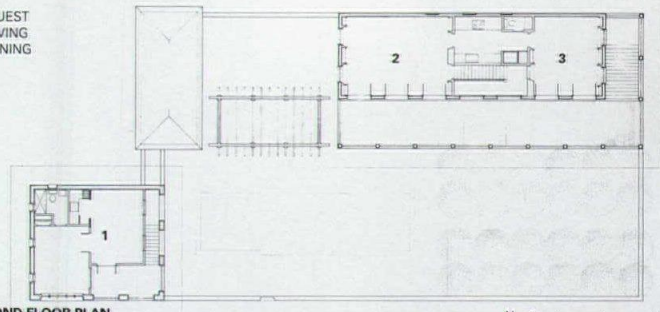


1 GARAGE
2 BEDROOM
3 BEDROOM
4 POOL



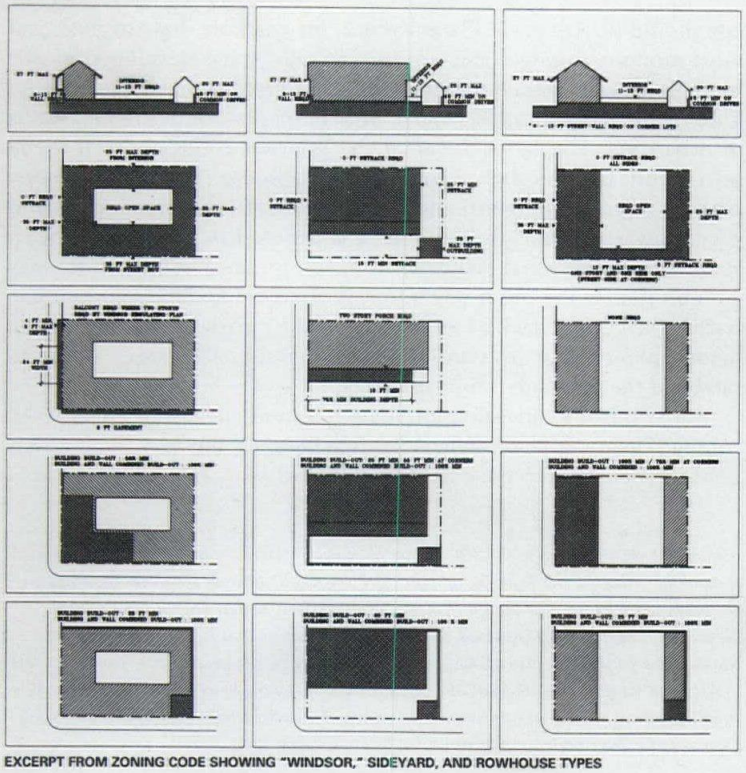
FIRST FLOOR PLAN

1 GUEST
2 LIVING
3 DINING

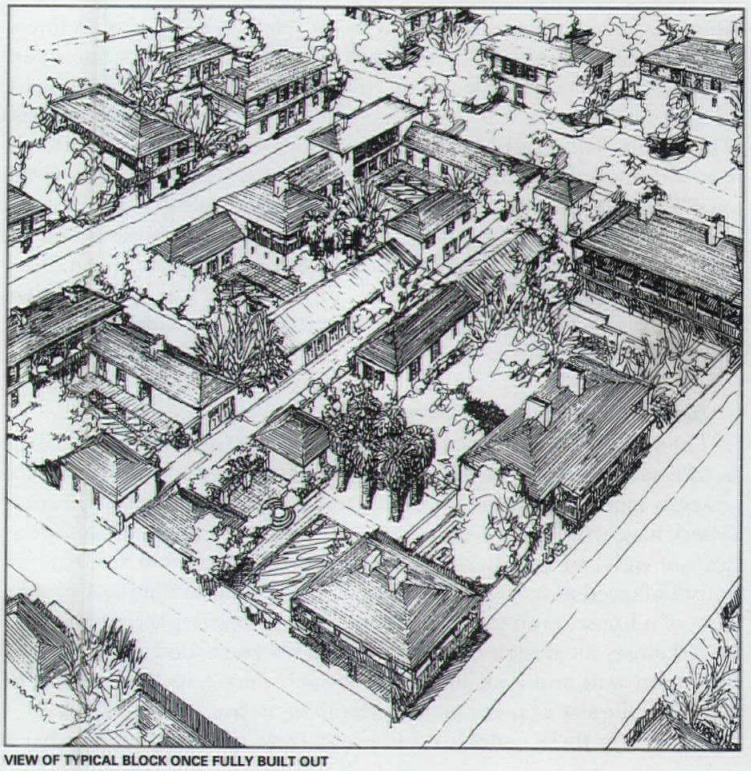


SECOND FLOOR PLAN

N 20'/6m



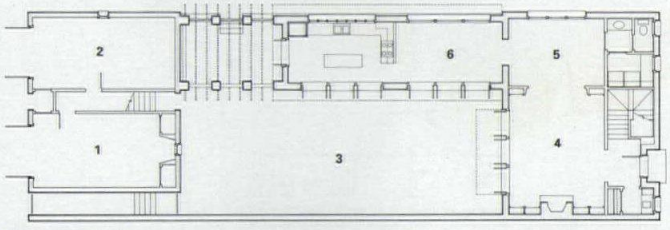
EXCERPT FROM ZONING CODE SHOWING "WINDSOR," SIDEYARD, AND ROWHOUSE TYPES



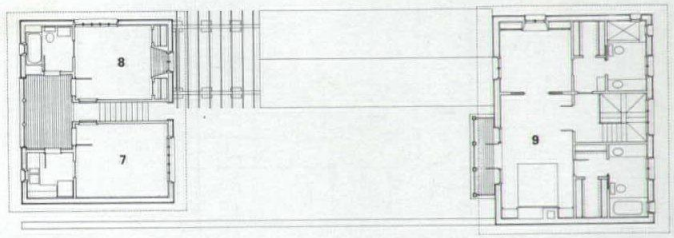
VIEW OF TYPICAL BLOCK ONCE FULLY BUILT OUT

3

1 GARAGE
2 GARAGE
3 COURTYARD
4 LIVING
5 DINING
6 FAMILY
7 GUEST
8 GUEST
9 BEDROOM



FIRST FLOOR PLAN



SECOND FLOOR PLAN

N → 20'/6m

right to do what they want with their property as long as it does not endanger their own health and safety and that of others. This "natural" right to property (which has its roots in Roman law and which influenced our country's founders through the writings of John Locke) helps explain why most building and zoning codes say very little about the design of structures that otherwise meet health and safety requirements and basic massing and setback restrictions.

Duany & Plater-Zyberk draw from a very different tradition. The so-called "conventional" approach to property (which has its origins in early Germanic law and was imported to this country through various channels – the early Protestant religious communities, the writings of Idealist thinkers such as Hegel, even the urban visions of Modernists such as Le Corbusier and Hilbersheimer) holds that property belongs to the group – the clan, the community, the state – and that the group can attach any number of restrictions on the use of property by individuals. While many Americans may object to the idea when stated so baldly, it takes many forms today, including the restrictions placed on property within historic districts or condominium developments. And it is the basic idea upon which Windsor stands.

There are a few ironies here. For example, we in America tend to pride ourselves in our individualism, and yet we are often attracted to early colonial towns that, like Windsor, stem from an anti-individualist view of property. Also, we may now object to the Modernist vision of the city, which tended to suppress individual living units in favor of highrise towers and continuous blocks. Yet this restrictive approach to private property is similar, at least in principle, to that of anti-Modernist town planners such as Duany & Plater-Zyberk.

The issue, however, is not whether one or the other view of property should prevail, since both are firmly a part of the American tradition, but what balance we should strike between the individual and the group, between our right to property and our community responsibility. It is at this level, rather than at the level of style or function, that a discussion of Duany & Plater-Zyberk's urban ideas seems to be most useful.

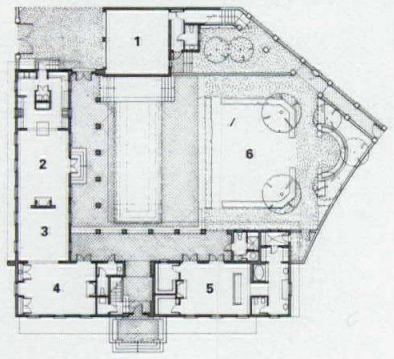
The Architect and Artistic License

Duany & Plater-Zyberk's work provokes a similar debate on the role of the architect. Their codes are highly specific about certain forms and architectural details to "restrain architects," says Scott Merrill,

The zoning code that Duany & Plater-Zyberk developed for Windsor (excerpts of which are shown on the facing page, bottom left) requires that a house hug the street edge, have a separate garage/guest house, and enclose a garden within its walls. The result (facing page, bottom right) will be a densely packed community that offers a maximum of private outdoor space. The code also identifies specific types of houses for particular lots, two examples of which are the sideyard house (2) and the rowhouses (3) designed by Scott Merrill. The sideyard house has living spaces on the second floor, with a broad porch overlooking the side garden and pool, while the rowhouses have a main block defining the street edge, with guest quarters and garages along a rear alley separated from the house by a private courtyard.

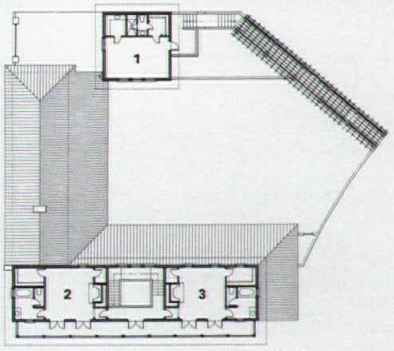
4

1 GARAGE
2 FAMILY
3 DINING
4 LIVING
5 BEDROOM
6 COURTYARD



FIRST FLOOR PLAN

1 GUEST
2 BEDROOM
3 BEDROOM



SECOND FLOOR PLAN

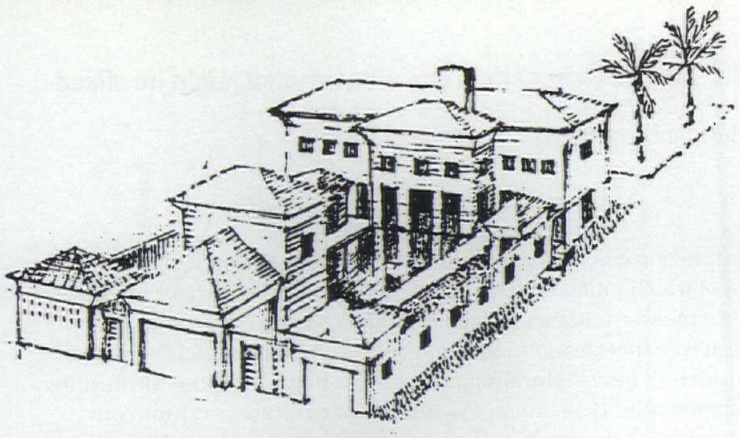
"who no longer have much self-restraint." Or as Duany puts it, "We don't worry about the good architects, it's the rest we write the codes for." You might think that this view would annoy other architects, but quite the contrary. The architects I spoke with, who have designed houses in Windsor, all praised the codes. Scott Merrill views the codes as a "rational response to construction and climate," and as a "foil against which architects can be inventive," especially with plans; Clemens Schaub likewise views the codes as a way of "ensuring that the architect's work is part of an urban fabric"; even Hugh Newell Jacobsen, who ran into some flack from Windsor's design review board because of a coved cornice that he put on one house, still "loves the code," although he admits that its flexibility "depends upon who is sitting on the board."

Perhaps the best measure of Windsor's design code is its result: the houses themselves, which are all well-proportioned, sturdily built, ingeniously laid out, and, I should add, very expensive. Merrill's side-yard house, for example, has a first-floor base of bedrooms and a second floor of elegant high-ceilinged living spaces facing a deep porch and overlooking an intimate courtyard pool and grove. Likewise, the rowhouses Merrill has designed, with their asymmetrical Arts and Crafts façades, relaxed interior layouts, and long courtyards leading to rear guest pavilions, are very comfortable. And the larger courtyard houses, one designed by Duany & Plater-Zyberk and another by Jacobsen, have a more monumental scale, with high volumes and axial relationships among their parts.

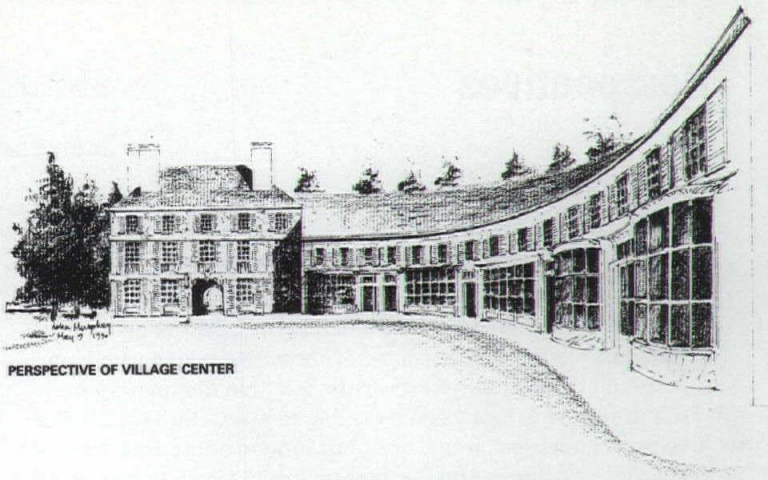
Behind the reassurance of these houses, though, are some rather unsettling implications for architects. It is no coincidence that the rise of the architectural profession in this country after the Civil War paralleled the growing domination of the "natural rights" view of property. Architects thrived, as they never had before in this country, when they made the transition from being pattern-book designers to being the interpreters of a client's individuality and the carriers of artistic vision. In other words, the client's "natural" right to property had its equivalent in the architect's "natural" right to personal expression, something that has become so much a part of the profession's culture that it is difficult even to imagine it any other way.

Yet for long stretches of the history of architecture, architects have been judged not by the originality of their work, but by its conformance to and invention within a framework of plan types and a Classical design vocabulary – a "convention-bound" view of practice that has tended to rise and fall with the "conventional" view of property. It is this earlier tradition that Duany & Plater-Zyberk have recalled through their codes at places such as Windsor.

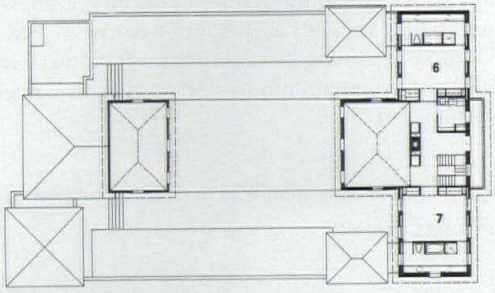
The appeal of Windsor is undeniable; it seems to speak to some collective unconscious of what a town should be, at least in the Western world. And such traditional towns seem to be catching on; Duany claims that his firm has all the work it can handle far into the future. What this phenomenon means, however, is not entirely clear. Does the growing popularity of traditional towns reflect a shift in the underlying values of this country, away from the individualism that has reigned for



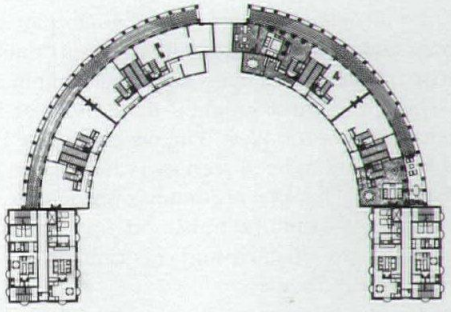
PERSPECTIVE SKETCH OF "WINDSOR" TYPE HOUSE



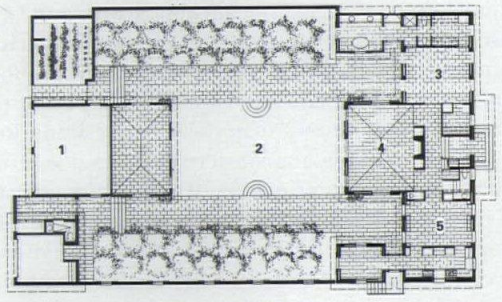
PERSPECTIVE OF VILLAGE CENTER



SECOND FLOOR PLAN



SECOND FLOOR PLAN

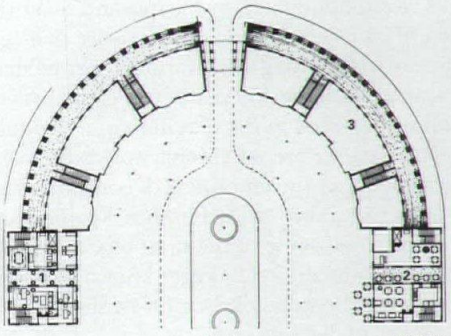


1 GARAGE
2 POOL
3 BEDROOM
4 LIVING
5 DINING
6 BEDROOM
7 BEDROOM

FIRST FLOOR PLAN

N → 20'/6m

1 OFFICES
2 CAFE
3 RETAIL
4 TYPICAL APARTMENT



FIRST FLOOR PLAN

N ← 40'/12m

over 100 years toward a greater identity with community? Or do these towns appeal to us mainly as a refuge in a society that is more fragmented and individualistic than ever before? And what do those trends suggest for the architectural community? Those are not easy questions to answer. They suggest, however, that the importance of Windsor lies not just in its physical structure, but in the larger issues it raises.

Thomas Fisher ■

The so-called "Windsor House" type, shown here in houses designed by Duany & Plater-Zyberk (4) and Hugh Newell Jacobsen (above left), has an interior courtyard with a two-story block along the street line and a rear guest house and garage. These two architectural firms interpreted the requirements quite differently, however. The Jacobsen house, although symmetrical, has a Modernist character, with minimal detailing, flowing space, and articulated pavilions, while the Duany & Plater-Zyberk house recalls a more traditional Florida vernacular, with its thick stuccoed walls, bracketed balcony, and shuttered double-hung windows. Jacobsen has also designed a semicircular village center for Windsor (above right) containing apartments and small shops.

Project: *Windsor, Vero Beach, Florida.*
Town Planners: *Andres Duany & Elizabeth Plater-Zyberk, Miami, Florida.*
Architects, interior designers, and landscape designers for various properties: *Cynthia Bardes, Andres Duany, Geoff Ferrell, Dan Ford, James E. Gibson, Elizabeth Gillick, Hugh Newell Jacobsen, Naomi Leff, Frank Lincoln, Donayda Marin, Scott Merrill, Debra Nevins, Felix Pereira, Elizabeth Plater-Zyberk, Craig Roberts, Robin Bell Schafer, Clemens Bruns Schaub, Ernest Schichler, Susan Schuyler Smith, John Stephanidis.*
Windsor Village Clients: *Galen and Hilary Weston, Geoffrey and Jorie Kent.*
Site: *flat, 416-acre parcel in former citrus groves along Route A1A, north of the center of Vero Beach, Florida. The site stands between the Indian River and the Atlantic Ocean.*
Program: *lots for 300 houses and community facilities including a village center, a meeting hall, a beach club, a golf club and an 18-hole golf course, polo fields, an equestrian center, tennis courts, and a croquet field.*
Consultants: *Robert Trent Jones, Jr., golf course; Stan Smith, tennis courts.*
Costs: *withheld at request.*
Photos: *Thomas Delbeck.*

Perspectives

P/A's Executive Editor **Thomas Fisher offers one view of what might lie ahead** for architecture in the coming years.

An Agenda for the 1990s: Toward a Multicultural Architecture

Where should architecture be headed in the next few decades? That question is impossible to answer without first asking where our culture should be headed – precisely the question too many of us, in this Post-Modern era, have been unwilling to raise. Our best thinkers seem to prefer nostalgia, irony, or obfuscation to addressing the real problems of our culture. And our best politicians seem to focus on the symptoms of our society's illness – crime, unemployment, drug abuse – rather than deal with the underlying causes. Ultimately the ineffectualness of our leaders is itself a symptom of what may best be described as a kind of cultural fatigue – the ecological, ideological, and political exhaustion of the West. The decline of the West is not a new idea, but it has too often been seen as a catastrophe, portending another Dark Age. What that argument overlooks are the opportunities inherent in such a cultural transition, opportunities that I believe will greatly benefit architecture and yet dramatically alter its course over the next several decades.

One way to think of this transition is as the end of the modern age born during the Renaissance. Four hundred years after Francis Bacon envisioned a world dominated by science and technology, we are witnessing the effects of his utopia in the massive damage we have inflicted upon the environment: global warming, ozone depletion, polluted food, water, and air. Some 450 years after capitalist merchants and humanist scholars joined in the elevation of individualism, materialism, and secularism, we are watching a worldwide revival of religion and a growing sense of the emptiness of consumer culture. Five hundred years after Columbus landed in the "New World," inaugurating the age of empire and some of the most bloody, repressive, and imperialistic centuries humankind has ever known, the West as a whole is finally recognizing the value of the non-Western cultures we have tried, for so long, to destroy.

Such long-term change may seem far removed from the problems of architecture, but it is not. In fact, architecture carries much of the burden of our cultural exhaustion – the rising crime rates that turn buildings into fortresses, the declining standard of living that translates into shoddy construction and shrinking personal space, the widening gap between wealth and poverty that finds an apt symbol in the empty office towers and overcrowded homeless shelters of our cities.

At the same time, our culture is looking to architecture for direction – mostly in vain. On one side stand a few architects promoting "undecidability," as if we can eliminate the problem of directionlessness by simply calling it a virtue. On the other side stand a number of architects rummaging through certainties from the past in search of answers. Some have come up with the old authorities of Classicism or high-style Modernism, without asking what that means at a time when most people are ignorant of Classical culture and often are repelled by Modern architecture. Others have found comfort in creating their own highly personal aesthetics, without seeing that such individualism, disconnected from any tradition, has helped bring the West to its current crisis. Still others have forged a new orthodoxy out of unorthodox, fragmented forms, without acknowledging that this latter-day Romantic Rebellion absolutely depends upon the continuation of the status quo to give it meaning. All of these architectural "positions" amount, in the end, to variations of the same theme – formalism – which has always been a generous refuge when we had not the faintest idea what to do next.

If architecture is to help give form to the new culture now being born, we must begin to grapple with the changes happening around us – of which multiculturalism may be the most important. I hesitate to use the word that on college campuses has become a weapon to quash free speech and heighten tensions among people. But rightly considered, multiculturalism represents a huge and generally healthy change: rather than attempt to make other cultures over into our image (whether with an army or with mass-produced products and media), we in the West are beginning to see that those cultures have much to teach us. We are doing so not out of the goodness of our heart, for there is little enough of that, but because we have no choice. The West is becoming increasingly multicultural: in many American cities, for example, "minorities" are now the majority, and so we must adapt.

"The challenge of architects ... should be to make this dawning multicultural world concrete."

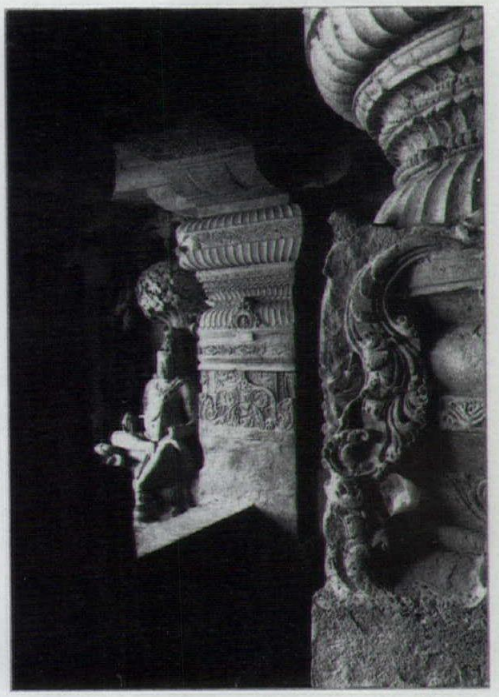
The native cultures of Africa and America, for instance, offer innumerable examples of how people can live an environmentally sustainable existence in structures that use locally available materials and that are well adapted to the climate. The ancient Islamic and Chinese cultures suggest several ways in which people can coexist in cities, achieving an integration of living and working, family and neighborhood, rich and poor. And traditional Hindu and Buddhist cultures provide powerful alternatives to our own materialistic obsessions. Recognizing that we can learn from these non-Western cultures does not mean that we must discard our own: its principles of democracy, equality, and freedom of speech and thought have been an invaluable gift to the world. It simply means that the West can no longer survive without these other cultures, just as we can no longer survive without rain forests or ozone in our atmosphere.

The challenge to architects, now that the madness of the 1980s – that last gasp of Western machismo – is over, should be to make this dawning multicultural world concrete, to give it form and substance for all to see. Such an architecture will not look like that produced by any one of these cultures: we cannot house our populations in adobe villages or in nomadic tents any more than we can house them in Classical villas. A multicultural architecture would, instead, be one in which the ideas and traditions of other peoples would be abstracted and then applied to our own situation. For example, at a time when zoning codes in the West are becoming more prescriptive, what can we learn from Islamic cities, where a coherent urban fabric grew out of a few simple rules regarding privacy, accessibility, and access to light and air? Or, at a time when metropolitan areas in the West grow ever larger and more environmentally destructive, what might we learn from native American cultures, whose villages had a density and spacing attuned to what the surrounding land could support with food and resources? Other cultures, in short, can give us a renewed sense of public life, of being responsible for ourselves, our environment, our communities and institutions. And architecture, as the most public of the arts, can thrive in such a setting.

Finding the appropriate forms for this multicultural world will be no easy task, in part because there are so few precedents. Yet we succeeded once before in a similar situation. Architects took the lead in shaping the new world that arose during the Renaissance, and now, as we watch that world subside, it is time for us to do so again.

Thomas Fisher ■

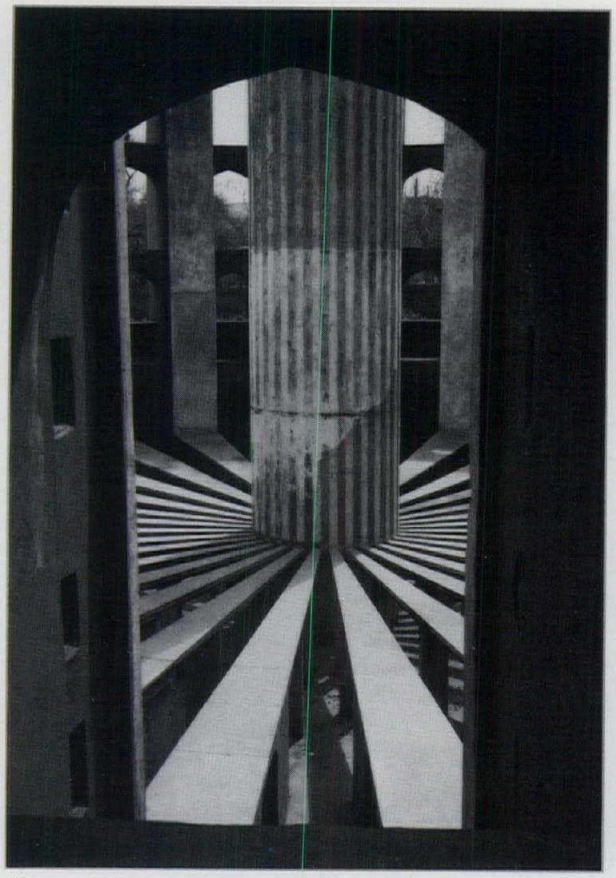
Gallery: Photographs taken by **Barry Perlus in India** bring to light abiding – and universal – qualities of architecture.



Above, left and right, corridor and detail of stone carving from the cave temples at Ellora, excavated 600–1100 A.D.

Overview of the Jantar Mantar at New Delhi, a celestial observatory built by Maharaja Jai Singh II between 1724 and 1734.

Photos © 1989 Barry Perlus



These photographs and others may be seen in a traveling exhibition entitled "Made of Light," currently at the Sordoni Gallery at Wilkes University, Wilkes Barre, Pennsylvania, through June 14, and at the Berman Museum of Art at Ursinus College, Collegeville, Pennsylvania, from October 6 to November 15. The photographer, Barry Perlus, teaches photography at Cornell University's College of Architecture, Art and Planning.

Above and below, views within the Jantar Mantar, a vast complex of monumental masonry "instruments," designed in the 18th Century to make astronomical observations and measurements of unprecedented accuracy.

Photos: © 1989 Barry Perlus

Gregory La Vardera resumes the debate on the current relations between theory and practice.

