Progressive Architecture

October 1980

Some conventional ceiling systems give you high-quality light. Some furniture-mounted systems give you low-energy light. Only Tascon™ task lighting gives you both.

Here's a dramatic improvement in lighting systems that can cut lighting costs by over 65% in either open plan or conventional offices. (See chart below.)

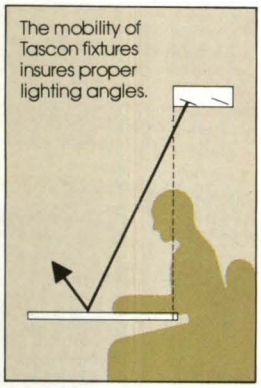
The principle behind Tascon lighting is simple. The lighting fixtures, because they're moveable, can be positioned to provide light only in the areas where it's needed. So a properly positioned Tascon fixture provides ESI values of 40 to 60 and up to 90 maintained footcandles on the work surface.

With one fixture for every 100 square feet, Tascon provides this high-quality lighting for less than one watt per square foot. And the 120-volt fixture with optional on/off capability can cut lighting costs another 15%.

Unlike some low-energy systems, Tascon provides comfortable light.

Because the Tascon pendant fixture illuminates from both sides, as well as above and behind, it distributes high-quality light evenly without the glare, shadows, and reflections some furniture-mounted task lights create.

And Tascon directs 20% of its light upwards to create visual interest and ambient illumination.



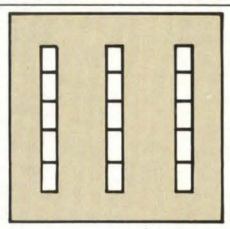
Armstrong Tascon fixtures fit most types of ceiling grids.

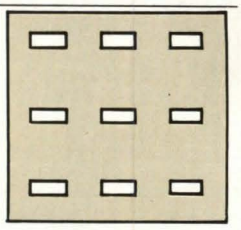
The tracks that support Tascon fit most ceiling grid systems. And you can relocate them to reposition the fixtures easily. So Tascon gives you the quality of ceiling-mounted lights and the energy savings of furniture-mounted lights along with flexibility that neither can offer.

For more illuminating information about Tascon lighting fixtures, write Armstrong, P.O. Box 3001, Dept. 04NPA, Lancaster, PA 17604.

Performance Comparison – Conventional vs. Tascon

Room size	30'x30'x9'
Reflectances	
Ceiling	80%
Walls	50%
Floor	20%
Task	#2 Pencil
Lumens/Lamp	3150





	2'x4', 4-Lamp Recessed Troffer (prismatic lens)	2-Lamp Moveable Tascon Fixture (prismatic lens)
No. of fixtures	15	9
No. of lamps	60	18
ESI (equivalent sphere illumination)	40 (80% area coverage)	40–60 (on work surface)
Classical footcandles (maintained)	95 (CU method)	90 (on work surface)
Watts/work station 100 sq. ft.	307	92
Watts/sq. ft.	3.07	.92

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How to combine the expensive look of linear ceilings with the economy of lay-in panels

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It's a look of beauty, too, with the 2'x4' Second Look panels blending so well with the low-gloss grid that you have to look twice to see the grid pattern.

Second Look III is the newest addition to a line of Armstrong ceiling panels. Like Second Look I and Bold Look™ I (shown below), it disguises the grid pattern, creates an upgrade ceiling image, and provides the plenum accessibility of a lay-in ceiling—all in one economical, easy-to-install package.

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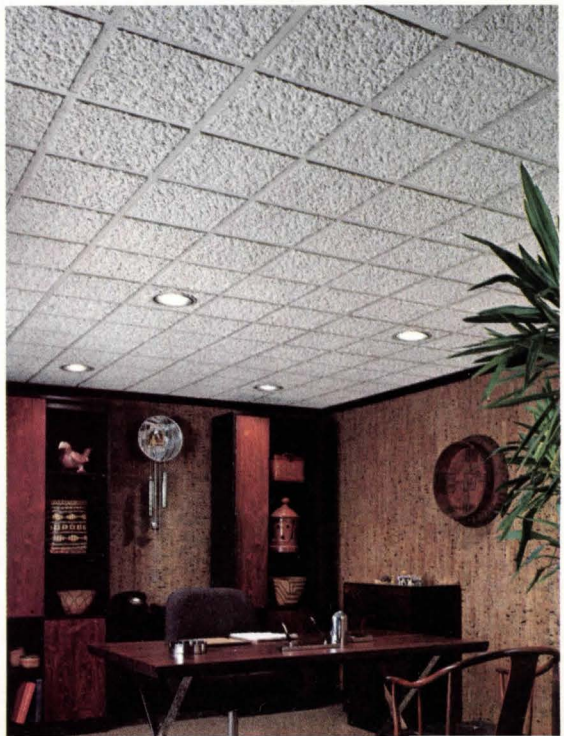
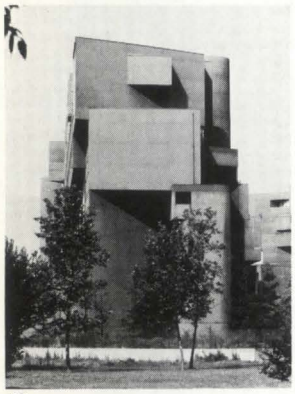
Bold Look I.
Boldly textured 2'x 4' lay-in ceiling panels that resemble 12"x12" ceiling tiles.



Second Look I.
Lightly fissured nondirectional design in a panel scored to look like tile.

October 1980

Progressive Architecture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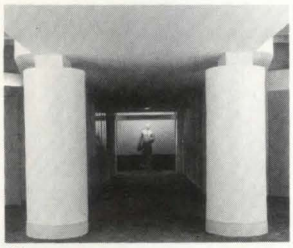
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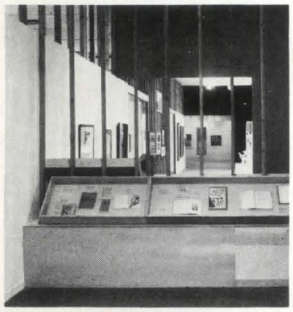
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Cover: *Rossi's Teatro del Mondo, seen from near San Marco, across Grand Canal to its Lagoon mooring in Venice. Photo: D. Morton.*

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An architectural crisis.
Versacor: Robertson's response.

International in scope. Acid precipitation has become an architectural crisis of international proportions. And it's a crisis that directly affects your buildings, wherever they may be.

Last year alone, three international conferences addressed the problem. A recent *Scientific American* article reported: "On an annual basis, rain and snow over large regions of the world are now from five to 30 times more acid than unpolluted rain. The rain of individual storms can be from several hundred to several thousand times more acid than expected."

What causes acid rain? Airborne sulfur and nitrogen pollutants (from automobiles, smelters, and power plants, among others), often traveling hundreds of miles before combining with water vapor to form an acid solution, can fall unpredictably—perhaps on your latest building site.


In many areas, fish are already dying from the effects of acid rain.

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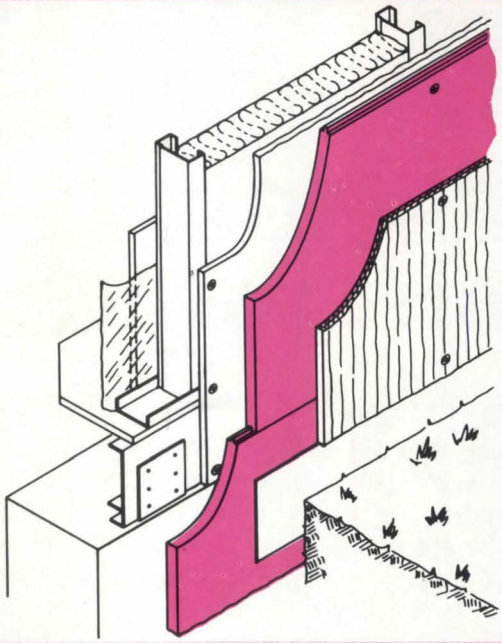

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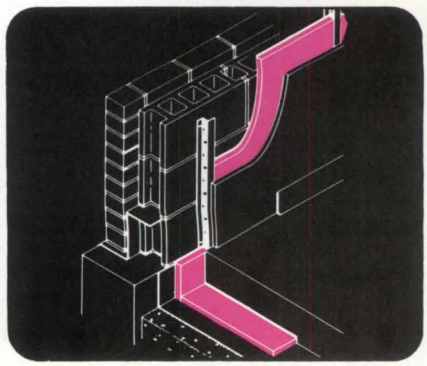

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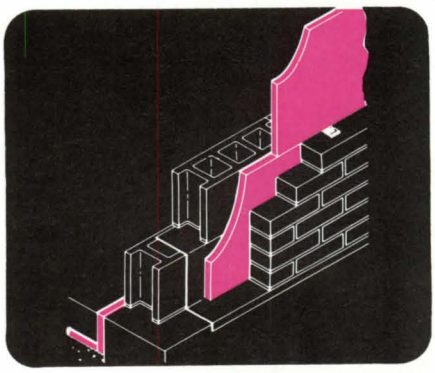

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Eleven views of the Bay Area

San Francisco was the site of an AIA Design Conference in early September (see next month's P/A News Report). The subject was Ornament in Architecture, but the Bay Area summons up diverse observations on design—a sampling of them here.

1 Grid and topography. The relentless extension of the street grid over the city's steep hills is 19th-Century pragmatism stretched to absurdity. The mismatch causes its own inconsistencies: tunnels and stairs interrupt the grid even as they maintain it. The up-and-down juxtaposition of pretentious façades, random yet predictable, makes visual irony the norm. Contradiction becomes a basis of city form.

2 The value of views. A glimpse of the Golden Gate Bridge or the ramparts of Alcatraz seems to be everyone's prize and solace. A sidelong sliver of Bay view, from the limits of the zoning envelope, can add $100,000 or more to the price of a condominium.

3 San Francisco Civic Center. There are dozens of Bay Region styles, overlapping and merging. One style that excels here, to the consternation of Easterners, is Beaux-Arts Classicism. There is no finer Renaissance-inspired dome in America than Bakewell & Brown's on City Hall here, no more ambitious City Beautiful complex than the surrounding precinct. Yet it all seems alien to the lively city, its white façades and overexposed plazas demarking an island of anomie.

4 Palace of Fine Arts. Here, however, Beaux-Arts Classicism transcends rules of proportion or decorum. Gigantic columns and urns, idiosyncratic in color and detail, serve no purpose except to blend with greenery and lagoon in a dream scene made real—a scene that local citizens refused to give up (P/A, Nov. 1976, p. 66). Architects attending the conference responded to Maybeck's achievement with awe.

5 Pacific Street houses. The Shingle Style reaches unsurpassed spareness and subtlety in turn-of-the-century houses on the 3200 block of Pacific. Ernest Coxhead's application of attenuated, skewed Georgian details to minimal shingled forms carries multiple coding to a level rarely approached by Moore or Venturi. Such thin-skinned, primal building forms gave rise to a Bay Region Style, but San Franciscans were actually expanding on another all-American mode.

6 Downtown Towers. Now the focus of "Manhattanization" fears, downtown San Francisco has been sprouting towers for decades. As in other cities, our perception of earlier highrises shifts as tastes grow more inclusive. Suddenly demanding attention here, for instance, is the 1930 Shell Building (George Kelham, Architect), with botany-based relief ornament and a silhouette that emulates Eliel Saarinen's Tribune Tower entry.

7 Market Street. Like many an American main drag, it is too long, wide, straight, and flat for what happens along it—and it is seedy. Given new transit stops, new brick paving, jazzy new signs, and a new Halprin fountain belching concrete and foam, it remains a seedy main drag.

8 Movie palace. As the Palace of Fine Arts embodies the dream of 1915, the Oakland Paramount expresses the dream of 1930—an interior, artificially lighted and ventilated movie house dream (P/A, July 1974, p. 50). Architect Timothy Pfleuger's staff transmuted ordinary sheet metal and lights into South Seas sunrises—expressing an uninhibited optimism that was smothered even before the theater opened.

9 Pier 39. Today, theme has supplanted dream, as in the packaging of this shopping complex (P/A, Dec. 1978, p. 52). Even though skillfully composed, a collage of gangplank walkways and weathered timber turrets does not a waterfront wonderland make.

10 Santa Cruz downtown. A meandering garden along the main street of this old coastal town lets a trickle of traffic through and seems to generate the continuous activity planners pray for. A Richardsonian courthouse turned bazaar exhibits the peculiarly California mix of pop, funk, punk, and Victoriana.

11 Santa Cruz campus. Notched humbly into the redwood groves, overlooking fields that sweep down toward the Pacific, is some of the most serious California architecture of recent decades. The several separate "colleges" here differ widely in design, but all combine aspects of earlier Bay Region modes, and all offer the user rewarding processional sequences. Cowell College (Wurster, Bernardi & Emmons, 1965) recalls the local picturesque Classicism, with redwood trellises on concrete piers framing its views. Stevenson (Joseph Esherick & Associates, 1967) exemplifies the casual composition of minimal, shed-roofed stuccoed volumes. Kresge (MLTW, 1973; P/A, May 1974, p. 76) turns those same forms inward to form a student street, distorts and paints them in unaccustomed ways—suggesting variously Spanish Colonial plazas, frontier-town false fronts, and Mill Valley domesticity; discounting some of its facile supergraphics, this may be California's best effort to fuse the local and the universal in a meaningful architecture—since Maybeck, that is.

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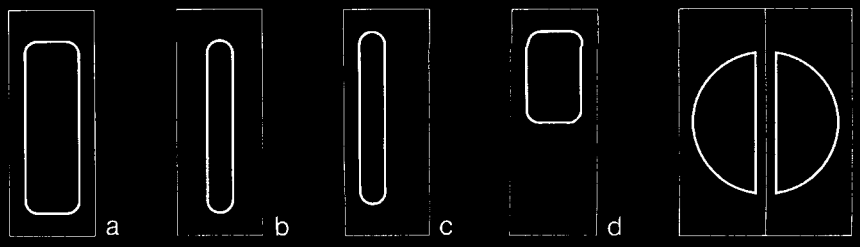

Views

On the sunny side

In reference to your article in "Energy Update" (August 1980, p. 44) on the Building Energy Performance Standards, Solar Lobby's position on the weighting factors is classified under "industry's role" and also as "having a direct stake in the outcome." Both of these comments are incorrect.

First, we are not an industry organization but a public interest organization. We were organized in 1978 to accelerate the development of solar energy through legislative and educational means. And as a public interest organization we have no financial interest in the development of solar energy. I hope that *Progressive Architecture* would clarify this in any future publications.

Joan Shorey
Legislative Representative
Solar Lobby
Washington, DC

[We did not mean to equate the public interest Solar Lobby with the economic interests of producers, though their representatives understandably presented similar viewpoints at the BEPS hearings.—Editors]

Miami: two sides of the bay

Your August issue stories on Miami and Miami Beach were architectural journalism at its very best. William G. Conway, Suzanne Stephens, and David Morton covered this tremendously complex story with not only a most unusual accuracy but with insight and sensitivity. This is already a document of political and economic importance beyond the confines of the design world. In fact at a meeting of the Miami Beach City Commission, citizens lobbying against blight and potential dangers caused by expansion of a hospital complex to a beautiful residential neighborhood (for which incidentally, district status is being sought) applauded every line of Mr. Morton's last paragraph about the necessity to protect the Art Deco District.

