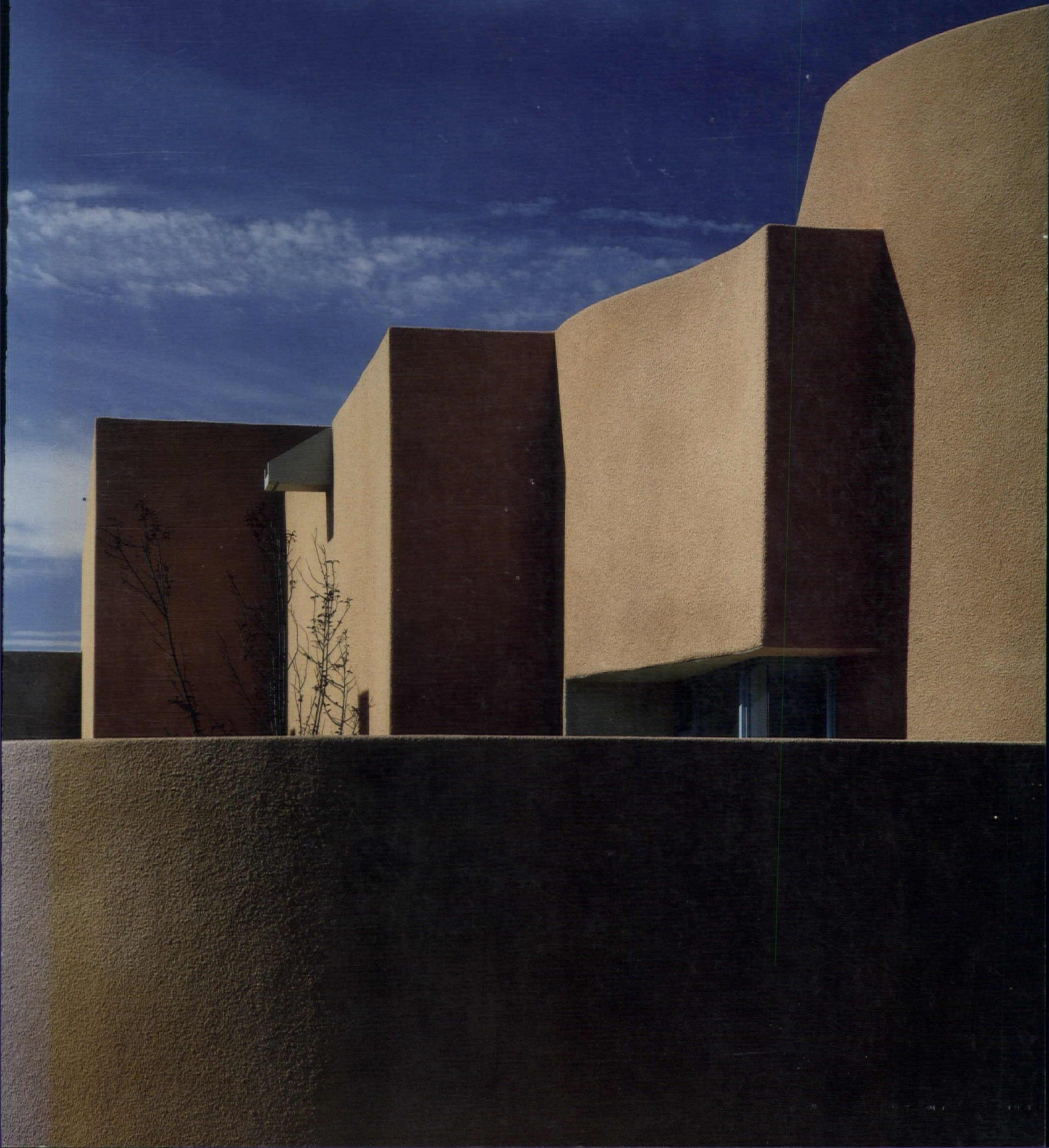


ARCHITECTURE

Incorporating Architectural Technology January 1987 Five Dollars



UNSURPASTEL CHOICES





Armstrong contract flooring offers a surprising selection of popular pastels. Mauve. Teal. Blue Gray. Sterling Gray. Hazelnut. Taupe.

Colors that capture the contemporary. Colors that span our product line. Carpet. Resilient sheet and tile. Vinyl wall base.

For a pastel sample package, call 1 800 233-3823 and ask for PASTELS.

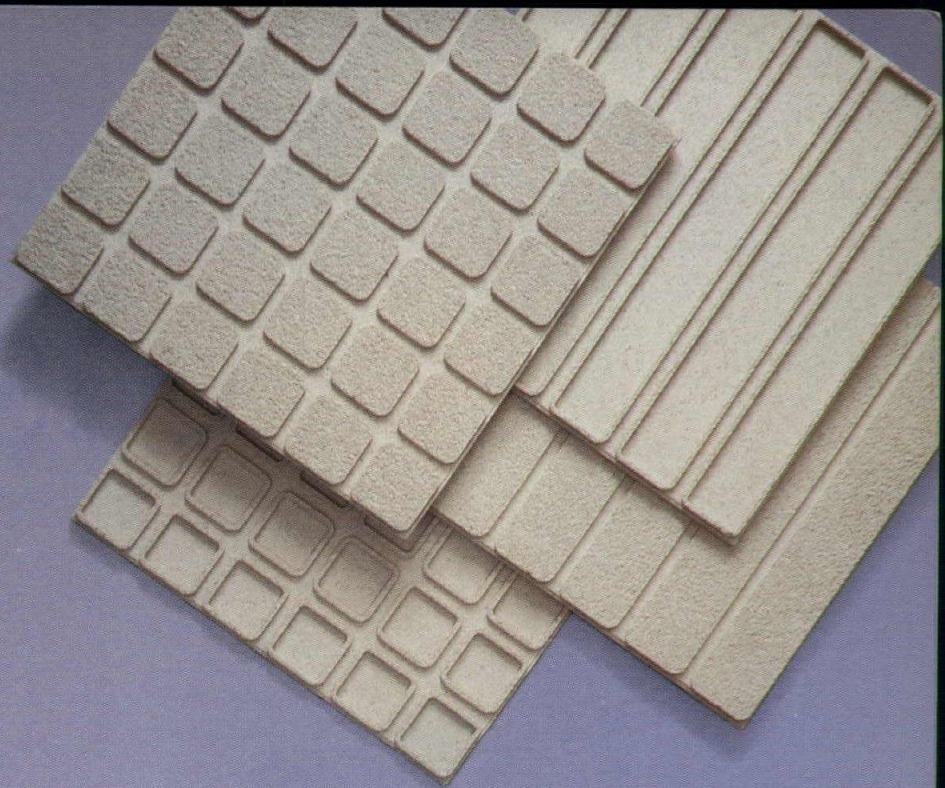
Armstrong

Circle 1 on information card

DUPONT
ANTRON

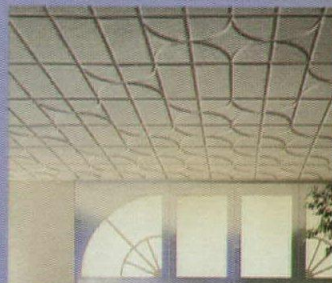


Ceiling designs copyrighted by Armstrong
Patent Pending



We design the systems.
You design the ceilings.

Syllables™ is a collection of highly decorative, in-relief, acoustical ceiling systems. Each one contains various, distinctly different panel designs.



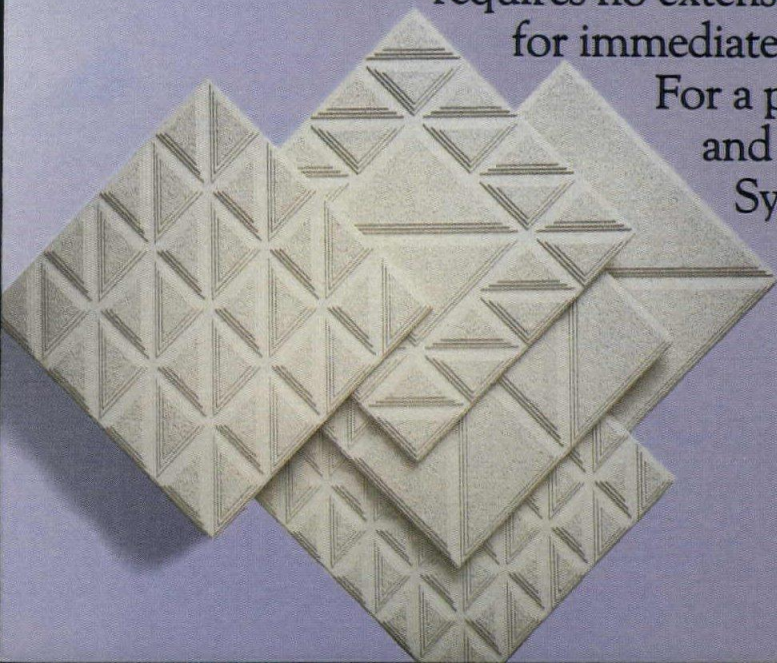
Arrange these panels any way you choose to create your own ceiling design.

Despite its intricate look, a Syllables ceiling requires no extensive design time. And it's available for immediate delivery.

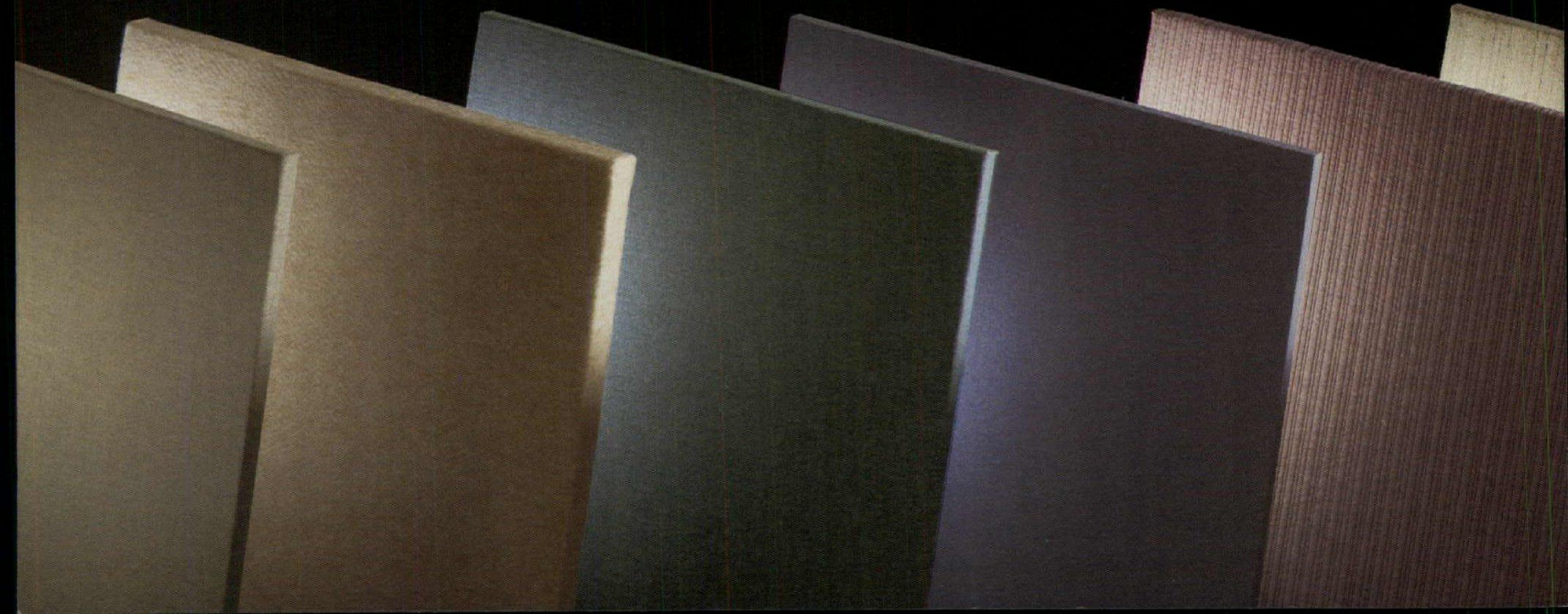
For a portfolio, call 1 800 233-3823
and ask for Department
Syllables.

Armstrong

Circle 2 on information card



Silence is golden.



Quiet is paprika.

Soundsoak[™] acoustical wall panels come in 55 colors.

Five fabric finishes. Standard sizes. And most panels are tackable.

So even if your budget is limited, your options aren't. Soundsoak is your economical yet attractive alternative to custom fabric treatments.

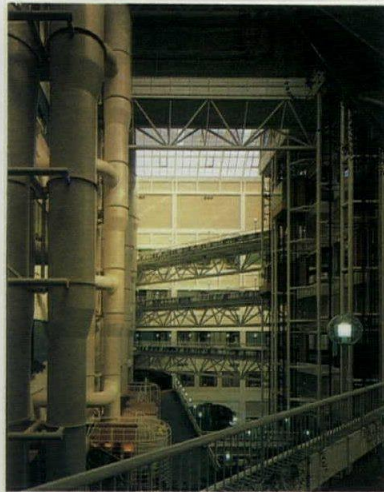
Soundsoak products are available locally through Armstrong distributors and contractors. For product literature, call 1 800 233-3823 and ask for Soundsoak.

Armstrong

Circle 3 on information card

And
Light Rose
Frost Blue
Flagstone
Caramel
Concrete
Desert Sand
Brown
Pearl Grey
Sea Green
Mist
Wheat
Khaki
Oatmeal
Coral
Persimmon
Green Neutral
Pewter
Wheat Neutral
Tiger's-Eye
Opal
Blue Neutral
Crystal Blue
Wedgwood
Rose
Rose Quartz
Garnet
Seafoam
Cream Neutral
Cameo
Quartz
Silver Neutral
Cherry Neutral
Lavender Neutral

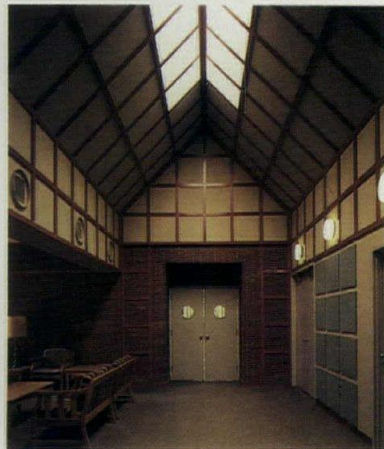




Page 52



Page 34



Page 70

Architecture as an Asset in Health Care BOOR/A's Kaiser Rockwood Clinic. By Gideon Bosker	34
Children's Ward Made into a Friendly 'Village' Hansen Lind Meyer's Mercy Memorial Medical Center. By Andrea Oppenheimer Dean	40
Reassuring Setting for High-Tech Medicine Westwork Architects' diagnostic center at the University of New Mexico. By Michael J. Crosbie	43
Designing for Health Care as Process and Marketplace Architecture can be of both therapeutic and competitive help. By Carleton Knight III	48
Evaluation: Therapeutic Environment Mackenzie Health Sciences Centre, Edmonton, Alberta. By Allen Freeman	52
The State of the Art of Design for Accessibility Architects and the disabled have different perspectives. By Nora Richter Greer	58
Designing for 'Special Populations' It requires strong emphasis on user need. By Lynn Nesmith	62
Angela Westover House, Boston; Jan Wampler Architects. By M.J.C.	65
The Gables at Old Farm Forest, Farmington, Conn.;	68
CBT/Childs Bertman Tseckares & Casendino Inc. By L.N.	70
Women's Center and Shelter, Pittsburgh;	70
Bohlin Powell Larkin Cywinski. By N.R.G.	71
Tacoma (Wash.) Area Center for Individuals with Disabilities;	71
Reed Reinvald Architects. By N.R.G.	72
Camino Alto Court, Mill Valley, Calif.;	72
Kaplan McLaughlin Diaz. By Donald Canty, Hon. AIA	74
Shriners Hospital for Crippled Children, Shreveport, La.;	74
SOMDAL Associates and Bobrow/Thomas. By A.F.	76
Wheeling (Ill.) Senior Center;	76
Holabird & Root. By N.R.G.	76

Donald Canty, Hon. AIA, *Editor in Chief*

Carole J. Palmer *Executive Art Director* Andrea Oppenheimer Dean *Executive Editor, Architecture and Design* Mitchell B. Rouda *Executive Editor, Technology and Practice*

Allen Freeman, *Managing Editor*

Nora Richter Greer, Michael J. Crosbie, Lynn Nesmith, Sharon Lee Ryder, *Senior Editors*; Douglas E. Gordon, M. Stephanie Stubbs, *Technical Editors*; Karen Collins, Amy Gray Light, *Assistant Editors*; Kathleen Vetter, *Design Assistant*; Timothy B. McDonald, Ronald J. Tomasso, *Technical Illustrators*

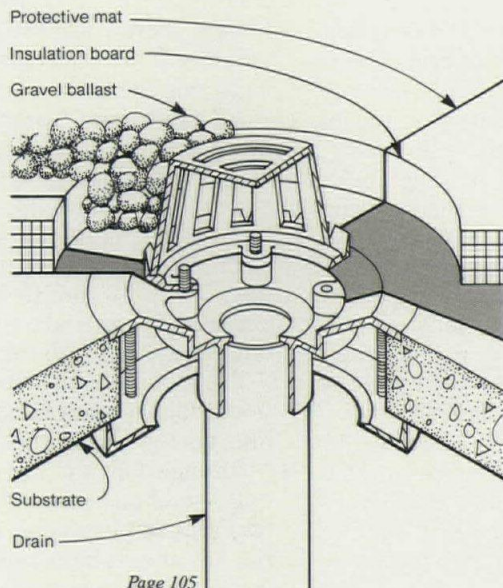
Robert Campbell, AIA, David Dillon, Robert A. Ivy Jr., AIA, Carleton Knight III, John Pastier, Marguerite Vilecco, Forrest Wilson, Oliver R. Witte, *Contributing Editors*

Bernard F. Kroeger, *Circulation Manager*; Brenda L. Owens, *Assistant Circulation Manager*; Jesse Sims, *Production Manager*; Cynthia Kellar Duck, *Assistant Production Manager*; Christi L. Wilkins, *Business Manager*; Nancy Perri, *Assistant to the Publisher*

Bob Kliesch, *Publisher*

ARCHITECTURE, publication number ISSN0746-0554, official magazine of The American Institute of Architects, is published monthly by the AIA Service Corporation at 1735 New York Ave. N.W., Washington, D.C. 20006. **Individual subscriptions:** U.S. and its possessions: \$35 for one year, \$53 for two years, \$70 for three years. Canada: \$41 for one year, \$61 for two years, \$80 for three years. Foreign: \$59 for one year, \$101 for two years, \$143 for three years. Single copies, \$5 each (except for May and September issues, which are \$10). Publisher reserves the right to refuse unqualified subscriptions. For subscriptions: write circulation department, ARCHITECTURE, 1735 New York Ave. N.W., Washington, D.C., 20006; allow eight weeks. Quotations on reprints of articles available. Microfilm copies available from University Microfilm, 300 N. Zeeb Road, Ann Arbor, Mich. 48106. Referenced in The Architectural Index, Architectural Periodicals Index, Art Index, Avery Index to Architectural Periodicals. Second class postage paid at Washington, D.C., and additional mailing offices. © 1986 by The American Institute of Architects. Opinions expressed by the editors and contributors are not necessarily those of AIA. The drawings, tables, data and other information in ARCHITECTURE have been obtained from many sources, including government organizations, trade associations, suppliers of building materials, and professional architects or architectural firms. The American Institute of Architects Service Corporation has made every reasonable effort to provide accurate and authoritative information, but does not warrant, and assumes no liability for, the accuracy or completeness of the text or its fitness for any particular purpose. VOL. 76, NO. 1.

CONTENTS



Cover

Photograph by Kirk Gittings/SYNTAX
of the Center for Non-Invasive Diagnosis
at the University of New Mexico,
Albuquerque, by Westwork Architects
(see page 43).

News

Benjamin Thompson wins firm award	14
Aga Khan awards	20
Conference on daylighting	24
Perspectivists form society	26
Remembering Henry Wright, FAIA	28
Susan Davis' Willard Hotel	31

Events & Letters	8	Books	123
Briefs	28	Products	129
Technical Tips	110	Credits	134
Interiors	115	Advertisers	136

The American Institute of Architects

Officers Donald J. Hackl, FAIA, *President*; Ted Pappas, FAIA, *First Vice President*; Robert A. Odermatt, FAIA, Leon Bridges, FAIA, William W. Herrin, AIA, *Vice Presidents*; Philip W. Dinsmore, FAIA, *Secretary*; Harry C. Hallenbeck, FAIA, *Treasurer*; Louis L. Marines, *Executive Vice President*; James P. Cramer, *Senior Vice President*

Directors (Year indicates expiration of term), Frederic P. Lyman, AIA ('87), *California*; Donald C. Axon, AIA ('89), *California*; Warren Thompson, AIA ('89), *California*; Harry Jacobs, FAIA ('88), *California*; Gregory S. Palermo, AIA ('88), *Central States*; H. Kennard Bussard, FAIA ('87), *Central States*; Lawrence J. Leis, AIA ('88), *East Central States*; Mark T. Jaroszewics, FAIA ('88), *Florida/Caribbean*; Glenn Allen Buff, FAIA ('87), *Florida/Caribbean*; Thomas R. Nathan, FAIA ('89), *Gulf States*; Norman L. Koonce, AIA ('87), *Gulf States*; T. Graham Bradley, FAIA ('87), *Illinois*; Robert E. Greager, AIA ('89), *Michigan*; Robert Calhoun Smith, FAIA ('87), *Middle Atlantic*; C. James Lawler, AIA ('88), *New England*; Douglas K. Engebretson, AIA ('89), *New England*; Eleanore K. Pettersen, AIA ('89), *New Jersey*; John M. Laping, AIA ('87), *New York*; Laurie M. Maurer, FAIA ('88), *New York*; Thomas Van Housen, AIA ('88), *North Central*; Richard W. Hobbs, AIA ('89), *Northwest*; Christopher J. Smith, AIA ('87), *Northwest*; Gerald S. Hammond, AIA ('88), *Ohio*; Sylvester Damianos, FAIA ('87), *Pennsylvania*; James Lee Thomas, AIA ('88), *South Atlantic*; Thomas P. Turner, AIA ('89), *South Atlantic*; James D. Tittle, FAIA ('88),

Technology & Practice

Contract Documents: A Quality Control Guide

Checklist pinpoints errors. By William T. Nigro

Specifications: The Substitution Game

The key to specs that stick. By Bea Sennewald

Shop Drawings: Minding Someone Else's Business

Is there such a thing as too much checking?

By M. Stephanie Stubbs

Construction Administration: All Work and No Pay?

The 'standard of reasonable care' is difficult

to define. By Douglas E. Gordon

Construction Administration:

Five Experts, Five Perspectives

Insurer's response. By Lynn Palmer

Architect's response. By Jasper S. Hawkins, FAIA

Engineer's response. By Roger T. Welcome

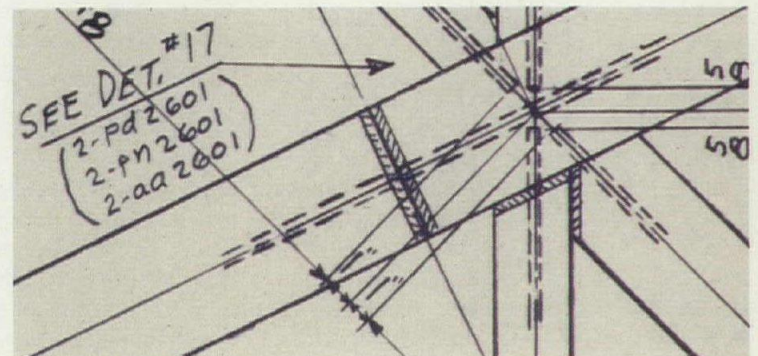
Contractor's response. By Vernie G. Lindstrom Jr.

Building Inspector's response. By Robert J. Fowler, AIA

'Upside Down' Roofs

Protected membranes lie beneath insulation board.

By Timothy B. McDonald



Page 88

Texas: Velpeau E. Hawes Jr., FAIA ('87) *Texas*: Robert H. LeMond, AIA ('89), *Texas*: Paul H. Barkley, AIA ('89), *Virginia*: David A. Daileda, AIA ('87), *Western Mountain*: Gregory Franta, AIA ('88), *Western Mountain*: Scott Norberg, *ex officio*, *President AIA*; Barbara J. Rodriguez, *ex officio*, *Chairman, CACE*

Headquarters

The American Institute of Architects: Louis L. Marines, *Executive Vice President/Chief Executive Officer*; James P. Cramer, *CAE, Senior Vice President and AIA Foundation President*; Gordon J. Alt, *Public Outreach*; Suzanne Beauchesne, *Administrative Services*; Stephanie C. Byrnes, *Information Center/Library*; Daniel J. Cohan, *Institute Resources*; Fred R. DeLuca, *Chief Financial Officer/Assistant Treasurer*; Deborah A. Diffendal, *Management Information Services*; Sandy G. Dresser, *Human Resources*; James E. Ellison, *AIA, Education Services*; Steven A. Etkin, *Corporate Vice President*; James R. Franklin, *AIA, Group Executive, Professional Services*; John Gaillard, *Convention*; Timothy Hargrove, *Controller*; Susan Allen Hecht, *Membership Services*; John R. Hoke Jr., *AIA, AIA Press*; William D. Hooper Jr., *AIA, Professional Systems*; Bob G. Kliesch, *Publisher, Magazine Group*; Paul T. Knapp, *CAE, Communications*; John E. Lynn, *Government Affairs*; Ronald J. Panciera, *Hon. AIA, Accounting*; Ann L. Parenteau, *Marketing*; James A. Scheeler, *FAIA, Group Executive, Liaison and Special Programs*; John H. Schruben, *FAIA, Real Estate*; James Vincent Siena, *General Counsel, Group Executive/Government Affairs*

EVENTS

Jan. 13-Apr. 26: Exhibition on "Crystal Palaces" of London and New York City. Contact: Cooper-Hewitt Museum, 2 East 91 St., New York, N.Y. 10128.

Jan. 28-May 24: Exhibition on "The Golden Age of Ottoman Architecture: Sinan, Sultan Suleyman's Court Architecture," the Octagon Museum. Contact: Ann Carper at Institute headquarters, (202) 626-7467.

Feb. 2-6: Annual Conference and EXPO '87 of the Society of the Plastics Industry Composites Institute, Cincinnati. Contact: SPI Composites Institute, 355 Lexington Ave., New York, N.Y. 10017.

Feb. 6-8: AIA Urban Design and Planning Conference in conjunction with Yale University school of architecture symposium on "The State of the City," New Haven, Conn. Contact: Bruce Kriviskey at Institute headquarters, (202) 626-7452.

Feb. 9-12: AIA committee for justice conference on "Security and the Built Environment," Honolulu. Contact: Michael Cohn at Institute headquarters, (202) 626-7366.

Feb. 15-18: Tenth Annual Energy-Sources Technology Conference and Exhibition of the American Society of Mechanical Engineers, Dallas. Contact: American Society of Mechanical Engineers Petroleum Division, 13773 N. Central Expressway, Suite 1314, Dallas, Tex. 75243

Feb. 15-19: Energy Sources Technology Conference and Exhibition, Dallas. Contact: American Society of Mechanical Engineers, 345 E. 47 St., New York, N.Y. 10017.

Feb. 19-20: Annual Charrette Living Catalog Show, New York City. Contact: Conference Director, Charrette Living Catalog Show, Practice Management Associates, 10 Midland Ave., Newton, Mass. 02158.

Feb. 23-24: Modular Housing Symposium, Boston. Contact: Manufactured Housing Newsletter, Box 1307, Barrington, Ill. 60011.

June 19-22: AIA Annual Convention, Orlando, Fla. Contact: John Gaillard, (202) 626-7397.

LETTERS

Wright's San Francisco Store: Your article [Nov. '86, page 45] about the renovation of Frank Lloyd Wright's San Francisco V.C. Morris store concluded with the phrase "Wright, no doubt, would approve." Wright might possibly approve of the nicely restored body of his inspired work, but he would weep at its loss of philosophical spirit which once interacted so beautifully with the dinnerware objects displayed and sold there.

No other work I have ever seen has matched that original for its poetic expression of the nature of its contents. What a succinct introduction it was to first see the rhythmic droplets of water from a

little tube end under the spiral ramp as you entered from Maiden Lane! The drops, falling into the water surface of a huge clear plastic bowl, would send circles radiating out, saying that here is the most fundamental and complete of all line forms. They would pass against floating glass spheres, throwing the imagination from one and two dimensions into all three.

After that introduction, one's view would sweep around and perceive the symphony theme upon theme, movement after movement. The instruments were circles, spheres, tubes, and spirals. They were there in the forms of the building's parts and also in the goblets, cups, bowls, and vases displayed.

The radiating movement of that droplet dropped seemed to suggest expanding glass in the hands of a glass blower craftsman fashioning a carafe or a wine glass, or even the movement of a potter's wheel where the making of the best bowls or plates might be in process. They indeed were some of those beautiful things that the Morris had selected to sell. The merchandise was high quality, and it deserved and received a high quality setting.

Even though this renovation is a welcome improvement over the recent state, there are still important ingredients missing. The big rectangular paintings seem not to be at ease in a place made for the curves of smaller things.

This Christmas the ghosts of the V. C. Morris store past, I'm sure, emerged during the wee hours and wandered uncomfortably behind those Maiden Lane arches.

*Gene D. Smith, AIA
Los Angeles*

Design/Build Courses: I was very pleased to read "Home is Where the Art Is" by Senior Editor Michael J. Crosbie in the October issue, which discussed the curriculum and philosophy of the two week design/build classes offered by the Yestermorrow School. Yestermorrow also offers a six-week PRO course for architecture students, where students further explore the relationships that exist between design and the art of making buildings. This course affords students the opportunity to expand on what they've learned in the design studio and to experiment with the design/build process. For more information, readers may write to Yestermorrow, Box 344, Warren, Vt. 05674.

*Diane Lisevick
Yestermorrow School Manager*

Japanese Architecture: I am writing in response to the book review by William H. Coaldrake published in ARCHITECTURE [Sept. '86, page 107]. Upon reading it I was dismayed by the quality of judgment, evaluation, and imbalanced treatment of my recent book *Contemporary Japanese Architecture: Its Development and Challenge*.

What is most striking in Coaldrake's review is his concentration upon the introductory material of the book and only superficial treatment of its major subject, the architecture of Japan since World War II, to which he devotes hardly more than one short paragraph. Even in this paragraph, similar to his parallel review of *Contemporary Architecture in Japan: 1958-1984* (edited by Hiroyuki Suzuki), his text merely lists the contents of contemporary materials rather than critically analyzing them.

As a historian, Coaldrake is seemingly more familiar with traditional Japanese architecture, whose significant principles and features I have introduced and analyzed in the initial part of my book. Yet, even with this more traditional material, the reviewer's criticism is filled with inaccuracies. Let me take these issues one by one, beginning with the minor ones.

Regarding the use of stone in traditional Japanese architecture, Coaldrake informs the reader that my statement, "Although Japan is equally blessed with both wood and stone of good quality, the importance of stone as a building material has always been minimal" is—and I quote him—"one of the pervasive Western stereotypes about Japanese architecture . . . and is patently incorrect." This is a curious statement considering the wealth of literature, especially by Japanese scholars, which emphasizes the primacy of wood and relative unimportance of stone in Japanese architecture. This is not to say, of course, that stone was not used at all. If Coaldrake read the whole paragraph on the same page, and the part dealing with Buddhist temples in my book, he would find a discussion.

As a representative example of how the Japanese themselves see this issue of stone, I quote only Ota Hiroto, architectural historian and editor in *Japanese Architecture and Gardens*: "In Japan buildings of every kind, up to the time of the Meiji Restoration, were made of wood, and the principles of construction and design of Japanese architecture were based on this use of wood. . . . Even though there was some small scale construction in stone, if you define a building as having an inhabitable inner space, it can be said that there were no stone buildings erected in Japan."

The second point of Coaldrake's criticism is aimed at my stating: "Monumentality is largely missing from Japanese art and architecture," and he says that this statement is incompatible with another of my sentences: "Important architectural monuments can be found throughout the country." Coaldrake, as he himself admits, does "not see how one can have monuments without monumentality." Well, the answer is simple; an architectural monument is not necessarily monumental. The word "monument" has another meaning—a structure surviving from a former period.

continued on page 10

■ N E W ■ P R O D U C T S ■



Great Benches

Concrete and wood are subtly combined to create a new architecturally scaled series of benches. These are coordinated with matching planters, litter receptacles and smoking urns. Available in lengths up to 12 feet. Concrete elements are available in 5 colors.

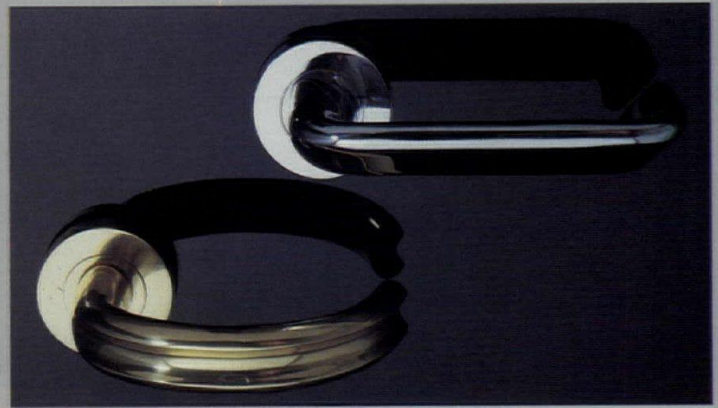
Circle No. 29



Tables

A beautiful new series of table top and pedestal designs for outdoor or indoor installations. Table tops are fiberglass, marble, or perforated metal in a wide range of colors. Pedestals are concrete, metal or marble.

Circle No. 31



Lever Handles

New lever handles are forged in brass for strength, durability and unsurpassed quality of finish. Use with any major mortise lockset. U/L Fire Safety Classification for use with locksets rated up to 3 hours.

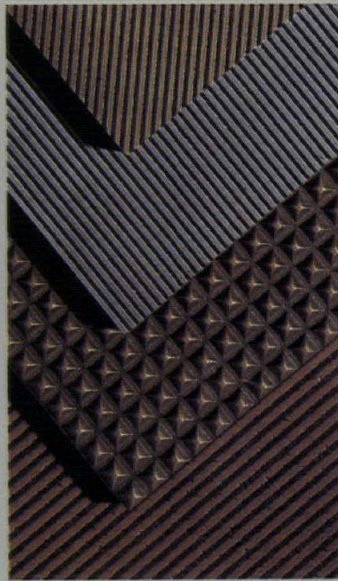
Circle No. 30



Wood Ceilings

New CS400 Series wood ceilings consist of lay-in panels for easy installation in a 24" x 24" T-Bar grid. A wide range of hardwood veneers in plain or design faces are featured, plus Class 1 fire rating and various detail options.

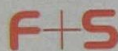
Circle No. 32



Bonded Bronze®

Bonded Bronze, which has set a standard of excellence in the surfacing of walls, doors, columns, and other architectural elements, is now available in 16 new designs and geometric patterns.

Circle No. 4



Forms + Surfaces

Box 5215
Santa Barbara, California 93108
(805) 969-7721

Letters from page 8

This is precisely the way I used the term, though, perhaps for the uninitiated, I could have phrased the same thing as "examples of traditional architecture."

In addition, as opposed to Coaldrake's presumption, I did not equate monumentality simply with the largeness of a structure or with "something monolithic," and nowhere in the book is there anything to support Coaldrake's argument. I am convinced that what I summed up with regard to monumentality is clear enough to stand against Coaldrake's confusing the matter. I wrote: "Buildings in Japan . . . never had the everlasting character of the colossal Egyptian pyramids, Greek temples, or the formidable Gothic cathedrals, neither in the materials used nor in the spirit in which they were conceived."

When it comes to the meaning of "space," perhaps the most important aspect of traditional Japanese architecture, Coaldrake's comments, even more than elsewhere in the review, are based on his exercise in "splitting hairs" with regard to my using certain English and Japanese terms. This attitude seems to eventually and successfully prevent him from understanding my overall position, a position that I outlined thoroughly and also maintained, as opposed to the allegations, consistently all through the book.

My main point in discussing the issue of "spatial" quality in the book was to prove that *space as understood in Western thinking and architecture*, played hardly any role in traditional architectural and this, by and large, applies to the majority of contemporary architectural thought and intentions as well. We can talk about space in Japan only as the perceptual or "experiential quality of place." And though in the following chapters I, just as every foreign as well as Japanese author trying to outline this special quality, used the word "space," it did not mean "backtracking" to a Western-type spatiality at all. It was done so because the Japanese terms, including *ma*, denoting the experiential quality of "space" in traditional architecture, have no satisfactory equivalents in English. Therefore, from the above mentioned and rather explicit clarifying statement and introductory paragraphs thereon, "space" in the rest of the book, with regard to Japanese architecture is, and should be, understood accordingly; that is to say—and as I have pointed out elsewhere—even if we speak about space in Japan, this would be *radically different* from the Western one.

Coaldrake outright dismisses *ma* and *oku*, two of the numerous multivalent Japanese terms—that allude to culturally conditioned perceptual and esthetic qualities,

sensible also in architecture—as "the new stereotypical catchwords," and declares as fact that "it is Western thinking reinforced by recent writings by Japanese architects that has promoted *ma* to heroic proportions." While *ma*, one of the most important notions in architecture, played indeed an important role in the structural and proportional aspects of buildings by designating the length of span between two adjacent posts (*ken*), as Coaldrake points out, and as it is discussed in detail also in my book, to reduce the significance of *ma* to only this instrumental role of measurement in construction, necessitates a vast oversimplification.

Botond Bognar
University of Illinois at
Urbana-Champaign.

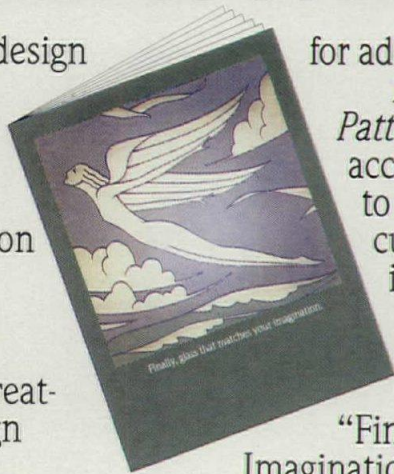
William Coaldrake responds: I have read Professor Bognar's letter carefully. Nothing in it nor my experience at building sites in Japan convinces me that modification of my criticisms of his book is warranted. [Dr. Coaldrake was born in Tokyo and is the only non-Japanese practicing member of the Kyōto Dentō Kenchiku Gijutsu Kyōkai (Kyoto Association of Architects and Master Carpenters). His series on Japanese industrialized building systems is currently appearing in *The Japan Architect*. —Ed.]

A few words to inspire a new decorative architecture.

Like never before, glass is a design element. Because now glass has more than color, it has pattern.

Patternclad® Spandrel glass and *Patternlite*® Vision glass from PPG can fuel your imagination with patterns, geometrics, contrasting colors, herringbones: All looks that combine graphic elegance with dramatic lighting treatments. And you can use our design or create your own.

Both *Patternlite* and *Patternclad* have their patterns printed in permanent ceramic enamel on either the exterior or interior surface. For exterior surface applications, an extra protective coat is there



for added durability and long life.

And best of all, *Patternlite* and *Patternclad* are glass. Dimensionally accurate and stable, familiar and easy to work with. Nothing fits into a curtainwall system better. Nothing is easier to maintain.

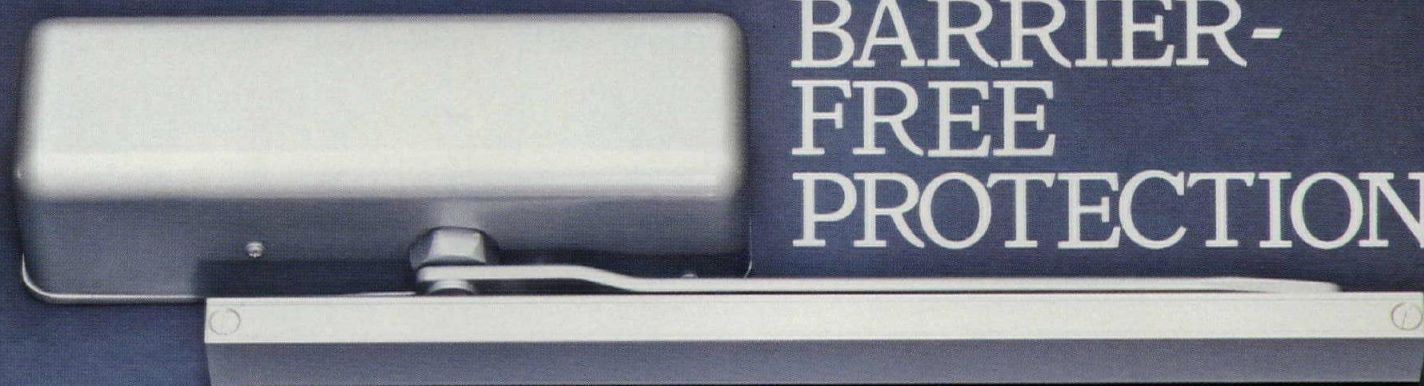
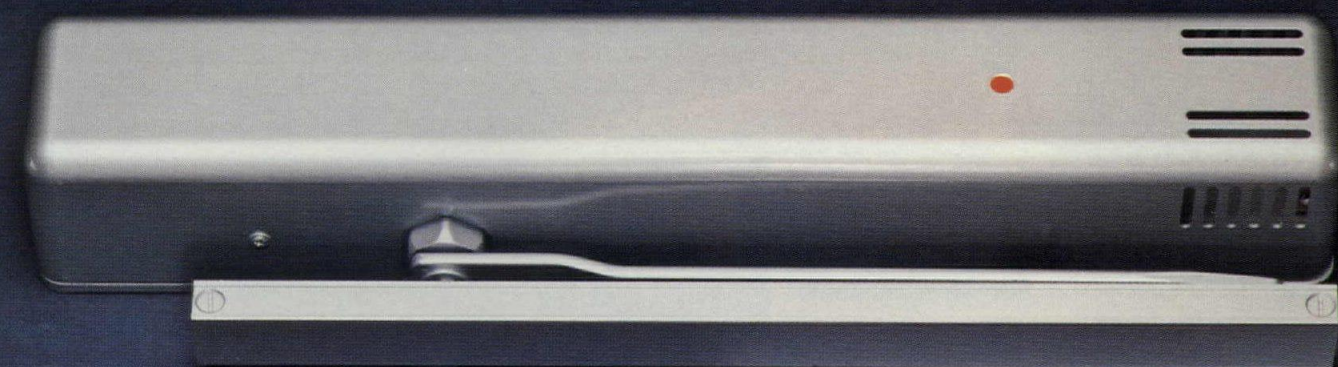
Get the whole story on design creativity. Write for your free copy of our 12-page brochure,

"Finally, Glass That Matches Your

Imagination." PPG Industries, Inc., Glass Advertising, PL 18, P.O. Box 8727, Harrisburg, PA 17105. Or use the order card in this issue.

And see how *Patternlite* and *Patternclad* can inspire you.





BARRIER-FREE PROTECTION

Stop the rapid spread of smoke and toxic gases without interrupting traffic flow. The DORMA 160 and 170 series electromagnetic fire/life safety units allow unrestricted movement through a door under normal conditions. But at the first detection of smoke, current is interrupted and the door closes automatically. Fire, smoke and toxic gases are confined.

The DORMA 170 series has an integral smoke detector/transformer. Both series are available for either hold open or free swing specifications and will interface with new or existing fire/smoke detector/alarm systems using existing on-site electrical current without modification.

The DORMA 160 and 170 series are certified to ANSI specification A156.15 and are listed by Underwriters Laboratories, Inc. under their continuing reinspection program.

Call or write for more information on BARRIER-FREE DOOR CONTROL.



DORMA Door Controls Inc.
Dorma Drive, Reamstown, PA 17567
215-267-3881

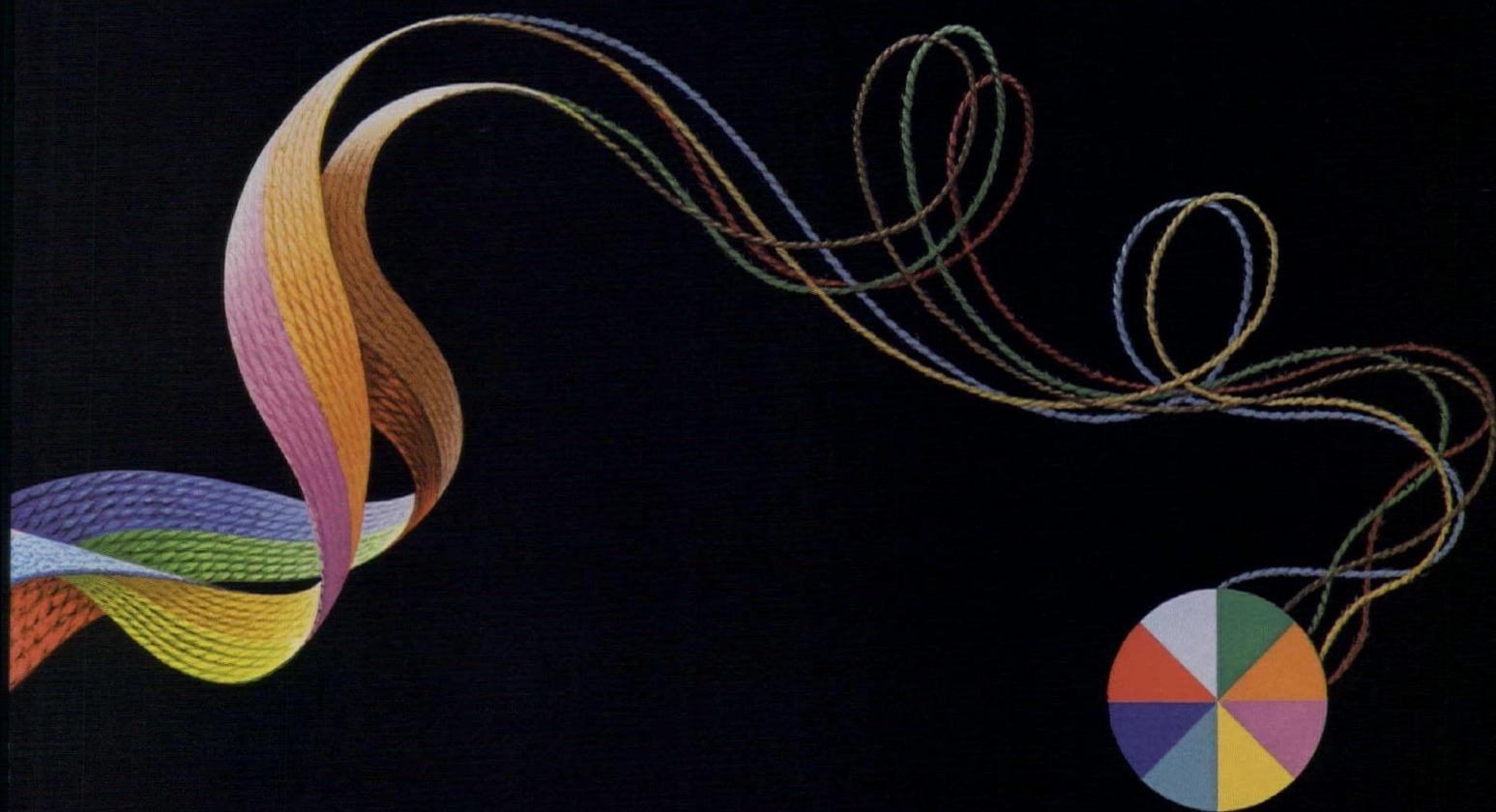
DORMA Door Controls Ltd.
1680 Courtney Park Drive, Unit 13
Mississauga, Ontario, Canada L5T 1R4
416-673-1281

Circle 5 on information card



The fiber with authority? (Associated Space Design relied on Zeftron 500[®] nylon.) High-performance fiber for an energy efficient office complex? Associated Space Design put down versatile carpet tiles and matching broadloom with Zeftron 500 nylon because it met toughest specifications for color

Zeftron 500[®] is a registered trademark owned by BASF Corporation.



Zeftron 500[®] nylon

consistency and performance. Zeftron 500 nylon tiles are solution dyed for long-lasting color. Dye lots are limitless. Tiles can be easily interchanged and replaced. Zeftron 500 nylon keeps Tennessee Valley Authority running very smoothly. Fibers for every way of life.

BASF Corporation
Fibers Division

BASF

Circle 6 on information card



The Institute

Benjamin Thompson & Associates Receives AIA's Firm Award

The Cambridge, Mass., firm of Benjamin Thompson & Associates is without rival among contemporary U.S. architects for the profound effect it has had on American cities.

The rejuvenation of downtowns from coast to coast might have occurred without BTA's prototypical Quincy Market in Boston, a conjury of shops, food stores, and eateries cobbled together of renovated and new buildings that—unlike the ubiquitous shopping mall—open out to surrounding streets and neighborhoods. It has some precedents in San Francisco's Ghirardelli Square and Salt Lake City's Trolley Square. But the now 10-year-old Quincy Market had special assets. Brilliantly choreographed by BTA and developed and packaged by master marketer James Rouse, it is in the heart of the city and at the edge of its harbor. In a stroke, it restored allure to a downtown long abandoned as shabby and dangerous by people with money in their pockets while acting as catalyst for "reclaiming the waterfront for its city," in Ben Thompson's words.

Other developers recognized a good thing, and the concept of "festival marketplaces," as Rouse calls them, spread like wildfire. BTA itself adapted it for Baltimore's Harborplace of 1980, completely new construction that Thompson characterizes as "more of an object than Quincy Market, which is more of a happening in the city." In other incarnations, BTA recycled the idea five years later at South Street Seaport in a historic New York City warehouse area; at its recently finished Pier 17, also on Manhattan's East River; as well as for Jacksonville Landing in Florida, Bayside in Miami, and Century City Market in Los Angeles, all to be completed this year.

The ideas and attitudes underlying these projects were well implanted in Thompson by the time he founded BTA two decades ago after leaving The Architects Collaborative, of which he was a founder two decades earlier. From the beginning of his career Thompson's orientation and beliefs have fit into a framework that now looks very 1980s.

In 1969 he wrote, "Today's environ-

Recently completed Pier 17 in Manhattan.

ment displays our deeper social values as if on giant billboards: Boredom, drabness, squalor, confusion, overscale . . . life is no fun . . . pleasure is forbidden. . . . If we razed all the identifiable slums in major cities, we would be left with a possibly worse disaster area. Perhaps then we could really see it—the vast middle class slum created by business and bureaucratic indifference and sustained by public insensitivity. Because it is technically clean and new, this middle-class slum is worse than the others—an overscaled psychological ghetto, whose inhabitants are disadvantaged and culturally deprived in the truest sense." His antidote was design that underscored the "infinite variety and interaction of life . . . surprise, action, intimacy, fusion . . . the lovely unpredictability of life."

Much of what Thompson has propped over the years—a commitment to revitalizing cities, to human scale, to craftsmanship, the sensual values of design, putting users first, bringing the outdoors into buildings and physically and visually linking them to their surroundings and history, etc.—sounds like clichés mouthed by myriad other architects. The difference is in the doing. Thompson's buildings and urban schemes do, in fact, put into practice what he preaches. Rouse, for instance, likens BTA's architecture to "a comfortable living room" and calls it "good architecture," to distinguish it from monumental or stylish design.

Before Quincy Market, Thompson was, as Robert Campbell wrote in the *Boston Globe*, "a major architect with a conventional practice who won national awards" for such buildings as the 1972 Gutman Library of the Harvard school of education and his dormitories for Colby College of 1967. But in the spirit of his later work, none of Thompson's early buildings was intrusive or self-consciously high style and each showed a precocious respect for its natural and manmade surroundings. Two pre-Quincy Market projects were especially prophetic for the future.

In the late '50s, before his break with TAC and before preservation had become a battle cry even for the legendary oldsters in tennis shoes, Thompson persuaded Harvard to recycle historic Boylston Hall for use as an up-to-date lan-

guage center with 40 percent more floor space than before. Since its beginnings BTA has adhered to the antipurist principles of rehabilitation Thompson employed at Boylston Hall. As he told an interviewer three years ago, "Most great buildings of the past are like layer cakes, showing modifications and changes over time, accretions, accidents, repairs, all of which keep pace with technical and social change. If you applied the strict purist historical standards that have become the weapon of some preservationist groups in this country, the unmatched towers of Notre Dame would not be permitted."

Together with Boylston Hall, Design Research served as harbinger of BTA's future direction. Thompson founded it as a store in Harvard Square in 1953 to make available then trendy, modern yet rustic accoutrements and appliances for the home, which were otherwise available only through decorators. As architecture critic and Cambridge habitué Jane Holtz Kay recalls, "With its Scandinavian blondes walking around in Marimekko prints selling Danish furniture, D-R was a cult in the '60s." In 1969 Thompson completed the see-through, D-R building on Brattle Street, which Kay has called "the ultimate showcase architecture." Before its completion, Thompson wrote, "The goal would be a quiet architectural framework for public theater-in-the-round. The form would be elemental simplicity, a non-building whose structure would fade and re-emerge as a warm busy world inside, or at times as a kaleidoscope of people, shadows, buildings, and clouds."

He adds, "Thinking back, D-R has been our Cambridge counterpart of the popular market, not only as a merchandising idea but as a small-scale visual world to entertain all comers."

Entertainment happens also to be an important part of Thompson's modus operandi in trying to win over new clients. His unorthodox presentation consists of a multimedia show using three simultaneous slide projectors and musical accompaniment. The images are from Copenhagen, Paris, Venice, Zurich—places the Thompsons have visited and enjoyed. (It is, perhaps, no coincidence that BTA's urban conjuries are tourist meccas, fun to visit but without great holding power.) The images on the screens are of fresh food, lovingly and mouth-wateringly composed for market day, of jugs of wine, loaves of bread, explosions of color in blossoms and fountains and benign crowds, of laughing children, old-timey shop doors and signs and lamp posts and outdoor

continued on page 16



Jon Goell

The Institute from page 15 benches. There are pastoral riverside scenes with sunbathers, strolling couples, pleasure boats, working trawlers. This, he tells the prospective client or visitor, is what America's beleaguered cities can become.

These presentations take place in BTA's offices, a friendly looking jumble of furniture, posters of faroff places, drawings, models, fabrics, books. It's a kind of controlled, homey-feeling chaos, not unlike Quincy Market in spirit. The cast of BTA characters has changed over the years and the firm has grown to over a hundred, but the relatively unstructured studio method of design, which provides for broad staff input and exchange, remains much the same. It is presided over by

In front of Design-Research building: third row from left to right, Philip Loheed, AIA, Ed Des Jardins, AIA, Herbert Gallagher, FAIA, Benjamin Thompson, FAIA, George Bissell, Bruno D'Agostino, AIA, Jane Thompson. Second row, Hank Haff, Charles Izzo, John Shank, Jim Van Sickle, John Vinton, AIA, Scott Wilson. First row, Fred Groff, Rob Imhoff, Gaius Hershey, Tom Quirk, Hans Strauch, Benjamin Wood.

Thompson, whose principal role is "design management" and "to reduce abstraction," according to Philip Loheed, one of seven vice presidents. Among them is Thompson's wife Jane, whose main responsibilities are early conceptual planning, public relations, and—it seems to outsiders—to

keep her husband's free-spirited, often impractical approach to life from propelling BTA beyond the reaches of gravity.

While Jane Thompson, a former curator and editor who founded *Industrial Design* magazine, is the most straightforward and down-to-earth of humans, Ben is among the least. John Sloane, former design director for the Boston Redevelopment Authority, for instance, describes him as "the original free spirit, totally disorganized but brilliant, totally unpredictable but wonderful, much like his work."

The oft-noted resemblance between architects and their buildings is particularly striking in Thompson's case. Like BTA's offices and its projects, his look is

continued on page 18



Located in West Orange, NJ, The Manor is set on 25 acres of formal gardens with gazebos, splashing fountains, and manicured lawns. Rated "one of the top 100 restaurants in the nation," The Manor boasts eleven dining rooms, two wine cellars, and over 300 employees and has been visited by U.S. presidents, as well as by dignitaries and celebrities from around the world.