Real Life Theory

Faithful readers of Perspectives will have followed the "dueling" in these pages over the uses and abuses of contemporary architectural theory. Whether you are familiar with the arguments or not, I would like to call your attention to four of the essays published on the subject: Sylvia Lavin's, in the August 1990 issue, Jeffrey Kipnis's response in November of that year, and companion pieces by Robert McCarter and editor Thomas Fisher, which appeared in May 1991. The opinions voiced in these articles still reflect clearly the diverse and often contrary feelings in the architectural community today.

While some architects maintain that the ideas explored in the academic pursuit of theory have opened up new opportunities for design, others hold that theory has grown remote from building. In the worst cases, the "easy" visual image generated by certain current ideas has been mindlessly repeated, and voided of the insights from which it emerged. This sort of empty manipulation has resulted in a predisposition of distrust towards any work whose imagery may be associated with contemporary theory.

"I propose that theory become part of the value system that governs our choices in the design process – rather than being the object of those decisions."

If I could beg a bit more leeway than the preceding writers allowed one another, I would like to make some observations about the way we use the theories and ideas that concern us. My desire is not only to find a resolution to the disparate feelings, but also to suggest a more successful means of creating theoretical works of architecture. I propose that theory become part of the value system that governs our choices in the design process — rather than being the object of those decisions.

In order to consider the mood of our community, allow me to briefly describe my impressions of the previously published positions: Sylvia Lavin spoke of the excess and abuse of theory today. By reviewing the typical transformation of theoretical movements into meaningless styles, she tried to demonstrate how today's "critical theory" is not only subject to the same progression, but appears to be indirectly grounded in that phenomenon, being somehow reinforced and rewarded by its own convenient capacity to become a commodity.

Jeffrey Kipnis criticized Lavin's assumptions and, in my view, justly so. He opposed Lavin's position that theory, being mainly concerned with conceptual principles, was irreconcilable with architecture, which she argued was chiefly concerned with building, and "actual form." Kipnis asserted that this polarization debased architecture by separating it from culture. As a consolation for Lavin, Kipnis's tedious undoing of her writing may be seen as a clear example of the excess she condemned.

Kipnis's wordy rebuttal of Lavin may have partly inspired Robert McCarter's response, which called into question the linkage between language and architecture, and challenged our over-reliance on words to rationalize design. This provoked criticism from editor Thomas Fisher, who argued against a simplistic dismissal of the cultural and ethical values of verbal communication.

To resume the dialogue, I don't believe that McCarter was advocating the abandonment of language as a design tool, or even as a basis for design. I interpret his intention to be more of a reminder that in the end, all architects may offer by way of explanation is the experience of the places they have created. On those terms, much of what we build falls short of our stated intentions. And, conversely, the masterworks that enter the historical canon do so on the power of their presence.

I would like to further explore where McCarter's good intentions may take us. Without making too many assumptions about how others apply theory, I will describe an extreme situation for the sake of suggesting an alternative. The extreme is intended to lend clarity to what I propose, not to be definitive of contemporary theory. Depending on your point of view, you may or may not recognize the syndrome I describe.

"The dialogue surrounding theory should focus on the significance of the experience our architecture provides, not on which cultural concepts to appropriate in order to legitimize the design."

Our values, like the arms of a scale, weigh and determine our decisions, including those entailed in design. This personal value – or evaluation – system is formed over years, shaped by the many lessons and experiences of life, including our intellectual inquiries. When these conscious stimuli are infused into a work of architecture, they may well be handled in a self-conscious manner: The idea generates an architecture. The architecture becomes a means of representing the idea that generated it. It is self-referential. Likewise, a self-conscious posture often produces architecture that is less about theory and more about being theoretical: an idea is represented and meant to be read, like a page in a book. But without fluency in its particular language, little of it can be understood. (This is not to deny that architecture may be beautiful despite its obscurity; however, we should aspire to incorporate meaning in our design, and not only beauty.)

The disturbing result of this condition is familiar. We have all seen work that radically departs from convention as a result of some ideology. Yet what those underlying ideas actually are all too often remains a mystery. An example can be found if we examine one "intention" of a complex project like Peter Eisenman's Wexner Center for the Visual Arts (P/A, Oct. 1989, p. 69).

"Much of what we build falls short of our stated intentions. And, conversely, the masterworks that enter the historical canon do so on the power of their presence."

Aiming to reveal our perceptions of reality as purely subjective, Eisenman intends to dislocate us. He strives to accomplish this through the creation of architecture as fiction – an architecture which, despite its fulfillment of specific functions, does not present itself as such. The order of the Wexner Center may not be discerned from one's activity in the building. A gap is opened between order and a deliberate act of construction.

How does one read such a place? Do we perceive Eisenman's premise regarding the tenuousness of "shared" reality, or is the dislocation seen as a deliberate disorder? If the latter, then little has actually changed from the conventional model where order is dictated by function. Except that at the Wexner, disorder stands in for order, being equally contrived and imposed. It is fair to say that the dislocation could only be accomplished by taking an architectural approach

that undermines the very program that gave rise to the building. In any case, Eisenman's animosity towards program is well represented, but not his intent. While a perceivable disorder is apparent, its significance is not.

It would be foolish to abandon our theoretical investigations, or to reduce their intensity. But we must endeavor to stop using ideas in this manner. We must be prepared to moderate our fascination with language, representation, theater, texts, deconstruction, and the like. The ideas associated with these realms were not formulated for the purpose of generating form in design, but to increase our insight and objectivity. We investigate these theories, we participate in discourse, we learn about broader cultural concepts in order to enrich our interpretation of the world and the diverse environments we design. The places we create should not be a by-product of theory, but rather they should be based on such philosophical concepts that enhance and increase understanding of the public and private life they contain.

We must turn our efforts towards making architecture that enriches its users. And while there should be no shying away from language, the dialogue surrounding theory should focus on the significance of the experience our architecture provides, not on which cultural concepts to appropriate in order to legitimize the design. Thus, our theoretical inquiries may originate not only from the customary cultural sources, but may also spring from revelations of the most personal nature, which need not be validated by the authority of their reference.

Only then will we develop inextricable ties to the places where we lead our lives, and find the meaning we strive to instill in our work. Through the values formed by life experience, designers and dwellers alike may find a common ground. Perhaps it is the "middle ground" between words and buildings that Thomas Fisher was looking to.

Gregory J. La Vardera ■

The author is an architect practicing in Philadelphia.

Noted with Pleasure

From **Michael Sorkin's** body of essays in *Exquisite Corpse.*

New York had only one real story in the Reagan/Koch years: Who profits? In a deregulated climate in which planning had devolved into a series of give-away strategies for stimulating "development," writing about architectural expression often seemed not simply irrelevant but complicit with the occlusive needs of capital. Their own fascinations notwithstanding, questions of style are simply peripheral to these issues: for the woman staring at the CRT screen in the windowless back office, whether the doo-dads on the roof are Tuscan or De-Con will be of no great import. To paraphrase a dimly remembered line from somewhere in Marx, "never mind the fluctuations in the price of beef, the sacrifice remains constant for the ox." [*Introduction, January 1991.*]

If "sculpture" behaves like architecture, then it gets judged that way. If "sculpture" makes space in the city, then it takes the rap for its cock-ups as urban design. Just calling it art won't do. [*Que Serra Sera, March 1985.*]

The architectural profession has – over the past 20 or so years – woken up and smelled the urban bacon, come to the realization that most of what we prize in our climax metropoli, like Manhattan, comes from formal strategies in which the urban ground is favored over the architectural figure. [*Dump the Trump, December 1985.*]

Mention Paul Rudolph to an architect and the immediate association is with his poured concrete buildings, most dramatically represented by the Yale Art and Architecture Building: projects which – in their sensuousness, weight, and occasional Roman gloom – are out of step with our ephemeral and veneered moment. It's not just that we're nervous about the avoirdupois, about the unabashed permanence of this work, it's that we cannot countenance the aspiration to grandeur untinged with irony. [*The Invisible Man, March 1986.*]

Now, I'm as amused as the next ironist with the juxtaposition of the Golden Nugget and Saint Peter's. The problem with the Venturi effect is its politics. Let's not forget that the activities conducted in those casinos are both opiate and rip-off, that their calculation is exquisite. The arty view displaces this manipulation, obscuring it in a schlag of decor. There's a choice being made here: one elects to see the glitter and reflection and to ignore the hundreds of surveillance cameras. [*True West, August 1987.*]

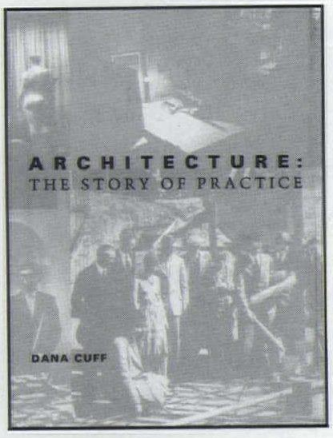
Writing this column gets harder and harder for me. The reason, I think, is that so much architecture – especially in the city – has become like so much bomb design. Appreciating it formally demands that the terms of the discussion be totally hemmed, that the question of effects be trivialized. I don't want to be Letterman, leering month after month at Stupid Architecture Tricks. Writing about the quiddity, the stuffness, of architecture increasingly seems a sellout, an act of self-repression, when substance is lacking. Loving building, I prefer to engage it optimistically, don't want to write constantly about Vegas. While my dismay at the current course of events is undimmed, my passion to denounce is ebbing; I'm enervated by irony. [*True West, August 1987.*]

Michael Sorkin is an architect practicing in New York. For ten years he was the architecture critic of the Village Voice.

Architecture: A Reality Check

Books

Design is as elusive to describe as it is to execute. Dana Cuff's ambitious book, reviewed by **Donlyn Lyndon**, describes its milieu, if not its essence.



Architecture: The Story of Practice *by Dana Cuff, MIT, Cambridge, Mass., 1991, 306 pp., $29.95.*

Dana Cuff's welcome study, *Architecture: The Story of Practice* will no doubt meet with many different reactions. There will be sighs of recognition from countless practitioners who see their own circumstances writ not large but ubiquitous. The AIA's public relations wing could be mildly hostile, for it prefers to smooth waters that Cuff shows to be inherently turbulent. A chorus of "right-ons" is likely from young professionals reconciling the disjunction between aspirations induced in school and the grub work of initiation. Howard Roark and devotees of *The Fountainhead* would dismiss it, but academics ought to be enthusiastic, particularly those inclined to take up Cuff's challenge to create programs that "train architects to take the knowledgeable lead in the complex collaborative settings where design evolves." Students will no doubt soon encounter Cuff's book as a text for practice courses.

Cuff is forthright about the premise of her book, stating at the beginning that it "examines how buildings may be collectively conceived; that is, it considers architecture as a social construction." The nemesis of her study is the "myth of the autonomous architect-hero." Cuff analyzes real world scenarios in "the culture of architectural practice," applying perceptive insights about the innumerable personal interactions that attend the evolution of a building's design. She traced these exchanges as a participant-observer in several architectural offices; she also interviewed 50 architects and made judicious use of studies by other scholars, most noticeably Robert Gutman and Judith Blau.

Architecture: The Story of Practice is carefully documented: a set of appendices lists Cuff's research, the architects she interviewed, and summaries of attributes and problems in the design process. These are followed by copious notes and an extensive bibliography. The book will serve well those who wish to give more study to the problems that it poses. As a bonus its pages are frequently adorned with many archival photographs of architects and clients at work.

Throughout the book Cuff examines a triadic relationship between practice, the profession (as codified by the AIA), and schools of architecture. She sets out to show that the actual practice of architecture is a dynamic, protean, and indeterminate enterprise that the AIA vaingloriously presents as a discrete manageable process with the "architect at the helm" and for which the educational system gives, at best, dubious preparation – not because it neglects technical competence or shortchanges training in design and representation, but because it misconstrues the nature of design practice.

In schools, Cuff maintains, "projects take design to be a master value." Most are executed in solo (or with echoes of the instructor's voice), address problems that are clear, lead to uncertain solutions, and are formulated so that only the student is affected by the outcome.

Problems situated in practice are quite different. Cuff delineates six characteristics: 1) The costs of design time must be balanced against the demands of maintaining a business. 2) There are "countless voices" that have a say about the outcome of the design process – consultants, city agencies, and often several layers of the client's own bureaucracy. 3) There is a great deal of uncertainty in the process; "the responsibilities, authority, allegiances and expertise ... are ambiguous." 4) There is always the temptation, often the necessity, for "perpetual discovery" as new information leads to modification of the design and then again to new questions. 5) There are surprise endings (some greater than others) since the outcome can never wholly be predetermined. 6) The stakes are significant; they involve many people and have serious consequences. The world of building is not solipsistic.

Citing John Forester's studies, Cuff argues persuasively that design should be considered not as decision making, but as sense making, a continual reformulation of proposals to make sense of an emerging situation. She locates this situation in a social setting, be it among colleagues or clients.

Cuff's analysis gives short shrift to the situation

(continued on page 161)

Books of Note

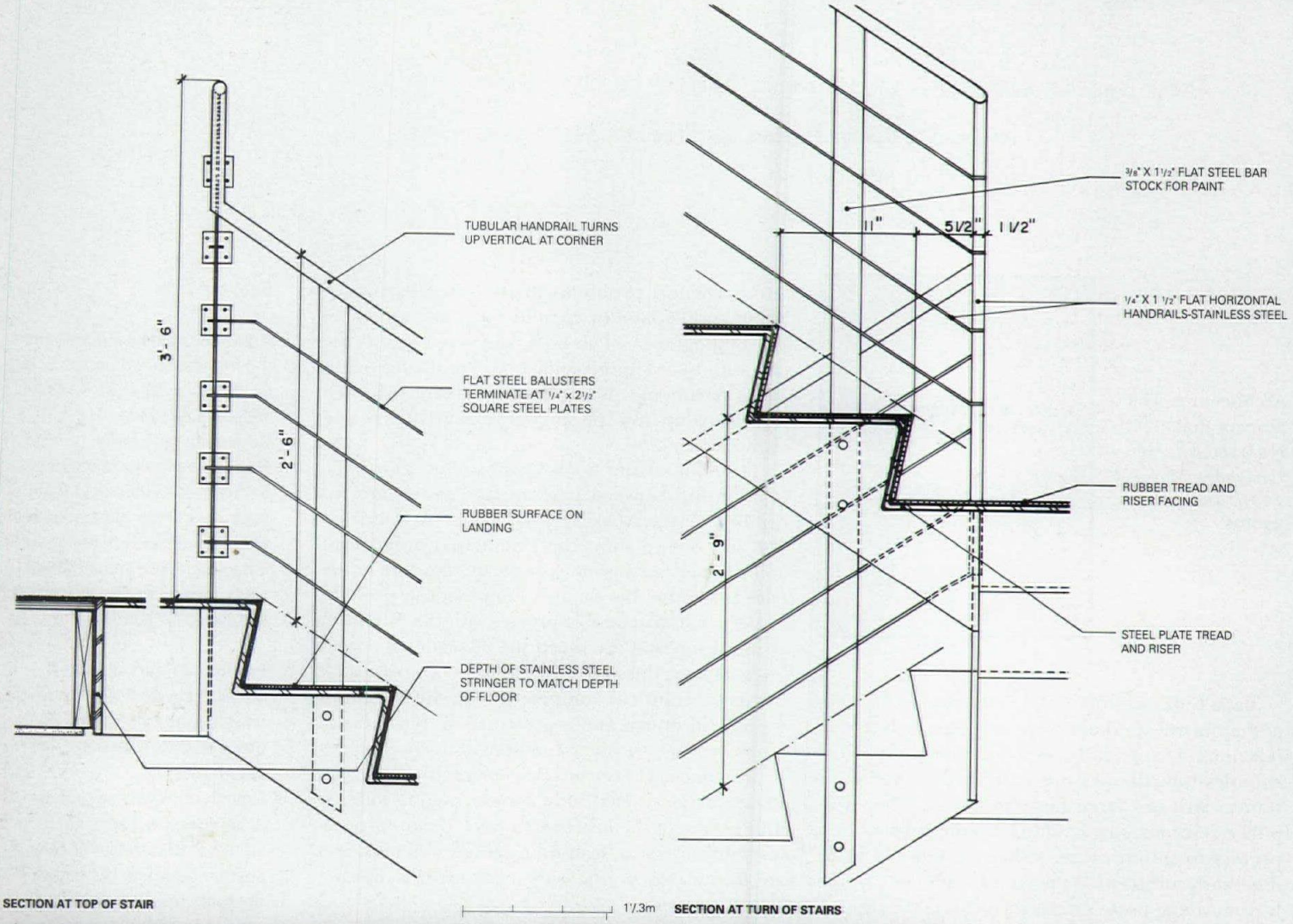
Architecture: The Natural and the Manmade *by Vincent Scully, St. Martin's Press, New York, 1991, 388 pp., $40.*
Beginning with early Mesopotamian form-making, Scully offers stylistic and philosophical connections between ancient and modern works with the exuberance and wisdom made famous during his tenure at Yale.

The Architecture of Mott B. Schmidt *by Mark Alan Hewitt, introduction by Robert A.M. Stern, Rizzoli, New York, 1991, 165 pp., $50.*
Though relatively unknown, Schmidt is cited as a major arbiter of Classicism in 20th-Century America. His legacy of Georgian townhouses and estates for wealthy New Yorkers is documented in this large-format monograph.

Modern Furniture Classics Since 1945 *by Charlotte and Peter Fiell, AIA Press, Washington, D.C., 1991, 192 pp., $49.95.*
This valuable resource chronicles the evolution of postwar furniture design with lush photographs of familiar and lesser-known works. An international listing of dealers, galleries, and museums is included.

Mario Botta: Architecture 1980–1990 *introduction by Werner Oechslin, Editorial Gustavo Gili, S.A., Barcelona, 1991, 223 pp., $49.95.*
This volume covers the second half of Botta's career and his mannered rendition of Ticinese Rationalism.

Selected Detail



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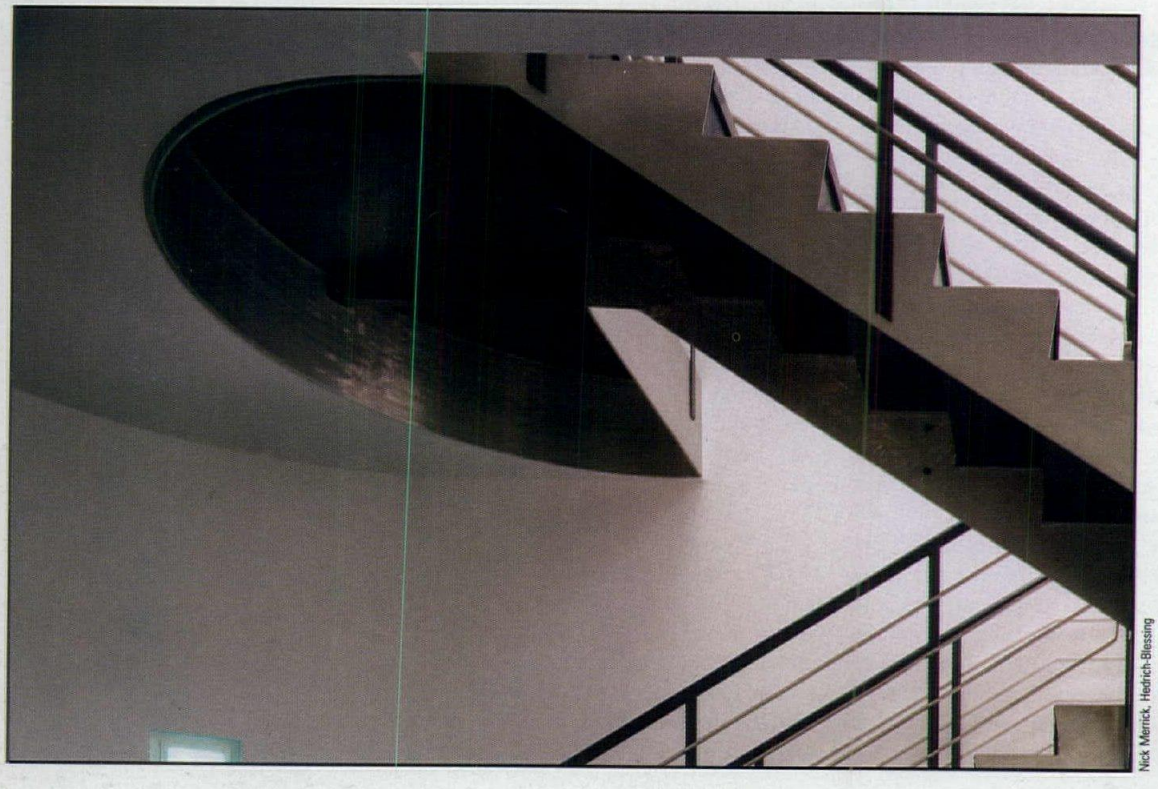

Nick Merrick, Hedrich-Blessing

Stair, Sedelmaier Productions Office, Chicago

Steel stairs are marvelous pieces of construction, which we too often cover up with concrete, carpeting, and gypsum board. It is thus refreshing to see, in this rehabilitated office townhouse by Nagle, Hartray & Associates of Chicago, a steel stair reduced to its most essential features and left exposed. The stair consists of steel treads and risers welded into a continuous plate and stainless steel stringers that curve under the landing to tie one side of the stair to the other. Bolted to the stringers are flat steel railings with horizontal balusters and tubular handrail. A rubber flooring material is affixed to the stair's upper surface. ■

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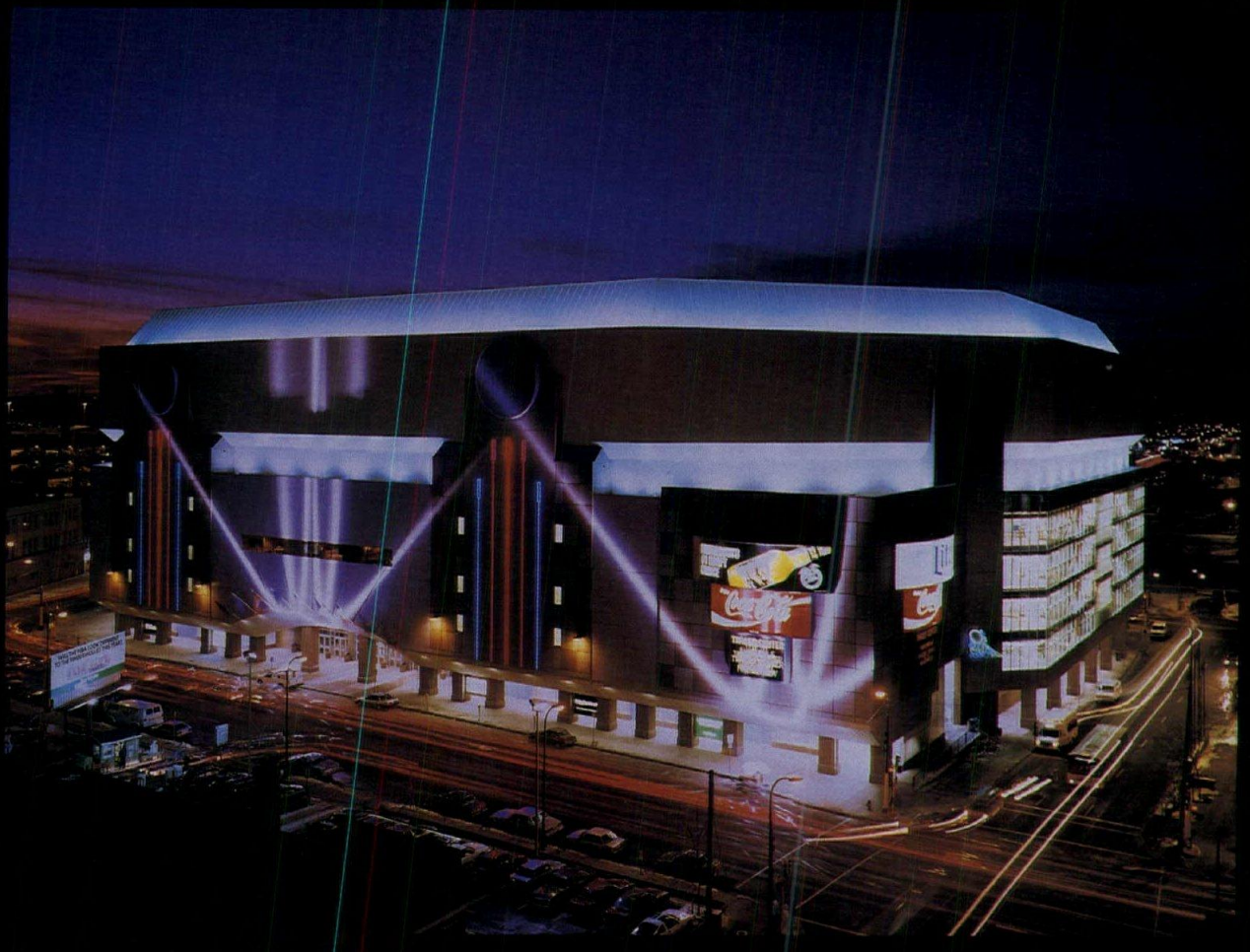

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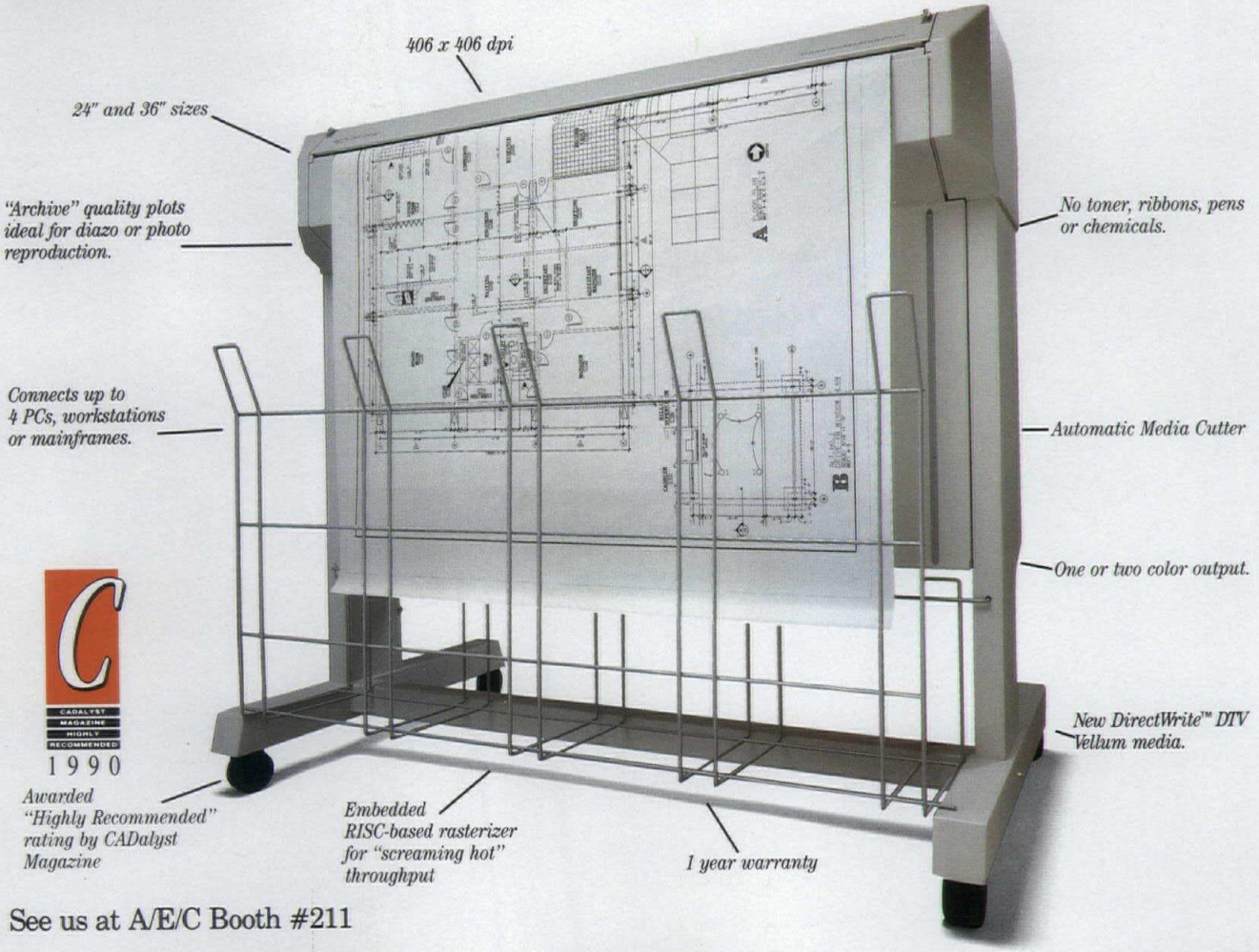

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Computer Focus
How to Choose a CAD System

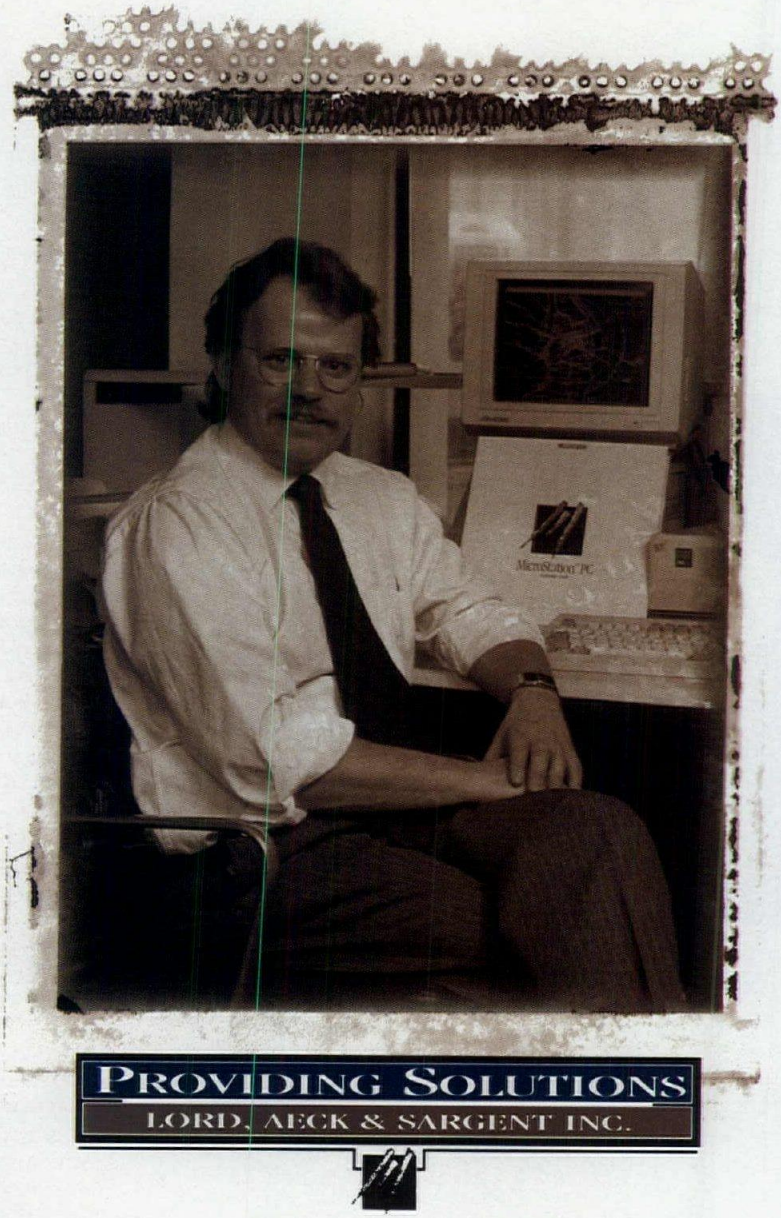
Contents

Al Payne

After conducting a two-year search, the Orcutt Winslow Partnership (left) of Phoenix, Arizona, chose a CAD system that complemented the firm's method of practice (see page 135).