What the two articles do is present the two opposites in urban design today at their most extreme. In Miami the architectural superstars, giant developers, and city administration have assumed complete dominance, ignoring every principle of growth limitation and social responsibility developed over the past two decades in a mad scramble for megabucks. On the Beach, our grass roots group, backed by local design professionals, preservation architectural stars, and the federal urban design officials, battle those same corporate forces in a last ditch attempt to save what is acknowledged as the world's foremost, if not only, Art Deco precinct. If "bottom line" thinking succeeds here this year, the architectural community will be among the big losers, because despite incredible odds (from red-lining banks to a hostile tourist development board) we are making this a true living museum and center for the study of pre-World War II American architecture.

Barbara Baer Capitman
Executive Director
Miami Design Preservation League
Miami Beach, Fl

The firemen's side of the story

It's fantastic—one of your reviewers actually asked the users of a building what they thought of it! Congratulations to David Morton on his excellent article on the Olean Central Fire Station. I hope his format becomes the model for all of your reviews.

I would also propose that you review buildings again after five years or so. It is frustrating to read of some great new technological or social idea which has been in place less than a year. A new look at these ideas would let us know which ones were successful.

Ward Bucher
Wm. Ward Bucher, Architect
Washington, DC

If your purpose for reporting and critiquing architecture is to evoke a response in your reader, then you have succeeded on a grand scale with David Morton's July cover article on Warren Seligmann's Olean Fire Station. On the other hand, if you are trying (as I hope) to educate, enlighten and present a forum for new and different ideas on the nature of architecture, then the term dismal failure comes to mind.

As I first began reading the article, I looked forward to hopefully gleaning some understanding of the differing interpretations of architectural image through a specific case history. Instead of a treatise on architectural imagery and symbology, I found myself reading a bombastic, narrow article which was obviously written by a Post-Modernist design snob who totally dismissed the gut of the building's image problem by merely stating that it is difficult to overcome. Here Mr. Morton takes the easy way out (as elitists are prone to do). He glosses over the programmatic conflicts and goes directly to the juggler [*sic*] of taste. He contends that the problem with the building is not that its image is possibly wrong or inappropriate in the view of its occupants, but that they as a group are too tasteless and uncultured to realize the gem with which they have been blessed. Rather than explore the complexities of architectural image and perception of symbols in architecture, Mr. Morton appoints himself the Mr. Blackwell of architectural fashion and proceeds to put the Olean firemen at the top of his 10 worst occupants list.

It is unfortunate that he reduces the significance of architecture to that which can be only appreciated by the few who happen to have some training in architecture. Yes, Mr. Morton, architecture is a "high art," but it is also much more. If one doesn't relate to the canvas imagery of a "serious" artist one only has to remove it or at least look the other way. This is not quite so easy with architecture. Both the good and bad must be endured by all according to their personal likes and dislikes.

The point that Mr. Morton overlooks is that it is not impossible to produce brilliant, beautiful, and highly artistic architecture for people who own crocheted stuffed frogs. The brilliance of design is in solving the programmatic problems while achieving aesthetics which please the observer and project an image which relates to its occupants. With his article, Mr. Morton chose to ignore the possibility that Mr. Seligmann could have produced an even more brilliant work had the occupants been more involved in the design process. Instead he attacks the firemen for their reaction to what is for them a major source of discontent. This approach can only result in irresponsible and unprofessional criticism which serves no constructive purpose. Surely the profession deserves better from a journal which calls itself progressive.

Keith James Schreiber
Fort Hood, Tx

[While some of the writer's observations are worth sharing with readers, we do not consider the article high-handed, as it is portrayed here. The firemen were not "attacked." The hope was expressed that—as so often happens—users will place a higher value on the aesthetic qualities of the building once they have become accustomed to it.—Editors]

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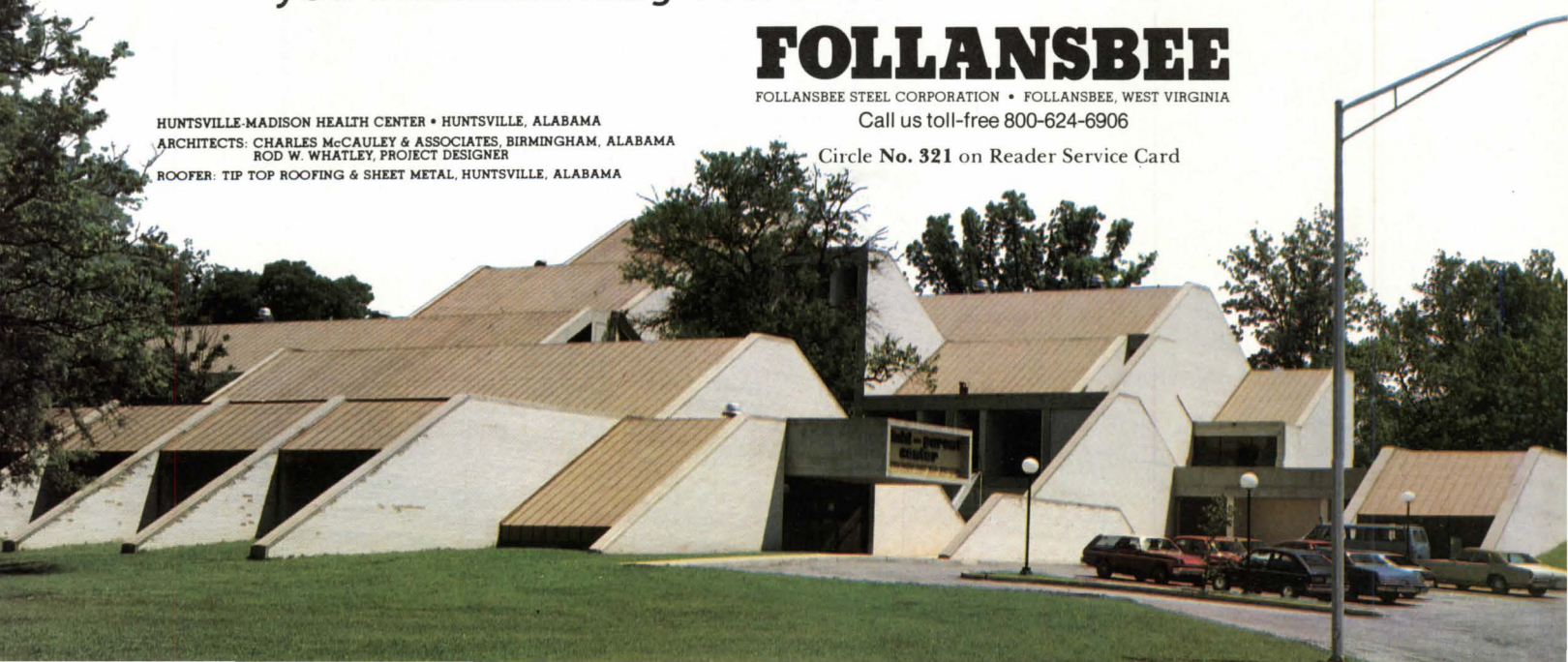

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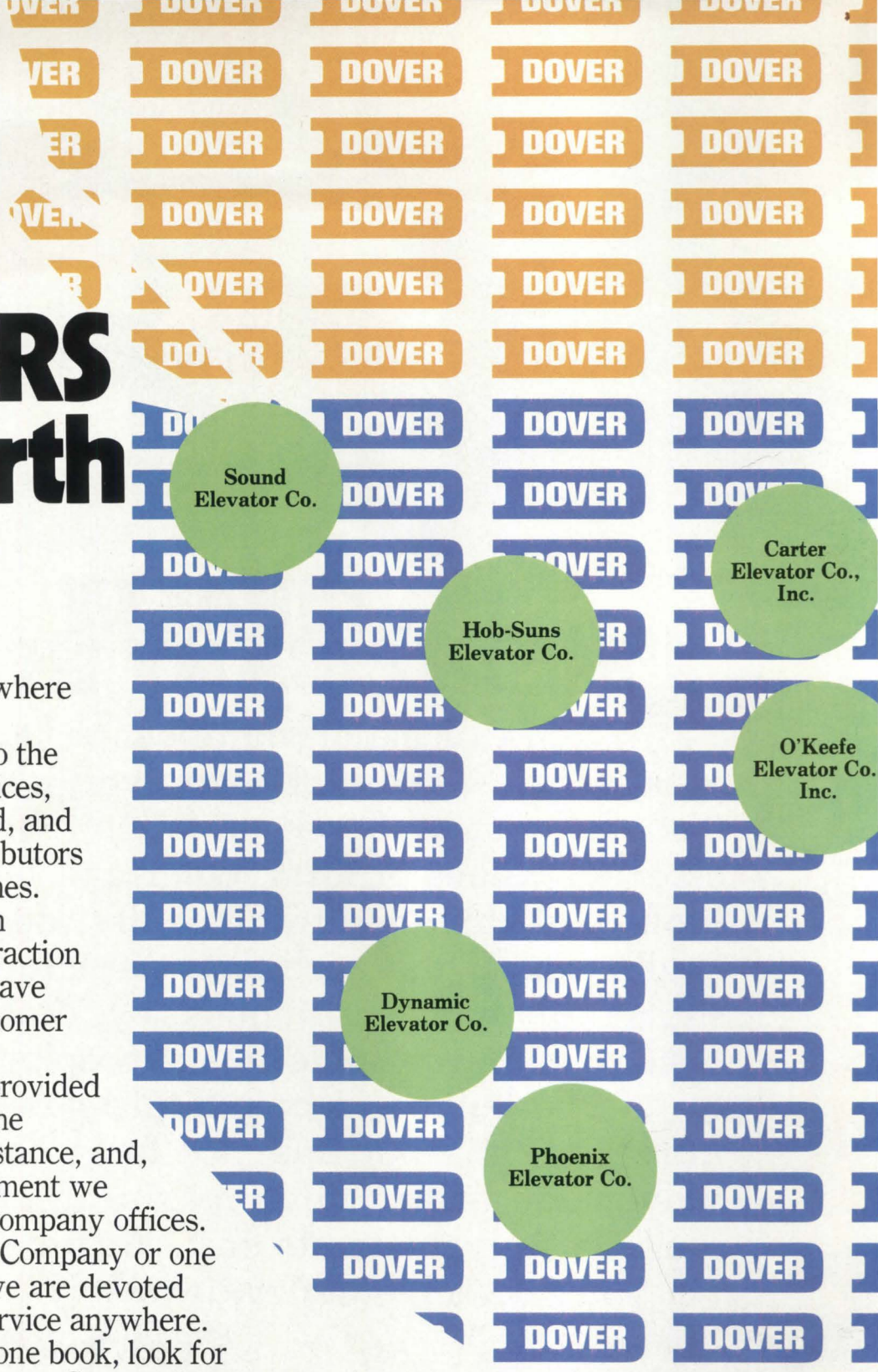

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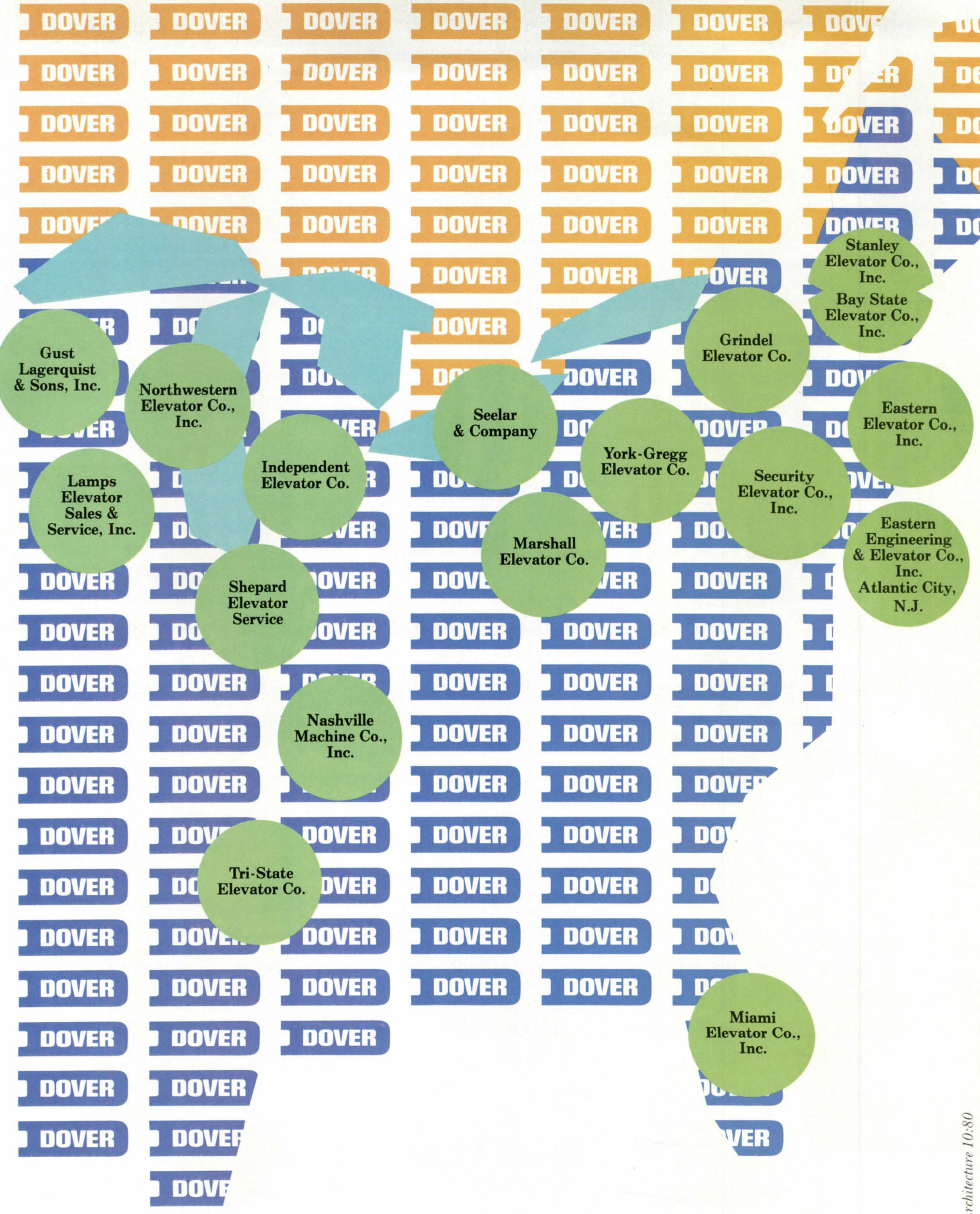
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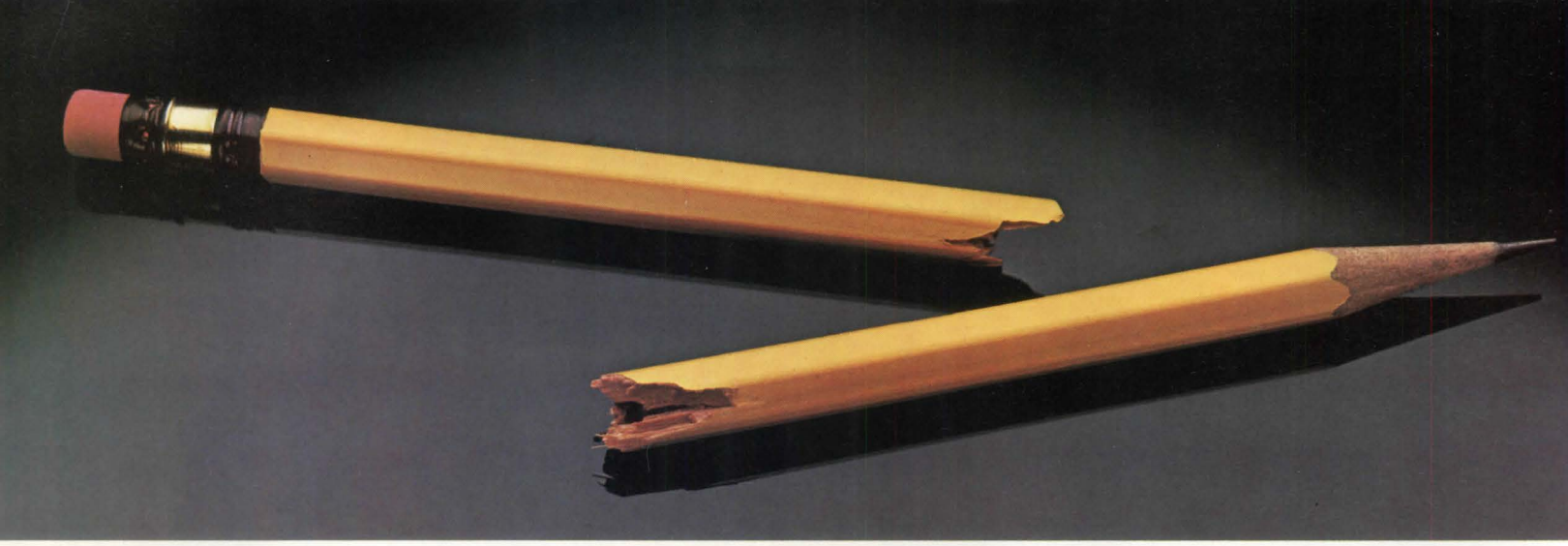