"Each year, The Manor offers 400,000 guests world-class dining—plus the convenience of Sloan automated restrooms."

As one of the nation's most prestigious restaurants, The Manor makes every effort to assure that each guest has a pleasant dining experience. These efforts even



extend to offering the cleanliness and convenience of automated Sloan OPTIMA® No-Hands restrooms.

A Sloan OPTIMA system uses an electronic sensor that "sees" the user and automatically flushes the sanitary fixture—or turns the faucet on and off—only as needed.

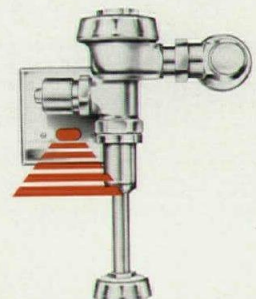
This eliminates unflushed urinals and toilets as well as assures that faucets and hand dryers are turned off after use.

The results: Increased customer comfort with more sanitary restrooms. And peace of mind for management in the form of increased cleanliness, reduced odors, reduced costs from lower energy and water consumption, fewer repairs, and less daily maintenance.

The Sloan OPTIMA system meets all building codes and installs easily—and unobtrusively—in any new or retrofit situation. The system also adapts to soap

dispensers, hand dryers, shower heads, and more.

Ask your Sloan representative about Sloan No-Hands automated systems. Or write us.



SLOAN VALVE COMPANY

10500 Seymour Avenue, Franklin Park, IL 60131

A Tradition of Quality and Pride

Circle 7 on information card

The Institute from page 16 casual; nothing he wears matches anything else, and, like his recycled buildings, most of it has seen better times. He's the obverse of slick. But then, there's a touch of color in a bright red tie and there's his mod-looking leather vest. Thompson is a shy man for whom control is enormously important, as he is the first to admit and to explain it as one reason for his interest in markets, including their fabrics, furniture, and other wares. As he says, the design of retail spaces assures dominion over people's total experience of shape and color, smell and feel, and over their movements, even as they are given ample room for spontaneity and exploration.

In discussing cities, Thompson doesn't talk theory or abstract philosophical con-

cepts. Neither intellectual nor arty, he characterizes himself as "an activist," by which he means he's a doer, having founded not only D-R but also restaurants in Cambridge and Quincy Market. As he wrote in 1967: "In practice we must stop designing for ourselves and the critics and instead begin to identify with the joys and terrors of the man who will spend his life in what we build. That means we must design for people. But if we stop to analyze people, we'll never make it. The process of understanding and empathy must be as instinctive as understanding ourselves."

More than most architects, Thompson is guided by a sure instinct for what people want, which, as it happens, seems to coincide with what he likes.

He talks about "the city as fantasy"

characterized by sensuous colors and smells, "joy" and "pleasure." Its most reliable pleasures for him are gustatory and, as he says, "food is the common thread of my urban shopping creations. Food is the critical ingredient in any real marketplace, from Mexico to Manchuria."

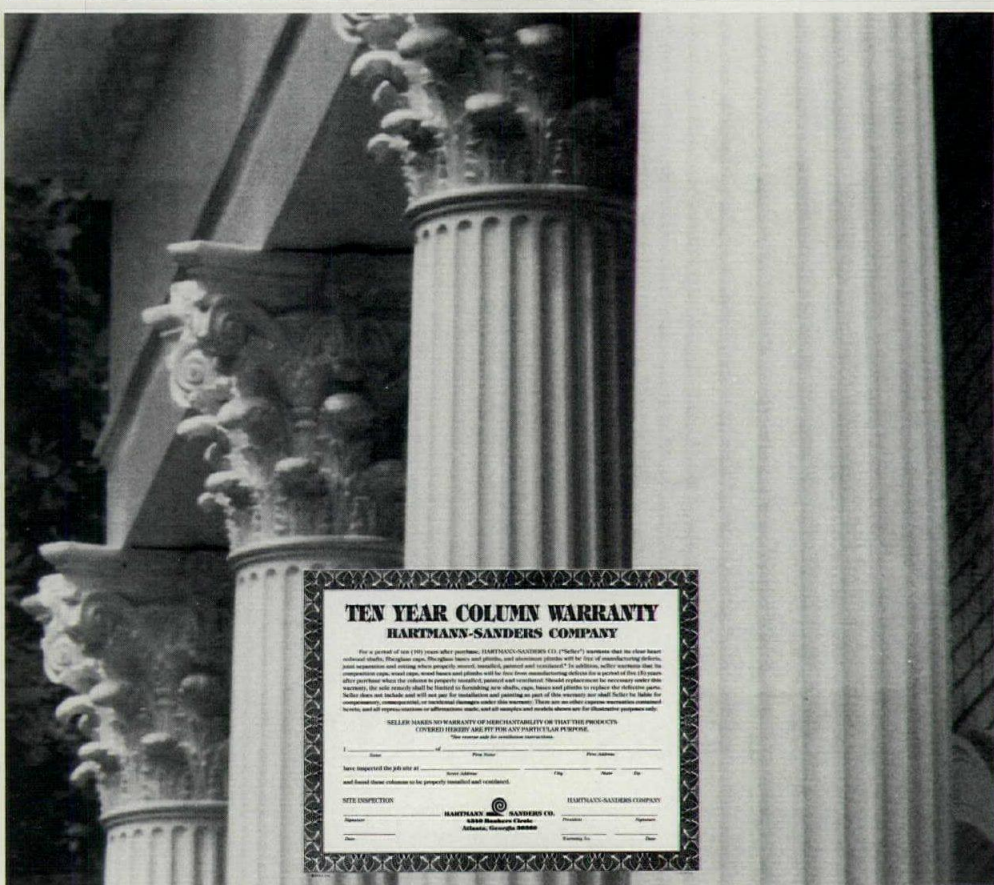
But BTA's shopping creations are less like markets in the original sense than like 1980s bazaars. Unlike markets all over the world they cater less to people from the area doing their weekly (or daily) food shopping than to office workers on their lunch hour, suburbanites meeting for a day in town, and tourists. The Thompsons are well aware of the dangers of touristification and homogenization that diminish local flavor. Though the architecture of BTA's three projects in Boston, Baltimore, and New York City is very different, the wares sold in each are similar, with many of the retailers belonging to national chains, a trend that is accelerating as developers nationwide create knockoffs.

A related criticism comes from a sort of snobbism, part of it inverse, that objects to the markets' yuppification, the "impurity" of their rehab work, the overly sweet feel of it all. As Jane Thompson wrote in a recent letter, "Preservationists are increasingly literal; architects are frequently removed and hostile to the whole idea of shopping and selling. Some, it seems, see yuppies under every bush, armed for attack with cheese and wine. What do you suppose preservationists swill for fun? (Moldy mead and figgy pudding?)" The logical retort comes from Peter Davey of the *Architectural Review*. "The shopping street," he writes, "provides the most easily available up-to-date index of a culture." We may not like what the mirror reflects, although it's accurate.

In the end, BTA's marketplaces are "an impersonation of a kind of urban life that no longer exists in most of America," as Robert Campbell wrote. "It's a theatrical representation of street life. It has to be, because that is a stage we have to go through as we begin cautiously, self-consciously to re-enact the urban culture we abandoned." In the meantime, he adds, the markets are "a halfway house for people from the car culture who are trying to love cities again."

The most serious criticism of the markets is that they cater to the affluent and underscore the schism in American cities between the moneyed and the poor. In this respect they also mirror the priorities of our time, something for which Ben Thompson & Associates can hardly be held responsible. Their responsibility is for solving design problems, and, as the Boston redevelopment authority's former design director John Sloane says, "If someone asked which architect I'd choose to respond to people's needs, cares, aspirations, dreams, I'd choose Ben Thompson."

—ANDREA OPPENHEIMER DEAN
News continued on page 20



Specify our columns to get an important new detail the competition omits... a 10 year warranty.

Hartmann-Sanders' authentic architectural columns last a very long time. Some have been in place at the White House for over 80 years. That's why only our columns are warranted to be free of manufacturing defects, joint separation and rotting for 10 years.

There is no 'or equal' quality when you specify Hartmann-Sanders, because you will receive:

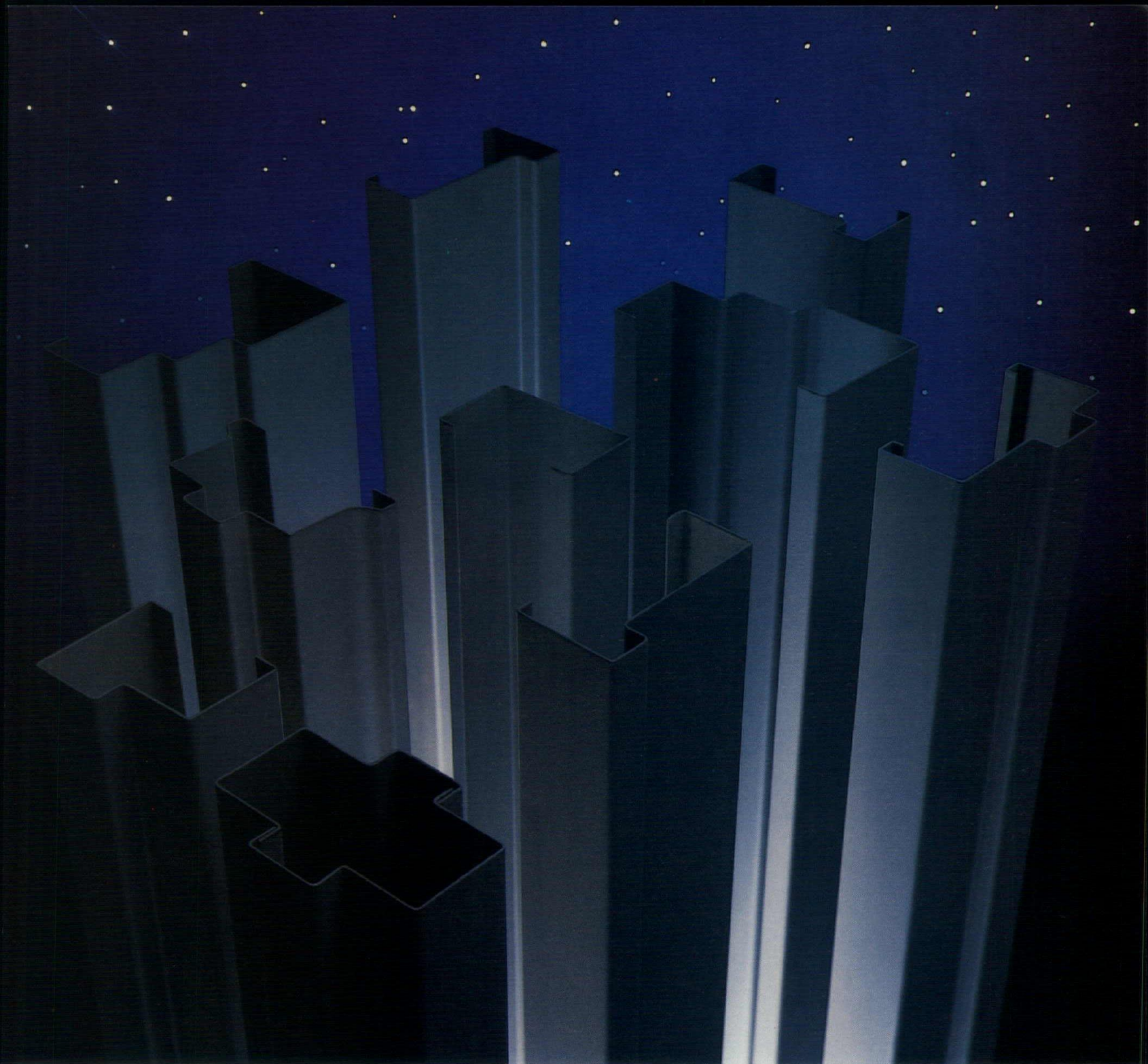
- The only 10 year column warranty*
- Exclusive, rotfree, clear heart redwood shafts
- Joint free, rotproof, fiberglass caps and bases
- 90 years of uncompromising architectural authenticity

When your design calls for columns, specify only Hartmann-Sanders Co. Don't overlook the important details.

*Some column styles use composition or woods caps and wood bases which are covered by a 5 year warranty.

HARTMANN SANDERS CO.

4340 Bankers Circle, Atlanta, Georgia 30360
Call 1-800-241-4303 (In Georgia, 1-404-449-1561) for information.



Because your buildings take many shapes, so do our frames.

You specify it. For masonry, steel stud, wood stud, dry wall or poured concrete. We'll fit it. Exactly.

Curries has more standard frame configurations to choose from than anybody else. In 12, 14, 16, or 18-ga.

cold-rolled or galvanealed steel. And 16-ga. stainless steel.

Order them any way you want. Knocked down. Set up and spot welded. Set up and arc welded. Or set up and full welded.

Curries custom frames fit only one way. Your way. And they can be fabricated locally, by your Curries distributor. So there's less chance of damage in shipment. And you don't have to put up with costly delays.

Curries delivers on time. So you get what you want. Correct. Complete. No excuses.

Call your Curries distributor today. He's in the Yellow Pages under "DOORS" or "DOORS-Metal." Or see Sweet's 8.2 Cur. Curries Company, 905 South Carolina, Mason City, IA 50401. Member Steel Door Institute.

CURRIES

A Unit of L.B. Foster Company

FOSTER

©Curries 1985

Circle 9 on information card

The Aga Khan Awards for 1987 Raise Issues of Tradition

The Aga Khan award for architecture was presented in late November in Marrakesh, Morocco. Six buildings from around the Muslim world received awards totaling half a million dollars, while five other projects received honorable mentions.

The prizes are intended to help defend traditional Islamic culture and identity against the impact of Western modernism. For such a purpose Marrakesh seemed the ideal setting. In perfect weather, the city sat on its flat desert site like a red clay model on a table, backdropped by the curtain of snow-covered Atlas mountains 40 miles to the south. Culture clash was everywhere. In the great market plaza of Jemaa Al-Fna, some of the snake charmers wore jeans and running shoes. Veiled women whizzed mysteriously past on motorcycles.

Even the guests for the award ceremonies—winners, clients, and advisers, Muslim leaders, staff, and press—arriving from all around the world, came in identical Western airplanes and most wore

nearly identical dark Western suits. As my own Air Morocco plane came to a halt in the Morocco desert, the intercom was playing the Tijuana Brass. What is genuine Muslim culture, one wondered. Should the Marrakesh airport have horse-shoe arches? Shouldn't it, at least, be distinguishable from the airports of Ohio or Australia? Or was it I who was at fault, seeking and missing in this place a romantic uniqueness that, if it could be preserved, might only constrain the lives of the inhabitants?

The six winners, picked by an international jury after a long and exceptionally careful process, proved to be controversial. Even the award program's board of advisers was disconcerted by the awards' narrow range and sent the jurors back into

Award winners, clockwise from bottom right: Yaama Mosque in Tahoua, Niger; Stari Mostar bridge in restored Mostar Old Town, Yugoslavia; Social Security complex in Istanbul, Turkey.

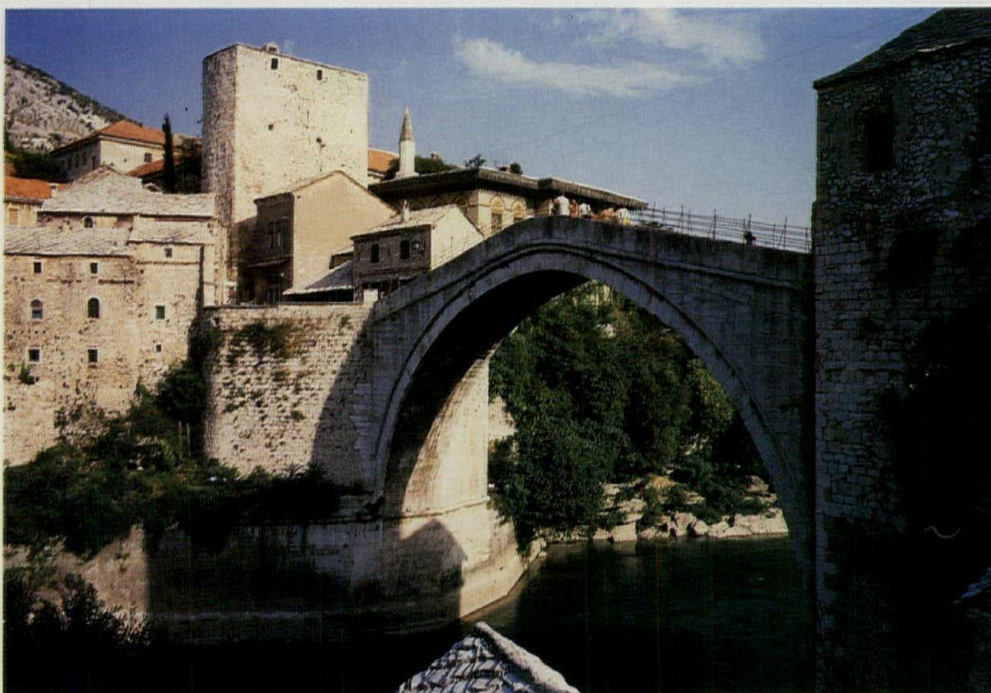
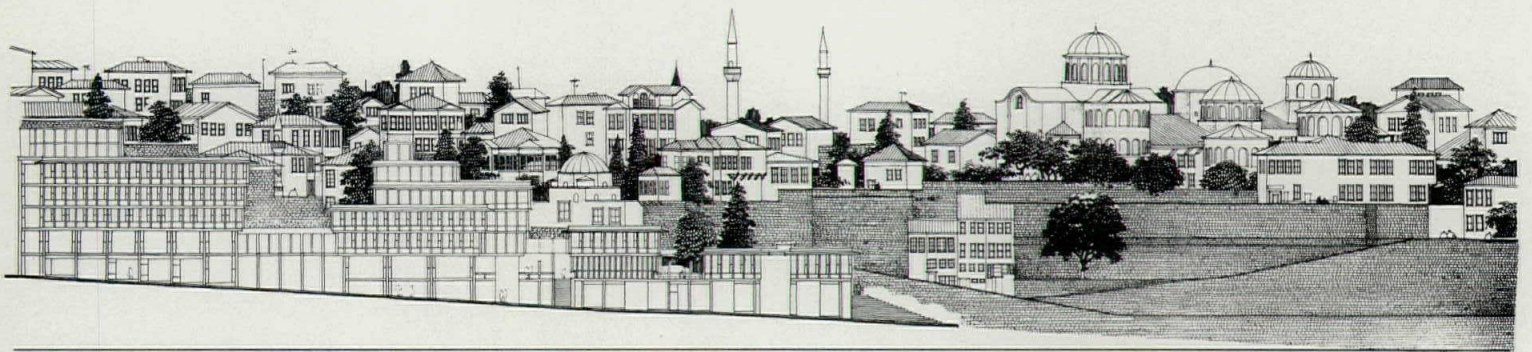
session to add the five honorable mentions. Of these 11 winners and mentions, none was a large or especially innovative building, and none was designed by a Western architect. Of the six winners, only two were designed by professional architects. Three were restorations; three were mosques. The general feeling among the 250 who gathered for the awards ceremony seemed to be that the prizes had been weighted toward what the jury perceived, perhaps with nostalgia, to be natively Islamic.

The jury disagreed, asserting in its report that "the apparent lack of balance in the range of awards results . . . from the particular quality of the submissions and not from any bias."

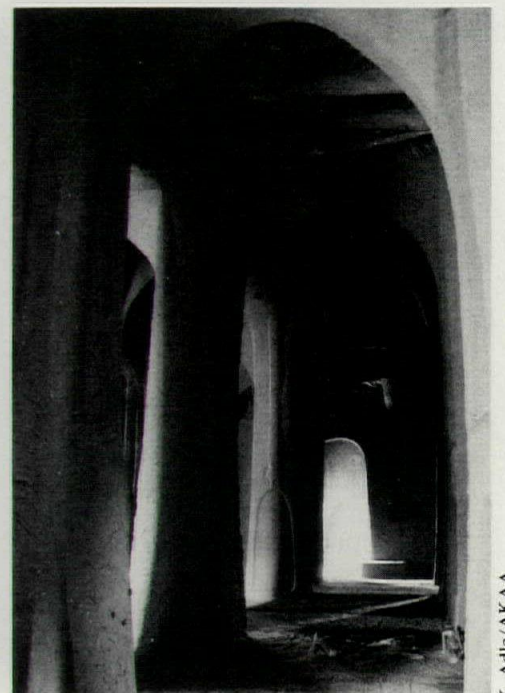
The prize winners were as follows:

- Social Security Complex, Istanbul, Turkey (1970). Architect: Sedad Hakki Eldem, Istanbul. A series of four connected low-rise buildings, intended for mixed use, that terrace down a slope. Materials are concrete frame, precast fins, concrete block, and metal sash. Pleased that the architect had avoided the cliché of a high-rise slab that would have disrupted the neighborhood, the jury praised the building for "the absence of any ideological bombast in its expression."

- Dar Lamane Housing Community, Casablanca (1983). Architects: Abderrahim
- continued on page 22*




Reha Gumay



K. Adle/AKAA

Handicaps aren't always permanent. But they're always inconvenient.

 That's why we've made the new Oasis[®] automatic water cooler so user-friendly it can even be started with a tap of the hip as our mother of twins has done.

In fact, just a tap on any one of the four conveniently located touch pads — with any part of the body — starts it. Cold water runs for 7 seconds, then stops. Automatically.

It's the only cooler available that even the most severely handicapped can use by themselves.

Electronically timed control means there's no need to maintain constant pressure to keep the water running. The secret is our exclusive membrane switch design that activates a solid-state, solenoid valve control circuit.

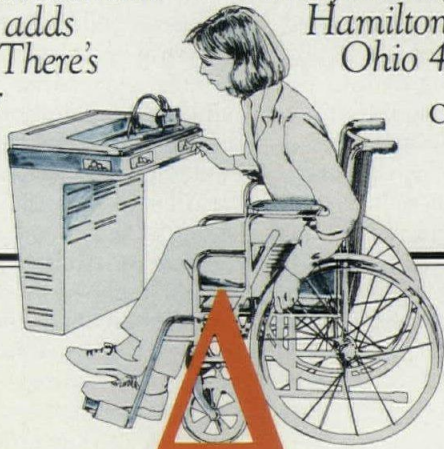
Overall styling adds convenience, too. There's more room under the basin for the wheelchair-



bound. And there's no mirror distortion of the water flow for the visually impaired.

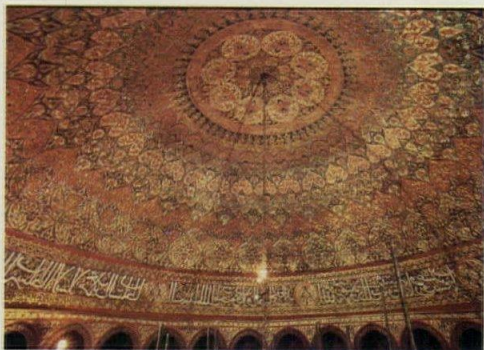
Get full details on this elegant new water cooler, Model OEP8WM-AE. See your Sweet's or Hutton Files. Or contact your nearest Oasis distributor. He's listed in the Yellow Pages. Ebco Manufacturing Co., 265 N. Hamilton Road, Columbus, Ohio 43213-0150.

Circle 10 on information card



OASIS

WATER COOLERS BUILT WITHOUT SHORTCUTS.



J. Bétant/AKAA



C. Lignon



J. Bétant/AKAA

Awards from page 20

Charai and Abdelaziz Lazrak, Casablanca. A high-density low-rise, inner-city housing complex of 4,022 dwellings for 25,000 people. The jury liked its use of gates, streets, and courtyards and said: "The overall organization and the design of the housing clusters recalls the traditional pattern of the Moroccan town and ensures a rich, continuous pedestrian network."

- Conservation of Mostar Old Town, Mostar, Yugoslavia (1978 and ongoing). Conservator: Stari-Grad Mostar; Dzihad Pasic, director; Amir Pasic, assistant director. Restoration and adaptive use of a historic town center, cited as a "remarkably conceived and realized conservation of the entire 16th-century center of this historic town. . . . The old town center is again commercially viable and alive."

- Restoration of al-Aqsa Mosque, Jerusalem (1983). Restoration: Isam Awwad, Jerusalem, and the International Centre for the Conservation and Restoration of Monuments (Paul Schwartzbaum, chief conservator/restorer). Meticulous restoration/reconstruction of a major monument of Islam.

- Yaama Mosque, Niger (1982). Master mason: Falke Barmou. A new mosque, built collectively by the members of the community with innovative use of such traditional techniques and materials as sun-dried mud brick and arches of bent bundles of sticks. In the most rapturous of all its comments, the jury spoke of "a primordial state of being in which men are umbilically bound to Nature" and "the attainment of grace throughout the process" and concluded: "In an era when traditional architecture is losing ground, this is a remarkable feat."

- Bhong Mosque, Pakistan (1982). Patron/designer: Rais Ghazi Mohammad, Karachi. Built over a period of 50 years, the mosque was described by the jury as "populist" rather than traditional, although its con-

struction helped train 200 craftsmen. The rather ambiguous citation reads in part: "It enshrines and epitomizes the 'popular' taste in Pakistan with all its vigour, pride, tension, and sentiment. Its use—and misuse—of signs and symbols express appropriate growing pains in transition."

The five honorable mentions included a housing project, Shushtar New Town in Iran; the upgrading of a self-help community in Indonesia; two additions to the town of Ismailiyya in Egypt housing 90,000 people; a new mosque in Indonesia; and the preservation of a group of historic buildings in Istanbul.

A chairman's award was presented to Iraqi architect Rifat Chadirji, who was cited as critic, teacher, and designer for a lifetime of seeking to synthesize Islamic heritage with contemporary thought and technology.

Among buildings nominated but not premiated, the most notable was probably Louis Kahn's Assembly Hall for Dhaka, the capital of Bangladesh. It was criticized by some members of the jury for being neither traditional nor well related to context and for its cost and was finally postponed for consideration by future awards on the ground that too little time had passed for user evaluation.

Unfortunately, the report by the jury—which included such internationally known architects as Robert Venturi, FAIA, Fumihiko Maki, Hon. FAIA, and Hans Hollein, Hon. FAIA, among its nine members—was garrulous and confused. It listed an excellent set of criteria, then collapsed into unrelated comments that often were apt but that didn't add up to a policy. Its most memorable passage attacked self-conscious design:

"Throughout, the jury placed emphasis in making its assessments on basic, elemental architectural qualities, as opposed to the over-simplistic, bombastic, or ideological qualities that are some-

Winners, clockwise from above right: Bhong Mosque in Rahim-Yar Khan, Pakistan; Dar Lamane housing in Casablanca, Morocco; restored dome of al-Aqsa Mosque, al-Haram al-Sharif, Jerusalem.

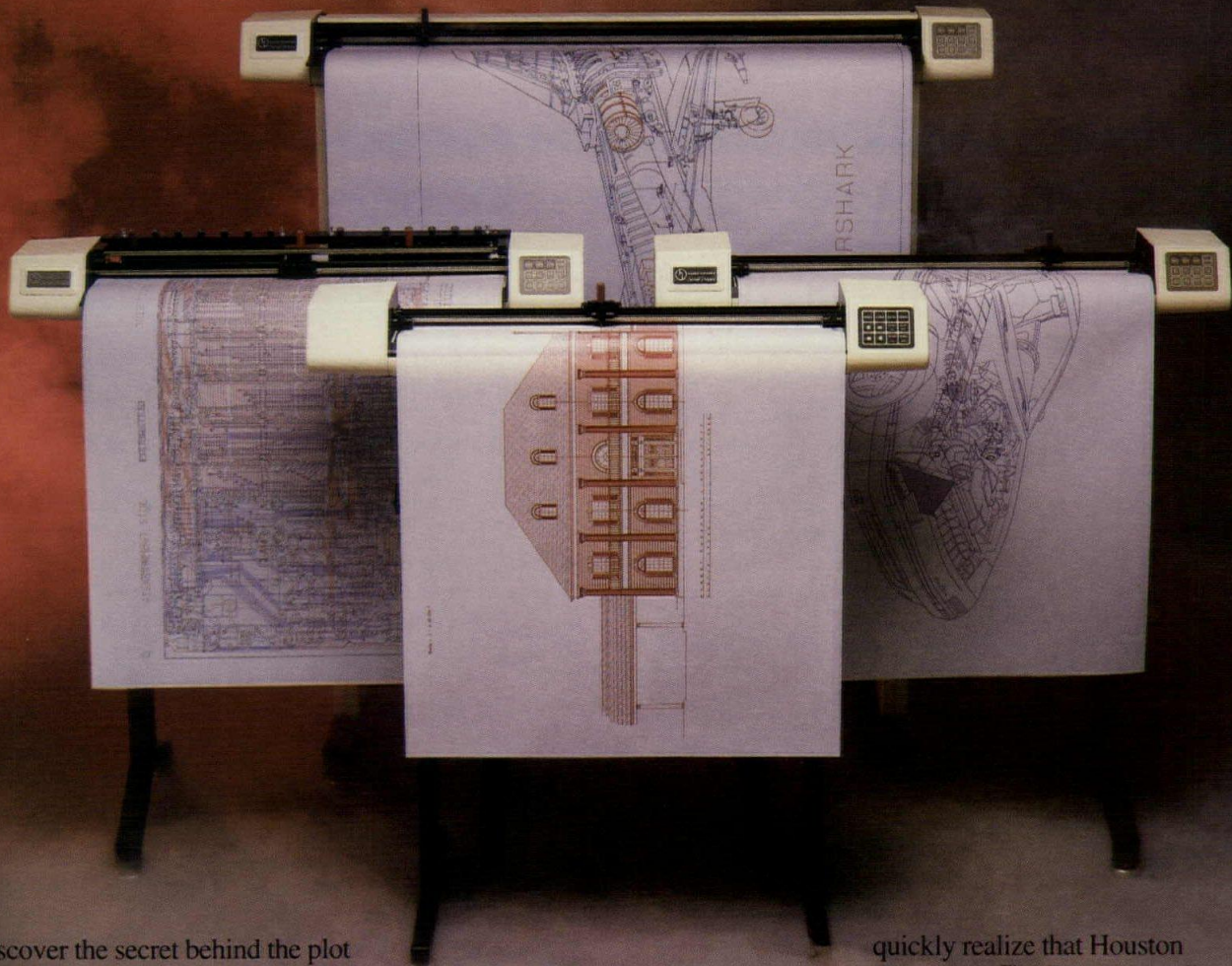
times lauded in contemporary and 'vernacular' architecture alike. . . . The jury was concerned to note conflicting philosophies between the approach of the 'modern movement,' which is often concerned with the search for a logical language of clarity and unity which might be universally applied, and the results of the continuing evolutionary process, which are frequently more concerned with diversity and vitality, with joy and engagement."

Two jurors, Hollein and Mehmet Doruk Pamir of Turkey, submitted minority reports. Hollein complained that "to the aims of the Aga Khan award for architecture, a judgment against architecture is a disservice," but didn't elaborate except to praise the Louis Kahn complex. The sharpest critique appeared in the Aga Khan program's own magazine, *Mimar*, in which Executive Editor Brian Brice Taylor asked: "Where are the schools, universities, hospitals, factories, public administrations? . . . The 1986 jury . . . avoided the crucial subject of contemporary professional contributions. . . . All seemed to have joined hands to settle certain accounts with the 'modern movement.' . . . Future juries will face the challenge of recovering contact with the mainstream of the profession in countries with significant Muslim populations." Similar issues were raised at a seminar after the awards presentations.

The Aga Khan program is probably the most ambitious and intelligent effort being made today to address the single most serious issue in contemporary architecture, which is the question of how to preserve any sense of place in a world that is be-

continued on page 24

THE SECRET BEHIND THE PLOT: HOUSTON INSTRUMENT.



Discover the secret behind the plot with Houston Instrument's line of low cost, high performance plotters.

Within HI's impressive line, you'll find a full range of models suited for virtually any CAD application.

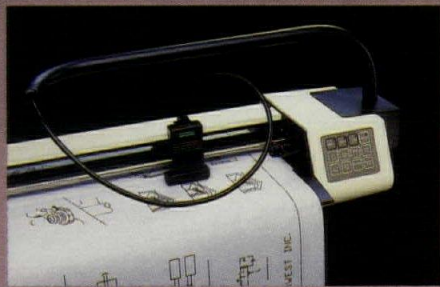
Secrets in flexibility and quality.

Define your requirements. You'll find a plotter that's uniquely suited to your CAD system in HI's lineup.

Choose from models with one, four, six, eight, even 14 pens. Select the types of pens and plotting media you need. Decide on format sizes — from A through E. Whichever model you choose, your HI plotter will create accurate, crisp, colorful drawings.

Secrets in performance and price.

With high MTBF ratings, your HI plotter excels in reliability. And,



Accessory to the plot: HI's exclusive SCAN-CAD™ option turns your DMP-50 series plotter into an automatic scanner.

depending on the model you select, you'll experience plotting speeds up to 22 inches per second and resolutions ranging from .005 to .001 inch.

As you examine features, performance, and especially price, you'll

quickly realize that Houston Instrument™ offers outstanding performance at an affordable price.

Regardless of the model you pick, you'll find hundreds of compatible software packages. And, by using HI's popular DM/PL™ language, you can create your own custom software and be assured of upward compatibility with HI's entire line of plotters.

Discover more about the secret behind the plot. Also examine HI's full line of TRUE GRID™ digitizers. Call 1-800-531-5205 (512-835-0900 if in Texas) or write Houston Instrument, 8500 Cameron Road, Austin, Texas 78753.

**houston
instrument** **AMETEK**
DIVISION

OEM discounts available. Houston Instrument, TRUE GRID, and DM/PL are trademarks of AMETEK, Inc.

Awards from page 22

coming a single global culture. How can architects in such a culture maintain any difference between one place and another, without descending to caricatures and cartoons of the past?

Seeking an answer to that conundrum is the quest of the Aga Khan award for architecture, which was founded a decade ago by the Aga Khan, the spiritual leader of the Ismaili sect of 20 million Muslims scattered among many nations from Indonesia to Morocco. The Khan believes that Muslim architecture has been

debased by the impact of Western modernism, but at the same time he is sensitive to nostalgic fakery: "Adding a dome and towers to a downtown office block," he once observed, "does not make it either Islamic or appropriate." The triennial prizes—along with a program of seminars and scholarships—are the Khan's attempt to stimulate an Islamic architecture that can serve the present without abandoning the past. Probably their chief value is in stimulating thought and debate; if that is true, the 1986 awards were a success.

—ROBERT CAMPBELL

Practice

Conference Addresses Theories and Applications of Daylighting

While the use of daylight has historically been a serious design consideration, the recent International Daylighting Conference demonstrated the remarkable number of professionals now committed to daylighting research and its real-life application.

From Nov. 3-8 in Long Beach, Calif., nearly 300 registrants witnessed an array of technical and design case study presentations. Significantly, this year's conference included two programs that had not been explored in-depth at its first meeting in Tucson in 1984—a day-long design program and a presentation on the psychological aspects of daylighting. What resulted was a lively interaction between theorists and practitioners.

Keynote speaker Charles Moore, FAIA, not only opened the conference, but introduced the design program, which included five architectural designers—Richard Peters, AIA, Henning Larsen, Joseph Esherick, FAIA, Rafael Moneo, and Barton Myers, FAIA—all of whom are known for innovative use of daylighting.

Peters, architecture professor at the University of California at Berkeley and partner in Peters Clayberg & Caulfield, pleaded his case that "to love light is to love people." The architect's goal should be to blend electric light and daylight on an intuitive level, for the scientific approach does not always directly translate for the human.

Well-known for this intuitive approach is Esherick of Esherick Homsey Dodge & Davis. "See daylight as an actuality. Do not be deceived by marvelous photographs, for they can misinform us of the reality of a space," explained Esherick. "If we properly use daylight, we can reward people by knowing the passage of the day and the passage of the seasons."

With an avowed "fascination with light," Myers used his new experiences working in California and Arizona to argue for designing in context. "Architects must be willing to 'start fresh' and be inventive

when designing in a different climate or geographic area.

"The peculiarities of mixing artificial and natural light, and the resulting energy issues, are critical in the job of pulling everything together."

The idea that humans respond positively to daylight has long been acknowledged and used as a design premise by architects, even without scientific data available to prove it. The program on psychological aspects of daylighting explored a variety of current studies that go a long way to supporting that premise.

Program co-chairwoman Jacqueline Vischer, a consultant based in Carlisle, Mass., set the framework for following presentations by outlining her directions for research. These include issues of window accessibility, glare factors, the relationship of daylight and productivity, physiological needs for light, and controls.

Min Kantrowitz, program co-chairwoman and president of Kantrowitz & Associates, reported on her study for the U.S. Postal Service, which involved how postal employees think of their working environment. Through extensive employee interviews an overwhelming 90 percent wanted improved daylighting.

Kantrowitz developed a "package" for new, mid-size USPS buildings that included daylighting in the workrooms.

"But having proximity to a window is not just the answer," said Judith Heerwagen from the University of Washington. "Windows have been extensively studied in terms of their size and shape, daylighting aspects, and glare or heat gain. Much less is known about the window view."

After a brief review of related research projects, the most significant results of the Heerwagen and Orians study were explored. Their research underscored people's strong need for contact with the natural environment—a need that may be more pronounced when the opportunities for contact become restricted as they do in windowless settings.

In a presentation entitled "Groundhogs, Morning Glories, and the Rhythm and Blues," Yoland Slocum of Nova University discussed the relatively rare condition called seasonal affect disorder, an annual human depression that occurs during winter months. She hypothesized that some people's predisposition to such depression relates to light.

Implications for architects during the design process should include asking questions such as: Do most structures elicit feelings of well-being? Do buildings have daylight to promote psychological health? And can we detect depression in respect to the amount of light? Perhaps the bottom-line question for a designer is: Can such information be used to support an argument for quality of light versus economics?

The study of the biological need for light, given by Michael Terman, associate professor of clinical psychology at Columbia University and a research scientist at New York State Psychiatric Institute, evoked the most lively audience discussion.

"Man has an internal time-keeping system," explained Terman, "and under natural lighting conditions at northern latitudes, seasonal variations in daylight availability can precipitate major mood swings." His research indicates that humans require light at the "borders" of the day, thus architects should consider designing buildings so that daylight is perceivable by workers at the beginning and end of the day.

Audience questions focused on whether an architect should design more east-west fenestration than north-south. While Terman's responses were inconclusive, his ideas stirred further thought.

And so it was throughout the conference—a great body of valuable research and information was disseminated, encouraging future discussion.—JANET NAIRN

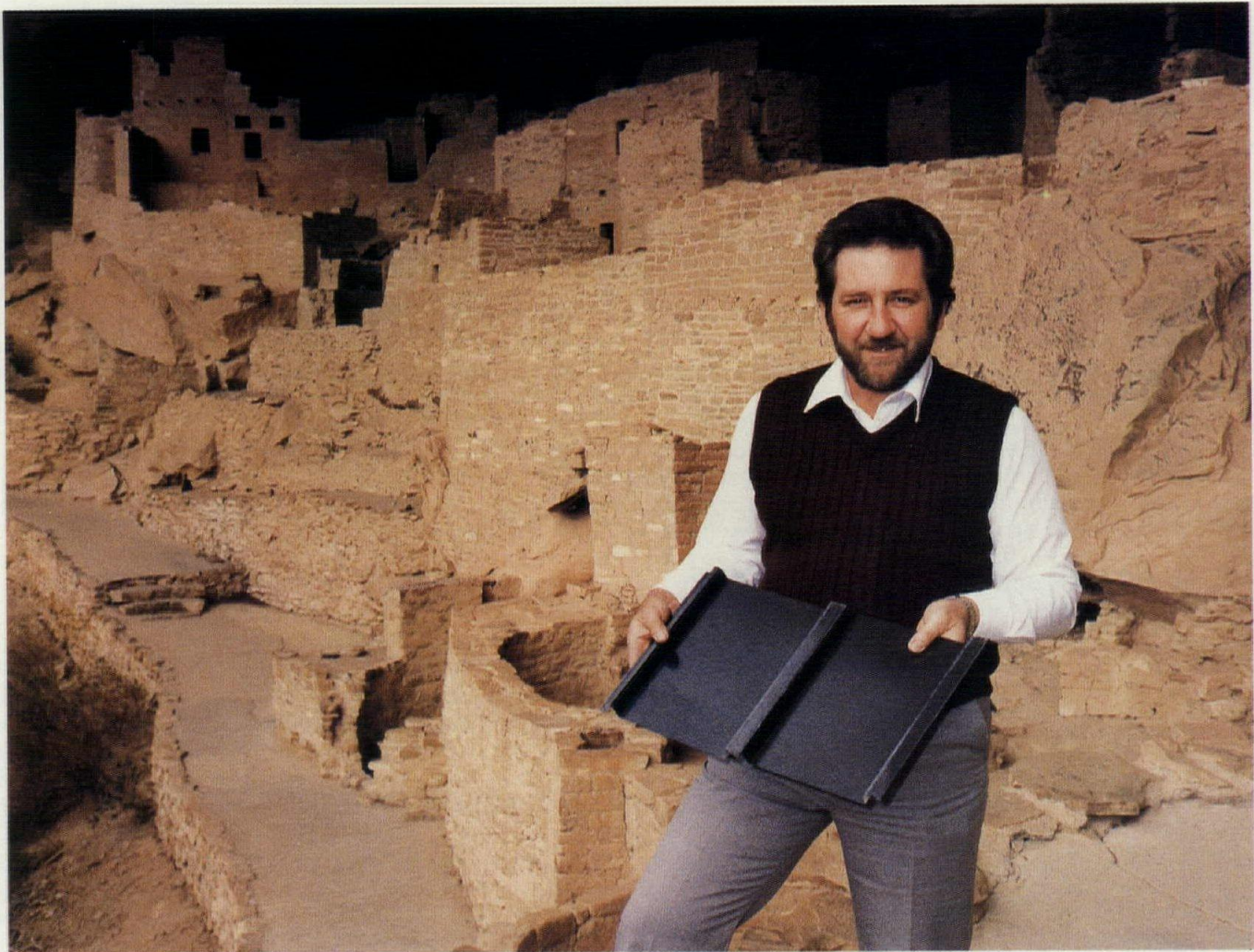
Ms. Nairn is a freelance writer in California who specializes in architecture.

Asbestos Removal Documents Offered by Two Organizations

The Institute's subscription guide and specification service, MASTERSPEC, recently sent its subscribers the new guide specification for Section 02080, "Asbestos Removal." This section was developed to provide basic guidance for the removal and disposition of asbestos-containing materials and, as with similar forms of specifications, the information it contains is designed to be carefully reviewed and edited to suit each particular project and local governing authority requirements.

Because this section has no history of use, MASTERSPEC recommends it be employed with caution and prefaces the technical information with recommenda-

continued on page 26



Royal Lock 9.25" panel shown here. A 16" panel is also available.

“If The Anasazi Indians Had Known About Royal Lock Metal Architectural Panels, Chances Are They’d Still Be Living Here.”

But they didn’t...

They didn’t know that the beauty of Royal Lock not only exists in its wide range of complimentary colors, but in the versatility of the concealed fastener system itself. Royal Lock’s unique locking feature at the top of the rib, plus its factory applied sealant, insure a weather tight roofing system that can be used on mansard, fascia, and other roofing applications.

They didn’t know that architects and contractors alike appreciate the prepunched fastening flange that reduces labor costs 40%, and creates an attractive contemporary look. Royal Lock’s beauty and versatility really shine when you consider it’s 100% painted Galvalume, and protected by a 20 year warranty.

They didn’t know that to top it off, Royal Lock’s crown jewel is its cost. Beauty, versatility, and economy make Royal Lock the architect’s roofing system for the 80’s, and beyond!

The Anasazi Indians didn’t know about Royal Lock, BUT YOU DO! Before you begin your next commercial, industrial, or residential project use our free 800 number — 1-800-654-8709 and give your building the Royal Lock!

FOR RETROFIT AND NEW CONSTRUCTION

STANDARD AND CUSTOM TRIMS AVAILABLE

 **American Building Components Company, Inc.**

‘a Southwestern General company’

Cincinnati, OH • Kingsbury, IN • Nashville, TN • Omaha, NE • Denver, CO SEE US IN SWEETS — 7.2

Circle 12 on information card

Practice from page 24

tions for its use. The work defined in the master specification covers projects with demolition or removal of friable asbestos (such as found in some types of asbestos insulation) and projects with demolition or removal of nonfriable asbestos (such as cement asbestos siding and vinyl asbestos floor tile). Other topics of sample specifications include: quality assurance, equipment, caution signs and labels, and work procedures. A glossary of asbestos-related terms follows. For more information, contact William Hooper, AIA, at Institute headquarters (202) 626-7350.

Another model guide specification for the abatement of asbestos in buildings was recently published by the National Institute of Building Sciences (NIBS). This document, entitled *Model Guide Specifications: Asbestos Abatement in Buildings*, provides a guide for design professionals and building owners in developing contract documents for asbestos abatement. It is coordinated and formatted consistently with AIA's MASTERSPEC.

The *Model Guide Specifications* sells for \$75 for hard copy in a looseleaf binder. It is also available on 5¼-inch floppy diskettes, with hard copy, for \$150. Contact Sarah Homis at NIBS, 1015 15th St., N.W., Suite 700, Washington, D.C. 20005.

Concrete Institute Offers New Design and Selection Software

The Concrete Reinforcing Steel Institute now offers three new column design and selection programs for personal computers. This software simplifies concrete column selection and design for all types of building structures. CRSI's PRECOLSL program generates a table of reinforced concrete column load capacities to help in selecting the optimum column size and reinforcement arrangement for a laterally braced building. RECTCOL tabulates the interaction diagram for short, reinforced concrete columns of rectangular or square cross sections, with symmetrical combinations of longitudinal reinforcing bars. ROUND COL develops an interaction diagram for short, round reinforced concrete columns with evenly distributed longitudinal reinforcing bars.

Both RECTCOL and ROUND COL also calculate additional interaction points from a given load or eccentricity and can perform an optional cost analysis of the column based on concrete, rebar, and form work costs. All three programs are written in BASIC and run on any IBM PC or any IBM-compatible computer. Each program, supplied on a 5¼-inch diskette, is accompanied by a user's manual.

The three programs may be ordered as a set for \$95; single programs cost \$40. For complete ordering information, contact CRSI, 933 North Plum Grove Road, Schaumburg, Ill. 60173, or telephone (312) 490-1700.

Survey Tracks Increase in Liability Limitation Clauses

Design firms are responding to the current liability crisis by including "limitation of liability" clauses in their project contracts, according to the recently published 1986 "Design Services Fee Structure Survey." *Professional Services Management Journal (PSMJ)* and the *A/E Marketing Journal (AEMJ)* sponsored the survey.

Thirty-six percent of the participating firms now report they have limitation of liability clauses in at least some of their current contracts, according to *PSMJ* editor Frank Stasiowski. "For these firms, an average of 33 percent of their fee volume is covered by these clauses," he says. "Seven percent of participating firms report they are adding the cost of liability insurance to their fees as a separate reimbursable item."

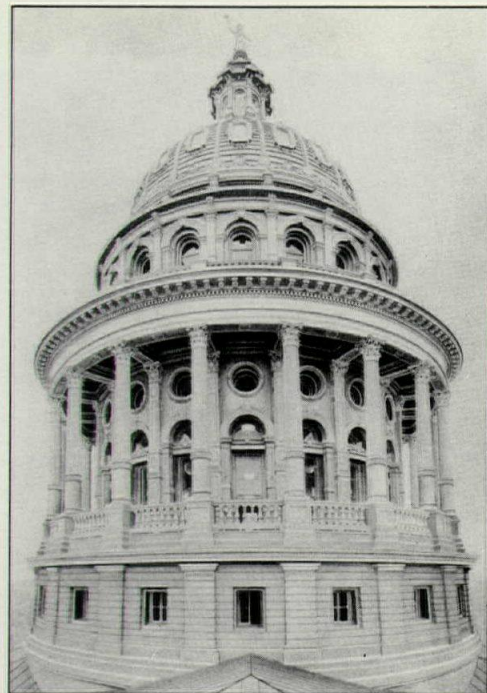
The survey also states that firms have raised their hourly billing rates by 3 to 6 percent over the past year. The median hourly rate for principals is now \$80, up from \$75 a year ago. Hourly billing rates for other employee categories also moved up from last year's levels. The complete 1986 survey contains billing rates and mark-ups by size, type, and location of firm, and according to whether the firm's work is mainly governmental or private. Other areas covered include government pricing data, pricing of computer use, and marketing department data. The survey also categorizes information on fee levels and scope of work for 44 major building and construction types.

The complete survey report is available from *PSMJ*, Publication Sales Department, 10 Midland Ave., Newton, Mass. 02158 for \$125 prepaid, plus \$3 for shipping and handling.

Architectural Renderers Group Holds First Exhibition

A new professional organization of architectural renderers in the U.S. held its first exhibition in October at the Boston Architectural Center. The American Society of Architectural Perspectivists—its name an obvious pun on the acronym ASAP ("As Soon as Possible"), referring to the crash deadlines under which perspectivists often work—is modeled on similar societies in Japan and Britain. Founders of the American group are Stephen Rich, Frank Constantino, and Paul Stevenson Oles. It is currently headed by Oles, perhaps the world's best-known contemporary perspectivist.

The exhibition, entitled "Architecture in Perspective," presented 60 drawings by 41 artists, selected by a jury from 467 works submitted from all parts of the U.S. Picked as "best in show" were a drawing by James Record of Fort Worth of the



dome of the Texas State Capitol (above), rendered with stunning literalness in very fine pencil that was then silk-screened, and a drawing by Lee Dunnette of New York of a neo-art deco tower, "Worth Square Building," which expressed a Manhattan glitter in airbrush and watercolor.

ASAP plans an annual exhibition. Interested persons may contact the group care of the Boston Architectural Center, 320 Newbury Street, Boston Mass. 02115.

—ROBERT CAMPBELL

Revised Design Guidelines for Automated Offices Released

A new report issued by the National Bureau of Standards states that while some people see technology as the answer to office productivity problems, it is widely recognized that many office workers are dissatisfied with the environment in their automated offices. To help designers alleviate this problem, NBS recently issued "Revised Interim Design Guidelines for Automated Offices," a report that presents the problems and benefits of office automation, and suggests methods for making automated offices functional and pleasant to work in as well as economical to develop and operate. The report discusses details of planning and designing, from acoustics to typical approaches to workstation layout.

The report, fourth in a series for the General Services Administration, is a major revision of an earlier report and includes more extensive information about communications systems, intelligent buildings, and data processing center design.

"Revised Interim Guidelines for Automated Offices" costs \$16.95 prepaid from the National Technical Information Service, 5285 Port Royal Rd., Springfield, Va. 22161. Request order number PB#87-105276/AS.

News continued on page 28

TOP LEVEL INTELLIGENCE.

Build R/26 structural roof systems in one step with TUPS™: the smarter, faster way to build.

Smart architects have discovered an intelligent way to stay on top of current demands for higher energy ratings *and* lower costs.

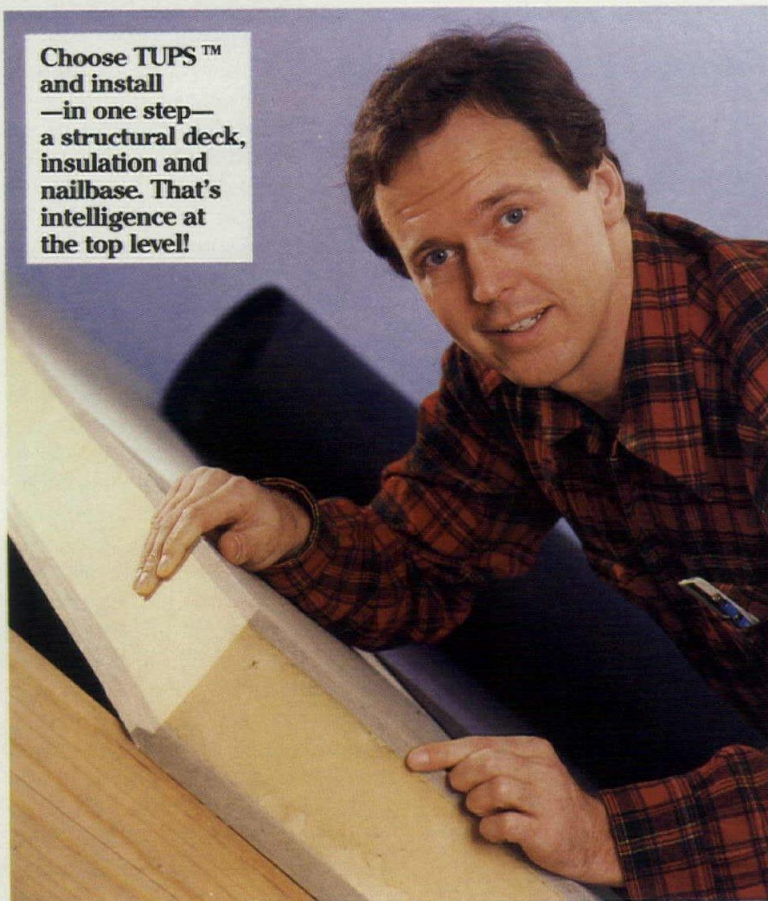
They go to the very *top* and choose a structural, insulating roof system panel that can save energy, reduce cost, eliminate labor-intensive steps and cut time.

They choose TUPS.

Only TUPS features a load bearing, stress skin panel integrating structural Homasote 440 Boards with an insulating core of rigid polyisocyanurate foam.

In just one step, you can install an interior ceiling ready for paint or other finish. And an energy efficient layer of insulation. Plus a structural nailbase

Choose TUPS™ and install —in one step— a structural deck, insulation and nailbase. That's intelligence at the top level!



ready for shingles, slate, tile, BUR or single-ply membrane roofing system.

All with one-step TUPS roofing panels. That's intelligence at the top level.

For full details, call (609) 883-3300. Or write The Homasote Company directly.

Panels sizes, nominal 4' x 8', 10' and 12' with T & G Long Edges	Nominal Thickness	
	4"	5"
R-FACTOR AGED	19.2	25.48
R-FACTOR SYSTEM*	20.43	26.71
Lbs. per sq. ft.	4.2	4.4
Foam Thickness (nominal)	2½"	3½"

*Includes air film and asphalt shingles.

homasote

C O M P A N Y

P.O. Box 7240, West Trenton, New Jersey 08628-0240

SMART ARCHITECTS CHOOSE HOMASOTE.

5666

Technical Reference Guide on Radon Pollution Released

"Indoor Air Quality Environmental Handbook: Radon," released by the Department of Energy, provides the technical reader with a comprehensive review and reference guide on the sources of radon and its transport mechanisms, reported indoor concentrations, building and meteorological effects on radar concentrations, models for predicting indoor concentrations, health effects and standards, and control technologies.

The handbook addresses the concerns of homeowners in a separate section entitled "Radon in the Home." This section also provides a starting point for readers desiring an overview of the subject.

The handbook is organized into seven major sections and has three appendices: instrumentation, mathematical modeling of indoor radon levels, and a glossary.

The handbook (DE86-005006) can be ordered for \$22.95 plus \$3 shipping and handling, from National Technical Information Services, 5285 Port Royal Road, Springfield, Va. 22161.

Deaths

Henry N. Wright: Architect, Editor, and Teacher

If ever a person deserved the accolade "polymath," it was Henry N. Wright, FAIA, who died Oct. 10 in Hyannis, Mass., at the age of 76. His extraordinary intelligence, broad curiosity, and swift imagination enabled him to operate simultaneously in many varied fields. These qualities made Wright one of the formative influences in modern architectural theory, especially during the years 1936-1949, when he was executive editor of *Architectural Forum*. There, as well as later when he taught Environmental Design at Columbia, Kansas State, and City College of New York, he displayed his brilliance in architectural technology. The aspects that most absorbed him were advanced theories of heating, cooling, and ventilating, and the manipulation of natural and artificial light.

Son of a famous pioneer in housing and town planning, Henry Wright Sr., Henry Wright was born in St. Louis, where he finished high school—as it turned out, the last formal education of his life—before his family moved East. He worked in a series of architectural offices in New York City and Albany before joining the *Forum* in 1936. Under his editorship the *Forum* produced two magnificent Frank Lloyd Wright issues and some of the first articles on architectural climatology, including the pace-setting special issue "Measures."