Where do you start when you are ready to purchase, upgrade, or expand an architectural computer system? P/A offers a guide to information resources, insight on the CAD decision-making process from three CAD managers, and suggestions for protecting your investment.

"Powerful and flexible in a workgroup environment."



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Where to Start

CAD consultants offer advice on how to get a system that meets the needs of your firm.

Whether you are just now thinking of purchasing your first computer or are planning to replace or upgrade a system you purchased a decade ago, changes in the computer industry are making systems that are tailored to the individual needs of architectural firms. Today's CAD is far from being just a drawing tool; it can now help architects offer new services to clients, such as 3D animation and facilities management databases. Furthermore, CAD is helping architects incorporate into their projects electronic information such as pre-drawn manufacturers' details, lighting and energy analysis tools, and on-line code information. Despite the promises of high technology, however, the decision to automate architectural design should be based on the needs of a firm's practice.

Before investigating a CAD purchase, a firm should look critically at its own needs and think of the services it will want to offer clients in the future. CAD consultant and co-author of *CAD and the Small Firm*, Geoffrey Moore Langdon, notes that architects often turn to engineers, who have been using computers much longer than most architects, for advice about computer systems. "Months later," says Langdon, "the architectural firm that fell for this advice is wondering why it is not seeing the magical productivity that CAD seemed to promise. Meanwhile, it is suffering under the high payments of far too expensive a CAD system. Frequently, the architects are too embarrassed to say the system is not productive and ask for help; they think something must be wrong with *them*."

Matching a System to Your Needs

"The most common mistake that architects make when they buy a system is to buy a general-purpose CAD 'engine' like AutoCAD and then stop there," says Mark Lauden Crosley, author of *The Architect's Guide to Computer-Aided Design*. "Using an engine program alone is like using a very expensive pencil; you can draw only one line at a time, and with some packages you cannot even draw a double line without an enhancement. AutoCAD was never intended to be used that way." Third-party software, sometimes referred to as "templates" or "modules," can make AutoCAD, or other CAD engines such as Intergraph's Microstation, work optimally for architects. Using third-party software allows a firm to pick and choose from specialized applications it may need, such as detail libraries, interiors, landscaping, facilities management, or specialized engineering software. Other CAD software comes complete with both engine and architectural tools in one package, an ideal and economical solution for some firms, but these packages sometimes offer less expandibility, compatibility, and raw power than the engine-based packages.

Which CAD software is appropriate for architects? The best sources of information are other architectural firms and local users' groups. These are apt to be people whose needs reflect your own. Also, check with architecture schools; most of them have had the opportunity to try out a variety of software packages. Other sources of information are books, periodicals, trade shows, and software vendors; P/A has compiled a list of these sources that we think you may find helpful (see sidebar). You will probably wish to contact vendors directly to get more information on a particular system, as software packages are always being redeveloped and re-released.

How Much Should You Spend?

When we asked consultants how much an architect should consider paying for a complete CAD system, they all agreed that the actual cost of a system must take issues such as training time and the firm's goals into account. For hardware and software costs, Bradley Holtz, author of *The CADD Ratings Guide*, suggests that you think of buying a CAD system in the same way you think of basic transportation: "$3,000 will get you a motorcycle ... $30,000 will buy you a truck." He also stresses that costs should be calculated on a "per seat" rather than a "per system" basis; some are more economical if you buy several workstations with only one plotter. Dr. Joel Orr provides a formula for calculating the possible return on your CAD investment by comparing system and training costs with potential efficiency gains (see sidebar page 136).

Langdon suggests that you can start with CAD on a limited budget by choosing a single application, such as conceptual 3D modeling, that adds to the firm's capabilities without disrupting any existing office production procedures. "With the software available today," Langdon advises, "it is possible to get started in 3D modeling for less than $500 using the low-end Macintosh or IBM PC that the firm may already be using for word-processing." Once the firm is comfortable with computers in the design process, more powerful and complex hardware and software can be added. **Julie M. Trelstad** ■

CAD Resources

The following list of information sources compiled by P/A includes books, periodicals, conferences, and architectural CAD vendors that may facilitate your search.

Books/Pamphlets

CADD and the Small Firm '92: A Resourcebook, version 4.1: Evan H. Shu, Ruth Neeman, and Geoffrey Moore Langdon. Available from the Boston Society of Architects (617) 951-1433, ext. 221. $30 for BSA members, $45 for non-members. [This down-to-earth guide offers practical advice for professionals as well as vendor and consultant listings.]

The CAD Rating Guide, Bradley Holtz, High Mountain Press, 2nd Edition., available from the author (301) 365-4585, $49. (A 3rd Edition due out in September will be available with diskette, $150, with a credit for the price of the 2nd Edition; there is a 20 percent discount on pre-publication orders.) [This guide rates the features of each CAD package and offers users' and vendors' candid statements.]

PSMJ Software Directory for Design Professionals, Practice Management Associates, Ltd., $49, (800) 537-7765. [Lists over 800 software packages by more than 400 vendors.]

The Apple Business Solutions Directory: Engineering and Architecture. The directory and a video are free from Apple, (800) 441-3001, ext. 550.

Macintosh Construction Forum, newsletter, $10/year plus annual 60-page software directory, $69/year, (208) 263-3078.

"How to Choose a CAD System," Dr. Joel Orr, free brochure from Autodesk, (800) 445-5415.

(continued on page 142)

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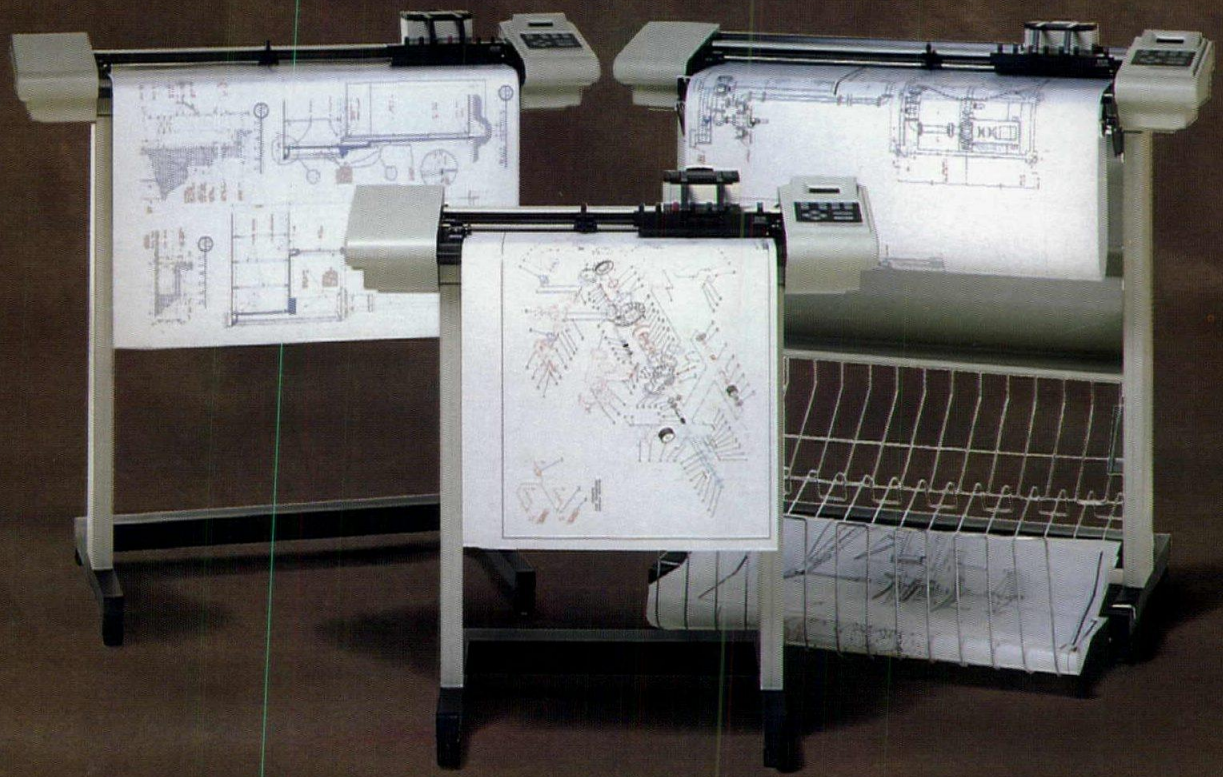

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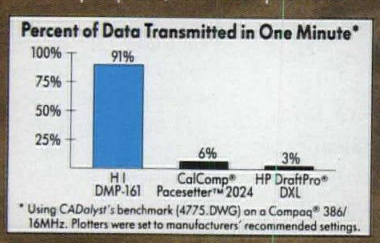

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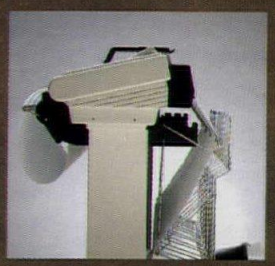

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Working With CAD Consultants

CAD Manager **Bertha M. Martinez** offers advice on choosing and working with a CAD Consultant.

More often than not, in-house CAD expertise is not what it should be. With technology continually changing, it is sometimes impossible to keep abreast of all the latest CAD improvements while still practicing architecture. Many firms using CAD extensively in everyday design and production are realizing the need for full-time CAD managers to maintain smooth system operation and promote innovative ways to use CAD applications. However, not every aspect of CAD needs to be dealt with in-house. In the same way an architectural firm teams with other consultants to produce a building, a CAD manager can team with a CAD consultant to accomplish a particular task. Selecting the right consultant for the job can greatly improve your chances of success.

If you have never worked with a CAD consultant, you have some preparation to do before you select one (see chart on next page). Many people will be happy to have your business, but you have to be careful that the one you select will meet your needs. Organize your thoughts and define the tasks before you seek a consultant. Also, preparing a list of requirements is essential prior to delegating work. This list should identify who is responsible for which tasks, to help you evaluate your consultant's submittal. Unless you are unwilling to compromise on a particular product or procedure, list your requirements instead of your perceived solutions. Remember that you want to learn how the consultant will help you meet your individual needs.

Once you have generated your requirements, you need to make them available to reputable CAD consultants. When identifying candidates, do not hesitate to call CAD managers at other architectural firms similar to yours and ask for their recommendations. Taking a few minutes to talk to a satisfied, or dissatisfied, user can save you a great deal of time and effort. In the past, I have also received excellent leads from people at conferences, CAD user groups, and computer shows; magazine articles, advertisements, and on-line services (like CompuServe) have also been helpful.

Evaluating a proposal involves more than comparing prices and quantities. Verify your consultant's expertise; some are not the experts they claim to be. It is critical therefore that you ask for references from firms with installations similar to the one being proposed for you. It is a good idea to select a short list of candidates so that you can spend more time courting the ones that best meet your needs. Once you have narrowed the list, visit some of the individuals given as references who are responsible for maintaining a CAD system. You can get more insight from a user in one hour than you can get from an over-zealous salesperson in a day.

Strodeckert Photographics

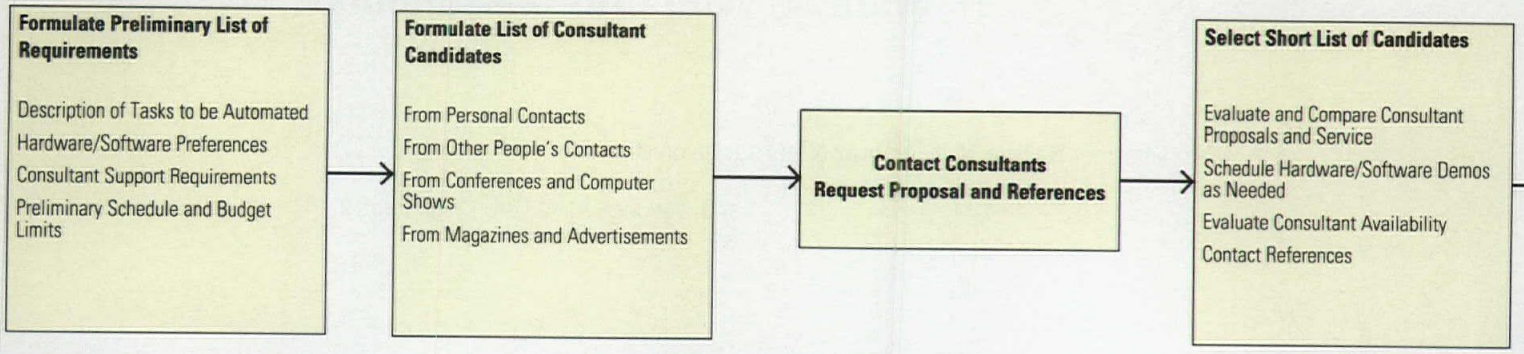
CAD STATIONS AT ZIMMER GUNSUL FRASCA

The CAD System that consultants helped set up for Zimmer Gunsul Frasca consists of KETIV 386/33 and newer 486/33 workstations (with 8 or 16MB RAM, 128 or 256K Cache, and 120MB hard disks) with 21" Hitachi Superscan monitors and Calcomp 16-button tablets. The workstations are networked together with NOVELL, a 386/33 server with 1.3GB disk capacity at each site. Peripherals connected to the network include a Calcomp electrostatic plotter, NEC Silentwriter2 printer, FileSafe Mountain Tape backup system (1.3GB capacity), and Multitech Systems Modem. The software is AutoCAD 11, enhanced by KETIV's ARCH-T2/3D architectural package. The firm also uses AutoSOLID, Renderstar2, KETIV's Advanced Rendering extension, Animator Pro, and Autodessys FORM-Z (on Macintosh) for 3D work.

Schedule hands-on demonstrations for the software/hardware being proposed. Good consultants will not hesitate to show their capability, so take advantage of these sessions to eliminate as many future surprises as possible. Often, a consultant may also be a qualified dealer for a certain line of products, so check the competition to assure yourself that these circumstances do not compromise your requirements. Also request specifications and literature, whenever applicable, so that you can compare and evaluate the proposals knowledgeably. It is usually a good idea to revise your preliminary requirements before you request a final itemized proposal. Be specific about any special hardware, software, custom needs, system management issues, consultant responsibilities, budgets, schedules, and future plans. Many misunderstandings will be eliminated if you first commit your thoughts to paper. Lastly, satisfy yourself that your consultant will be available to help you when needed and can work within your budget and schedule. If you have problems during the proposal stage, it is likely that you will not be able to establish a good working relationship once the consultant is hired.

Having selected your CAD consultant, negotiate a contract based on your final list of requirements. Cost will vary depending on the consultant's experience, the type of work being done, and the fee structure selected (hourly or flat-fee). You should establish early-on a process by which to communicate ideas, report deficiencies, and measure

Process for Selecting a CAD Consultant



Words of Advice for Working With Consultants

The author suggests the following guidelines:

- Keep a paper trail; document requirements and CAD Problem Reports.
- Budget enough money to ensure quality and good performance.
- Seek help for tasks that you are not qualified to handle or do not have the time to perform.
- Verify your consultant's references and schedule site visits.
- Ask questions; better to sound ignorant than to stay ignorant.
- Request written proposals that include an implementation plan and schedule.
- Space out the timing of major installations whenever possible.
- Test your system before dismissing your consultant.
- Get upper management support.

Guidelines for Dealing with Dealers

Computer consultant Geoffrey Moore Langdon offers the following advice:

- Don't buy promises (e.g., "our next update is coming next month.")
- Take a typical drawing that your firm has done and have the dealer replicate it on the CAD program in front of you.
- Beware if you cannot follow what the dealer is doing.
- Beware of the standard demonstration. (Many demonstrators use a variety of tricks such as hidden layers or files of predrawn elements ... so it is difficult to

(continued on next page)

progress. Logging CAD Problem Reports (CPRs) is useful not only to identify problems, but also to provide the means to track the resolution of problems and to establish priorities.

There are many areas of CAD where consultants can prove to be a valuable resource. Consultant support can help CAD managers fulfill goals that they may not have the time or expertise to accomplish. It is very important these efforts are well guided by someone in your firm who understands the CAD implications within the context of your organization. CAD should not impose limits on the way you design, but rather enhance the process.

The following is a synopsis of some of the services available from CAD consultants. Depending on your firm's in-house CAD expertise, you may require varying amounts of support in some or all of the categories listed below:

System Selection

Before a system can be selected, the tasks to be automated must first be identified. Determine whether a system will be used alone or in a network and specify storage needs, backup methods, file management issues, compatibility with other systems, output devices to be supported, training issues, budget limitations, and maintenance support. A consultant can recommend hardware and software based on these user-defined requirements. In some cases, consultants can even evaluate your operation to assist you in defining your needs.

Once the requirements have been established, a CAD consultant can schedule hands-on presentations of the products involved, prepare literature and bench-mark tests for your evaluation, and put you in touch with other users with similar installations. You make the final decision, but a knowledgeable consultant can aim you in the right direction. It helps greatly if the staff person dealing with the consultant has CAD knowledge as well as a good understanding of your firm's goals.

System Installation

Installing a new CAD system successfully takes hours of planning. If you do not have previous experience with computers or the time to become more familiar with them, you are well advised to get some help. Many people with limited budgets buy systems without support and find themselves with a costly investment they cannot use. A CAD consultant can assist you in preparing an installation plan and schedule for your hardware, software, and peripheral devices such as printers and plotters. Many consultants can offer assistance in customizing the software according to your particular needs. They are good sources for providing training and system support. If you are just starting out, they can get you going much faster than if you rely on teaching yourself by reading the manuals.

Managing Your System

Although it is most efficient to keep CAD management tasks in-house, there are some tasks that may be delegated to a trusted consultant. If you are starting out with CAD, consultants can help you set up system management standards for backups, file management policies, project archiving, disk maintenance, CAD accounting, and the like. Managers who already have a working system can employ knowledgeable CAD consultants to suggest new ways to operate their system more efficiently. Consultants also can make sure that your system is kept up to date with the latest upgrades and viral protections. Finally, CAD consultants are a good source of information when you are working on your future CAD management plan.

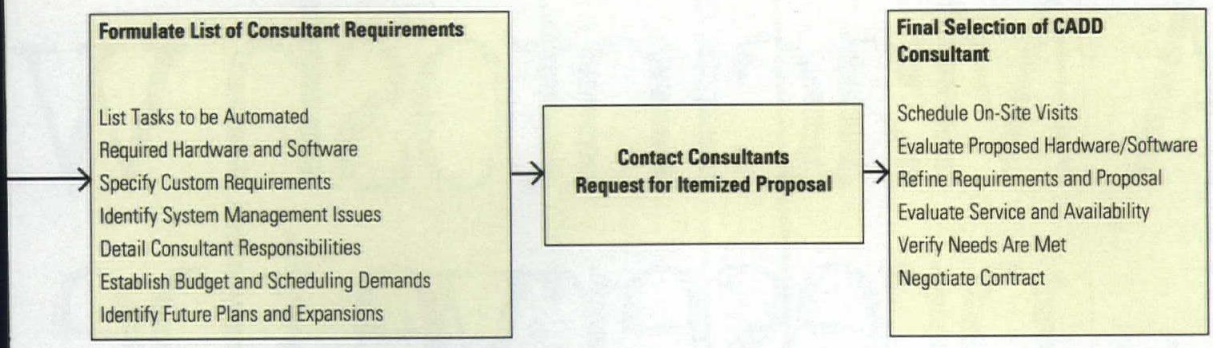
Customizing Your System

Regardless of how good a software package may be, applications are usually kept generic to accommodate most users, so consultants can assist you in customizing your software to respond to your individual needs. CAD software enhancements can range from writing simple macros to developing elaborate programs. Additionally, you can customize system management procedures to minimize and simplify your system maintenance tasks, and commit repetitive procedures to programs to reduce the risk of costly mistakes.

Before hiring someone to write software for you, find out if there is a third-party package that already exists for that particular application. Using an existing program will likely be more cost-effective than hiring a programmer to do the job. However, should you decide to have custom software developed, make sure you have written requirements and are provided with a cost estimate and a schedule for completion.

Expanding Your System

Just when you get everything running smoothly, invariably you will want new software releases or



need to upgrade and/or expand your system. The right consultant can make sure that your operation does not come to a halt while these changes take place, and they can assist you in adding workstations and incorporating new peripherals into an existing system.

Networking your operation may not be done with the introduction of your first workstation but, as your system grows, it may become a viable solution. Again, if you have never installed a network, do yourself a favor and hire someone who has. It can be a complicated job, especially if you are bridging to other networks in your organization.

Training

Investing in proper training for employees can result in higher levels of productivity. Although it is better to have the CAD manager conduct in-house training sessions, there may not be time for that. Consultants can offer relief by teaching the staff basic skills so that the CAD manager can concentrate on exposing the company's CAD standards and procedures. Besides CAD training, there are many classes being offered by qualified teachers that include system and network management, programming, and advanced uses of CAD such as 3D and animation. Before you enroll in any class, request an outline so you can evaluate the material to be covered. Conventions and computer shows are good places to find useful lectures and workshops.

Hardware/Software Maintenance

Nothing is more important than consultant availability when something goes wrong with your system. Of almost equal importance is the timely resolution of your problem. Although most software questions can be addressed by a telephone call or a modem connection, hardware failures demand more personal attention. A local consultant can obviously get to your office faster than a distant one. However, if the local person cannot fix your problems, you may be better off with a reputable out-of-towner.

There are many issues involving software and hardware support that are contingent on how much money you are willing to pay. Depending on your financial situation, you may decide that on-site repairs are too costly, although that means taking on the responsibility of doing the initial diagnostics to isolate faulty equipment. If you do not have the skills and experience to troubleshoot computer problems, you will likely save time and money by choosing on-site repairs. Many consultants offer maintenance agreements with fix-or-replace policies within a pre-defined response time. Ask yourself: How long can I live with a broken system and how much am I willing to pay for support?

One last issue you should consider is that every time you involve more than one consultant you are inevitably going to have some "finger-pointing." Software people will blame hardware, hardware people will blame software, and both will in turn blame the operating environment. This situation could drive your CAD manager to an early retirement. Unless you have the time and in-house expertise to do proper diagnostics, it may be worthwhile to employ a consultant capable of coordinating all components.

Miscellaneous Tasks

There is a series of miscellaneous services that CAD consultants can offer architectural offices on an as-need basis. At times, you may not have the necessary volume of work to warrant the specialized equipment required by a particular task. It may prove more practical to hire a consultant to do this work rather than to implement the system in-house. Consultants can offer services like scanning, digitizing, color and laser plotting, producing high-resolution animations, generating CAD videos, electronic modelmaking, etc. Consultants are also available to help out with overflow work.

As a CAD manager, I have had the opportunity to work with several consultants. Last year, we survived a complete system overhaul involving new hardware and software, and lived to tell the story. I am convinced that our CAD consultants had a great deal to do with our success. It took careful planning and coordination, but by selecting a reputable professional committed to responding to our needs, we were able to implement major changes with minimal disruption to our production schedule.

Bertha M. Martinez ■

The author is an associate and CAD Manager at the Zimmer Gunsul Frasca Partnership in Seattle, Washington. During the last 10 years, she has been involved in selecting and implementing CAD systems. Her extensive CAD background includes teaching graduate-level CAD courses for specialized applications, and developing software for specialized applications.

(continued from previous page)

tell how long it would really take.)

- Beware if you ask demonstrators to do a feature and they suggest an alternate; this may mask a shortcoming in the software.
- Try the program yourself.
- Take a DXF file of one of your firm's typical drawings and get the demonstrator to bring it up on the screen.
- Bring more than one person.
- Don't assume that 3D CAD is more difficult.
- Don't assume that just because a program is better at several features that it is better at all of them.
- Don't be wowed by glitz; sometimes a program that seems to do it all can be missing basic important features.
- Don't assume that just because it runs on a Macintosh that it is always easy to use.
- Look out for Beta testers (dealers or architects who have helped the vendor develop the software for market use); like proud parents, they cannot be objective.
- Be skeptical of anything a dealer says about the competing software.
- Beware of superfluous service contracts; plenty of places may be able to service your equipment less expensively.
- Beware of dealers who set you up with an access or menu system that you do not understand.

Excerpted from CADD and the Small Firm '92 *(for reference information see page 119)*.

A Macintosh w preserve the

"No house should ever be *on* any hill," Frank Lloyd Wright once wrote. "It should be *of* the hill, belonging to it, so hill and house could live together, each the happier for the other."

The Apple Macintosh Quadra.

The notion of integrating into an environment rather than overwhelming it, of complementing what already exists rather than eliminating it, is as relevant to the architecture of computers as it is to the architecture of buildings.

Macintosh Quadra runs all the most powerful design and architecture software.

Yet, to this day, the Apple® Macintosh® remains the only kind of computer designed from the very first chip to work the way people work, instead of forcing people to work like a computer.

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Both computers combine the simple, commonsense virtues of every Mac® with a whole new level of speed, storage, expansion and networking capabilities.