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Submissions are invited in all categories including chairs, seating systems and sofas, tables, desks and work stations, storage systems, lighting and miscellaneous furniture pieces. Designations of **award** and **citation** may be made by the invited jury, based on overall excellence and advances in the art.

Emilio Ambasz, architect, graphic and industrial designer, former curator of design at The Museum of Modern Art, New York;
Martin Filler, editor, *House and Garden*, New York;
Mildred S. Friedman, design curator, Walker Art Center, Minneapolis, and editor, *Design Quarterly;*
Michael Graves, FAIA, architect and Professor of Architecture at Princeton University;
Lella Vignelli, architect and designer, Vignelli Associates and Vignelli Design, New York.

Judging will take place in New York City during the month of February. Winners will be notified—confidentially—before March 15. Public announcement of the winners will be made at the presentation ceremony at NEOCON 13 and in the May 1981 issue of P/A. P/A will arrange for coverage of winning entries in national and local press.

Eligibility
1 Architects, interior designers, industrial designers, and design students from all countries may enter one or more submissions.
2 Design must be original, not known to be substantially identical to any existing product design. *(continued on next page)*

Entry form:

International Conceptual Furniture Competition

Please fill out all parts and submit, intact, with each entry (see paragraph 10 of instructions). Use typewriter, please. Copies of this form may be used.

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Address:

Entrant phone number:

Category:

Entrant:

Address:

Designer(s) *responsible* for this submission (identify individual roles if appropriate):

I confirm that the attached entry meets eligibility requirements (paragraphs 1–4) and that stipulations of publication agreement (paragraphs 5–6) will be met. I verify that the submission is **entirely** the work of those listed on this form (or an attached list as necessary).

Signature _____

Name (typed) _____

Furniture Competition

Progressive Architecture

600 Summer Street, Stamford, CT 06904

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(Receipt)

3 Designer must not be under contract to or in negotiation with any manufacturer for this design. Design is not to be submitted to any manufacturer until after P/A announces winners.

4 Design must not have been executed

academic credit.

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10 Each submission must be accompanied by an entry form, to be found on this page. Reproductions of this form are acceptable. All sections must be filled out (by typewriter, please). Insert entire form into *unsealed* envelope taped to *back of submission board.* P/A will seal stub of entry form in envelope before judging.

11 For purposes of jury procedure only, projects are to be assigned *by the entrant* to a category on entry form. Please identify each entry as one of the following: Chair, Seating System, Sofa, Table, Desk, Work Station, Storage System, Lighting. If necessary, the category *"Miscellaneous"* may be designated.

12 Entry fee of $10 must accompany each submission, inserted into *unsealed* envelope containing entry form (see 10 above). Make check or money order (no cash, please) payable to *Progressive Architecture.*

13 To maintain anonymity, no identification of the entrant may appear on any part of the submission, except on entry form. Designer should attach list of collaborators to be credited as necessary.

14 Submissions become the property of P/A and *will not be returned.*

15 Deadline for mailing is January 26, 1981. Other methods of delivery are acceptable. Entries must show postmark or other evidence of being en route by deadline. Hand-delivered entries must be received at the address shown here by January 26. In any case, entries sent by mail or other means not received at P/A by February 13, 1981, will be disqualified.

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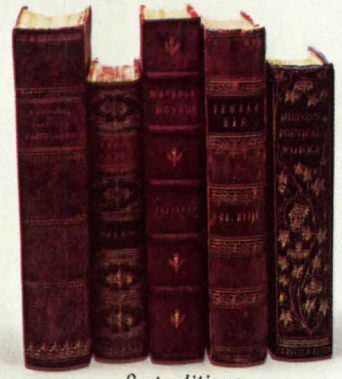

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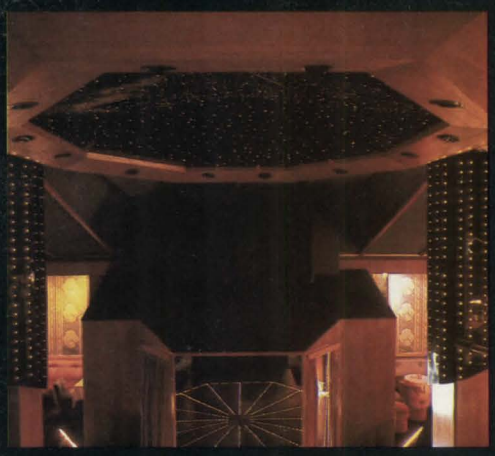

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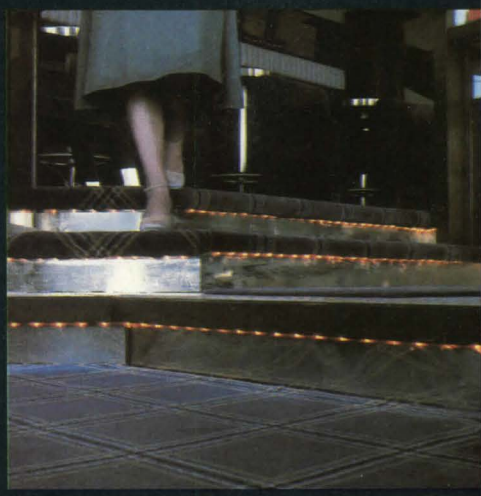

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P/A News report

Report from Houston

Texas Contextualism

In the 1960s, the development of the Rice University campus was unfortunately distinguished by a string of departures from the principles advocated in the "General Plan of the Rice Institute" delineated by Cram, Goodhue & Ferguson of Boston in 1909. When the School of Architecture came on line to develop its renovations of M.D. Anderson Hall (originally intended as a general classroom building) and to further expand for needed program space, the decision was made to retain the prime location on the main quadrangle rather than opt for a new building.

The School felt a particular imperative to initiate a modest demonstration that campus growth might more reasonably follow a path of infill and refinement, contextual acknowledgment and reinforcement. In May, work was begun on the designs of James Stirling, Michael Wilford & Associates, and the outline frame of the project was in place by late July. Gone are the dramatic loft spaces of the 1960s and 1970s (Yale, Harvard GSD) and in their place is an arrangement which is accommodating and frankly conventional, perhaps admirably dull to a certain extent, but potentially a success in leading the way for a more appropriate attitude in design intervention.

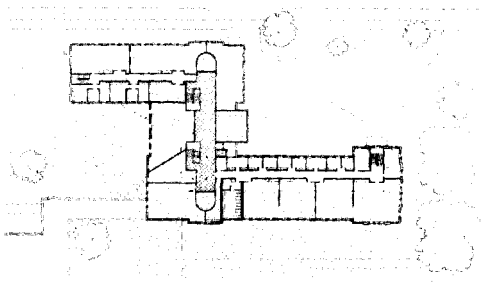
Stirling and Wilford, along with Associated Architects Robert Ambrose and Michael McEnany of Houston, have limited the extensive reworking of an existing context and clarified circulation. At the same time, they have proportioned the interior of both wings to adapt to a variety of sizes and shapes for studio spaces, designed as separate rooms. The building configuration is a Z-shape whose principal opposing old and new wings are tied together at the center by a familiar element from Stirling's previous work—a two-story gallery space. It is traversed by an open "bridge" connecting to vertical stairs on either side of the multipurpose (but essentially exhibition) space.

Such an element has almost iconographical significance as a socializing device in the work of the office, but its use is particularly appropriate at the heart of the School whose other spaces are considerably routine. Site development is the distinction of the design, for the extended new wing serves to articulate a patio-courtyard adjacent to a portico connection to the University library. This courtyard is backed up internally by the School gallery whose reworked "keyhole" windows effectively articulate the newly created two-story volume. In fact, the design has very carefully respected, and taken its cues from, the position of masses of adjacent buildings, heights of eaves, setbacks, and so forth. The addition eventually came to quote directly from the existing Anderson Hall by repeating the West *risalit* of the quadrangle elevation on the loop road façade of the new wing, and by centering the cross circulation within this element.

Other quotations also exist: the conical lanterns penetrating the roof at either end of the gallery concourse share formal affinities with the tabernacles rising above and punctuating the roofline of the immediately adjacent Physics building designed by Ralph Adams Cram. In addition, by observing the footprint prescribed by the original General Plan, the scheme reinforces and extends the intended form of the quadrangle and its ancillary spaces. This strategy is compatible with the original *parti* in which the narrow buildings of the central quad were supplemented by linked blocks facing outward towards the loop road; a new "porch" on the northeast corner of the new wing emphasizes this relationship.

When Anderson Hall was built in 1947, its vocabulary was an abstraction of motifs found in the early Cram buildings, a coming to grips with Modernism by the firm of Staub, Rather & Howze. Stirling and Wilford undertook many studies to extend the implications of this

North elevation.



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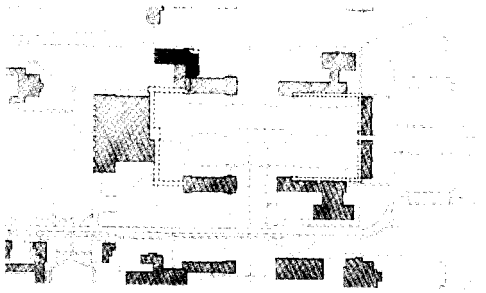
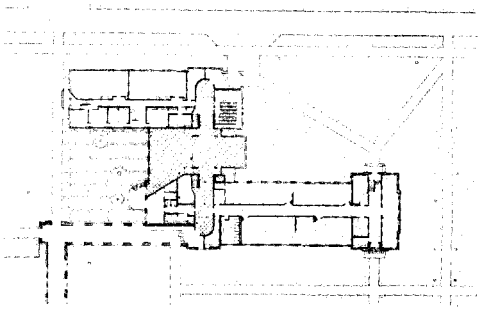


SITE PLAN



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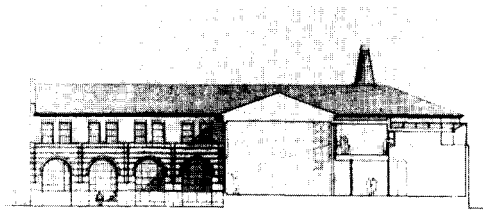


West-east section through courtyard and gallery.

News report continued from page 21

treatment into one making references to the initial campus buildings. The existing line of the eaves, primary string and shiner courses are carried through the new elevations and the design is intended to match the facing brickwork, stone trim, and clay pantiles as nearly as possible.

Architecture was one of the first disciplines offered at Rice, and its first chairman was William Ward Watkin, representative for Cram, Goodhue & Ferguson who stayed on in Houston. As construction proceeds, it becomes evident that the intervention strategy undertaken by the School is one which physically ties into the life of the inner campus and philosophically implies a more integrated and accommodating attitude in institutional terms. The Rice students, dispersed to a variety of campus locations during construction, will be watching in anticipation. Physical design will be enriching a larger portion of campus life upon completion, demonstrating a building scale to context relationship both unique and unusual in Houston. [Peter Papademetriou]

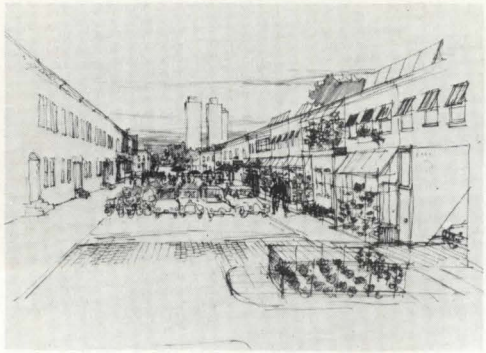
Solar Cities Design Workshop

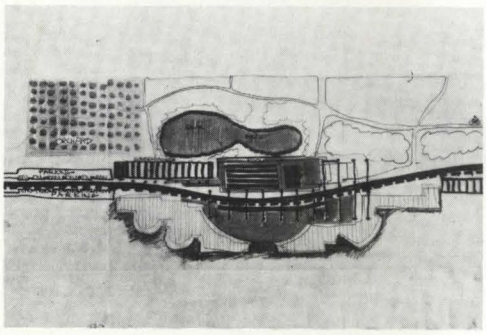
What are the problems and possibilities for communities seeking to make a transition to a solar future? What kinds of physical patterns will solar communities have, and what are the implications of these patterns for social, economic, ecological, and cultural change? These were questions posed by the Solar Cities Design workshop, held from August 3–10, sponsored by the Solar Energy Research Institute (SERI) and organized by Van der Ryn, Calthorpe & Partners whose offices are in Inverness, Ca.

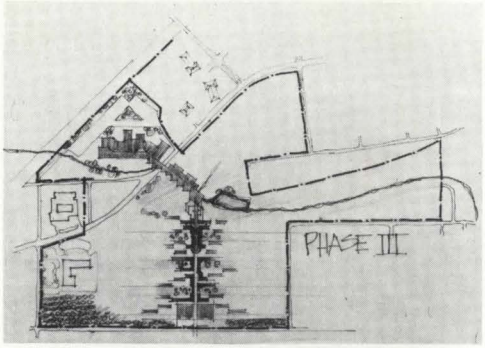
Rather than a think tank on the obdurate problems of technology and the politics of economic and social change, this was a week-long "design charrette" intended to conjure up prototype solutions expressed in sketch plans. The program organizers placed a high priority on developing images as a way of making the "solar transition" a more tangible reality to architects, developers, and decision-makers in government and the private sector.