His formal commitments never prevented Wright from engaging in a series of less structured ventures. Together with

George Nelson, he wrote the best-selling *Tomorrow's House*, and during those same years he designed and manufactured the prototypical Storage Wall, a modular system of storage units for all household goods. During this period, too, he patented and began the manufacture of the vertical-slatted fabric Venetian blind called Thru-Vu. During his idle hours, Wright designed cameras and built (at Kansas State) one of the country's most advanced helidomes. Fascinated by the construction of the Roman Pantheon, he used one of his cameras to photograph the interior of the dome in one uninterrupted exposure from oculus to floor. And then he wrote a paper on why the famous brick "relieving arches" in the Pantheon actually "relieved" nothing because there were no tell-tale expansion joints or cracks around them.

Wright retired from City College in 1975 and went with his wife, Dorothy, to live in a house he designed and built for them in Wellfleet, on Cape Cod. Naturally, it incorporated some of his latest theories, including low-cost radiant heating panels fabricated of plastic tubing mounted behind corrugated sheet-metal. The tubing tended to leak a bit and the panels cracked and pinged with expansion and contraction. But for a pioneer in radiant heating—who had had his full share of disastrous experiences with copper coils embedded in concrete and electric resistance coils buried in plaster—he found his new system had many desirable qualities. It was low in first cost, it was easy and cheap to repair, and it didn't require the destruction of a whole floor or ceiling in the process.

Those of us who across the years enjoyed his endless flow of ideas will find the world duller for his going.

—JAMES MARSTON FITCH, HON. AIA

A prolific writer on architectural history and technology, Dr. Fitch is preservation consultant to Beyer Blinder Belle, New York City.

Benjamin Lane Smith, FAIA: A partner in the firm Haines Lundberg Waehler, Smith specialized in the design of hospitals, and his major architectural accomplishments included the Henry Ford Hospital Clinic, the Jewish-Medical Center, and the Main Medical Center. During his career he served as vice president of the Architectural League of New York and was the author of many articles and papers in the field of hospital design. Smith, 79, died last October in New York City.

James E. Pearson, AIA: Author of the *Hawaii Home Energy Book* and architect of the Tropical Research house for the University of Hawaii, Pearson died in Hawaii in late summer. He was the chief of urban design for the Honolulu department of land utilization and was a former assistant professor of architecture at the University of Hawaii.

Islamic Architecture Fellowships

The Aga Khan Program for Islamic Architecture at Harvard University and MIT is sponsoring a visiting fellows and associates program. Visiting fellowships will be awarded each year to scholars and/or practitioners interested in scholarship and research who give evidence of excellence in their previous work. Fellowships will not be renewable. Visiting associateships will be awarded to scholars and/or practitioners who are either self-sufficient or are supported by some other organization. Associate status may be renewable in special circumstances. Deadline for applications is April 2. For more information, contact Y.R. Isar, The Aga Khan Program for Islamic Architecture, Room 10-390, MIT, Cambridge, Mass. 02139.

Architectural Photo Competition

The St. Louis Chapter/AIA is organizing the 1987 architectural photography competition. The competition is open to all AIA members, associate members/AIA, student members of AIAS, and professional affiliate members of AIA components. Previously published work, photographs pending publications, and previous cash winning slides are not eligible. There is a \$15 entry fee for AIA members, associates, and professional affiliates; \$10 for student members. Prizes totaling \$2,500 will be awarded. Contact the St. Louis Chapter/AIA, 911 Washington Ave., St. Louis, Mo. 63101. The submission deadline is March 31.

Design Competition for Fixtures

Delta Faucet Co. is sponsoring a design competition open to architects, product designers, and engineers for devices used in the delivery of water. Prizes totaling more than \$20,000 will be presented in both a student and a professional category. The deadline for entries is Feb. 27, 1987. For more information, contact "The Challenge," Gibbs & Soell, Inc., 126 East 38th St., New York, N.Y. 10016.

Fund for Advancement of Architecture

Auburn University school of architecture is administering the Samuel G. Wiener fund, which was created to encourage the advancement of architecture in the mid-South region. The fund will distribute \$40,000 to \$45,000 each year in grants. Deadline for proposal abstracts is Feb. 1. For more information, contact Keith McPheeters, FAIA, Auburn University, School of Architecture, Auburn, Ala. 36849.

Design Competition Winner

Philip A. Carhuff of CRS Sistine in Washington, D.C., and a student at Cornell University was awarded prizes totaling \$10,000 by Haworth, Inc., as first place winner in its design competition.

News continued on page 31



Architect: Lance Muehlen & Associates, Seattle, WA

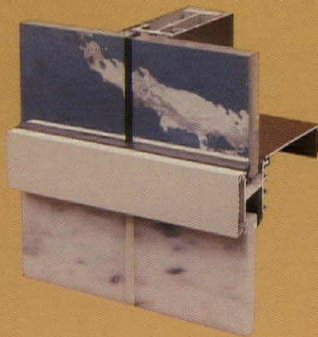
We're behind the country's most interesting rock formations.

From traditional punched windows in granite, to glass and marble ribbon systems, Vistawall's stone curtain wall is behind the nation's most breathtaking stone exteriors.

Our stone curtain wall allows you the flexibility to combine all-glass walls with stone infilled areas to create a variety of architectural looks. All at a cost well within the range of a typical curtain wall system.

Vistawall's advanced system shows off the natural aesthetics of stone, while often requiring less structural steel and exposed metal supports than ordinary stone systems. And, our support goes well beyond the building

itself, with our staff of highly-skilled engineers who make certain that your design will be rock solid.



Of course stone curtain wall is only one of our many quality architectural glazing systems. Our line includes innovative high

performance entrances, store fronts, wedge systems, window walls, slope walls and ribbon window systems — all backed by more than 40 years of manufacturing experience.

If you want the expertise of the company that pioneered stone curtain wall, put Vistawall behind you. For more information, write Vistawall, P.O. Box 629, Terrell, Texas 75160, or call (214) 563-2624. (Sweets 8.1 and 8.14/VIS or 08400 VIS and 08900 VIS)

*The
Clear
Choice*

VISTAWALL
ARCHITECTURAL PRODUCTS
A Division of Butler Manufacturing Company

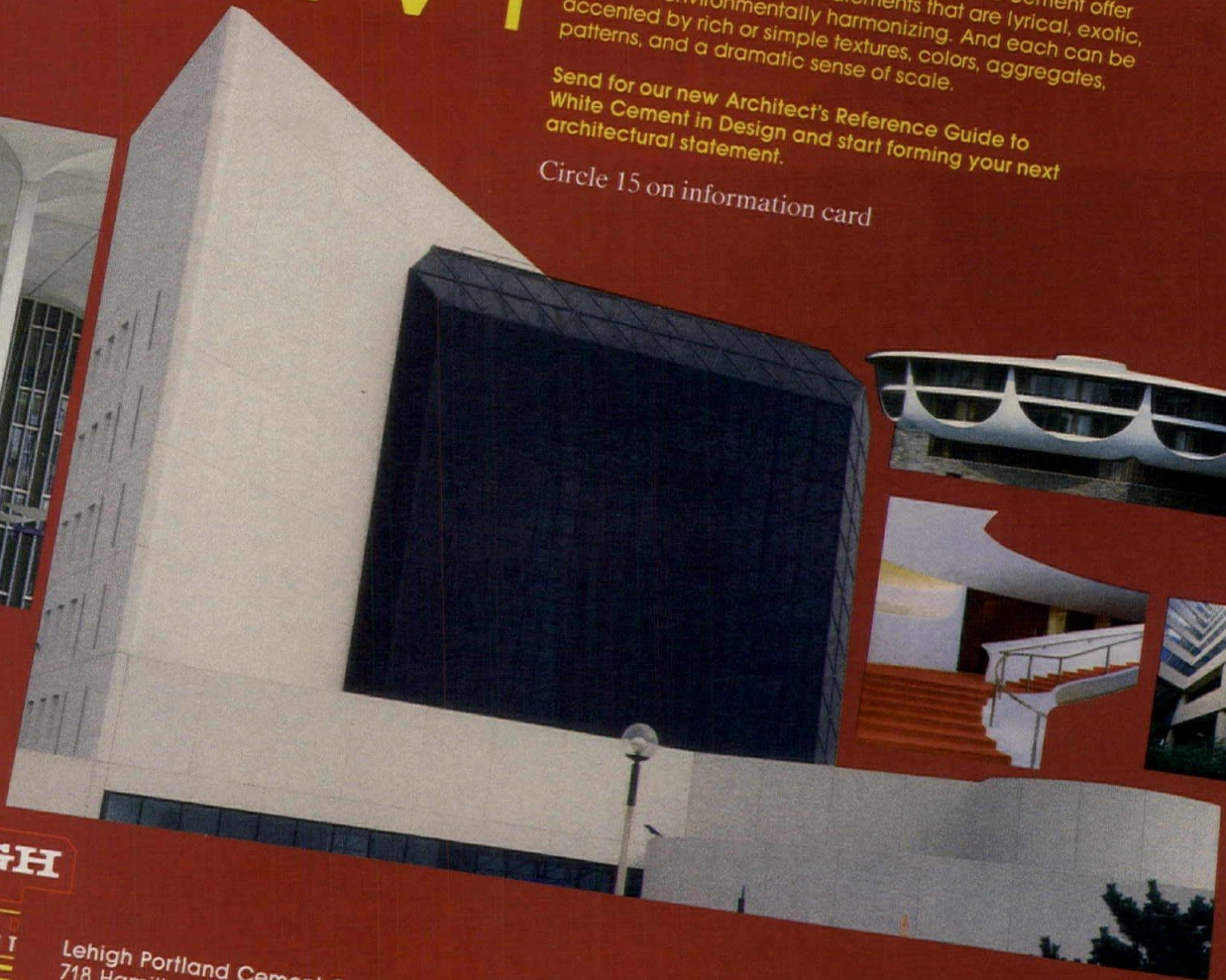
White
Cement
Imagination
in Architecture

FREEDOM IN DESIGN 6 FORM

Creativity cast-in-place. Forms obedient to imagination—sweeping, soaring, reaching, encompassing, spanning. Canopies, columns, and staircases which flow and cascade, evoking aesthetics virtually impossible with any other architectural medium. The unlimiting forms of terrazzo and concrete made with architectural white cement offer freedom to make design statements that are lyrical, exotic, unified or environmentally harmonizing. And each can be accented by rich or simple textures, colors, aggregates, patterns, and a dramatic sense of scale.

Send for our new Architect's Reference Guide to White Cement in Design and start forming your next architectural statement.

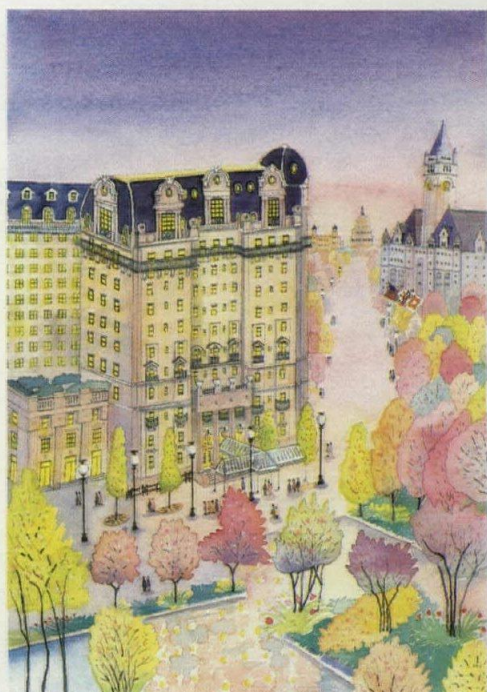
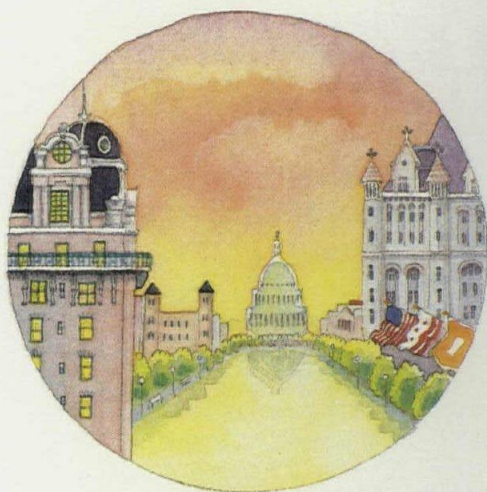
Circle 15 on information card



LEHIGH

WHITE CEMENT

Lehigh Portland Cement Company
718 Hamilton Mall, Allentown, PA 18105
215-776-2600



The Arts The Willard in Four Seasons

Last September, the Willard Hotel, empty for nearly two decades, reopened to great fanfare in Washington, D.C. (see Nov. '86, page 48). With oriels and exaggerated mansards, this refurbished and augmented 1901 building once again commands a regal presence on Pennsylvania Avenue.

To celebrate the Willard's rebirth, illustrator Susan Davis of Washington, D.C., was commissioned by developer Oliver T. Carr and the Intercontinental Hotel to illustrate invitations for four inaugural balls and, subsequently, a poster. Following the suggestion of her partner Robert Barkin, Davis depicted the changing of the seasons: the Willard, looking down

Pennsylvania Avenue past the towered Old Post Office to the Capitol, in spring (left); the hotel's facade, brilliantly lit by Fourth of July fireworks in summer (above left); the Willard, profiled against a clear, starry sky in fall (not shown here); and the Willard, a warm and inviting respite on a cold winter's night (above).

Davis finds that the transparency of watercolors—her preferred medium—lend a warmth, softness, and immediacy. While painting the Willard from Pershing Park, Davis fell under the romance of the place: "It is a beautiful hotel in a beautiful city with a beautifully colored sky."

—NORA RICHTER GREER

Sensor Operated Another first from Haws.



The First Water Coolers To Offer TOUCH-FREE Operation

Introducing "Hands-Off" water coolers from Haws. "Hands-Off" coolers feature a patented electronic sensor that activates the water stream as soon as a user comes within range. A built-in timer stops the water flow automatically if the sensor is blocked for more than 30 seconds, thus discouraging tampering and preventing damage to the sensor itself. Another protective feature—a time-delay mechanism—prevents accidental activation by passers-by. Now health care facilities, office complexes and all indoor public areas can be designed with the ultimate in barrier-free convenience.

"Hands-Off," the "Smart" Water Coolers

Models HWCF8HO, HWCF8-2HO, HWDFS8HO, HWDFS8-2HO and HWCT8HO
These sleek, wall-mounted units each feature a receptor, backplate and grille constructed of heavy-gauge stainless steel with #4 Satin finish. They're also available in Stainless Steel with a Sienna Bronze™ finish.

Model HCBF7HO
This handsome wall-mounted model is manufactured of heavy-gauge steel and finished in Kenyan Beige Enamel. Optional finishes include: Alabaster Enamel; Espresso Enamel; Metallic Bronze Enamel; Cork Vinyl; Stainless Steel; and Stainless Steel with Autumn Bronze™.

Envision the possibilities!



Haws Drinking Faucet Company
P.O. Box 1999, Berkeley, CA 94701
(415) 525-5801 Telex: 33-6358

Haws AG
Kirchberg/Bern Switzerland

For more information on Haws' new "Hands-Off" water coolers, contact your local Haws representative, see Sweets section 15.7C, or phone the Sweets Buylines.



HWDFS8HO



HCBF7HO
Kenyan Beige

Circle 16 on information card

ARCHITECTURE

A new year begins, and may it be a good one for the profession and, indeed, all of our readers. It will be a busy one for us, with the magazine increasing in heft. These are some of our plans for the year:

We will conduct our second design awards program in the area of architectural interiors. Entries are due March 25 and winners will be published in the June issue.

The program is open to anyone: architects, interior designers, artists, lay persons. The jury will consist of two architects versed in interior design and three members of the editorial staff. Interiors of any kind are eligible but must be completed, not projects.

Only two entries will be accepted from any one individual or firm. Entries can comprise anything that communicates the design to the jury, but all photos should be prints and nothing should be larger than 9x12 inches.

The following issue, July, will be devoted to housing. Like this issue on health care and disability, it will deal with the subject not just as a building type but as a matter of broad social and human concern.

October will be our first issue devoted largely to low-cost buildings of architectural quality. We'll define low-cost more precisely as the year goes on. November, as has come to be our custom, will focus on the constellation of issues surrounding the preservation of old buildings and the relating of new ones to them.

Readers are invited and urged to submit material for these issues, and all of the others, for that matter. *D.C.*



Architecture as an Asset in Health Care

As exemplified by BOOR/A's Kaiser clinic in Rockwood, Ore. By Gideon Bosker

Over the past two decades, American health care has experienced the greatest retailing the medical establishment has ever seen. For a good part of the 1960s and 1970s, medical care appeared to be the boom business of the century. Under the traditional fee-for-service system, the federal government and insurance giants fueled the growth of high medical technology, and more than 4,000 hospitals across the country were sufficiently solvent to finance ambitious building programs that took the form of research centers, hospital wings, and ambulatory care health clinics. In short, the healing arts were on a fiscal roll, and employment opportunities were bountiful for physicians and nurses, engineers and administrators, as well as architects providing services for the health sector.

But as our national health bill soared above the \$220 billion mark in 1981—nearly 12 percent of the gross national product—the financial burden of delivering health care emerged as one of the most prominent issues of national policy. The greatest fraction of this astounding expenditure could be attributed to the proliferation of technological innovations and the lack of checks and balances over physicians' fees that would have given consumers, insurance companies, and the federal government control over spiraling medical costs. In an effort to slow the accelerating rate of health care outlays and foster competition, the Reagan Administration has encouraged the growth of health maintenance organizations. Unlike the fee-for-service system, HMOs offer their members a comprehensive range of health benefits for a fixed price in advance. No matter how many services a patient receives, his monthly premium remains essentially unchanged. Doctors affiliated with the organizations are paid a fixed salary or receive a percentage of the gross revenues.

Over the past decade, HMOs sent shock waves through the world of organized medicine. Now 15 years after President Nixon enacted HMO legislation and more than \$200 million later in direct federal support, HMOs have emerged as some of the most powerful and financially solvent health care institutions in America. As of December 1986 more than 300 health maintenance organizations were operating in the United States, providing health services for nearly 15 million Americans in 157 metropolitan areas.

In Portland, Ore., where the physician-to-population ratio is higher than any other city in the country, the competition for health care dollars has been especially fierce. In this otherwise tranquil outpost in the Pacific Northwest, one of the nation's first and largest HMOs, the Kaiser Foundation Medical Care program, with annual revenues in excess of \$2.5 billion, has become the city's largest single institutional provider of health care services. Like other HMOs serving large numbers of patients in multidisciplinary clinic-hospitals, Oregon's Kaiser Permanente system has fostered a network-wide architectural program designed to shed the impersonal, "patient mill" image that has tainted the reputation of its Kaiser affiliates in other parts of the country, most notably in California.

Put another way, architecture has become increasingly integrated into the marketing strategies of America's largest HMOs and investor-owned hospital chains. The esthetic and functional goals are well-known to every hospital administrator bent on assuring that his or her institution will weather this new embattled age in health care. At a time when free-standing hospitals are engaged in everything short of scalpel-to-scalpel combat for market share with HMO megasystems such as Kaiser's, there

has emerged an unambiguous mandate for promoting "patient friendliness" in the clinical setting. Shaping architectural environments that promote reassurance, warmth, and trust—a personal touch, if you will—has become an increasingly viable strategy for luring potential health care consumers into one system over another. This has become especially important for HMOs, which historically have been perceived as processing hordes of patients through an impersonal system and then treating them in cold, sterile structures that antagonize rather than placate an already anxious population.

In short, the entire medical-industrial complex has become more and more preoccupied with image-making through architecture. As Portland physician-entrepreneur John W. Grigsby explains, "In the present health care environment, the 'high-touch' component of health care has become every bit as important as conveying a 'high-tech' image." Perhaps a beacon for things to come, Grigsby, an emergency physician and Portland's most successful ambulatory care center developer, regularly carries designer fabric, wallpaper, and carpet swatches in his briefcase along with his medical journals. "As far as architectural spaces for health care are concerned," notes Grigsby, "clinics have been forced by competition and consumer preferences to move away from stainless steel, metal doors, linoleum, insensitive lighting, and bland institutional color schemes. The emphasis on 'high touch' means that physician-administrators are asking their architectural consultants to help them de-institutionalize, de-stress, and dress up their waiting rooms, clinics, and hospital service areas. Along with this, there is an emphasis on communication and patient circulation. We've even gone as far as trying to duplicate the living room in our very own homes."

Situated on a verdant, three-acre, fir-mottled site, the Kaiser Permanente Medical Office Building in Rockwood, Ore., is an enlightened example of how architecture serving medical needs can help overcome the feeling of anonymity, visual blandness, and sterility that characterize many of the HMO facilities built during the 1970s. Completed in 1985 and designed by the Portland firm of Broome, Oringdulph, O'Toole, Rudolf, Boles & Associates (BOOR/A) and costing \$4 million, this two-story, 48,000-square-foot clinic/pharmacy/optical center has become a prototype for other Kaiser clinics in the Oregon system.

Housing a number of clinical services including internal medicine, ob-gyn, pediatrics, social work, pharmacy, and optical center—and joined to a full complement of administrative services—the Rockwood facility projects an array of architectural-cum-functional messages, all harmoniously intertwined. In its choice of materials, lighting, and color schemes, the architectural program conveys both the exactitude and precision expected of a sophisticated medical delivery system and the tranquility offered by your trusted family doctor's office during days of a bygone past. The building also intrigues by its ability to meld formal elements—so heroically resuscitated in recent architecture that has come under the historicist spell—with the local wood-based tradition in architectural design. Geometric and pristine, the clinic signals the urgency of medical needs with its metal fire-engine red window sashing, on the one hand, yet soothes and comforts the visiting patient with a subdued, quintessentially Pacific Northwest exterior of cedar veneer and brown brick, on the other. The strong emphasis on squares, rectangles, and figural setbacks imparts a high-tech image, while the formidable port-cochère, with its large fir beams and seamed sheetmetal roof, conveys the high-touch ambiance of mountain lodges that dot Mt. Hood just down the road.

The focal point of the structure is a 15x30-foot stained and

Dr. Bosker is a physician in Portland, a free-lance writer, and co-author of Frozen Music: A History of Portland Architecture.



Strode Eckart Photographic



Ed Hershberger



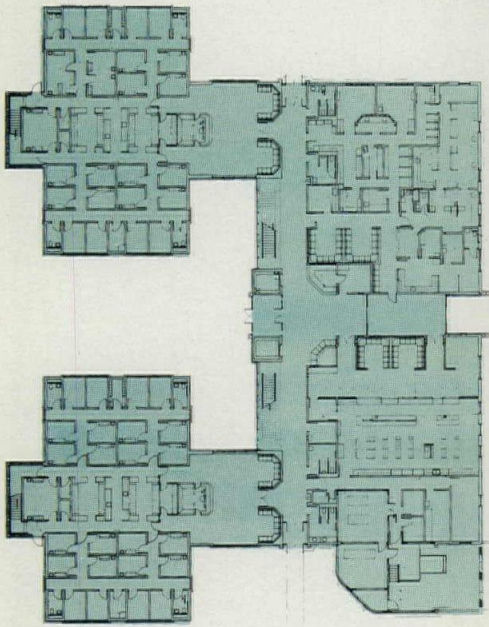
etched glass window designed by Portland artist Ed Carpenter. Cathedral-like when illuminated from the interior at night, the glasswork is set into a triangulated, vaulted ceiling of exposed wood beams that span the main axis of the structure and that connect to the port-cochère entry. The entry leads to four distinct medical modules divided according to specialty, each with its own waiting area. "The client requested that we develop a spatial program in which the needs of a large multidisciplinary clinic serving 25,000 patients could be housed to create the sense of warmth, familiarity, and convenience characteristic of a small-scale family practice," explains BOOR/A design principal Stanley Boles, AIA. "To avoid the impersonal feel of large waiting rooms, we segregated patient seating areas according to medical specialty. We also relied heavily on warm-tone fabrics and used carpeting throughout the building."

To soften harsh, unflattering fluorescent lights mandated for energy reasons, a suspended wooden grid ceiling—a lattice structure that has a distinct Japanese influence—spans the entire patient service area. Reflective domes of painted sheetmetal were also used in some areas of the building to provide indirect fluorescent illumination. Within each clinical module, glass panels separate patient waiting rooms from nurse working areas and examining suites. The open feeling fosters a sense of communication and patient flow.

Nestled on a fir-lined meadow only a few hundred yards from a stop on MAX, Portland's new light rail line, the Kaiser Rockwood clinic is "patient friendly" in every aspect of its architectural program except one. Outside, adjacent to the pediatric module on the ground floor, the consulting landscape architect installed a small garden at the request of the Kaiser pediatricians. It's a very unusual garden. The locked gate reads "Sinister Garden: A collection of Oregon's toxic and poisonous plants." On a typical day, adult Kaiser subscribers, with young tots firmly in tow, stroll through the garden pointing out Oregon's toxic greenery to their children. This wonderful laboratory is yet another way in which the architecture of health care can serve the social good. And it also goes to show that "don't touch!" and "high touch" are frequently one and the same.

Across page top, the Kaiser Rockwood clinic's north entrance; bottom, the south entrance; above, the staggered southeast elevation; right, the lofty main lobby with its typically Northwest exposed trusswork and glazed gable.





Stained and etched glass window by artist Ed Carpenter (seen from outside at right and from inside across page) terminates clinic's main axis. Plan divides medical facilities into four modules, each with its own waiting room and area of specialization. Interiors, right, are warm and relatively non-institutional. □



Ed Hershberger



Ed Hershberger

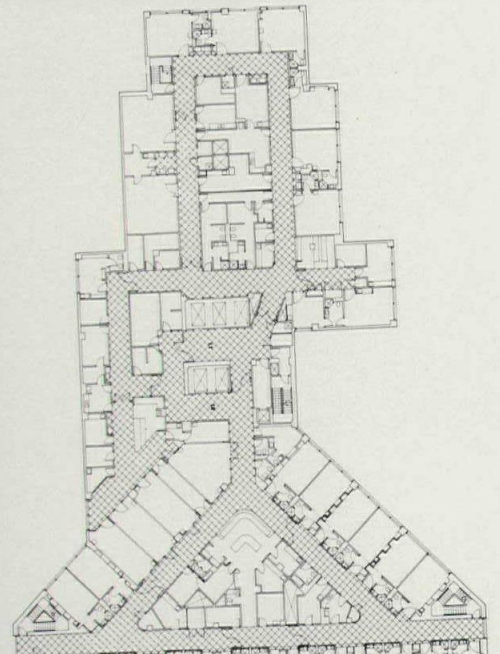
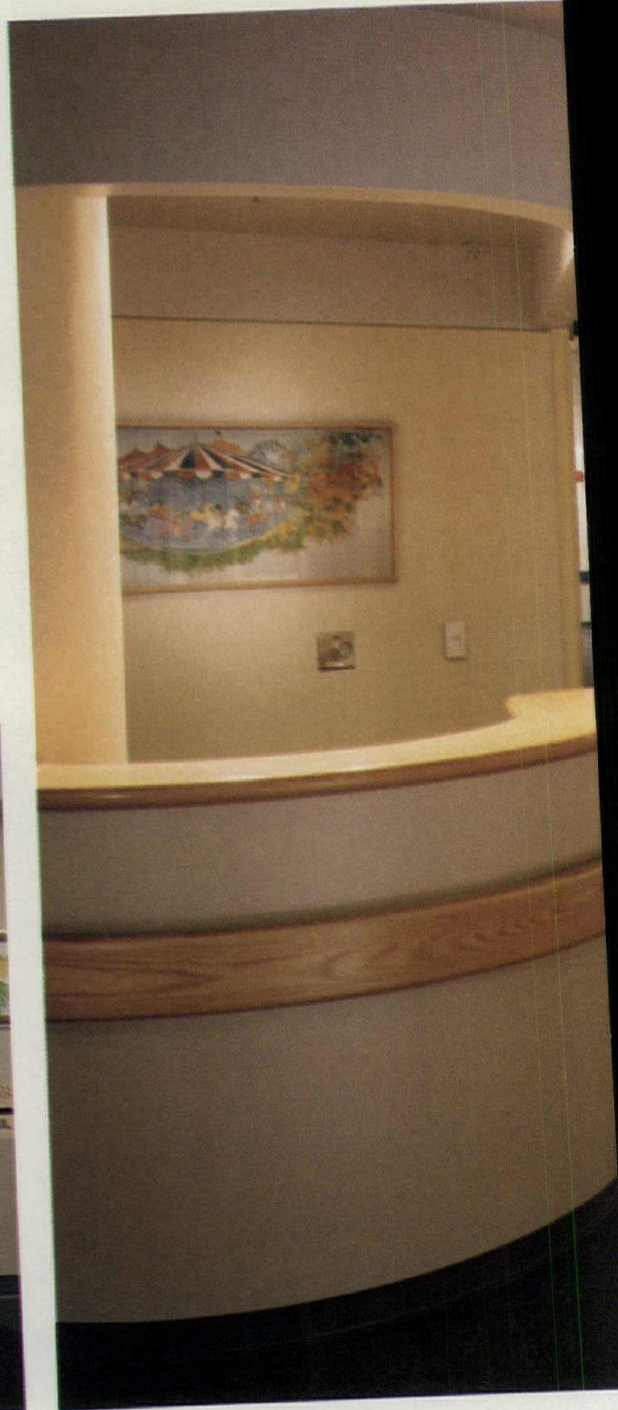


Karlis Grant



Children's Ward Made Into a Friendly 'Village'

*Mercy Memorial Medical Center, St.
Joseph, Mich.; Hansen Lind Meyer.
By Andrea Oppenheimer Dean*





The idea behind this addition—the first phase of consolidating Mercy Memorial Hospital's acute care functions in St. Joseph, Mich.—was “to please the consumer in the manner of a hotel or office building,” according to Hansen Lind Meyer's project designer Rich Potokar.

To minimize disruption during construction and provide a framework for expansion, the four-story addition was pulled away from the existing building and appended to a glass-enclosed spine.

A triangular plan was chosen for the addition for at least three reasons: A triangle provides, says the architect, a large interior area with a relatively small amount of exterior envelope so it saves fuel; permits the greatest possible number of patient rooms around nursing stations while avoiding the need for long corridors; and it gives patient rooms, which line the perimeter, broad views. Diagnostic and utility spaces are at the center.

Among devices used to make the hospital resemble a hotel or comfortable office are carpeted rooms as well as public spaces; a vestibule-like space separating each room from the corridor; indirect lighting; built-in wardrobes, desks, and other fixtures; and large (6x10 foot) windows.

The high point is the pediatric ward, whose corridors resemble streets with little gabled houses. Each room has its own mailbox, lamppost, flower shelf, and fixtures scaled for pint-sized humans.

Mercy Hospital's addition was constructed as a separate building from the original and attached to the original by a glass-enclosed corridor (below). The hospital's main entrance was relocated in the new building, which is approached via a circular drive. □



Elizabeth Ernst

Calming Setting for High-Tech Medicine

Diagnostic center at University of New Mexico; Westwork Architects. By Michael J. Crosbie





The Center for Non-Invasive Diagnosis at the University of New Mexico in Albuquerque incorporates the latest, cutting edge technology; yet its shelter, designed by Westwork Architects, bespeaks architecture of a timeless nature that invites visitors to be at ease.

The center uses magnetic resonance imaging (MRI) for probing the human body. The heart of MRI is a huge magnet with a bore large enough to slide a patient through on a moving table. The nuclei of our body's biochemical elements such as hydrogen and carbon have magnetic properties, and when passed through a magnet these nuclei behave as tiny compass needles, pointing north. Radio waves bombarding the nuclei cause them to skew, and when the waves are turned off and on, the nuclei move back and forth, emitting faint radio signals. Reading these signals, a computer can plot their location and produce an image of the body's interior and its biochemical nature. This technique is superior to X-rays because it uses no radiation and it can distinguish different types of tissue and its condition, all without making an incision.

Nevertheless, being pushed through a magnet and emitting radio signals is a frightening experience, especially for the uninitiated, and Westwork's Glade Sperry Jr., AIA, says that the center was designed to conjure up familiar associations for visitors, namely the architecture of the American Southwest. Sperry points out that an architect's immediate reaction to the program might be to celebrate the technology, to express the building as a giant

machine (which it actually is). But the center's location on the University of New Mexico campus put it in proximity to some of New Mexico's best regional architecture in the work of John Gaw Meem, and the need for the building to encourage visitors to relax made regionalism the logical architectural response.

The center, at one story high, is quite domestic in scale, full of graceful curves that exhibit their stucco texture as the sun rakes across their arcs. Approaching the building's main entrance is akin to walking into the welcoming courtyard of a hacienda, shaded with an open trellis that is rendered in turquoise steel sections supported by a salmon colored I-beam, where traditionally the structure is of wood. At the entry court's center is a planter with tree, symbolic of the round fountains that are found in the courtyards of houses. Off to the south is a small, planted alcove for outdoor waiting, with visual connection to the interior waiting area.

Through the entrance one arrives at the reception area, which is a double-height, clerestoried space admitting natural light on all four sides. The compactness of this space reinforces the sense that this is a small building, houseslike. While the exterior colors reflect the palette of the desert landscape, the interiors are cool and restful—rose, gray, mauve, and tan. Sperry says that he felt it important to have human contact on entering the center, and the receptionist's desk is positioned so that one immediately makes eye contact. Above, a warm wood ceiling contrasts with polished metal tubular lights, a play of high-tech imagery

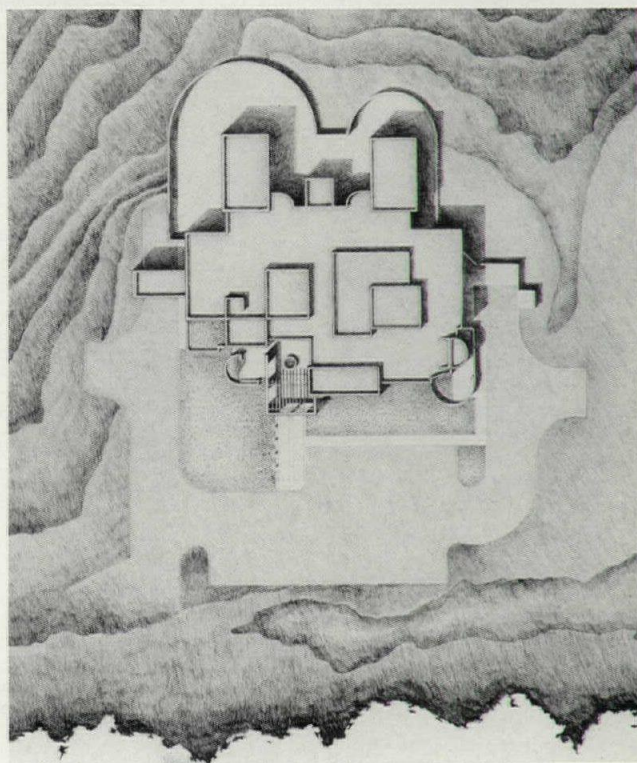


Page 43, shaded entry court of MRI Center with a view towards outside waiting alcove, showing full range of desert colors. Above, view of Center from northwest.

against natural materials. Staff offices are found north of reception, having lots of natural light and views of a nearby golf course and, in the distance, a dramatic mountain range. A small staff lounge with a private court is found at the northeast corner, offering views of the mountains.

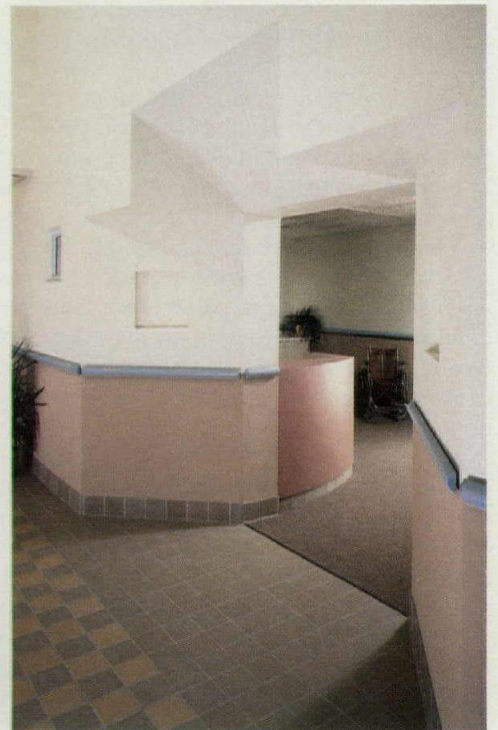
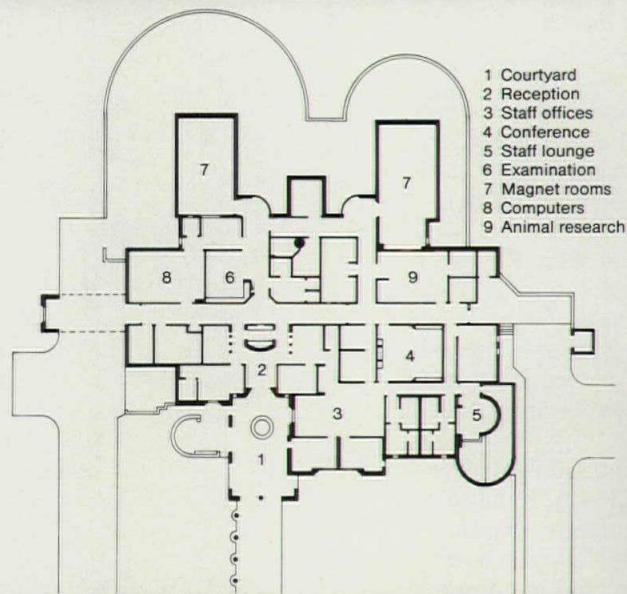
The reception area is the building's control point. Beyond it, a corridor running north-south separates examination from staff spaces. Past reception, patients are admitted to examination and change rooms, and then on to the magnet room that is entered beside a glass block, sunlit curved wall. The center's north wing is used for animal research, its circulation separate from patient areas.

Spaces devoted to MRI were especially demanding, technically. Because ferrous metals cause the magnets to go haywire, nonferrous materials were used near the magnet rooms, such as glass fiber concrete reinforcing, plastic pipe and ducts, and aluminum flashing. The magnet rooms are clad in copper sheathed plywood to repel outside radio waves. The sweeping, curved walls on the building's west side follow the magnetic fields' curves, preventing moving metal objects (such as cars) and people wearing pacemakers (which can disfunction) from coming too near the magnets.





Above, concrete portal and stainless steel column that mark entry into courtyard and play high-tech off of traditional materials. Left, view of vehicular entrance on south side, with decorative turquoise gates that hide mechanical equipment. Below, examination room with palette of colors typical of interior. Right, sunlit reception area with glazed conference room. □





Photographs by Kirk Gittings/ SYNTAX

Designing for the Health Care Process and Marketplace

Architecture can be of both therapeutic and competitive help. By Carleton Knight III

Can design help patients to improved health? Author Norman Cousins thinks so, and he ought to know. In his 1979 book, *Anatomy of an Illness*, and other writing since, Cousins, who was once diagnosed with an incurable illness, holds that a holistic approach including a positive mental attitude and relaxed, familiar surroundings aids the healing process. Asked recently about the physical setting as a factor in this wellness equation, Cousins became adamant. Speaking from his office at the University of California at Los Angeles Medical School where he is an adjunct professor, the long-time editor of *Saturday Review* stated, "Environment has a large part to do with getting the best out of health care. It's not theory; it's fact."

In the interview, Cousins said that after publication of his book a number of hospitals developed special facilities within their cancer treatment centers based on his ideas. The first was St. Joseph's Hospital in Houston where Dr. John Stehlin, a prominent oncologist, was instrumental in creating what they call the living room, an airy, open space with comfortable furniture, a television with video cassettes of old comedies (Cousins discovered that laughing at Laurel and Hardy enabled him to get needed sleep), a place to paint or play a piano. Cousins reports hearing of a dozen hospitals that have taken similar steps to reduce the institutionalality of a medical environment and make it more homelike for patients and families alike in recent years.

These efforts to humanize what can be a very daunting experience come none too soon and result in part from the fierce competition within the health care industry for patients. It's a time when the field is undergoing major changes. Ambulatory, or outpatient, care is rapidly supplanting hospitals, and specialty clinics are springing up all over the country. It is estimated that 60 percent of all surgery is now done on a day-basis. This change has important design ramifications. Herbert R. McLaughlin, FAIA, of Kaplan McLaughlin Diaz, which has made itself a specialist for medical facilities, points out, "As the health world becomes more outpatient-oriented, architecture becomes more important because more people are funneling through."

By an ironic coincidence, this writer, while researching the story, was a surgery outpatient at the George Washington University Medical Center in Washington, D.C., a major, urban health-care complex built in the 1950s but remodeled 15 years ago, and subsequently a patient at the Cleveland Clinic, whose new outpatient building designed by Cesar Pelli & Associates received an AIA honor award last year. The experience, while not something one would choose willingly, was nonetheless instructive and illustrative of the problems and changes now taking place in health care.

Just walking into the lobby of the George Washington University Hospital can create a systemic shock. Very dark and confining, it barely admits sunshine. Those being admitted as patients and those for day-surgery share a dark waiting area with chairs lined up in rows. Getting around the hospital maze is supposedly made easier by a system of color-coded arrows—yellow, red, blue, green—in overly bright, fluorescent-lighted corridors. The outpatient surgery waiting room is constricted and shared by pre-operative patients, post-operative patients, and their families and friends. There is no natural light, not even a window. The space is not conducive to relaxation. A subsequent visit to

the hospital emergency room proved equally unpleasant psychologically.

By contrast, patients referred to the Cleveland Clinic for consultation first see their doctors in the new 14-story, granite-walled ziggurat designed by Pelli. The architect says that William S. Kiser, M.D., the clinic's chairman, told him, "I want patients to feel better as they walk through the doors." From experience they do, at least mentally.

The three-story, glazed lobby with surrounding balconies reminds Pelli of "Grand Hotel," an analogy not altogether inappropriate given the direction of hospital design these days. Soft colors—sages, mauves, and roses—predominate along with light-colored oak featuring rich moldings and gray and reddish granites on the walls and floor. Simple signage—white letters on gray panels—directs visitors with ease and efficiency throughout the building. The initial atmosphere is one of restfulness.

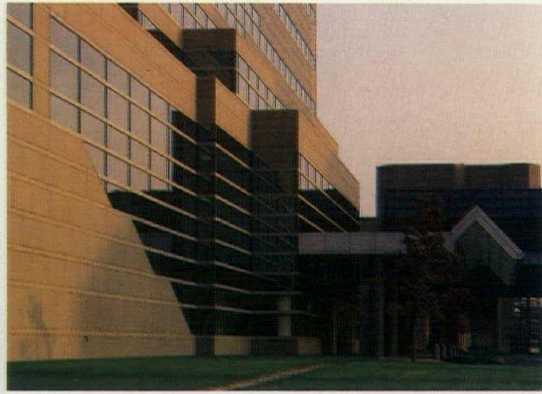
Upstairs is no different. The examining rooms all have large windows with no blinds or shades—somewhat disconcerting at first but reassuring when one finds out that mirror glass precludes any view inside. Despite its somewhat institutional-looking rooms and furniture, the new hospital itself, by van Dijk, Johnson & Partners (joint venture partner with Pelli on the outpatient building), offers patients day-lighted places to get out of their rooms and relax as well as a large, light-filled atrium on the ground floor. Glazed bridges link the various elements—including the delightful, twin-domed Meyer Center for Magnetic Resonance designed by URS Dalton and constructed entirely of non-ferrous materials so as not to harm the highly advanced technological devices inside—in this growing complex.

Everything at the clinic, even down to the parking garage—a stylish building also designed by Pelli—is aimed at the patient, notes van Dijk, Johnson partner Stephen Rajki Jr., AIA. "All contribute to an atmosphere that is stimulative to the healing process." Why the strong interest in design in general and Pelli in particular? Rajki says the Cleveland Clinic sought a "flagship" that would draw attention to itself by its architecture. The clinic competes with two other major medical centers and believed Pelli's ziggurat would provide a physical focus. With some 2,400 beds in the immediate area, Rajki notes, "the consumer has a choice. Using Cesar Pelli may be one way to compete."

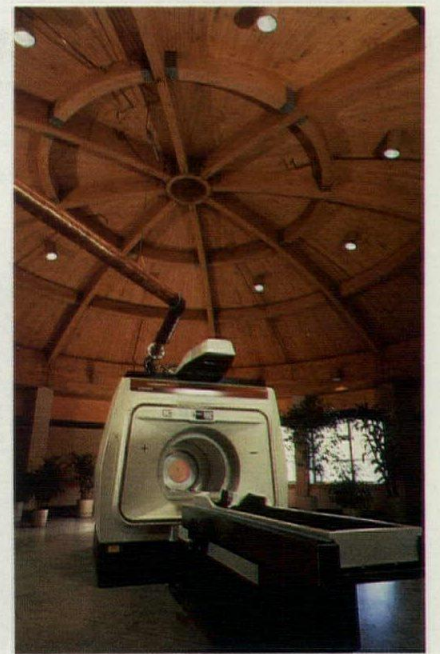
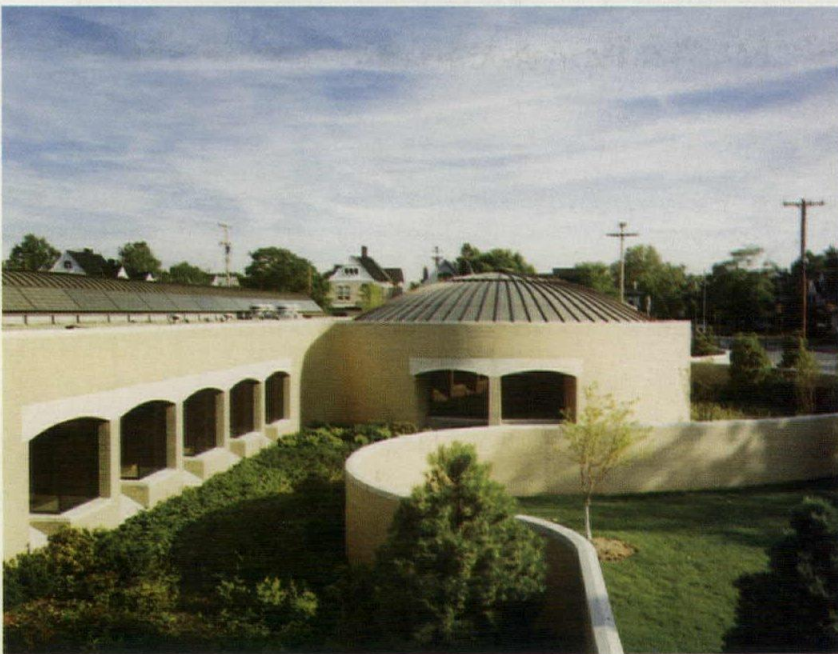
The health-care industry, which spends approximately \$8 billion annually on construction, seems to be lifting a page from the developers' manual, using architecture as a tool to market their facilities, as Dr. Gideon Bosker points out on page 34. Robert J. Frasca, FAIA, of the Zimmer Gunsul Frasca Partnership, says medical facilities today are "scrambling for patients like they are selling automobiles." Notes Michael Bobrow, AIA, whose firm, Bobrow/Thomas Associates, specializes in medical design, "Just as developers realized that architecture can affect the bottom line, so hospitals are discovering this too. Clients today are looking for any edge they can get, and architecture can provide that."

Across page, top and center, the gargantuan Cleveland Clinic and its 'flagship' outpatient building. Right, a minor gem in the clinic complex, the domed magnetic resonance building whose architect was URS Dalton of Cleveland.

© Tim Street-Porter



© Tim Street-Porter





Timothy Hursley/The Arkansas Office



Timothy Hursley/The Arkansas Office



S. Painter

Glade Sperry Jr., AIA, of Westwork Architects agrees that marketing concerns, of the kind made famous by Texas mega-developer Gerald D. Hines with his collection of stylish office buildings, is guiding hospital design today. "It's not that much different from corporate America," he notes. "A few years ago, architects could do anything. Now, design is part of creating an overall image."

Robert M. Guinn, AIA, director of health facilities for the architecture firm of Heery International, Inc., contends that rather than architecture leading this trend to increased competition, it is reacting to it. Competition is forcing health care operators to "look for ways to differentiate their services, which are now being treated as products," he says. That attitude has led directly to specialized facilities, such as women's care, day-care for the elderly, and emergency facilities, for example. "We are not generating these facilities, but are responding with new architectural features as demanded by the client," he says.

This is quite a change, Guinn notes. In the past, because of a desire to appear prudent and unostentatious, "hospitals looked for plain vanilla." Now, hospitals view patients and their families as potential customers, one result of this altered point of view being a desire by older facilities to "glitz up public spaces such as cafeterias," says Guinn. He explains that medical facilities can no longer compete on cost and that they are now starting to compete on amenities, which include quality architecture. "Rooms do not need to be institutional looking," he says, comparing hospitals to hotels.

Other architects also use the hotel analogy. "We have tried

Above, two examples of the use of architecture as an attraction in entrepreneurial health care facilities. Top, the Southwest Atlanta facility of PruCare Royal Phoenix by Heery International, Inc. Above, the rough-hewn Southwest Medical Clinic in Las Vegas, Nev., by Kaplan McLaughlin Diaz. Across page, gentle historicism in the Renfrew Center for eating disorders in Philadelphia suburb by Atkin, Voith & Associates.

window seats, alcoves, places for chance encounters," says Bobrow, who compares his firm's hospital designs to the efforts of the Four Seasons hotel chain. Patients at one hospital responded so well to his humanistic changes that they began asking the staff for what was considered too much non-medical assistance. Finally the administrator asked the architect to respond. Bobrow's somewhat facetious suggestion: "Hire a concierge."

McLaughlin points out that "touches of elegance," such as those found in fine hotels, also make a big difference with the staff, which can gain an improved sense of self-worth."

Imaginative solutions to medical-facility design problems are no longer the sole province of architects whose practice is limited to the health-care field. When Bernard Salick, a physician/entrepreneur and art patron, was given the rights to build a children's cancer clinic at Cedars-Sinai Medical Center in Los Angeles he chose as architect the firm Morphosis. He did so in large part because, according to architect Michael Rotondi, the firm had no experience in the field. "He thought we could look at the problem with a fresher eye," says Rotondi. Salick sought a facility that would be different, but not scary to the



© Tom Bernard

young patients, who would be undergoing chemotherapy.

"Health care is a \$400 billion industry," says Salick, who believes there are very few good firms doing design in the field. "There is much room for innovation," he says. "A little out of the ordinary draws a lot of attention." The Cedars-Sinai facility, now under construction and due for completion next November, features a treehouse-like structure for children to play on and in within a large atrium.

Nor has the lack of previous medical work stopped another Southern Californian, Frank Gehry, FAIA. In one of his first major East Coast projects, Gehry has designed a 60-bed center for adolescent schizophrenics at Yale University. The major problem in Gehry's view: "How to make a place for people and not make it look like an asylum." The site, a transition zone between the New Haven ghetto and the medical school, was unlike those for most such similar facilities, a bucolic country setting. Gehry suggested commercial space to diffuse the institutionality of the entry and, in keeping with his current thematic interest, planned a collection of small buildings, almost village-like in nature. He believes that concept will have twin salutary effects by offering the neighborhood residents a non-institutional, non-foreboding facade to look at and by giving the patients a sense of the real world outside that they will rejoin when they get better. For design of the Renfrew Center, an eating disorders facility in Philadelphia, partners Allen Davis and Samuel Menaged turned to architects Atkin, Voith & Associates for a solution that would attract patients to a non-threatening environment. "You can't do that in a steel and glass box," says Davis. The partners

had acquired a 1920s manor house designed by Philadelphia architect Robert McGoodwin, and, says Davis matter-of-factly, "We didn't want to put a motel next to a French chateau."

Tony Atkin, AIA, renovated the main house into offices and integrated it with a new dormitory facility that is residential in scale and form.

Davis and Menaged have big plans for the future, having acquired additional acreage at the Renfrew Center. "We want to be innovators in the health-care delivery field," says Davis, who adds that design will be an important tool. "We have seen what effect good architecture can have," he says, adding that the center's success rate is 80 to 85 percent, much higher than in standard, hospital-type facilities.

Davis contends that the problem with most hospitals is that they deprive a patient from being able to control his or her situation. Heery's Guinn declares bluntly, "There is no reason why hospitals cannot be an extension of the home. Let the hospital staff adapt, not the patient."

"Health care is in a revolution," says McLaughlin. Just as doctors are trying new techniques and approaches to healing, so too are architects responding to his challenge. In the July 28, 1986, issue of *Newsweek*, critic Douglas Davis reported on the latest in hospitals planned to make patients feel better by design. "The 'temples of healing' in ancient Greece," he wrote, "were elaborate buildings designed by the finest architects and rich with gardens, libraries, and theaters. Like the Greeks, we are coming to see that beauty is the natural right of the weak and the sick as much as the strong and healthy." □

Evaluation: Therapeutic Environment

Mackenzie Health Sciences Centre, Edmonton, Alberta; UHSC Architects. By Allen Freeman



© Balthazar Korab

Portmanesque hotels, Centre Pompidou, and futurist urban cityscapes come to mind; some staffers call it South Edmonton Mall in irreverent reference to a grotesquely elaborate 825-store shopping center in another part of town. But the Walter C. Mackenzie Health Science Centre is an 850-bed tertiary (acute) care hospital. Located in Alberta's provincial capital, it is the most serious built example of the idea that stimulating architecture can speed recovery. It is a paradigm as well of layering habitable spaces between floor-height interstitial spaces through which services are threaded, thus minimizing disruption when equipment is upgraded or spaces rearranged.

Can architecture have a curative effect? Are interstitial spaces worth the extra money required to build them? The answers from Edmonton are probably and yes.

With two million square feet of usable space, Mackenzie is the centerpiece of the University of Alberta medical complex, a teaching hospital and the referral center for Northern Alberta and the Yukon and Northwest Territories. It cost 412 million Canadian dollars, financed by provincial oil and gas industry royalties channeled through the Alberta Heritage Trust Fund. Hospital administrators hope to make it the premier North American facility for teaching, research, and medical service, programmatically a Canadian Mayo Clinic. They believe they have a state-of-the-art building.

The architects were a consortium of two Edmonton firms—Wood & Gardener and Groves Hodgson Palenstein—and Zeidler Roberts Partnership of Toronto. Built in two steps—the first completed in late 1982 (see Aug. '83, page 124) and the second last September—the building was shoehorned into a tight campus site, requiring intricate logistics to keep the facility functioning through phased demolition of old buildings. Partner-in-charge Eberhard Zeidler likens the process to assembling a Chinese puzzle.

In plan, the building is a rectangle with a U-shaped atrium carved out of the center; nine vestial wings sprout from its perimeter, and a blocky tail is at its base. Support spaces (offices, residents' sleep rooms, classrooms, chapel, patients' library, etc.) make up the central building element around which the atrium is wrapped; laboratories and operating rooms are clustered in and near the tail at the south end; and nursing units occupy

the perimeter spaces and their small wings. Shops line the atrium's west leg at ground floor; the east leg has a cafeteria at its base. Although only five habitable floors are above grade (there are two below), the eight-foot-high interstitial spaces and an ample mechanical penthouse make it equivalent to an 11-story building.

The exterior is unremarkable: ribbon windows and orangy brick with precast horizontal coursing and metal-clad stair towers at the end of each wing. At ground level, the building seems sprawling and hemmed in, and its plan is hard to comprehend.

The interior public spaces bear little relationship to the street elevations. The 60-foot-wide atrium rises full height to a glass vault set over a white pipe space frame. Walkways, supported on a filigree of white pipe trusses, crisscross the space, and, at the two points where the atrium turns 90 degrees, these bridging elements angle dramatically 45 degrees off the two long axes. White, lollipop lamp posts line the bridges, and vines trail over the edges. Along the walls—painted white, green, and beige—clusters of air handling pipes spill down like huge stalactites. Enormous at the top, they diminish as they descend and plug into the interstitial spaces. The floor is paved in earth-tone brick and green tile in repeated bull's-eye pattern. There are terraces with pergolas, planters, vines, and fountains; windows with windowboxes; balconies at the ends of bridges; and exposed stairs and elevators.