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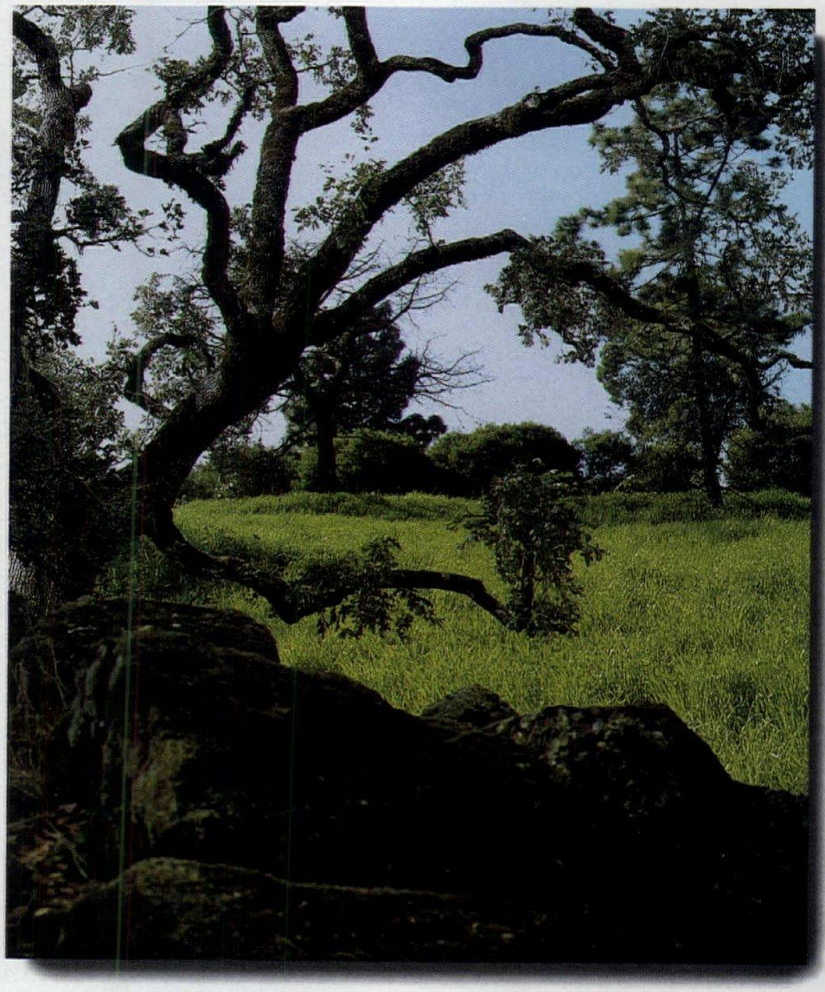
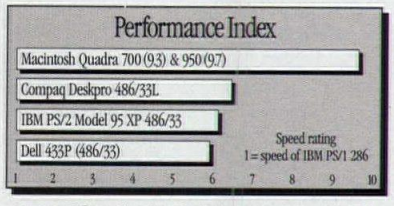
Both have the extraordinary processing power you need to run all the most popular architecture and design software, including programs such as AutoCAD, ArchiCAD, MicroStation Mac, Architrion and Alias Upfront.





Macintosh® Quadra significantly outperforms 486 PCs from IBM, Compaq and Dell running Windows 3.0.

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All this power means that you can now use

**Comparisons are based on a 1991 independent research study conducted by Ingram Laboratories that tested a variety of personal computers running applications available for both the Macintosh and Microsoft Windows 3.0 environments. **24-bit video support for up to a 16" monitor—also available for 21" monitors neither an endorsement nor a recommendation. All product specifications and descriptions were supplied by the respective vendor or supplier.*

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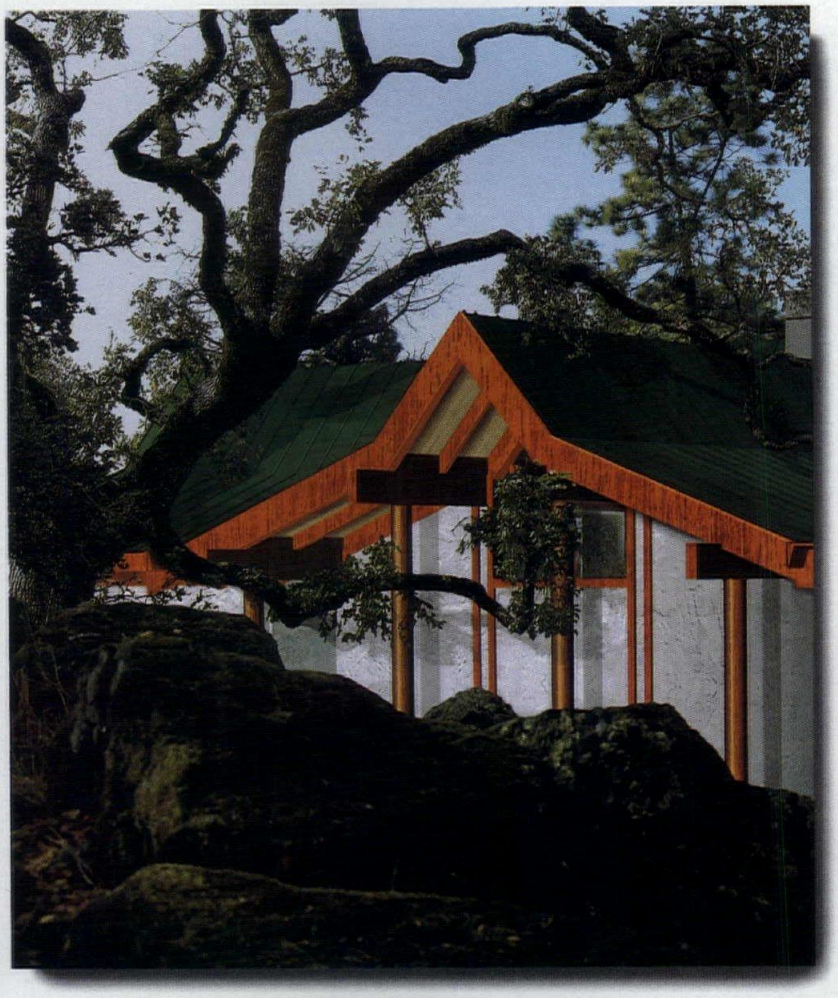


the simplicity of a Macintosh to do things like create a stunning 3-D model of a building and combine it with a photograph of the environment or location where you want the building to go. Then take your clients on a real-time tour of the structure with programs like Virtus WalkThrough, letting them interact with the computer and choose the areas they want to explore.

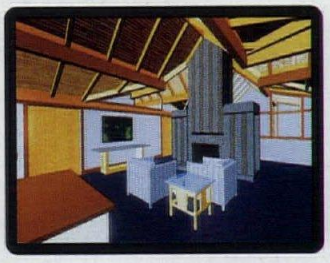
You can add a 400MB hard disk to both the 700 and the 950. And the 950 even lets you add a CD-ROM drive or a removable cartridge drive, and a disk array or more than one gigabyte of internal hard disk storage.

There are two Macintosh Quadra models. The 950 sits next to your desk; the 700 fits on top of it.

You can increase the memory of the 950 to up to 64MB of RAM so you can have several large files or many programs open at the same time.

And you don't have to buy an extra video card because high-resolution 24-bit photographic-quality video** support is already built in.

Macintosh Quadra helps people work together, too. File sharing and networking are both built in, making it possible for anyone to build a network simply by plugging in a cable. For high-performance networks, Ethernet is built in as well.



With accelerated 24-bit video support built in, Macintosh Quadra brings spectacular, photo-quality color to programs like ArchiCAD and Architrion without the expense of an extra video card.

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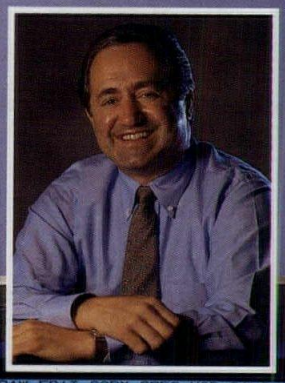
Jim Scalise finds FastCAD®'s speed and ease of use gives more than an increase in quality production time... "We found other systems difficult to learn, but FastCAD enabled us to get up and running in short order. Architects that need the fastest CAD system have to see this to believe it. FastCAD really lives up to its name. Without FastCAD it would be tough to compete and we wouldn't have time for the extensive detailed work we consider standard on all construction documents.

Jim Scalise
Nickels + Scalise Architects



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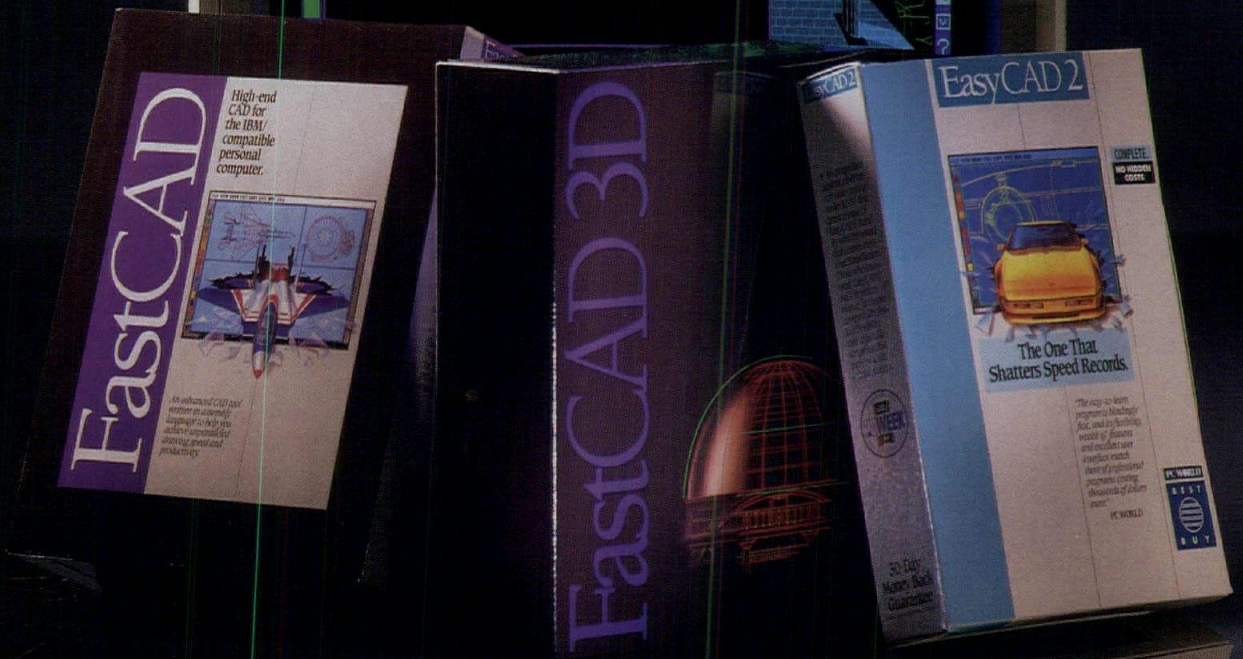

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Integrating CAD Technology

Hans-Christian Lischewski and **Mark Hartmann** describe the steps that were taken in selecting and implementing a Computer System at the New York offices of Perkins & Will.

When Perkins & Will and Russo + Sonder, Architects, P.C., merged and planned to move into their new office in New York, computerization was given special attention. Both firms had previously employed CAD systems and had developed capabilities to use CAD. Production procedures to generate documents on CAD had been established by both offices and each had libraries of symbols, details, and macros. Because of the different capabilities of the hardware, software, and the operational skills of the staff, the firms had different methods of working with CAD.

Russo + Sonder had used a mid-sized system service center staffed with junior architects who worked closely with the studio teams. The center generated the bulk of the construction documents and provided three-dimensional modeling for the designers. Perkins & Will, on the other hand, had installed a high-end system, which supported all its architectural and engineering applications in its offices in Chicago and London. The system was decentralized, allowing designers, detailers, and engineers to work directly on the system as professionals rather than as CAD operators.

Evaluation Process

Selecting a CAD system is a decision-making process that is made more difficult because architects are not trained to be computer experts. A CAD decision is complicated further by the fact that there are often many people involved in the process, all with their own experiences and opinions. This analytical method gives the decision-making process more clarity and a degree of objectivity. It offers a vehicle for representing individual judgments and opinions in a form where they can be critiqued by other decision makers, disagreements can be uncovered, and a rational consensus can be reached. It is also an excellent way to communicate a decision to upper management. Evaluating the relative value of the criteria and giving each a weighted value was in many respects the most critical step in making our decision, and it was important for us to complete this process before going on (see worksheet).

Creating a Strategic Plan

Before we decided which CAD system we should acquire for the new office, representatives from all Perkins & Will offices met to develop a strategic plan for the selection and implementation of elec-

Criteria	Value*	Rating	Score
I.Software	**48**		
A. Drafting			
1 Capability	8		0
2 Ease of Use	3		0
3 Multiuser Drawings	5		0
4 Links: Data, Text	5		0
5 Expandibility	4		0
6 Attribute	3		0
7 Available trained staff	2		0
B. Sketching			
1 Capability	1		0
2 Ease of Use	2		0
3 Attribute	1		0
4 Link to Drafting	2		0
C. 3D			
1 Capability	2		0
2 Ease of Use	3		0
3 Presentation	3		0
4 Links	2		0
5 Attribute	2		0
II. Platform	**14**		
A. Hardware	3		0
B. Operating System	3		0
C. Network	3		0
D. System Management	1		0
E. Range of Hardware	2		0
F. Available Software	2		0
III. Compatability	**25**		
A. Existing			
1 Hardware	10		0
2 Software	10		0
B. Clients			
1. Software	2		0
C. Consultants			
1. Software	3		0
IV. Vendor	**13**		
A. Platform			
1 Speed/Power/ Redraw Time	4		0
B. Software			
1 Updates	3		0
2 Support	2		0
3 Add-ons	1		0
4 Stability	3		0
Total Value	**100**		**0**

* Figures in this column are the values that were set by the office of Perkins & Will.

Hans-Christian Lischewski

CAD SELECTION WORKSHEET PREPARED BY PERKINS & WILL.

CAD Worksheet

1 *Determine what criteria are relevant to your goal.* What is needed for you to reach your goal? What is important today? What is important five years from today?

2 *Determine the relative value of each criterion.* How important is this criteria to the overall system selection? What values does it represent in reaching your goal? This step should be developed in two parts. First determine the overall value of each group (software, hardware, compatibility, or vendor). Second, allocate some portion of the total value of the group to each criteria. The total value for all criteria should equal 100 percent.

3 *Identify system alternatives.*

4 *Evaluate each system against the criteria using a numeric rating system.* (0=Unacceptable, 1= Minimally acceptable, 5=Acceptable, 10=Best). The step is best implemented by independent evaluators. All rates should be explained to the group, discussed and a consensus rate reached for each. This value is that was multiplied in step 5 by the values established in step 1.

5 *Determine the score for each criteria by multiplying the value by the rate.*

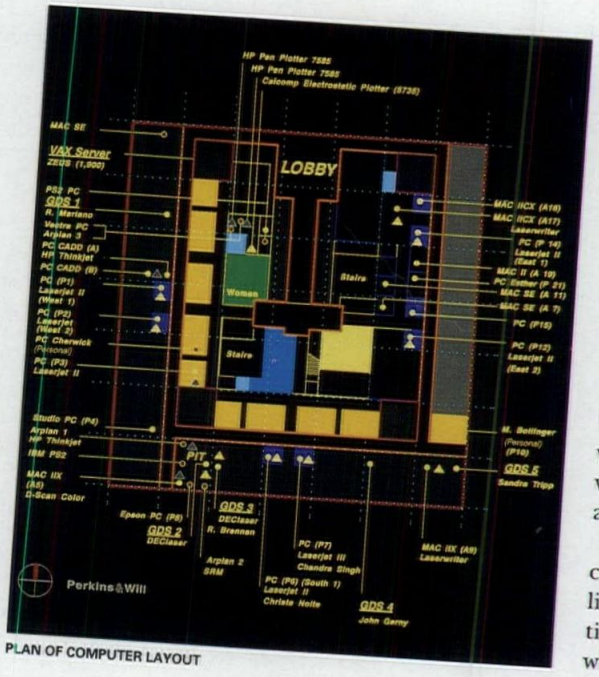
6 *The total score for each system alternative provides a relative index of how the selection group sees each alternative.* This last step was the most enlightening for our firm. No one knew how each system alternative would compare with the others until all the mathematical computations were completed in step 5. At this point, the group can step back from the very detailed work and look at the big picture. It is important to agree that the decision will not necessarily be the system with the highest score, because the process was only a tool to help us better understand why and how we were making a decision.

HARDWARE	**HP 2000** **SILICON GRAPHICS**	**386 PC**	**VT 320**	**386 PC**	**VAXSTATION 3100** **M76 SPX**	**HP THINKJET** **DEC LASER 2100**
APPLICATION	MODELING CONSTRUCTION DOCUMENTS	MODELING BUSINESS GRAPHICS DESKTOP PUBLISHING	SYSTEM/NETWORK MANAGEMENT	WORDPROCESSING SPREADSHEETS DATABASES SCHEDULING	MODELING CONSTRUCTION DOCUMENTS	
SOFTWARE	ARVIEW	ALIAS UPFRONT HARVARD GRAPHICS PAGEMAKER 4.0 COREL DRAW AMI PRO LOTUS FREELANCE	VMS PATHWORKS	WORDPERFECT 5.1 LOTUS 1-2-3 REL. 3.1 PARADOX TIMELINE 5.0 MICROSOFT EXCEL	GDS-MODULES	

A Strategic Plan for Computerization

Perkins & Will developed the following computerization objectives:

- *Educate staff.* Maintain a computer systems education program; Maintain a job-related computer skills standard; Maintain knowledge of the computer systems marketplace trends.
- *Attract and retain computer literate staff.* Provide effective computer tools (support the professional); Provide focus on professional growth, not on the tool.
- *Manage computer resources.* Balance system device to meet task requirements (PC vs. Workstation); Maximize equipment use; Maintain documented procedures.
- *Maintain compatible and integrated computer systems.* Maintain a prioritized "Wish List"; Implement the necessary computerization tools; Maintain an implementation/support group; Maintain current and consistent hardware and software; Integrate office procedures where feasible.



PLAN OF COMPUTER LAYOUT

tronic information systems for all of the firm's operations. In addition to selecting the appropriate CAD system for the new office, we had to consider the compatibility and performance of other computer resources, such as marketing, accounting, administration, and project management. Although Perkins & Will had already invested heavily in a large high-end CAD system, the committee decided not to let past decisions dictate future computerization of the New York office. Their mission was to select a computer system that addressed the professional needs of the New York office and was consistent with the goals of the Eastern region and the corporate strategic plan (see sidebar).

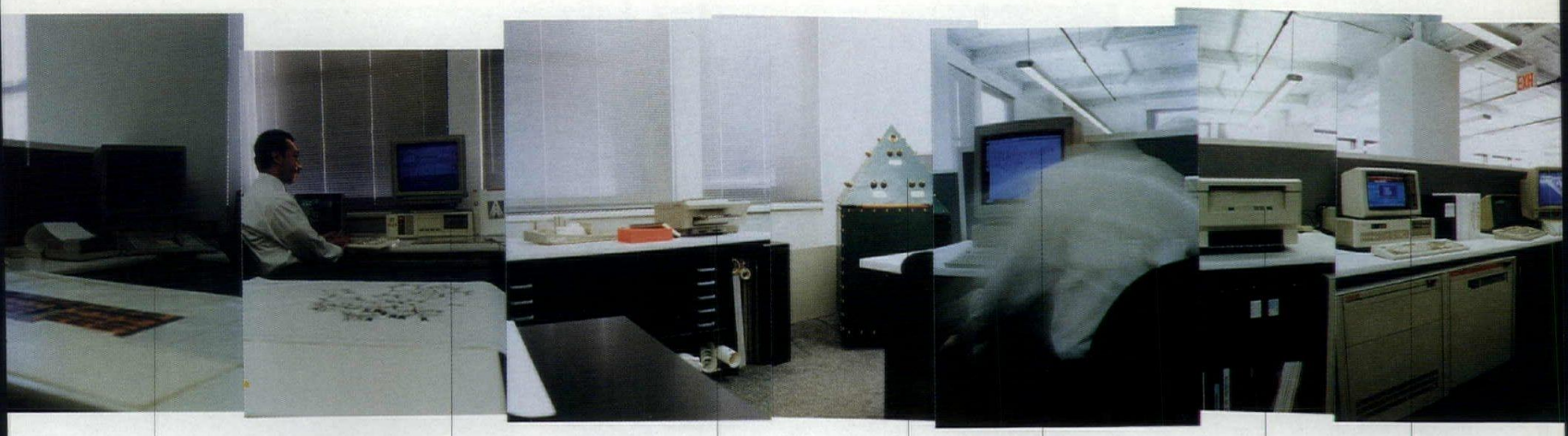
During our initial session we determined the following requirements for our office:

Integration. The CAD system should be part of an integrated office information system. We wanted more than an automated drafting device, we wanted a set of professional tools that would support the corporate strategic goals, such as providing a superior project delivery system.

We decided that the best system should be an "Open System." That means the hardware and software should be as generic as possible and allow for versatility of use and access to multiple purchase and support options, both now and in the future.

Hardware. The professional CAD stations should consist of a workstation with a large graphics screen linked to a central system that allows all workstations, input and output devices to communicate with each other. Smaller workstations for other purposes, such as wordprocessing, conceptual design, and office managment tools will also be networked together. Workstations should be equipped with a pointing device (such as a mouse) in a windows-type environment that allows for multiple activities to occur at the same time.

Software. The professional will need to use the following software applications that ought to be linked to each other to eliminate redundancy: 2D and 3D CAD, simple drawing and sketching, special applications such as engineering design and analysis or project management, and general purpose applications such as spreadsheets, word processors,



HP 2000	386 PC	DECLASER 2100	PYRAMID FOR DISPLAY OF STEREO-GRAPHICS	MAX IIX	COLOR PRINTER D-SCAN CH-5312	386 PC
CONSTRUCTION DOCUMENTS SYSTEM MANAGEMENT	FACILITY MANAGEMENT PLANNING PROGRAMMING CONSTRUCTION DOCUMENTS MODELING			MODELING DESKTOP PUBLISHING SPREADSHEETS CONSTRUCTION DOCUMENTS		WORDPROCESSING SPREADSHEETS SCHEDULING
ARPLAN	DRAWBASE AUTOCARD SPACE WINCAD			VERSACAD VIRTUS WALKTHROUGH ALIAS UPFRONT MODELSHOP II FROM-Z ALDUS PAGEMAKER MICROSOFT EXCEL		WORDPERFECT 5.1 LOTUS 1-2-3 3.1 TIMELINE 3.1

desktop publishing applications, and databases that have been customized for specific needs where possible.

We wanted the firm to be able to use several CAD packages simultaneously. While there are many benefits to having a primary system that is the same in all offices, there are several small, secondary systems that could be used for specialized applications.

Implementation

After a thorough analysis and evaluation, we decided to expand the existing CAD system as a backbone of our network that was compatible with our other offices. To make this decision successful we agreed to the following implementation plan:

1 Perkins & Will's Chicago office committed experienced resources to aid in the set-up, installation, training, customizing, use, and management of the systems. 2 Perkins & Will Corporate (the firm's administrative office in Chicago) appointed a professional systems manager responsible for the implementation of professional systems at a firm-wide level. This allowed us to leverage our current and future system investments in the New York office. 3 The New York office appointed a system manager and an application manager. 4 Perkins & Will Corporate provided a budget to ensure that the financing for these objectives remain available. The goal to maintain compatibility throughout all offices is a good idea, but it is of no value unless we commit the necessary budget and staff time required to take advantage of it.

What We Learned

A year has passed since we installed our new system that is decentralized throughout the design studios and used by designers and project architects. A centralized support service has been established to coordinate these system resources, develop customized applications, train new staff, and provide special services such as computer-aided modeling and conversions. As expected, getting familiar with the system took time and yielded some surprise. Following is a summary of what we have learned.

Training. Because training for our office was provided by an expert from the Chicago office to a large number of our staff, sufficient system expertise was soon available, allowing a number of projects to be executed by system novices. We soon realized that to utilize the full potential of the system, both continued training and, more importantly, continued regular use, were required.

Outside support for networking. Support from the corporate office was important in making the system operational in the new office. Although a system manager was hired for the New York office, we encountered problems implementing networking capabilities. In addition to bringing the high-end hardware on-line, it was necessary to network PC's, Macintosh, Hewlitt Packard, Silicon Graphics, and DEC equipment together. While we fine-tuned the local area network, we also established a link with the Chicago office via a "wide area network."

Network procedures. While most staff who were working with CAD managed to come "up to speed" on the new system within a relatively short period of time, we encountered problems among others who

A panorama of the offices of Perkins & Will, New York, (above) reveals a wide variety of platforms and application software. The larger, more expensive systems are used for production work on large commercial and institutional jobs, whereas the smaller, less expensive systems are used for small design jobs, office management, and marketing functions (see diagram, page 130). Yet every computer is linked in a network; if you look closely, you will find an image of the same building on every screen. How are they connected? Components from Digital Equipment represent the core, including a DEC-server and various VAX workstations and are networked via DECNET. DEC's network protocols, "Pathworks DOS/VMS," and "Pathworks-Mac/VMS" link PCs and Macintoshes to the server. The "multinetwork" employs Novell and Appletalk to link selected computers of the same platforms. The distributed network, on the other hand, allows users to transfer data from one system platform to the other and provides easy conversions of data.

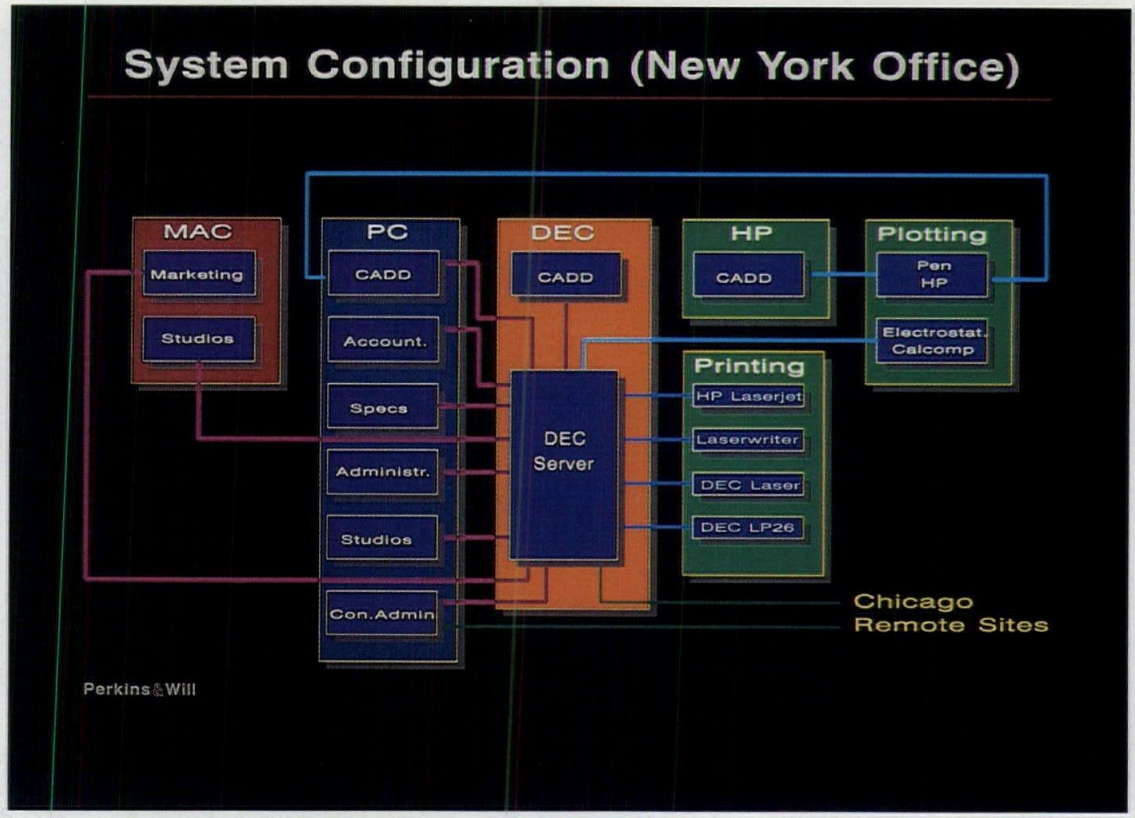
CAD Operator/Architects

Skills required to generate architectural drawings in the CAD system are changing. Fifteen years ago, when CAD systems were expensive and required tedious data entry procedures, CAD operators performed exclusively drawing functions. In larger firms and in CAD service bureaus, assembly-line-like procedures were not uncommon. Operators were assigned special drawing types or even selected input tasks that they repeated from project to project. This work required minimal architectural skills and CAD training. It was performed by people with entry-level positions. Although production was relatively efficient, it involved a substantial amount of coordination and checking of intermediate results by others.