To this end, three case studies were examined. The first was for an inner city riverside neighborhood in Philadelphia; the second was for a post-World War II suburban community, Sunnyvale, in the San Francisco Bay Area; and the last was for a new planned community adjacent to the existing urban fringe town of Golden, Co. The sites were chosen because they had the potential to become actual project areas.

Each project had a team. Don Prowler led the Philadelphia team of Richard Stein and Travis Price. The Sunnyvale team included Robert Twiss, leader, and David Sellers and Sally Harkness. John Anderson led the Golden team of Bob







Top: Philadelphia: renovated street. Middle: Sunnyvale: Activities "bulge" along strip. Golden: site plan.

Harris and Doug Kelbaugh. Eleven technical consultants assisted the team leaders and prepared background papers on their specialities for the group at large. Consultants were: Fred Dubin, Central Power; Fred Reid, Transportation; Sheila Daar and Richard Merrill, Urban Food; Clare Cooper, Urban Sociology; Amory Lovins/Hunter Sheldon, Energy Systems; David Morris, Community Development; John/Nancy Todd, Whole Systems; Mary Catherine Bateson, Cultural Anthropology; Ralph Knowles, Solar Design; and Steve Serfling, Aquatic & Waste Systems.

Although the projects had different settings, common themes emerged. Each case showed that conservation technologies used at the community level would strengthen the local economy by establishing community-based industries interwoven with the "nutrient cycle." If communities take charge of their water supply, waste disposal, and food production, their resulting autonomy would also produce a general decentralization. In other words, the shift to solar or self-sustaining communities is a shift to regionalism or localism, politically, socially, and economically.

For the Golden site (where a local developer has expressed interest in the solar community idea) the team proposed a regional shopping center and office park with residential development. Organized along an active pedestrian spine, glazed to capitalize on the greenhouse energy potential, the plan recognizes, innovatively, how a closed-system environment integrates living and working. Energy and food production, as well as nature, weave through the heart of things, and the community water ditch symbolizes this.

In Philadelphia the idea was to take a slice through the city, to include a spectrum of income levels. The South Street site along the river encompasses a gentrified industrial area in the north and a poverty level residential neighborhood in the south. Overall, the slice has a mixture of underutilized industrial buildings. The foremost task was to stabilize the south end of the strip by creating job opportunities. The redesign of the area emphasized retrofitting buildings for small businesses, shifting the location of service-oriented industries, and creating intriguing entrepreneurial ventures, such as the conversion of river barges into commercial aquaculture fish farms. Here again, the team recommended passive energy devices, insulation, orientation, and greenhouse areas. This was, perhaps, the most utopian of the plans because it involved the most social and economic change. However, the Philadelphia City Planning Dept. has targeted the area for future study as part of a city-wide DOE grant.

Sunnyvale represented the middle-aged, middle-income community. Originally primarily orchardland, Sunnyvale burgeoned as a post-World War II bedroom community for the technical labor force of "silicon valley." Here the team aimed to return the site from Anyplace to Someplace by reestablishing agriculture as a local industry, turning the major commercial strip, El Camino Real, into a "pulsing" intermittent commercial development, and detailing the possibilities for an integrated, self-sustaining community. What is now, on the map, a continuous, fine-grained, urbanized development became a patchwork of voids and solids achieved by awarding density bonuses to homeowners for relinquishing front yard areas and 40-ft-wide streets, and by the development of parks and orchards on city land.

The utopian cast of the workshop was admitted by the participants with the defense that, in view of the acknowledged crisis, utopian is utilitarian. Sim Van der Ryn who, after his tenure as California State Architect, is certainly no stranger to the political/policy arena, spoke earnestly of the need for a clean vision of the future and for models demonstrating this. If indeed that is what we have been lacking, the results of

this workshop should certainly help fill that lacuna.

SERI will issue a publication of the workshop's proceedings, as well as a book by Sim Van der Ryn and Peter Calthorpe describing and illustrating the three solutions. [Sally Woodbridge]

Architectural Ring Cycle

Presented at Seattle's Pacific Northwest Festival in the Forest was a traditional staging of Richard Wagner's "Ring of the Nibelung" *and* an unorthodox version. The second version, called "The Ring of the Baubildung," was mounted largely under the direction of East Coast impresario, architectural theorist Anthony Vidler.

As an elaboration on the Seattle Opera's famed German and English Ring productions, Vidler's company performed the opera mainly in English mixed with a French-based form of speech called semiotica. Because of this vocabulary, plus the heavily altered libretto, the audience had trouble at times following the action. But basically the dramatic events echo Wagner's narrative.

Das Meaninginformen

Wotan, King of the Gods (played convincingly by Anthony Vidler) has called a meeting in Valhalla. In this staging the setting is the Battelle Institute, a conference center rendered in folksy bungaloid vernacular and nestled in a "micro-wilderness" in the heart of residential Seattle.

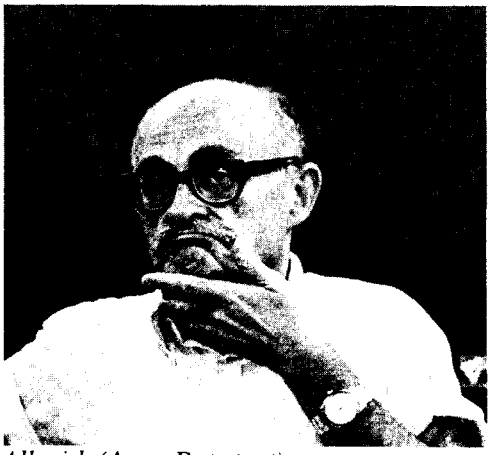
Wotan announces das Meaninginformen must be found. Lost since the Age of the Modern Movement, "meaning in architecture" is a shimmering essence, the possession of which would enable architects once again to control the built environment.

In the opening sequence, Freia, Wotan's daughter, performed by architectural theorist/historian Mary McLeod, appears, wistfully singing about the search for "meaning in architecture" over the last several decades. She relates in a clear soprano how the rational versus the intuitive impulses in architectural expression became polarized after the 1920s. Then she brightens with the refrain about the reassessment of architectural theory that began with Venturi, Norberg-Schulz, Baird & Jencks et al in the 1960s, deepening her dramatization as she turns to the investigation of architecture as a communicating object, and finally launches into the gaining of influence of the "linguistic model." Freia here lowers her voice to a mezzo-soprano for a passage about the denial of references in the abstracted architecture of Eisenman and Rossi; then her voice rises to a high pitch for the "PM" leitmotif—a questionable exaggeration of "meaning" by Post-Modernist architects.

Fasolt/Fafner (Arthur Erickson).

Freia (Mary McLeod).

Wotan (Anthony Vidler).



Alberich (Amos Rapoport).

Sigmund/Sieglinde (George Baird).

Seignifikation (Michael Graves).

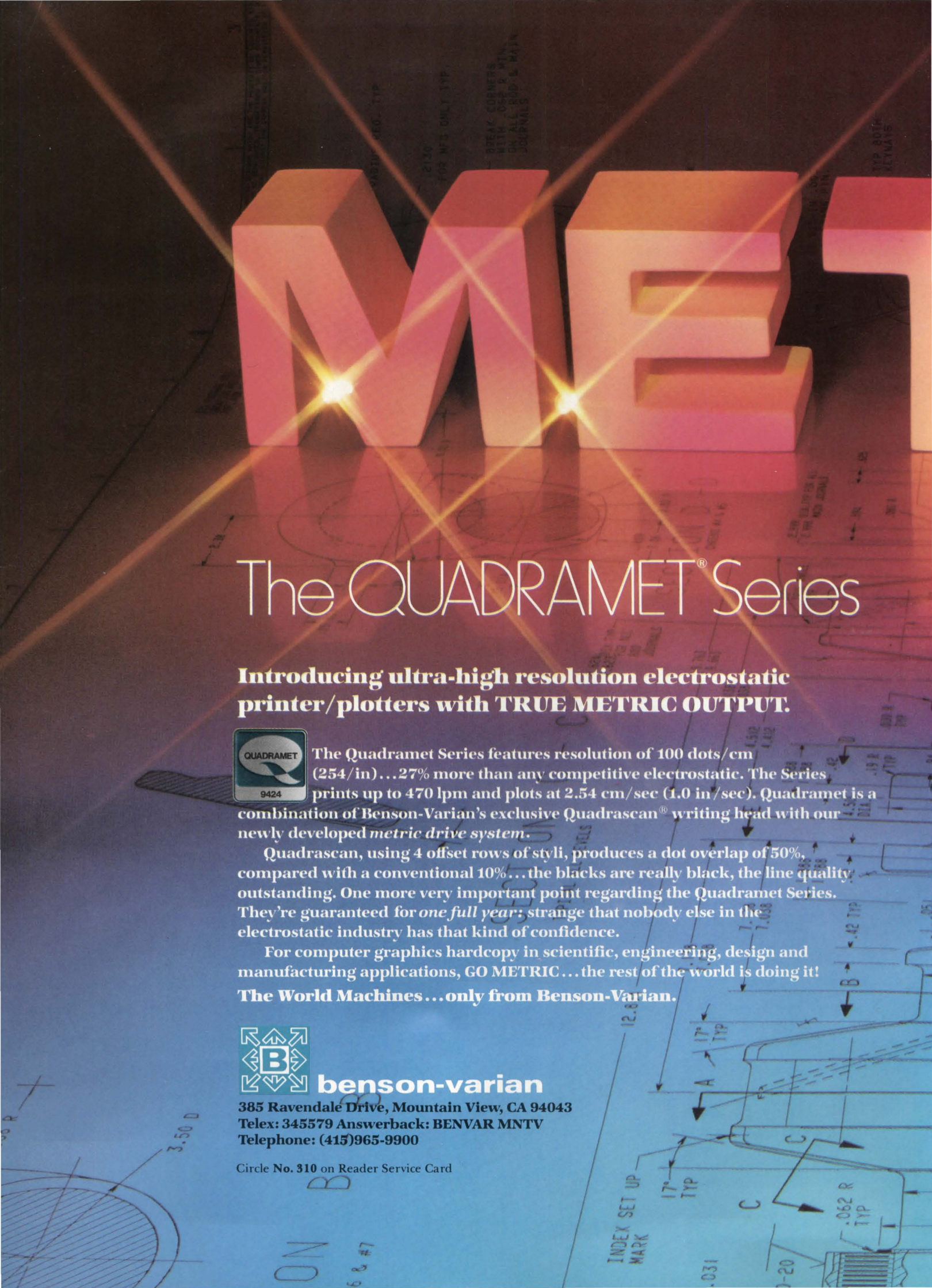
Immediately upon finishing, Freia is dragged away by two giants who built Valhalla—Fasolt and Fafner (whose names are changed in this production to Gropius and Mies, and both played by architect Arthur Erickson). The giants demand as payment the essence of das Meaninginformen. Since Freia is the goddess of youth and eternal renewal in Architecture, Wotan is troubled. If he doesn't find the essence soon, the discipline of Architecture will not survive; it will dissolve into commercialistic commodity fetishism on one hand or boring Building on the other.

Wotan and his sidekick Loge, God of Fire (played cooly but authoritatively by architectural historian/theorist Kenneth Frampton) decide to go among the mortals to find das Meaninginformen. They visit the land of the Nibelungen—in this staging called Funktionenbauen. The local inhabitants (played for the most part by social scientists) tell them that one of their own, Alberich, has seized it.

Alberich, sung fiercely by anthropologist Amos Rapoport, insists das Meaninginformen is not the ineffable essence for which Wotan and Loge search. It exists all around in the form of the built environment. Meaninginformen can be detected by close scientific analysis of specific behavior in place. Fearing that Meaninginformen is being reduced to a materialist type of function, Wotan and Loge leave Alberich in Funktionenbauen.

Der Search for die Morpheme

Meanwhile, Wotan has joined with Erda, the Earth Mother (in this staging played interestingly enough by the National Endowment for the Humanities) who insists on having some daughters to give a sexual balance to Valhalla. So the Valkyries enter, with the part of Brünnhilde recast continuously. The [*News report continued on page 26*]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first Brünnhilde was dynamically performed by sociologist Galen Kranz using chalk and charts instead of spear and shield to graph the differences in attitudes between the thinking of the gods (the architectural theorists) and the inhabitants of Funktionenbauen (the social scientists).

The scene soon shifts to other offspring of Wotan, the twin mortals Sigmund and Sieglinde. Separated for many years, they meet again and fall in love. The part of the twins here was arrestingly sung by one person, Canadian architect George Baird. Baird was deemed perfect for the part because of the professional split he had shown in his own career—first as coeditor of the book, *Meaning in Architecture* in 1969 (thus "god-like"), then as a practicing architect in Toronto (thus mortal).

In a moving aria, "Der Search for die Morpheme," Sigmund and Sieglinde (Baird) explain that in spite of the focus on the "linguistic analogy" in architecture, the architectural equivalent of a "morpheme" had never been found. But Sigmund and Sieglinde remain hopeful about the search in general: perhaps "illumination by analogy" can guide gods and men to the mysteries (unconscious and conscious) of Meaninginformen.

Fearing that practitioner and theorist cannot become one and will not find the essence that allows architects to determine their fate and that of the built environment, Wotan decides the union of Sigmund and Sieglinde is doomed. He orders Brünnhilde to kill Sigmund, the practitioner.

Brünnhilde, now performed with straightforward gusto by anthropologist Hildred Geertz, empathizes with Sigmund and Sieglinde. Building on the cadence of the linguistic analogy leitmotif, Brünnhilde also asks if a model of language can be used that encompasses both communication and interpretation, or *rhetoric*.

Spanish philosopher Xavier de Ventos enters, recast as Fricka, wife of Wotan. In Wagner's Ring, Fricka of course is the goddess of marriage. Not so in this production. Fricka begins to sing quite vivaciously and humorously, if not a little darkly, that *all* who are optimistic about the linguistic analogy should be killed off. Fricka desires to "save spaces from signs." Fricka further urges gods and mortals not to look for Meaninginformen in the production of signs: by making signs intentionally carry meaning, man will forever be trapped in a production cycle of trying to "overcome control with control."

Siegnifikation

At any rate, Sigmund is killed by Wotan, and Sieglinde will soon die, but not until she bears the child of their brief union, Siegfried the theorist and practitioner named in this staging Siegnifikation.

Siegnifikation is sung valiantly by Michael Graves. Since this production is so unorthodox, no one is shocked to see Graves first appear as Brünnhilde announcing the arrival of Siegnifikation—the world's greatest hero-architect. Graves as Brünnhilde insists das Meaninginformen can be found by entering the Golden Arch—this production's equivalent of wearing Wagner's Gold Ring. The moment is made dramatic (in the Wagnerian tradition) by employing a setting built on images of the famed and mythic golden arches of antiquity, back when gods were gods and mortals knew about das Meaninginformen. The scene becomes even more ethereal when Graves gesticulates with a light pointer instead of Brünnhilde's usual spear.

Then, before the very eyes of the audience, Graves metamorphoses into Siegnifikation. The setting changes to images of his own work. His light wand now represents Siegfried's sword Nothung. Yet some members of Valhalla quietly chant, in a moment of ribald humor, that it be renamed "Po-Mo Schtick" in honor of his disputed "Post-Modern" polemic.