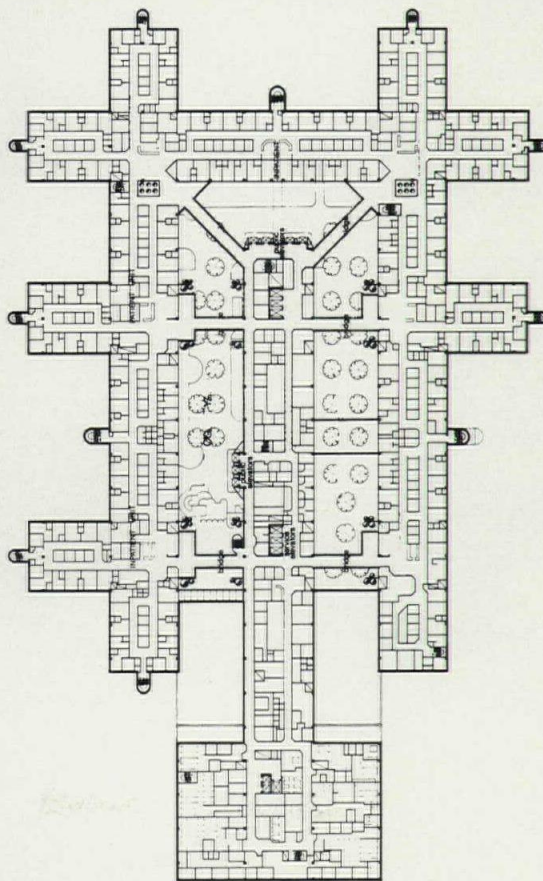
The space seems enormous, audacious, complex. Zeidler sees its esthetic as a sort of humanist high-tech. He has given people something to look at, and they seem to like what they see. All through the day and into the evening, patients sit on the balconies and terraces, alone in contemplation or in small groups. In addition to the architecture, they can watch fellow patients wheeled on stretchers from operating rooms across distant bridges or follow the path of sunlight as it rakes one side of a long space and then the other. It is a stimulating, sociable environment, and, Zeidler believes, curative.

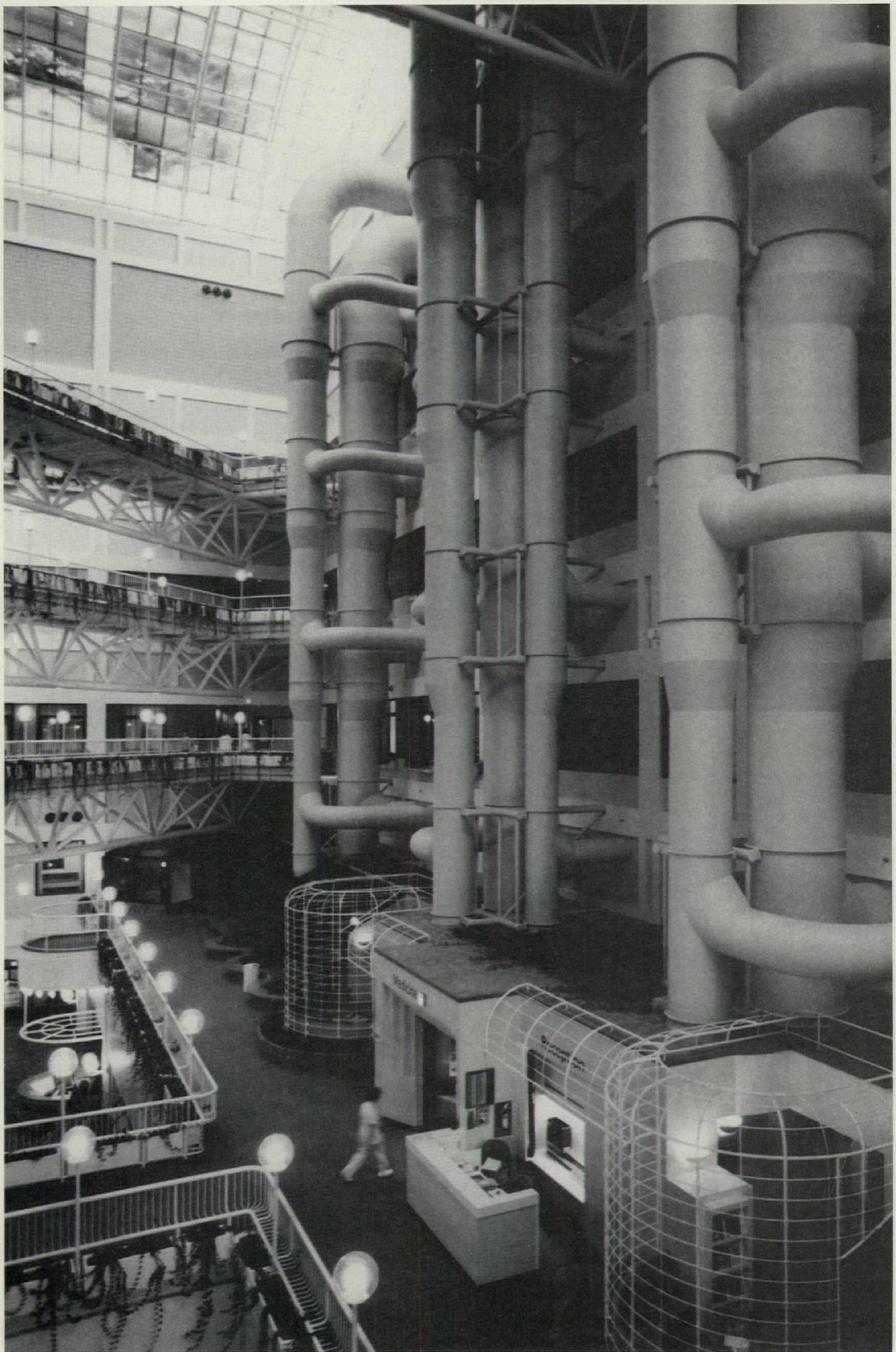
There was an early attempt to evaluate the effect on patients. Shortly after phase one opened, a nurse, Janice Jolly, voluntar-

Opposite, the hospital's east entrance, with two-story administrative wing angling left. Aerial from southwest shows North Saskatchewan River and downtown Edmonton. Plan, below, is fifth floor.

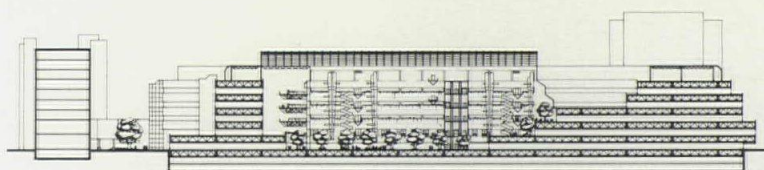


Gordon Cook

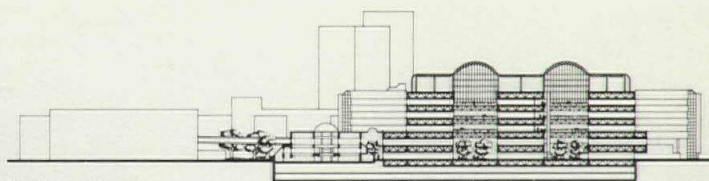




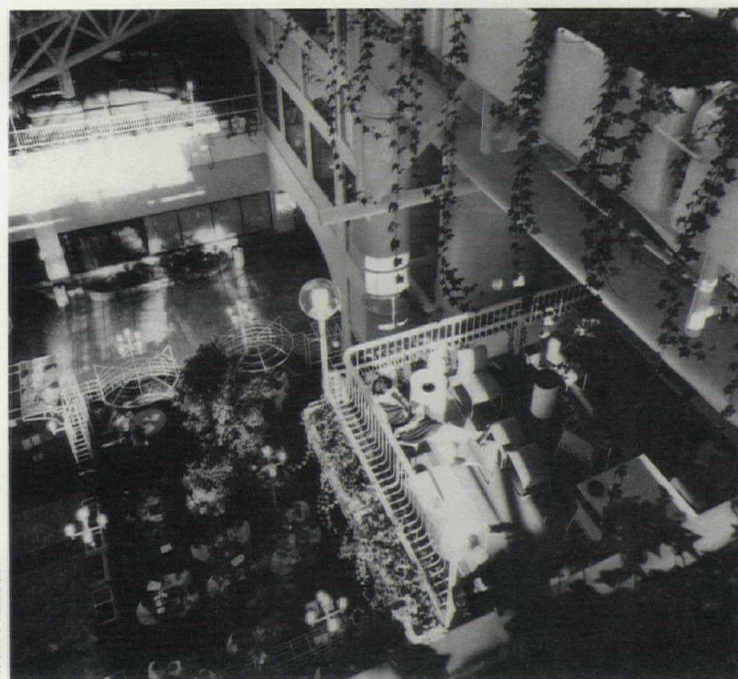
Allen Freeman



Section north-south



Section east-west



Allen Freeman



© Balthazar Korab

ily compared the amounts of analgesics required of post-surgery patients in a still-used ward of the old hospital with those given similar patients in the new building. The charts showed that “a lot less painkillers” were required in the new building, Jolly says, while acknowledging that her survey methods were not highly scientific.

Last year the hospital’s nursing education and research department began a more systematic and broader study of not only painkillers but patients’ length of stay from surgery to discharge, ambulation (how soon and how much time spent walking), and anxiety. The study is also trying to evaluate the effect of staff attitudes and ways of working in the new building. Although data won’t be analyzed until later this year, the staff members I talked with, without exception, believe the building has a positive effect on patients.

They like the atrium for other reasons. Director of Operations Planning Ron D. Taylor considers it “almost free space” because the premium for the glass vault, compared with a conventional roof over just the first floor, was largely offset by use of inexpensive drywall lining the atrium instead of expensive exterior walls required in Edmonton’s climate. Physical Plant Director Al Mohler says energy efficiency is “a sawoff. You have to heat the atrium in winter and cool it in summer, but the patients and staff love it.” Nurse Jolly finds it “a morale booster. . . . We are more enthusiastic about our work.” And hospital President Donald A. Cramp says it makes the job of recruiting top-quality staff and students easier.

Four fairly minor problems relate to the atrium:

Rough paving on the atrium floor is potentially harmful to patients with fractures being wheeled on stretchers to the department of physical medicine and rehabilitation, located on the north end of the first floor. A suggested solution is to purchase new stretchers that roll smoothly. Cleaning the exposed ducts and ledges at the edge of the atrium is expensive; the hospital contracts the job out. Although ventilation is generally well engineered, cigarette smoke tends to collect at the second level. This will be remedied this September when smoking will be prohibited in most of the building. The nursing staff, especially, would like more atrium staircases, says Pamela Allan, vice president for nursing. The west leg of the space has stairs all the

Opposite, air handling tubes spill vertically down north wall of atrium and connect horizontally at interstitial levels. Bowers at second level define patient waiting areas. Above left, a patient reads in sunshine on second-level balcony overlooking cafeteria. Above, a nursing unit with view to balcony.

way to the top, but the east leg has exposed stairs only between the first and second floors; above, you must use interior stairways. She also says the extra floor height of the interstitial spaces tends to make staff disinclined to use stairs, resulting in crowded elevators and long waits.

Extra stairs to climb seem amply compensated by the advantages of interstitial spaces. Such interfloor service areas have been used elsewhere, notably in Louis Kahn’s 1965 Salk Institute in LaJolla, Calif., more recently in U.S. Veterans Administration hospitals, and at Zeidler’s 1972 McMaster Health Sciences Center in Hamilton, Ontario.

Besides already mentioned advantages, the interstitial spaces take into account that Mackenzie’s building life expectancy is 100 years while mechanical systems will wear out every 20 years or so. Between renovations and maintenance, Mohler expects the extra construction cost to pay for itself in 10 years.

Only two shortcomings have surfaced at Mackenzie related to interstitial spaces, the most important resulting from the lack of sound insulation on the floors. Mohler says that footsteps can be distracting to those below, and a workman dropping a tool on the corrugated metal decking directly over an operating room during surgery could possibly have dire consequences. As a result, some interfloor areas must be closed off at times. The proposed and obvious remedy is carpeting on the concrete walkways in the interstitial spaces and spray insulation over the sheetmetal.

A second problem resulted from the rush to complete the first building phase, which was fast-track designed and constructed. Mechanicals were installed there with little regard for future access, and as a result many areas are difficult to walk through and work in. The second phase was built at a less frantic pace, and its interstitial spaces are well ordered and logical.

The floors themselves seem eerie and inert throughout—except along the 2.5 miles of track where 180 small, self-propelled cars



Above, bridges and elevators from northwest corner of atrium. Left, pipe trusses support bridges and balconies, and tubes thread through the structure. Right, the west leg of the atrium from the south.

travel, carrying X-rays, mail, supplies, etc. A \$4 million, modified off-the-shelf system by Mosler, the cars serving 64 stations throughout the building seem a glimpse of the future.

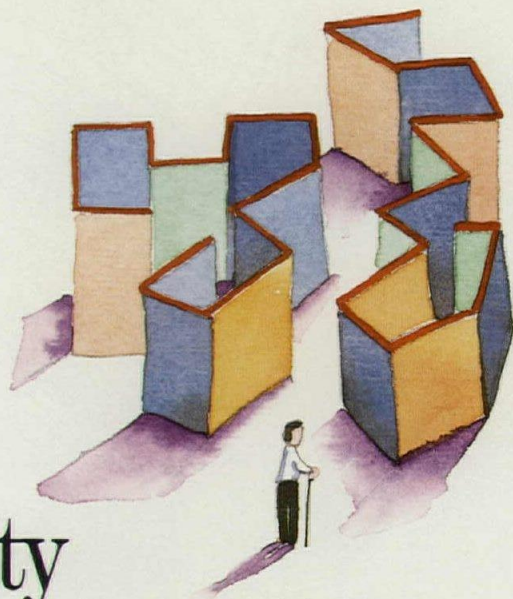
Such high-tech systems make the huge hospital function smoothly, but nursing units remain central to patient care. At Mackenzie, 54-bed, T-shaped units are broken into 18-bed subunits. The intent was to fully staff the subunits during the day and then operate with a smaller staff from central stations at night. But the concept has been rejected by the nursing staff, which uses the central stations in the larger units only for computer and other support functions. More successful was the idea of moving patient food preparation to a separate building. Meals are frozen and brought to small heating kitchens in each 54-bed unit.

But the accomplishment of Mackenzie is in its larger tapestry, that of emphasizing "a feeling of hope, kindness, and beauty," in Zeidler's words, and creating "a place that emotionally assists in the healing process and gives the staff personal satisfaction in providing care." □



The State of the Art Of Design for Accessibility

Architects and the disabled can have different perspectives. By Nora Richter Greer



The built environment is far more accessible to those with physical handicaps than at any time in the past. Overall, compliance with accessibility building codes is strong; there is movement toward uniformity of codes and standards; and accessibility products are more attractive and less costly. Yet, advocates of barrier-free environments still discern a stigma assigned to the handicapped through building design, the result of a strong division between designers of accessible buildings and disabled users. It can only be through an empathic relationship between architect and user, they continue, that esthetically pleasing and humane barrier-free environments will emerge.

Estimates of the number of Americans with sensory or mobility impairments range from 32 to 35 million. If those with temporary handicaps are also counted, the number skyrockets. Since most people will be disabled at some point in their lives—by disease, accident, old age—the architect's task then becomes designing for an "entire life span," in the words of Ruth Hall Phillips, senior associate director for barrier-free design, Paralyzed Veterans of America. "We're only able-bodied, any of us, for a certain portion of our life. When we're children we don't fit in the average mold, and when we're old we don't fit in. We expect people to be perfect—perfect health, perfect vision, a 30-year-old, able-bodied and strong."

The first accessibility design standards came in 1961 when the American National Standards Institute released standard A117.1. While considered sketchy at best, the 1961 ANSI standard was an important victory for the disabled. Prior to that, most public and private buildings were not accessible; many municipalities even had laws that discriminated against the physically disabled, such as the so-called "ugly laws" that barred disabled people from public places on the grounds that their presence was offensive and posed undue legal liabilities. This first ANSI standard was not revised until 1980 when it was expanded from 6 to 60 pages. Then for the first time, the needs of the hearing impaired and the visually impaired were addressed and requirements for bathing facilities and kitchens were included. Now in an effort to keep pace with new technological or design advancements, A117.1 is to be reviewed every five years.

A major change in the recently released 1986 revision of the standard is the elimination of all scoping requirements (scoping identifies the number and location of various accessibility features in certain building types). What ANSI previously prescribed was "a reasonable number, but always at least one." It was presumed that states and municipalities would readily supply the number appropriate to a specific locale. "People had a real problem with that because very few jurisdictions really know how many disabled people reside in their boundaries or what

the nature of those disabilities are," says Laurence Field, chief administrator of Delaware's Architectural Accessibility Board and chair of the National Council of State Building Codes and Standard's State Accessibility Officers. So, it was not uncommon, for example, to find a large facility with only one bathroom accessible to the handicapped.

Under the 1986 ANSI standard, the code-setting bodies will be forced to look more closely at the needs of their jurisdictions. In order to aid this process, the NCSBCS is developing a uniform scoping guideline. However, until such a guideline is adopted extensively, there will continue to be vast differences in the number of accessible features required from state to state and locale to locale. And for architects, this will continue to cause confusion. "There is little dispute over the specifications of an accessible bathroom, but there is no agreement on how many accessible bathrooms there should be or how they should be spaced throughout a building. It is the implementation and application of standards that have caused major difficulties for practicing architects," wrote social scientist Gerben Dejong and architecture professor Raymond Lifchez in *Scientific American*, July 1983.

During the 20 years in which the first ANSI standard was not upgraded, design requirements proliferated in local and state codes, many of which were in conflict with federal code. "If you had a building, like a hospital, that included federal funding, it would be required to comply with the local code and state code, and perhaps three or four conflicting standards," Phillips says. Currently, the 1980 ANSI standard is law in 95 percent of the code jurisdictions and referenced in the three model building codes. All 50 states require that most buildings constructed with state revenues be accessible. Four-fifths of the states also extend accessibility requirements to certain privately owned buildings used by the public.

Now that all three model codes are consistent with ANSI 117.1-1980 (and most likely will adopt the 1986 changes) there will probably be, in the near future, uniform design standards for accessibility in this country. "The ANSI is rapidly becoming the uniform technical provisions for accessibility," says Field. "It has been happening for years, I guess, but we are really getting close to the point where it is a reality, and so once we get the uniform scoping provisions in place we will have true uniformity in accessibility."

Aiding that process was the federal government's promulgation in 1984 of the Uniform Federal Accessibility Standards, which are basically the 1980 ANSI technical specifications with minor amendments. All federally financed building projects must comply with these standards. Actually, in the development of

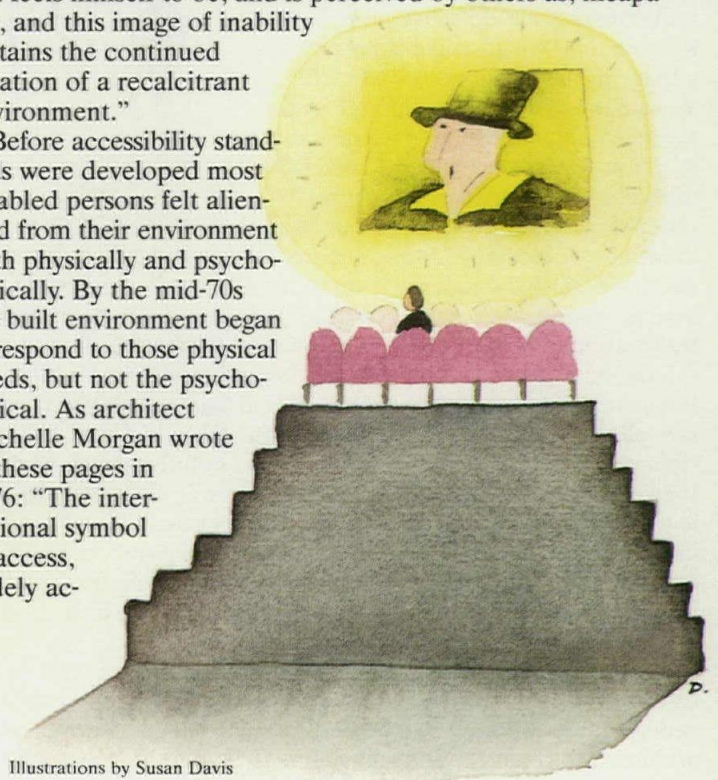
the 1986 ANSI standard, some changes were made to the standard to achieve more conformity with the UFAS standard. "I think we have made some real progress toward getting uniformity in standards," says Margaret Milner, executive director of the federal Architecture and Transportation Barriers Compliance Board. "Basically, I think we have a good set of standards. Now the challenge is to use those standards creatively in building design."

Once uniformity is reached, the next step is "universal design," where the built environment is accessible to all. As explained by Ronald Mace, AIA, president of Barrier Free Environments, Inc., Raleigh, N.C.: "Improved design standards, better information, new products, and lower costs have made it possible for design professionals to begin designing all buildings, interiors, and products to be usable by all people all of the time, instead of responding only to the minimal demands of laws that require a few special features for disabled people. Universal design means just that—making all products, buildings, and facilities usable by all people to the greatest extent possible." Will this approach cost more than current practices? Mace answers, no: "In our society, where mass production is the method used to reduce cost, it will always cost more to build a few special and different features."

Already, many products that conform to accessibility standards are changing: No longer are the products "institutional" in appearance, ugly, and different. They are becoming more and more similar to the products used by the able-bodied, yet they meet accessibility standards—the idea being that both the able-bodied and the disabled will ultimately benefit from accessible environments. One manufacturer reports that its accessible water cooler is becoming the most popular drinking fountain in their line for all types of installations. Other products being marketed as "universal" are automatic doors, lever handles, grab bars in the showers, telephone volume controls, "talking" exit signs, low-pile carpet, rubber floor covering, slip-resistant tile, and awning, casement, and hopper windows. And some required accessibility features have even become the standard for some products—in elevators, for example, car-position indicators, delay in door-closing time, door re-opening devices, floor gap, audible and visual signals, tactile signage for panels and on-floor door jams, emergency communication devices. New products incorporate state-of-the-art technology to aid the disabled: water fountains with electronic control valves; sinks, the height of which can be adjusted with a hinged arm; electronically controlled push-button window operators; infrared and radio frequency technology for sound amplification in theaters and auditoriums. (For more disability-related product news see page 131.)

While new products and the movement toward uniformity in standards are obviously helpful in achieving a barrier-free environment, it still remains crucial that the users' environmental needs—both physical and psychological—are understood. Basically, there are three kinds of disabilities: sensory distortions and deficits, motor impairments, and emotional and cognitive impairments. While only the first two categories are normally addressed in accessibility standards, all three have "a particular set of compensatory behaviors and activities, and an accessible environment is one that supports compensatory maneuvers," says Lifchez in his book *Rethinking Architecture: Design Students and Physically Disabled People*. For example, Lifchez says, "Blind people depend on fixed landmarks for orientation and rely heavily on auditory perceptions and changes in air pressure; to a lesser degree, they also rely on olfactory sensations and temperature gradients. . . . Environments that do not offer coherent nonvisual cues thus unnecessarily handicap the blind and create a psychological feedback loop: The disoriented blind person feels himself to be, and is perceived by others as, incapable, and this image of inability sustains the continued creation of a recalcitrant environment."

Before accessibility standards were developed most disabled persons felt alienated from their environment both physically and psychologically. By the mid-70s the built environment began to respond to those physical needs, but not the psychological. As architect Michelle Morgan wrote in these pages in 1976: "The international symbol of access, widely ac-



Illustrations by Susan Davis

claimed by proponents of barrier-free design, unfortunately actually reinforces stigma and segregation. . . . Disability and stigma go hand-in-hand in our society. . . . Any time a designer provides a solution for a person with disabilities that is of lesser quality and convenience than what he would provide for himself, he is creating a psychological barrier."

Generally speaking, architects have responded to the accessibility standards as "unusual or burdensome" rather than as the "latest requirement placed by consensus on the environment," in the words of Lifchez and Cheryl Davis, a disabled design consultant. "I think a lot of people still associate accessibility with ruining the esthetics of their design, often due to badly done building codes," Mace says. Edward Noakes, FAIA, adds, "We hoped that architects by now would automatically be thinking in terms of barrier-free design when they design anything. Very, very few are."

Incorporating accessibility in design is often hardest in a renovation. "It is a very sticky design problem to do it without looking like a jungle gym and without having very awkward ramps and putting elevators where you don't want them, especially when the building is a split level," says Sarah Harkness, FAIA, of The Architects Collaborative in Cambridge, Mass.

"The buildings that are most successful in my estimation are the ones where the provisions for the disabled are not apparent at all. It's just part of the normal process," says Edward Matthei, FAIA, of Matthei & Colin, Chicago, and chairman of the 1986 ANSI accessibility standard review committee. ATBCB's Milner suggests that when integrated into the overall design, accessibility provisions can actually enhance the design. "It is quite possible that a feature designed for accessibility will actually turn out to be a very good design feature for the building. And it makes the building easier for everybody to use," she says. "Very good architects have developed solutions to accessibility problems that are quite handsome," says Edward Steinfeld of the school of architecture, University of New York, Buffalo.

Architects should strive, says Donlyn Lyndon, FAIA, "to make it possible for people to have encounters with the environment that make them able to do more, to know more, to experience the world in ways that augment, rather than diminish, their sense of dignity and competence and joy, and that awaken their interest in one another. . . . Imagine instead a place where movement is thwarted, outlook is denied, where nothing quite fits and the light is always either glaring or dim. These are the partial prisons in which many disabled people now find themselves."

Lifchez and Davis take the discussion a step further: "If a facility can accommodate the needs and wants of disabled people, allowing them not only to enter the place but also to experience it in a meaningful and reasonably comfortable fashion, then its design has really achieved something. For accessibility is more than a matter of admittance or logistics; it is also a quality of experience. How one feels about a place, how one interprets it, or even whether one can adequately interpret it—these are all less quantifiable, but crucially important, aspects of accessibility."

In an effort to promote barrier-free environments of high quality design, the Adaptive Environments Center in Boston will sponsor over the next five years an awards program honoring architects and developers whose buildings demonstrate design excellence and thoughtful accessibility. Among the winners in its pilot program last year, the best of accessible Boston 1986,

were I.M. Pei's John F. Kennedy Library and addition to the Boston Museum of Fine Arts, TAC's Josiah F. Quincy School, and Cambridge Seven Associates' New England Aquarium.

The architect's automatic inclusion of accessibility in the design process, however, still seems a long way off. "Few professionals have had the vision to create new forms that are not inherently discriminatory," Lifchez suggests. Steinfeld says, "What we have to do is work toward extending the attention of barrier-free design from codes to design practice in general, so that it doesn't only become institutionalized as a code matter, but also becomes a basic criterion in design."

Lifchez recounts: "Three or four years ago I met a young architect recently graduated from school, who was working for a large New York firm that had an excellent reputation in the design of high-rise public housing. She had been placed in charge of the design of a regional library for the blind, and as I looked through her drawings I could immediately see that she had been well trained. I asked her if she had enjoyed working with clients who were blind—an interesting challenge even for a seasoned architect. But no blind people had been consulted during the design process. After all, she asked, what possible use could blind people have been to her, an architect, in the design of a building they would never see?"

Architects need to understand the people behind the codes and standards—the disabled who want to live independently and who want to experience the built environment with as much ease as the able-bodied, or who at least want some input into the design of their environment. And it seems especially important that this kind of empathic relationship between client and architect be taught in the schools of architecture. Speaking of such a program offered at University of California, Berkeley, where he teaches, Lifchez says, "The presence of disabled people in the classroom, we hoped, would challenge our student's assumptions about the people who would use the buildings they design, induce our students to confront their prejudices about disabled people, and heighten their sensitivities to clients as complex individuals with specific needs, preferences, and dreams. . . . A major hurdle for our students was to conceive of physically disabled people who lived normal lives in everyday society. For in the students' world view, consciously and unconsciously, the realm of the disabled is the institution—a misconception we took great pains to dispel and one boldly contradicted by the presence in the studio of our design consultants."

However, the Berkeley program remains all but unique. "There is no training, no education available in the schools of design," Mace says. Lifchez adds, "I don't see that schools of architecture are using the issue of access as a touchstone by which to look at the whole issue of frailty and vulnerability among the greater population."

According to Lifchez, not only a change in the education of architects, but a change in society's values and attitudes is the prerequisite to achieving a totally barrier-free environment. "Barrier-free advocates are not asking society to turn the environment into one giant appliance, filled with ramps and grab bars," he says. "They are asking communities to make a serious commitment to attention and caring. In caring communities, various mechanical fixtures would be perceived not as concessions to a minority population of disgruntled cripples, but as useful features in the community landscape, as symbols of its humanity, and as aids that would satisfy the needs of many constituencies: children, pregnant women, people carrying heavy loads, older





Illustrations by Susan Davis

people, and the temporarily disabled," Lifchez adds.

Sometimes a good tactic in securing a barrier-free environment is discussing the needs of other population groups. Increasingly, for example, designing for the disabled has been linked to designing for the elderly. "Try and be aware of the fact that all of us are going to age and as we age we will have frailties and some of those frailties will result in difficulty in maneuvering in our environment," says Robert Katz, director of housing research and design, University of Illinois, Urbana-Champaign. "Therefore, let's make the environment work for us as long as possible." With designing for elderly comes the concept of adaptability, another important design direction for the disabled.

Although only a few states now call for a certain percentage of certain types of housing to be adaptable, the practice is likely to expand in the future. Basically the units have universally accessible doorways, thresholds, and hallways; at least one bedroom and one full bathroom are on the first floor. Kitchen cabinets and bathrooms are designed to be adapted to meet accessibility requirements at some later date. "In the residential setting where the occupants are going to change is where you need the adaptable design. Ultimately it could make a lot of sense for developers to go the route of adaptability," Milner says. "Then you never have a problem; when you have a vacancy and you have a handicapped person, he can go into that vacant unit and you can just adjust the kitchen cabinets, put in the grab bar, and that's that."

Phillips notes that one of the major manufacturers of modular housing, Cardinal Industries, has become virtually a lobbyist at the state level for adaptable housing. "Recently the State of Indiana was writing a new accessibility regulation," Phillips says. "They were going to call for 5 percent accessible. Cardinal came in and suggested, 'Why not make it 5 percent accessible or 10 percent adaptable?' And in the end, Cardinal won." The next marketing campaigns may well be for life-span houses, adaptable houses that can accommodate an individual through the aging process.

Although the federal government is virtually out of the business of constructing new housing for the disabled and the elderly,

the question of accessibility versus adaptability is still being discussed regarding federally funded housing projects: Should accessibility be built-in from the start or should units be made adaptable, so that modifications can be made with minimum cost and effort? Should only a few units be made accessible or should they all be accessible?

What the federal government does, and will continue to do, is offer a tax credit for the incorporation of accessibility provisions in buildings and vehicles. Up to \$35,000 can be deducted annually for such improvements. Known as section 190 of the IRS tax code, the provision had already expired for 1986 (its revision date) when Congress passed a permanent provision in the tax reform package (it will never need to be reviewed again). The code calls for compliance with the 1960 ANSI standard, a requirement that can be overridden by a more stringent state accessibility code. It is very likely that the IRS accessibility tax credit provisions will be upgraded next year with at least a minimal reference to the 1986 ANSI revision or the federal government's UFAS.

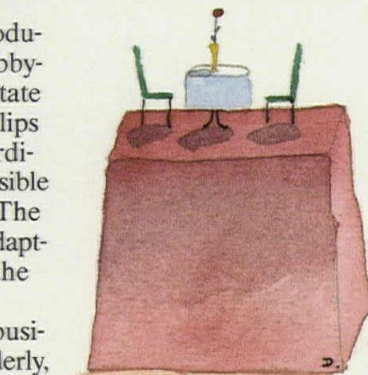
The federal government, through the Architecture and Transportation Compliance Board, has also been the major sponsor of research into the environmental needs of the disabled. Much of this research has been the basis for the UFAS and the updated ANSI standards. Usually undertaken by universities, the early projects basically were designed to verify existing code requirements and to provide data for the establishment of new standards. Areas of research have been signage (the width-to-height ratio of letters); textured floor surfaces to warn blind people of an upcoming hazard; hand anthropometrics; a pedestrian accessible network. Among future topics are visual cues and egress. Prototypes for accessibility products have also been developed: a tub with seat, a tub for people who can transfer out of a wheelchair (with full-support cushioned seat, grab bars, hand-held antiscald shower head); a shower with room for a wheelchair; contoured padded seat for standard shower stalls; electronic guidance systems.

What does the future hold? "I'm very optimistic," Mace says. "I think we are 10, maybe 20 years away from where we will not have to talk about this as something special. It takes a long time to change attitudes and practice. I think, though, we are well on our way." Others express more dissatisfaction over the current state of affairs. What is needed, some contend, is continued advocacy by disabled people; architects, too, must rally for a more widespread and esthetically pleasing accessible environment.

"Disabled people must become much more active and present in their community," says Michael Jones, associate director of training, Research and Training Center on Independent Living, University of Kansas. "Society is going to have to decide what value they put on the full participation of disabled people. . . . It is an uphill battle, and it is not going to happen unless we continue to fight for it."

Architects, in their visionary role, "must remind others that architecture reflects how society feels about itself, that creating an environment is a dynamic process, and that architecture should express a society's highest aspirations and ideals," say Lifchez and Davis.

"Access is not just another constraint on architectural design; it is a major perceptual orientation to humanity." □



Designing for 'Special Populations'

*It requires placing a strong
emphasis on user need.*

By Lynn Nesmith

The concept of creating a special environment for a group of people sharing common characteristics is not new. A hundred years ago there were orphanages, poor houses, old folks homes, sanatoriums, and other institutions whose names today evoke images from a Charles Dickens novel or a B-movie. Changing attitudes toward society's view of and responsibility to the aging, the poor, and the disabled have resulted in reforms that have greatly improved the physical environments of all types of facilities for these special populations. The names of many institutions have been replaced by a host of euphemisms, but anyone who has ever visited a skilled nursing care facility for the elderly, a hospital for terminally ill or disabled children, a shelter for the homeless, or a psychiatric unit has seen the grim realities of the functions of these facilities.

Architects of such facilities agree that the most important aspect in designing for any special population is the creation of an environment that is sensitive to the needs, feelings, and dignity of the people who will use the space. The Boston firm Payette Associates is designing an acute care hospital that will have a high percentage of elderly patients but must also accommodate such severely disabled patients as a 17-year-old who is going to be in an institution for the remainder of his life. Thomas M. Payette, FAIA, says that the "environment there should be no different than the environment we try to create for anybody—in an institution or not. The issues are openness, friendliness, and delight."

The dramatic increase of the elderly population, in terms of both numbers and as a percentage of the nation's overall population, is one of the most important demographic changes in society. The more than 29 million people 65 and older who make up the specialized population (defined by many labels including the aging, the elderly, or senior citizens) form a diverse group representing a broad spectrum of capabilities, incomes, and preferences. During the 1980s, the population of Americans over the age of 65 will increase by four million. Currently about 80 percent of Americans 65 and older live independently in their own houses or apartments, and of this group 80 percent own their own homes. According to the U.S. Census Bureau, households headed by someone over the age of 65 owned houses with equity totaling \$725 billion in 1984.

These demographics illustrate the growing need for a wide range of environments to meet the varying requirements of the aged. Although the different living arrangements and needs of the elderly are almost infinite in number, five categories of facility types are commonly recognized: housing, senior citizen centers, residential care facilities, skilled nursing facilities, and life-care retirement centers. In each of these rather loosely defined categories programmatic and design issues vary greatly.

Housing for the elderly refers to dwellings where residents are generally able to care for themselves without supervision or extensive medical care, and can range from resident-owned single-family houses to high-rise and low scale multi-unit complexes to congregate housing, which offers ancillary services.

Residential care facilities provide varying support for the elderly

who can no longer live independently but who do not require the level of medical care provided by nursing homes, which are health care facilities licensed by the state to provide long-term, 24-hour skilled nursing care in addition to custodial care and meal service. The most comprehensive facility designed for the aging is the life-care or continuing care retirement center, which typically offers all levels of care from independent housing to skilled nursing home care.

In a speech on designing facilities for the aging, Boston architect Lawrence P. Schwartz of ARC, Inc., reiterated the importance of architecture understanding the social requirements of designing for the aging. "The successful design of facilities for senior residents goes far beyond a discussion of how high to place grab bars or the proper slope of ramps," he said. "The design professional's responsibility is to understand the needs of those who will use the building. The design challenge becomes: How can we create an environment that will reinforce positive aspects of living for residents and users?"

One of the biggest criticisms of elderly facilities and communities is that they are often not part of the community at large. "The elderly should not be isolated," says Payette. "Fortunately, people are getting smarter, and more of these facilities are being built within reasonable neighborhoods." Schwartz agrees, saying, "Perhaps the single most important factor in the success of a retirement community is site selection, and for site selection the key aspect is location."

There is a certain adjustment period when anyone moves into a new environment, and this adjustment can be unusually disorienting for an elderly person who has lived in one neighborhood for many years or one who is undergoing major social, psychological, or physical changes. In response to these issues, Joe J. Jordan, FAIA, a gerontological planning consultant and architect, developed a basic set of rules for architects of facilities for the elderly: increase opportunities for individual choice, minimize dependence and encourage independence, compensate for sensory and perceptive changes, recognize the probability of decreases in physical mobility, improve orientation and comprehension, encourage social interaction, stimulate participation, reduce conflict and distraction, provide a safe environment, make activities and services accessible, improve aging's public image, and plan for growth and change.

According to Constantine Tsomides, AIA, of The Richie Organization, there is a definite trend toward facilities offering the full continuum of services. "Hospitals are scrambling to diversify and to expand their service base to the elderly, nursing homes are expanding into housing, and owners of congregate housing facilities are expanding into health care," he says.

Exploring alternative modes of care to meet the growing health care requirements of the aging is a challenge being addressed by an increasing number of hospitals, both for-profit and not-for-profit. Tsomides says that there are drawbacks because often the hospitals aren't as well equipped to deal with the service programs that are necessary to adequately care for the elderly. "It is not a strictly medical problem. The psychological, social,

recreational, and emotional issues are equally, if not more, important," says Tsomides.

Developers, major hotel chains, and insurers are also aiming at the growing market of accommodation for the elderly. The *Wall Street Journal* recently reported that the Marriott Corporation plans to build dozens of life-care communities before the year 2000 and that Oxford Development Corporation, one of the country's largest apartment builders, intends to build a network of 18 congregate living facilities by 1988.

There is concern that developers may profit at the expense of the elderly. In Florida, a judge ordered the state to take over a \$14 million life-care community, the Cloister, after the developers went bankrupt before constructing the building, which was to house dining, nursing care, and recreational facilities.

Although architects and developers have targeted the aged as an important market, the estimated number of Americans with sensory or mobility impairments (see related story, page 58) is actually larger than the elderly population—Americans 65 and older number more than 29 million, while the estimated number of permanently disabled persons is 32 million to 35 million.

The most important aspect of creating environments for special populations with physical disabilities is reducing social and architectural barriers and providing appropriate facilities for the activities of daily life. According to Payette, the issue of designing for special populations really has to do with creating a program that defines and reduces elements of conflict in the environment. Rather than focusing on the differences, the program should address the needs and requirements that are common to all people—eating, sleeping, working, and playing.

Herbert McLaughlin, FAIA, whose San Francisco firm Kaplan McLaughlin Diaz has designed for the disabled (see page 72) and the elderly, mental health facilities, and various health care facilities, stresses the importance and difficulty of addressing the different requirements of the wheelchair-bound and other disabled groups. The requirements of disabled persons vary greatly, and the needs of different groups may be in conflict. For example, a blind person may be most comfortable in smaller spaces where most elements are within touch, while a person confined to a wheelchair maneuvers better in wide open spaces. In addition, a floor textured for the blind to guide their feet would impede a wheelchair, but both groups function better in a space with hard-surfaced floors (the sound assists the blind; traction is better for wheelchairs).

In designing housing for the disabled, McLaughlin says, their firm worked with residents to develop a set of design principals and concerns. They include: integrate accessible elements into the overall fabric to avoid "stigmatizing" design, avoid hidden costs to residents, promote appropriately designed products, provide options, avoid stereotypical assumptions about the disabled, and recognize codes as minimum design guidelines.

In the introduction to *Building Without Barriers for the Disabled*, Sarah P. Harkness, FAIA, and James N. Groom Jr., AIA,

wrote that "architectural planning that will permit 'free use of the manmade environment' is not easy. The requirements of disabled people differ, and what may help one person may sometimes hinder another. No arrangement will be perfect for people of every size and with every kind of disability. . . . However, an understanding of the needs of the disabled should open buildings to many more people than it was possible to do in the past."

A number of highly technical and specific design issues must be addressed in designing an environment for the disabled as well as the elderly. According to Charles N. Tseckares, AIA, of the Boston firm CBT, a person with severe arthritis in his or her hand simply cannot use a doorknob, so a lever handle is the only smart thing to specify and install in a facility for the elderly. There are similar requirements for hardware on windows. "Many residents have impaired depth perception, so subtle differences in color between carpet and vertical walls is not appropriate," says Tseckares, "and carpet on the floor shouldn't creep right up the stairs because it makes it difficult to identify the exact location of the rise."

Tseckares also outlines a "whole list of things that simply must be accommodated" in a facility to meet the requirements of the elderly and disabled. The problem in his words is that "a lot of architects have traditionally said, 'My responsibility as an architect is to provide all the technical stuff to make their lives easier from a physical movement point of view,' rather than addressing the needs of their psyche."

To view these design obstacles as a problem that only a limited number of people faces is a denial, yet it is a denial that many people practice. In the prologue to a book on designing for the disabled, Irving Kenneth Zola, professor of sociology at Brandeis University, wrote, ". . . it seems to be a denial that cuts across all classes of income, education, and even sophistication. This was illustrated to me recently by a friend, a psychologist, who with great enthusiasm was showing me pictures of his retirement home—a lovely condominium in Southern California. Instead of showing appreciation at the panoramic view it offered, I gasped at the two flights of winding external stairs it took to get there as well as at the balconies and the many flights of stairs inside the building. Aware of my shock, he looked at me and shook his head. It was the first time it had dawned on him that he might not be in the same physical shape at age 70 that he is now at age 43."

The mental health field is another area that has undergone drastic changes over the past 20 years. While the number of patients in state-operated facilities has decreased substantially, many for-profit health care corporations now look toward psychiatric facilities and chemical dependency units as a booming market. In the competitive health care marketplace, where many hospitals are competing to fill beds, many hospital corporations are looking for a new niche. Frequently mental health facilities are filling this niche.

More important than the changes in the marketplace for psychiatric services are the dramatic changes in the treatment

approaches and the design of the physical environments.

According to McLaughlin, it is important to emphasize the impact of architecture on both the patients and the staff. The late '60s was the beginning of some of the pioneering efforts in the design of psychiatric facilities—not only in terms of trying to create a more "homey," friendly, and nonthreatening environment but in developing changes in the spatial aspects of the facility.

High-security, closed wards are no longer the model for mental health facilities. Most of the facilities being built today are 60- to 100-bed centers with a residential-type inpatient care and more ambulatory and day-care facilities within the complex.

McLaughlin also stresses the importance of creating more "open and complex environments for the mentally ill" while achieving "a balance of privacy, security, and interaction."

The design program for a residential chemical dependency unit is similar to a psychiatric facility, although the security requirements are generally less strict for a facility designed specifically for drug and alcohol related treatment. Some of the most important changes in the design of these facilities over the last 10 years have resulted from changes in the patient populations and theories of treatment, according to Stephen Sawyer, AIA, of Anderson DeBartolo Pan, Inc., of Tucson, Ariz. The number of adolescents being admitted to these facilities is substantial—in some cases 50 percent of the beds are dedicated to this age group. (Many of these facilities, as well as psychiatric units, include a school for inpatients and might incorporate a day school.) In a majority of the for-profit facilities being built today, there are separate units for adults and adolescents.

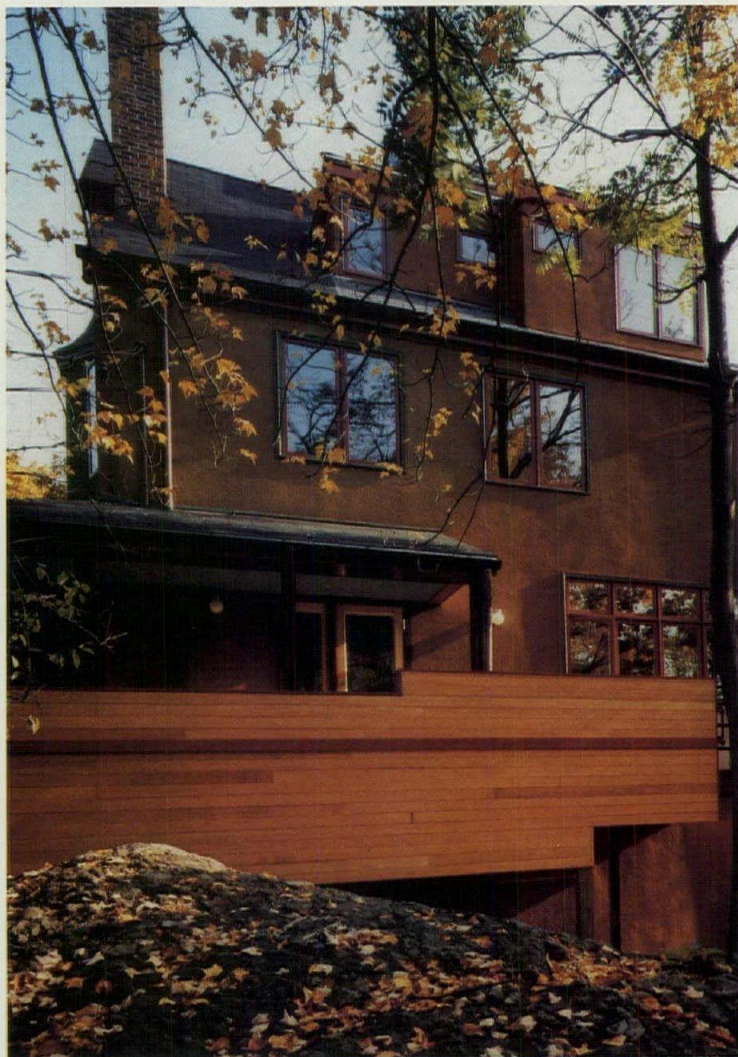
The buildings must also respond to changes in patient treatment. "Some of the facilities spend a lot of time with one-on-one treatment, while others emphasize group therapy," Sawyer says. "These are subtle differences in the programmatic requirements, but the buildings must be able to respond to these different treatment approaches." Both chemical dependency and mental health facilities have requirements for indoor/outdoor spaces and more outdoor recreational areas. "In many of the facilities we have designed, the physical rehabilitation is as important as the medical or emotional treatment," he says.

Ronald L. Skaggs, FAIA, of Harwood K. Smith & Partners predicts that there will be a continuation of emphasis on designing for the consumer of health care related facilities rather than for the board, physicians, or the administration. "As health care architects, we have emphasized functional design. That is expected of us—like knowing your ABCs—you must know how to design functional buildings. Today, clients are looking for creative responses to user needs," Skaggs said.

Summarizing many of the problems in designing for special populations, Dr. Lorraine Haitt, a psychologist and gerontologist, wrote: "Environments cue behavior and signal the expectations of occupants or users. Too often, the environments inhabited by older people [as well as other disabled persons] communicate images of disability and dependency, which become a self-fulfilling prophecy." □

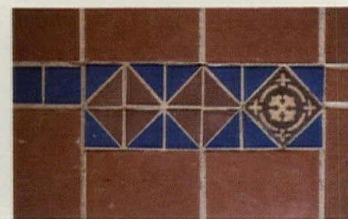
*Distinctly Homelike
Congregate Housing
For the Elderly*





The Angela Westover House, a congregate elderly housing project in Boston's Jamaica Plain neighborhood, by Jan Wampler, AIA, is out of the ordinary, especially when you consider that it was built with a \$677,000 HUD grant as Section 8 housing, yet is more like a real home than an institution. Wampler's client, the Neighborhood Development Corporation of Jamaica Plain, sought to provide housing for local, elderly residents that would be an alternative to the typical nursing home setting. The idea of a congregate program, where a dozen residents have private, separate rooms and share bathrooms, kitchen, dining, and convivial spaces, intrigued Wampler, who as an architecture professor at MIT often assigns studio problems that deal with the design of communal spaces.

Wampler describes himself as a "local, family architect" whose work is found mostly in Jamaica Plain, where he lives. In designing Westover he spent a lot of time at a local elderly boarding house ("a big commune," Wampler calls it) drinking coffee, talking to the residents, and in general just watching



how they lived their lives. "The kitchen was always a hang-out," says Wampler, "so I decided to make the kitchen at Westover the very heart of the house, and make it a little awkward to get around the house without walking through the kitchen." Wampler's observations also taught him that there should be lots of cozy nooks for sitting, that each private room should be a different size (for individuality), and that the dining room should be somewhat formal, where residents could sit down at the end of the day, over a common meal, and exchange their thoughts. More than any of these requirements, however, Wampler wanted Westover to be like a big house for a big family, full of handcrafted details, not an institution that was alienating to the residents. This notion, according to the architect, caused bureaucratic consternation at HUD, which had no neat pigeonhole for such a project and bargained Wampler and his client with a paper blizzard and untold delays. "I'm still filling out forms," says Wampler.

The finished product appears well worth the wait. The core of Westover is a Victorian house that had been an abandoned nursing home, idle for a half-dozen years before NDC bought it. Wampler stabilized the old structure and added onto the back of it, virtually doubling its size. The addition surmounts the site as it drops about 30 feet, growing out of a base of poured concrete that is softened with decorative tiles in a rainbow of colors. The exterior is brown stucco that relates to the wooded site, warmed with horizontal bands of wood and fir-clad balconies and terraces. The addition is crowned by a broad hip roof with a deep, fir soffit.

At the front of Westover, a chest-height wooden wall frames a porch that reaches around the house's west side as a ramp. At the front door more delightful details—are tiles set like a stained glass window (Wampler collects tiles, and Westover is sprinkled with them, as is his own house and studio).

Once inside, one is impressed with the lightness of the interior—white walls with strips of fir molding, and occasionally soft colors, such as blue for some ceilings as to suggest the sky. The kitchen, the house's center, is an open arrangement with a tile floor that has windows to admit light and views in and out. The kitchen is the hub of activity and one expects it to be larger (in fact, one of the residents, Jim, remarked that morning finds the kitchen jammed with people, each making breakfast). Beside the kitchen is the dining room, opening to a sunny deck. More rich detailing is seen in the first floor's inlaid mahogany squares that echo tile patterns throughout the house. At the other side of the house is a large common room for conversation and television watching. The upper two floors contain private rooms for a dozen or so residents, with common balconies and bathrooms. There are lots of sitting areas throughout, cozy and intimate with wood benches and mirrors, sometimes highlighted with bits of stained glass and tile.

The residents I spoke with find Westover comfortable and homelike, supportive of the independent lives they lead outside the house. To the credit of Wampler, who helped build it as well as design it, Westover shows the care of its creators and the consideration of its residents.—MICHAEL J. CROSBIE

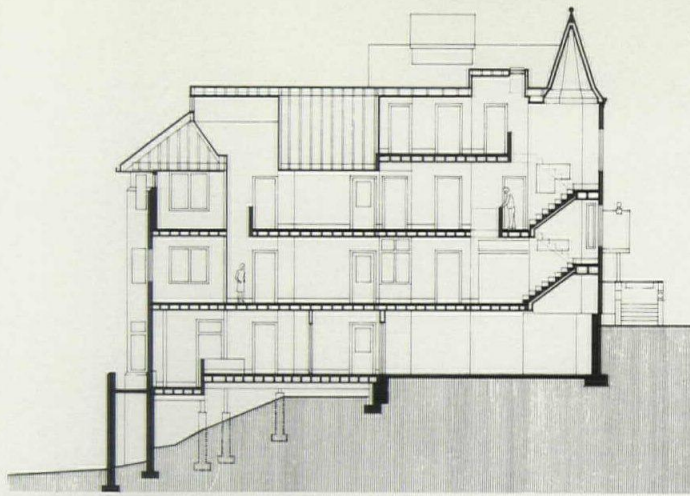
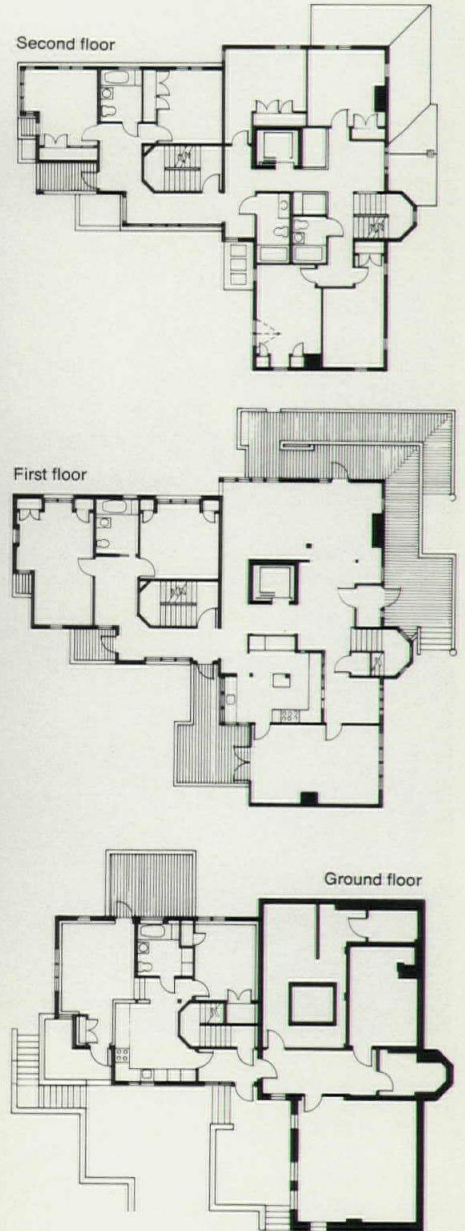


Photo on page 65 shows Westover from southeast as it commands the site. Across page, left, house from northwest, showing porch/ramp that wraps around from front; across page, top, decorative tilework, some designed by Wampler and others designed by carpenters who worked on the house, found throughout Westover. Below, view of balconies and terraces from top floor.

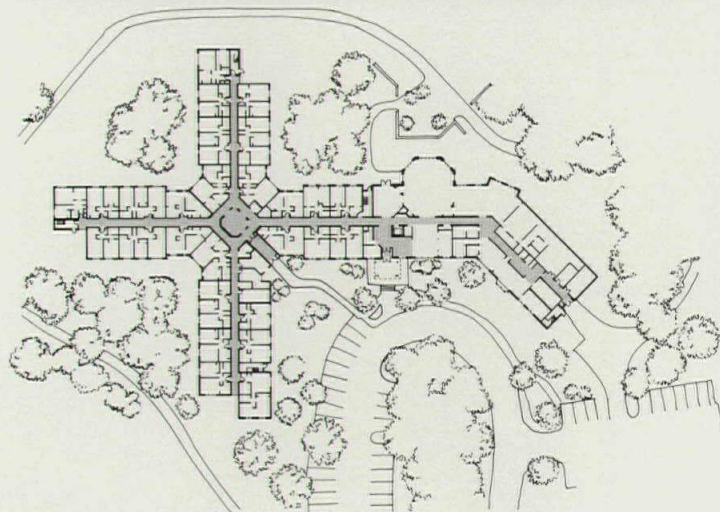


Richard Bonarrigo

*Historicism Helps
Congregate Housing
Fit Its Neighborhood*



Photographs by Hutchins Photography, Inc.





The Gables at Old Farm Forest by CBT/Childs Bertman Tseckares & Casendino Inc. is a 100-unit congregate retirement community that responds to the special needs of its elderly residents while blending with the character of its well-established residential neighborhood in Farmington, Conn.

Taking cues on the form, massing, and detailing of a nearby boarding school, the architect designed a three-story clapboard and masonry building with a heavy cornice line, ornamental trim, and residential-scale windows, dormers, and gables. The architect also provided extensive landscaping, including a manmade lake contoured around the building.