Today's systems, more powerful and more user-friendly, are easier to work with. The CAD system has changed from being a drafting processor to a being tool that generates a database of a design. To operate these systems efficiently, users have to be familiar with architectural design. Instead of occupying workstations with key-punching operators, CAD workstations are used today by CAD architects. Being familiar with all aspects of drawing production and project-specific codes, they can work under a minimum of supervision with the highest productivity. We can observe a trend that construction documents are being generated by those individuals who actually design the project.

Depending on the CAD applications, an operator might need a number of months of training to become efficient in CAD. Operators should have architectural training or at least experience in drafting. Once they are trained in the use of various software applications, they will be able to enter, manipulate, and extract graphics and non-graphic data. To increase their productivity on the system, operators should be self-motivated to learn about CAD in general. ■

Excepted from Hans-Christian Lischewski, "Implementation and Management of CAD Systems," in the NCGA '92 Proceedings (see page 119 for resources).



THE PERKINS & WILL NEW YORK SYSTEM CONFIGURATION. EACH PLATFORM FULFILLS A SPECIAL NEED.

had been accustomed to working on stand-alone PC's using word processing and spreadsheet programs. Used to managing their own data files on their individual hard disks, they had to learn how to relate to networked systems. Standardization of screen menus and the development of an office-wide computer manual were necessary to establish uniform operations among all system applications and users.

Compatible file formats. The drawback of our CAD system is that many of our clients and consulting engineers work with other CAD systems. Data formats of CAD documents are not directly compatible and have to be converted. Such conversions can be time-consuming and expensive if proper planning and compatible layering standards are not decided upon by both parties at the beginning of a project. To overcome this, it was necessary to implement a smooth conversion procedure between various CAD packages. Using the DXF conversion program, automating the procedure, and moving files from one hardware platform/CAD program to another are now standard operations in our office.

Shared Resources. The installation of a firm-wide system allowed the New York staff to benefit from the experience the users had in Chicago. The shared resources are now available to solve bottlenecks in production. This is especially useful to meet deadlines because drawings can be generated at different locations simultaneously. Being able to share electrostatic plotters has also been important on several occasions.

Scheduling. Since the system resources are spread throughout the office and are used by many individuals, conflicts can occur. The same applies to estimating production time. System users have different levels of expertise that can result in diverse efficiencies. To avoid surprises it has become essential to match performance skills with the complexity of the work and time schedules.

Future Plans

Implementing a professional CAD system was only the initial phase of computerizing our new office. The next step will be to streamline our resources for efficiency and increased value, and expand them to every staff member and phase of work in the office. This will allow us to support each task with a productive computer tool. We are considering implementing a secondary, lower-cost CAD system, which will be used for smaller, less complex tasks and as additional workstations to generate detail libraries and other in-house information resources. Over the past few years we have experienced an improvement in system performance and a drop in costs. We have learned that computer technology is constantly changing and we have to learn and relearn it on a regular basis. Only if we are familiar with current, state-of-the-art system performance will we be able to use our tools efficiently.

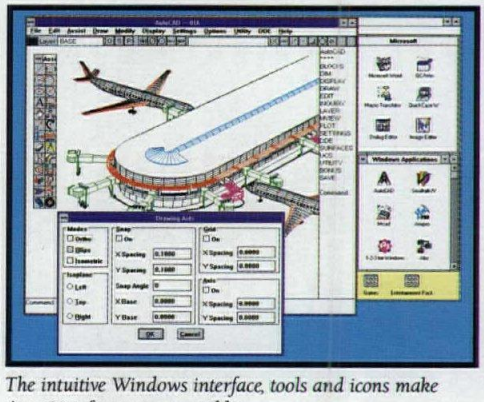
Hans-Christian Lischewski and **Mark Hartmann.** ■

Hans-Christian Lischewski is the director of computer services at Perkins & Will, where he is an associate, Mr. Lischewski is also an Associate Professor and the director of Architectural Computing at the Pratt Institute of Technology in New York. Mark Hartmann is also an associate of Perkins and Will where he is a project manager and a member of the firm's CAD Management Committee.

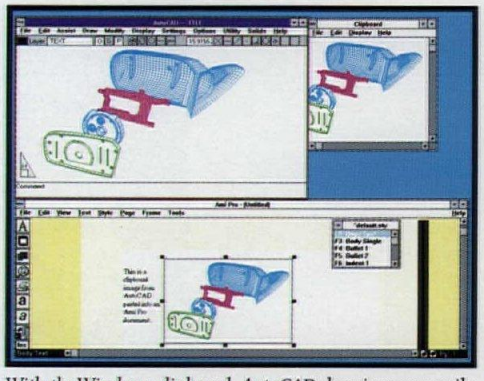
The Creators Of AutoCAD Have Just One Thing To Say To All Those Who Have Stubbornly Refused To Learn CAD.

"You

We have to admit, you're persistent. Year after year, you've had the same objections to learning CAD. So we've finally decided to do something about them.



The intuitive Windows interface, tools and icons make AutoCAD far more accessible.



With the Windows clipboard, AutoCAD drawings are easily added to documents and presentations created on desktop publishing, paint, drawing or word-processing software.

Objection #1:

"IT TAKES TOO LONG TO LEARN."

Not any more. Now AutoCAD® runs on Windows.™ That means you get all the advantages of AutoCAD without memorizing command names. Instead, you create your drawings by selecting simple Windows tools and icons. So your learning curve is much shorter.

Objection #2:

"I CAN'T DESIGN ON A COMPUTER."

Windows helps change all that. Its intuitive interface and pull-down menus eliminate most of the repetitive keyboarding that makes computer work feel confining.

The AutoCAD Release 11 Extension for Windows also lets you move back and forth effortlessly between other Windows applications. So you can work the way that comes naturally to you. Create a brilliant drawing on AutoCAD. Write the specs on your word-processor. Then use the Windows Clipboard to insert both pieces into a desktop publishing program, so you can polish your proposal.

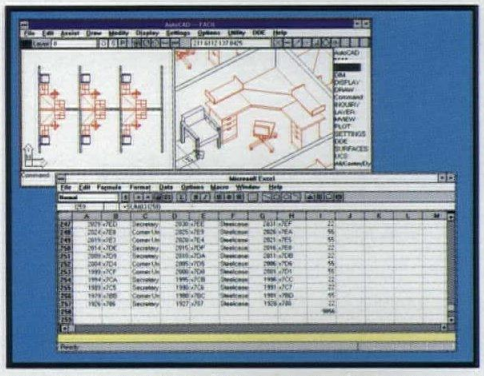
Now AutoCAD

Objection #3:

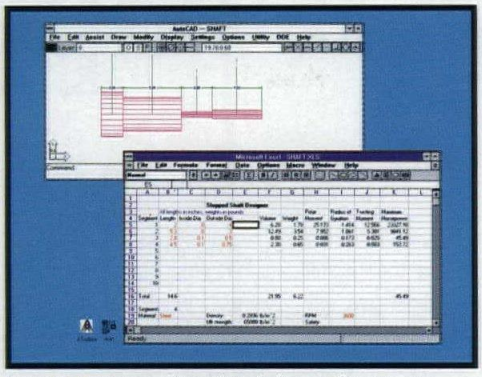
"I CAN WORK FASTER BY HAND."

Okay, let's be honest about this. Maybe you and your pencil can beat the blazing speed of AutoCAD for rough sketching. But AutoCAD leaves your pencil in the dust

Win.”



Using Dynamic Data Exchange, you can eliminate many repetitive tasks by linking AutoCAD to other Windows programs.



AutoCAD gives you the tools to link your drawings to spreadsheets. So you can explore the possibilities of parametric design.

Runs On Windows.

when it comes to designing, making revisions and creating multiple views.

That's not all. AutoCAD on Windows has another way to make you more productive. It's called Dynamic Data Exchange (DDE). With DDE, information flows in both directions between AutoCAD and other Windows applications, like Microsoft® Excel® and Lotus 1-2-3®.

So when you update an AutoCAD drawing, new costs can be automatically computed on your spreadsheet. And when you update your spreadsheet, it can revise your AutoCAD drawing for you. See how long that takes you by hand.

With the new AutoCAD Extension for Windows, all the advantages AutoCAD users have been hoarding are now accessible to you. Now your files will be instantly transferable, and your work compatible with more than 650,000 other AutoCAD users. That probably includes many of your clients and colleagues. In addition, you can use the power of programs like Microsoft Visual Basic™ or Borland Turbo C++™ to create custom CAD applications that fit the work you do.

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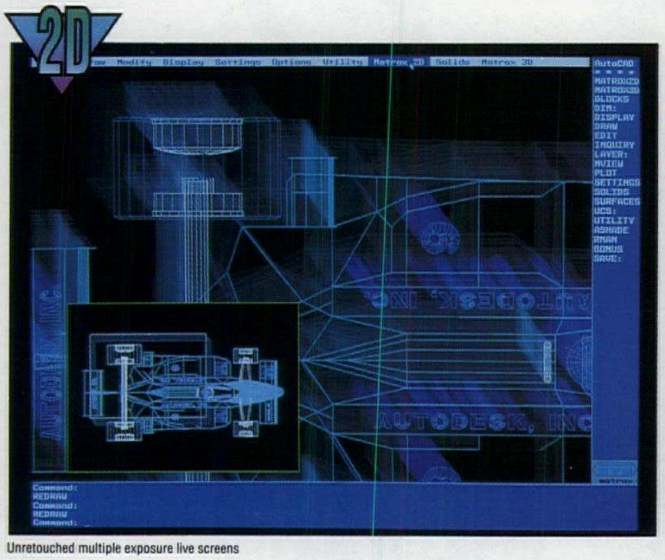
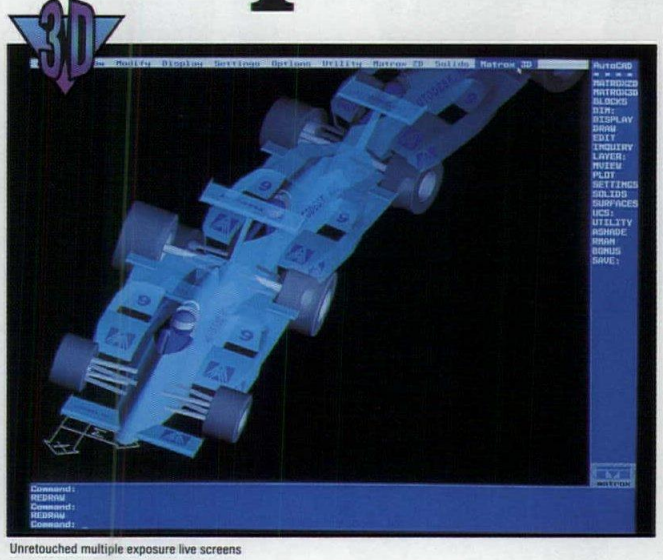


Unretouched multiple exposure live screens



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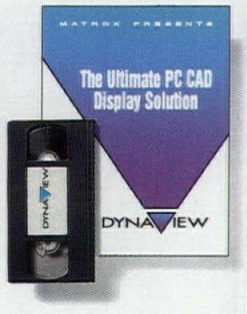

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One Firm's Search for CAD

The Orcutt Winslow Partnership demonstrates how a firm can employ its architects' skills to choose a CAD system that best meets its needs.

The Orcutt Winslow Partnership, a mid-sized architectural firm with 39 employees (21 of them architects) has a commercial and institutional building practice with educational, medical, and commercial projects. The firm frequently offers programming and masterplanning as services to its commercial and institutional clients, so it was logical for the firm to use the same techniques in organizing their search for CAD. The following is an account of the process as told to P/A by the firm's CAD Manager, Charles W. Hill.

Al Payne

Orcutt Winslow and one of their computers

Obviously, the Orcutt Winslow team thinks a lot of its new CAD system. Shown here with one of their computers are Chuck Hill, Martin Flood, Carl Nelson, Edwin Wilson, Mark Patterson, and Paul Winslow. Which system did they choose? According to their calculations, the UNIX-based Arris System by Sigma Design should have been the winner, with Cadvance's DataCAD and Accugraph also scoring high, but the firm ultimately chose Graphisoft's ArchiCAD because it worked best with their existing Macintosh network. Currently, the office has 20 Macintoshes, three of them for dedicated CAD use. The firm also decided that it would consider expanding its system to include other platforms in the future.

Getting Started

The first step for Orcutt Winslow was to determine whether it even needed a CAD system, and if so, what the system would be used for and who would use it? Before the firm considered a CAD purchase, the architects took a careful look at their needs and goals.

The practice of the Orcutt Winslow Partnership is divided into seven teams – six architectural and one interiors. Each has its own projects and clients and works esentially as a small office. Because the teams are made up of professionals, architects and architectural graduates, who all work on all phases of a project, the challenge was to find a system that would work well with this structure. Furthermore, the office already had a computer system, a Macintosh network with a fileserver used for word-processing, spreadsheets, scheduling, desktop publishing, and graphics applications. In 1986, a single Autotrol CAD workstation had also been purchased by the firm.

One of the seven teams took on the role of the "CAD Implementation Team" in addition to its design work. The team sent out a questionnaire to all members of the firm, including the principals and support staff, asking them what they thought a computer system could do for them. At the same time, it began to research what kinds of CAD systems were available. The team concluded that properly implemented, CAD could improve the firm's overall design, product, and performance. It also came up with the following seven requirements that a system should meet:

1 *Ease of learning, training, and operation.* Because everyone in the firm is a generalist and is expected to fulfill multiple roles, from programming to construction supervision, it would be unproductive for them to spend too much time training on the system. Furthermore, some team members might be off the system for months at a time during some stages of a project, but they should be able to sit down at the computer at any time without retraining.

2 *An integral database.* Drawings are only one small piece of the total CAD product. It would be most productive to be able to use the information generated in the pre-planning stages of the design through the end of the project, when it could be turned over to the client and used as a facilities management database.

3 *Full 2D capabilities.* The firm should be able to customize drawing graphics.

4 *3D capabilities.* The firm should be able to generate 3D drawings with rendering, modeling, and animation.

5 *Ability to network with the firm's existing Macintosh network.* The new system would not necessarily have to be Macintosh.

6 *Ability to communicate electronically outside the office.* Files should be shared easily with engineers or capable of being sent via modem to service bureaus.

7 *Capability to work with other software.* In particular, a system should work with software provided by building product manufacturers and with third-party software.

Benchmark Evaluation

Using these requirements, the CAD implementation team created an evaluation worksheet that gave weighted values to each criterion. In order to initially identify software that might meet their needs, firm members attended the A/E/C Systems show

Orcutt Winslow's CAD Evaluation Worksheet.

Is CAD Cost Justified?

The decision of whether or not to invest in a CAD system is directly related to the benefits you receive from the system and the speed with which you attain the rewards. One of the best ways to demonstrate the value of an investment in CAD is to calculate the return on investment (ROI). This provides objective, quantifiable information to your company management that will help them make a decision about CAD. The following is a simple, step-by-step guide that will enable you to calculate ROI on your own CAD System.

Step A: Estimate the cost of hardware, software, peripherals, and other services you will buy to equip a single CAD seat. If you are considering purchases at different cost levels, you can easily make a separate ROI calculation for each possibility.

Step B: Determine the monthly cost of a typical employee currently performing design and drafting work. You should include salary and benefits, but not overhead.

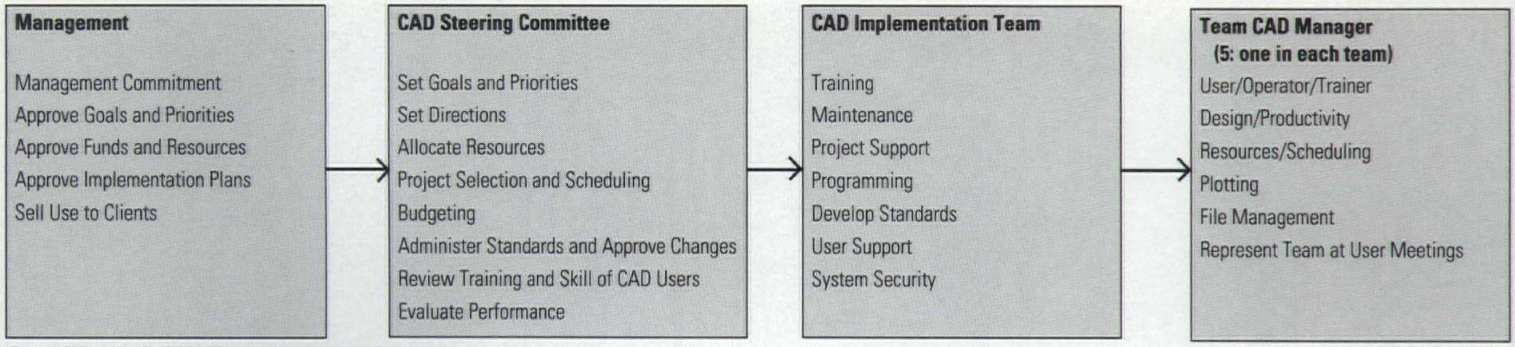
Step C: Estimate the amount of time needed for retraining. Can this employee learn the system in one month? Four months? One of the best ways to estimate this is to talk to the CAD managers in a firm that has recently installed a system similar to yours.

Step D: Estimate the loss of productivity during the training period. How much less productive will an employee be? Will this individual get only 50 percent as much work done? Again, if you can talk with another firm, you will make a better estimate.

Variable E: Estimate the productivity increase gain that you expect to realize after training is completed. AutoCAD users often report gains in productivity of between 25 and 100 percent.

(continued on next page)

Features				Rating (1,2,3)	Weight	Comments
A	**Modules**					
	1	Civil Engineering				
	2	Landscape				
	3	Architecture				
	4	Interiors				
	5	Structural Engineering				
	6	Electrical Engineering				
	7	HVAC				
	8	Facilities Management				
B	**Drawing**					
	1	Set-Up				
		1	Set Defaults		3	
			a Scale	•	•	
			b Units	•	•	
			c Drawing Size	•	•	
		2	Layers		2	
			a 200 Minimum	•	•	
			b Setting Parameters	•	•	
		3	Identification and Control of Line Widths and Types		3	
		4	Grid Snap		3	
			a Masonry Module	•	•	
			b Floating Point Decimal Accuracy	•	•	
		5	User-Defined Keyboard Commands		1	
		6	User-Designed Menu Options		2	
		7	Windows		2	
	2	Operation				
		1	Ease of Learning		3	
		2	Quick Command Access		3	
		3	Fast Operation (redraw, zoom, pan, etc.)		3	
		4	Undo Command		2	
		5	Preview of Movement		2	
		6	Rubber Banding, Point Dragging		3	
		7	Multiple Views		2	
		8	Windows into other Drawings		2	
		9	Single-Stroke Access Macro and Command Files		3	
		10	Ease of Rotation		3	
		11	Mirroring (keeps text in proper orientation)		3	
		12	Parametrics		3	
		13	Symbol Creation by User		3	
			a Graphic Information	•	•	
			b Attributes	•	•	
		14	Symbol Manipulation		3	
		15	Symbol Library		2	
			a Landscape	•	•	
			b Plumbing Fixtures	•	•	
			c Toilet Partitions	•	•	
			d Furniture	•	•	
			e MPE	•	•	
			f Pattern Fill (cross hatch)	•	•	
		16	Creation of Schedules (door, window, room finish)		3	
		17	Arrays		2	
		18	Autosave		1	
		19	Selecting EIntities		3	
		20	Generate Property Lines from Site Survey		3	
		21	Data Extraction		3	
	3	2-D				
		1	Line Snap (midpoints, 3rd points, arc centers, etc.)		3	
		2	Intelligent Walls		3	
		3	Door and Window Insertion and Manipulation		3	
		4	Resolution of Intersections		3	
		5	Ease of Automatic Dimensioning		3	
		6	Calculation of Lengths and Square Footage		3	
	4	3-D				
		1	Hidden Line Removal		3	
		2	Extruded 3-D		3	
		3	3-D Wire Frame		3	
		4	3-D Solid Modeling		3	
		5	Perspective		3	
		6	Light Sources		3	
		7	Animation		2	
C	**Administration**					
	1	Integration to other Software			3	
			a Word Processing	•		
			b Spreadsheet	•		
			c Database	•		
	2	Input of Existing Hardcopy Drawings			1	
	3	Add-On Software			1	
	4	Recovery from Crash			2	
	5	AutoCad (DXF) Interchange - Accurate and Friendly			3	
	6	IGES			1	
	7	Network			3	
			a Multi-Terminal	•	•	
			b Transmission Media	•	•	
			c Connectivity to Existing LAN	•	•	
			d Modem	•	•	
	8	Output			3	
			a Generation of Plot File	•	•	
			b Plotter Support	•	•	
			c Postscript Support	•	•	
	9	Security for Administration			1	
	10	Job Tracking			1	
	11	Software Support			3	
			a Documentation	•	•	
			b Phone	•	•	
			c On-Site	•	•	
D	**Remarks**					
	1	Operating System(s)				
	2	Copy Protection				
	3	Upgrades				
	4	Supported Hardware Platforms				
	5	Required Hardware Configuration				
	6	Cost Per Workstation				
			a Software	•	•	
			b Hardware	•	•	
	7	Networking Cost				
	8	Unique Features				
	9	Installed Base				
	10	References				



Orcutt Winslow's CAD Management Organization

and used the *CAD Rating Guide* (see page 119 for resources) to find 19 systems that might work for them. They narrowed their choices down to 11 vendors and the option of upgrading their existing Autotrol system.

The process of actually evaluating each system took the Orcutt Winslow team almost a year to complete. They contacted vendors, sent them all the same sample drawing, and scheduled a three-to-four-hour demonstration with each one. The entire CAD Implementation Team attended each session, and each person individually ranked each product using the firm's worksheet. When demonstrations were held in-house, other firm members and the partners also participated. The group met after the demonstrations to compare notes and to reach a consensus on an average value for each figure.

This process of recording information and playing it back with everyone's feedback is something that this firm is very familiar with because of the emphasis they place on programming and master planning that often involves getting the consensus of the needs of a future building's users. "This was a very difficult task," says Hill, "it would have been much easier to hire a consultant and less expensive to have the principals just choose a system, but we would not have been able to get such strong commitment from the firm. The overhead for this kind of process is high. The process took about a year and, according to Hill, probably cost the firm thousands of dollars, but, says Hill, "in the long term, those costs are negligible."

Implementation

In order to implement its new system, the firm retained its participatory method of working. It started a CAD Steering Committee that meets on a bi-monthly basis with representatives from management and a CAD manager from each team. In the meetings the committee discusses what works and what doesn't. It is also responsible for administrative standards and training. This "network" of team managers and upper management helps to solve problems with hardware and software. Hill says, "Our research demonstrated that failures of CAD implementation in other firms are often a result of the management's not supporting it. Principals often make the mistake of spending a lot of money, turning a system over to junior operators, and then wondering why it doesn't work." It is important that the entire firm remains involved with the system even after it has been brought on line.

To save training costs and to customize CAD procedures, Orcutt Winslow also set up their own in-house training system. To date, about 25 percent of the firm's projects are done with the new system; other projects are drafted by hand, but all notes and schedules are recorded on the computer. "Our goal," stresses Hill, "was not to do all projects on CAD, but to find ways to do them more efficiently with better accuracy." If it is more efficient to do a project by hand, it is done by hand.

New Services

Ultimately, it was not drafting that system was best for. Orcutt Winslow has found that a lot of its computer resources are now used to create animations for clients. The firm puts its own drawings on videotape using a video card. "Once clients see an animation, they do not want a traditional model," says Hill. "Architects love the beautiful white massing models, but clients are more comfortable with what a building is going to look like if they can see it on video. We can walk the client down the street and through the front door."

The firm is also looking forward to using the new powerful portable computers in the field with our system in the future. For instance, with a Macintosh PowerBook the architect could pull up the details for the construction manager without having to carry a set of drawings. If a change needed to be made in the field, it could be made right there. Hill is confident that the potential for this tool to help communication between the different building professions is great; "by being able to share data, we can help mend the fragmented, adversarial relationship that sometimes exists between architects and contractors." **Julie M. Trelstad** ■

(continued from previous page)

A = Total System Cost ($) = ___
B = Total Monthly Labor Cost ($) = ___
C = Required Training Time (months) = ___
D = Training Productivity Loss (%) = ___
E = Final Productivity Gain (%) = ___

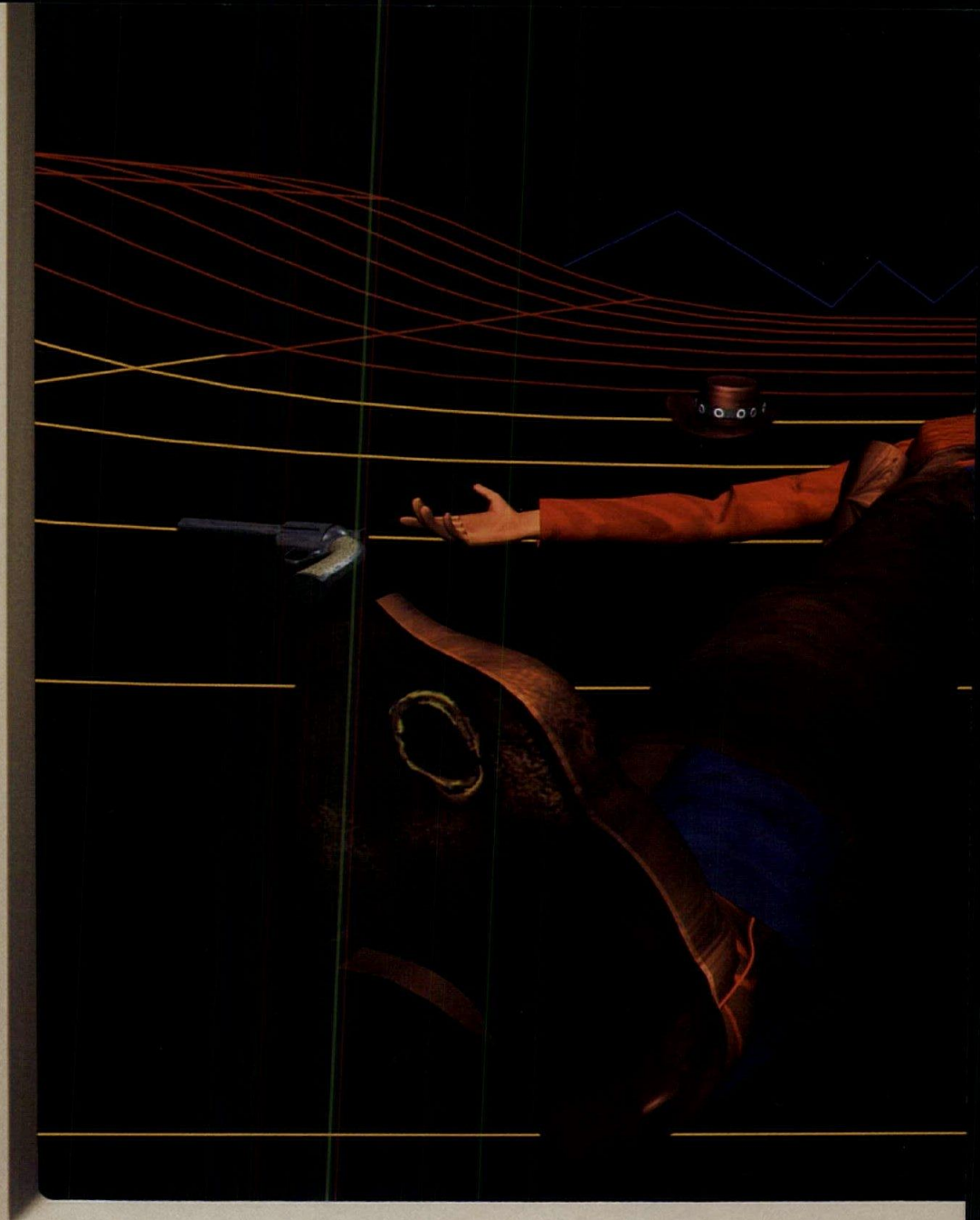
$$\frac{\left(B - \left[\frac{B}{(1+E)}\right]\right) \times (12 - C)}{A + (B \times C \times D)} = \text{First Year ROI}$$

Case Study

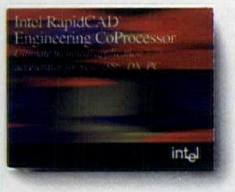
Let's take the case of an architectural practice buying its first CAD system. And let's assume that this company is fraught with problems. There is only one person doing full time drafting and the monthly cost for labor is $3,300. After buying a CAD system for $10,000, the employee attends a full-time training program during which none of the usual work gets done. After a month of training, the employee has not learned anything and the firm decides to purchase an additional software program costing an additional $3,000. The employee spends an additional two months learning this program, still completely neglecting usual work while in training.