Shortly after his appearance, Siegnifikation must confront the dragon (one of the giants transmogrified) who remains a threat to the peace and quiet of Valhalla by still keeping Freia, goddess of architectural renewal, captive. Gropius, the dragon, played in absentia by Arthur Erickson (who departed for another singing engagement) is represented pictorially through images of buildings. Victory is unclear; Siegnifikation leaves to resume his quest for the Golden Arch.

Gesamstkunstwerk

This last and fourth part of the Ring Cycle was the most unfinished part of the staging. As the "Ring of the Baubildung" draws to a close, only Wotan is certain Meaninginformen still lies out there, but it must be created or generated by a mortal man in tune with society and the universe—a mortal man who aspires to be of his own time and who will not be deluded by "signs." Loge agrees but also warns against thinking that Meaninginformen can be recovered through strict application of the behavioristic models put forth by the residents of Funktionenbauen.

And so the musical drama ends. If it lacked the death-and-destruction type of ending of Wagner, this one still struck a properly avant-garde note with its ambiguity, and with its skepticism and optimism tempered by insights.
[Suzanne Stephens]

Program notes: In the interest of brevity, some members of the cast were not mentioned above. They are: Lance Brown, Roger Conover, Victoria de Grazia, Don Genasci, Lars Lerup, George Ranalli, Suzanne Stephens, Georges Teyssot, Alan Trachtenberg. The symposium, called "Tradition and Identity: Towards an Anthropological Architecture," was sponsored by the Pacific Northwest Festival in the Forest Association. Anthony Vidler is currently preparing a publication of the proceedings.

Gerald Allen

America-Europe symposium and drawing show, Helsinki

"The aim of the symposium is to analyze the presently confused and contradictory state of contemporary architectural theory and practice, which is at the moment at a decisive crossroad. Modern ideology has been scattered, and there are differing attempts toward a new approach," stated Juhani Pallasmaa, director of the Museum of Finnish Architecture, which sponsored the Helsinki drawing show and concurrent symposium held in August for a small group of European and American architects. The American contingent consisted of Charles Moore, Helmut Jahn, Daniel Libeskind, Robert Kliment, Gerald Allen, Peter Pran, Richard Oliver, Michael Sorkin, and Bartholomew Voorsanger. Europeans attending were Heinrich Klotz, Marburg; Roland Schweitzer, Paris; Dennis Sharp, London; Jean-Claude Steinegger, Zurich; Kjell Lund, Oslo; Carl Nyren, Stockholm; and Anton Schweighofer, Vienna. Nine Finnish architects completed the group.

To assure a relaxed atmosphere, the symposium took place on board a 100-ft schooner sailing around the archipelago in the Gulf of Finland. With no space for either an audience or the press, there was no need for any of the participants to feel they had to "perform." Rather, in small groups that gave everyone a chance to interact, productive conversations resulted. Architects who rarely have the opportunity to exchange architectural theories were delighted to do so. Helmut Jahn, of C.F. Murphy Associates, and Charles Moore, for example, rarely sit down to discuss architecture together. Here they did, and, says Jahn, "Moore and I are not as different as might appear. Pallasmaa called us both terrorists, me the urban variety and Moore a 'suburban cowboy guerrilla.'"

As no great surprise to anyone, the future of the Modern Movement was not resolved; yet some interesting observations did surface. For one, most agreed that despite the similarities between American and European architects, there exists an invisible line down the Atlantic, primarily regarding Modernism. The Europeans, after 50 years, see it as a way of life rather than an ar-

[*News report continued on page 30*]

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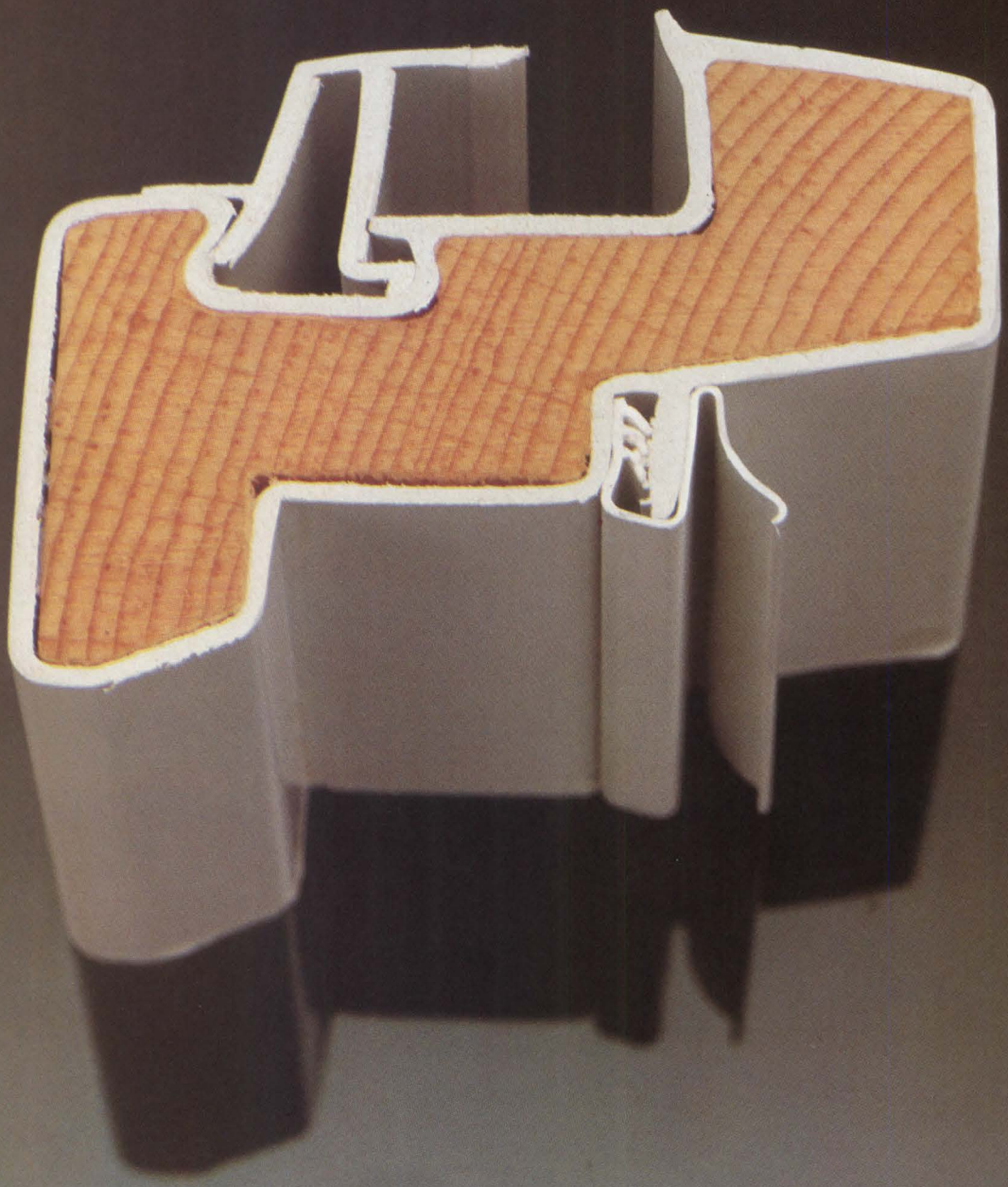

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News report continued from page 26

chitectural style, and rarely question its soundness. "Perhaps," concluded Pallasmaa, "it is because we have always had a rich view, like the one now only beginning in the U.S. Alvar Aalto's Modernism included the vernacular, historical references, and the arts and crafts tradition. Rockefeller Center exemplified a genuine brand of American Modernism, but the influx of German architects cut this down. Now, a national style seems to be recommencing, with Venturi, Moore, and Graves as key figures."

"I think we all agreed," concluded Heinrich Klotz, curator of the Frankfurt Architectural Museum, "that we want to move away from the Modernist dogma; we only differ in our methods." Cranbrook's Daniel Libeskind concurred that a variety of opinions was healthy. "Our one common expression was to challenge the orthodoxy of the Modern Movement." "It was a very gentle learning process," commented historian Dennis Sharp, who was surprised that there were not more deliberate attempts toward a new architecture. "The talk was much more about meaning and content than form."

The drawing show

The same non-polemic atmosphere that pervaded the symposium held true for the drawing show, with one difference: the latter was a strictly American endeavor. The Europeans have inferred from the American architectural press that drawings are the best indicators of the state-of-the-art in America, an interesting observation in Finland, where building rather than drawing is seminal.

The show's surroundings complemented its contents: the richly ornamented drawings of Robert Stern, Stanley Tigerman, Rodolpho Machado, Richard Oliver, Gerald Allen, and Mark Simon seemed at home in the magnificent Jugend Style interior by Finnish architect Larks Sonck.

But this show was not meant to favor a point of view, and some of the juxtapositions were refreshing. For example, whimsical drawings by Janet Needham-McCaffrey surrounded drawings by Cesar Pelli. Graphics by Helmut Jahn and Daniel Libeskind neatly sandwiched George Ranalli's lyrical representations of the Frehley house. The rich colors of Andy Burr are predictable near those of Charles Moore, but the bold black and white graphics of Hardy Holzman Pfeiffer are rarely seen near the soft pastels of Kliment & Halsband or Voorsanger & Mills. These, along with the hard-edged minimalism of Lauretta Vinciarelli, showed the Europeans the scope of American production. Piled nearby in a clear plastic showcase were the sketchbooks of Jim Freed.

The show will travel around Europe and the U.S., although the dates have yet to be set. The Whitney Library of Design plans to expand the show's excellent catalog into book form.

[Susan Grant Lewin]

RIBA Conference 1980 The City: Architecture and Politics

As location for its 1980 Conference on "The City: Architecture and Politics," held July 16–19, the RIBA chose Newcastle-upon-Tyne, a city that has shown political determination in its attempt to transform a derelict coal and shipbuilding port into "the Brasilia of the north." The Conference was structured to juxtapose cities with contrasting problems—Venice and Atlanta, Paris and Bombay.

RIBA President Bryan Jefferson identified two democratic forms inimical to architecture: first, the tendency for leadership to assume a transactual rather than a transforming role; second, the four-year governmental term.

Sir James Richards drew a distinction between the industrial "producer" city and the more fundamental hub—of interest, ideas, and consumer needs—that gave its name to civilization. Modern mobility, he believes, has caused a shift in ownership. The rights of residents are challenged by those of the world's tourists and scholars.

Newcastle savaged her classic fabric in the hustle to modernize, but she counts among her successes the brilliant mosaic of the flowering Byker neighborhood (P/A, Aug. 1979, p. 68), as well as the rapid transit system, whose construction set, according to its director David

[*News report continued on page 32*]

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News report continued from page 30

Howard, a world record for speed. Vernon Gracie, Ralph Erskine's resident partner, described a decade of his office's involvement with the City and residents at the center of the Byker clearance area. Designed strictly as low-cost rehousing, it is now an international tourist attraction.

From Atlanta, Newcastle's twin city, Walt Huntley, Black representative of Black Mayor Maynard Jackson, described the success story of social and political restructuring that he himself symbolizes. And Richard Rogers showed enchanting slides of Paris's Centre Pompidou, though he omitted what should have been an instructive political narrative.

Venice, meanwhile, embodies the extreme conflict between a city's historic fabric and its industry. The petrochemical industry pollutes the air and upsets the rhythm of the lagoon, while the potential value of upgrading old buildings threatens the social structure. Chief Planner Eduardo Salzano explained that there can be no question of a choice between conservation and development in Venice, nor can the solution take the form of compromise. It has to be a synthesis. A case where the architectural situation required political action occurred after the 1966 floods: international aid was forthcoming to restore individual buildings, but the infrastructure should have been tackled first.

Of all the dilemmas facing cities, it was the plight of Bombay that most fully engaged the audience's sympathies. Charles Correa's fearless acceptance of the situation was most encouraging. The half-million commuters and the squatters, ten to a room, are there to find jobs, not to experience the civilizing influence of the city. Correa, unlike most Bombay residents, accepts the influx as a positive and healthy reaction to distress in the villages. He points out that when, in the past, Europeans faced a similar situation, they were able to emigrate. This option is not open to Asians today. The cities must absorb these migrants and generate employment for the long and short term. The role of the architect, he believes, is to conceptualize—and help catalyze—the restructuring of the city. In the case of Bombay, this means replacing the north-south structure by a system of urban centers around the bay. Instead of trying to bar immigrants from the city, he suggests revising the street profile to provide a raised platform between road and pavement to be used by vendors during the day and for sleeping accommodations at night.

In this atmosphere of global concern, the British Secretary of State for the Environment did not meet with the reception he perhaps expected, considering his strong commitment to conservation and to architectural competitions. Mr. Heseltine was seen simply as a representative of a government that, rejecting the Brandt Report, overlooked the potential importance of Third-World markets for slack Western industries. At the local level, it is a story of underutilized (not insufficient) resources. Anthony Collier, director of the local Architects' Workshop, drew attention to the possibilities of reclaiming derelict urban land with the help of unemployed school dropouts and underemployed architects. [Diana Rowntree]

ASID convenes in New York

Design Power 80, the American Society of Interior Designers' national convention, brought more than 2000 members to New York, August 20–24. Major speakers Dr. Jean Houston and Count Arnold Keyserling set the tone with remarks on increasing human potential. More than 30 workshops presented discussions on energy conservation, designing with exotic artifacts, recycling, design in the 21st Century, and the effect of light and color on health. Large crowds turned out to hear the business-oriented discussions that suggested, among other things, that firms expand to include higher paying specialties such as graphics; that designers consider being in-house corporate staff; and that grant application, promotion, and marketing techniques be perfected.

A highlight of the conference was the extensive awards program. *New Yorker* drama critic Brendan Gill received the Thomas Jefferson Award for his championing of historic preservation. Everett Brown was named designer of distinction for his interior design, introduction of such products as leather floor tiles and wool suede wallcoverings, and his [*News report continued on page 36*]

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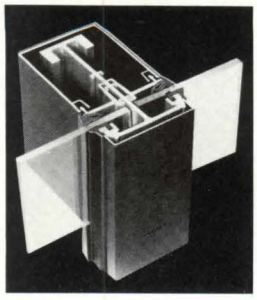

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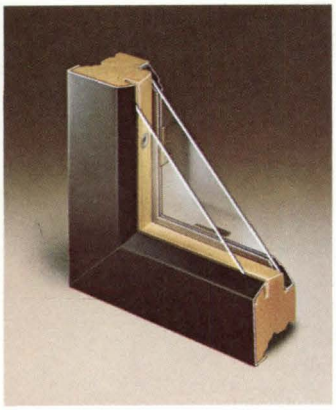

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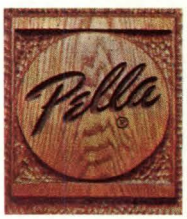

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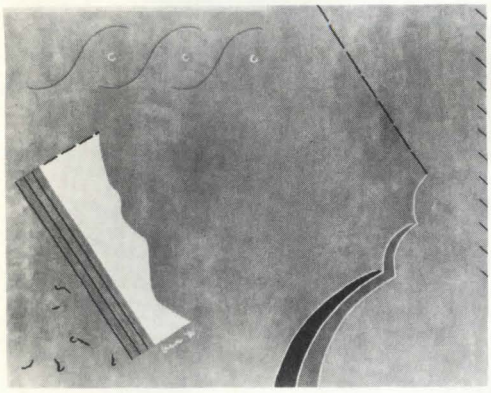


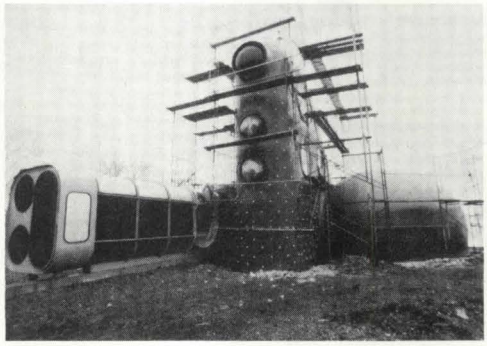
Above: Graves's rug design.
Below: Engstrom's Top of the Hub restaurant.

model rooms for department stores and advertising campaigns. James L. Quinlan of Ford Motor Co. received the human environment award for his renovation of the Henry Ford Museum in Dearborn, Mi.