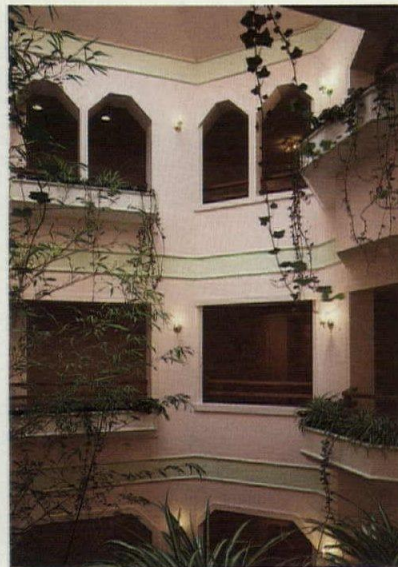
The building's cruciform plan helps to reduce the exterior massing and also serves to reduce the lengths of the interior hallways. In addition, these four wings are interrupted by skylit atriums with seating and small gardens to encourage impromptu social gatherings.

One key to designing a successful congregate living facility, says CBT principal Charles N. Tseckares, AIA, is to link important communal spaces (the elevators, mail room, dining hall) to draw the residents into activities and to create a sense of spontaneity. Recognizing the special needs of the elderly, the complex also includes a doctor's office with a small examination room, a complete laundry facility, and a hair salon.

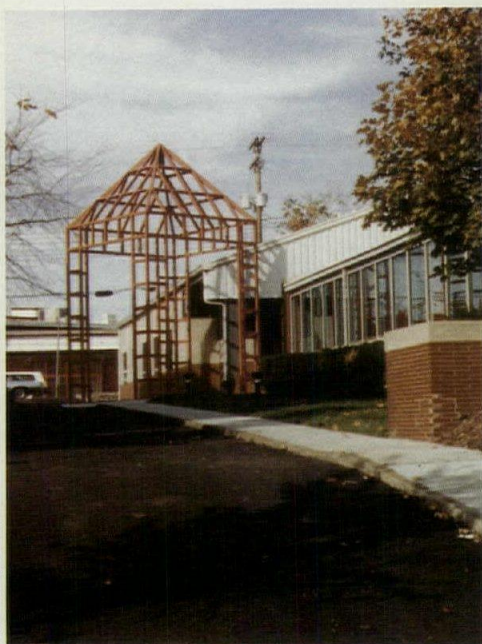
Four different apartment floor plans are available—a studio with a sleeping alcove, one-bedroom units, two-bedroom units, and gabled alcove units on the third floor—and all have full bathrooms with an emergency call system and standard kitchens that include a small breakfast nook.

To create the illusion of a front porch for each apartment, the architect recessed the doorway a few feet to provide a space for residents to place plants, flowers, or sculptures. So as you walk down the corridor, says Tseckares, "you don't see a row of doors, you see decorated 'front porches' that are evidence of the pride and positive feelings of the residents."

—LYNN NESMITH



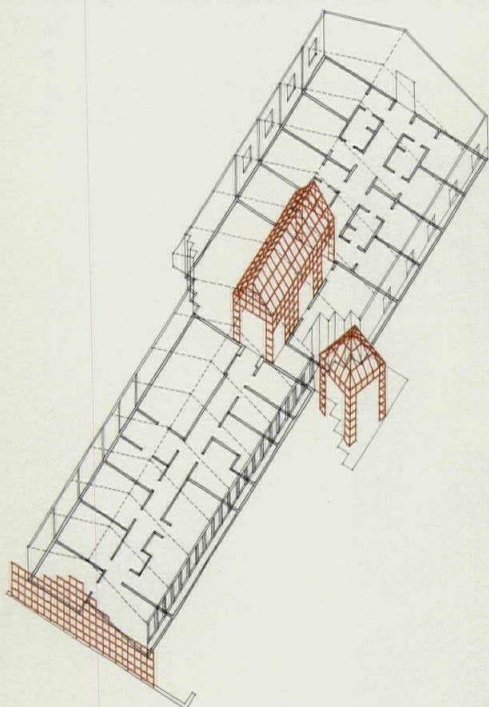
Women's Center Given Touches Of Delight and Comfort



Karl A. Backus



Paul S. DeCourt

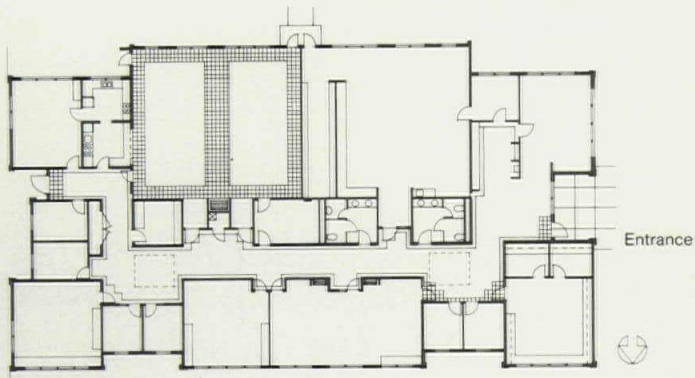


Shoe-string budgets commonly characterize homeless shelter projects. Under these circumstances, it is a formidable design challenge to provide a pleasant, inviting, comfortable environment with resources that run the gamut from simple to crude. That challenge was met skillfully in the Women's Center and Shelter of Greater Pittsburgh, designed by Bohlin Powell Larkin Cywinski of Pittsburgh and Wilkes-Barre, Pa.

The project involved the renovation of the existing prefab, aluminum-sided building. Because of the narrow site, the addition was attached to a short side of the original. It, too, is a prefab, rectangular, aluminum-sided building, but is slightly wider. In the existing building are now the offices and support functions. The new building houses eight rooms designed to contain 32 beds, the reception area, and the kitchen. The latter opens to the living room that in turn opens to the dining room, a plan meant to promote companionship among the residents.

To add delight to this straight-forward design, says Peter Q. Bohlin, FAIA, three terra-cotta colored trellises were added: one at the front facade of the old building, which was also an effort to de-emphasize the old entrance; one in the shape of a pyramid-topped pavilion to mark the new entrance; and the third inside, decorating the high-ceilinged, skylit main hall. For continuity, the trellis concept was carried through the remainder of the guests' main living area. —NORA RICHTER GREER

*Community Center
for Victims of Four
Different Disabilities*

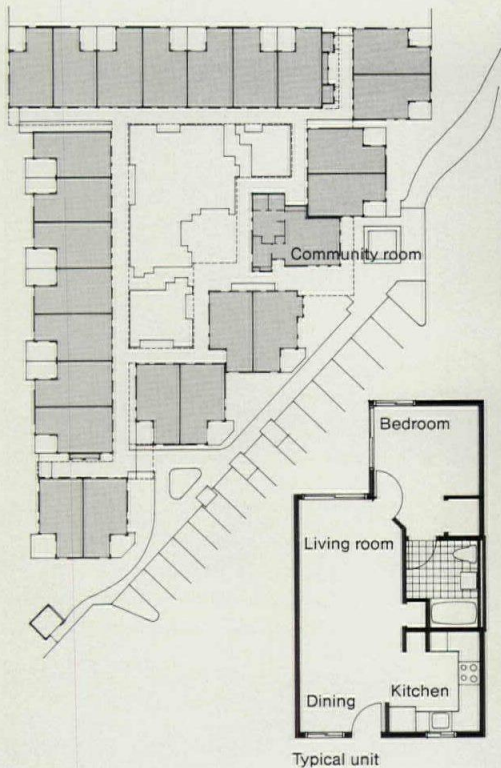


The disabled have very diverse requirements for accessibility. Resolving those conflicting needs in the Tacoma Area Center for Individuals with Disabilities in Tacoma, Wash., was often as "amorphous as an amoeba dividing and multiplying," in the words of Ilmar Reinvald, AIA. What he and his firm, Reed Reinvald Architects, Tacoma, achieved is a trim and colorful 12,000-square-foot building that meets these needs so successfully that the clients, who in the past have often been at odds with one another, are now a harmonious group.

The facility serves as a community center for persons with four types of disabilities—the blind, the deaf, the wheelchair bound; and those with multiple sclerosis; Reinvald, wherever possible, tried to accommodate more than one group's needs. For example, flush curbing would give easier access for wheelchairs but would be a hindrance for the blind who rely on curbs for orientation. In the end, a flush sidewalk with a textured concrete strip was chosen. Special lighting was included to aid the blind: Skylights were placed at assembly points to help the partially blind (these skylights are lit from the exterior to simulate daylight at night), as well as vertical light strips placed next to doors. Textured paving announces the entrances to the rooms for the blind and are found in the multi-purpose rooms. Rooms for the deaf and the blind were placed on the north side of the building in an effort to reduce glare.—N.R.G.



Courtyard Housing Sensitively Designed For the Disabled



Sally Painter



Sally Painter



Camino Alto Court in Mill Valley, Calif., by the San Francisco firm Kaplan/McLaughlin/Diaz, is a rarity: a residential complex designed specifically for adults with a variety of disabilities. Built with HUD assistance, it consists of 24 one-bedroom apartments of 540 square feet each in a single-story, pleasantly houselike building ringing a central court, plus a multi-purpose community center. These are architects with a bent toward basing design on user need, so there was extensive early consultation with potential residents as well as sponsors and neighbors.

Some of the results: No steps anywhere; wider than usual doorways; higher electrical outlets; lower light switches and thermostats; deep bedroom closets with double rods easily reached from wheelchair level.

Kitchens have sinks and stovetop counters that can be raised or lowered by eight inches. There are no cabinets under the sink or stove so that wheelchairs can be pulled up immediately against them. The oven opens sideways. Bathrooms have either roll-in showers or bathtubs, tilt-down mirrors, and lowered sinks and cabinets.

The site, only 34,000 square feet, was chosen for adjacency to shopping, services, and transportation. In sum, everything possible was done to encourage residents' mobility, without apparent loss of architectural quality.

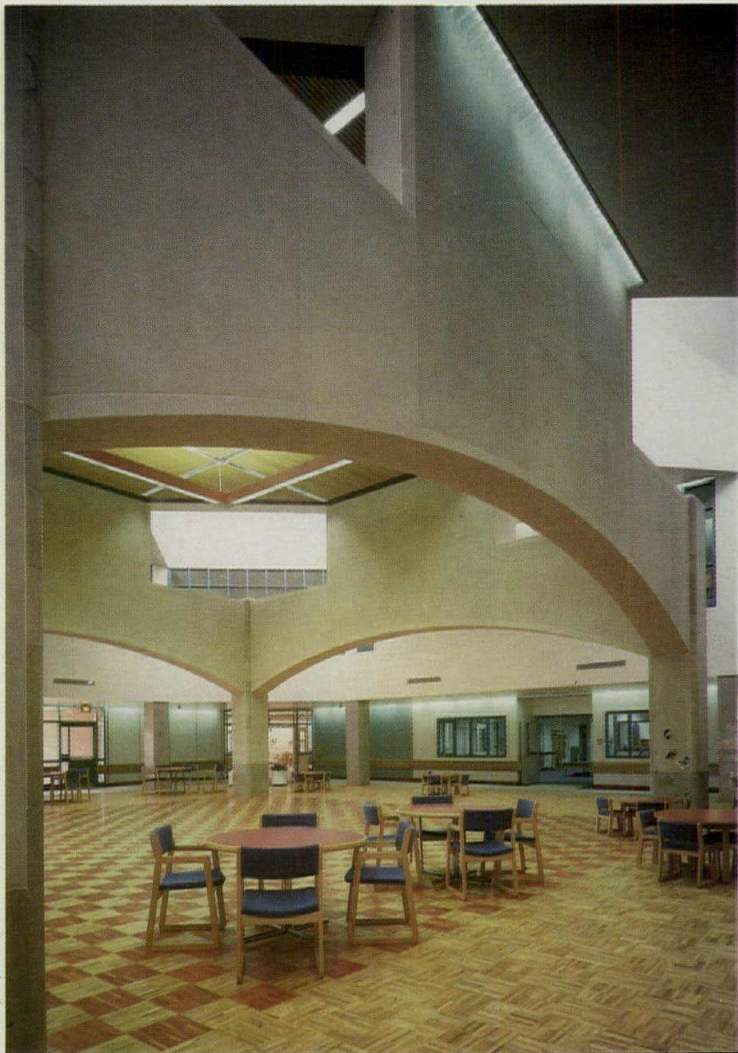
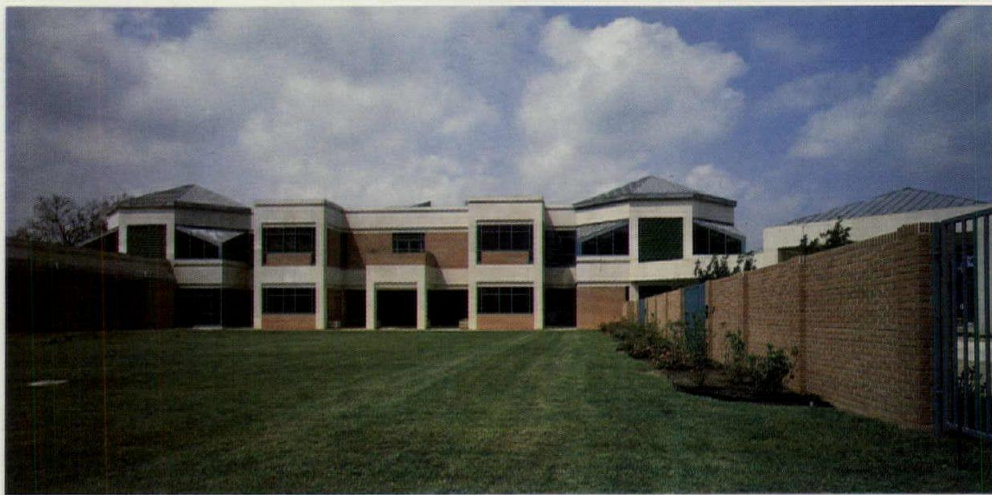
Sponsor of the development was Catholic Social Services of Marin County. Project architect was Paul Barnhart, and landscape architect was Royston Hanamoto Alley & Abey.

—DONALD CANTY, HON.AIA

Above, stepped elevations give illusion of a house cluster. Right, caring designed kitchen. Across page, units ring court.



*'A Proper Facility' for
Children for Whom
Hospital Can Be a
Second Home*



Photographs by Marvin Rand

The patients in this Shreveport, La., hospital are children and adolescents with birth defects, diseases, or injuries to their bones, joints, muscles, etc. Except for these frequently serious orthopedic problems, most are vigorous and otherwise healthy; importantly, their length of stay could add up to weeks, which can seem an eternity to any young person away from home. With this paramount in mind, the architects, SOMDAL Associates of Shreveport and Bobrow/Thomas & Associates of Los Angeles, sought to make the hospital's ample spaces as cheerful as possible.

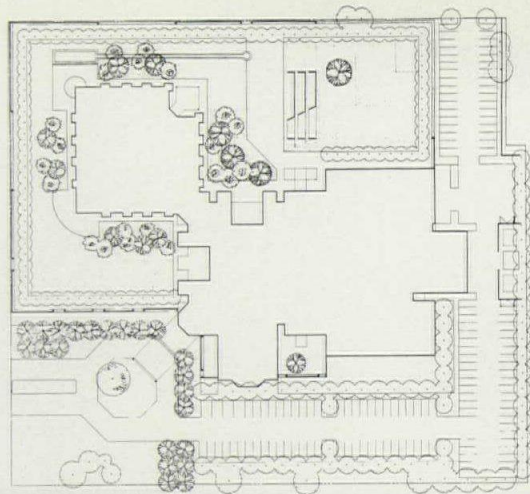
The client was the Ancient Arabic Order of the Nobles of the Mystic Shrine, better known as the Shriners. In 21 North American hospitals (plus one in Hawaii) they annually provide free surgery, inpatient and outpatient therapy, braces, and prostheses to some 17,000 young people.

This medical philanthropy began in 1922 in Shreveport, and the new hospital replaces the original. The Shriners wanted something residential in scale, the antithesis of the modern-

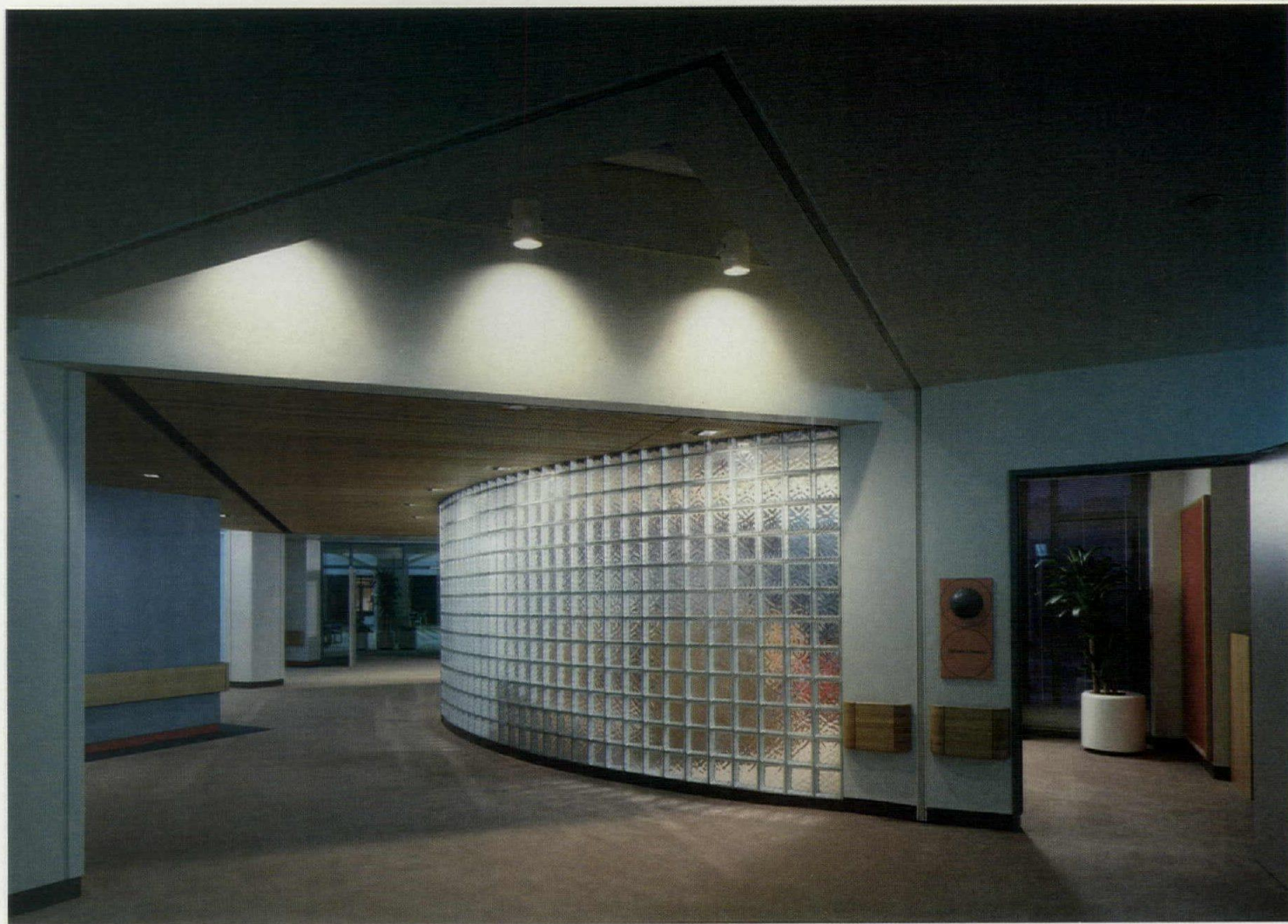
ist, institutional high-rise hospital that neighbors their seven-acre site 10 blocks south of downtown. They also rejected incorporating parts of their old building, which included two Old South, white-columned pavilions. As Erich Burkhart, AIA, of Bobrow/Thomas puts it, "Everybody thinks of the Shriners as guys riding around in a parade with funny hats on. In fact, they are doing some of the most innovative work in orthopedic surgery for children in the country. They wanted a completely new facility to help project that image."

The hospital's exterior walls of brick, sandstone, and glass are subdued and pleasantly modulated. The plan centers on a double-height space used for school, meals, and exercise, a big room defined by a four-footed, limestone-faced structure with broad arches. Corner cutouts in the structure provide views down from second-story corridors.

Interior colors tend to be bright but not primary, a scheme that seems appropriate to the patients' broad age span from infancy to 18. Signs are also bright—and delightful. The archi-



Interior photos, from far left: the central activity space with its four-footed, arched structure; typical skylit corridor with carpet strip and cove lighting on one side; the patients library with glass block wall and round symbol next to door; and, bottom of this page, a typical patient room with quilts made and donated by Shriners' wives.



itects thought up a great number of round objects that young people know well—like doughnuts and pizzas, Frisbees and baseballs—and placed round symbols at child's-eye-height to identify hospital departments. As Patricia Ford, formerly of Bobrow/Thomas (now with her own firm), puts it, "The symbols give children—even those who can't read—a measure of dignity because they can find their way without a nurse, and a sense of security because they can more easily remember where they've been."

Perhaps the most exceptional aspect of the hospital was the client's insistence on quality. Today, when corporations intentionally build hospitals with mere 10-year life expectancies and then take tax write-offs, the Shriners took another approach. Says Burkhart, "We had a budget target, but repeatedly when we met with them to discuss the quality of finishes or adding this or that system to the building, they increased the budget. At every turn, they elected to build a proper facility."

—ALLEN FREEMAN



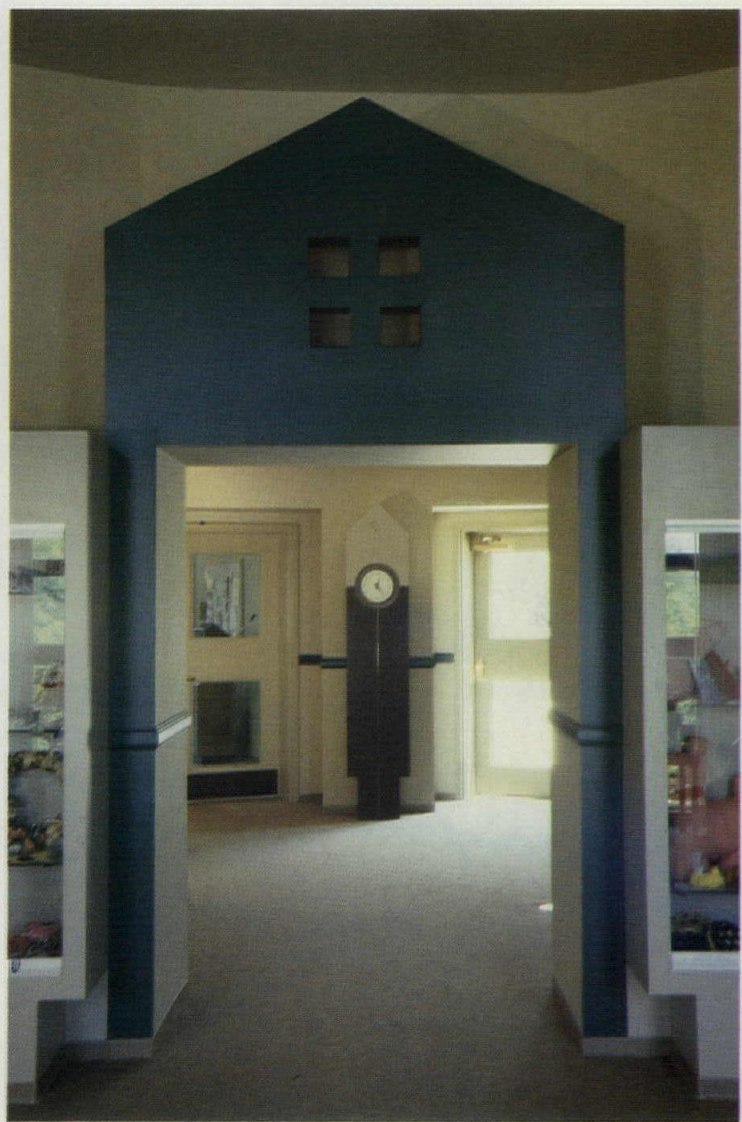
*Cheerfully Changing
Set of Shapes Adorns
A Senior Center*



Located on a 2.1-acre site in Wheeling, Ill., the Pavilion is a place for senior citizens to gather that is residential in scale and in ambiance. At the same time, it is a building that on the exterior is never static but changes from vantage point to vantage point, from formal to informal.

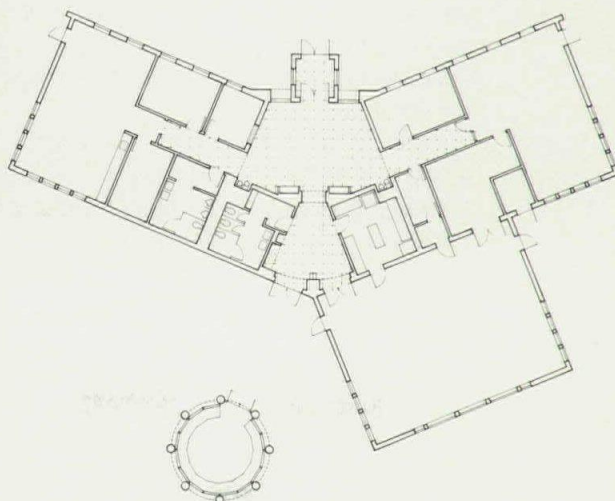
Designed by Roy Solfisburg, FAIA, of Holabird & Root, Chicago, the 6,890-square-foot Wheeling Senior Center is adjacent to the ambulatory care facility of a large hospital and a mid-rise senior citizens' residence. A network of pedestrian walkways links three structures and winds through a common landscaped area containing a small retention lake. Facing the lake is the new center's informal side, with its conical-shaped, detached 475-square-foot screened-in porch. While the rear seems a collage of elements, the front is more formal, with a clearly defined entrance that is flanked on each side by symmetrical wings that slant inward as they move away from the entrance.

The building's heart is the lobby from which all the activity rooms radiate. It serves as a prefunction area to the multipurpose



room and provides direct access to the screened-in porch. The two wings, seen symmetrically from the front, are set diagonally off this lobby; at the ends of these two slanted wings and accessible down a short hallway from the lobby are the recreation room and the arts and crafts room. Against one wing in the rear is a smaller rectangle, housing the multipurpose room. The large rooms can be divided by moveable partitions. Other spaces include offices, a library, and a kitchen. The use of moldings, residential windows, and other small-scale elements help create the center's home-like ambiance.

From the rear, Solfisburg created a collage by varying the height of various sections of the building, by painting the facade two different colors, and by breaking the symmetry of the wings by placing the third wing off center. Solfisburg calls the composition "both spontaneous and ordered, changing continually with the vantage point of the viewer." The conical gazebo is meant to anchor the composition. It is, by far, the favorite place of repose on a warm summer afternoon. —NORA RICHTER GREER





Only
one other face
can be linked
to a team as
good as ours.

Vince Lombardi was more than a football coach. He was a living legend. An inspiration to all those who played for him. And against him.

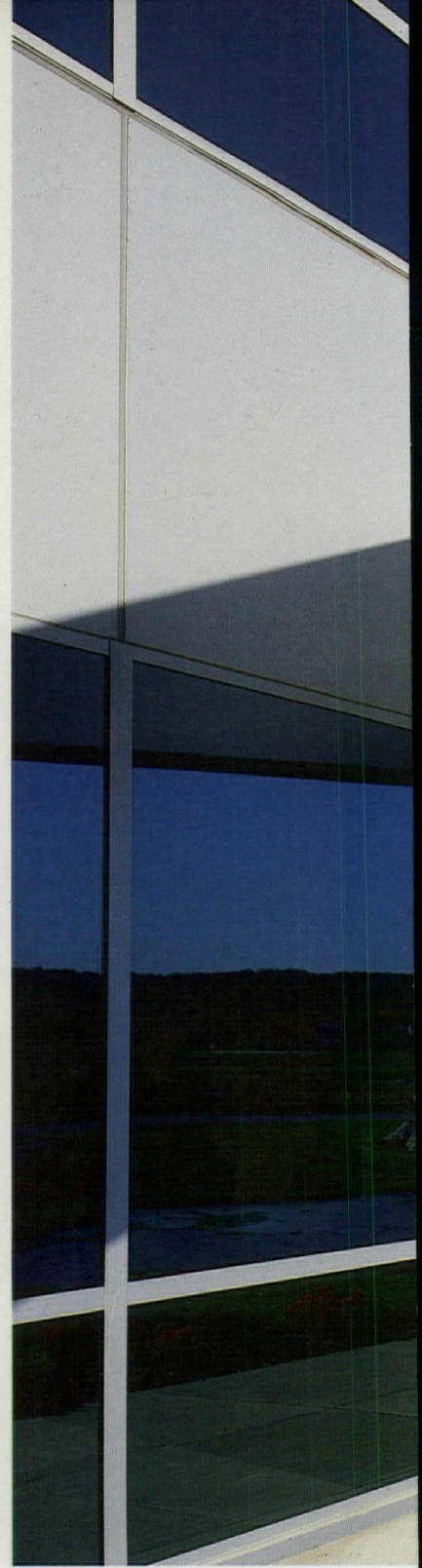
We have the same drive that made Lombardi the very best.

It can be felt through Team Alucobond, a nationwide group of distributors and employees. Dedicated professionals who know their product and know how to get your materials on site. On time.

What's more, you can be sure our distributors will keep the installation of your materials on schedule. And at a price that's less than you'd expect to pay.

Our same drive for excellence can be seen in the products we create. Such as Alucobond® material, the innovative building face that's changing the face of modern commercial architecture.

Made with two tough sheets of aluminum with a thermoplastic core, Alucobond material is





*Valley Stream Corporate Center
Malvern, Pennsylvania
Architect: F. Daniel
Malvern, Pennsylvania
Distributor: Fred Boschan Co.
Philadelphia, Pennsylvania*

virtually flat and doesn't oil-can. Yet it's flexible enough to be formed or molded to the most exacting specifications. It's also versatile and practical enough to be used in exterior or interior applications as well as retrofit projects or commercial signage.

62 colors including four anodized finishes, lengths up to 28 feet, plus three standard thicknesses and two widths add to the diversity.

For more information about Alucobond material and for the name of your nearest Team Alucobond distributor, call (314) 851-2346. Or write: Alucobond Technologies, Incorporated, 11960 Westline Industrial Drive, St. Louis, Missouri 63146.

Put our quality material and spirited team to work for you.



TEAM ALUCOBOND®

MATERIAL

More than just a pretty face.

Circle 17 on information card

LCN EQUALIZER® MAKES HEAVY BRONZE DOORS SURPRISINGLY EASY TO OPEN



Humana Building, Louisville, KY; Michael Graves, Architect, Princeton, NJ.

Stately bronze doors contribute importantly to the classic elegance of the main entrance at Humana's corporate headquarters. The closers which control these doors help to make them as functionally practical as they are aesthetically impressive.

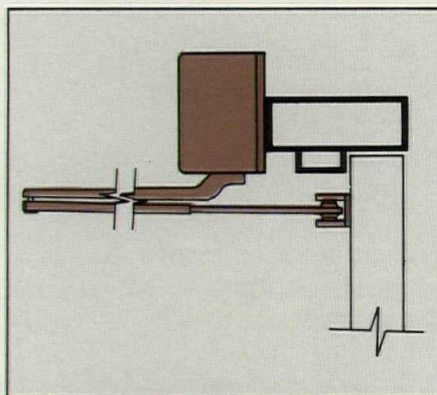
The closers, LCN 6920 Self-Actuated Equalizers, do an outstanding job of making the building

accessible to everyone, including people who are handicapped. The reason is a pneumatic power assist feature that goes into effect automatically with just a slight movement of the door. This feature can reduce the opening force by as much as 75% — to meet opening force requirements of architectural barrier free codes — without sacrificing

closing power. They perform dependably all year around and all through the day, including peak traffic periods.

For complete information, see Sweet's Section 8. Or, in U.S.A., contact LCN Closers, P.O. Box 100, Princeton, IL 61356; (815) 875-3311.

In Canada, Ingersoll-Rand Door Hardware, Mississauga, Ontario LE5-1E4; (416) 278-6128.



LCN CLOSERS

Part of worldwide Ingersoll-Rand

Circle 18 on information card

Technology & Practice

Good design is certainly a prerequisite of good architecture—but it is unfortunately no guarantee. The best among us have experienced breakdowns along the road from schematics to building occupancy, breakdowns that lead to compromised quality, delays, errors, and (this is no surprise) lawsuits.

This month's Technology and Practice material travels that arduous route through design development, working drawings, specifications, and construction, by means of a group of stories we developed under the working theme "Getting Buildings Built Right." We've flagged the four tasks where architects are most likely to encounter problems: coordinating the work of various disciplines in the contract documents, maintaining critical specifications, reviewing the plans of contractors and subs (as evidenced in their shop drawings), and adequately "administering" construction work at the job site.

Two generalizations emerge. The first is that construction problems usually arise not because of one individual's mistake but because of a communications failure between individuals. In other words, it's the things that fall between the cracks that we've got to watch for. Coordination checklists (like the one related to working drawings that you'll find on page 83) can help in this regard.

The other truism is that there will be fewer mistakes to check for and correct if all of the parties in the construction process can agree, up front, on respective roles and responsibilities. How to do this has been the subject of much debate these last few months, especially as the details of the Kansas City Hyatt disaster are revealed. Our colleagues at the professional engineering societies hope to solve the problem by defining, for all projects, areas where each discipline should have authority. Our material reveals the problem with that approach: No two jobs are alike. We think it's better to make the defining of roles and responsibilities a specific part of the contract discussions for each project. Not only does this ensure that the plans accord with project realities, but it also helps focus all players on the problems of interdisciplinary coordination early, before a good design turns into a bad building.—MITCHELL B. ROUDA

Contract Documents: A Quality Control Guide

Checklist pinpoints interdisciplinary coordination errors.

By William T. Nigro

Are you tired of negotiating needless change orders and time extensions? Are your A/E liability insurance premiums steadily increasing as a result of change orders? Errors and omissions typically account for 50 percent of all change orders, with the rest due to unforeseen or differing site conditions and changes in user requirements. Such errors and omissions can be greatly reduced through the use of Redicheck, a simple interdisciplinary coordination checklist and overlay checking process.

Redicheck is a structured review system consisting of procedural instructions and a checklist that address the source of most design errors and omissions—the point of interface between one discipline and another. The U.S. Navy first put Redicheck to use in 1982 at the office in charge of construction, Trident Naval Submarine Base, Kings Bay, Ga. Since employing Redicheck, the office has experienced a large reduction in construction change orders and a corresponding construction percentage cost decrease (see chart, right).

The checklist is based on sequence of construction. In a typical construction contract the contractor will work from the civil engineering drawings first, structural drawings second, underground utilities third, electrical and mechanical drawings fourth, and the architectural drawings last. Even though the architect is the project manager, he or she cannot assume that other discipline drawings have been coordinated with architectural drawings. And, if the architectural drawings have not been coordinated with the work of the other disciplines, very expensive redesign and/or change orders can result.

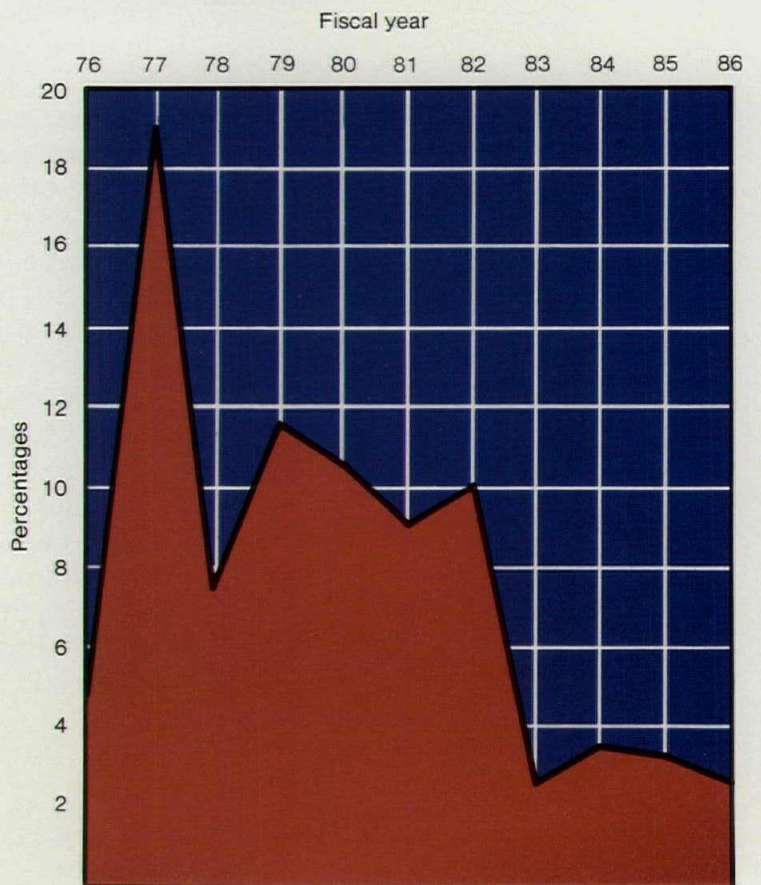
Redicheck is not a safeguard against technical problems and should not replace or be confused with single discipline technical reviews. Single discipline reviews are essential for assuring things like the adequacy of structural members and design calculations for HVAC equipment. Also, Redicheck is not meant to eliminate other types of reviews that should occur on most projects such as code, value engineering, scope, and constructability reviews.

Projects most suited for this type of review are multi-discipline vertical construction projects on which architects tend to lead. A Redicheck review will have a higher payoff on a hospital project the incorporates the work of seven or eight disci-

plines than on an airport runway extension with only two disciplines involved.

The Redicheck system is ideal for finding these types of coordination errors:

- Structural drawings with column locations and grid lines that vary with architectural drawings.
- Architectural floor plans that do not match other discipline floor plans.
- Architectural reflected ceiling plans that do not match light fixtures on electrical drawings or ceiling grilles/registers on mechanical drawings.
- Electrical drawings that indicate items of equipment with different horsepower ratings, voltages, and phases than mechanical drawings and/or specifications.
- Mechanical drawings that read “see structural drawings for additional roof supports” while the structural drawings do not indicate such supports.



Mr. Nigro, originator of the Redicheck system, is a registered architect retired from the Civil Engineer Corps of the United States Navy where he was course director for design contract management. Currently a quality assurance consultant, Nigro is preparing an expanded Redicheck resource manual that will be available shortly through AIA.

Redicheck® Plan and Specification Review

1. Preliminary Review

- a) Quickly make an overview of all sheets spending no more than one minute per sheet to become familiar with the project.

2. Specification Check

- a) Check specs for bid items. Are they coordinated with the drawings?
- b) Check specs for phasing of construction. Are the phases clear?
- c) Compare architectural finish schedule to specification index. Ensure all finish materials are specified.
- d) Check major items of equipment and verify that they are coordinated with contract drawings. Pay particular attention to horsepower ratings and voltage requirements.
- e) Verify that items specified "as indicated" or "where indicated" are in fact indicated on contract drawings.
- f) Verify that cross-referenced specification sections exist.
- g) Try not to indicate thickness of materials or quantities of materials in specifications.

3. Plan Check Civil

- a) Verify that site plans with new underground utilities (power, telephone, water, sewer, gas, storm drainage, fuel lines, grease traps, fuel tanks) have been checked for interferences.
- b) Verify that existing telephone poles, pole guys, street signs, drainage inlets, valve boxes, manhole castings, etc., do not interfere with new driveways, sidewalks, or other site improvements on architectural site plans.
- c) Verify that limits of clearing, grading, sodding, grass, or mulch are shown and are consistent with architectural or landscaping plans.
- d) Verify fire hydrant and street light pole locations against electrical and architectural.
- e) Verify that profile sheets show other underground utilities and avoid conflicts.
- f) Verify that horizontal distances between drainage structures and manholes match with respect to scaled dimensions and stated dimensions on both plan and profile sheets.
- g) Verify that provisions have been included for adjusting valve box and manhole castings (sewer, power, telephone, drainage) to match final or finish grade of pavement, swales, or sidewalks.
- h) Verify that all existing and proposed grades are shown.

4. Plan Check Structural

- a) Verify column lines on structural and architectural.
- b) Verify that all column locations are same on structural and architectural.
- c) Verify that perimeter slab on structural matches architectural.

- d) Verify that all depressed or raised slabs are indicated.
- e) Verify slab elevations against architectural.
- f) Verify that all foundation piers are identified.
- g) Verify that all foundation beams are identified.
- h) Verify roof framing plan column lines and columns against foundation plan column lines and columns.
- i) Verify perimeter roof line against architectural roof plan.
- j) Verify that all columns and beams are listed in column and beam schedules.
- k) Verify length of all columns in column schedule.
- l) Verify that all sections are properly labeled.
- m) Verify all expansion joint locations against architectural.
- n) Verify dimensions.
- o) Verify that drawing notes do not conflict with specifications.

5. Plan Check Architectural

- a) Verify property line dimensions on site survey plan against architecture.
- b) Verify that building is located behind setback lines.
- c) Verify all concrete columns and walls against structural.
- d) Verify on site plans that all existing and new work is clearly identified.
- e) Verify building elevations against floor plans. Check in particular roof lines, window and door openings, and expansion joints.
- f) Verify building sections against elevations and plans. Check roof lines, windows, and door locations.
- g) Verify wall sections against architectural building sections and structural.
- h) Verify masonry openings for windows and doors.
- i) Verify expansion joints through building.
- j) Verify partial floor plans against small scale floor plans.
- k) Verify reflected ceiling plan against architectural floor plan to ensure no variance with rooms. Check ceiling materials against finish schedule, check light fixture layout against electrical, check ceiling diffusers/registers against mechanical, check all soffits and locations of vents.
- l) Verify all room finish schedule information including room numbers, names of rooms, finishes, and ceiling heights. Look for omissions, duplications, and inconsistencies.
- m) Verify all door schedule information including sizes, types, labels, etc. Look for omissions, duplications, and inconsistencies.
- n) Verify all rated walls.
- o) Verify all cabinets will fit.
- p) Verify dimensions.

6. Plan Check Mechanical and Plumbing

- a) Verify that all new electrical, gas, water, sewer, etc., lines connect to existing.

- b) Verify all plumbing fixture locations against architectural. Verify all plumbing fixtures against fixture schedule and/or specs.
- c) Verify storm drain system against architectural roof plan. Verify that pipes are sized and all drains are connected and do not interfere with foundations. Verify that wall chases are provided on architectural to conceal vertical piping.
- d) Verify that sanitary drain system pipes are sized and all fixtures are connected.
- e) Verify HVAC floor plans against architectural.
- f) Verify sprinkler heads in all rooms.
- g) Verify that all sections are identical to architectural/structural.
- h) Verify that adequate ceiling height exists at worst case duct intersection.
- i) Verify that all structural supports required for mechanical equipment are indicated on structural drawings.
- j) Verify that dampers are indicated at smoke and fire walls.
- k) Verify diffusers against architectural reflected ceiling plan.
- l) Verify that all roof penetrations (ducts, fans, etc.) are indicated on roof plans.
- m) Verify all ductwork is sized.
- n) Verify all notes.
- o) Verify all airconditioning units, heaters, and exhaust fans against architectural roof plans and mechanical schedules.
- p) Verify that all mechanical equipment will fit in spaces allocated.

7. Plan Check Electrical

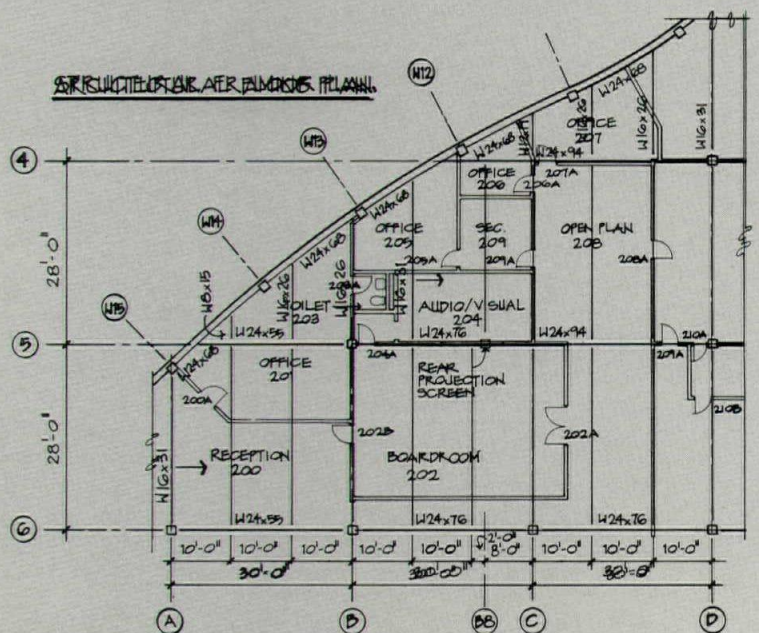
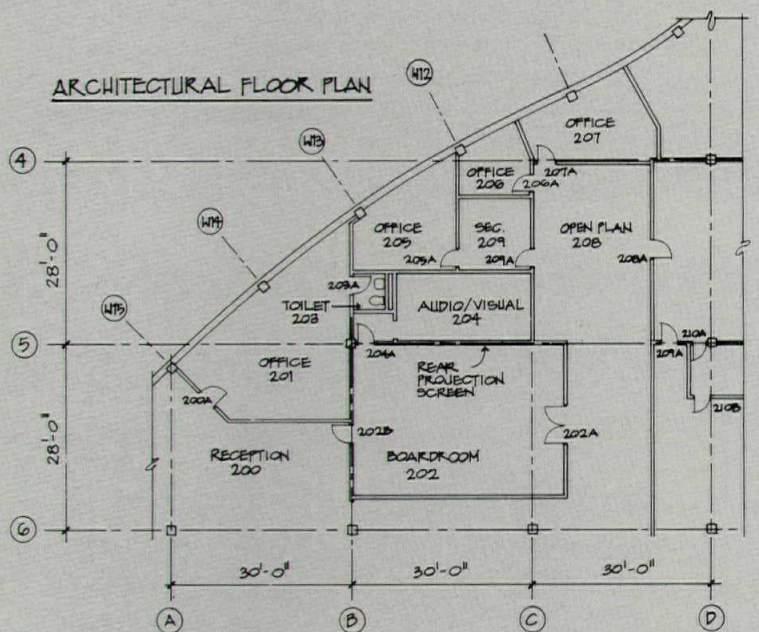
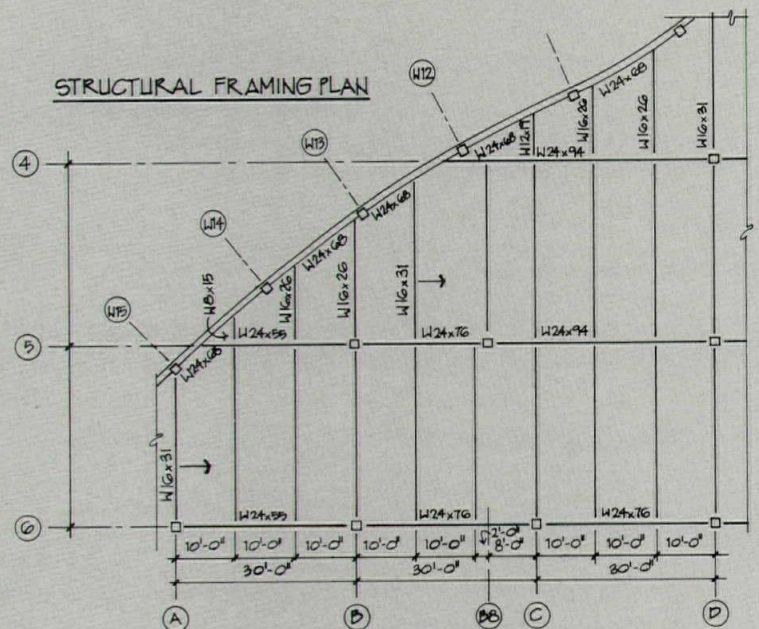
- a) Verify that all plans are identical to architectural.
- b) Verify all light fixtures against architectural reflected ceiling plan.
- c) Verify that all major pieces of equipment have electrical connections.
- d) Verify location of all panel boards and that they are indicated on the electrical riser diagram.
- e) Verify all notes.
- f) Verify that there is sufficient space for all electrical panels to fit.
- g) Verify that electrical panels are not recessed in fire walls.
- h) Verify that electrical equipment locations are coordinated with site paving and grading.

8. Plan Check Kitchen/Dietary

- a) Verify equipment layout against architectural plans.
- b) Verify that all equipment is connected to utility systems.

© 1986 William T. Nigro

In this example, no discrepancy is immediately evident in the separately developed structural and architectural plans for an office building. Overlaying the two drawings reveals a column that will fall in the center of a rear projection screen. The Redicheck reviewer notes this error without offering a solution; the necessary corrections are left to the project architects.



Checking between disciplines is not magic; it's an acquired skill. The more you do it the better you get. Many architects and engineers do not devote enough time to a final coordination review. Those who know how to coordinate documents tend to be very experienced and, ironically, are often thought to be too valuable for such work. Result: The least experienced person in an office makes the final coordination review, frequently without any training at all. The Redicheck system is straightforward and structured enough that even relatively inexperienced design professionals can immediately uncover potentially disastrous discrepancies.

Sometimes due to poor scheduling, designers wait until the last minute to consolidate drawings from other disciplines. The result is that all too often no coordination reviews occur at all. For success, schedule Redicheck as a "dedicated" review period that will occur prior to advertising the project for bid. It is better to hold off advertising and push back the bid opening for a few days or weeks than to award a construction contract full of coordination errors that will cause weeks or months of construction delay.

Keep the number of Redicheck reviewers to an absolute minimum. Normally one person can handle projects up to \$8 million and accomplish the review within six working days. Those who have worked on the documents should not be involved with the final coordination review. It is best to have someone with "fresh eyes" without preconceived knowledge of the intent of the documents perform the Redicheck review. To be most effective it must be scheduled at the 100 percent design stage.

Performing the Redicheck review

If you do not have a CADD system that will allow overlays, begin the Redicheck review by working with prints, not originals, and make sure the staples or post pins have been removed from the set of drawings. The use of a light table is recommended. If you do not have a light table, tape the drawings to a window and in a short time you can compare overlays.

The checklist consists of directions such as: "structural plan check Item 4b—verify that all column locations are same on structural and architectural." Procedural instructions include the use of CADD or a light table for overlays, yellow highlighter pens for marking items that have been checked correct, and red pens for marking and noting incorrect items. In the case of Item 4b listed above, the checker would overlay appropriate structural and architectural drawings, locate each column, and highlight them in yellow on both sheets if they indicate the same location or, if the locations do not match, circle each column in red and write a note on the architectural sheet, "column location at variance with sheet S-4" and also write a similar note on the structural sheet, "column location at variance with sheet A-7."

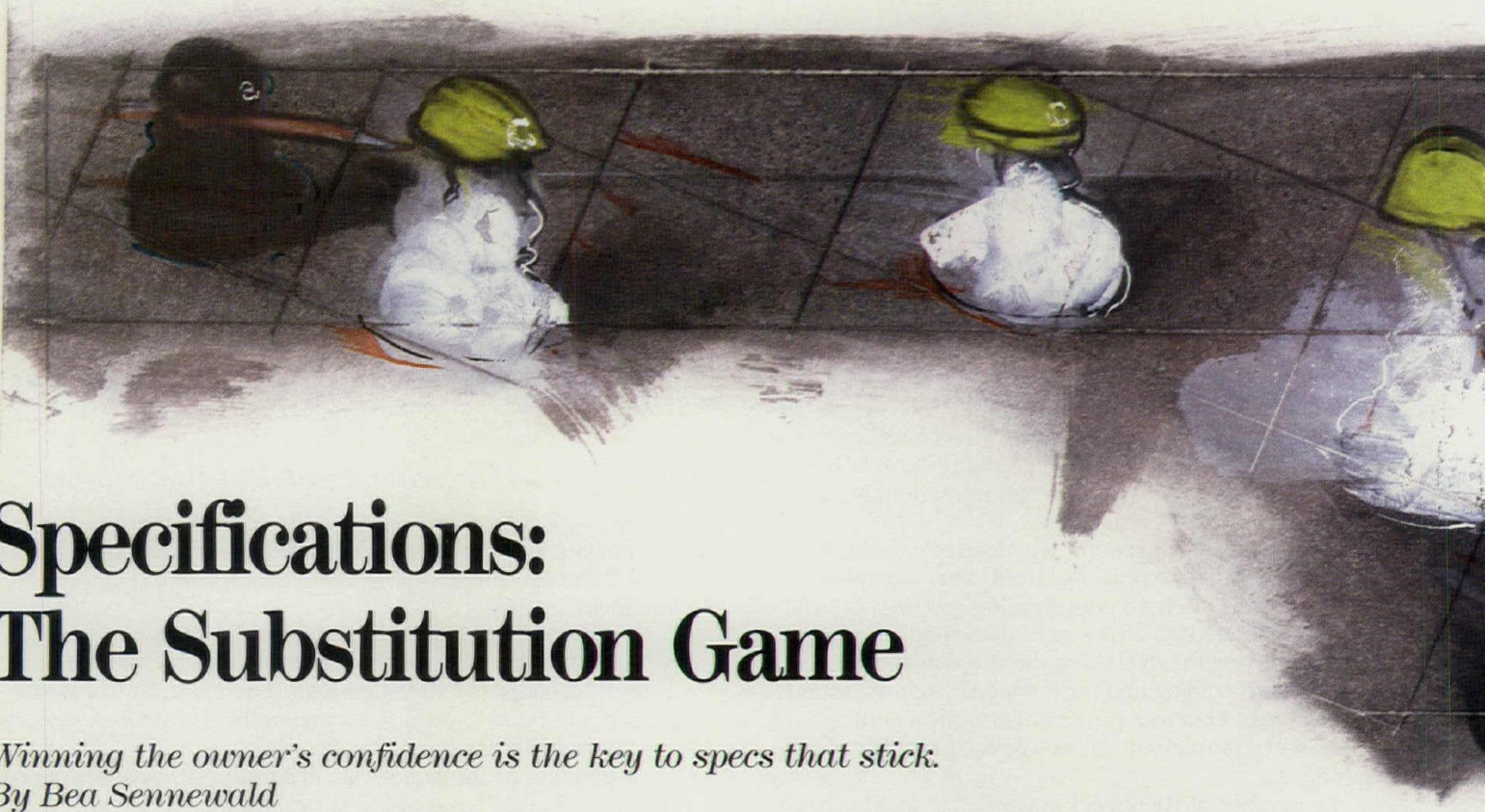
In an \$8 million project with 80 drawings, five coordination errors per sheet, or a total of 400 coordination errors, are typically found. Plan on spending 45 minutes per sheet in an average project. This may seem like a lot of time, but it is well worth the effort. The time required is reminiscent of an oil filter commercial on television where the garage owner says, "Pay me now, or pay me later." If there is time to make corrections later in an extreme situation during construction, it certainly makes sense that there is likewise time to do it right the first go-around during design.

One word of caution: An independent Redicheck reviewer should not provide direction as to how to correct an item. In the Item 4b coordination error example above, no attempt was made to state the correct column location. Instead problems were noted and left for the designer to decide which column location is correct and what revisions to drawings are necessary.