After training, the employee can use CAD, but not especially well; mistakes are still made that require correction. Nonetheless, CAD has managed to increase the employee's overall productivity by 25 percent. Even under these conditions, the CAD investment provides a 26 percent return on investment.

Excerpted from the Pamphlet, "How to Choose a CAD System," by Dr. Joel Orr, (see page 119 for resource information).



Could your i386 PC stand



Wait, wait, wait. Do you ever get the feeling that's all you do when your PC is running CAD software? Annoying, isn't it?

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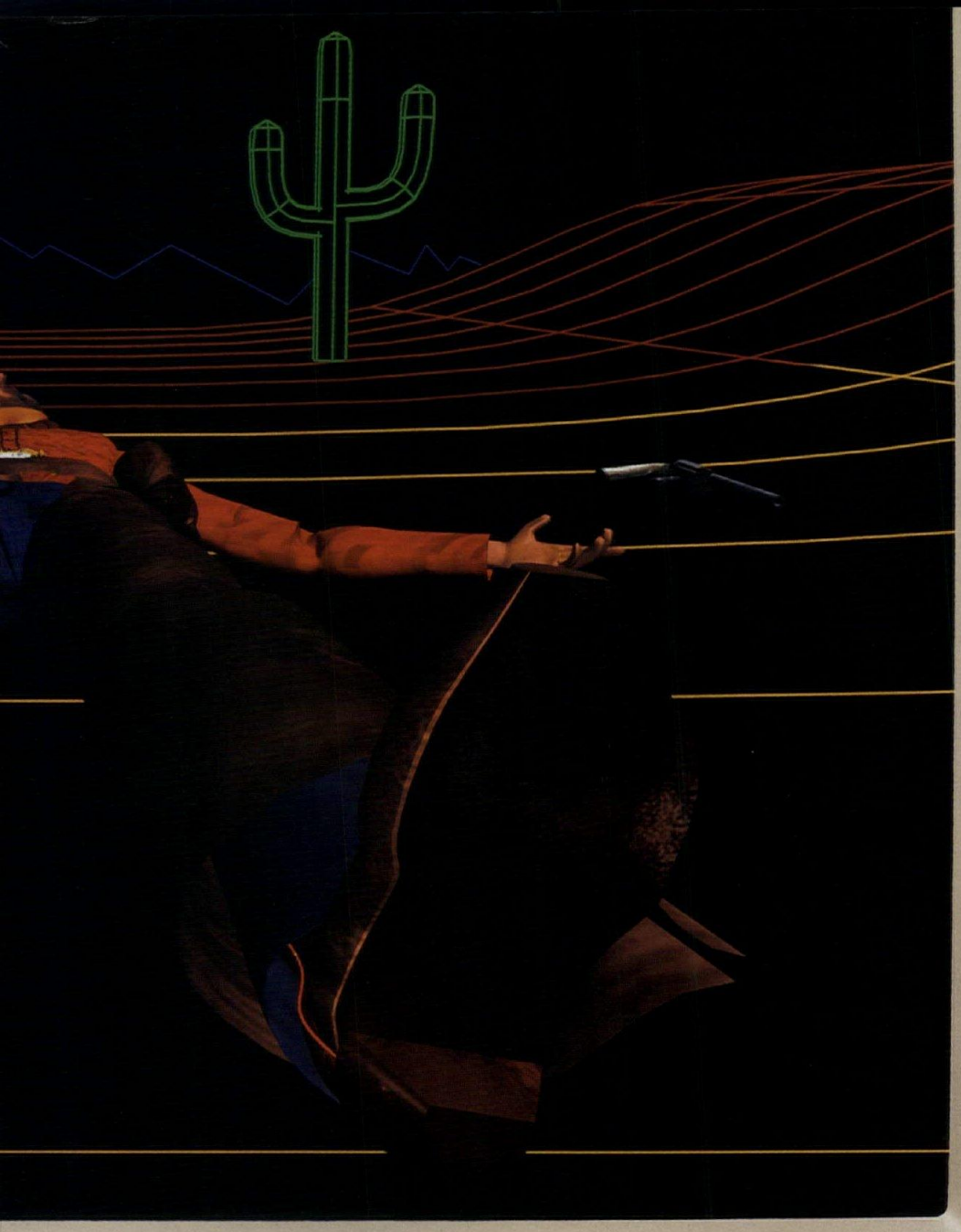
Designed specifically to accelerate PC CAD and other technical applications, the RapidCAD Engineering CoProcessor will help you realize productivity gains of up to 70% on certain CAD functions. Or to put it in



to be quicker on the draw?

dollars and cents, by saving you an hour a day, the RapidCAD Engineering CoProcessor will pay for itself in no time.

Naturally, since it's made by Intel, the world's leader in microprocessor technology, it's compatible with plenty of technical applications—over 2,100 at last count.

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PACIFIC DATA PRODUCTS

Protecting Your Technology Investment

Eric Teicholz and **Larry Yu** suggest guidelines to ensure that data created with today's CAD systems will serve future needs.

When economic conditions are poor, it can be difficult to justify new capital investments in technology. On the other hand, clients are increasingly demanding the use of computers so that drawings can be kept in electronic format to be archived or used for future applications such as facility management. For this reason, the choice of hardware and software vendors has become much more critical; you cannot afford to choose a vendor that will go out of business soon or one using a proprietary technical standard that will not be compatible with clients or consultants.

How do you know which vendor to select? Is Apple, for example, a safe bet? Do you buy an IBM PC or a clone? What about UNIX workstation vendors (P/A, Mar. 1992, p. 59)? Should you use a CAD system that runs in Microsoft Windows (P/A, Jan. 1992, p. 39)? These questions cannot be answered without considering your needs; however, there are guidelines for minimizing the risk of obsolescence.

The Database

Remember that software will come and go as technologies continue to evolve, so you need to think about protecting your investment in the electronic drawings and databases created after the CAD systems are employed. Keeping electronic data over time means that it must remain in a format that other systems can understand. Whether the drawing files are simply archived, or used as a base for space planning and layout applications, the files cannot be locked into a system that does not allow communication with other software. Sixty percent or more of a CAD system's life-cycle costs can be tied up in the creation and management of graphic and related non-graphic databases. Thus, the flexibility of the database is a critical issue in the specification of a CAD system.

Clients who wish to maintain graphic databases of their building may specify file formats at the outset of a project. If you choose a CAD system other than AutoCAD, make sure its DXF capabilities are strong. DXF is a common transfer format for CAD systems to communicate with each other, but it results in large files and slow performance. Also this generic format may not be read or written exactly the same in different applications, adding difficulties in layer translation or object definitions (for instance, the symbol for "chairs" in one set of drawings may translate to just a series of lines on another). Many CAD vendors have gone further, using translators to convert drawings directly to and from common CAD applications such as AutoCAD and Intergraph, or other transfer formats such as IGES.

"Sixty percent or more of a CAD system's life-cycle costs could be tied up in the creation and management of graphic and related non-graphic databases."

The non-graphic aspects of the databases are emerging in importance, so that "intelligence" can be added to graphic images. Some feel that real productivity gains cannot be achieved through CAD use until the non-graphic database is fully realized. This may be less true for design applications, but an associated database, such as dBASE, can make construction estimating, scheduling, or facilities management much more efficient. Many high-end CAD systems have built-in proprietary databases or links into specific commercial databases, while others offer links via SQL (a standard access format for relational databases) to other database management systems such as Oracle or dBASE. Make sure you understand the nature of these links; some restrict data structures or require translations of existing data files into duplicate and non-integrated databases, and others may require database programmers if you want to perform anything but the simplest of data queries. CADwork's DRAWBASE is a PC CAD application known for its graphic to non-graphic data integration, and most UNIX CAD systems also have these abilities. A planned future release of AutoCAD will also include an SQL extension.

Other Standards

Proper and continued use of the system will require in-house standards within an office as well (see sidebar). Without an organized attempt to enforce graphic and administrative standards within an office upon all users, not just full-time drafters, chaos may ensue. These standards do not have to be complicated, but they have to be well documented and distributed. What is also necessary is a comprehensive understanding of the system in general so that flexibility in procedures can be maintained for different clients. (See sidebar for a list of standards that ought to be addressed.)

In-House Standards

Technical Standards

- CAD layer conventions
- Pen/line type conventions
- Hatching conventions
- Text conventions
- Labeling conventions
- Attribute/database conventions
- Base drawing conventions
- Default CAD parameters
- Environment conventions (set-up, configuration, external data sources, telecommunications)
- CAD graphic symbols (file naming, library procedures, standard graphic library, space standards)
- CAD file data management (file naming, directory structure, file transfer, backup and archiving procedures, disk media management)

Administrative Standards

- Reporting conventions
- Project management
- Disaster recovery
- Data exchange with clients (graphic/non-graphic, 2D/3D, hard copy and electronic database, design versus as-built issues)
- Project coordination (between other consultants/clients)
- Project management (time and resource scheduling, communication, plotting bottlenecks)
- Training
- Documentation

Vendor/Product Selection

The CAD system first and foremost must have the 2D and 3D graphic capabilities required. Make sure the vendor or dealer discusses installation, training, and on-going support issues, as these will determine how quickly the system can be brought online and how well it will remain so. Next, consider the database links. There are different levels of associativity; some databases may have to be downloaded to separate files for linking text and other data with graphics, which also raises questions of security and data integrity. Standard and custom reports should be available from within the CAD system if the database options are used. You must also consider the availability of third-party products for your application. Most important, allow an open architecture for both graphic and non-graphic data so that it can be passed on to other applications on other hardware platforms. This flexibility can make or break your ability to communicate with clients or to adapt your system in the future.

As the price/performance ratios of PCs versus UNIX workstations continue to blur the line in functionality between these computer types, the leading CAD vendors are no longer locking themselves into one hardware platform. AutoCAD, the PC CAD leader, has been ported to UNIX and Macintosh platforms, and many UNIX CAD applications are now available for high-end PCs. A recent industry effort to network hardware, software, and applications now makes it possible to make disparate computers operate together in a workgroup. It may be just as important to consider a hardware vendor's support and training policies as to compare performance specifications directly, since new product releases seem to appear every six months. Make sure you are getting the power you need now, and the ability to expand.

A Final Word

There is another interesting development that bears watching. The Department of Defense, led by the Navy's facilities group, NAVFAC, has developed a CAD system specification that may have far-reaching implications for the architectural profession. "CAD2," as the group is calling it, requires an open CAD platform to take advantage of data exchange and communication. Specific technological strategies include the development of open standards for hardware (both workstations and peripherals), networks, software (operating systems, graphic user interfaces), geometric databases (common 2D and 3D formats), relational databases, applications (common databases), and documentation. This may lead to a requirement by government agencies that AEC contractors submit drawings to them in an electronic form based on these standards.

"A recent industry effort to network hardware, software, and applications now makes it possible to make disparate computers operate together in a workgroup."

Respondents to the project so far include IBM, Intergraph, and Autodesk. The successful bidder will be expected to provide hardware/software training and support. The "open systems" aspect of the CAD2 specification could precipitate a fallout of CAD vendors and third-party products. In order to remain competitive, it may turn out that only the vendors that use the CAD2 specification will survive. This could conceivably usher in a new era of CAD computing in which database standards and communication between applications are more reliable.

Eric Teicholz and **Larry Yu** ■

Eric Teicholz, P/A's contributing editor for computers, is president and Larry Yu, editor, at Graphic Systems, Inc., a Cambridge, Massachusetts automation consulting and publishing company. Mr. Teicholz's book, Computer-Aided Facility Management Automation *was published by McGraw Hill in February.*

(**CAD Resources** *continued from page 119*)

Conferences/Organizations

A/E/C Expo, October 19–21, 1992, San Francisco; September 21–23, New York. Expoconsul International, (609) 987-9400.

A/E/C Systems, June 8–11, 1992, in Dallas, Texas; June 7–10, 1993, in Anaheim, California. Other shows in Japan, Canada, Brazil, and Korea. Call (800) 527-7493.

National Computer Graphics Association Conference & Exposition, April 26–29, 1993, Philadelphia, (800) 225-6242.

SIGGRAPH, July 26–31, 1992, Chicago; August 2–6, 1993, Anaheim, CA (212) 869-7440.

League for Engineering Automation Productivity (LEAP). This organization offers a computer applications demonstration center in Virginia Beach, Virginia. Users can rent the facility to try out a wide variety of hardware and software products (800) 223-3226.

Architectural CAD Vendors

MountainTop/Architectural Design, Accugraph, 5822 Cromo Drive, El Paso, TX 79912, (915) 581-1171.

ArchCon (AutoCAD application), Porak Computing Services, 2613 Flintridge Drive, Colorado Springs, CO 80918, (719) 593-1187.

ArchiCAD (Macintosh), Graphisoft, 400 Oyster Point Blvd., Suite 429, So. San Francisco, CA 94080, (415) 737-8665 or (800) 344-3468.

Architrion (MS-DOS and Macintosh), Unic Software, 1330 Beacon Street, Ste. 320, Brookline, MA 02146, (617) 731-1766.

Arris (UNIX), Sigma Design, 1 Vandegraff Drive, Burlington, MA 01803, (617) 270-1000.

ASG Architectural (AutoCAD application), 4000 Bridgeway, Suite 309, Sausalito, CA 94965-1451, (415) 332-2123.

AutoArchitect (AutoCAD application; a whole line of multidisciplinary tools is also available.) Softdesk, 7 Liberty Hill Road, Henniker, N.H. 03242 (603) 428-3199.

AutoCAD, Autodesk, 2320 Marinship Way, Sausalito, CA 94965, (415) 331-0356.

CADVANCE (MS-DOS and Windows), ISICAD, 1920 West Corporate Way, P.O. Box 61022, Anaheim, CA 92803-6122, (714) 533-8910.

Claris CAD (Macintosh), Claris, 5201 Patrick Henry Drive, Box 58168, Santa Clara, CA 95052-8168, (408) 727-8227.

DataCAD (MS-DOS), Cadkey, 4 Griffith Road North, Windsor, CT 06095-1511, (203) 298-8888.

Drafix (MS-DOS and Windows), Foresight Resources, 10725 Ambassador Drive, Kansas City, MO 64153, (800) 231-8574.

Drawbase (CAD database), CADworks, 222 Third Street, Suite 1320, Cambridge, MA 02142 (617) 868-6003.

EasyCAD, FastCAD, Evolution Computing, 437 S. 48th Street, 106 Tempe, AZ 85201, (800) 874-4028.

Form-Z (3D conceptual, Macintosh), autodessys, 2011 Riverside Drive, Columbus, OH 43221, (614) 488-8838.

GenCADD Architectural (MS-DOS), Softdesk, 7 Liberty Hill Rd., Henniker, N.H. 03424, (603) 428-3199.

GEOCAD (AutoCAD application), RH Associates, P.O. Box 186, Pound Ridge, NY 10576, (914) 764-4072.

MegaMODEL/MegaDRAFT (MS-DOS), MegaCADD, 65 Marion Street, Suite 301, Seattle, WA 98104, (206) 623-6245.

Microstation, Intergraph, Microstation Operations, Huntsville, AL 35894, (800) 345-4856.

Point Line CADD (MS-DOS), Point Line Graphics, 8309 Greenway Road, Middleton, WI 53562, (608) 831-0077.

PowerDraw (Macintosh), Engineered Software, P.O. Box 18344, 615 Guilford-Jamestown Road, Greensboro, N.C. 27419, (919) 299-4843.

Sonata (UNIX/Silicon Graphics), Alias, 110 Richmond Street East, Toronto, Canada M5C 1P1, (416) 362-9182.

Star Architecture, Ridgeline Software, 23 Morning Glory, Irving CA 92715 (714) 854-0112.

Upfront (3D conceptual, Macintosh and Windows), Alias Style! 110 Richmond Street East, Toronto, Canada M5C 1P1, (416) 362-9181.

Ashlar Vellum (MS-DOS and Macintosh), Ashlar, 2190 Oakmead Parkway, Sunnyvale, CA 94086, (408) 746-1800.

VersaCAD, Computervision, 100 Crosby Drive, Bedford, MA 01730, (617) 275-1800 ext. 4594.

Virtus Walkthrough (3D conceptual, Macintosh), Virtus, 117 Edinburgh South, Suite 204, Cary, N.C. 27511, (919) 467-9700. ■

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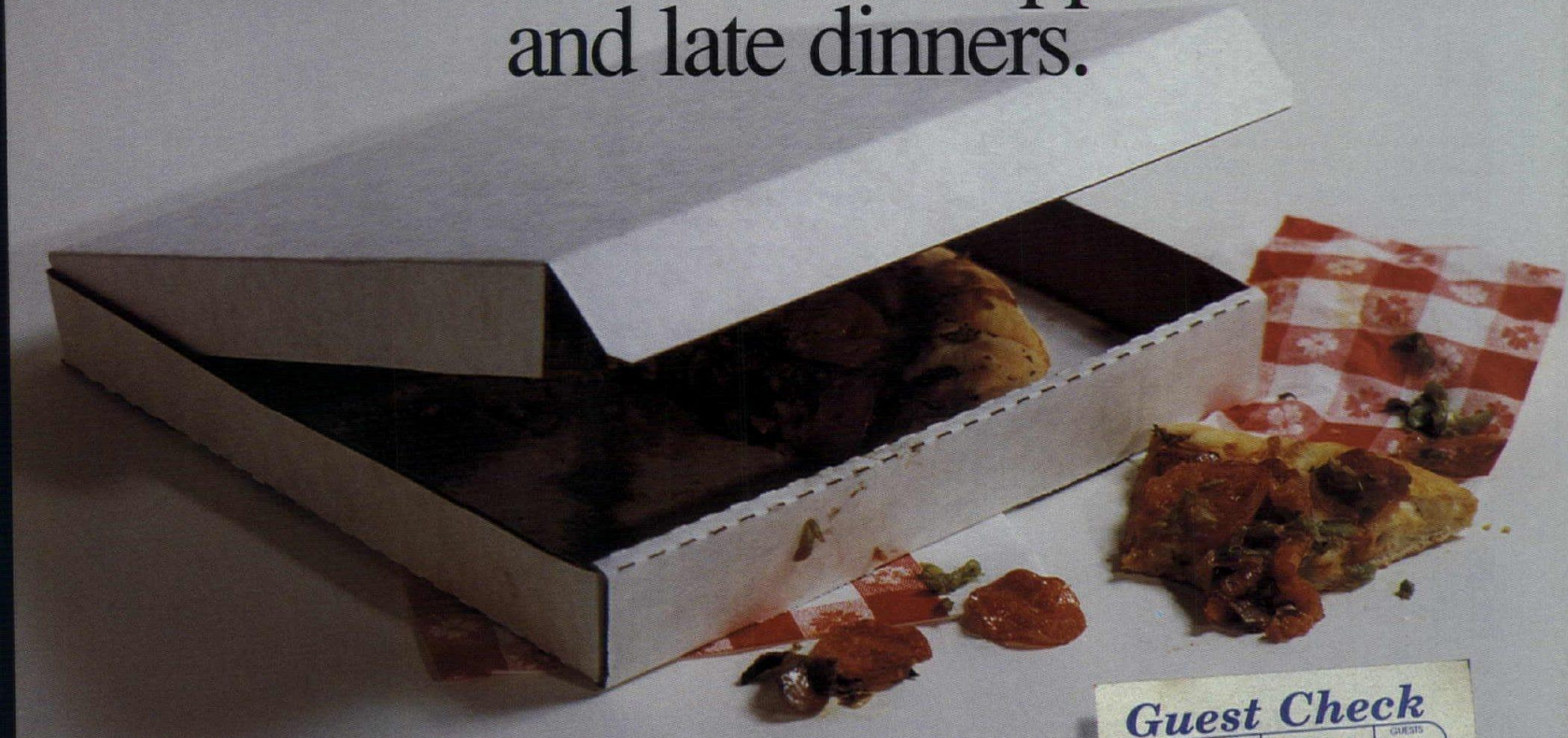

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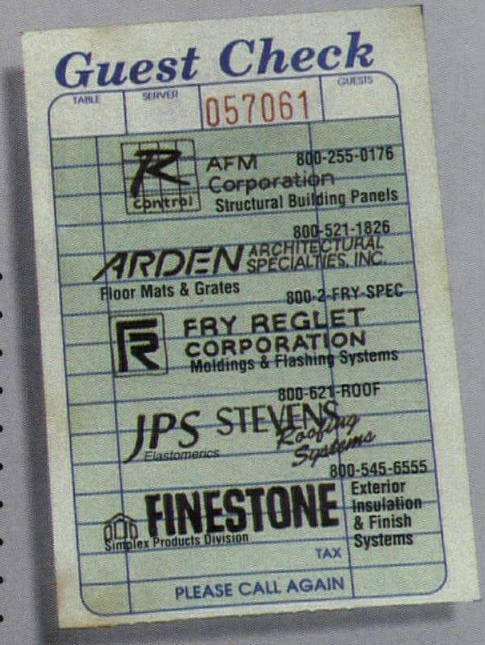

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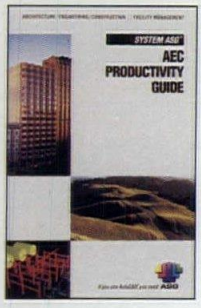
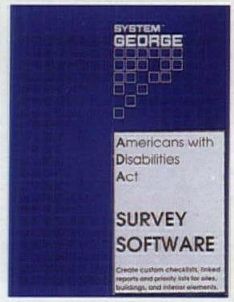
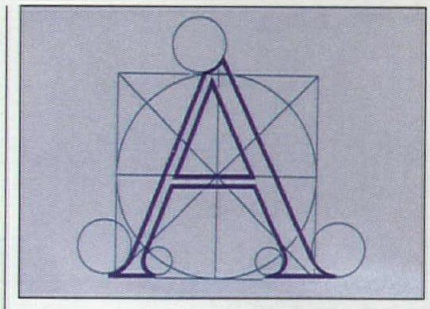


Software developer ASG is the only company in the world to provide a total set of software solutions, from design to presentation, construction details to specifications. Information on ASG's AutoCAD applications – including ASG Architectural, Version 5 – and other resources is contained in their new *AEC Productivity Guide*.
ASG. Circle No. 360

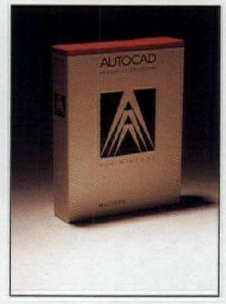


This ADA Survey Software includes a tested database for custom barrier checklists. Each detailed checklist follows the path from site boundary to minor building elements. The resulting "paper trail" includes automatic "Links" of barrier alternatives and "Links" that help summarize and prioritize barrier removal. Separate packages for public and private entities.
Active English Information Systems, Inc. Circle No. 363

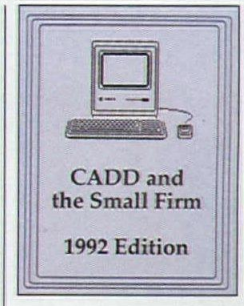


By combining AutoCAD with a powerful database and spreadsheet program, ARCHIBUS/FM gives you instant access to information for strategic space planning and asset management. Available modules: Real Property and Lease Management; Space Management; Design, Furniture, and Equipment Management; Telecommunications and Cable Management; Building Operations, and FIMS.
ARCHIBUS, Inc. Circle No. 364

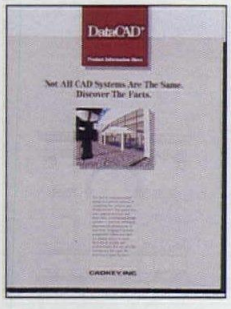
Autodesk 3D Studio™ Release 2 is 386/486-based PC graphics software for creating high-resolution three dimensional models, renderings, and animations. 3D Studio can also quickly render CAD (DXF™) files as richly detailed stills or animated visualizations. Release 2 is ideal for creating architectural walk-throughs and a host of other photorealistic three dimensional presentations. **Autodesk.** Circle No. 361



AutoCAD, the world's most popular design software, is now available for the Windows operating environment thanks to a new $99 Extension for Windows product. The Windows interface and inter-application features add substantial productivity and ease of use advantages to a program that is already uniquely flexible and versatile for nearly every design application.
Autodesk. Circle No. 362

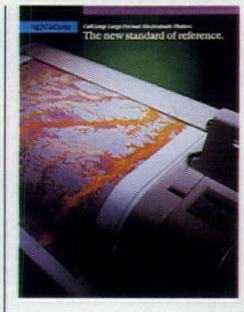


CADD and the Small Firm: A Resourcebook, a nationally acclaimed, 160-page resource, includes 21 articles on CADD uses, technology, terminology, three dimensional rendering animation and video, production of construction documents, and other issues of concern to design firms. The 1992 edition is compiled and edited by the Boston Society of Architects/AIA. **Boston Society of Architects/AIA.** Circle No. 365



DataCAD –an architectural CAD designed by architects that's easy to learn, easy to use, and affordable – offers full-featured, integrated two dimensional/three dimensional design and drafting that will help reduce production costs and improve profitability. A free PC demonstration disk is available.
Cadkey, Inc. Circle No. 366

Available in six tablet sizes, the new Drawing Board II series includes features such as dynamic pen sensing (sensitivity to pressure, proximity, and tilt) to give the user the same control as a conventional pen or paintbrush. DrawingBoard II is compatible with most leading software applications and operates with multiple computer platforms and environments.
CalComp, Inc. Circle No. 367



CalComp's newest high-speed, high-resolution, large-format electrostatic plotters – the monochrome Model 67436 and the color 68000 Series – offer architects superior accuracy and line quality; area/color-fill capabilities; an automatic humidity compensation system; extensive connectivity capabilities; memory options; time- and money-saving features and CalComp's worldwide service.
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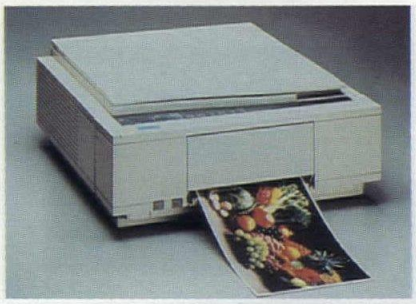

Color copying makes the leap to the desktop with the CJ10 color Bubble-Jet copier from Canon U.S.A., Inc. The first desktop digital color copier with printing and scanning capabilities, the CJ10 offers 400 dpi resolution and 256 gradations of color to enhance the impact and effectiveness of business communications.
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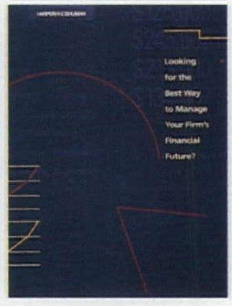
FastCAD 3D can take you from plan to presentation in a single package. Selecting, drawing, and editing entities has never been faster or easier. Why not optimize your design environment with FastCAD 3D's eight interactive windows, icons, and pull-down menus? Viewing three-dimensional objects is a snap from any position in hidden line, surface, and animation modes.
Evolution Computing. Circle No. 370

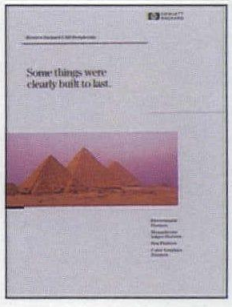
GEOCAD is an architectural application to AutoCAD; it contains symbol libraries and routines that create complete presentation and working drawings, including plans, details, schedules, architectural fonts, and much more. GEOCAD has a uniquely friendly graphic interface that builds on architects' skills instead of forcing them to learn new ones.
GEOCAD Inc. Circle No. 371

GEOVUE creates perspectives directly from two-dimensional elevations and plan done in AutoCAD or GEOCAD without the need to build three-dimensional models inside the computer. Perspectives are constructed using a horizon line, picture plane, and station point. Multiple perspective studies can be generated on a single drawing and display.
GEOCAD Inc. Circle No. 372

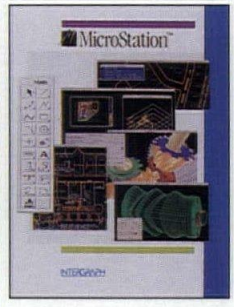


CFMS (Computer-based Financial Management System). Harper and Shuman develops, sells, and supports financial management software specifically for architects. The only system sponsored by the AIA, MICRO/CFMS runs on PCs and CFMS runs on the DEC VAX. A modular approach lets you buy only what you need.
Harper and Shuman. Circle No. 373