Three interiors were given awards: Top of the Hub restaurant in Boston by Eric G. Engstrom of Wudke Watson Davis and WME of San Francisco; Salzman residence in Fort Lauderdale by Bud Merle; and Wentletrap Restaurant, renovated from a warehouse in Galveston by M. Robbins Black.

Five international design awards were given. Senator Paul E. Tsongas of Massachusetts was recognized for helping develop Lowell Massachusetts National Park. William N. Lacy, president of Cooper Union, was recognized for his efforts in education. Site, Inc., of New York was cited for expanding the traditional definitions of the visual arts. Phyllis Lambert, architect and president of Heritage-Montreal, was cited for her efforts in urban conservation. The city of Jerusalem, KARTA-Central Jerusalem Development Corp., and architects Moshe Safdie and Gilbert Weil were cited for Jerusalem's Mamilla project.

Other events of note: 35-year veteran of *Interiors* magazine Olga Gueft was named an honorary fellow; Michael Graves's second limited edition rug design for V'Soske was unveiled in a booth also designed by the architect; New York's Mayor Edward I. Koch celebrated his city's $2.5 billion interiors industry by proclaiming it "ASID Week." [NM]



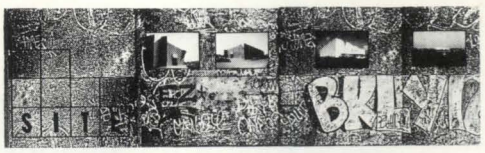
New face, familiar form for House of Century

An architectural landmark of the mid-1970s has been restored to its "original alien splendor," in the words of the architects who carried out the rescue. After only a few years of exposure to the industrially infiltrated air on a marshy site near Houston, fungus had totally besmirched the sleek white spray-on concrete that clad its wittily rounded protrusions. Architectural commentators have repeatedly interpreted these protrusions as "anthropomorphic" (à la Stanley Tigerman) but the designers insist they actually based the forms upon a machine aesthetic—the sleek aerodynamic styling of the 1936 Cord automobile, to be exact.

To cure the water damage incurred by the firmly rooted fungus, the growths were removed by high-pressure water blasts; then a new plastic waterproofing membrane, 2 in. of polyurethane foam insulation, and a ferrocement shell were applied; and finally the surface was coated in white epoxy paint. This new finish, like the first one, will have to be consistently maintained (cleaned, repainted) to prevent deterioration.

Original design credits for the modestly dubbed House of the Century (P/A, June 1973) belong to Ant Farm (Doug Michels, Ghip Lord) with Richard Jost. Jost (who practices architecture in Houston) and Michels are responsible for the restoration.

Ant Farm, known also for its experiments with inflatable structures—hence its interest in aerodynamic forms—subsequently set up shop in San Francisco (P/A, Sept. 1973), but came to a rather sad end. Fire destroyed its studio, consuming design drawings and the archive of photographs and videotapes that represented much of its output. Partner Chip Lord now works as an artist and photographer in the Bay area; Doug Michels is with the firm of Philip Johnson/John Burgee in New York.



Graffiti-covered construction wall.

SITE: Buildings and Spaces

SITE, the irreverent and often controversial New York City architectural firm that has designed some of this country's most unusual buildings, is the subject of a retrospective exhibition that opened at the Virginia Museum in Richmond in June.

Most of SITE's work has been for Best Products, the Richmond catalog showroom firm that is sponsoring the show. SITE buildings for Best Products feature a peeling wall, a notch at one corner that moves to provide entry, a tilted front wall, a crumbling façade, and a glass-walled rain forest.

The medium for this intriguing show—conceived and developed by SITE—is a graffiti-covered construction fence (it's real, done by a New York City street gang) into which are punched holes. Some hold light boxes with transparencies of the projects; others offer a view of an actual construction project with workers alternately building and destroying a brick wall. In addition, there are drawings and models of SITE proposals. One of the most fascinating is a water wall to replace a building façade on Venice's Grand Canal; the façade lies on the water like a pier.

SITE's philosophy—the fusion of art and architecture—is explained in a superbly illustrated catalog that includes an essay on the firm by critic C. Ray Smith.

The show travels to Austin, Tx (Laguna Gloria Art Museum, Nov. 27–Dec. 31), Pasadena (Baxter Art Gallery at California Institute of Technology, Feb. 19–March 22), and Sacramento (Crocker Art Museum, July 13–Aug. 23). [Carleton Knight, III]

Calendar

Meetings and conferences

Oct. 8–12. Annual conference, The National Trust for Historic Preservation, New York City. Contact the National Trust, 1785 Massachusetts Ave. NW, Washington, DC 20036.

Oct. 20–26. Fifth National Passive Solar Conference, University of Massachusetts at Amherst. Contact Passive Solar 1980, Box 778, Brattleboro, Vt 05031.

Oct. 27–29. National conference on fire and safety design for the handicapped, Howard University, Washington, DC. The National Task Force on Life Safety and the Handicapped and the AIA Research Corporation have organized the conference, which is sponsored by the National Bureau of Standards with

[*News report continued on page 40*]

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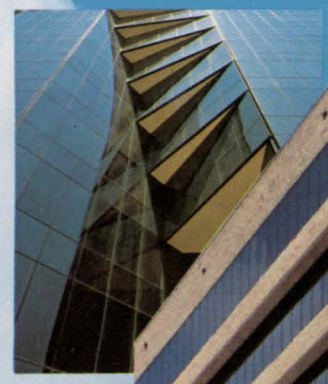

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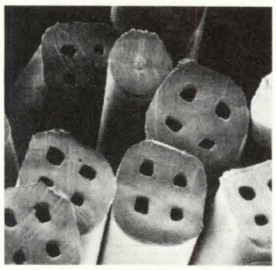

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News report continued from page 36

the support of the Veterans Administration, the U.S. Department of Labor, and the U.S. Fire Administration/Federal Emergency Management Agency.

Nov. 2–4. Designing with Systems, Rapids Rally '80, national student interior design conference, Grand Rapids, Mi. Write Cath McGlynn, IBD, Rapids Rally '80, P.O. Box 2383, Grand Rapids, Mi 49501.

Nov. 9–14. International Federation for Housing and Planning World Congress, Jerusalem, Israel. Write North American Committee for the 1980 IFHP Congress, Suite 308, 1750 Pennsylvania Ave., Washington, DC 20006.

Exhibitions

Oct. 18. Opening of "Architecture II: Houses for Sale," exhibition of original designs for family houses by eight internationally known architects. Leo Castelli, 420 West Broadway, New York.

Through Oct. 19. "Beach, Boardwalk, Boulevard," tracing Atlantic City's transition from ocean resort to casino-oriented community. Cooper-Hewitt Museum, 2 E. 91 St., New York.

Through Oct. 26. "Boston: Forty Years of Modern Architecture," featuring 22 notable projects in drawings, photographs, and models. Institute of Contemporary Art, 955 Boylston St., Boston.

Through Dec. 1. "Celluloid Cathedrals," color photographs by John Margolies of movie theaters. The Lobby, 369 Lexington Ave., New York.

Oct. 11–Nov. 7. "Emilio Ambasz: House for a Couple in Cordoba, Spain." Max Protetch Gallery, 37 W. 57 St., New York.

Oct. 14–Nov. 29. "Michael Thonet: A dominant influence 1830–1980." Lord & Taylor, 8th Floor Furniture Gallery, Fifth Ave., New York.

Nov. 11–Nov. 30. "Buildings for Best Products," Contemporary Arts Museum, Houston.

Competition deadlines

Oct. 30. Entry deadline for Tucker Awards for excellence in use of natural stone. Write Building Stone Institute, Room 2800, 420 Lexington Ave., New York, NY 10017.

Nov. 15. Deadline for applications to Rome Prize Fellowships in the arts and humanities. Contact American Academy in Rome, 41 E. 61 St., New York, NY 10021.

Dec. 1. Plywood Design Awards for outstanding aesthetic and structural applications of softwood plywood in projects completed after June 1, 1979. Write Plywood Design Awards, American Plywood Association, P.O. Box 11700, Tacoma, Wa 98411.

Jan. 26. Mailing deadline for International Conceptual Furniture Design Competition, cosponsored by Progressive Architecture and NEOCON. For information contact Furniture Competition, Progressive Architecture, 600 Summer St., Stamford, Ct 06904.

[*News report continued on page 42*]

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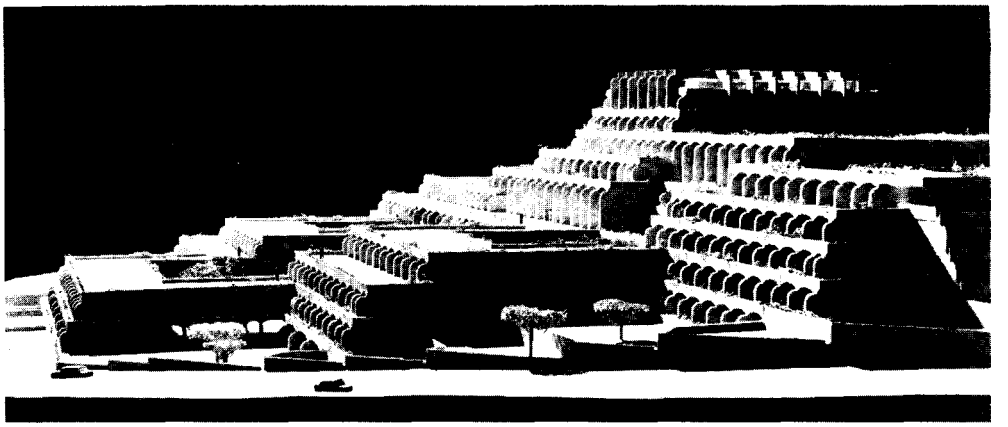
News report continued from page 40

In progress



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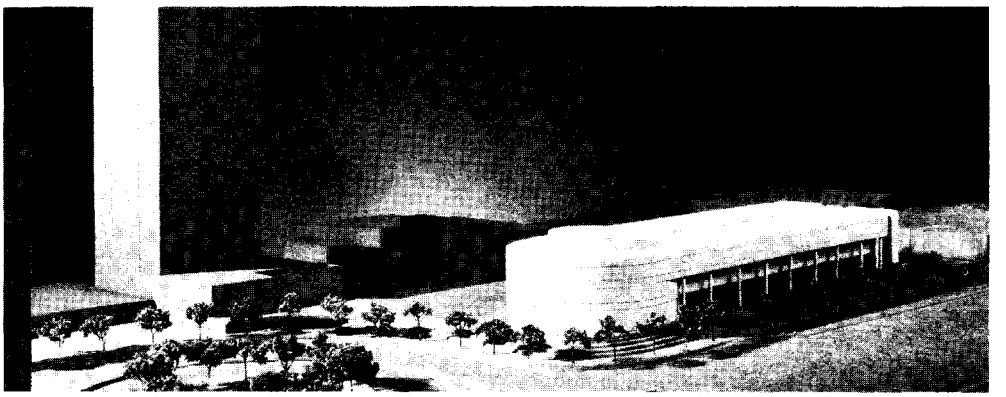

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Hyatt Regency Jerusalem, Jerusalem, Israel. *Architects: David Reznik and Nitsa Ruskin, Jerusalem.* Construction has begun on a 600-room deluxe hotel located on French Hill and the slopes of Mount Scopus. The hotel will be terraced down the slopes and will extend around seven open courts and a six-story enclosed atrium. Facilities include three restaurants, two bars, outdoor and indoor swimming pools, a health club, tennis courts, game rooms, and a shopping arcade. A large ballroom, 12 meeting rooms, and a business center will be provided for conferences. Completion is estimated for September 1983.

Alfa Industries Division, Monterrey, Mexico. *Architects: 3D/International, Houston.* Sited on two acres in Downtown Monterrey, the 87,000-sq-ft office building is surrounded by a raised landscaped plaza which takes full advantage of a panoramic view of a river and of mountain ranges. The low-rise building features a skylit circulation spine which terminates in an atrium rotunda and is finished in bands of aluminum panels and silver insulating reflective glass. Interior balconies overlook the lightwell and rotunda, and provide access to all offices and public spaces. A portion of the new plaza, which connects to existing Alfa facilities by a skywalk spanning a street, will serve as exhibition space for sculpture and artwork, in conjunction with a museum and art center in the existing facilities. Two levels of parking are located below grade. Completion is expected in the spring of 1981.

Warwick Post Oak Hotel, Houston, Tx. *Architects: I.M. Pei & Partners, New York, in association with Richard Fitzgerald & Associates, Houston.* The Warwick Hotel has been a Texas—even a national—landmark for over 50 years. This new project gives the city a second Warwick, located within walking distance of The Galleria in Smith Office Park. Containing 490,000 sq ft, the 460-room hotel is oriented at 45 degrees to South Post Oak Road, in accordance with an area master plan design of the developers, Gerald D. Hines Interests in partnership with the John W. Mecom Co. and Mrs. R.E. Smith. The building's exterior will be clad in rose-colored cast stone with a six-level court enclosed by curved, silver-tinted reflective glass. Completion is projected for Spring 1982.