Concepts to improve contract documents

To facilitate Redicheck reviews and to avoid at the onset some of the most common coordination errors found in contract documents, adhere to the following production and review guidelines:

- Each architect or engineer should use the portion of the checklist that pertains to his/her discipline as he/she prepares contract drawings and specifications. The principles of Redicheck should be used during the preparation of plans and specifications, not just as a final check.
- Draw all plans at the same scale. The use of overlays is impossible with different scale plans. A project that is easy to check will likely have less coordination errors.
- Show the right information the least number of times—preferable only once. If there is a design change, it is much easier to change the item once. If the item is cross-referenced 15 times, it is very likely that when a design change occurs the item will be corrected 14 out of the 15 times—and the one that is missed will be a change order. A good example of what to avoid is repeating dimensions on large scale plans that already exist on small scale plans.
- Keep the same orientation on all plans. Keep the north arrow in the same direction at all times. It is very confusing to have different orientations on different sheets drawn by different disciplines.
- Use consistent terminology between plans and specs. If the specifications call an item "fabric panels," the drawings should not identify the same item as "fabric-wrapped tack panels," "fabric-wrapped acoustical panels," "fabric-wrapped wall panels," or "solid core, wood-fabric-wrapped sliding panels." Consistent terminology will avoid misunderstandings and claims.
- Avoid notes such as "see architectural" or "see structural." Always refer to a specific detail and sheet. These types of notes are generally made when one designer assumes another discipline will provide a detail. Very often that detail does not exist. Avoid this pitfall by insisting that all details be cross-referenced to a specific detail number and sheet.
- If possible avoid match-lines. Plans that are split into portions are difficult to read and check. Numerous design errors have been caused by match-lines that did not line up properly. If due to the size of the project match-lines have to be used then make sure all disciplines use the same match-lines.
- Show all wall sections at relative elevations to each other on the same sheet. This is easily done by drawing continuous horizontal reference lines across drawings that contain the sections.
- Avoid the word "new." All work on the contract drawings is either "existing" or understood to be "new." When the word "new" is inserted in a detail it now creates the possibility of misunderstandings and claims. If a note has some items identified as "existing" and some items identified as "new" and some items identified as neither "existing" or "new," contractual problems can easily arise. The items that are not identified as "existing" or "new" can often be interpreted either way. □



Specifications: The Substitution Game

Winning the owner's confidence is the key to specs that stick.

By Bea Sennewald

When we were building a high rise for the elderly a few years ago, the contractor insisted on using a different window wall from the one specified. We resisted, but the owner told us to accept the substitution. The wall leaked, had to be replaced, and it all ended in a lawsuit. Ironically, we had to kick in some cash. Why? The insurance company thought it was cheaper to settle than to fight."

This story, recounted by James M. Evans, AIA, partner of Gassner, Nathan in Memphis, may be an extreme case, but it illustrates the predicament architects face on almost every job: how to deal with product substitutions.

Everyone agrees, substitutions are inconvenient. They come in the mail in giant packages five days before bid opening, when it's too late to write an addendum, and they sneak into the small print on shop drawings just waiting to be overlooked. Worse, they appear, seemingly out of nowhere, on job sites, defying harassed architects on their site visits.

Why is it so difficult to insist on the products specified for the job? Architects give a variety of reasons. Sometimes the spec is too tight. Only one manufacturer may be listed for a piece of equipment, inducing the supplier to quote a high price. Then the contractor will feel the almost irresistible temptation to substitute a different manufacturer's product line.

On other occasions the spec may be too loose. This occurs especially on public work where a government guide spec must be used. Rick Lincicome, chief architect of Ellerbe's Washington, D.C., office, remembers the construction of a large Navy hospital where the contract for the windows went to a small Florida supplier who operated out of his garage. The windows arrived out of line and out of plumb, but the spec standards were so lax that it was almost impossible to reject them.

Lincicome points to another problem that seems to occur on jobs run by construction managers. On these projects the subcontracts are often awarded at the last possible moment. When the architect rejects a substitution, the CM approaches the

Ms. Sennewald is a project manager with Henningson, Durham & Richardson in Alexandria, Va. She received her M. Arch. from the University of Oregon.

owner directly with the threat that the project will be delayed if the specified item must be supplied. "The owner gets cold feet almost every time, and even a good spec becomes completely worthless," says Lincicome.

Some firms have tackled the problem head on. "People don't substitute on us anymore," claims William A. Atwell, P.E., AIA, vice president of the West Virginia firm Alpha Associates, Inc. Alpha uses a proprietary master specification and accepts only the listed product manufacturers. Contractors may propose substitutes prior to bidding. If a substitution is accepted an addendum is written. After contract award substitutions are not allowed.

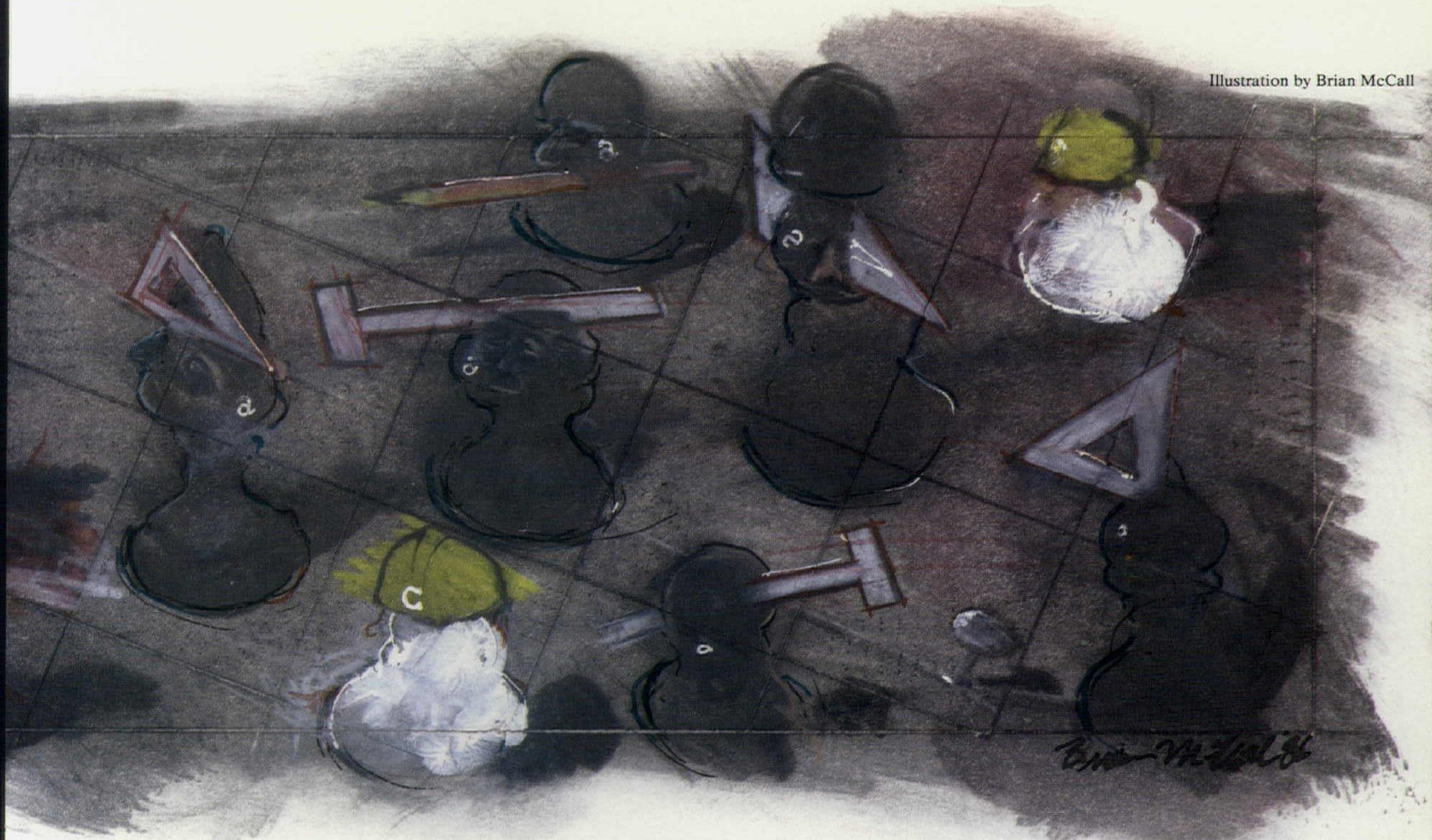
Atwell reasons that the relatively small construction market around Morgantown, W. Va., creates a special bidding and specifying climate. "In our area we have three general contractors, five electricians, and three pavers. It's an inbred situation where we all know each other."

A contractor disagrees

If you ask Jack Horn about approval of substitutions prior to bidding, he will laugh. "When I started in construction a good many years ago, we would spend three weeks writing letters to subs and suppliers and getting written quotes back. Today, my secretary and I take 60 to 80 telephone quotes on the day the bids are due. Almost no one has the time to get substitutions approved prior to bidding."

Horn, who is a vice president with Martin/Horn General Contractors in Charlottesville, Va., prefers tight specifications he can enforce. His biggest problem is getting the entire job covered. In his experience, suppliers will often quote on a spec section but leave off incidental items, like the waterproofing called out in a mechanical section. "The subs rely on the general contractor to keep them out of trouble," he says.

From a general contractor's perspective, substitutions are often justified because of cost but disliked because they cause debates and delays. Robert Wyatt, project director with construction giant CRS Sistine echoes this thought when he says:



"We prefer not to mess around and give the architect what he wants." But he cautions that bid protests always loom on the horizon, particularly on large public projects, if less than three manufacturers are named.

Contractors like to be involved before specifications are written, because they feel they are knowledgeable about constructability and pricing. "Sometimes a small change in the detail can save a lot of money," says Wyatt. Evans heartily agrees: "On a job that came in over budget the contractor told us we could save \$50,000 by deleting the bronze nosing on the stairs. We weren't even aware of this nosing, which had been specified by an inexperienced junior architect."

Looking for solutions

Even if substitutions cannot be made to disappear entirely, firms have come up with some ideas for controlling them. Most obvious is a clear procedure for approving substitutions. Alpha has adapted a four-page form from a Construction Specifications Institute publication that spells out exactly what the contractor must submit with a substitution request.

Most firms' specifications require that the contractor coordinate the substitute material with all surrounding construction. Wyatt cites an example where the coordination was well defined. At a new hospital project in Ann Arbor, Mich., the power, water, and medical gas lines had been designed around a single supplier of medical equipment. According to the specifications, other manufacturers could bid the job, but they were then held responsible for modifying their utilities to fit.

There is a consensus among designers that not every building product requires the same amount of scrutiny. Visually important design elements, such as the hardware on an entrance door or the slate in the lobby floor, should be tightly controlled, but for "back of the house" items, such as metal studs or ceiling supports, a generic or performance specification may be more appropriate.

Many architects feel that good specifications are the best defense against unwanted substitutions. For them, the answer

lies in developing a solid master spec based on proven products for every conceivable building material. All the specifier has to do is select from a menu of spec sections. The people who swear by the office master spec point out that it ensures a consistent level of quality from one project to the next. But there are pitfalls: A manufacturer may go out of business or discontinue a product. Or the waterproofing that worked well on a parking deck may not be appropriate on the foundation wall of the next building.

Lincicome stresses the importance of knowing what is in the firm's master spec and changing it for specific projects as appropriate. "Since it's so easy to edit a master, it can happen that the specifier does not really know the products or who makes them. We used to have a tile specified that could only be bought in Timbuktu, Minn. Of course, the contractors wanted to substitute."

Some offices take an entirely different approach to specifying. At Hardy Holzman Pfeiffer Associates in New York City, samples of all materials are collected during schematic design, and scale mockups are built during design development. "We don't draw the first line of the construction documents until we are happy with all the materials," says Kala Somvanshi, a project architect in the firm's New York office. For Somvanshi, who is currently working on the Los Angeles County Library, this means on-site testing of the exterior etched steel panels to evaluate their resistance to acid rain. This job-specific product research results in a tight specification, she explains. It also makes it easy to insist on an exact "equal" if a substitution is proposed.

The key element in all these suggestions is a specification that is project specific. A boilerplate spec will almost always contain a few products that are either not quite appropriate or locally unavailable. When the contractor points out these shortcomings the architect not only has egg on his face but also loses some of the owner's trust. This makes it more difficult to maintain the owner's support in subsequent substitution decisions. A well researched, appropriate spec, on the other hand, seems to inspire confidence in the architect's decisions throughout the construction process. □

Shop Drawings: Minding Someone Else's Business

Is there such a thing as too much checking?

By M. Stephanie Stubbs

Just what should an architect do with the myriad shop drawings that pile up on the drafting table, threatening to throw the project schedule off balance if not sent immediately along their tortuous path back to the field? Some say architects should "check shop drawings carefully and approve them—it's your job!" Others insist that shop drawings are submitted to architects "for review only." Still others, many lawyers included, recommend that architects "don't touch shop drawings at all—it leads to unwarranted liability!"

Over the past decade, the role of design professionals in the "approval" of shop drawings has been questioned ever more seriously, perhaps partly as a result of the notorious collapse of Kansas City Hyatt Regency Hotel walkways in 1981. Vagaries in text and language of documents concerning shop drawings, coupled with increasing concern over professional liability, have led to close scrutiny of those sections of the AIA documents presenting information about shop drawings. The following arguments represent the range of opinions being voiced regarding the role architects should take in this area.

John L. Webb, FAIA, principal of Bodman, Webb, Nowland & Guidroz, Inc., Baton Rouge, La., and past chairman of the AIA documents committee, says, "Part of the argument over shop drawing approvals harks back to the concern that architects are in danger of writing themselves out of any responsibility whatsoever. In so doing, they write themselves out of a role in the construction process. Over the years, for a number of situations, I've helped to write the contract document language to limit our liability. And other professions, like construction managers, have moved in to assume responsibilities that architects are not willing to assume, such as guaranteeing the cost estimate and taking responsibility for the quality of the work."

Barry B. LePatner, partner of LePatner, Gainen & Block, a New York City law firm specializing in representing architecture and engineering firms, agrees with the fundamental concepts underlying Webb's statement. However, he cautions that there has been a growing area of liability for design professionals in the actual implementation and very often the expectation of clients vis-a-vis the role to be played by the architect in the shop-drawing process. "The liability that has sought to be attached against the design professional for the shop drawing function has been one of hindsight. Architects have not fully understood in which areas the shop drawing review function is part of the full services to be offered to a client, and which belong in the construction arena. Only when there is a clearer acknowledgement of this division on the part of the owners, the contracting world, and the design professions, will there be a better working relationship that minimizes liability for all concerned."

Many questions about the architect's role in the shop drawing approval process have been answered by the rewriting of AIA's A201 General Conditions of the Contract for Construction, to be released early this year. The new version of A201 clarifies issues such as what the architect should do with unrequested shop drawings and the contractor's responsibility for engineers' certifications, making the architect's role, if not easier, at least more focused.

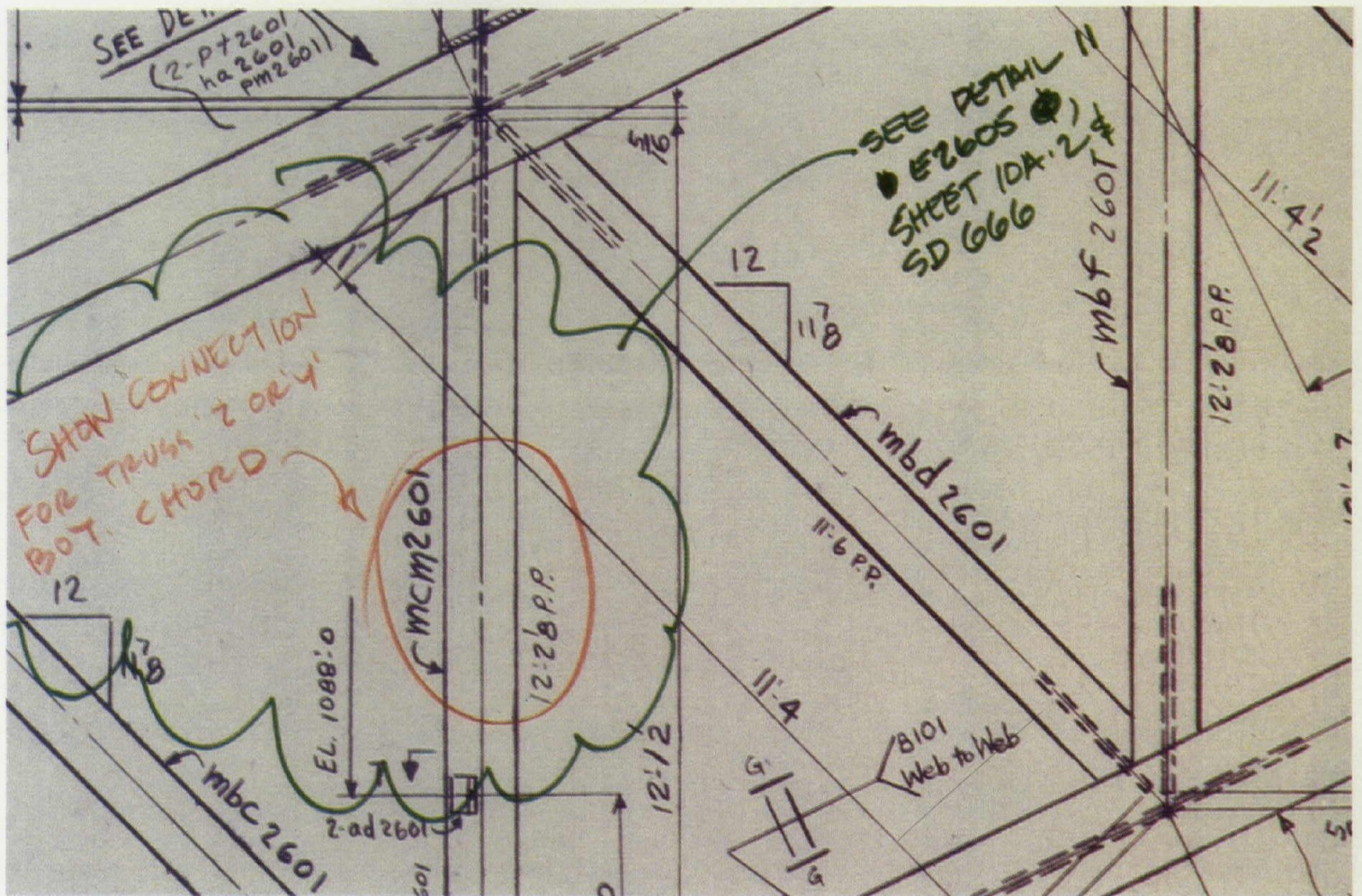
There seems little disagreement about what shop drawings are. The AIA document A201 defines shop drawings as: "... drawings, diagrams, schedules, and other data specially prepared for the work by the contractor or any subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the work." The definition remains basically the same in the 1986 version of A201, adding only "sub-subcontractors" to the list of shop drawing preparers.

Disputes have arisen, however, about what shop drawings are not. The new version of A201 helps in this regard by the addition of the following paragraph (section 3.12.4): "Shop drawings, product data, samples, and similar submittals are not contract documents. The purpose of their submittal is to demonstrate for those portions of the work for which submittals are required the way the contractor proposes to conform to the information given and the design concept expressed in the contract documents."

Shop drawings, by nature more detailed than drawings in the contract documents, serve several purposes. Overall, they explain how the contractor intends to construct a portion of the work. Specifically, shop drawings indicate a component of the work. For instance, shop drawings for an aluminum window frame would indicate the exact materials used in the work, placement of the work within other components of the work, dimensioning of specific work, dimensions required to fabricate the individual material items, and the sequences of erection and installation of the component (either through direct representation or by implication).

Regardless of the size of an architectural firm or the project it is working on, shop drawing production process follows basically the same steps:

1. The subcontractor or supplier makes a shop drawing working from information supplied in the contract documents, and sends a copy to the contractor.
2. The contractor checks the shop drawing against the contract documents and other shop drawings related to that piece of work. He or she notes approval of the work and sends a copy of the shop drawing plus a marked-up print with corrections to the architect.
3. The architect receives the drawing, checks it for conform-



ance with the contract documents and the design intent of the project, marks each individual document with his or her stamp of "approval," and returns it, along with a print marked with corrections, to the contractor.

4. The contractor receives the documents and notes the approval status and the architect's corrections. The contractor then returns the shop drawing and the corrected print to the subcontractor or supplier, along with a transmittal form noting its status.

5. If the architect stamped the drawing "not approved," or "approved as noted," the entire process is recorded and repeated.

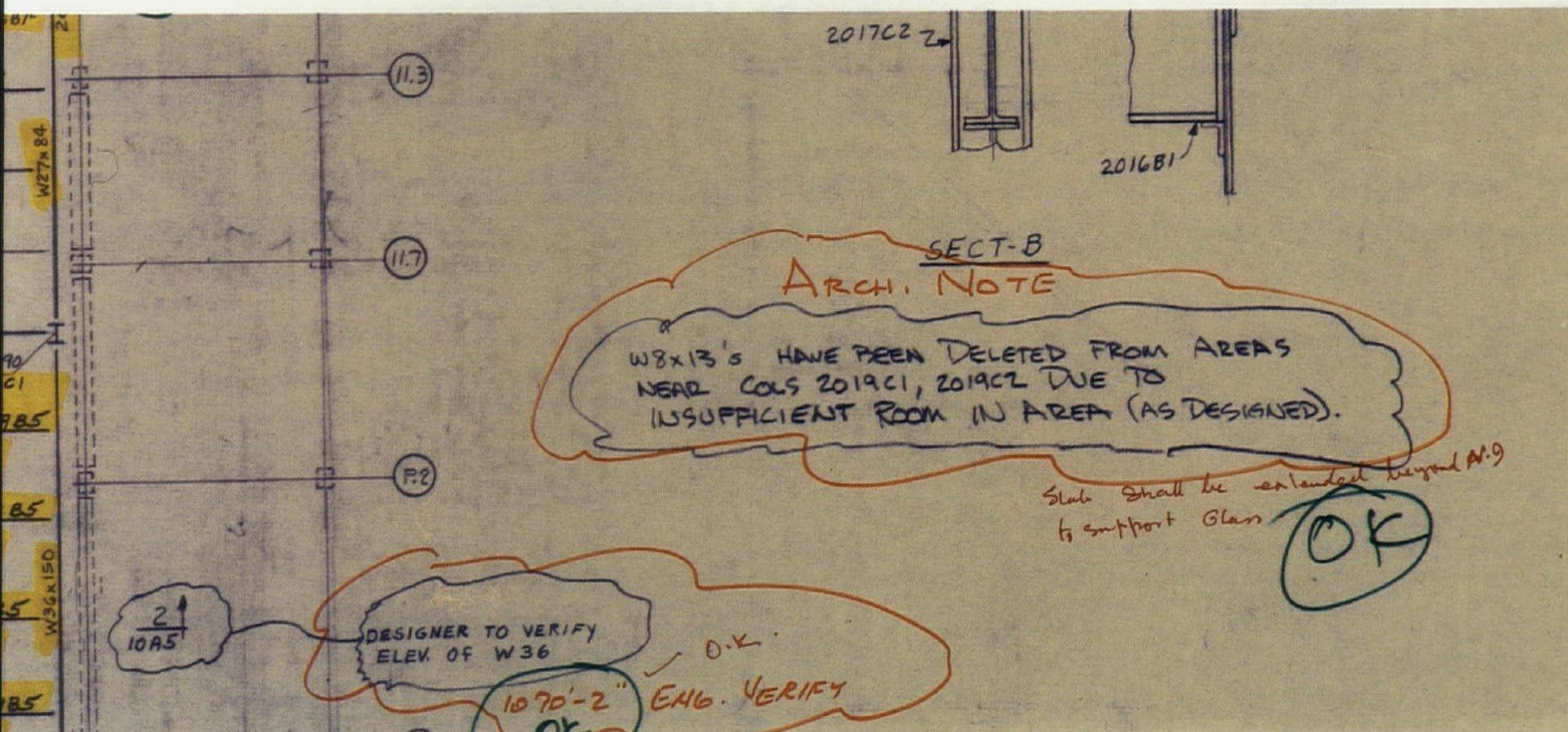
Most of the steps of the process seem clear. Basically, the subcontractor prepares the shop drawings, the contractor checks and approves them, and the architect ascertains that they are in line with the design intent of the construction documents. Yet confusion has reigned over the legal interpretations of the architect's role—what "approval," and especially "approval for design concept only," actually mean and the level of involvement the architect plays in each step.

If "approval" causes architects so much grief, why did the AIA documents committee leave it in the new version of A201? Webb explains, "When we update the documents we try to respond to changes in the law brought about by judgments and changes in the technology brought about by the construction industry. We talked a lot about getting rid of 'approved,' but the feeling of our group was that we would not be doing the profession a service to withdraw from that role in the process."

Design intent defines responsibility

AIA Document A201 states, in Section 4.2.7: "The architect will review and approve or take other appropriate action upon contractor's submittals such as shop drawings, product data, and samples, but only for the limited purpose of checking for conformance with the information given and the design concept expressed in the contract documents. . . . Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment and systems, all of which remain the responsibility of the contractor as required by the contract documents." The architect may not have the expertise to confirm that the intricate details shown in the shop drawing are correct in themselves, but must, by contract, be able to ascertain that the component is in line with the ideas expressed in the contract documents.

According to A201, it is clear which professional defines the design intent of the contract documents: "The architect will be the interpreter of the requirements of the contract documents and the judge of the performance thereunder by both the owner and the contractor." A blanket definition of design intent is not easy to find, however. "You can get to a definition of design concept the opposite way—by defining what it doesn't mean," Webb says. "One of the things it doesn't mean is checking quantities; if the architect called for 100 windows, and the contractor ordered 101, it's not the architect's duty to find this mistake. Another thing the architect wouldn't include as



tion would be provided on shop drawings versus construction documents in steel fabrication and construction.

Construction drawings describe steel floor and roof construction in terms of framing plans which represent beams and girders as single lines with size and weight designations noted. Member spacing is indicated. Dimensions are provided describing overall size and configuration. Openings are sized and located. Typical and special details are shown. Spot elevations at connection points show slopes or changes in elevation.

Specifications indicate standards under which connections are to be made and fabrication is to be accomplished.

Shop drawings include a framing or erection plan similar to that provided in the contract drawings. Beams and girders are given designations or marks that identify them for fabricating and erection rather than by size and weight. To provide shop workers with a picture of what is to be done to steel members, each girder and beam is drawn in elevation. The drawing indicates its length and how it is to be cut and altered to fit with adjacent steel. Each bolt hole is drawn and exact size and location is indicated. Connecting devices such as clip angles are drawn in the same fashion. Mark numbers are assigned to each piece corresponding to members indicated on the erection plan.

Structural steel drawing review would include a check to determine if the member sizes and spacings were consistent with those indicated on the contract framing plan. To be sure that the contractor is properly interpreting the dimensioning system, a spot check may be made of dimensions. If dimensional discrepancies are found, attention is called to the problem and direction is given as to where in the contract drawings information may be found relating to correction of the error. Providing dimensions as a part of the notes made during the shop drawing review may remove the responsibility for such information from the contractor and place it upon the design professional. Connection details are reviewed for structural integrity. Connection configurations are checked to ascertain slopes or changes in elevation have been accomplished in the detailing.

Approval is approval is approval?

Some contend that it is preferable for the architect to use a stamp saying "reviewed" instead of "approved." LePatner is an advocate of this approach. However, he says that what is really important is the actual undertaking by the A/E as opposed to what he or she puts in a contract. "For example, too often the architect or engineer performing a shop drawing review function ends up reviewing items on the drawing which go beyond the mere purview of seeking to check for general conformance with the contract documents. That is sometimes seen as going beyond the contract and creating a liability."

Webb, on the other hand, maintains, "The language you use—approved or reviewed—doesn't make any difference, the intent is the same. In most cases I've heard about in which architects have been held liable in shop drawings disputes, the architects, in my opinion, were negligent in their duties."

Few will deny, however, that it is helpful if the architect's shop drawing stamp reflects the words of A201: "conformance to the contract documents and design concept." Another good defense that an architect can have is an accurate record of receipt and action. Minimally, the shop drawing record should include: identifying features of the submittal for easy retrieval, such as a code number; a description of the submittal; the date submitted and the name of the initiating party; the date the submittal was returned; the action taken; and the reason for that action.

Webb sums up the architect's role in the shop drawing process this way: "To me, the answer is pretty simple. The architect must simply recognize that shop drawings are an area of potential risk, and you do everything you can to minimize your risk. Recently, during a lawyers' roundtable at AIA headquarters, I said that our firm has been in business for 52 years, and we have never been a party to a lawsuit, and we have never failed to collect our fees. And one of the lawyers remarked, 'God, you must not be doing any business!' 'No, sir,' I replied. 'We just do our business very carefully.'" □

Construction Administration: All Work and No Pay?

The 'standard of reasonable care' is difficult to define.

By Douglas E. Gordon

Construction administration, on-site observation, contract administration—there are many terms used to describe the architect's role during construction, and many levels of service architects provide in fulfilling that role. But when all the obtuse contract language and liability-mitigating devices are swept aside, the concern is fairly simple. There is a basic level of architectural involvement that is required during construction to ensure that the ideas encapsulated in the design are understood and made real by contractors and/or construction managers.

Construction administration, as the term implies, is the array of contracted-for architectural tasks that follow completion of design phases in traditional delivery processes. In fast-track projects, construction administration services integrate ongoing construction and design. Construction administration tasks may include checking interdisciplinary construction drawings, collecting and filing construction documents, observing construction, administering change orders, and approving payments to contractors.

Although the overriding purpose of construction administration is to ensure that a quality product is delivered by the contractor to the owner, the reduction of potential liability is always a factor, which is why record keeping is such an important function of construction administration. Because of the underlying concern about liability and because profitable compensation is always a consideration, an architect's involvement in construction administration begins well before construction—when the owner/architect agreement is negotiated. A well-written contract is not a free ride out of liability, or even assurance that the architect will be properly compensated for what can turn into a very time-consuming service. But, if well written, a contract will keep an architect from taking on unnecessary liabilities and is the point at which the architect establishes a mechanism for fair compensation.

Compensation for construction administration is a particularly difficult paradox. If the quality of the contractor is unknown, there is the possibility that an architect will have to spend a more-than-average amount of time in the field. If construction administration is included as part of the basic design fee, then every man-hour spent on these services over the originally estimated allotment cuts into the profitability of the project for the architect. On the other hand, if the architect itemizes basic services, puts a cap on the number of hours of construction administration services covered under the basic fee, and stipulates that the owner pay additionally for services beyond

that cap, another problem arises. If the owner refuses to pay for additional construction site visits, and the architect doesn't provide them when the visits are necessary, the architect is in a position of possibly not providing the reasonable care demanded by professional standards.

Whatever contract approach is chosen, construction administration should definitely be a part of any architect's basic services. "To be avoided at all costs are projects where the architect is asked to act solely as the designer without any construction administration services. This situation only exacerbates the potential liability that faces an architect as it precludes his or her involvement in ensuring that the contract documents are followed," says Barry B. LePatner, partner of LePatner Gainen & Block, a New York City law firm specializing in representing architecture and engineering firms.

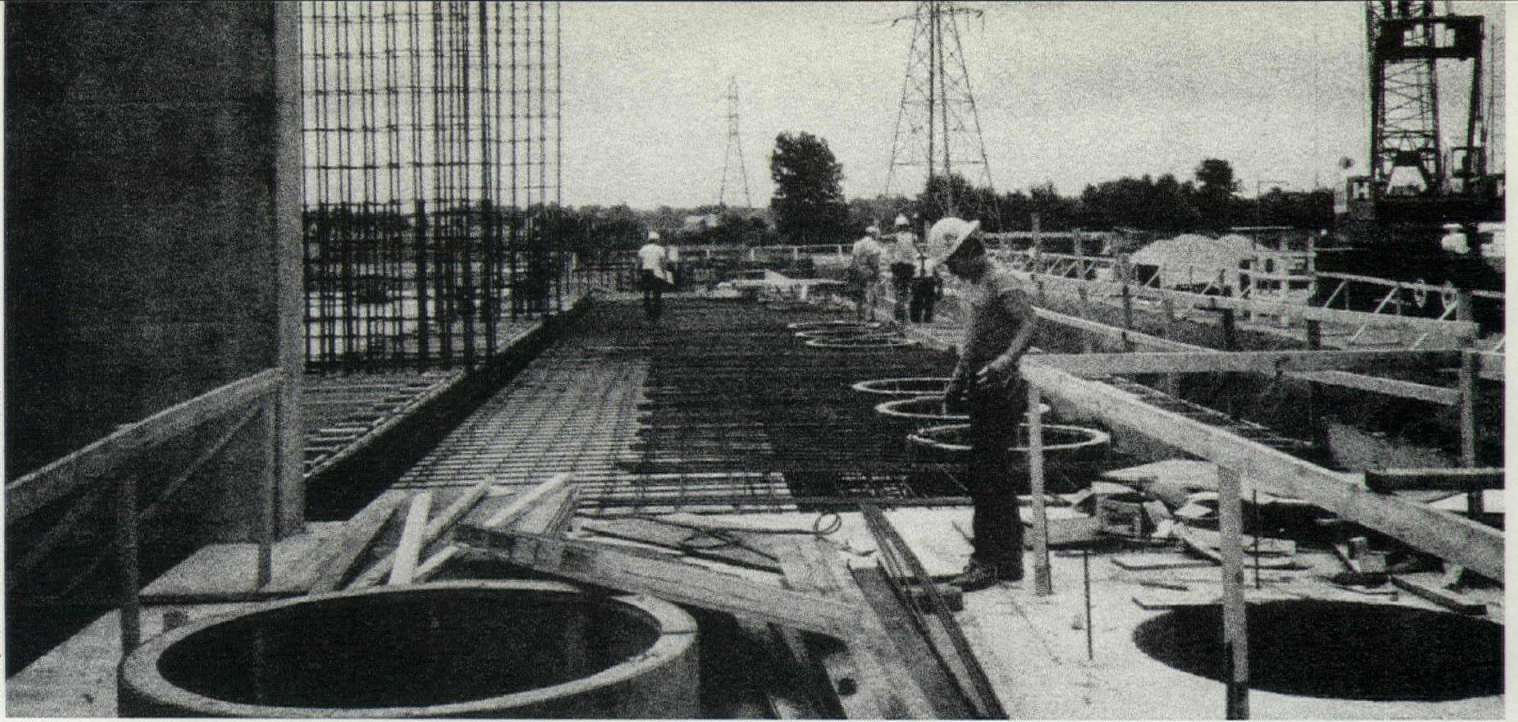
Good field observers know everything

Construction administration is a very specialized science and requires someone with a rare combination of experience and personal qualities says Gerald Hammond, AIA, of Steed Hammond Paul Architects, Hamilton, Ohio. "Construction administrators need a wealth of experience, a sense of fair play, and a sufficient understanding of design to be able to make on-the-spot decisions in the field," he says.

A thorough familiarity with acceptable methods of construction and alternatives is merely a minimum requirement for performing construction administration services. A construction administrator must also understand the thinking behind the design and specifications. For this reason, if time and resources permit, the project manager is often the best candidate for construction administrator. "We try to extend our project manager's involvement in a project into the construction phase," says Kenneth Neumann, FAIA, of Neumann/Greager & Associates, Southfield, Mich. "As a 'mother hen,' the project manager is very effective in helping to avoid problems. Further, clients appreciate the project manager's involvement in the field, although such involvement does have the drawback of tying up the project manager from going on to the next job."

AIA document B162a (scope of services to the detailed owner/architect agreement B161) lists 13 items under the description of designated services for construction contract administration services: project administration, discipline coordination/document checking, agency consulting/review/approval, owner-supplied data coordination, office construction administration, construction field observation, project representation, inspection coordination, supplemental documents, quotation requests/change orders, project schedule monitoring, construction cost accounting, and project closeout. Depending on the

Many of the opinions expressed in this article were drawn from the discussions of a roundtable of successful architectural firms held in Memphis October 14, 1986, by the AIA practice committee.



owner/architect agreement, construction administrators may also survey the construction site; check insurance, delivery, and storage of owner-supplied objects or materials; and ensure code compliance of changes.

Project scheduling is the responsibility of the contractor. But a construction administrator who knows bar-chart and critical-path scheduling further serves the owner's interest by monitoring construction progress and identifying potential problems before they become grounds for liquidated-damage claims.

Maintaining good relations with the other team members and the community is another important, but not-so-obvious construction administration responsibility. Having a command of local codes and construction methods is important in establishing a smooth working relation with the local building official. A good relationship with the contractor may be more of a problem, especially if a lump-sum-fee contract is putting the architect and contractor at cross purposes.

The very first step in providing construction administration services is negotiating a contract that sets out the responsibilities of each of the parties involved in the construction, the level of construction administration or construction observation services the architect will perform, and the compensation those services will bring. It also sets out the terms of construction observation—frequency, required tests, team meetings, channels of approval, and methods of payment—that set the tone for the construction phase.

Contracts are well written to be well-read

Construction administration staff who understand the roles and responsibilities of the other members of the construction team avoid misunderstandings that are a major cause of things "slipping through the cracks" and ending up in claims. A basic strategy to achieve this understanding is for everyone involved in a project to read the contract agreements carefully. By knowing the contract terms, construction administrators know the bounds of their responsibility, and they recognize additional services when the client requests them.

Section 1.5.4 of the AIA B141 Standard Form of Agreement Between Owner and Architect defines basic services for administration of the construction contract this way: "The architect shall visit the site at intervals appropriate to the stage of construction or as otherwise agreed by the architect in writing to become generally familiar with the progress and the quality of the work and to determine in general if the work is proceeding in accordance with the contract documents. However, the architect shall not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work."

At first glance, the B141 definition raises two questions. Does

the language indemnify architects against non-design-related construction errors and omissions? And what are "appropriate" intervals of site visitation?

The contract wording seems to indicate that the contractor is responsible for construction quality and that the architect is under very little risk of future liability as long as construction is proceeding in accordance with the contract documents. The courts, however, have defined an architect's professional responsibility during construction administration in ways that transcend the written word. Writing a contract that exonerates the architect from liability for improper construction practices perpetrated by the contractor is good business practice, but it is not all-protecting.

Good contract language isn't what protects an architect from liability, good work is. For instance, case law shows that if the construction-observing architect sees improper construction activity, he or she must bring it to the immediate attention of the contractor and owner—stopping construction if necessary—or risk the possibility of a mishap or building failure that could lead to a substantial settlement against the architect. This is particularly true with such high-risk construction tasks as excavation and demolition.

"Appropriate intervals," under the contract language, is at the discretion of the architect. At the low end of the scale, this might mean intervals at which the contractor submits billings that the architect must certify, although such a construction observation schedule is practical only on the most basic construction projects since it is totally unrelated to the construction schedule. Construction administration services may also include observation at critical points in construction—the beginning and completion of single-trade tasks, for instance—or observation on a set schedule, such as weekly.

Another approach is for the construction administrator to work closely with a separately contracted construction observer. Alan Sclater, AIA, of Kober/Sclater Architects, Seattle, often works with clients who provide their own construction observation personnel. "Most of the clients we work with have fairly skilled people, some of whom may be full-time on the job, and often are architects," says Sclater. "These owner representatives never interpret our documents. We'd have a hard time with that, but they can call and get us out there immediately if there's any problem."

"We want full-time construction administration on every job we do," says Richard Anderson, AIA, principal of Anderson DeBartolo Pan Inc., Tucson, Ariz. "On our complex projects, three or four full-time construction administrators are pretty common. This approach cuts down on change orders and helps speed up costly problem resolutions, which makes up for the cost of putting those people on the site, which is about \$5,000 per person per month."



Courtesy of Anderson DeBartolo Pan, Inc.

Getting paid for onsite services

The owner/architect contract can set compensation for construction administration apart from the design fee, include construction administration as a basic design service, or both, depending on the scope of the services and the complexity of the job. "We don't take out a separate contract for what's called 'periodic visits' in the AIA standard form contracts—we include that in the basic fee," Sclater says. "If we provide full-time site observation, that is a separate contract or an amendment to the basic agreement," he says.

According to LePatner, an early step for architects in negotiating an owner/architect agreement is to define what "appropriate" construction administration services will entail and establish a fee that will generate profit. He contends that by defining the frequency and duration of site visits in the owner/architect agreement, both parties understand that the basic construction observation visits are only as defined and required and that a percentage of the total fee pays for an approximate number of visits of a defined length. Separate from the basic construction observation, the contract may also include a clause that allows the owner to request and pay for construction site visits by the architect beyond those defined in the basic services.

A caveat to LePatner's approach comes from a roundtable of architects' attorneys convened in November by AIA. Regardless of the contract stipulations, there is a standard of reasonable care to which architects are expected to adhere and against which the courts will measure an architect's performance if a lawsuit arises, the lawyers agreed.

James R. Franklin, AIA, group executive of the AIA professional services center, concurs. "Setting a base level of construction administration services in the contract does not mean an architect is guaranteed of having to perform only those services for which the owner is willing to pay. If owners know they will have to pay extra to get the architect onto the site for a nonscheduled visit, they may avoid requesting that extra visit. That means the likelihood goes up that a construction error or omission will go unnoticed. And despite what a contract may say, I have found that the architect's liability stays constant in the eyes of the courts."

Noting that construction administration is an area that can turn a project from a boon to a bust as far as the architect's profitability is concerned, Franklin says that estimating a fee for unspecified construction administration services is a tough and often unfair gamble architects have to take. "But the only situation I can think of where an architect might contract for additional payment for site visits is where the contractor requests more than one visit to check for substantial completion. And in those cases where repeat visits are required, since it's the contractor who is benefitting from them, the contract could stipulate that the contractor pay for those additional services," he says.

When full-time on-site construction observation is not possible, the architect relies on the contractor to provide a quality product without supervision. "On a project of less than \$5 or \$6 million, we find that continuous construction observation is not economically feasible," says John Brown, AIA, of Selzer Associates Inc., Dallas. "In a situation of minimum construction observation, where we visit the site only once a week, the way we try to guarantee an acceptable level of construction quality is to try to get contractors onto the job who have a good track record."

One word of caution in prequalifying bidders, however, is that an architect should avoid telling an owner that a contractor is

not qualified for a project. Such a statement could open the architect to a defamation lawsuit. Architects should present owners with the background facts as objectively as possible, and let the owners make selection decisions themselves.

Redesign work resulting from construction changes creates another complexity for construction administrators that a well-written contract can make a little easier, according to Dan S. Brock and Lystre L. Sutcliffe Jr. in *Field Inspection Handbook*, recently published by McGraw-Hill. A contract for design services that calls for a separate accounting system for change work allows the cost of the extra work to be kept apart from the overall project budget for easier monitoring, they say. If there is any doubt whether a service is additional or to be included in the standard scope of services, a new line item for that service will allow construction record keeping to continue uninterrupted, and later the time and expenses for that service can be called out should the architect deem separate billing appropriate, they explain.

Good administrators keep good records

As the point of contact between the owner, the general contractor, and the home office of the architect's firm, construction administrators are in a position to receive all important construction-related information. But gathering is only half the job. The other half is devising a storage system so that information can be found quickly later (see box on page 96).

Checking and filing begins with the fundamental construction documents—checking interdisciplinary drawings and specifications for consistency and correctness (see article on page 82)—and may also include keeping a construction administrator's diary, monthly reports, meeting notes, and copies of documents generated by the general contractor or construction manager.

If a resident construction administrator is feasible, his or her daily construction observation reports include information on the work that has taken place; the location, type, and quantity of material placed; the number and trades of construction personnel and visitors present on the site; and general comments on progress, any unusual occurrences, and the construction-site conditions. If kept in great detail, these files are one of the best records for reconstructing day-by-day occurrences and may also later serve to locate underground or otherwise covered elements.

Other information that should find its way into the construction administrator's files includes routine agreements from conversations with the contractor and client; notes on construction methods; accident reports from the contractor; letters and memos that document decisions between the architect, contractor, and owner that deviate from the original design documents; and notes from all formal and informal meetings, including reports to the client on project progress and telephone conversations. With regard to telephone conversations, an important habit to get into is taking notes during calls, transcribing them while they're still fresh in mind, and sending them to the other party for written confirmation or approval.

Good advice for phone conversations is also good advice for construction-team meetings. The purpose behind such a strategy is communication. It lets everyone know the construction administrator's understanding of what transpired during the meeting. And if anyone disagrees with the construction administrator's interpretation, it gives that person a chance to set

the record straight right away. Another important medium of interdisciplinary communication is the trading of drawing checksets, according to Brock and Sutcliffe.

Authorized changes are only those that are approved in writing by the architect and owner. If the owner does not offer written documentation when making a request for additional work, the architect should take the initiative and draft a work authorization memo for the owner to sign and return that includes a clear description of the proposed work, and the compensation and billing procedure for that work, Brock and Sutcliffe contend.

In preparing for any eventuality, one finds there is never too much documentation, points out David Harper, AIA, of Harper/Carreño, Miami. "We find it necessary to document everything we can that has happened, and even things that haven't happened," Harper says. "We send a standard letter to the contractor and owner each week stating developments during that week. And if no changes have been approved or communication received, we state that in the letter. We also document the timeliness of both our and the contractor's responses to reduce the possibility of a claim that we delayed the project because of our documentation. In fact, we've even found it necessary to document the weather information that's logged into the job diary," he says.

Two important things to remember when committing this kind of information to paper, however, are: Be sure the information is absolutely accurate and have the correspondence signed by a person with the authority to stand behind the decisions or statements of fact. If the site observer is not sure of either facts or authority, he or she should call the home office for confirmation, Brock and Sutcliffe advise.

The records with which the construction administrator wraps up field observation include the certificate of final completion (prepared by the contractor and approved by the architect) and a statement from the contractor and suppliers that the owner has paid all outstanding claims. Where appropriate, and stipulated by contract, the construction administrator may also collect subcontractor guarantees, certifications and as-built drawings for the client's files.

When construction is done and the owner is ready to take over the building, it is helpful if the architect has already gotten two basic concepts across to the client, Brock and Sutcliffe suggest. One is that the contractor has charge of construction means and methods and is responsible for worker safety. The other is that design documents and subsequent construction are never perfect. A certain level of change orders and errors are to be expected, and it is the construction administrator's job to minimize, not eliminate, such errors. Conveying these messages is a form of "client management," and failures in this area were identified at AIA's lawyer's roundtable as the primary cause of claims, Franklin says.

Brown sums up the special architect/owner relationship by saying that "owners seem to feel comfortable looking to the architect to keep the contractor in line. And construction observation accomplishes two important functions: it keeps a project moving smoothly and it helps establish a rapport with the client that is very beneficial should something go wrong during construction."

Hammond concurs, adding that "the construction administrator is at the front line of client contact, and his or her performance is probably the last impression the owner has of an architectural firm's project performance." □

Computers Belong at the Job Site, Too

When construction claims arise, arguments are won or lost not necessarily on the facts but on the documentation that exists to substantiate the claims being made. With the high rate of litigation these days, huge amounts of information are generated by all parties involved in construction management and administration to establish a trail of accountability. Before attorneys and their expert witnesses can develop their offensive or defensive postures for negotiation, litigation, or arbitration, they must understand how the project in question was built. To assemble the necessary overview of the situation, they attempt to obtain and review the entire universe of records concerning the project.

Though there seems to be far too much data collection when the job is proceeding smoothly, that same quantity of information seems to be far too little when a claim arises. The fear of litigation coupled with advancements in production volume of automated office equipment has turned the project manager into a part-time document manager.

Especially with large, complex projects, no one person has the time to review each and every document associated with construction. Further, coordinating the present flood of information typically is beyond the capabilities of both the home-office personnel, who know little about the day-to-day site operations, and the field-office personnel, who know the site but are never very interested in paperwork.

Many design professionals providing construction administration services are just beginning to appreciate the ways personal computers could help simplify this task. For one thing, personal computers offer an affordable, effective way for the project administrator to monitor construction schedules generated by the contractor. Beyond that, because a large part of construction administration involves creating and researching records, PCs can alleviate the vexing problem of keeping huge quantities of written records in a format that minimizes duplication and maximizes accessibility.

Because owners or contractors cannot sign off on information kept in a computerized data bank, hard copies of letters, memos, and approved field reports must still be kept in files as they have been for years. With automated indexing and cross-referencing, however, finding the correct documents out of the thousands generated takes minutes rather than hours. But to realize these efficiencies, the construction administrator must gather and catalog files logically and consistently. A simple strategy is offered here.

The development of an on-site computerized document retrieval system (CDRS) is a quest to combine the best efforts of man and machine. A CDRS combines procedures and resources by which construction administrators acquire, condense, manipulate, retrieve, and present information concerning day-to-day construction site functions and problems.

Although retrieval systems are as different as the firms that use them, most share the same basic procedures and organizational needs. First and foremost, a file structure and

document-numbering system is established. Each document gets a number, which makes it unique and identifiable. A common approach to organizing a file structure is to group documents according to the specifications, the parties involved in construction, and foreseeable problems. For example, files should be set up for: excavation, concrete, owner correspondence, architect correspondence, shop drawings, potential change orders, and approved change orders, to name a few. The best approach is to establish the coding structure for the PC database software at the same time the file structure and numbering system is being set up for the documents themselves. The PC index coding should include the document title, number, date, author, receiver, parties copied, subject codes, and action codes. Due to the importance of timing in the construction business, all incoming and outgoing correspondence, transmittals, shop drawings, catalog cuts, and daily logs should be coded into the PC-based index on a daily basis.

A primary source of project information to which design professionals have access is the construction administrator. Ideally, the construction administrator has as complete a set of project records as the project manager, and he or she has filed construction-related correspondence plus copies of all other critical documentation regarding field activities. The construction administrator's daily job diary can be the most useful source of information that exists on a project and serves as a good example of what computer coding involves. The computer database structure should include data fields for all the information typically contained within the diary reports, such as weather conditions for the day, workers and equipment on the site, material delivery, detailed notes on work performed, and problems and how they were resolved. The capacity of the data fields should be large enough to store pertinent details, such as noting temperature, site conditions, atmospheric conditions, any unusual weather situations, a count of individuals on the job categorized by contractor and subdivided by job category, an itemized listing of major equipment (e.g., dump truck, backhoe, etc.), the location of work performed, or detail of problems and resolutions that adequately explain the situation.

With each specialized category of data situated in its own data fields and filed with consistent code designations, the construction administrator can easily call up, for instance, a record of every day that freezing temperatures occurred on the site. The construction manager could then see which construction activities took place on those days.

Other important sources of information are notes from the project manager's periodic job progress meetings. The categorization of these records parallels the purpose of the job progress meetings: progress to date, current and potential problem areas, responsibility assignments for problem solving, and follow up on how problems were solved. Details of importance include but are not limited to attendees, technical issues discussed, problems cited, parties responsible for follow-up on issues, and details on problem resolutions.

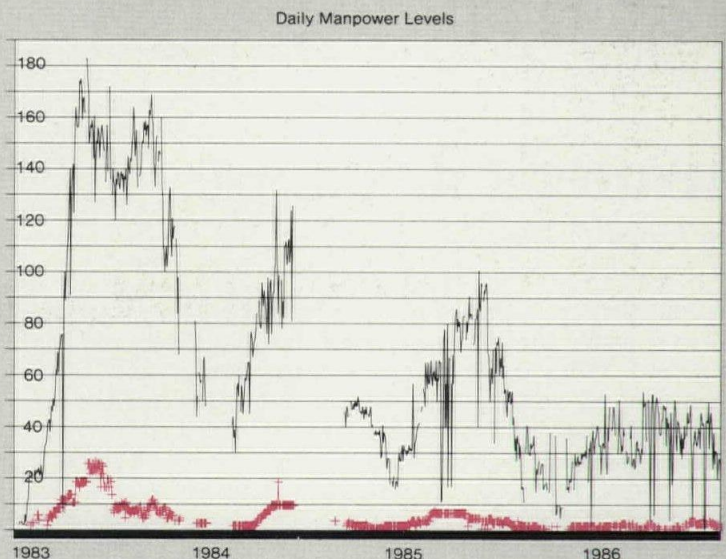
Since change orders are one of the major causes of disputes on construction projects, the prudent construction administrator is well advised to document the entire universe of change-order work on a project via two documents: a change-order control log and a project schedule.

The ability of the project manager to directly input, manipulate, and obtain current reports is an important part of the

decision process. Using a CDRS system, the project manager may take a portable PC to the field office and send information directly to the home office via telephone modem. In the past, the project manager would have to wait for the home office to receive the data, input the data, review data, make adjustments, and transmit via regular or air carrier. Upon receipt, the project manager may find that data were incorrectly entered and the process starts all over again.

While computers are by no means a substitute for an experienced construction administrator, they are invaluable assistants that can provide information with accuracy and speed, thus leaving the construction administrator time to run the job or plan and control. One of the more important advantages of computer-organized record keeping becomes evident when a project experiences management turnover. A new construction administrator can get up to speed or can zero in on unresolved issues within a short period of time. In the event a claim comes to negotiation or mediation, the database will be one of the major factors in determining the eventual outcome. A well-documented database will enable one to quickly and efficiently determine and document a settlement that is equitable to all parties. Should the project end up in litigation, CDRS is invaluable. While the opposition may be plodding through mountains of documents, CDRS will allow you to only look at the pertinent documents in an orderly, organized manner. On the other hand, if you do not have CDRS, and your opponent does, then you are the one in trouble.—GORDON CURTIS

Mr. Curtis is senior vice president of Wagner-Hohns-Inglis Inc., a construction management firm in Mount Holly, N.J.



This computerized man-hour evaluation compares the total number of workers on a construction site (indicated with vertical lines) to the number of plumbers on the site (indicated with cross marks) throughout construction. This graphic depiction was automatically derived by pc-driven database software from daily diary entries, and is only one example of the many construction data printouts, comparisons, and evaluations that architects can make quickly and accurately using any of a variety of readily available database software packages.

Construction Administration: Five Experts, Five Perspectives

Who should be performing construction observation? Should that person be liable for overlooked construction errors? How can architects improve their construction observation skills? To get some sense of what architects should and shouldn't do in the field, ARCHITECTURE asked these and other questions of an insurer, an architect, an engineer, a contractor, and a building inspector. Although the viewpoints of these individuals cannot be interpreted as representative of all members of their respective fields, we selected our respondents because of their national reputations for thoughtful, informed, and outspoken opinions on construction observation and team-member responsibilities. The main body of questions circulated to each was the same, although some questions were altered to address the particular concerns of each respondent. Responses were subsequently edited into the five essays that follow.

All of the participants feel that construction administration is an integral part of any design firm's basic design services. Insurer respondent Lynn Palmer adds that terminology is a problem in construction-related architectural services and thinks that "observation" is better than "supervision" as a term to

describe what the architect contracts to do when on the site.

Architect Jasper Stillwell Hawkins, FAIA, believes in maintaining a system of checks and balances among the designer, contractor, and building inspector, and adds "inspection" to the list of things architects do not do on the site.

Roger T. Welcome, an engineer, recommends that construction administrators provide continuous observation during field fabrication, such as cast-in-place concrete. He also believes design personnel should stay involved with the construction effort both to gather information for future projects and to keep up with developments in the project under construction.

The contractor respondent, Vernie G. Lindstrom Jr., makes the point that architects should accept contractor's suggestions for a substitution only if the architect can verify that the substitution conforms to acceptable practice.

Building inspector Robert J. Fowler, AIA, sees himself inspecting for minimum compliance while the architect observes for quality and the contractor manages for profitable efficiency. The architect is the only one who knows what the completed project should look like, he says.—DOUGLAS E. GORDON

Insurer's Response

By Lynn Palmer

No other aspect of the design professional's practice is as subject to semantic complexity as the role of the architect and engineer on the job site. One person's "inspection" is another's "management" and another's "observation." However, the definitions of these terms, and the services provided under each of these designations, become critical elements of an owner's expectations of the design professional's scope and a jury's decision about the design professional's liability should construction-related litigation later arise.

Most job site responsibilities gravitate toward one of two classifications: (1) construction management or (2) construction review. Construction management tasks can vary widely from firm to firm, but usually involve an ongoing administrative role supervising subcontractors. For some firms, construction management includes inspection.

The insurance company I represent (DPIC) looks extremely carefully at firms that consistently provide construction management. A design professional who acts as an inspector falls outside of the risk profile of a firm we would currently prefer to insure. Inspection implies approval that all the contractor's

work is done correctly and extends the design professional's liability for undetected errors and omissions that subsequently lead to building failures. Of course, some construction management responsibilities may still be within a normal scope of services and, therefore, may not increase the design professional's liability. That is why we review each case individually. We are making efforts to learn even more about construction management. The experience we gain by handling construction-related claims and the input we receive from our policyholders and other advisers will continue to improve our underwriting judgment on this practice.

Construction review, on the other hand, has historically been one of DPIC's strongest loss prevention recommendations. We feel that every design professional should undertake construction review for his or her own responsibility area. This is the only procedure that will tell the architect or engineer whether the project is being built in conformance with the contract documents and according to design intent. It allows problems to be identified and resolved during the construction process at a

Ms. Palmer manages communications and education programs for Design Professional Insurance Corporation (DPIC), a California-based company that markets insurance services for architects and engineers. Palmer is editor of DPIC's Communiqué newsletter, a periodic loss-prevention publication.

much lower financial and emotional cost than after the project is completed.