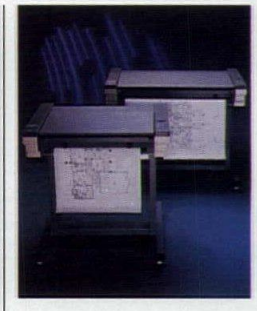
This data sheet describes the HP DesignJet plotter and includes product feature and technical information, interface and cable requirements, and ordering details. The HP DesignJet uses proven inkjet technology to produce E-size drawings in less than six minutes on commonly available media.
Hewlett-Packard Company. Circle No. 375



This full-color brochure features HP's full line of hardcopy output devices for CAD applications. Included are large-format and desktop pen plotters, color graphics printers, and the HP DesignJet monochrome inkjet plotter. All of these products are backed by HP quality, reliability, and the lowest cost service contracts in the industry.
Hewlett-Packard Company. Circle No. 374

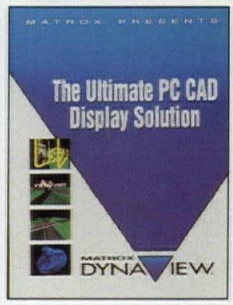


From its easy-to-use graphical user interface to its strikingly realistic rendering, MicroStation is becoming the CAD standard of choice. MicroStation offers integrated design and production system capabilities on PCs, Macintosh computers, Intergraph workstations, Sun SPARCstations, and Hewlett-Packard Series 700 workstations.
Intergraph Corp. Circle No. 376

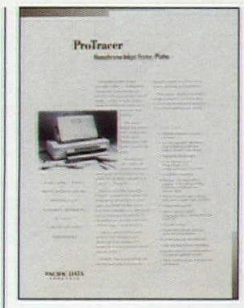


JDL introduces the D- and E-size ExpressPlotter II direct imaging, vector, and raster plotters. With easy set-up and exceptional plotting speed, the ExpressPlotter II offers finished plots that are cut, stacked, labeled, and ready to deliver. One plotter can efficiently handle the needs of an entire department or small company.
Japan Digital Laboratory. Circle No. 377

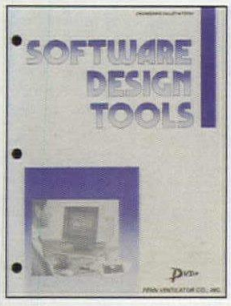
Marvin Windows' CAD software is designed to work with CAD Versions 2.52–11.0. The software lets design professionals draw and detail windows and doors with just a few keystrokes. It includes standard size symbols, elevations, and an architectural detail and specification manual on computer disk. **Marvin Windows.** Circle No. 378



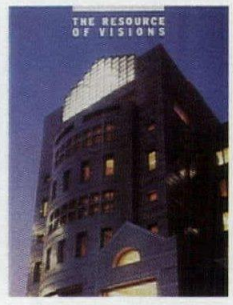
Matrox's new HiPER VGA AT display controller offers unmatched Windows and AutoCAD performance with Matrox's unique software tools to offer the benefits of much more expensive, high-end display controllers. Based on S3 Corporation's 86C911 VGA controller chip, HiPER VGA provides display resolutions up to 1024 x 768, noninterlaced and up to 32,768 simultaneous colors. **Matrox Corp.** Circle No. 379



ProTracer combines the desktop convenience and low price of a laser printer with the ability to produce 360 dpi, A- to C-size (17″ × 22″) output. Using the latest in inkjet technology, ProTracer provides Epson and IBM emulations, an ADI/PADI plotter driver, and optional accessories including HP-GL and PostScript emulation, memory boards, and sheet feeders.
Pacific Data Products. Circle No. 380



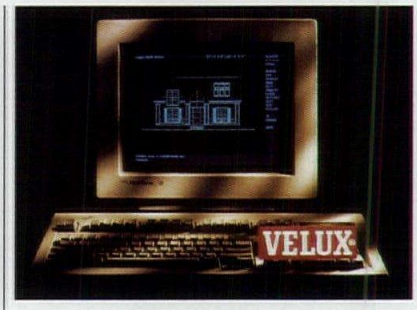
Get computerized speed and accuracy when selecting louvers and penthouses with new software products from Penn Ventilator and its Airstream Products Division. With Louversizer and Pennhousizer, you simply input specific design criteria and the software does the rest! Onscreen drawing helps you identify the louver models available and online helps make the system easy to learn and use.
Penn Ventilator Co., Inc. Circle No. 381



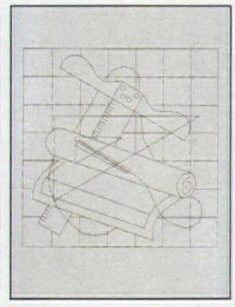
Commercial Division™. . . High Performance Products-High Performance Service. For the customer building or renovating a non-residential structure, Pella Commercial Product line combined with the Pella Commercial Service team is the optimum choice. The Commercial Division offers high-performance products combined with the reliability and responsibility of superior service.
Rolscreen/Pella. Circle No. 382

ARRIS is the AEC CAD system of choice for architects in 30 countries. Create photo-realistic three-dimensional models; generate drawings in record time. No project is too complicated. Send for a free brochure: *How ARRIS helps you win more business and be more productive on the business you win.*
Sigma Design, Inc. Circle No. 383

Summagraphics' new Houston Instrument JetPro Series Model V100 is three plotters in one. It is a vector plotter for outputting review plots; a high-resolution raster plotter for scanned images; and a wide format document output device for reports, letters, project management charts, format spread sheets and plain paper fax copies. It supports the HP-GL/2, HP-GL, and DM/PL languages.
Houston Instrument. Circle No. 384



New CAD software for roof windows and skylights. Designed in Microsoft Windows™ 3.0 and operable within or out of AutoCAD, VELCAD software accommodates two levels of user experience and can generate and receive DXF files. VELCAD users can print detail drawings and specs. Or, interfacing with AutoCAD, VELCAD allows users to manipulate elevations, drawings, and schedules.
Velux-America. Circle. No. 385



ArchiDOS includes an integrated menu system for easy selection of over 10,000 symbols. ArchiTOSH consists of over 2000 symbols while ArchiTOSH LAND includes a landscape database of over 1000 plants. Each package includes file and level management, an illustrated example project (utilizing the "ConDoc" system), and four hand architectural font styles. **Vermurlen Associates Architecture, Inc.** Circle No. 386

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Phone (703) 356-4578 - Fax (703) 356-3873

MID SIDE: Atlantic Trading Co.Ltd - 506 Industrial drive - 17339 Lewisberry, Pa U.S.A.
Phone (717) 938-5648 - Fax (717) 938-8749

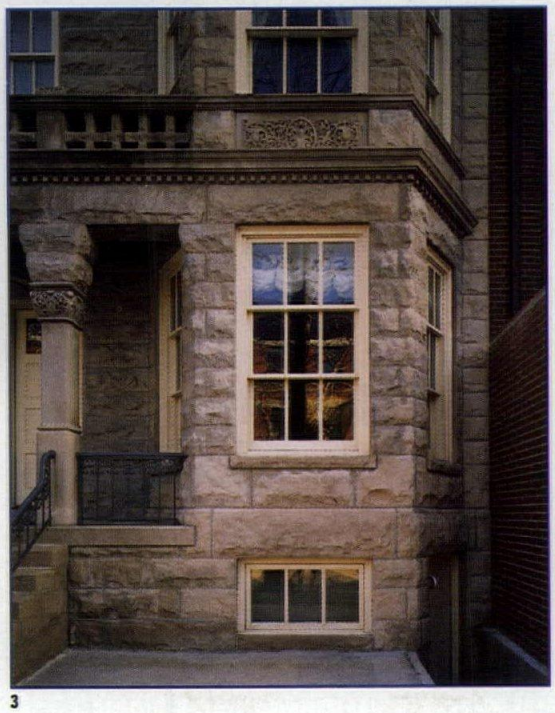
WEST SIDE: Del Piso Brick and tile - 1637 S. State College Blvd Anaheim (Ca) 9286
Phone (714) 634-4676 - Fax (714) 978-9018

BADASB&GUERRA

Building Products

1

2



3

Building Product Features

1 Access Floor System

"Cablefloor"™ is a nonmetallic, low-profile access floor system developed by CoDesign, an Australian company recently acquired by Allsteel. The modular system of fire-retardant polypropylene cylinders (6″ o.c.) supports 18-inch-square, moisture-resistant particleboard floor panels; cavities created by the cylinders accommodate cables and wiring. Cavities are ½″ thick and 3⅛″ wide; the overall height is 2⅖″. Allsteel.

Circle 101 on reader service card

2 High-Gloss Ceramic Tile

"Shop Art" is an expansion of the "Shop" series of ceramic tile and accessories. The stain- and frost-resistant, thickly glazed tiles are available in square and octagonal shapes, skirting board, and cove base. They are appropriate for residential and heavily trafficked commercial applications; fifteen colors are offered. Monoceram.

Circle 102 on reader service card

3 Triple Hung Window

The new "Magnum Triple Hung" wood window has three vertical sash and a springless counterbalance system that allows the top and bottom sash to operate simultaneously. Vinyl jamb tracks house the counterbalance hardware; top and bottom sash tilt inward for cleaning and all three sash can be removed from the tracks. Frames are 1 1/16″thick; the sash are 1¾″ thick; overall jamb width is 7 13/16″; ¾″-thick insulating glass is standard. Marvin.

Circle 103 on reader service card

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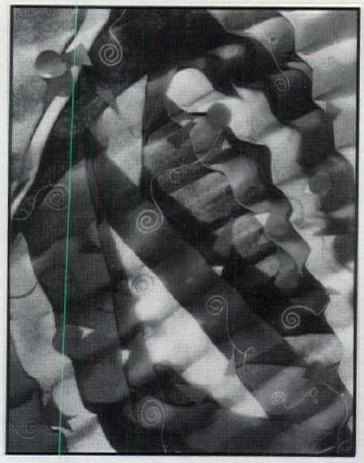
Products and Literature

Sealants Catalog
This ring-bound catalog includes detailed technical information on urethane, silicone,. acrylic, and butyl sealants. A section on primers and product-related articles is also included. Bostik®.
Circle 201 on reader service card

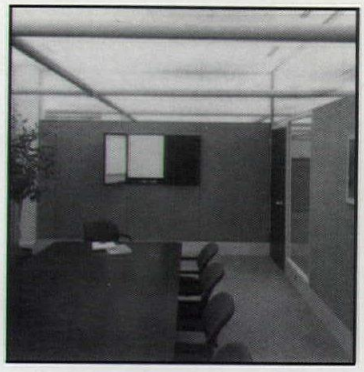
Vinyl Floor Tile Catalog
The *Azrok 1992 Designs* catalog includes technical data and color and style choices for the complete line of resilient vinyl floor tile products. Azrok.
Circle 202 on reader service card



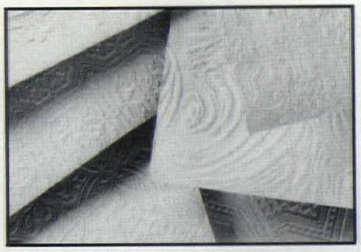
New Textile Collection
Sixteen seating upholstery lines and eight panel/component fabric lines comprise the "Celebration Collection." "Mardi Gras," a polyester, nylon, and Lycra blended twill, and "Arabesque," a wool and Lycra upholstery, are among the products included in the collection. American Seating.
Circle 104 on reader service card

Rubber Flooring Catalog
The *1992 Nora Rubber Flooring Systems* catalog includes desciptions, illustrations, and specifications for the "Norament" and "Noraplan" systems and accessories. Freudenberg.
Circle 203 on reader service card

Outdoor Wood Furniture
The "Fox Island Collection" is a seating system of interchangeable curved and linear settees and backless benches. The mahogany components are suitable for interior and exterior use. Weatherend.®
Circle 105 on reader service card



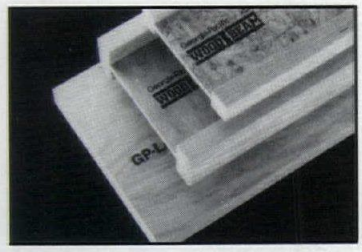
Movable Wall System
"Silhouette," a full-height relocatable wall system, may be specified with a variety of finishes, including mar- and chip-resistant baked enamel; fabric; and wood veneer. Lockable solid wood and hollow steel doors and glass panels are also available. The walls lock into steel ceiling channels and are secured at the floor with carpet grippers. Virginia Metal.
Circle 106 on reader service card



Embossed Wallcoverings
"Anaglypta" embossed wallcoverings from England, originally developed and patented in 1887 by J.J. Palmer, are available in low- and high-relief patterns. The white paper is designed to be painted and may be applied to ceilings as well as to walls. Crown.
Circle 107 on reader service card

Central Air-handling Unit
The "UniFLEX39"™ central station air-handling unit has double-wall construction with two-inch insulation and a comprehensive condensation removal system for "improved indoor air quality." Carrier.
Circle 108 on reader service card

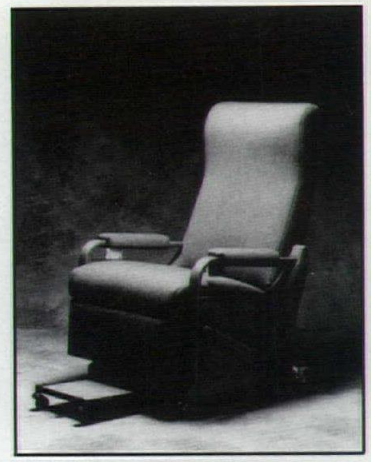
Fire-Retardant Wood Handbook
Dricon® Fire Retardant Treated Wood Product Handbook includes product performance characteristics, specifications, and other information on FRT lumber and plywood products. Hickson.
Circle 204 on reader service card



Engineered Lumber Joists
The "Wood-I-Beam"™ family of engineered lumber joists has been expanded. The "GPI-25" is available in depths of 9¼" to 11⅞", and the "GPI-35" is available in depths of 14" and 16". Both are constructed of Douglas fir with ⅜"-thick oriented strand board web-fitted into flanges of G-P Lam® laminated veneer lumber in lengths up to 60 feet. Georgia-Pacific.
Circle 109 on reader service card

Commercial Insulation Literature
Insulation for thermal and noise control in commercial buildings is thoroughly described in new company literature. Detailed drawings and specifications illustrate a variety of methods for controlling heat loss and noise levels in new and retrofit installations. Owens/Corning Fiberglas.
Circle 205 on reader service card

Roofing System Fasteners
The "New Generation HP Fastener" may be used, with the existing line of fastener plates to secure Carlisle's mechanically-fastened and fully adhered system and for installing its "RUSS strips." The fasteners may be used on steel, wood, or structural concrete decks. Carlisle SynTec.
Circle 110 on reader service card



Mobile Healthcare Chair
The "RoomMate Mobile" functions as a wheelchair, a rocking chair, and a reclining chair. A rear push-bar and locking casters are among its standard features. It is 44" high, 28½" wide, and 33½" deep. The wood framed chair has a lacquer finish and is stain-resistant. La-Z-Boy.
Circle 111 on reader service card

(continued on next page)

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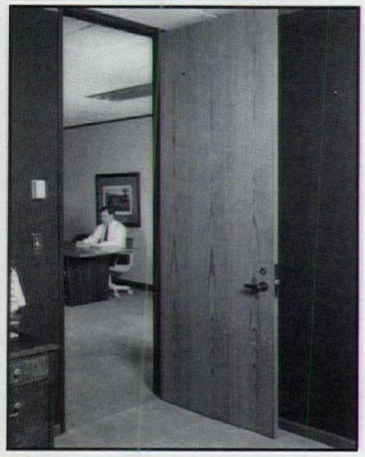
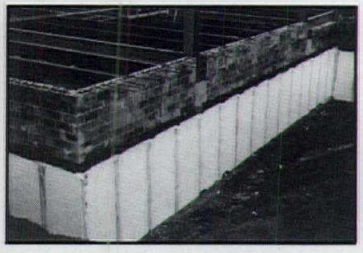
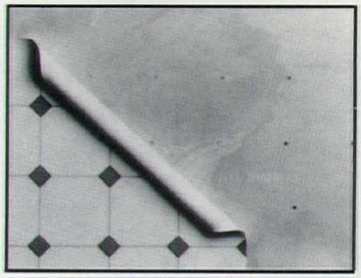
Woodwork Source Book
The *1992 Source Book* published by the Architectural Woodwork Institute is a 200-page, full-color directory of woodwork manufacturers and suppliers. Architectural Woodwork Institute.
Circle 206 on reader service card



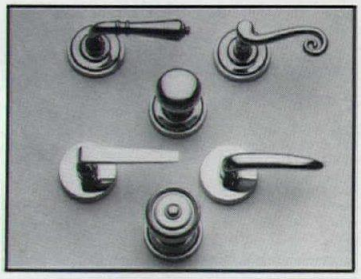
Acoustical Door
A new acoustical wood door assembly has been designed to offer an STC rating of 47. The 1¾″-thick door provides a positive acoustical seal at the floor without a threshold. A variety of wood veneers may be specified with standard or custom finishes. Krieger Steel.
Circle 112 on reader service card



Insulation/Drainage Board
"Insul-Drain" acts as an insulation, drainage, and protection board; the extruded polystyrene board is designed for long-term energy efficiency for below-grade foundation walls. Vertical drainage channels allow water to drain away from the foundation wall and provide a flow path for soil gases to vent upward. Boards are 4′ wide and 8′ long and come in a choice of 1-, 1½-, and 2¼-inch thicknesses. UC Industries.
Circle 113 on reader service card



Dual Application Underlayment
"Multilay"™ is a cementitious underlayment sheet designed to be used with ceramic tile or resilient flooring. One side of the sheet is unsanded for use under tile; the other side is smooth-sanded for use under resilient flooring. Four-foot-square or four-foot-by-eight-foot sheets (¼″ thick) are standard. James Hardie.
Circle 114 on reader service card



Latchsets Collection
The "Builders' Selection" of solid brass knob and lever latchsets for interior applications have a baked-on lacquer finish. The collection is designed to be "sensibly priced." Omnia.
Circle 115 on reader service card

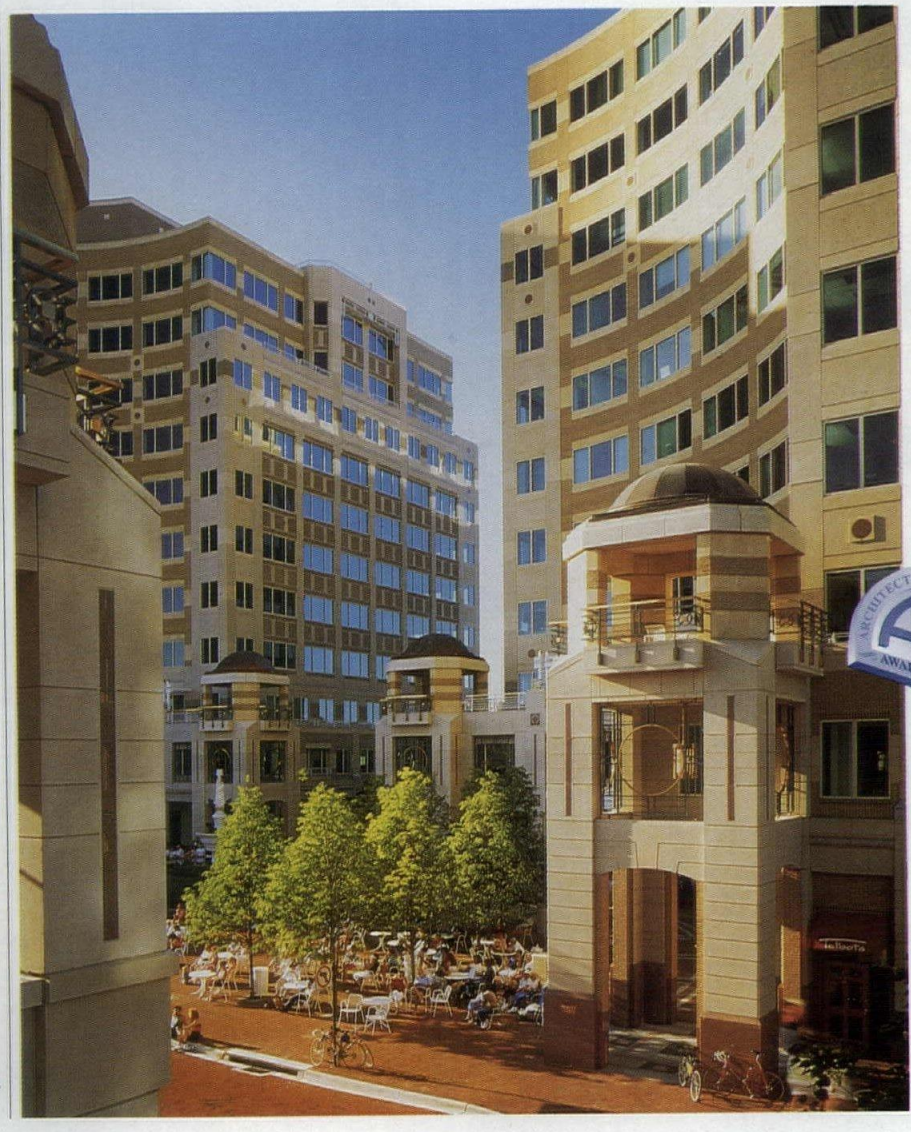
Cement Roof Slate
"Carolina Slate"™ Roofing Shingles" are produced with fiber-reinforced cement. Each unit has three flat butt end designs and mitered corners on the bottom to appear as three small individual slates. Each slate is 23½″ wide and 14¾″ long. FibreCem.
Circle 116 on reader service card

Architectural Artistry

Design professionals who create in concrete rely on the versatility and predictability of Architectural Precast to capture the artistry of their boldest compositions. The Reston

Architectural Precast

Town Center, recent recipient of the Architectural Precast Association Award of Excellence, confidently integrated variety with uniformity to achieve a model of precast perfection. Panels of simulated limestone and sand blasted exposed aggregate teamed with tan bricks and polished granite to articulate the design concept. The resultant structure boasts a cost effectiveness identified through time as the hallmark of Architectural Precast.



Reston Town Center
Reston, VA

Design:
RTKL Associates Inc.

Manufacturing:
Arban & Carosi Inc.

Arban & Carosi, Inc.
Woodbridge, VA
Arban Associates, Inc.
Dumfries, VA
Architectural Cast Stone
Santa Ana, CA
Arcon, Inc.
Gilford, NH
Arkansas Precast Corp.
Jacksonville, AK
Bailey-Sigler, Inc.
New Smyrna Beach, FL
Bluegrass Art Cast, Inc.
Winchester, KY
Ashland City, TN
Carolina Cast Stone Co., Inc.
Greensboro, NC
Joseph P. Carrara & Sons, Inc.
Middlebury, VT
Castcon-Stone, Inc.
Warrendale, PA
Cast-Crete of Kissimmee
Division of FECP
Kissimmee, Fl
Castone Corporation
Opelika, AL
Columbia Concrete Products
Columbia, SC
Concrete Technology, Inc.
Springboro, OH
Consolidated Precast
Thomaston, CT
Cook & Ingle Company, Inc.
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Coreslab (FL), Inc.
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Exposaic Industries Inc.
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Monroeville, AL
High Concrete Structures, Inc.
Denver, PA
International Concrete Products
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Omaha, NE
Miller Precast, Inc.
Columbus, GA
Modern Mosaic Limited
Niagara Falls, Ontario
Nitterhouse Concrete Products
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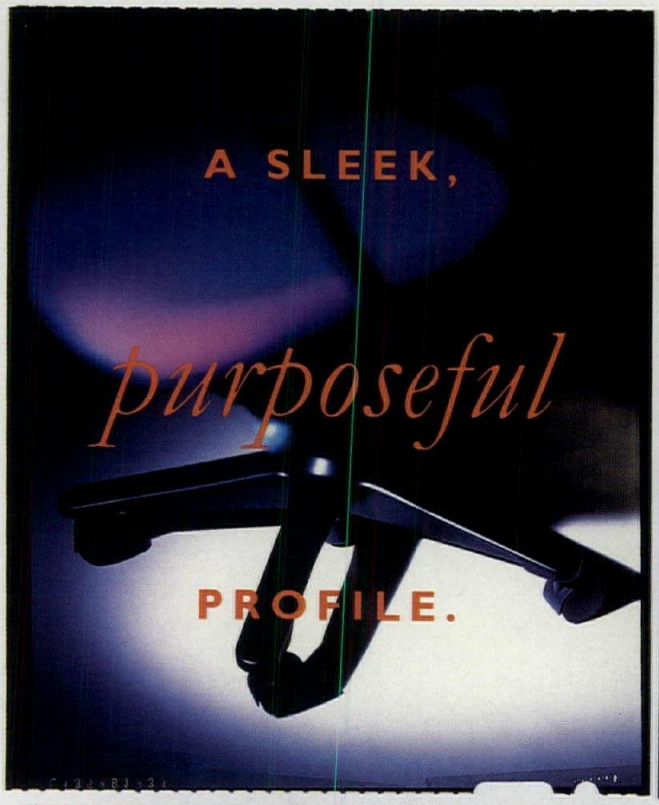

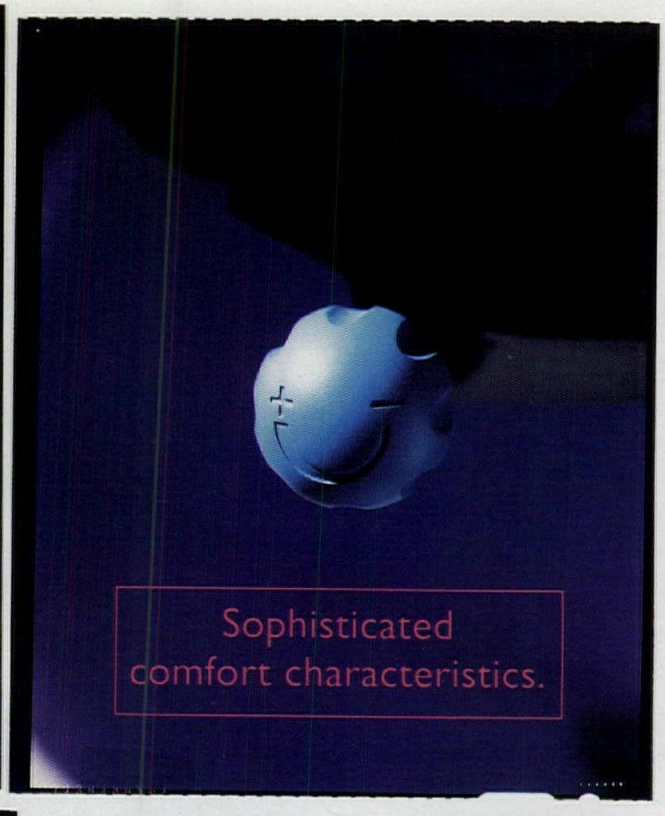

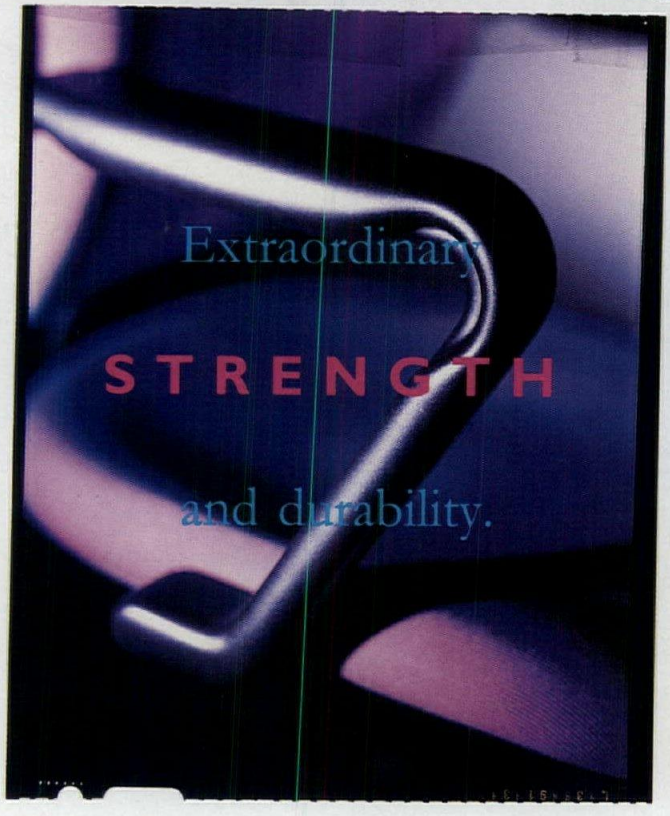

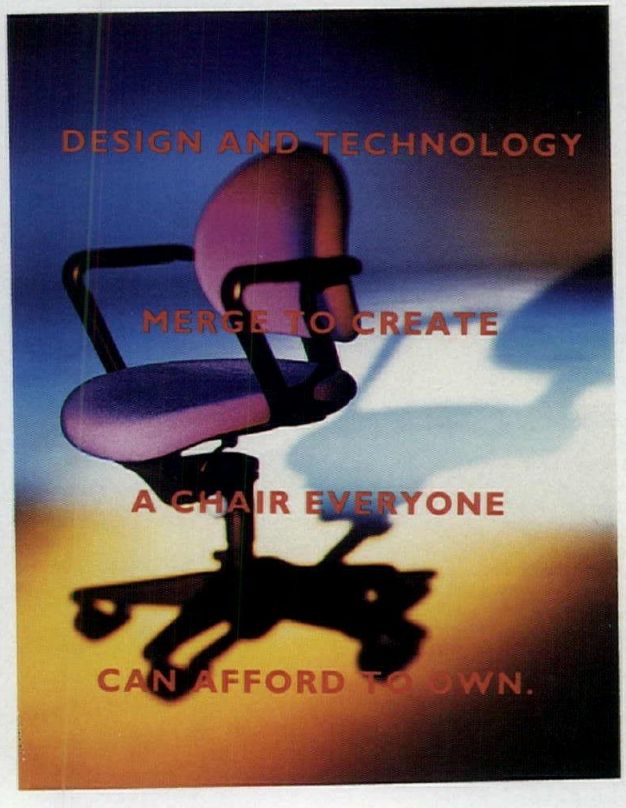

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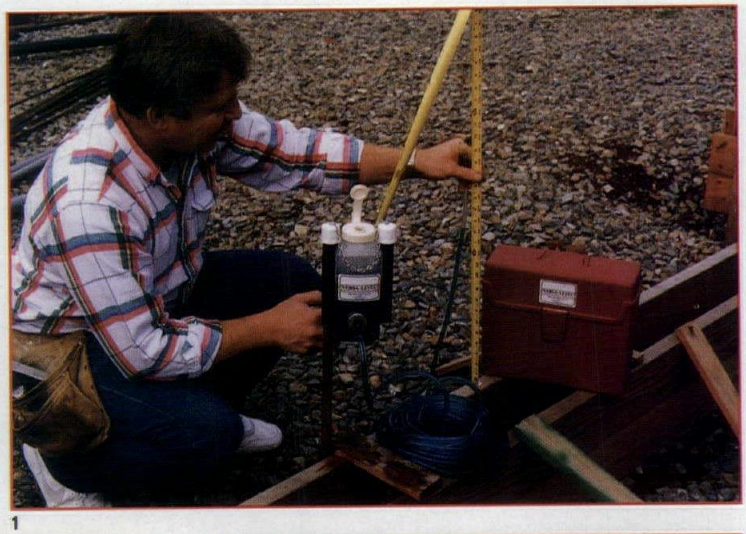