[*News report continued on page 44*]

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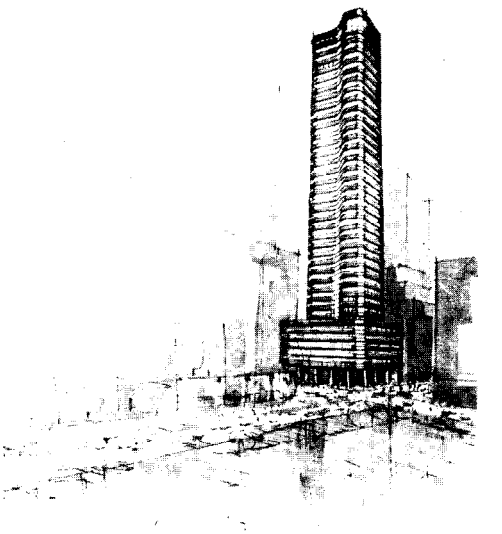

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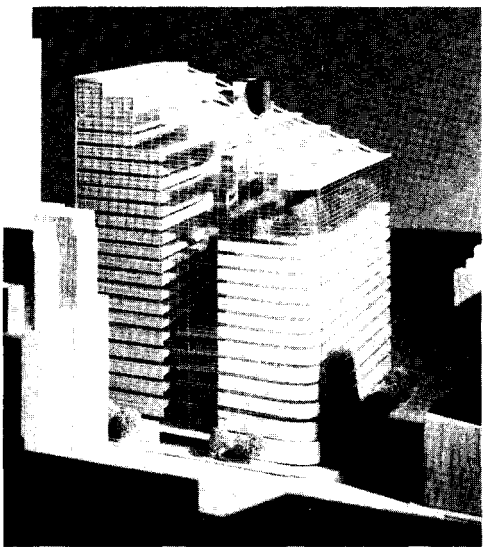

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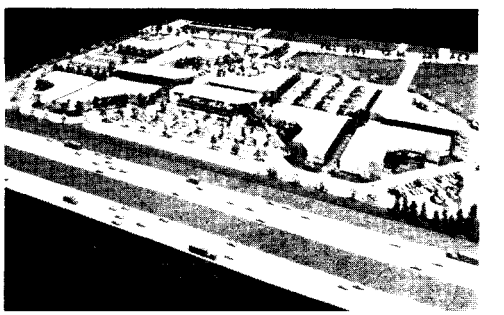

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1 Hyatt Regency Jerusalem. 2 Alfa Industries Division, Monterrey. 3 Warwick Post Oak Hotel, Houston. 4 New York office building. 5 Irving Trust Company Operations Center, New York. 6 Executive Park, Irvine.


Project: Cafeteria, The Prudential Insurance Company of America, Newark, New Jersey
Architect: Kling Partnership, Philadelphia
Interior Design: Daroff Design, Inc., Philadelphia
Engineer: Kling Lindquist, Inc., Philadelphia
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News report continued from page 42

Office building, New York, NY. *Architects: Fox & Fowle, New York.* Construction has started on a 40-story, 275,000-sq-ft office tower at the corner of Third Ave. and 48th St. It will be built "as of right," meaning that no zoning variances will be required. The building, to be sheathed in brick, will set back above the first six floors. Part of the site is now occupied by a nine-story apartment house, built in the early 1930s, and half of this structure is to be demolished to make way for the new tower.

Irving Trust Company Operations Center, New York, NY. *Architects: Skidmore, Owings & Merrill, New York.* Announcing its intention to strengthen its historic ties to lower Manhattan, Irving Trust has launched its new one million-sq-ft operations center, to be located north of the World Trade Center. Developers will be the Rockefeller Center Development Corporation, and Turner Construction will be project manager for Irving Trust. Construction costs for the 23-story mid-rise are expected to be approximately $85 million, with completion anticipated in 1983.

Divided by an atrium, the two sections of the building—one 23 stories, the other 15—are designed to keep overall height down and make a transition between the high-rise buildings south of the site and the lower ones to the north. The north-south full height atrium makes it possible for each occupant to be within 45 ft of a window. The upper level of the 15-story element, open to the atrium, will be landscaped as a cafeteria and lounge for Irving Trust employees.

In compliance with city urban renewal requirements, the facility will have the capability to provide retail space at the street level, and to connect by pedestrian bridges to subsequent developments. Of the projected 4000 employees to be provided for, about 2800 are expected to occupy the center initially. The remaining space will be rented, pending Irving Trust's planned growth.

Executive Park, Irvine, Ca. *Architects: Leason Pomeroy Associates, Orange, Ca.* The first phase of Executive Park, a 15-building office complex on the San Diego Freeway across from Orange County's John Wayne Airport, is underway. The total project, developed by the Irvine Company, will have 13 L-shaped and two trapezoidal buildings of one, two, and three stories, above parking at ground-level. These buildings will be arranged around a series of plazas and landscaped courtyards and will be interconnected by walkways. Horizontal bands of silver reflective glass will alternate with off-white aluminum spandrels on the L-shaped structures, reflective glass will completely enclose the trapezoidal buildings, and stair towers will be of concrete. The $18-million first phase includes a financial and restaurant plaza and five of the low-rise office buildings. It is scheduled for completion by the end of 1980.

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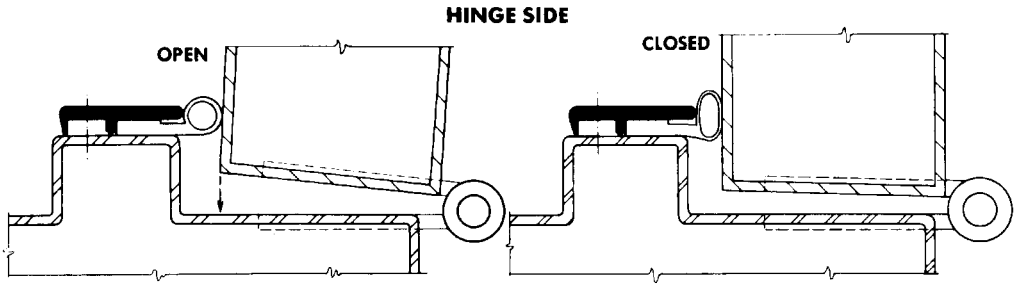

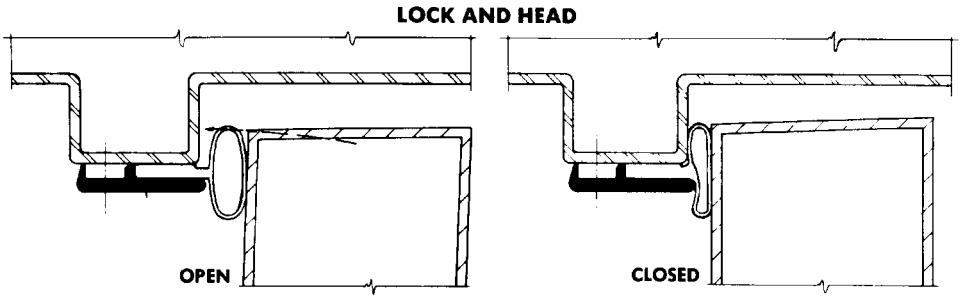

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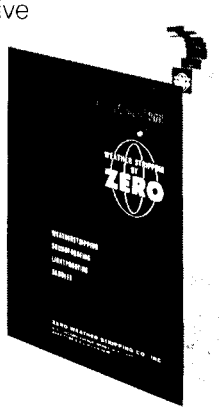

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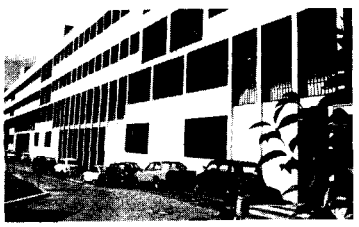
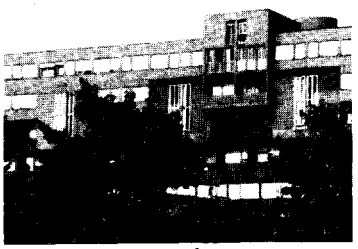
Italian Rationalism:
Rossi and Aymonino

Tendenza

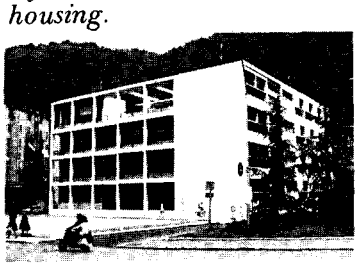
Tendenza is the Neo-Rationalist movement in Italy; the work of its most prolific adherents is shown on the following pages.



Rossi, Gallaratese housing.



Aymonino, Gallaratese housing.



Terragni, Casa del Fascio.

Foschini, Church of St. Peter and St. Paul.

All photos D. Morton unless otherwise noted

Modernism has traditionally taken two paths in Italy; that of the rationalists as expressed in Rossi and Aymonino's Gallaratese housing (1974) in Milan, and in Terragni's Casa del Fascio (1936, now Casa del Popolo) in Como; or that of the academics, as seen in Foschini's Church of St. Peter and St. Paul (1937) at the EUR '42 in Rome.

One of the most influential groups of architects in the world today are the Neo-Rationalists of Italy. They came to prominence in 1973 at the 15th Triennale in Milan, in an exhibition entitled "Rational Architecture" for which Aldo Rossi wrote the introduction to the catalog. Two important texts before this, though, had initiated the movement: Rossi's *The Architecture of the City* (1966), and Giorgio Grassi's *The Logical Construction of Architecture* (1967). Little has been built by the group, but Rossi and Carlo Aymonino have by now produced a body of work that is receiving increasing international attention.

Although Rossi prefers to label the group's attitude towards architecture simply as Tendenza (tendency), its approach is nevertheless broadly rationalistic, based on a particular analytical method and on a highly ordered approach to formal composition. In his and Aymonino's work, this rationalism is seen primarily through the results of their method of analysis of the city, which involves the concept of typology. To understand what the city or typology have to do with their approach, one must go back into history.

After World War II, Italy had to rebuild and expand its cities, and what came about in the name of orthodox Modernism was often quite bad. The new satellite communities, especially those around the large cities of Naples, Rome, and Milan, make a Co-Op City in the Bronx seem like heaven on earth by comparison. "The origin of my research," Rossi said (in an interview with Diana Agrest in *Skyline*, Sept. 1979, p. 4) "was the awareness of the deep crisis faced by the Modern Movement in the fifties. . . . I felt the need to free architecture from the fixed schemes of the Modern Movement, particularly from functionalism, which reduced architecture to economic behaviorism." For Rossi, in order to analyze architecture thoroughly, it would have to be seen as an autonomous discipline, related to nothing other than itself. Since for him the most complete expression of architecture is the city, that is what became the object of investigation.

Aymonino shares Rossi's concern for the city but expresses it in a different way. He has written (in *Lotus #15,* p. 4), "In current Italian practice the architectural result is 'indirect' (that is to say, it stems from a combination of regulations, limitations and prices...)." In the same article, Aymonino discusses the city, saying "an urban planning project should never be exclusively the town planner's province...the architectural scale ought to be the instrument of every town planning process aimed at the transformation of the physical environment." In the projects of each architect, the fundamental condition lies in their incorporation and expression of elements unique to the city—based on an understanding of the concept of urban typologies.

Typology

The study of typology is based on the perception of a thing that allows it to be grouped with another thing. The concept of typology is useful as a tool because it allows one to describe, analyze, and categorize things, from which comes knowledge and understanding. A type cannot be produced physically, but a model can be made as a result of its consideration. Simply, typology means that aspect of a thing that tells us it belongs to the same category as another thing with which it shares certain similarities. For instance, we usually know a house when we see it, although it can be a palace or a hut. With Rossi and Aymonino, the typologies they are concerned with are those of the city, those related to the street, the boulevard, the avenue, the colonnade, the square, the piazza, the courtyard, the esplanade, the steps, and so on. It is the spaces and the forms resulting from the appropriate combination of such elements that will be able to transform the environment.

Where the two architects differ from each other is seen mainly in Aymonino's adherence to a Modernist vocabulary and aesthetic, which can include aspects of brutalism as easily as it can extreme lyricism and color. Rossi, on the other hand, strips his architecture to the barest necessity and incorporates, in addition to typological ideas related exclusively to the city, other ideas

based on his concept of analogy. As Kenneth Frampton explains this (in *Modern Architecture: A Critical History,* p. 290), Rossi insists that ordinary needs must be met. He also believes, however, that only certain architectural types, including the monument, the cemetery, and certain regulatory types, such as schools, hospitals, and prisons, can embody the true values of architecture. This has led to an architecture that is based on analogies to those types, but which also makes reference to vernacular and historical architecture. The result is seen in works that his admirers consider to be of the highest form of architectural poetic art, but which his detractors see as akin only to the most brutalizing and punitive types of architecture such as the concentration or death camp. This double reading seems to be part of Rossi's scheme, since he feels that when a building can be unloaded of such connotations, society will no longer have use for that particular building type.

Neo-Rationalism and Fascism

Rossi's work, in particular, has been accused of being fascist—an accusation he considers absurd. While it can be agreed that this is absurd, there are nevertheless areas where the Italian Neo-Rationalist architecture of today can be seen as related to the Rationalist architecture produced during the Fascist regime.

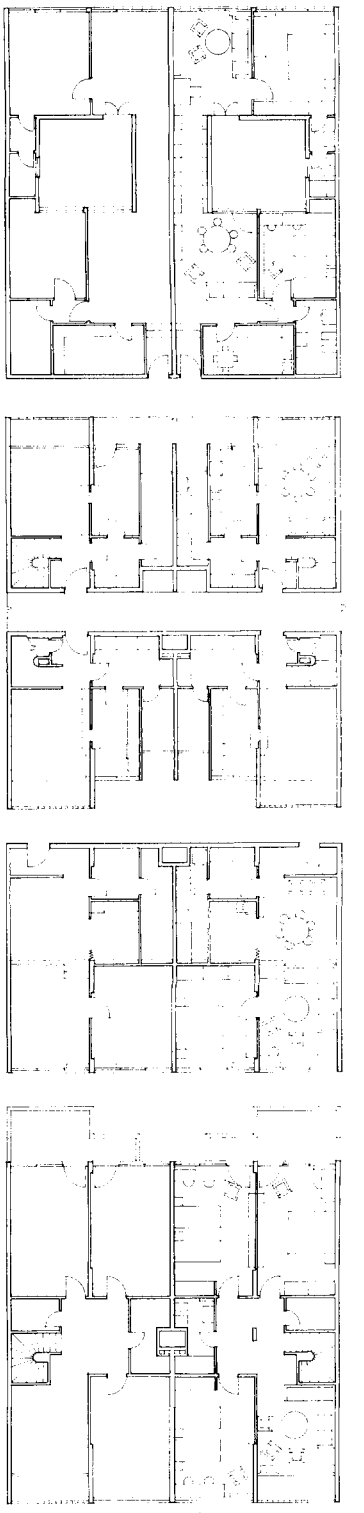
Modernism, it must be remembered, came to Italy during the Fascist period, and it was there at that time that Rationalist architecture developed to a degree unprecedented in the modern world. The movement was begun by the "Group 7" young architects of Milan, and was later to grow into the much larger Italian Movement for Rational Architecture. Like the Neo-Rationalists of today, the Group 7 was concerned with the idea of creating types, but not for the purpose of restructuring the urban environment. Instead, their interest was in the glorification of the regime. As stated in their manifesto of 1926 (translated by Ellen R. Shapiro and published in *Oppositions* 6, p. 91), "We must persuade ourselves of the necessity of creating *types,* a few *fundamental* types. . . . All the architecture which made the name of Rome glorious in the world was based on four or five types..." In their manifesto, the Group 7 also avowed that "The new architecture, the true architecture, must result from a rigid adherence to logic, to rationality. . . . A rigid constructivism must dictate the rules." Such a statement would hardly be compatible with the metaphysics/poetics of Rossi's work or the lyricism that can be found in Aymonino's.