We recommend that construction review be included in every design professional's scope of services and that the design professional avoid trading off construction review for a lower fee, as happens in "a la carte" pricing. If an owner absolutely refuses construction review services, we feel that the design professional, for his or her own safety, should visit the site anyway. Few rules are 100 percent, and this one isn't either. The in-house construction review activities of some sophisticated owners, such as certain U.S. government entities, may suffice.

Construction review should be a part of the contract and should provide for periodic visits to the job site to conduct visual observation of materials, equipment, or construction work for the purpose of ensuring that the work is in substantial conformance with the contract documents and with the design intent. (The definition of "periodic" is best left to the judgment of the design professional. The scheduling of periodic visits will be different for a wastewater treatment plant, for example, than for a less complex project.)

Certain caveats are equally important. Construction review by the design professional does not relieve the contractor of obligations under the construction contract, particularly those associated with means and methods of construction and job-site safety. This distinction should be clearly set out in the design professional's contract. Words such as "inspection" and "supervision" should not be used, as they unduly broaden the design professional's liability. Crucially important is *who* within a design firm performs construction review. It is not a job for junior staff, nor an opportunity for on-the-job training, in our opinion. A good case can be made for the most experienced professionals conducting job-site activities.

We are unimpressed with the arguments that risk exposure is created by site visits. We feel that being the "designer of record" is enough to establish vicarious liability in most cases, and that the benefits of site visits outweigh the disadvantages. Assume that there's trouble brewing on a project. In-person observation of the problem and the personalities involved may well give the design professional the opportunity to nip a potential claim in the bud and avoid a costly suit.

Architect's Response

By Jasper Stillwell Hawkins, FAIA

When discussing construction administration services I avoid using the term "inspecting construction" since it implies a very strict and detailed examination of the total construction process at the job site. This cannot be accomplished by an architect nor, for that matter, by building department representatives who are normally only present on the building site at intermittent times concurrent with major phases of the construction process.

The traditional system of construction administration that had served so well has changed drastically over the past 20 years. I believe this change is the reason we're now so busy trying to determine why we are experiencing building failures related to water intrusion, structure, foundations, and materials.

The traditional system was composed of a not-so-formal, but nevertheless effective, three-party system of the contractor/builder, the design professionals, and the government representative (building inspector). The checks and balances represented by this system were far more effective than today's methods, wherein two of the major partners in the system are either absent entirely from the job site or, at best, are rarely there. No one, it seems, is minding the store.

There are as many reasons for the change away from the traditional tripartite system as there are design firms and building departments. The reasons include budgetary constraints, insufficient numbers of competent field personnel; lack of understanding on the part of owners of the architect's role in the construction process; architects' inability to explain that role and the liability it engenders; and last, but not least, the entry into our industry of the construction manager, whom the owners have mistaken as a substitute for the design professional during the construction process.

Buildings are designed, constructed, and observed by human beings, who are fallible. Therefore, the more checks and balances that are present, the less likely it is that serious construction errors will occur that subsequently bring failures, injury, and in some cases death.

If the historical system were reinstated at the appropriate level of competency, all three parties would again be involved at the job site with the main responsibility for compliance with the plans and specifications remaining with the contractor/builder. The two other parties check work at intermittent times for different purposes, attempting to keep any contractor/builder errors to a minimum.

Currently, the owner pays for the contractor/builder inspection personnel as a matter of course. Through payment of taxes and fees for permits, the owner pays for the building department inspectors as well. The owner should also pay for similar services provided by design professionals since their role is every bit as important to the owner's ultimate goals as are the roles of the contractor/builder and building department inspectors. The owner is paying for—and expects to take occupancy of—a safe building that will perform according to the agreed-upon criteria established by the design professional team. Of course, architects could absorb construction administration costs in their overhead and "hide" those costs from owners reluctant to pay for them. Such an approach might solve the architect's problem of "selling" the service as a separate line item, but it would also require the raising of fees for basic design services.

My firm provides construction administration on every project. On single-family housing projects or prototype buildings, where there is a repetitive construction schedule, the models of the first one or two buildings are conducted under normal contract administration services. Later phases require less rigorous site reviews.

Our experience performing construction administration yields another critical benefit: a tie-back of information from construction administration from the field to the design architect. This feedback is the best way for architects to expand their knowl-

Mr. Hawkins is a principal and founder of Hawkins & Lindsey Architects of Los Angeles and Phoenix. A registered architect for almost 30 years, Hawkins is a member of the boards of Underwriter's Laboratories Inc. and the National Fire Protection Association and was formerly chairman of the board of the National Institute of Building Sciences.

edge base and minimize the translation between concept and field fabrication.

Tie-back to design is an essential element of construction administration because designers can learn from every project. But as important as it may be for designers to get field reports, there are some things you only learn by going out to the site. In fact, I have found at times that I learn more during construction observation than I do from the office phase.

There is no substitute for actually experiencing the construction process on-site, under the observation of others already experienced in job site observation and administration. During university training, greater emphasis should be put on construction, even to the point of requiring some on-site training prior to graduation. Large firms can afford the luxury of conducting on-site training. Unfortunately, the vast majority of architectural firms are small and cannot afford two people to do the job of one.

When the architect is the prime contractor for design services, consulting engineers should not have direct construction administration contracts with the owner any more than the consultant should have a direct contract with the owner for design services. The owner typically is not expert in the realm of managing or coordinating consultants. By using the services of the architect for this administrative task, the owner takes no responsibility for this service and can count on one party to whom to look to coordinate this activity.

Finally, as the owner's prime design contractor, an architect never should allow a construction contractor to make substitutions or design interpretations without architectural consultation. The potential for catastrophic errors in judgment is too great to be acceptable if there is no system of checks and balances to discover and correct them.

Engineer's Response

By Roger T. Welcome

My remarks are subject to the caveat that the services performed and the responsibilities assumed by the architect and/or engineer, regardless of the extent or manner of compensation, must in any case be consistent with the minimum standards (1) established in the professional's code of ethics, (2) imposed by law, regarding the professional's responsibility for public safety, and (3) imposed by regulatory agencies having jurisdiction over the project.

The primary reason to have the design professional inspect construction as construction progresses is to provide the owner a degree of assurance that the design intent incorporated in the contract documents is implemented in the construction process. To provide this assurance, the design professional compares completed work against the requirements expressed in the contract documents, including such details as have been further developed through the shop-drawing preparation and review process.

Even though the contract documents prepared by the Engineers Joint Contract Documents Committee make the contractor responsible for *how* the work is constructed (Article 6.1, EJCDC 1910-8), the essence of the contract between owner and

contractor actually is *what* is constructed. The owner (and the owner's representative on the job site) won't be able to ascertain compliance of the contract requirements by merely reviewing the finished construction. Direct observation of the work in progress is necessary as well as routine quality-control testing. Further, the design professional is the party to whom the contractor submits requests for progress payments, and thus the architect or engineer has a responsibility to the owner to ascertain that work has progressed as far as indicated on the contractor's invoice and, moreover, that such work appears quite satisfactory.

Except for inspections representing public or regulatory agencies having jurisdiction over the project, the design professional should perform construction inspections to the extent and at a frequency required to monitor compliance of the work with the contract requirements. The frequency of inspection will vary with the nature and complexity of the project. On a relatively small and uncomplicated project (if there is such a thing), the provision of EJCDC 1910-8, Article 9.2 may be adequate. Though written for engineers, this section may provide sound guidance for architects as well. The complete text of that article reads:

"Engineer will make visits to the site at intervals appropriate to the various stages of construction to observe the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the contract documents. Engineer will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work. Engineer's efforts will be directed toward providing for owner a greater degree of confidence that the completed work will conform to the contract documents. On the basis of such visits and on-site observations as an experienced and qualified design professional, engineer will keep owner informed of the progress of the work and will endeavor to guard owner against defects and deficiencies in the work."

On larger, complicated projects, the owner may elect to have the design professional provide field personnel as resident project representatives or construction managers. In this case, construction monitoring is a full-time job and construction inspection becomes an ongoing activity.

Continuous observation and periodic sampling and testing are necessary for items that are fabricated at the site, such as cast-in-place concrete and built-up roofing.

In general, architects have an excellent, broad-base knowledge of construction administration. There are, of course, many architects who would benefit from construction management training in the office and in the field. This is equally true of engineers whose functions are not primarily associated with the construction process. What is important is that the architect or engineer either participating in or responsible for construction administration have full-range involvement. This includes project personnel not directly involved in the field effort. For example, if the person handling paperwork regarding design changes in the office is kept aware of construction claims and associated resolutions, he or she gains experience and benefits from the con-

Mr. Welcome, P.E., is manager of the specifications department in the headquarters offices of Morrison-Knudsen Engineers Inc., San Francisco. He is on the National Society of Professional Engineers Professional Engineers Council contract documents committee and is a professional member of the San Francisco chapter of the Construction Specifications Institute.

struction process even though not directly involved in the field.

Engineers should and do have construction administration contracts directly with owners. The quality of services provided by the engineer must be that expected from a professional qualified by education, training, and experience. The contractual relationship with the project's owner is a business consideration that should be established independently of the quality of the services to be provided. Therefore, whether the engineer is employed by the owner or the architects should have no effect upon the professional services rendered.

The owner should pay for on-site construction inspection personnel. It is a legitimate expense billable to the owner. Such services should be agreed upon during negotiation of the owner/engineer or owner/architect agreement. I would be concerned about the alternative, where this basic design service is placed under the classification of a general overhead expense. As businessmen, we are driven to reduce general overhead expenses (and associated services) in those times when billable work is insufficient to support such overhead.

The design professional performing construction inspection should not be liable for undetected errors or omissions that subsequently lead to failure, in my opinion. The design professional's involvement in the construction process is intended to be an effort that will endeavor to guard the owner against defects and deficiencies in the work. EJCDC 1910-8, Article 13.7 states: "Neither observations by engineer nor inspections, tests, or approvals by others shall relieve contractor from contractor's obligations to perform the work in accordance with the contract documents."

The design professional can neither guarantee the quality, safety, or performance of construction by the contractor nor assume responsibility for any failure by the contractor to furnish and perform the work in accordance with the contract requirements. Responsibility for errors and omissions should be primarily with the party committing the same. For instance, if architects and engineers are jointly checking shop drawings, they would, I hope, be checking in accordance with their respective disciplines and expertise. I feel the party checking would have the responsibility for that portion he or she was required and qualified to check.

The minimum frequency of site inspection for a consultant engineer is dependent upon the nature of the project, its complexity, and the extent of services for which the engineer is engaged. One extreme would be a project that has specific predetermined milestones in the construction sequence requiring construction observation as a condition of progress payments and continuation of construction, with the design professional engaged only for that task by a private owner. The other extreme would be a project involving many concurrent construction activities for a number of facilities for a public agency.

In the first case, the design professional and the owner may be intermittent visitors to the site, whereas in the second case both the design professional and the owner would have complete, full-time field staffs on the sites. All of these factors must be considered in establishing the scope of work and compensation under the architect/engineer contract.

I have no experience on projects where the engineer's responsibility to the project is through (or with) the architect, but I can envision that the engineer's services under that arrangement would be provided under an agreement similar to that contained in EJCDC 1910-10 (or AIA C141), Standard Form of Agreement Between Engineer and Architect for Professional Services.

Contractor's Response

By Vernie G. Lindstrom Jr.

A responsible design professional should be available as construction progresses to interpret the documents where conflicts arise or questions of intent need clarification and to establish acceptable quality standards of workmanship as work progresses. Ideally, the architects should be the ones performing such observation. The frequency of observations depends upon the size of the project and the degree of complexity. For simple projects under \$2 million or \$3 million, inspections once a week, plus job visits as needed to meet specific requests from the contractor, are probably sufficient. This would eliminate unnecessary delays that can occur while the contractor is waiting for interpretations or clarification. Larger and more complex projects require full-time staff who bring with them the expertise to keep the job moving when problems arise that require design modifications.

I believe that an architect should accept a contractor's suggestions for substitutions to specified materials or systems only when such substitutions are consistent with the architect's knowledge of acceptable alternatives. No matter how knowledgeable and trustworthy the contractor is, the architects should always maintain control of design interpretations.

Whether a person performing construction inspections should be liable for undetected errors or omissions is an overly general question. But I do think it is mandatory that design professionals accept the responsibility and accountability for their construction administration services. If the architect has full-time inspection and a reasonable person could have detected the error or omission, the architect should accept responsibility if the construction error or omission was not committed to benefit the contractor. Also, in the tripartite relationship of owner, architect, and contractor, the architect is the one who must accept total responsibility for the shop drawings. How architects share responsibility with their consulting engineers is strictly up to each design firm.

The owner should pay for onsite inspection as a legitimate billable expense and not as a part of the design fee.

Excellence in construction administration will significantly reduce the litigious environment we currently detest, and I have three suggestions for increasing the quality of construction administration. First, make construction administration a special architectural profession (and not a necessary evil). Second, provide proper and continuing education in the skills of inspection to maintain high levels of competence. Third, instill in architects the need to be team players and provide timely response to requests for information and decisions. I also think that tie-back of information from construction administration to the designers is absolutely essential. The tie-back is a part of the continuing education process of the architects and their inspectors.

Mr. Lindstrom is president of Kitchell Corporation, a holding company representing wholly owned subsidiaries Kitchell Contractors Inc. (general contractors and construction managers), Kitchell CEM Inc. (program and project management), and Kitchell Development Company. He was the 1985 president of the Associated General Contractors.

Inspector's Response

By Robert J. Fowler, AIA

If you want a quality final product, then it's essential that the design professional follow a project through to the conclusion. Nobody knows a job to the detail and extent that the design professional does, and he or she has a different level of concern about it than anyone else. Not having the design professional serve as construction administrator is like having an artist conceive of a painting, then let someone else paint it without the artist ever looking at it.

Who should be doing the construction observation and at what frequency is dependent on the kind of project. I don't think project cost has much to do with this decision. What is involved is the end results you want, and the type and complexity of the project. You can have a \$10 million project, such as an open assembly plant, that wouldn't require very frequent inspections. On the other hand you can have a project of only \$500,000, for example a custom residence, in which the design professional should be on site almost every day and maintain very close scrutiny of it.

Most building codes require that the building inspectors make designated inspections prior to the work being covered. The architect, on the other hand, should observe the very beginning of a phase of construction as well as during that particular phase. With a brick wall, for instance, a sample panel should be built on the site, and the architect should be on hand to observe the start of the brickwork on the project to make sure it conforms with the sample panel. You don't wait until a wall is completed before you point out that the mortar is the wrong color.

I feel pretty strongly that construction administration should be billable to the owner, since the owner benefits directly from that service. I know that in some cases the construction administration cost is included in the contractor's contract or is included in the architect's fee, but I feel these services should be billed directly to the owner. The contractor should not be paying directly for construction administration because of the potential for conflict of interest.

An essential element of construction administration is passing information gathered during construction observation back to the design architect. When we have a project where there is professional observation of the work, we always make an attempt to inform the architect when a correction notice has been placed on the job. With jobs where the architect is not following through with field observation, we only notify him or her of the correction notices if it involves what we feel may have been an error in the construction documents. In some cases a problem could require redesign work.

If there's one area that stands out in my mind where architects in general could use improvement, it's knowledge of codes. Many times architects are not as sharp on the codes as they

could be, and as a result they are embarrassed too often by corrections the municipal inspectors place on their jobs.

I think the contractor should be an equal partner when it comes to cost-saving strategies or alternate substitutes. The contractor is the individual in the team who is best versed in cost. I've specified materials that cost several times as much as another product that would have done equally as well. The contractor is in the best position to identify these. However, substitutions should never be made without the involvement and approval of the design professional. The architect must maintain the final say, but the contractor should be encouraged to make substitutions available whenever they're appropriate.

Naturally the answer to the question of liability is determined by the courts, based on specific circumstances, but I do have a strong opinion on the subject. The contractor has contracted to produce a product based on a set of plans and specifications. Although the design professional may be responsible for errors made in plans, the contractor should be responsible for errors made during construction. In a case where the building inspector or design professional observing the project notices a problem the contractor has made and does not bring that to somebody's attention, or deliberately overlooks it, then I feel they have certainly gained some responsibility. I fail to see the logic in holding design professionals responsible for something they have not seen or that the contractor has covered up before they get there.

We check plans and issue permits based on working drawings. The engineer or architect is responsible for reviewing shop drawings. So unless there is a change from the working drawings, we rarely see shop drawings. We expect that if there's an error in the working drawings, the design professional will bring that to our attention and make corrections at the appropriate time.

We keep daily inspection records including the name of the inspector, the date the inspector was on the job site, and what was being inspected. If there are corrections written on the job, we record the nature of the correction and a date that the correction was made. Those become permanent records.

The design professional is the only individual in the program who really knows the end product everyone is working toward. For that reason, the design professional must be the guiding hand for quality control, fit and finish, and esthetics. The contractor is looking for staging, cost control, and efficiency in detailing. The building inspector is concerned mainly with minimum levels of life-safety and fire protection. Many times the respective interests of the three parties do not interface. The building inspector is a necessary part of the program but cannot control the fit and finish of the building, quality of painting, or joining work of the cabinetry. The contractor is mostly interested in getting in and out of the project with a profit, if possible. So the whole team has to work together to get a successful, completed project. If you wanted to put terms to what each member of the team does during construction, you could say the architect "observes" for quality control, the contractor "manages" for cost control, and the building inspector "inspects" for compliance with minimum standards.

The best way to get a satisfactory project is to have a team effort between the design professional, the contractor, and the municipal inspection department. If any element of that is not functioning properly, you run the chance of getting a less-than-satisfactory project. Normally, the one who I have seen most often left out of the construction phase is the design professional performing observation of work. □

Mr. Fowler is director of building inspections for the City of Abilene, Texas, as well as a registered architect and professional engineer. He is an active member of AIA's building performance and regulations committee, and a member of its steering group. He is also on the board of directors for the International Council of Building Officials.

Ah, the big idea. Everyone has one. But not everyone can afford a plotter to plot one on. Which got us thinking. What if there was an HP quality plotter so reasonably priced you could afford to hook one up to every PC CAD workstation in the office?

Introducing the HP DraftPro Plotter. Now for only \$5400 any architect, engineer or designer can create perfect plots time after time. Consider what the DraftPro can do:

It can draw straight lines, smooth arcs and perfectly-formed characters. All on C and D-size drafting film, paper or vellum, using eight different pen colors.

Furthermore, it works with

just about any PC, such as the HP Vectra PC and IBM PC's. As well as popular PC CAD programs like VersaCAD and AutoCAD.

If the idea of having HP reliability with a low price tag makes sense to you, call us now. For a brochure and sample plot, call 1 800 367-4772, Dept. 623C.

The HP DraftPro Plotter: high-quality drafting for only \$5400.*

The drawing shown below was produced on the HP DraftPro with VersaCAD software.



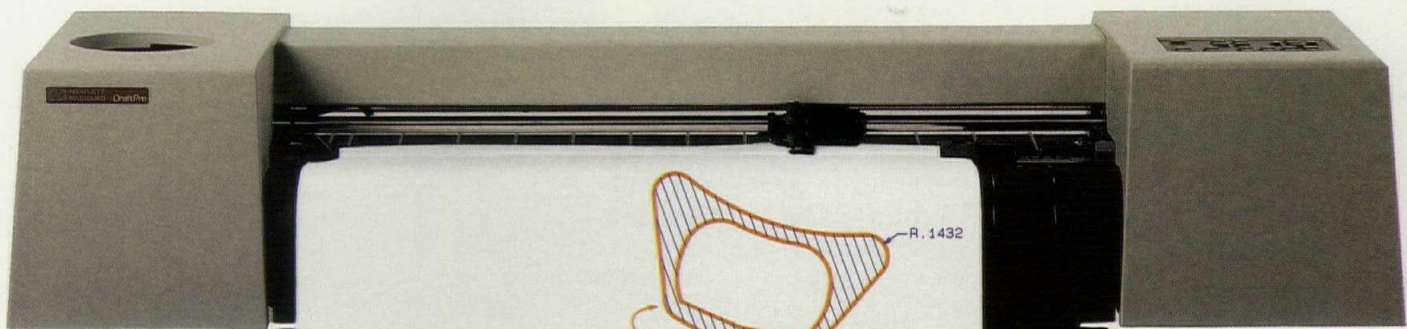
HP Vectra PC is a trademark of Hewlett-Packard. IBM PC is a registered trademark of International Business Machines. VersaCAD is a registered trademark of T & W Systems. AutoCAD is a registered trademark of Autodesk, Inc. *Suggested U.S. list price.

Circle 19 on information card

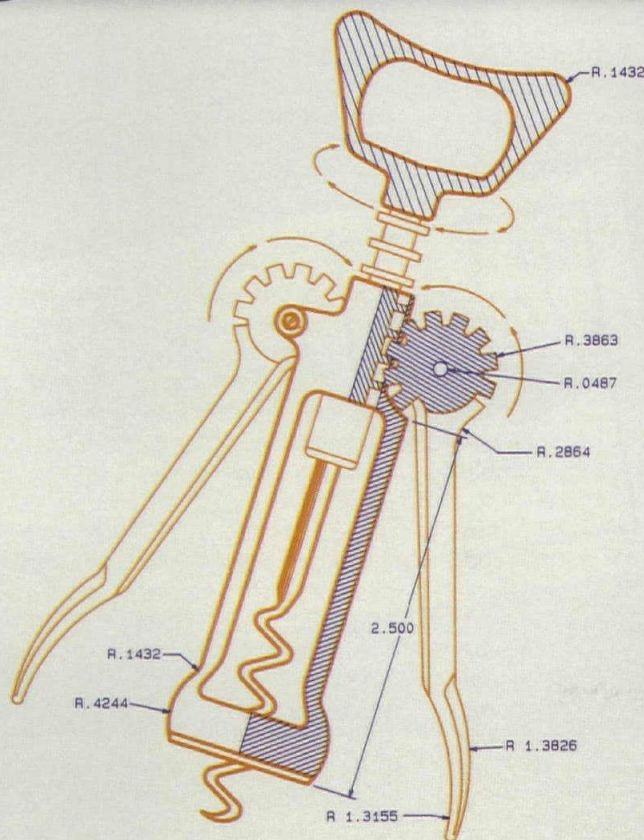
we never stop asking

"What if..."

How to pull off a fantastic HP plot for only \$5400.

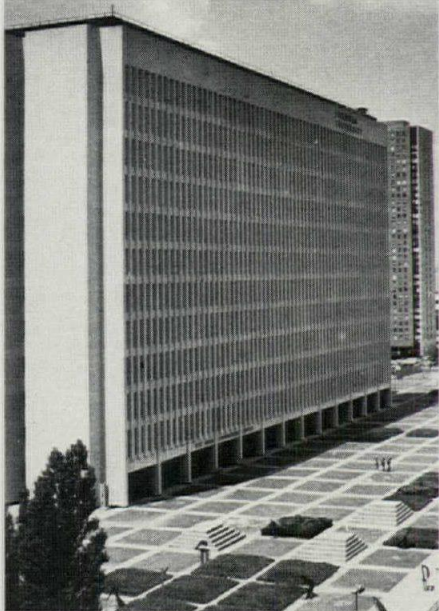


© 1987 Hewlett-Packard Co. PG704AM1



What Do These Prestigious Buildings Have In Common?

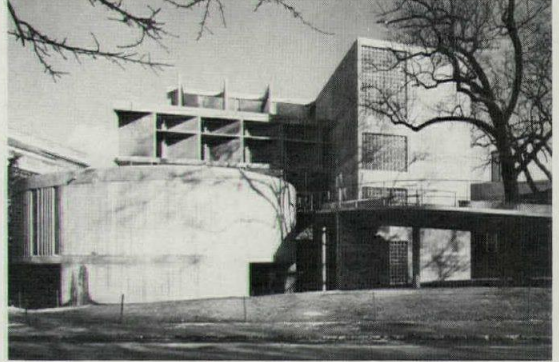
FORDHAM UNIVERSITY



SEALED WITH POLYSULFIDE 1965

*Lincoln Square of Fordham University
New York, NY
Architect: The Perkins & Will Partnership*

CARPENTER CENTER, HARVARD UNIV.



SEALED WITH POLYSULFIDE 1963

*Carpenter Center For The Visual Arts
Harvard University
Cambridge, Massachusetts
Architect: Le Corbusier*

UNITED AIRLINES HEADQUARTERS



SEALED WITH POLYSULFIDE 1966

*United Airlines Headquarters
Libertyville, Illinois*

If all started here...



For more than 50 years, LP polysulfide base sealants have been reflectively sealing curtain walls, concrete and masonry buildings against the elements.

To find out about other prestigious buildings that have been sealed for more than 15 years with Morton Thiokol LP® polysulfide base sealant, send for your copy of, "It All Started Here".

*Morton Thiokol, Inc.
Morton Chemical Division
Mkt. Comm. Dept AIA
333 W. Wacker Dr.
Chicago, IL 60606*

'Upside-Down' Roofs

Protected membranes lie beneath insulation board.
By Timothy B. McDonald

About 10 years ago I worked for an architectural firm that was constantly dealing with roofing problems—in its own office building. If the forecast called for rain that night, the standard drill was to put out the buckets and cans at quitting time and hope for a light rain, because if the buckets overflowed, we spent the morning mopping up. One morning, after a particularly heavy downpour, a sales representative met with us to demonstrate an entirely new roofing system. We were, if not excited, certainly receptive, particularly those of us who did the mopping.

The new roofing system we saw that day was called a protected membrane roof (PMR), sometimes known as an inverted roof assembly. (The general system configuration is shown in Figure 1.) When the sales rep left, my boss made it clear that the office wasn't going to be reroofed with what he felt was a highly suspect system, at least until the bugs were worked out. "Besides, the existing roof just needs to be patched," he said.

Since then, a good deal of testing and field experience has gone into perfecting PMR systems, to the point where they now represent a significant percent of the roofing market.

The protected membrane roof reverses the locations of the traditional roofing systems components, placing the membrane on the bottom directly over the substrate, with the insulation above, covered by a protective mat and ballast. This arrangement puts the membrane that keeps the water out of the building in a "protected" position, unlike the conventional roof. The layers above also protect the membrane from ultraviolet radiation, which causes deterioration, low temperatures that can cause splitting, and high temperatures that can cause blistering and ridging to conventional roofs. Thus, the membrane's sole purpose becomes waterproofing, while the role of the insulation is not only to insulate the building but, along with the other components, to help protect the membrane.

Early pioneers of PMR systems employed a variety of membrane materials, some that had previously been used only as waterproofing, others that were commonly used in conventional roofing systems. They included loose or fastened inorganic single-ply sheets, liquid-applied membranes, and bituminous hot-applied membranes. It has since become apparent that organic felts are unsatisfactory for PMR applications because they retain moisture and exhibit vulnerability to decay. Coal-tar pitch membranes assemblies using polystyrene insulation boards proved unacceptable because the two components are chemically incompatible. When expansion and contraction subject a concrete substrate to cracking, fluid-applied membranes are not a wise choice either.

For these reasons, most major manufacturers currently specify some type of ethylene propylene diene monomer (EPDM) membrane. These membranes are generally loose-laid directly on a concrete substrate. When the substrate is a steel deck, an underlayment board or insulation board is fastened to the deck, providing the smooth surface required for the membrane. If high humidity inside the building is likely, a vapor retarder is often placed between the steel deck and the underlayment. Whatever the substrate, it must be clean and smooth prior to laying the membrane.

Each manufacturer has its own methods of installing EPDM membrane sheets as well as recommendations for lapping and for fastening, whether with adhesive, mechanical fasteners, or both. Regardless of the method employed, the architect should check with the manufacturer to ascertain that all components in the assembly are compatible.

Prior to laying the insulation, flashing must be installed. Installation techniques depend heavily on the type of membrane and where the flashing is being placed, as shown in Figure 2. Check the membrane manufacturer's specifications concerning the membrane's perimeter

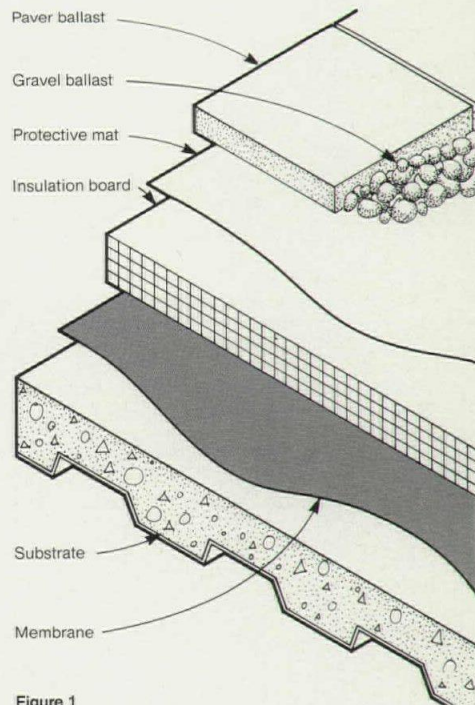


Figure 1

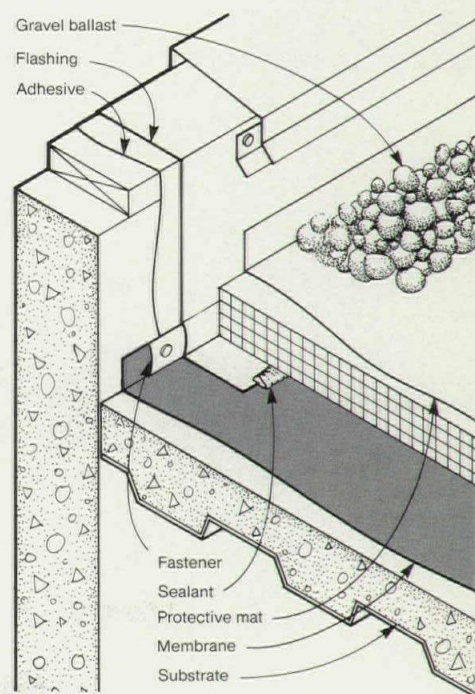


Figure 2

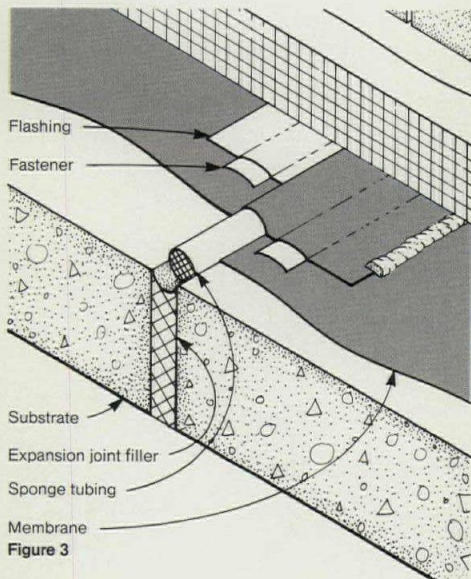


Figure 3

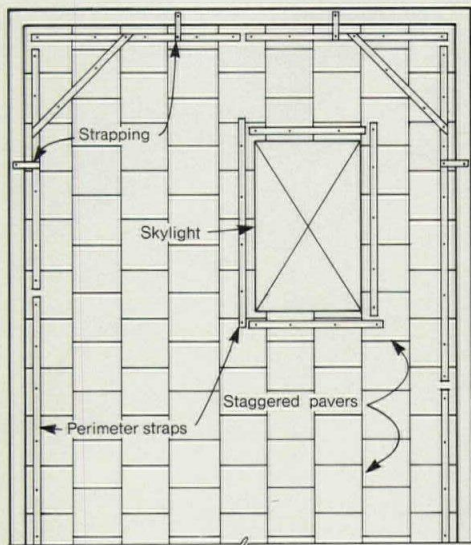


Figure 4

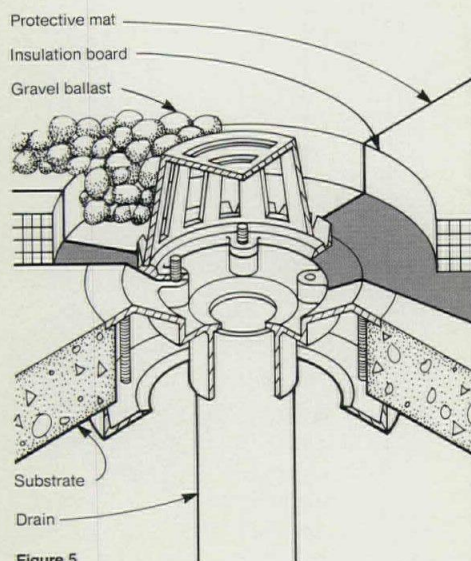


Figure 5

securement, required length of flashing where it laps the membrane, and the proper method of sealing the flashing to the membrane. Special attention should be given to penetrations, especially hot pipes, where a sleeve may be required between the membrane and the pipe. Carlisle, one of the largest manufacturers of PMR components, recommends that expansion joints be carefully designed to eliminate air pressure development below the loose-laid membrane, as illustrated in Figure 3.

Placing the insulation above the membrane practically eliminates the thermal stress to the membrane. Any thermal bridging that might occur because of loose joints between the insulation boards can be taken care of by using thicker insulation with narrow joints, or laying two layers of insulation and staggering the joints.

The two-layer solution has the added benefit of interlocking the system, preventing flotation of individual bottom boards. Carlisle Corporation states in its recommended specifications, "The system must float. The contractor's aim should be to build a 'raft.'" To this end, W.R. Grace Construction, another manufacturer of PMRs, recommends the use of tongue-and-groove insulation boards, which are also effective in eliminating thermal bridging.

Place drains carefully

Roof drainage is probably even more important to PMR systems than to conventional built-up roofs. Ponding increases the risk of leakage into the building and it allows the insulation time to absorb moisture. Standing water reduces the insulation's insulating ability as well as increases the risk of cracking, spalling, or flaking as a result of trapped, freezing water.

The integrity of the raft, or system of rafts, must be maintained so that water may flow freely beneath the insulation. Drains, expansion joints, and roof penetrations may disrupt the raft system and allow individual boards to float independently. As shown in Figure 4, many manufacturers recommend the boards be tied together at these points. Figure 5 indicates that the boards should not be attached to the membrane, especially around drains. Pavers around drains can secure the insulation boards, but they must not obstruct drainage.

Interior drains are best located in warm areas of the building, even though some heat loss may occur. In cold climates, they are preferable to exterior drains, which can become blocked with ice. To prevent ponding, interior drains should be installed below the top elevation of the substrate. In extremely cold climates, a correctly placed paver and insulation board can be located directly over the depressed drain to prevent freezing without blocking the drain pipe.

W.R. Grace Construction Products specifies positive drainage "within good roofing practice," such as a 1/4-inch minimum, and a 1/2-inch preferable, slope. This can limit the use of PMR systems in some new construction and particularly in existing construction, where the slope may be inadequate. One solution is to increase the slope of the existing roof with tapered insulation applied directly to the substrate. The membrane would then be applied over the tapered insulation, topped with an additional layer of insulation, protective mat, and ballast.

Protective mats filter debris

Debris and fine gravel washed down between the insulation boards caused some of the earlier problems in PMR systems, by blocking the escaping water and in some cases causing the boards to buckle when expanding on hot, sunny days. Today, most manufacturers specify a protective mat between the insulation and the ballast to alleviate this problem. The mat functions as a sieve, preventing the fine particles of gravel and debris from settling between the joints. It also helps tie the raft together, limiting flotation of individual boards. Even when using pavers, the mat is recommended to filter away debris carried by wind or foot traffic.

Protective mat material varies among manufacturers—often they offer several types in a variety of materials, colors, and weights varying from three to seven ounces per square yard. Each sheet of protective matting is loose-laid, lapping the preceding sheet, but, unlike the membrane, mat sheets are not attached to one another. Around drains, as illustrated in Figure 5, Carlisle recommends the protective mats be extended "to the base of the bonnets but should not cover the drain or restrict flow to the drain." Around penetrations such as vent pipe, additional fabric is recommended to

prevent debris from getting between the insulation and the pipe seals.

The tasks of the ballast include keeping the protective mat, insulation, and membrane from being blown off the roof; protecting these components from ultraviolet radiation; and preventing storm damage. Ballasts are usually crushed stone, gravel, concrete pavers, or sometimes a combination of these and are selected according to criteria such as expected wind velocity, required roof drainage, and projected foot traffic.

While normal adhered roofs are designed to meet a 30 to 60 psf wind uplift, most manufacturers of PMR specify 10 to 15 psf of gravel ballast; around drains, penetrations, the roof perimeter, and any place insulation boards stop, they recommend at minimum 20 psf. This lightened load is possible because loose-laid ballasted roofs, including PMR, react differently to wind uplift: Whereas the conventional adhered roofs tend to fail in local areas of weakness that spread rapidly, in a ballasted system any wind-lifted area shifts its ballast to an adjacent area whose uplift resistance is consequently increased.

The size of gravel plays an important role in resisting the wind's attempts to turn it into projectiles that can threaten people and property. The greater the stone size, the greater the force required to lift it. Another method of protecting the gravel ballast from being blown off the roof is to increase the height of the parapet, which shields the gravel from the direct wind.

Pavers may be installed instead of gravel, especially in areas where heavy foot traffic is expected. They should be designed for durability, ease of removal, and ability to resist wind uplift. The last two of these are functions of weight and installation. Manufacturers recommend the pavers be staggered, no larger than two feet square, and weigh no more than 60 pounds per paver. The manner in which the pavers are installed over the insulation can vary. Some manufacturers recommend the pavers be elevated above the insulation by means of pressure-treated wood blocks, paver pedestals manufactured specifically for this (shown in Figure 6), or a layer of permeable gravel or crushed stone.

All three methods increase the speed with which the roof drains, whereas placing the pavers directly on the insulation slows the drainage process as well as increases the average moisture content of

the insulation. The tradeoff is that when the pavers are placed on wood blocking or premanufactured pedestals, one can expect greater heat loss because of increased air flow between the insulation and the elevated pavers.

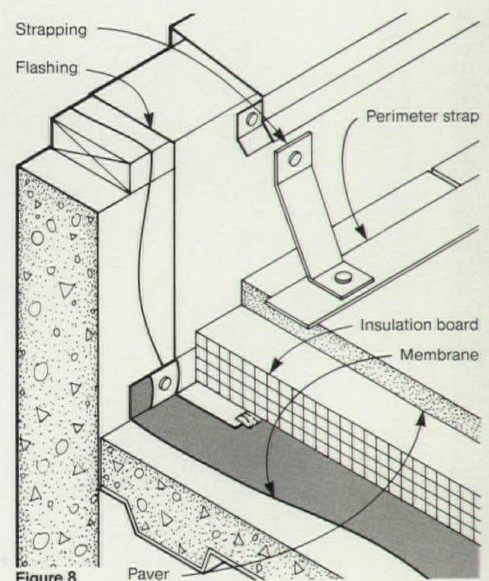
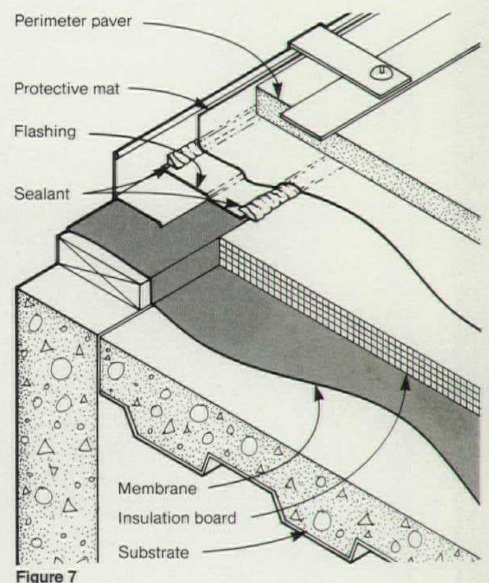
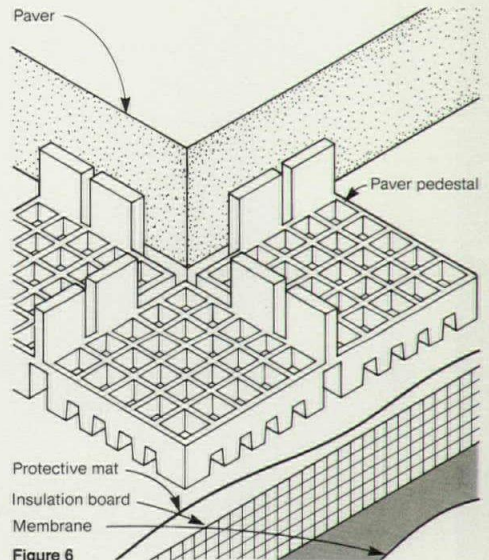
Pavers are also used on gravel ballasted roofs to secure the perimeter and around any penetrations, such as skylights, to provide additional resistance against wind uplift. Figure 7 illustrates this concept. Carlisle recommends these perimeter pavers weigh at least 20 psf and be a minimum 24 inches wide. Securing the pavers provides additional protection against wind uplift.

Metal strapping is usually used with the insulation/ballast board systems, such as Dow's LG board, but can also be used with concrete pavers, particularly in areas prone to high winds. Strapping fastens the individual pavers to one another so they work as a unit, as shown in Figure 4, and is especially effective around penetrations. Figure 8 illustrates how additional straps tie the perimeter pavers to the parapet. Strapping should be corrosion-resistant and flexible enough to allow for flotation of the raft.

PMR works for reroofing

Manufacturers of PMRs stress that the system doesn't disrupt the normal functions of the building during reroofing. However, when specifying PMRs for a reroofing, several things should be considered. Foremost is the ability of the existing structure to accommodate the dead loading of the ballast. In most cases this problem was solved when various manufacturers produced combination insulation/ballast boards, consisting of a lightweight concrete bonded to the insulation at the factory. They vary in thickness from 2 inches to 3½ inches, and come in 2- by 4-foot boards. They are not recommended for areas where heavy foot traffic is expected.

PMR applications can be placed over the existing roof if the old roofing is in good shape and compatible with the membrane. All gravel should be removed if the new membrane is to be laid directly over the old roof. If additional board insulation is needed, only loose gravel need be removed. When an existing roofing material is in very poor condition and has to be removed, the exposed substrate should be patched, cleaned, and made smooth and dry. □





S O F F

Choosing Stucco Systems

Stucco, a traditional building material in the American Southwest and the Mediterranean, is becoming more widely used throughout the United States and Europe. Increasing use of stucco in turn has given rise to increased use of synthetic stuccos. Architects, contractors, and owners are asking which to use when, the advantages and disadvantages of real versus synthetic stucco, how to avoid problems such as water seepage, and whether observed cracks are failures or just the nature of the material. The answers to these questions emerge from a better understanding of the various classes of products on the market.

Each type of stucco or synthetic stucco has its own material characteristics and behavior, offers a different architectural expression, and requires unique details. All, to be effective, depend on workmanship, which suggests that architects ought to select stucco products from manufacturers that take responsibility for their products and application.

Stucco and the many types of synthetics can be divided into four basic families, grouped by hardness and thickness of the finished coatings. The characteristics of each, together with guidelines for use, are outlined below.

Stucco—hard, thick finish

This is the “real thing” stucco, composed of Portland cement and sand plaster; it behaves much like concrete. Applied in a coating about 7/8-inch thick, authentic stucco requires detailing that will allow it to shrink toward its centroid, in order to remain crack-free, Figure 1. Penetrations such as electrical fittings may prevent proper shrinkage if they do not float with the stucco or have clear space around them.

Irregular thickness also may cause cracking, which is the reason that sheathing or stringer wires should be used with studs to provide uniform thickness in the stucco coating. Keeping the design free of stress points, such as intruding corners, and sizing the stucco spans with nearly equal dimensions that are not overly large (usually about one story tall, but it depends on the job), will also help reduce cracking. Adding a properly specified acrylic to the stucco is another commonly used method.

Application techniques greatly influence the success of stucco. Expanded metal laths, because of their stiffness, reinforce and support better than wire laths, Figure 2. In stucco applications on concrete or masonry, lath may be omitted if an adequate bond forms to the substrate.

It is advisable to place the second coat the day after placing the first coat and allow them to water-cure together. This permits the two coats to shrink in unison, as opposed to at different rates which may cause delamination and crazing. Beware if any part of the application looks lighter in color during the first three days of curing—the lighter color indicates damage to that part of the stucco from drying out too much.

Stucco application requires that the building joints be expressed. If the client is willing to accept cosmetic cracks (should they occur) as part of the building's esthetics, two integral colors (one of which will show through the cracks) can be used and extra painting avoided. Different colors are most successfully applied in the light-to-medium range, because darker colors tend to mottle.

Choosing among stucco and stucco-like synthetics requires analysis of material properties and application methods to select the best product for the job.

Hard, thin coatings

White Portland cement products with a high content of acrylic bonding agent form this category of thin, integral-colored, hard plaster coating assemblies, Figure 3. They may contain fine aggregates to provide a range of texture and troweling effects.

The thickness of this type of coating is approximately 1/8 inch, more or less depending on the surface to which it is applied. Pressed into place with a trowel, it requires a mechanical tooth in the concrete or masonry substrate.

A finish coat is then troweled or floated to provide the surface texture desired. Like stucco, hard, thin coatings will allow most building joints to show, but it can be used to conceal joints in concrete masonry. A hard, thin coating can mimic rubbed concrete or stucco in appearance, and, properly applied, it cannot be gouged off with a screwdriver.

An extra benefit of hard, thin coatings is that they provide dampproofing and, in proper applications, can also serve as waterproofing. “It is important for the architect to realize that ‘waterproofing’ constitutes not only specifying the correct type of coating, but also means that all the building components in the system, including the connections, should be designed to keep the water away from

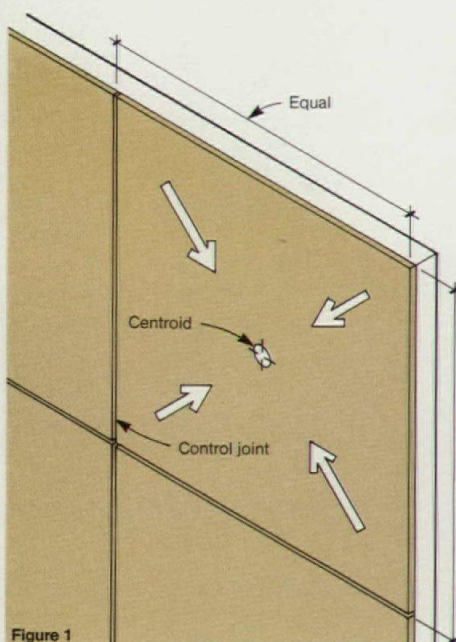


Figure 1

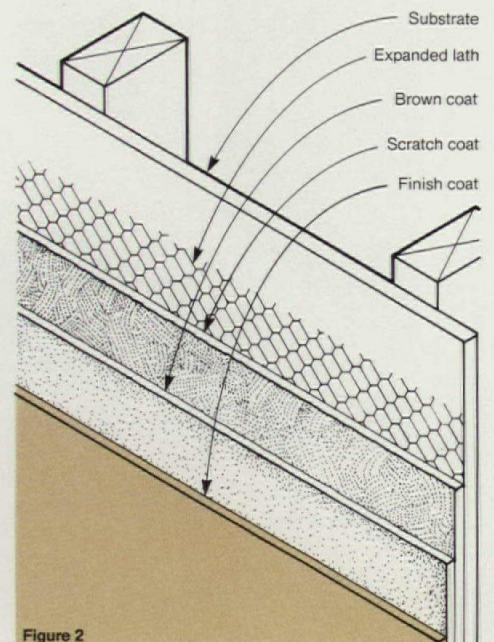


Figure 2

the wall," says Robert Sherro, technical representative for Thoro Systems Products, a company that has been manufacturing this type of coating ("Thoro-seal") since 1912. Sherro also cautions that different manufacturers have different definitions of waterproofing. "For Thoro products, 'waterproofing' means 'able to resist hydrostatic pressure,' not just 'able to keep water from penetrating the surface.' This is just one example of why architects' specifications should require the applicator to follow manufacturers' instructions."

Hard and medium-thick

These modified Portland cement plaster assemblies consist of polystyrene board to which chicken wire-type netting lath is applied, topped with a $\frac{3}{8}$ -inch thick finish coat of stucco, Figure 4. When detailed to allow shrinkage, hard, medium-thick assemblies have been successfully used in the residential market. This type of assembly is harder than stucco therefore more brittle and less "forgiving." It must be cured longer than stucco, because it may curl if inadequately cured. Curling may also result if detailing and accessories are incorrect, such as a lack of vertical expansion joints.

Hard, medium-thick assemblies, of which "Powerwall" and "Pleko" are examples, yield the same sort of architectural expression as stucco. If the surface to which they are applied is not true, or the wire netting is loosely applied, the thick-

ness of the coating may be as much as one inch. Potential problems, such as cracks from too few joints, inadequate curing, and poor workmanship, can be avoided by using manufacturers who provide technical assistance with detailing and specifying, have approved applicator programs, and take some responsibility in the finished work.

Soft, thin coatings

These coatings consist of fabric-reinforced, elastic, very thin multiple coat assemblies applied over polystyrene bead-board, and often backed with gypsum board, Figure 5. Some of the best known products of this coating type are "Dryvit," "Insul/crete," and "Surewall." Like the hard, medium-thick assemblies, they can be very dependent on strict adherence to manufacturers' requirements for successful applications.

Potential problems to be on the lookout for include: inadequate embedding of the mesh in the undercoat; lack of bond between the polystyrene and the coating; a coating that is crumbly and hard, as opposed to soft and elastic; or an uneven surface appearance of the polystyrene. The finish work should be applied tightly to the insulation with no gaps and no mesh showing, before the finish coat is applied.

Proper sealant joint construction depends on the coating-assembly applicator constructing the sealant groove to the proper size and shape.

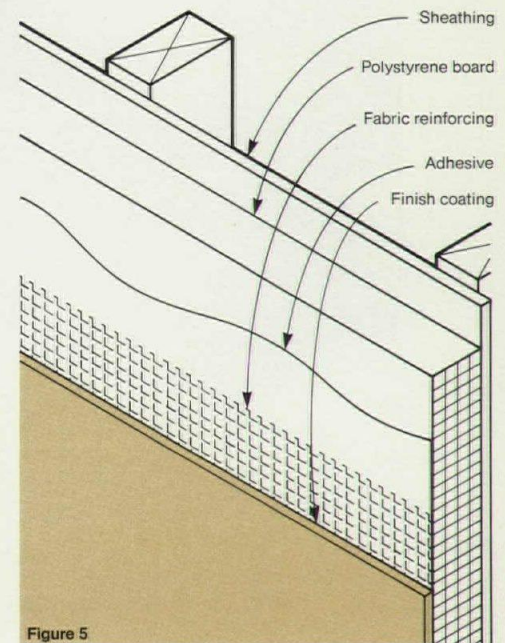
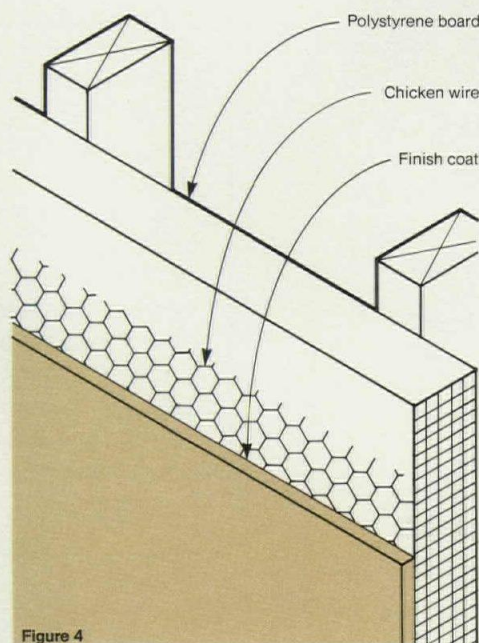
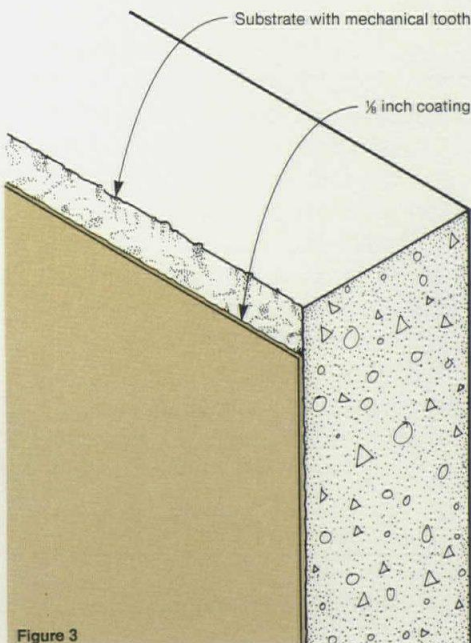
These coatings come in a wide variety of colors. In very warm, sunny climates, check with the manufacturer before choosing a very dark color, which may cause a buildup of heat, possibly damaging the coating.

Among stucco look-alike materials, soft, thin coatings have an architectural expression all their own. If the design calls for a joint-free, stucco-like surface, this type of coating may be ideal. It can be applied joint-free to light-gauge metal framing as far as the structure can go without an expansion or seismic joint.

According to William O. Bishop, P.E., vice president and director of technical services for ISPO, Inc., manufacturers of "R-wall" exterior insulation and finish systems, service of the manufacturer to those specifying and assembling soft, thin, coatings systems makes a tremendous contribution to the success of the application. "We feel obligated to provide a greater level of educational support to the specifier and installers of our products, especially considering the rapid growth of usage," he says. To this end, IPSO is preparing "10 commandments" lists of installation and design tips for their product, and plans to publish a monthly newsletter for architects and applicators this year.

—H. MAYNARD BLUMER
WITH STEPHANIE STUBBS

Mr. Blumer is a consulting architect in Paradise Valley, Ariz., specializing in materials selection and construction problem troubleshooting.



ARCHITECTS INTERIOR DESIGNERS

Major Mid-Atlantic firm seeks degreed Architects and Interior Designers with 3+ years experience in:

- Commercial building design
- Food facility/restaurant design
- Shopping Mall design
- Commercial interiors

Excellent advancement potential, benefits program and location with rapidly expanding office. Solid commitment to quality design. Salaries to \$42,000 commensurate with experience level. Openings at levels from draftsmen to multiple on-going projects manager. All fees and interviewing expenses borne by client. All replies acknowledged and remain strictly confidential. Contact Chip Saltsman by phone or résumé.

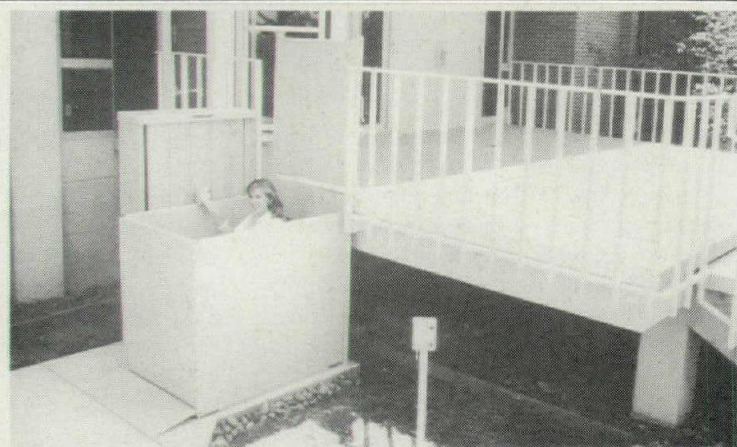
FOX-MORRIS

Personnel Consultants
Mercantile Towson Bldg.
Baltimore, MD 21204 (301-296-4500)

Circle 35 on information card

PORCH-LIFT[®]

VERTICAL WHEELCHAIR LIFT
provides a safe, simple solution
to architectural barriers



Whether you're modifying an existing building or designing a new one, accessibility to the handicapped is important. And PORCH-LIFT provides the simple, economical solution . . . indoors or outdoors. This safe vertical wheelchair lift platform anchors permanently beside the steps, using a minimum of space. Motor and mechanisms are enclosed. Runs on 110 volt current. Weatherproof finish. Choose from nine models with varying lifting heights. Shipped ready for installation.

WRITE FOR A FREE BROCHURE AND NAME OF THE DEALER NEAREST YOU.