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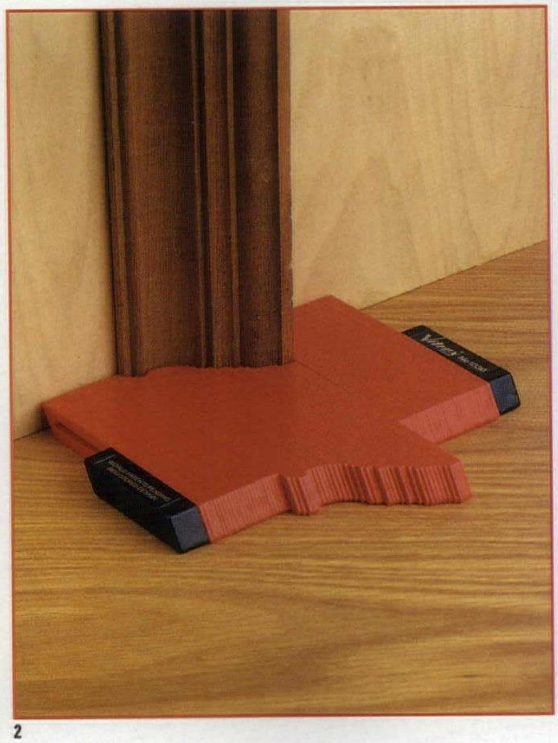

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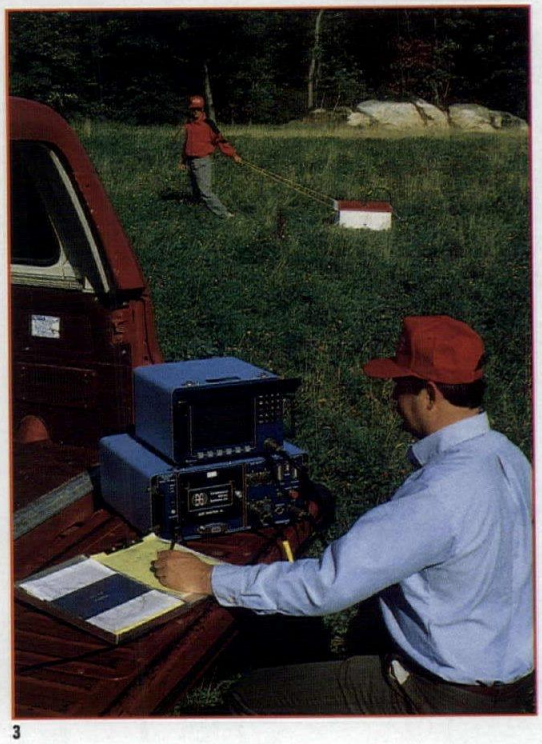


3

The products in this section complement the Technics article on Measuring/Documenting Existing Buildings (p. 39).

Measuring/Documenting Tools

1 Water Level
"Versa-Level" can be used to set a horizontal datum line from which to measure existing conditions or as a precise baseline of level for concrete forms, acoustic ceilings, and tile work. The system includes a hard-shell carrying case, a 50′-long clear plastic hose, and a quart-size reservoir bottle. The bottle is filled with water and positioned on the site.
Price Brothers.
Circle 117 on reader service card

2 Plastic Profile Gauge
This profile gauge, constructed of "unbreakable" plastic, in England, is designed to duplicate the contours of molding and other building elements up to 1¾″ deep. The "fingers" are 1/16″ wide, ½″ high, and 4″ long and will not fall out or cross over. The standard gauge copies shapes up to 5½″ wide and the large gauge up to 12″ wide.
Woodcraft Supply.
Circle 118 on reader service card

3 Subsurface Documentation
"Subsurface Interface Radar (SIR®) Systems," also known as ground-penetrating radar (GPR), "transmit a radar pulse into the ground nondestructively and automatically record a profile of subsurface features – natural and man-made – in real time." Concrete can be scanned for imbedded steel tendons, rebars, and conduit; voids within the concrete or between concrete and a sub-base material can also be documented.
Geophysical Survey Systems.
Circle 119 on reader service card
(continued on page 157)

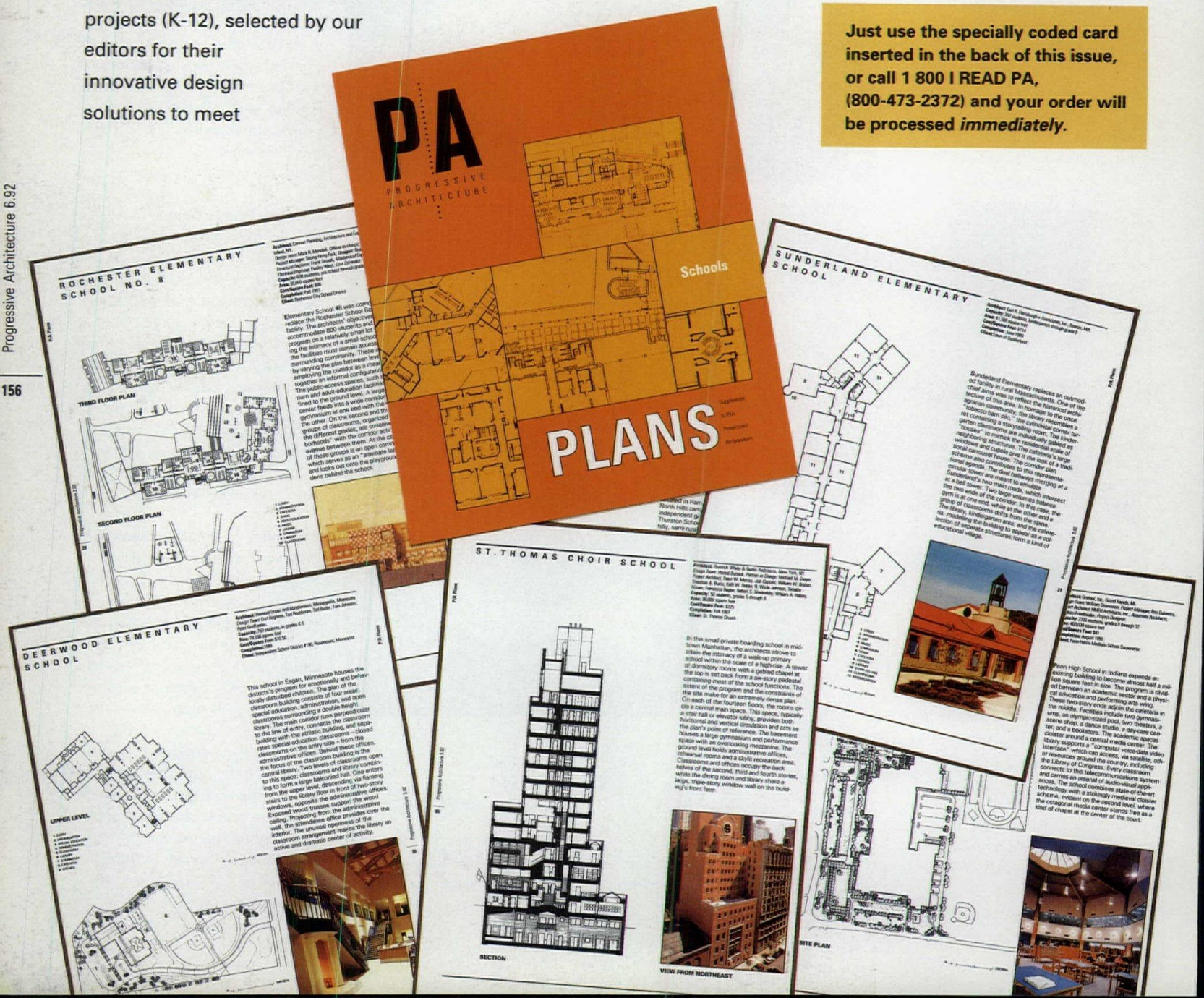
You can still get a copy of the March issue of P/A Plans!

P/A Plans is a series of supplements to our regular issues, each of which presents scores of projects of a timely building type. We'll publish a total of two in 1992. *P/A Plans* premiere edition, published in March, covers schools, and, the August edition, will cover small-scale medical facilities.

"Schools" examines the plans of more than 60 different school projects (K-12), selected by our editors for their innovative design solutions to meet the school needs of the 1990s. A primary goal of *PLANS* is to be a useful information source in this restricted economic climate. Each issue of *PLANS* will offer current ideas and direction opportunities from which designers may wish to draw cues. It is also intended as a generator of ideas among various client groups - for example, public policy-makers, managing boards, and administrators - to stimulate their imagination, opening the way for a constructive dialogue with architects.

You can still get a copy of the March issue of *P/A Plans*. Enter a one-year subscription to Progressive Architecture NOW, beginning with next month's issue and we will send you a copy of P/A Plans - Schools - absolutely *FREE!*

Just use the specially coded card inserted in the back of this issue, or call 1 800 I READ PA, (800-473-2372) and your order will be processed *immediately*.

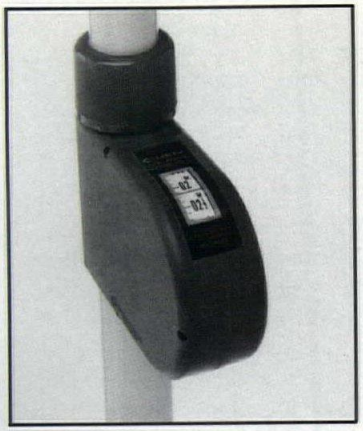


(continued from page 155)

Measuring and Documenting Tools

Desktop Photogrammetric System
"The Rolleimetric System," developed by Rollei Fototechnic of Germany, is a desktop photogrammetric system designed to produce "as built" drawings of structures from metric photographs. It is built around the Rollei single-lens reflex cameras and an IBM-PC compatible proprietary software package for conversion of the metric photographs to CAD drawings. "The Rolleimetric MR" may be used to analyze survey photos. Schneider.
Circle 120 on reader service card

Sonic Tape Measure
The "Dimension Master Plus Sonic Tape Measure" can measure up to 60 feet with "99.5 percent" accuracy. It automatically figures area and volume; it has a built-in memory, an "Aim Assist™ Spotter Lamp" to visually locate measuring points, one-button conversion capability, and a built-in dimensional calculator. Other measurement and optics instruments and tools are available through the Preservation Products Catalog. PRG.
Circle 121 on reader service card



Digital Measuring Pole
The "Lietz/SK Digital Measuring Pole" enables one person to take the field measurements normally requiring two people. When closed, the fiberglass pole is 4′-8″ long; its measuring range is 26′. The 4-lb.-12-oz. tool has a smooth telescoping movement and extra-tight clamps to prevent slippage. Many other measuring products are available. Sokkia (formerly Lietz).
Circle 122 on reader service card

Measuring From Photos
"PhotoCAD-Single" and "PhotoCAD-Multi" are AutoCAD add-on products. Photographs produced with a 35mm or larger format camera are digitized, from which a user can create true scale (not perspective) AutoCAD points and lines. PhotoCAD computes the true three-dimensional coordinates and passes them to AutoCAD. Desktop Photogrammetry.
Circle 123 on reader service card
(continued on next page)

(continued from previous page)

Remote Visual Inspection Products Brochure

Two new remote visual inspection devices are described, along with other measurement and analysis devices offered by the company, in a new brochure. "Videoimagescope," Model IV8D3, provides high-resolution, true-color images in real time; three probe lengths are available. "The Industrial Video Analyzer," model IW-1, has full-color, high-resolution display on a built-in seven-inch monitor. The latter is capable of measuring defects and other existing conditions inside pipes and on surfaces that have complex geometry or that are angled to the optical axis of the scope. Olympus, Industrial Fiberoptics Division.

Circle 207 on reader service card

Building Materials

Major materials suppliers as they were furnished to P/A by the architects for buildings featured this month.

Project: Post Ranch Inn, Big Sur, California (p. 86). *Architect: Mickey Muennig, Big Sur.* Wood poles, wood roof deck, vertical redwood boards, redwood doors, exposed wood deck, wood frame partitions: Big Creek Lumber Mills. Slate flooring: Walker-Zingger. Weathering steel cladding: U.S.Steel. Aluminum casement windows: Torrance Window. Concrete: Granite Construction. Membrane roofing: Brai. Waterproofing: Sure-Seal. Interior finish: Amazon Teakwood Oil Company. Hardware: Schlage. Kitchen equipment: Federighi. Stairs, exterior lighting, toilet stalls: Dan Woods Designs. Interior lighting: Kovac, Capri. Water-saving toilets: Kohler. Faucets: Grohe. Gas-fired furnace: Trane. Custom carpets: Sarana. Furniture: Dako. Custom office furniture: Mark Sullivan Cabinetry. Dining room seating: Dakota Jackson. Exterior seating: Linon. Blinds: Shades of Marin. Upholstery: Robert Allen Design. Stereo system: Hatimachi.

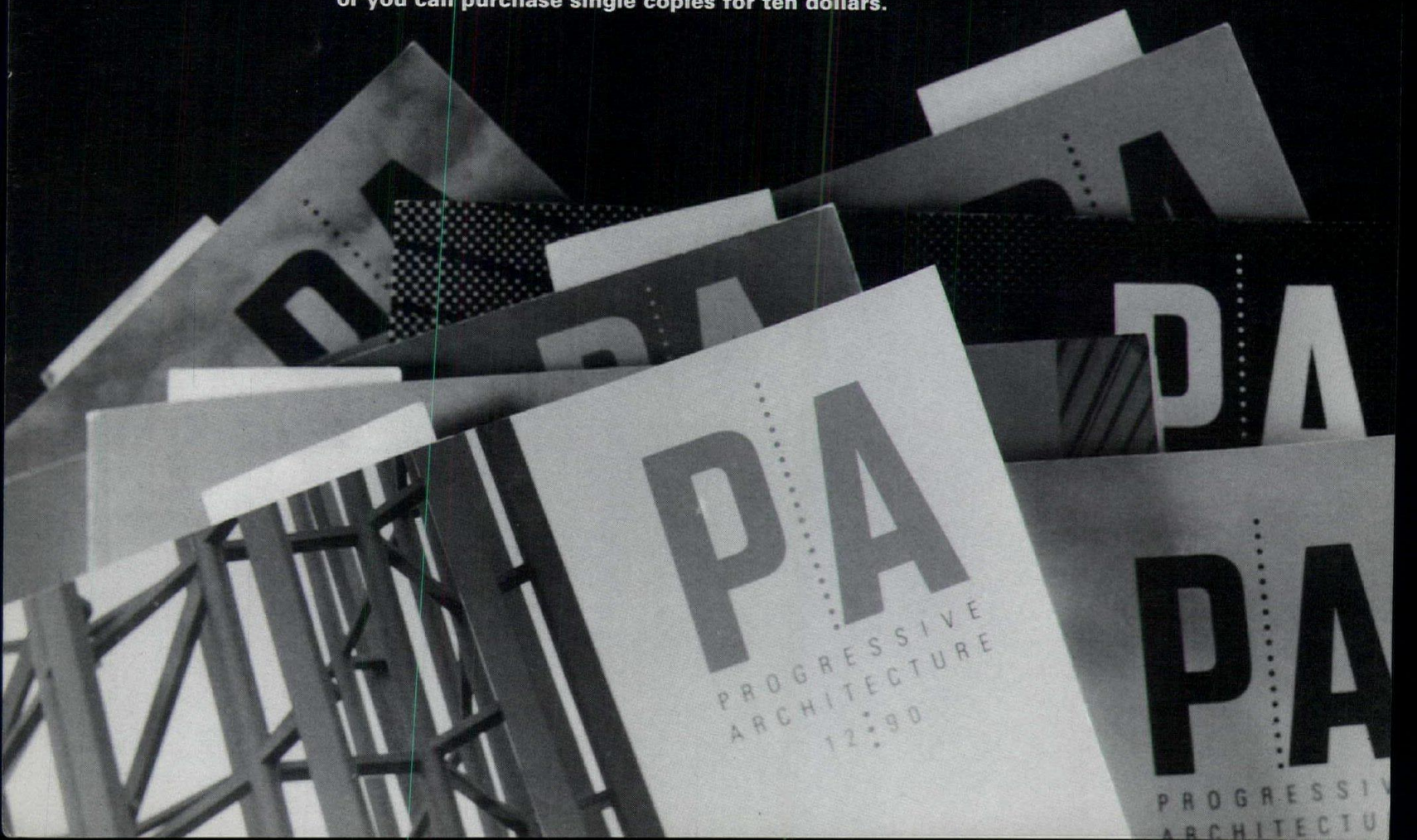
Q: Are you tired of leafing through back issues to find examples of how other architects have planned a particular type of building?

A: We are and we thought you might be too. In March, we published the first of a series of planbooks called P/A Plans. Scheduled to appear twice a year initially, P/A Plans will contain approximately 40 to 50 plans of recent buildings arranged typologically, with photos, a brief analytical discussion of each project, and an introductory text that discusses the evolution of the plan type. The first P/A Plans focused on schools, the second, in August, will cover small healthcare clinics.

We don't want to stop you from looking at back issues, because they obviously have more to offer than just interesting plans. But we hope that P/A Plans will make the job of designing easier and more efficient. And you might just enjoy leafing through it.

As a subscriber you will get two issues of P/A Plans as part of your subscription...

or you can purchase single copies for ten dollars.



Books *(continued from page 113)*

created by the emerging structure itself: the need to make things fit, to secure space from environmental hazards, to establish a systematic relation between parts so that the builder's actions will make sense. Making sense in these ways is nurtured by conversations with peers and consultants, but it takes place most essentially through "conversations" internal to the mind and prompted by pencil marks, ink lines, and dimensional calculations. Cuff is anxious to call everything that happens in practice a part of design, but she submerges the special activity that lies at the root of "making sense" in architecture – the integrative, dimensionally disciplined act of imagining how things come together and what they portend.

The most anachronistic part of Cuff's story is the culminating chapter on Excellent Practice: The Origins of Good Buildings. It comprises three case studies – the Peregrine House by Morphosis, the San Juan Capistrano Library by Michael Graves, and the Monterey Aquarium by Esherick, Homsey, Dodge and Davis. It's good reading, but oddly ill at ease with the rest of the book. Much of the book prepares us to believe that the studio culture of the schools (with its emphasis on individual achievement) makes a counter-productive model for the profession. But here the "excellent architectural office ... appears to have strong leadership, a loose organizational structure, a respect for the creative genius ... the principals who played the leadership roles in the projects are known as talented, strong-minded designers." These are the attributes inculcated in most architectural curriculums today. Can it be that the schools are well geared to produce leaders; that it's just the rest who are ill-served? It's a wasteful way to educate, if the objectives include, as they should, both improvement of the environment and nurturing productive lives.

In the beginning of Cuff's book we are invited to sympathize with the underlings, from whom the principals "hoard" design; in San Juan Capistrano we listen to the clients talk about how "All of us make real distinctions between Michael and Michael's staff" and to Michael Graves saying, "In my practice, I'm the principal designer of all the projects and the character of all the schemes is given by me." Such stereotypical stories may reflect the fact that for these studies Cuff interviewed only the principal architects and their clients (for example, Graves's staff was never heard from.)

Although Cuff's conclusions from the three cases of excellence may be at odds with the general orientation of the book, they are interesting: these projects were driven by demands for quality from both the clients and the architects, who managed to operate simply within a complex situation. All three buildings exhibited what Cuff calls stereovision – that is, the clients and the architects each described them as successful, but in different ways. The work was conducted within "open boundaries." The architects and clients showed "flexibility with integrity," used "team work with independence" and wound up "exceeding the limits" they had set for themselves, with satisfaction.

Architecture: The Story of Practice describes a work effort full of complexities and nuances, convincingly displayed in the guise of a culture of practice. Cuff's account is replete with astute analyses of the institutions that frame the practice of architecture, including modest and thoroughly reasonable recommendations for reform in education. Its shift of focus from pondering the head of Zeus to making sense of the babble of the conference room is altogether salutary.

Donlyn Lyndon ■

The author, is a partner at Lyndon/Buchanan Associates, a professor at the University of California, Berkeley, author of The City Observed: Boston *(Vintage, 1982), and editor of the journal,* Places.

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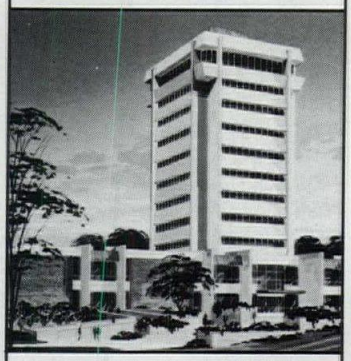

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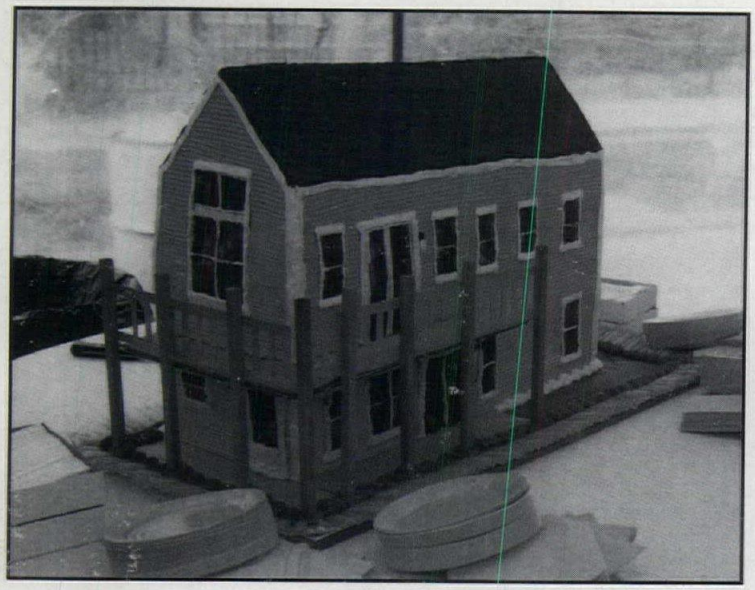

Tim Ryan

The House that P/A Built

P/A's demonstration affordable house, which we will feature in our August issue, opened on April 29th in Cleveland. And, as so often happens before an opening, we were working down to the wire. An hour before the ceremony, landscape crews were still laying sod, the concrete subcontractor was finishing the front steps, the architects were hosing dirt off the sidewalk, and our executive editor was vacuuming inside.

Yet 45 minutes later, as the CNN camera crews, the Deputy Secretary from HUD, and the Mayor of Cleveland arrived, we all had that "what-me-worry?" look as we walked – gingerly – up and down those front steps. By week's end, over 1200 people had tramped through the house, and the response was very positive. But, for the hungry people in the neighborhood who happened by, the hands-down favorite was not the house, but the large cake made in its likeness, complete with a wrap-around porch. When it comes down to food or shelter, the stomach invariably wins out: a building is no piece of cake.

A CAD Manager's Work . . .

CAD Systems Manager Tomas Hernandez of Kohn Pedersen Fox in New York has suggested that we should do an article about those annoying and unexpected computer glitches, such as plotter back-up, hard-disk crashes, and domestic disputes. Domestic disputes? When we asked Hernandez what he meant, he related the following story:

"We were scrambling to complete drawings for a large project, which were on the CAD system, but were not yet plotted. At 5 p.m., it was going smoothly, so I said good night to the staff assembling the plots and gave them my phone number in case there were any problems.

"At 3 a.m. the phone rang. My wife, fearing an emergency, picked it up and was surprised to hear a sultry female voice: 'Tom ... I *need* you.' No name, no explanation. I picked up the line in the other room and found a hysterical colleague having problems with the plotter. It took me a while to calm her down and help her fix the problem. When I returned to bed, it took me even longer to convince my wife that I hadn't been a cad."

Penn Station's Revenge?

When the Pennsylvania Railroad Company tore down New York's Pennsylvania Station in 1964 and replaced it with a joyless station under the new Madison Square Garden, it was an occasion for sorrow but also for action. Outrage over the demolition of McKim, Mead & White's station resulted in the establishment of the New York Landmarks Preservation Commission, and inspired a coalition of architects and other activists devoted to preservation around the country.

Now, in a development that illustrates just how far we've come, Amtrak wants to try to right the wrong of Penn Station. *New York* magazine reports that the railroad is seeking to renovate the nearby General Post Office, a 1913 Beaux-Arts building also by McKim, Mead & White, as their new home in New York, replacing the current Penn Station.

What would make a railroad want to embark on a $100-million project to move its station across the street? Amtrak spokesman R. Clifford Black offers an answer that vindicates those who fought for Penn Station: "It's desirable for big-city train stations to have the capacity to inspire people." Such inspiration, to be found in several recently rehabilitated Amtrak stations, has proven profitable: after Union Station in Washington reopened (P/A, Dec. 1988, p. 18), ticket sales jumped 25 percent. ■

P/A in July . . .

You've heard a lot by now about events in the Spanish cities of Barcelona and Seville. While Seville's Expo 92 offers a no-holds-barred assortment of brash architectural statements, Barcelona's Olympic-driven interventions emphasize urbanism, perhaps at the expense of architecture. Next month, we will devote our feature section to these two cities. Features will include:

. . . the Olympic archery facilities by Enric Miralles and Carme Pinós.

. . . the basketball stadium at Badalona by Esteve Bonell and Francesc Rius.

. . . the new airport in Seville by Rafael Moneo.

. . . Tadao Ando's Japanese Pavilion at Expo 92.

Technics will include an article on preformed metal roofing systems and the first of two articles explaining the technical aspects of the Americans with Disabilities Act.