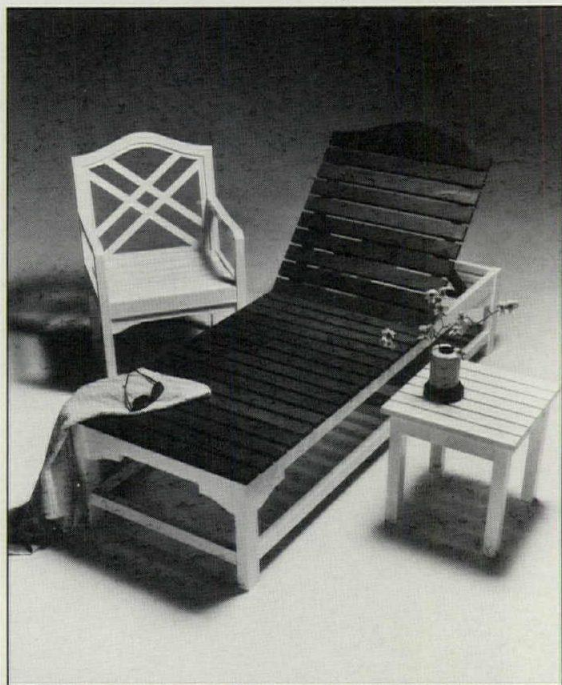
AMERICAN STAIR-GLIDE CORPORATION

Dept. AIA187, 4001 East 138th Street, P.O. Box B
Grandview, Missouri 64030

Circle 46 on information card

THE CHATTAHOOCHEE MAKERS COMPANY

1098 Huff Road, N.W. Atlanta, Georgia 30318 (404) 351-7016



Benchmark quality, handcrafted from Honduras Mahogany.
Color brochure available.

Wholesale only to the design trade.

Circle 37 on information card

POSITION ANNOUNCEMENT

SUNY at Buffalo's Department of Architecture is recruiting three full-time tenure track faculty for Fall 1987. Two of the faculty are being recruited at the rank of assistant or associate professor to teach design studios as well as support courses. The third position is also being recruited at the rank of assistant or associate professor and will primarily focus on the further development of our second professional, M.Arch., degree program in Advanced Building Technology. Salary for all positions according to rank and qualifications. Applicants should write to Professor Hiroaki Hata, Chairman, Faculty Search Committee, Department of Architecture, School of Architecture and Environmental Design, State University of New York at Buffalo, Hayes Hall, Buffalo, New York 14214. Applications should be submitted not later than 15 February 1987 and should include: a complete résumé; a list of at least three references with full names, addresses, and phone numbers; and samples of professional, artistic, and scholarly work. As an equal opportunity/affirmative action employer, SUNYAB is particularly interested in identifying and recruiting qualified applicants who are women, handicapped persons, and members of ethnic minority groups.

Circle 36 on information card

Avis designs new discounted rates...just for AIA members.

We at Avis have built special new discounts into our rate structure, just for you, whether you're traveling for business or pleasure. As an AIA member, you now get a **15%** discount on current low corporate daily rates at Avis. And you can receive a **10%** discount on Avis SuperValue Weekly Rates and a **5%** discount on Avis SuperValue Weekend Rates.

Your specially-constructed rates and discounts are available on subcompact-group through full-size, 4-door-group cars at Avis. For all other car groups, or where these special daily rates are not available, members receive a **5%** discount on Avis SuperValue Daily Rates.



Avis has also incorporated many exclusive time-saving services you're sure to enjoy, whether you're off to a construction site, or just taking a leisure-time trip. Our specially-designed services let you rent and return your Avis car quickly, without long waits in line at the rental counter.

For information or reservations, call Avis toll free: **1-800-331-1212**

Be sure to mention your Avis Worldwide Discount (AWD) number: **A/A991400**



Avis features GM cars. Oldsmobile Cutlass Ciera.

Avis. So easy.®

Circle 22 on information card

© Wizard Co., Inc., 1986

Corporate daily rates, SuperValue Rates and SuperValue Intercity Rates and discounts are available at all Avis corporate and participating licensee locations in the contiguous U.S. Daily rates are nondiscountable and are not available in Manhattan between 1 PM Friday and 3 PM on Sunday and during holiday periods. Cars and particular car groups subject to availability. There is an additional per-mile charge for miles in excess of the free mileage allowance. Refueling service charge, taxes, CDW and optional coverages not included.

What made manual AEC drawing obsolete in Japan?

Hitachi HICAD GM-1000™ micro-CADD software.
Now, for \$1,950, you can use the design tool that's #1 in Japan.

In Japan, efficient space utilization is a well-honed science. It has to be. That's why Hitachi dedicated a division with more than 3,000 software engineers to streamlining AEC design and drafting tasks. The result is the HICAD GM-1000 software package—a dramatic improvement in drawing productivity.

The HICAD GM-1000 software package brings full-function CAD system capability to your desk top, turning your IBM PC®, XT®, AT® or compatible into a CAD workstation.

HICAD GM-1000 gives you the features you need the way you need them—easy to learn and use. HICAD

GM-1000 provides prompts, error messages, and a help button to guide you.

Walls, windows, doors, floors, details, and site plans can be drawn free hand or automatically constructed, then combined, moved, copied, rotated, or scaled to create complex layouts. All entities are stored in a mathematical database that allows high-speed dynamic pan and zoom without interrupting another function.

User definable features include menus, keyboards, mouse, line styles, batches, and advanced macros. Dimensioning, leader lines, balloons, and fail-safe ten-command storage are automatic. Drawings may be separated into as

many as 255 layers and displayed independently or grouped.

HICAD GM-1000 is a package that will make manual drawing obsolete for you, too. Our demo will show you why. Send for details today.

IBM PC, XT, and AT are registered trademarks of International Business Machines Corporation.

Hitachi America, Ltd.

Computer Division
950 Elm Avenue, San Bruno, CA 94066
Telephone: 1-800/842-9000 ext. 6672
In Canada: 1-800/843-9090 ext. 6672



Circle 23 on information card



Image courtesy of Ragan Design Group

Interiors



© Colin C. McRae

Combining living and working arrangements is hardly an innovative idea, but doing it in the manner in which Toby Levy, AIA, did produced some highly unconventional results: glass block walls separating the shower from the corridor; blinds in lieu of closet doors; galvanized metal baseboards; translucent shades as room dividers; no doors or walls separating one space from another or living from working. "It's all the experiments you don't dare do for a client," says Levy of her approach to the space.

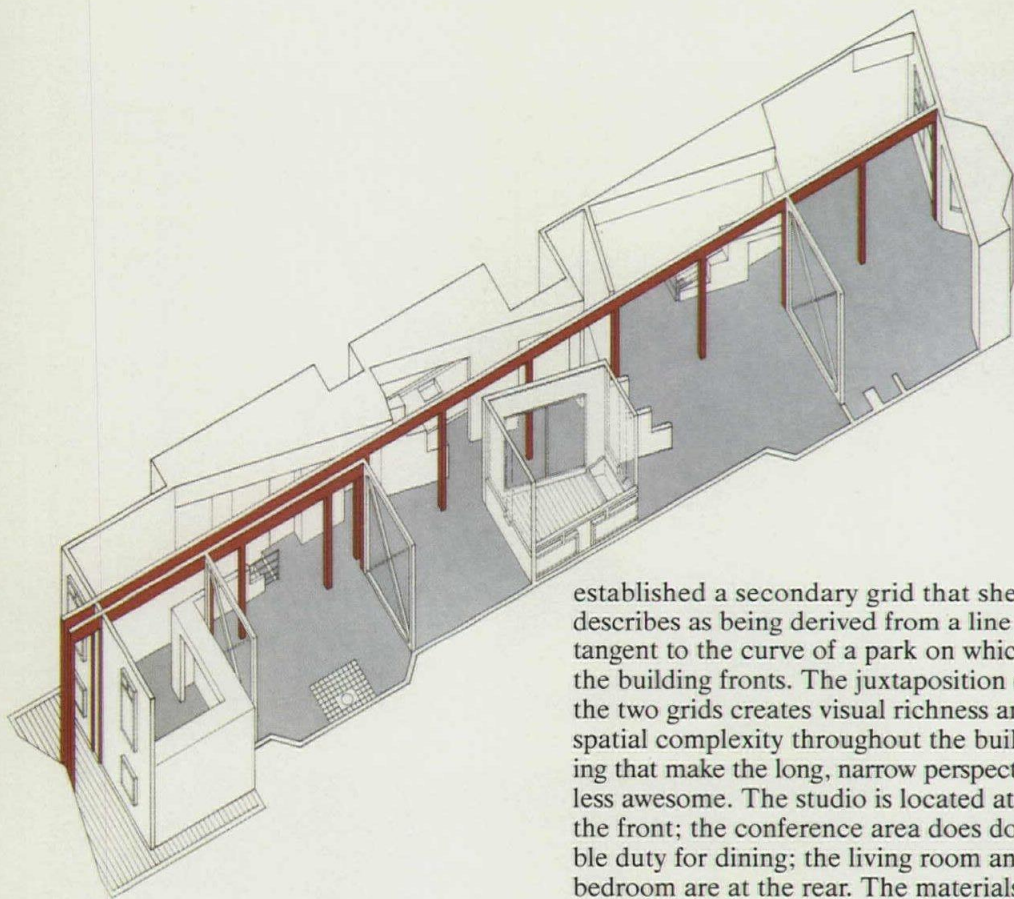
Occupying the entire second floor of a two-story Victorian house in San Francisco,

the space is 90 feet long and only 20 feet wide. It is laid out in a typical railroad flat arrangement of rooms strung out along a corridor and fronting on a tiny light well at the center of the building that brought a minimal amount of light into the rooms at the middle. Since the wooden structure had been badly damaged by fire and required new cross-bracing to conform to the earthquake codes, the interior was entirely gutted and a small court inserted into the middle of the building to bring more light into the interior. In spite of the legacy of San Francisco's Victorian buildings, Levy described this one as hav-

ing no charm at all. There was barely anything original left, with the exception of a few pieces of bric-a-brac that remain on the front facade.

While the basic wood structure consisted of three parallel load-bearing walls, little was kept of this orthogonal geometry except the positioning of the cross-bracing in steel. The center load-bearing wall has been replaced by a red, aniline-dyed wood beam and series of columns that march through the space and out the back wall to an alley.

Having freed the space from the constraints of the narrow width, Levy then



established a secondary grid that she describes as being derived from a line tangent to the curve of a park on which the building fronts. The juxtaposition of the two grids creates visual richness and spatial complexity throughout the building that make the long, narrow perspective less awesome. The studio is located at the front; the conference area does double duty for dining; the living room and bedroom are at the rear. The materials she chose, mostly corrugated metal, steel cross-bracing, and wire mesh railings, reflect the mixed industrial/residential nature of the neighborhood.



In keeping with the esthetic mix, Levy has also furnished much of the space with a combination of off-the-shelf furniture mixed with handmade pieces by Bay Area craftsmen. While the comfort level of some of the pieces is questionable, their visual quirkiness adds a certain delight to the hardness of the interior finishes. Ultimately, in spite of the rather disparate mix of materials and furnishings, Levy takes convention to heart. "In an area known for frequent earthquakes," she says, "there is a certain comfort in knowing that your bed is safely located under the cross-bracing." — SHARON LEE RYDER



Photographs © Colin McRae





With no sign, a few discreetly placed numbers, and an abstract facade punctuated by only a few deeply set openings, the Prytko Film Studio in Venice, Calif., gives little clue to its original incarnation almost 100 years ago as a barn housing streetcars. Although, strictly speaking, it is not a new building, little remains of the original masonry construction. A new coat of stucco, the addition of a pseudo-rusticated base, and a new entrance have transformed the building—like so many of the other warehouses typical of the area occupied (and occasionally even lived in) by artists and designers.

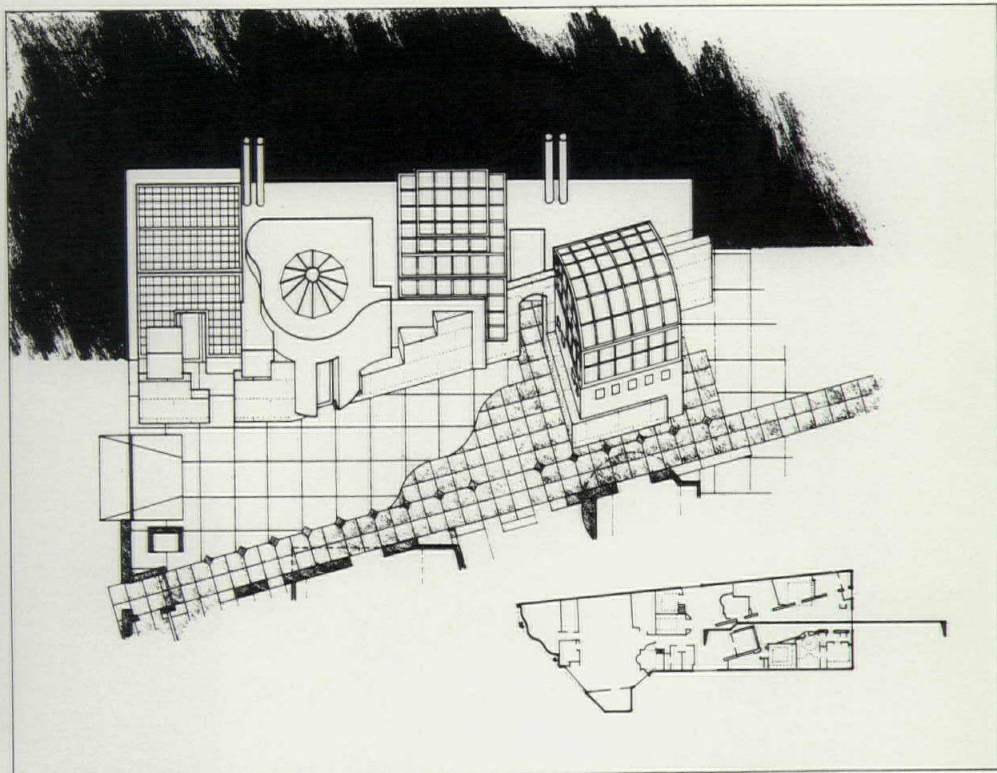
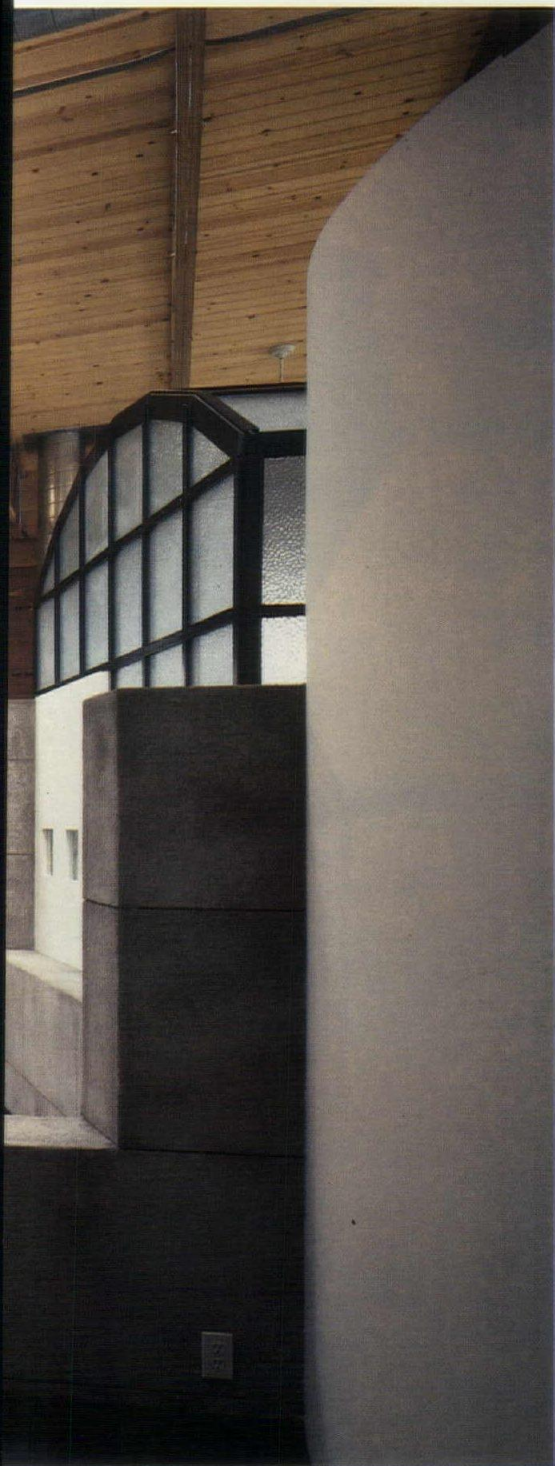
With a clear span structure of 8,000 square feet, the interior space reveals more starkly the coexistence of the older building with the new. Although the roof is almost entirely new (reflecting the need to conform to new earthquake codes), the materials are identical to the older. The

only exceptions are the new skylights that add light to the middle portion of the space. The warm wood ceiling and soft red original brick walls, banded with courses of darker red, reveal the qualities of the old building, the foil against which the new interior is set. Working within this warm palette of colors, architect William Adams chose materials, colors, and forms to contrast—abstract volumes rendered in gray, black, and white.

The programmatic requirements for the new space were treated as objects in space, each housed in separate spaces giving the appearance of a small village of discrete buildings lined up along a street. It was this spatial idea that brought Adams the commission for the job. Joseph Prytko, a producer of television commercials, purchased a house designed by Adams that played with the same building-within-building idea that Adams has developed

more elaborately here. Sensing that such an organizational concept would be appropriate for their new offices, Prytko and Adams continued to explore the idea, both in the new offices as well as in changes to the house. The idea worked well in the volume of the old building; it kept the integrity of the old while emphasizing the qualities of the vast space. It also gave employees separate and private work spaces while permitting a large amount of public space where they gather informally and often during the course of a work day. Prytko's own office is located well back from the entrance at the end of the interior street, not to isolate him from intrusion but to put him in the thick of things where he prefers to work.

In developing the containers for each of the separate functions housed within the space, Adams uses a consistent vocabulary based on the classical system of a



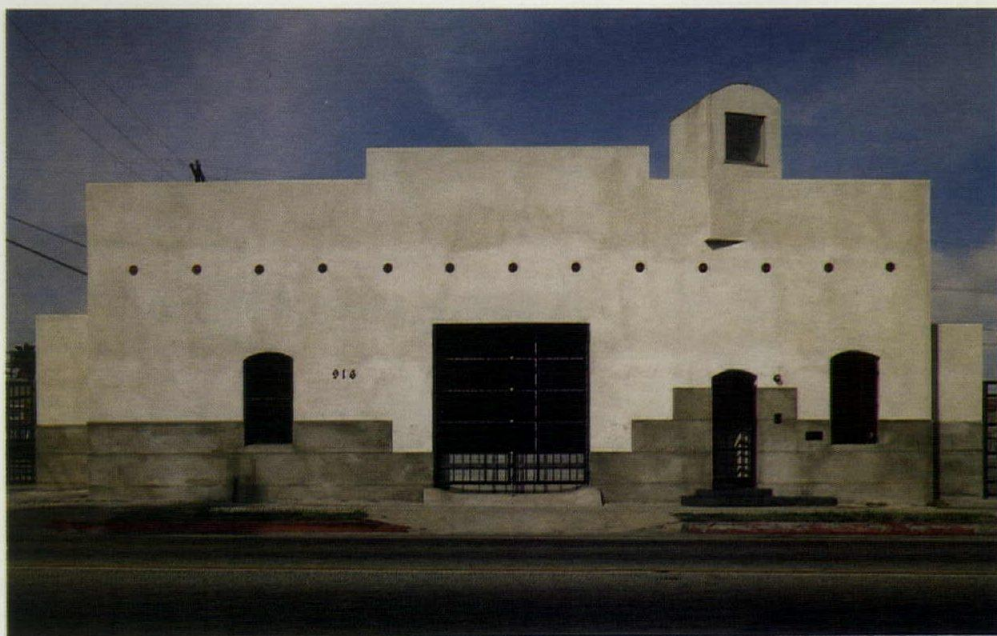
Right, the film studio's abstract stucco facade with new base and entrance. Above, the new interior—which reads as buildings set on a street—plays against the old.

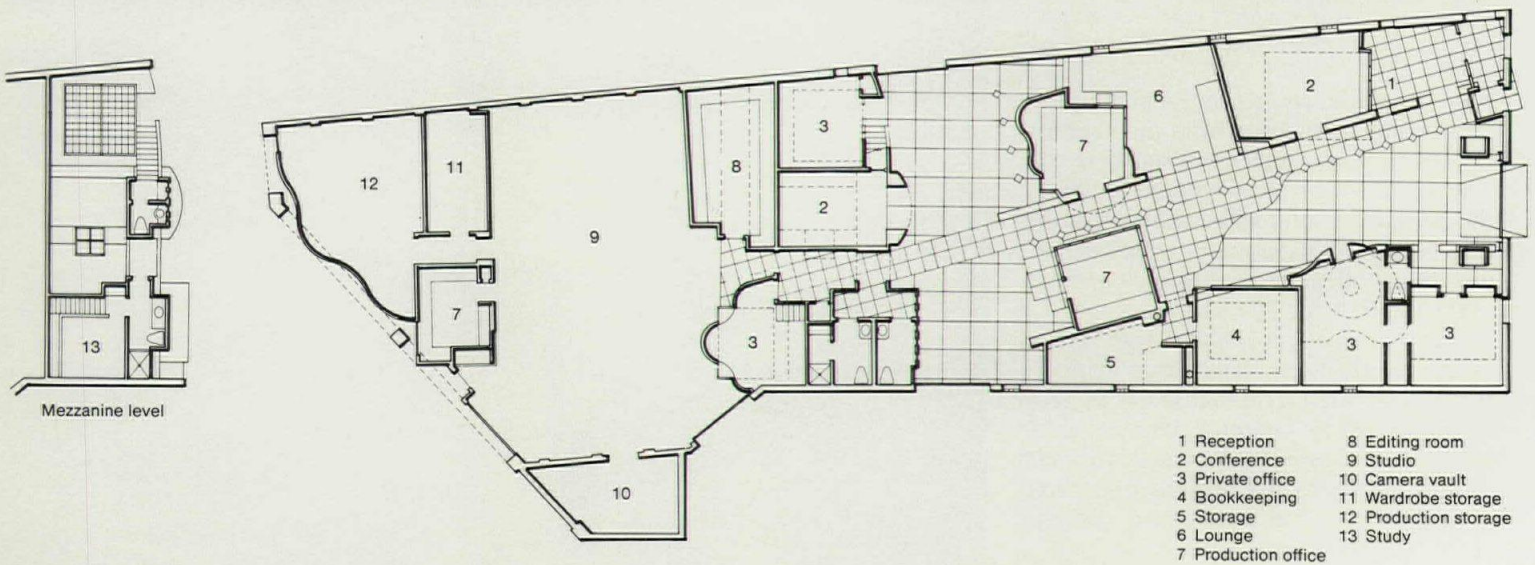
base, a middle, and a top. Picking up the darker gray rustication from the exterior, he sets all the structures on this base.

The degree of privacy required dictates the amount of solid white wall, while the roof is glass, transparent or translucent, providing both acoustical privacy and natural interior light.

The overall effect of the design is one of an eclectic assemblage drawn from disparate sources, a style that seems as heavily influenced by Oriental concerns as by any rationalist esthetic. It's a style to which Adams refuses to give specific definition. "I think of myself as a renovator," he says. "I like to play the new off the old."

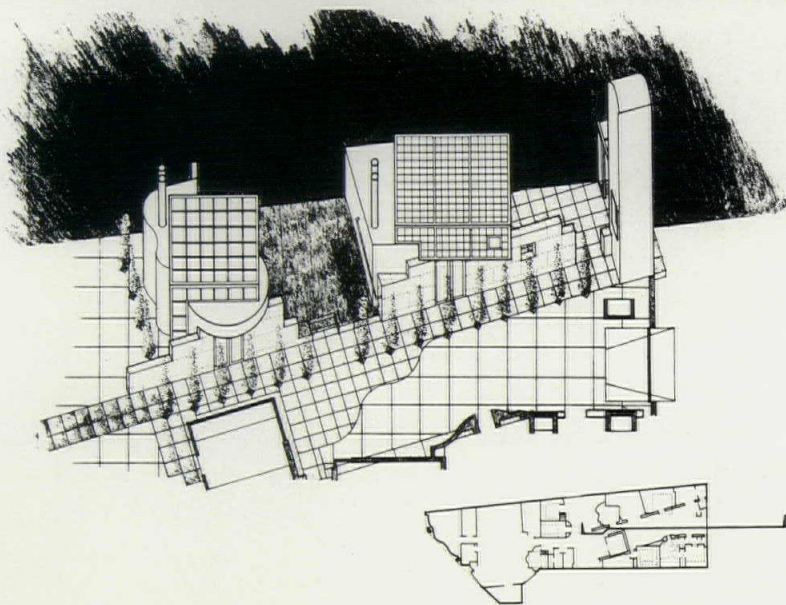
—SHARON LEE RYDER







Photographs © Tim Street-Porter



Private offices are in differently shaped structures along the central spine. These 'buildings' have a dark gray base, solid walls, and a transparent or translucent glass top. □



Introducing Brite Vue's New Revolving Door

With pride we present our new Revolving Door, designed and built to the fine quality standards that are the hallmark of all Brite Vue products.

3 or 4 wing models available ■ Overhead or in-floor concealed speed control ■ Power assist optional ■ Doors and enclosure provided in brass clad aluminum, stainless steel clad aluminum with satin or polished finish and aluminum with

anodized or electrocoat painted finish ■ Tempered glass in doors, curved annealed or laminated glass in enclosure.

Now you can have the energy savings and handsome appearance of revolving doors with the built-in Brite Vue quality and efficient performance.

Write or call today for complete information on Revolving Doors and other quality Brite Vue products.



Glass Systems, Inc.

1021 Walnut Avenue, Pomona, California 91766
(714) 628-5557, So. Calif. (800) 344-4554, No. Calif. (800) 445-5525, Outside Calif. (800) 423-1885, Telex 757808

Circle 24 on information card

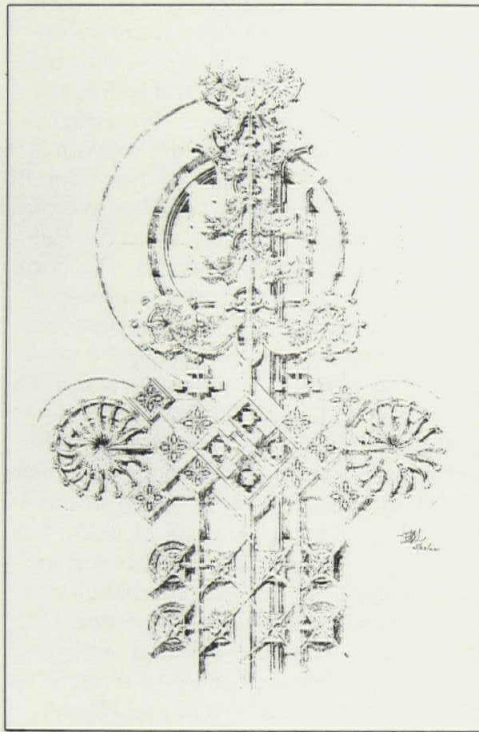
Three Views of the Tragic Louis Sullivan

Louis Sullivan: His Life and Work. Robert Twombly. (Viking, \$29.95.) **The Curve of the Arch: The Story of Louis Sullivan's Owatonna Bank.** Larry Millett. (St. Paul Historical Society Press, \$24.95.) **Louis Sullivan and the Polemics of Modern Architecture.** David S. Andrew. (University of Illinois Press, \$19.95.)

The life and work of Louis Henry Sullivan (1856-1924) embodies a tragic streak, for against spirit, vibrancy, and accomplishment, there plays in the background a funeral dirge. He reached the peak of the American architectural profession by the age of 35 and yet his life a decade later was in steep descent; fatal flaws and an uncaring American public—or at least those who commissioned buildings—brought him to the edge of insanity and death in poverty. Sullivan's career is of central importance not just to architecture but as a comment upon American culture and how genius operates and receives its rewards.

Sullivan is generally ranked—by architects and historians from around the world—with Henry Hobson Richardson (from whom he drew inspiration) and Frank Lloyd Wright (whom he in turn inspired) as a member of a great architectural trinity who created a distinctive American architecture. One part of his career—until the age of 44—was devoted along with other members of the Chicago School to giving form to the large urban commercial building. Sullivan saw the issues as visual, emotional, and theoretical, and he gave an emphasis—vertical or horizontal—that expressed the underlying skeletal and cellular structure of most large buildings. However, to Sullivan structural expressionism was not enough, and he created a naturalistic ornament of great originality and intensity that covered the building, providing both identity and a certain functional expression. After 1900, as his reputation rose both nationally and internationally, his career in Chicago plummeted; no large urban commissions came his way and he was forced to eke out a living as a designer of banks for small towns and other similar projects. The banks especially were unique creations, “jewel boxes” as he called them, that brought an air of drama and quality to the Main Streets of Gopher Prairies across the Midwest. Seeking vengeance for his downfall, Sullivan increased the ferocity of his verbal and written attacks, laying the blame of his

Courtesy of AIA Archives



Drawing from Louis Sullivan's *A System of Architectural Ornament*, completed 1922.

failure to the World's Columbian Exposition and the rise of East Coast-based classicism. His last years were a life in hell; drained by alcohol and nervous collapses, he existed on handouts at his death.

Actually Sullivan's rehabilitation was already apparent. He was eulogized extensively at his death, and in the next few years writings by historians such as Lewis Mumford, Charles Harris, Henry-Russell Hitchcock, and Hugh Morrison brought him back to center stage. In 1944 Sullivan was voted AIA's gold medal. Since then Sullivan has been effusively praised, sometimes damned, and the flow of books and articles investigating and interpreting his career and work seems not to slow, but to increase. In addition to the three under review, several more books and a large museum exhibition are planned in the next few years.

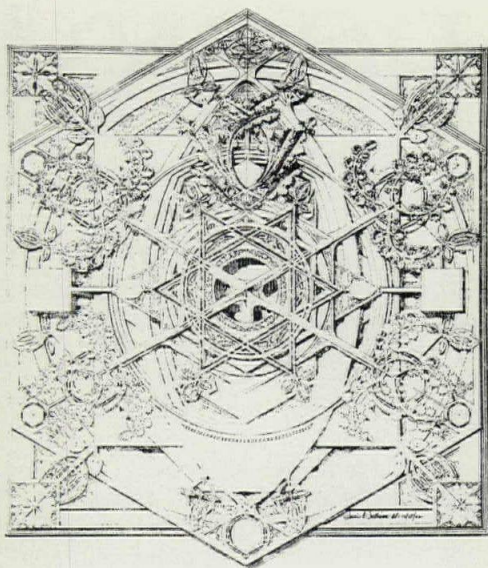
About Sullivan and his contributions and the nature of his genius there has always been some controversy. The modernists of the 1920s through the 1960s admired Sullivan for his structural expression, but they viewed with suspicion—when they did not completely ignore—his ornament and richly decorated late banks. Yet ornament was a matter of great concern for Sullivan, and his last important writing was a mystical treatise with drawings titled: *A System of Architectural Ornament According with a Philosophy of*

Man's Powers. While Sullivan frequently found himself in arguments with the architectural establishment such as AIA and its turn-of-the-century presidents, still it was the Institute and its journal editor, Charles Whitaker, who gave Sullivan an outlet and published his books, *The Autobiography of an Idea* and *A System of Architectural Ornament*.

Sullivan saw the cause of his failure in the 1893 Chicago Fair, claiming that the classical virus would last a half-century or longer (and this was picked up and used by historians and architects for years), but the success of Frank Lloyd Wright, the Prairie School, and indeed the entire arts and crafts movement in America indicates that the story is far more complicated. Rather, Sullivan's failure appears to have been a personal one with roots in his personality. In his strange *Autobiography*, Sullivan loves his mother and hates his father and brother, a perfect case for the Freudian couch. Yet all the evidence reveals he was devoted to his father as well as his mother, and he was extremely close to his brother until the latter's marriage. Certainly drink and perhaps a manic-depressive streak along with ego-centrism contributed to his problem. The falling out with his partner Dankmar Adler deprived him of a stabilizing influence and a business oriented partner. Without some guidance and control Sullivan floundered and ultimately crashed.

Architecturally, Sullivan tried to express the nature of the enterprise in his large urban buildings; but, as some historians have asked, what does nature-derived ornament have to do with ruthless business? Also Sullivan coined the phrase, “form follows function,” but do his buildings really follow this dictum? Sullivan's architecture (and his writings) are not easy. They aspire to a mystical transcendence of material into spirit that would uplift and embody the best attributes of what he saw as American and democratic. He aimed so high that perhaps the failure was inevitable.

Robert Twombly's new book is destined to become the standard biographical work on Sullivan, replacing Hugh Morrison's classic, yet dated, study of 1935. Twombly, who earlier wrote the best book on Wright, has turned his considerable talents on Wright's “lieber meister” and produced a thorough study, with warts and all. The detail is superb, perhaps too much, as in the tracing of Sullivan's various Chicago addresses, yet this does contribute to the overall picture of the man. Part of Twombly's accomplishment is to point out early



Hexagonal ornament by Louis Sullivan.

themes in Sullivan's life, such as education at the Ecole des Beaux-Arts (where he studied 1874-75) and how these remained as constants in his mature work.

Complaints about the book would be too much repetition, some poorly reproduced illustrations, and some overly labored descriptions of buildings. Also, in Twombly's hands Sullivan until the late 1890s remains a somewhat cold and wooden figure (and in truth he was a very private man), whereas after 1900 Twombly brings Sullivan alive with all the poignancy of a genius caught in his own undoing. Twombly probes the possible meanings of Sullivan's art and offers—what has only been hinted at before—a sexual and possibly homosexual interpretation of the ornament and forms. But this is only one of the meanings Twombly deduces, and he gives a fair picture of Sullivan's attempts to fashion a new American architecture and the contemporary responses.

Larry Millett, who writes on architecture for a St. Paul, Minn., newspaper, has produced an exemplary study with excellent illustrations of Sullivan's finest late building (possibly his very best), the National Farmer's Bank in Owatonna, Minn., 1906-08. The story of the design is told in detail, and what emerges is a fascinating picture of architectural commitment on the part of Sullivan's patron, Carl K. Bennett, the vice president and later president of a family bank. Bennett not only commissioned the bank—through reading an article by Sullivan—but became such a convert to Sullivan's cause that he helped Sullivan obtain at least four more jobs, commissioned a house from Sullivan (never built because of the expense), and helped Purcell & Elmslie to gain at least 10 buildings. (William Gray Purcell and George Grant Elmslie were Sullivan's major followers. Elmslie was with Sullivan from 1889 to 1909 and took major responsibility for some of Sullivan's later work; Purcell was with Sullivan for five months in 1903.) Bennett also emerges as a tragic

hero, for he lost his bank in a financial crisis—brought on by his own overextension—in 1926. A similar fate fell to Purcell & Elmslie's continuation of Sullivan's work. They fell apart and wound up as bitter old men.

David Andrew's book is mistitled. It should read, *A Polemic Against Louis Sullivan*. According to Andrew, Sullivan did everything wrong: He was confused, a poor architect, and deserves no admiration. His clients were poor models for behavior, and it is silly to think that any community values can be represented in a business building. Poor old Sullivan is even to blame—in Andrew's eyes—for all the sins of modernism, from Mies to today. Andrew's solution is a return to the Italian Renaissance and classicism. The book is written not from a postmodernist perspective (even the most ardent pomoist has more sense!) but as a pompous reactionary. It contains few insights and has a few errors and awful illustrations.

What Andrew fails to realize and what Twombly shows is that Sullivan is not much of a modernist, at least in the abstract-technological sense we think of today. Sullivan was a Victorian; he was rooted in 19th century culture and in a belief that individuals could make a difference. Certainly most of us have come to realize that the classicism of Chicago's White City, of McKim, Mead & White and Daniel Burnham—the arch enemies against which Sullivan railed—had many positive aspects. In its own way this classicism was as unique as Sullivan's, but it represented an overly filial tie to the old world, which Sullivan and others questioned and wanted to break. Sullivan did ask serious questions about architecture and art in America; he is one of the very few to seriously advance a theory of American architecture that expresses its culture. He saw architecture as not simply an agent of change but as life-enhancing. While some of Sullivan's answers may not be suitable or desirable for us today, he also left a legacy of great architecture, some of the best yet created in America. His failure was tragic, but his accomplishment overwhelms.—RICHARD GUY WILSON

Dr. Wilson teaches architectural history at the University of Virginia.

Design for Aging. The American Institute of Architects. (AIA Press, \$40 for nonmembers.) **Housing an Aging Society.** Robert J. Newcomer, M. Powell Lawton, and Thomas O. Byerts, eds. (Van Nostrand Reinhold, \$39.95.)

The subtitles of these two books reveal their purpose and content: The first is subtitled "an architect's guide," the second, "issues, alternatives, and policy." While the first is a true guide, the second is an anthology that could have benefited from a more guide-like approach.

Design for Aging consists of three sections and a separate pamphlet on the Uni-

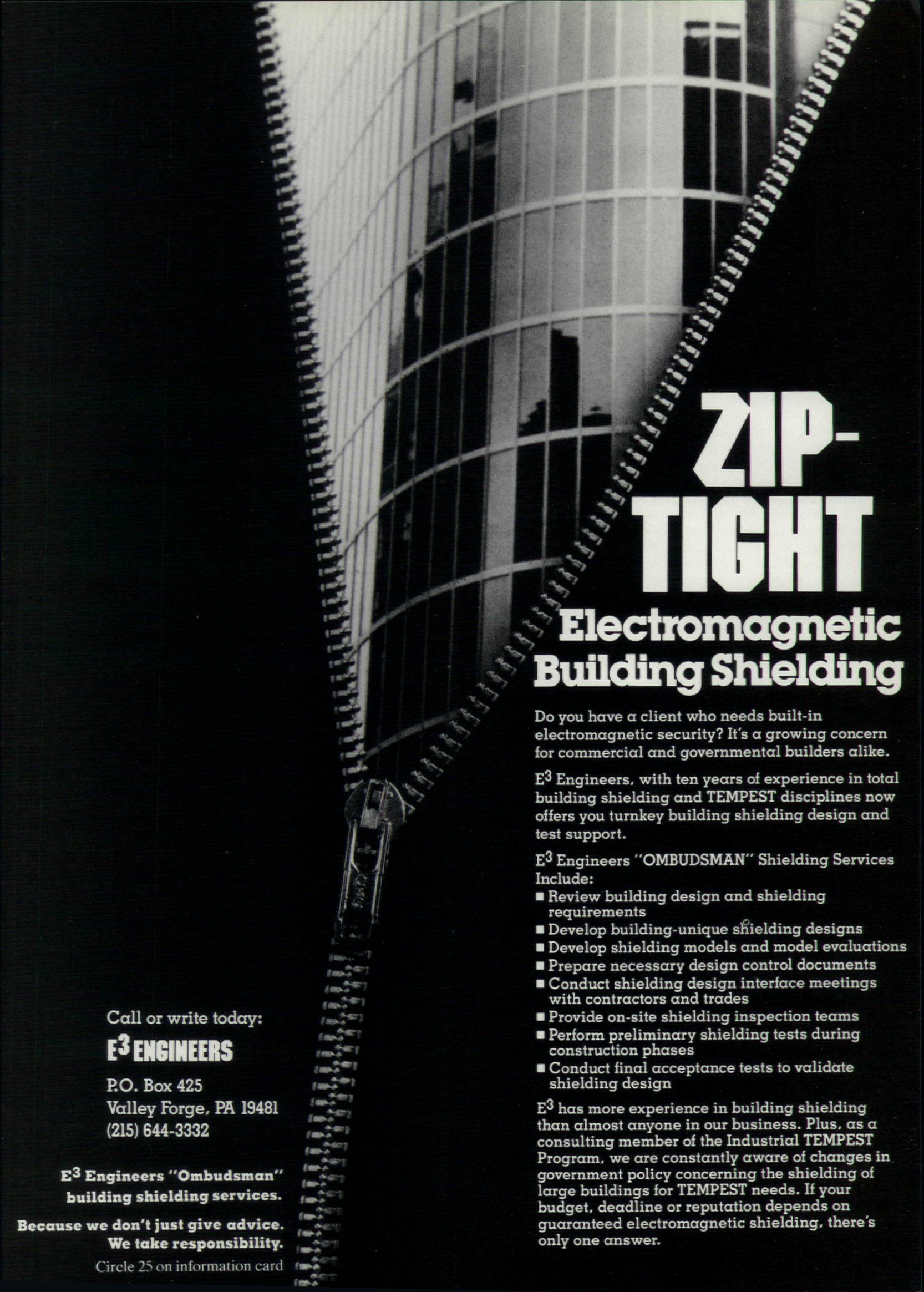
form Federal Accessibility Standards. The first section briefly reviews current living arrangements of the elderly and various physical, psychological, and social changes the elderly experience. Section two describes five facility types: elderly housing, senior centers, residential care facilities, nursing homes, and continuing care retirement communities. These are presented as "key" types from a continuum ranging from very low dependence (single-family houses and apartments) to very high dependence (acute care hospitals). Each key type is described in terms of its major spaces and spatial relationships, primary programming and design considerations, and other significant features. Building diagrams, adjacency matrices, and programming and design checklists are given for each type. Section three is a thorough, illustrated glossary covering types of spaces, types of facilities, design issues, and human needs. The appendix includes a good annotated bibliography and a list of key words for conducting a computer search at the AIA information center.

The guide provides useful and easily applicable information in a well organized and well designed format that allows the reader to locate particular items of information easily and, at the same time, refers to other related topics and other information sources. This is achieved with a clear organization of topics and subtopics (all well titled), lists, matrices, sample plans, and many cross references. It is an excellent example of what a design guide should be and would be a fine resource to have during programming and design.

In order to be brief and concise, something must be sacrificed. Several psychological and social aspects of environments for the elderly are excluded, such as the possibility of intergenerational living, the advantage of being able to view ongoing activities in spaces before entering the spaces, and the advantage of locating laundries at some distance from public gathering spaces to allow residents to do laundry without being concerned about their appearance. The book emphasizes design solutions rather than the nature of the daily lives and experiences of the elderly that could generate design solutions. The book assumes, and in so doing strengthens, the continuation of current, conventional facility types that it treats as "key." It does an excellent job of analyzing these types but never questions their merit, and, although it lists alternatives, it does not comment on them. While one would not expect a design guide to question the very facilities it is promoting, it is a feature that should be recognized by the designer who uses the book.

Housing an Aging Society does discuss alternatives in some detail, including hotels, rooming houses, shared housing, and board/care housing, but it does not describe the optimum physical design of these, or other, facilities. This book's stated

continued on page 126



ZIP- TIGHT

Electromagnetic Building Shielding

Do you have a client who needs built-in electromagnetic security? It's a growing concern for commercial and governmental builders alike.

E³ Engineers, with ten years of experience in total building shielding and TEMPEST disciplines now offers you turnkey building shielding design and test support.

E³ Engineers "OMBUDSMAN" Shielding Services Include:

- Review building design and shielding requirements
- Develop building-unique shielding designs
- Develop shielding models and model evaluations
- Prepare necessary design control documents
- Conduct shielding design interface meetings with contractors and trades
- Provide on-site shielding inspection teams
- Perform preliminary shielding tests during construction phases
- Conduct final acceptance tests to validate shielding design

E³ has more experience in building shielding than almost anyone in our business. Plus, as a consulting member of the Industrial TEMPEST Program, we are constantly aware of changes in government policy concerning the shielding of large buildings for TEMPEST needs. If your budget, deadline or reputation depends on guaranteed electromagnetic shielding, there's only one answer.

Call or write today:

E³ ENGINEERS

P.O. Box 425

Valley Forge, PA 19481

(215) 644-3332

**E³ Engineers "Ombudsman"
building shielding services.**

**Because we don't just give advice.
We take responsibility.**

Circle 25 on information card

Books from page 124

goals are to describe the changing health and social service circumstances of the elderly and to spark the interest of health and human service specialists in housing issues. Whether or how architects have been included in the targeted audience is not clear.

The book consists of four parts. The first part gives an overview of the continuum of care concept, household types and housing needs, demographic influences, and housing policies. Part two presents information on housing preferences and focuses on independent living, retirement communities, and supportive living arrangements. Part three takes a broader view, examining neighborhood quality, satisfaction, and preservation, and part four covers housing alternatives and opportunities.

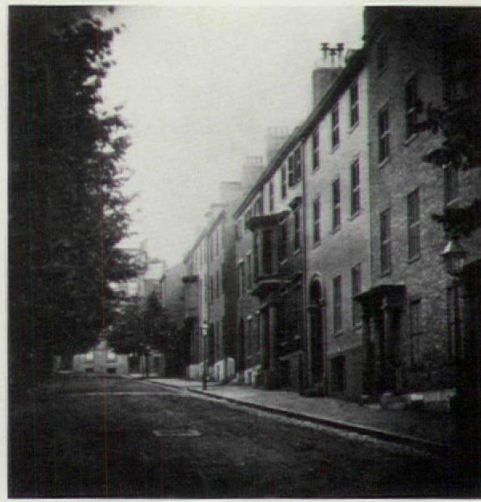
The editors are to be commended for putting together a good array of articles, each well researched and carefully written. Each essay draws upon existing and recent research in informative ways. In style and content the book follows social science traditions of research and discussion. Understandably then, this book is not directive but discursive. Since it is an anthology, the information presented is diverse and diffuse and the perspectives multiple. Nonetheless, it would have been possible to provide an analytic overview to the book's content in the form of a diagrammatic summary. This would have told the reader in a detailed but schematic way what topics, issues, and policies are pursued in which chapters as well as in other sources. Given the wealth of information contained in this book and elsewhere, such a chapter would have been extremely helpful as a way to locate particular items of information. It would have transformed the book from an anthology into an anthology *plus* a guide to research and policy issues. Maybe *Design for Aging* can teach us all a lesson in the benefits of presenting information schematically. —KAREN A. FRANCK

Dr. Franck is associate professor of architecture at the New Jersey Institute of Technology.

Preserving New England. Jane Holtz Kay with Pauline Chase-Harrell. (Pantheon, \$17.95.)

The force behind preservation in New England is to balance and reconcile the competition between the "new" New England—that of shopping malls, high-tech manufacturing, ski resorts, and condominiums—and the "old" New England of sleepy little towns with their white churched squares, populated by lanky, mackinawed Yankees—the New England we find on our Christmas cards.

Out of the scattered, personal attempts at preservation in New England over the past century have developed concerted efforts by organizations and communities



Town houses in Boston's Beacon Hill.

that are pouring billions of dollars into preservation activities. This book documents the myriad ways that the work is being implemented by hundreds of preservation groups and commissions.

Jane Holtz Kay, eminently knowledgeable of her subject, with her co-author traces New England's history in its building, land use, and early efforts at preservation. She documents preservation activities in waterfront towns, along the sea coast, and amid New England's numerous mill towns. Efforts in urban neighborhoods and downtowns, as well as farming communities and open lands, are considered. Kay and Chase-Harrell give us capsulized histories of preservation victories and some defeats in all of these settings, with the hope that this book—filled with stunning and haunting photographs—will show the way for future generations of New England preservationists.

—MICHAEL J. CROSBIE

Built for Change. Anne Vernez Moudon. (MIT Press, \$30.)

Built for Change is a wonderfully detailed case study of a 10-block area of San Francisco known as Alamo Square. The author carefully examines the history of land subdivision and building patterns over 75 years to explain the physical structure of the neighborhood and how that structure has evolved and changed. The book represents 10 years of research and is lavishly illustrated with maps, photographs, floor plans, and diagrams that are marvelously well integrated with the text. The presentation allows the reader to become immersed in the richness and rigor of the study without being overwhelmed by detail.

The book begins with a walking tour of the neighborhood. Alamo Square has a lovely green space the size of four city blocks at the top of a hill. Despite the rugged terrain, the street grid dominates this neighborhood as it does the rest of the city. Architecturally, the neighborhood has a mix of Victorian houses, apartment buildings from the 1920s, and large, modern buildings. Socially, the neighborhood houses a wide range of income groups,

from upper middle class occupants of restored Victorians to the very poor inhabitants of public housing. Overall, it is an area of incredible variety, and Moudon devotes much effort in tracing the development of this variety.

The author draws a number of lessons from her analysis of the process of neighborhood transformation. First, that the new tradition must coexist with what is there. In Alamo Square the grid, the lot, and the single-family house continue to dominate the pattern despite the more recent interventions. From this comes a second lesson: The separation of house and city design has had a negative impact on the environment. Third, that transformation is more gradual and less painful within a finer grain. As the increment of land development increases, the lot becomes the project and the inhabitants lose control of their territory. Finally, and most obviously, there is much to be learned from studying the design of the American city.

This book is filled with intricate detail about San Francisco and yet it is easy to imagine how the research could apply in any neighborhood, and so it should appeal to a wider audience than just San Francisco fans. In fact, *Built for Change* is a textbook with a method of analyzing city form and a set of guidelines for design. It should be required reading for anyone involved in the planning or design of new housing in older urban neighborhoods.

—MARY C. COMERIO

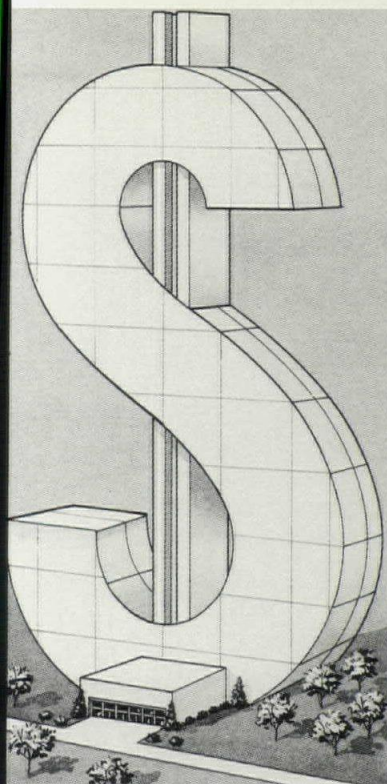
Ms. Comerio teaches architecture at the University of California, Berkeley, and is a principal of George Miers Associates, San Francisco.

Hospice Inpatient Environments. Deborah Allen Carey. (Van Nostrand Reinhold.)

Written for architects, designers, health-care providers, and hospital administrators, the text supplies detailed standards for providing hospice care—a method for providing palliative care within a home-like atmosphere to patients who are dying. The book contains guidelines for designing private and communal spaces, accommodations for visitors, kitchen facilities, and staff areas. Illustrations include some photos and sketches, and many charts and matrices. Case studies and discussion of the philosophy behind hospice care supplement the technical information.

Le Corbusier: An Annotated Bibliography. Darlene Brady. (Garland Publishing Co., \$60.)

This is a comprehensive listing of books, articles, and dissertations by and about Le Corbusier, including books through 1982 and articles and dissertations through 1981. The arrangement is by format, and then alphabetical by author. All entries for books are fully annotated. The bibliography is enhanced by five indices—author, title, subject, place, and building/project. □



Now You Can Design Bigger Profits

The design of projects is your area of expertise. Keeping those designs profitable is ours. Project profitability is no accident; it is the result of careful attention to budgets, schedules, and cash flow. AEMAS, the accounting and job costing software from Data-Basics, is the tool you need to handle the business end of your projects. Over 600 companies use Data-Basics' software to improve their bottom lines. Call us today and put our expertise to work for you.



DATA-BASICS, INC.

West Coast Office:
Newport Beach, California
(714) 250-7017

Corporate Office:
11000 Cedar Rd., Cleveland, Ohio 44106
(216) 721-3400

Software Systems for Management

Redwood



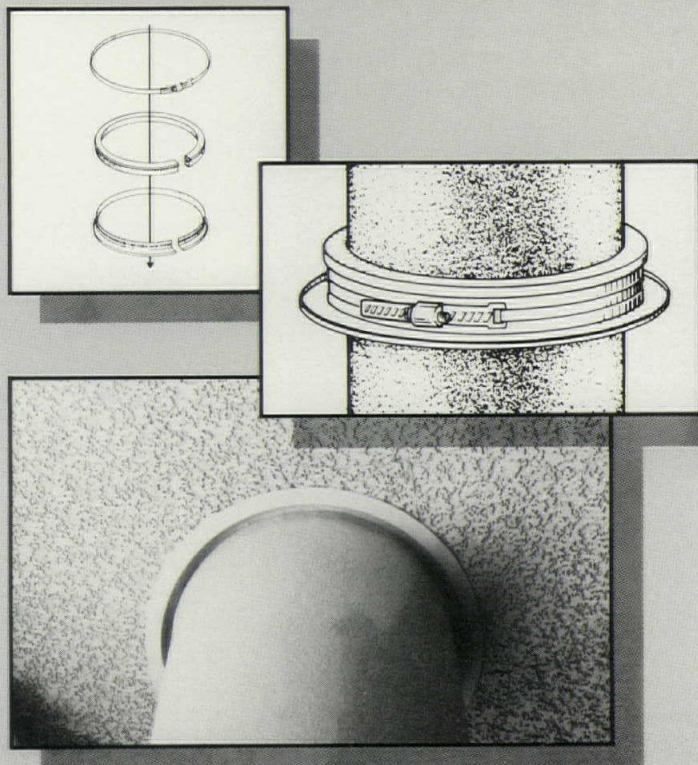
**Natural beauty and performance.
Free folio of literature for Architects.**

CALIFORNIA REDWOOD ASSOCIATION
591 Redwood Hwy. • Mill Valley, CA 94941 • 415-381-1304

Circle 33 on information card

Circle 34 on information card

Fry Reglet's New Column Collar: You'll Find Us In Tight Circles.



Introducing Fry Reglet's new Column Collar — finally a workable molding which fits around small radius columns!

- Creates a neat juncture between ceiling tile, or plaster, and a column.
- Available in painted or anodized finishes to create a reveal that is both decorative and functional.
- Shortens installation time and reduces labor costs.

When your needs call for a column collar that is easy to install, adjustable, and attractive, ask for the column collar that is found in tight circles. **Call or write Fry today.**

625 S. Palm Avenue, Alhambra, California 91803
(818) 289-4744

2777 Peterson Place, Norcross, Georgia 30071
(404) 441-2337

Look for us in Sweets Catalog 9.5/Fr.
Patent # 4,574,548

FRY REGLET®

Circle 26 on information card

WE CALL IT THE PERSONAL ARCHITECT. NOT THE PERSONAL DRAFTSMAN.

We named it on purpose. This is a tool for the entire architectural practice, combining automated design and drafting capabilities on industry-standard IBM* PC ATs and compatibles.

Use the Personal Architect to design buildings. While other systems work with lines and arcs, the Personal Architect lets you work with floors, walls, roofs, and rooms. In 3-D. In perspective. So you can create a true model of your building design.

Use the Personal Architect to present designs.

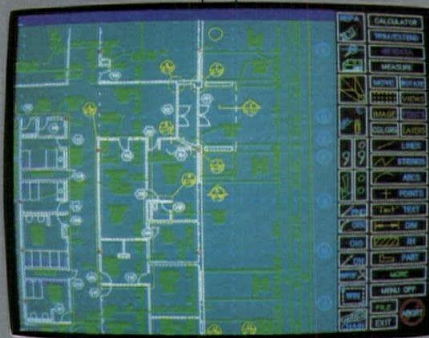
This system gives you the tools you need to make effective presentations. Like perspective views with hidden lines removed. Shaded pictures. And area takeoffs.

Use the Personal Architect to produce drawings. The system

has expert drafting capability to get your production work done. And can edit drawings quickly too.

On-screen icon menus get you up and running fast. And a graphic symbol library of over 1,000 architectural symbols gives you great flexibility.

The Personal Architect. It can help you get more business and do more business. And isn't that the name of the game?



Get more business done. On-screen menus (left screen) facilitate the production of contract documents. Drawing courtesy of Heard & Associates, Chicago, Illinois.

Get more business. Shaded pictures (right screen) like this help clients see your vision clearly from any perspective. An invaluable selling tool. Drawing courtesy of Stephen Douglass, Architect, Cambridge, Massachusetts.

For more information on the Personal Architect write: Computervision Corporation, Personal Systems Business Unit, Building 16-2, 100 Crosby Drive, Bedford, MA 01730.


COMPUTERVISION
Personal Architect

Circle 27 on information card

*IBM is a registered trademark of International Business Machines Corp.