It was this "rigid adherence to logic," however, that was ultimately to be the downfall of the early Rationalists. They continued to build, however, throughout most of the Fascist period and to produce (especially Terragni) some works of extreme grace and purity that are increasingly reappraised today as major monuments of the Modern era. They eventually lost out in favor of a group of conservative academics in Rome, who produced such overblown Moderne monstrosities as the University of Rome and the facilities of the Rome Universal Exposition of 1942 (the EUR), which was never held. The problem was that rationalism and logic appeal to the mind, and for a dictator interested in controlling thought, such ideas were dangerous. In addition, as Shapiro has explained (in *Oppositions* 6, p. 87), Group 7's "nationalism was based on a left-wing interpretation of Fascism, centered on the concept of revolution, and as such precluding any aspirations toward a purely Italian or nationalistic architecture." Eventually, Mussolini outlawed the Movement for Rational Architecture. Of the Group 7, most of those who survived the war did so by fighting in the Resistance.

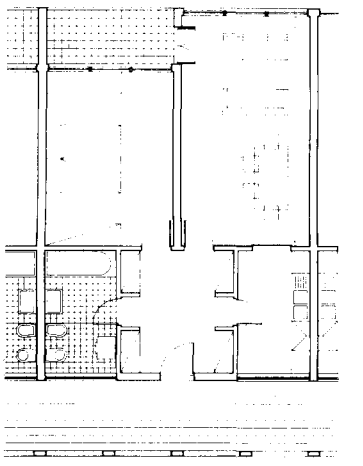
Now the question that should be asked is, if the architecture of the Neo-Rationalists of today has anything to do with the Fascists of 50 years ago, what is it? Of the architecture produced during that period, the Neo-Rationalist work of today is most like that which was officially rejected during its own time, and which was considered not a proper vehicle for the propagation of the Fascist myth. Those two architectures, however, are unlike in that the Rationalists of today are not so orthodox in their rationalism as were the early ones, and in the fact that their avowed ends are very dissimilar.
[David Morton]

Gallaratese housing, Milan

The Monte Amiata housing complex for the Gallaratese quarter in the northwestern outskirts of Milan was designed during Italy's "economic miracle" of the late 1960s. The 444-unit complex that was finished in 1974 contains apartments that range in size from one to five rooms and incorporates residential types ranging from bachelor accommodations to duplex units and courtyard housing. The complex was sponsored by a private real estate company, with the local city council drawing up the program. It was intended to be a showcase project, with apartments available only on a rental basis. It did not, however, become a showcase project in



TYPICAL A, B UNITS (AYMONINO) ABOVE.
D UNIT (ROSSI) BELOW



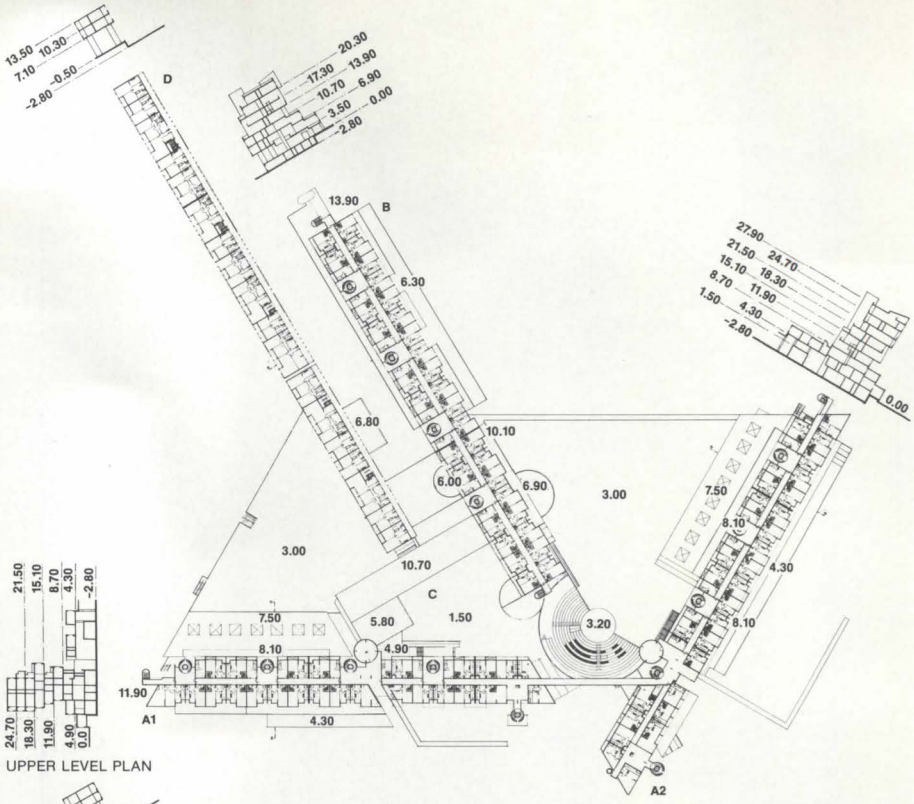
Aymonino's housing (right) is brown; Rossi's is white.

that it presented a model that has been replicated by others (one criticism of it has been that it is too "spectacularly complex" to function as such). Nevertheless, "this beautiful housing project is," (according to Robert L. Delevoy in *Rational Architecture: The Reconstruction of the European City,* p. 69) "without a doubt, the most important to have been built in Italy since the War."

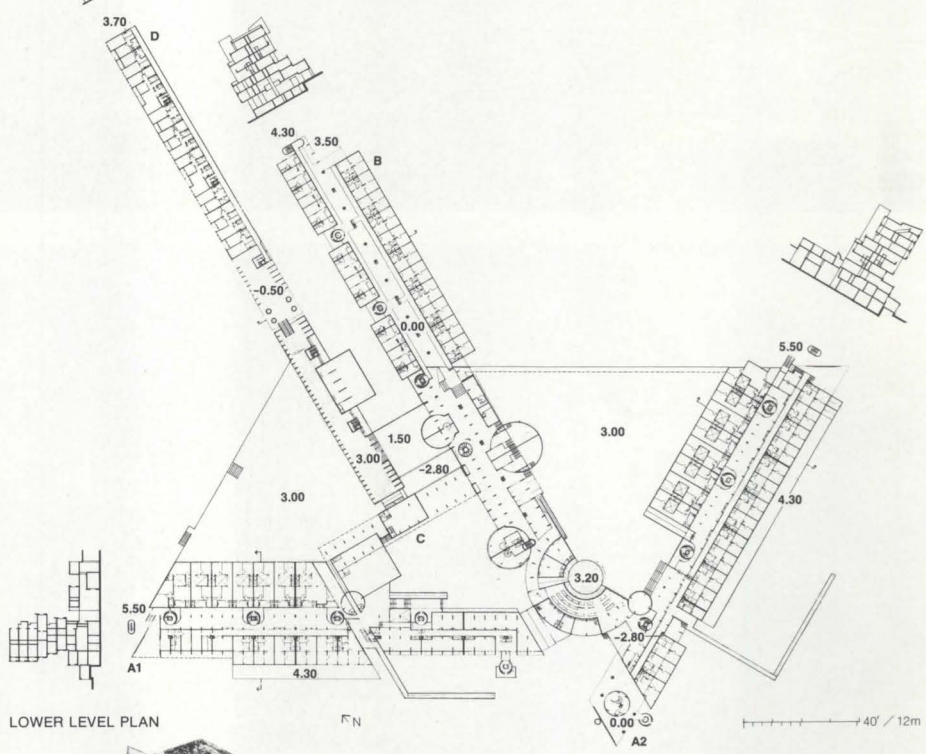
The Gallaratese housing was designed by both Rossi and Aymonino as a series of four separate but connected buildings. The plan they worked out for this scheme has two long, doubled-loaded hall structures forming the sides of an obtuse angle joined at their vertex by a half-circular amphitheater. From this, another similar housing structure extends between the first two buildings to a point beyond the implied base of the triangle. These three buildings and their connections were designed by Aymonino. The fourth structure, running parallel to Aymonino's third one and on the west side of it, was designed by Rossi. The overall planning scheme, now with the addition of the fourth building, can be seen to be generated on the basis of two equilateral triangles. The scheme is composed throughout in purely geometric forms, yet it does not appear as committed to rigid rationality as it does to some of the more angular and geometric designs of Frank Lloyd Wright.

One of the reasons for this complexity and richness surely has to do with the neighborhood where the housing is located. The Gallaratese quarter is typical of many postwar developments in Italy: unrelated 10- to 12-story housing blocks stand alone, scattered at random throughout a barren landscape that seems to have come about with little thought or plan in mind. There is no cohesiveness, no focus, no sense of place.

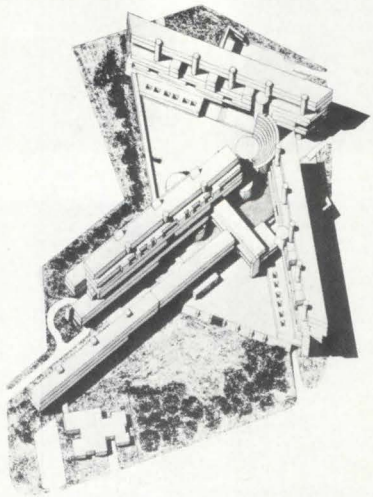
Given Rossi and Aymonino's commitment to the city and their belief in the power of urban types to become the instigators of transformation of the environment, it seems natural that with the circumstances of the context and the scale of their project, they would seek a more extreme solution than might otherwise be expected. But even with the scheme's complexity, it still represents less than what was originally proposed. Specifically, the nonresidential components such as the schools, nurseries, day-care centers, shops, and markets were not accomplished, and other amenities planned for community use were reduced in scale or have been left uncompleted. However, even though these are missing, there is still more



UPPER LEVEL PLAN



LOWER LEVEL PLAN



ISOMETRIC

At the Gallaratese housing in Milan, monumental spaces are provided in the entry gallery of Rossi's white D block, which sits between two of Aymonino's three brown housing blocks that pivot from a public amphitheater (right).

Photos: Y. Futagawa © Retoria.

richness and diversity in this complex than is usually seen in modern housing complexes in Italy, or for that matter, anywhere else.

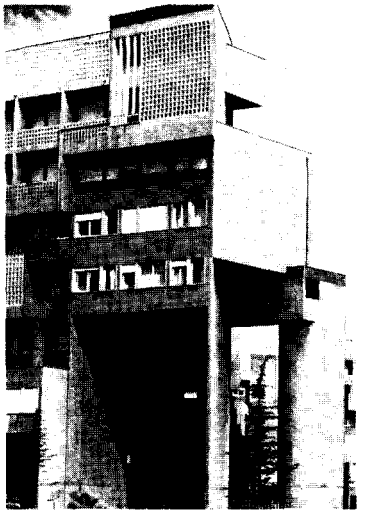
The three Aymonino buildings are continually broken down in scale by a combination of elements throughout the composition. These include small windows with colored frames, brick screens, balconies, sections of glass block, exposed cylindrical stair towers and elevator shafts, and many other indentations, cutouts, and protuberances. The complex is tied together by a series of urbanistic components that include pedestrian bridges (painted yellow), "triumphal" public entrances (painted blue), and outdoor courtyards and plazas, all of which come into focus at the public amphitheater. The buildings are painted a buff brown with red trim on the windows, and interior corridors are the same blue as the major entrances. Additional variety and richness are gained through the use of a complex stepped section that is employed to facilitate a wide range of urban residential models. Throughout the reinforced concrete structure, the brick floors are topped with marble. Although the finishing is poorly executed, the complex is well maintained for the tenants, who must be city employees to qualify to live there.

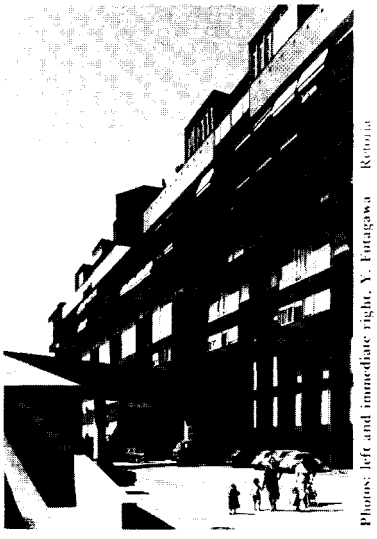
Rossi's building is quite different from Aymonino's and, as such, forms an interesting counterpoint to it. Where the latter is replete with variety and richness, Rossi's all-white oblong concrete structure sits atop a long gallery of flat columns, punctuated only by a series of windows and openings that follow a circumscribed regulating order. But even with this, the basic image of the geometric form remains inviolate. There is no color, and there is nothing in the plan or elevation that does not fall within the orthogonal scheme. The only break in the long block is at an off-centered point where one end of the building becomes physically separated, by a very narrow chasm, from the other end. At this major entry, four monumental columns within the gallery support the structure where a massive flight of stairs leads to the arcade on the floor above. The rigorous logic of Rossi's plan is carried out to the degree that the trees in the field beyond the structure have been planted in a straight line extending from it to continue the line initiated by the building into the distant landscape.

Concerning the typologies or reference represented in this building, the architect has said (in translation by Diane Ghirardo in the Institute for Architecture and Urban Studies Catalogue No. 2, entitled *Aldo Rossi in America: 1976-1979,* p. 18) ". . . there is an analogous relationship between it and certain engineering constructions, the typology of the external gallery, and the feeling I have always had for old Milanese houses, where the gallery is a form of life saturated with everyday history and relationships." Further in the same text, Rossi notes that while passing through the San Bernardino Pass during a trip from Ticino to Zurich, a companion ". . . recognized the repetitive aspect of the open galleries, and I understood then how at an earlier point I must have become aware of this particular structure of the gallery without deliberately thinking of expressing it in my architecture."

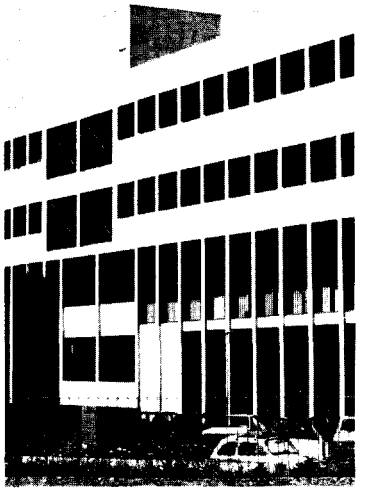
Before the Monte Amiata housing complex was finished, it was taken over and occupied by squatters who had come to Milan from the south, looking for work. Pierluigi Nicolin relates (in *Global Architecture* No. 45) that these temporary occupants were ". . . surprised and puzzled by these buildings, which were so unlike the models of bureaucratic or speculative housing so well known everywhere." In addition, they couldn't understand why people who shared nothing more than a common residential structure were expected to participate in any particular kinds of social relationships, which the organization and design of the complex suggested. Also, "they criticized the width of the corridors and what they considered to be a sheer waste of space (for example, the arcade in Rossi's building)." They were "disturbed and surprised" by the color scheme, and they found it hard to believe that the complex was not housing designed exclusively for the rich.

The squatters' presumption about the economic class for which the complex was designed may have something to do with the fact that in the Gallaratese, which is the largest postwar development in Milan, only the Monte Amiata is barricaded. It is surrounded by a high fence, painted *red* (so one won't miss it?); entry to the grounds is through one guarded gate only. Under these circumstances, and given the fact of the exclusion or reduction of originally planned social services and community amenities, the project cannot exert influence at the larger urban scale as the architects had initially hoped. Consequently, to a certain extent at least, the Gallaratese housing remains a postulation of hypotheses rather than their testing.



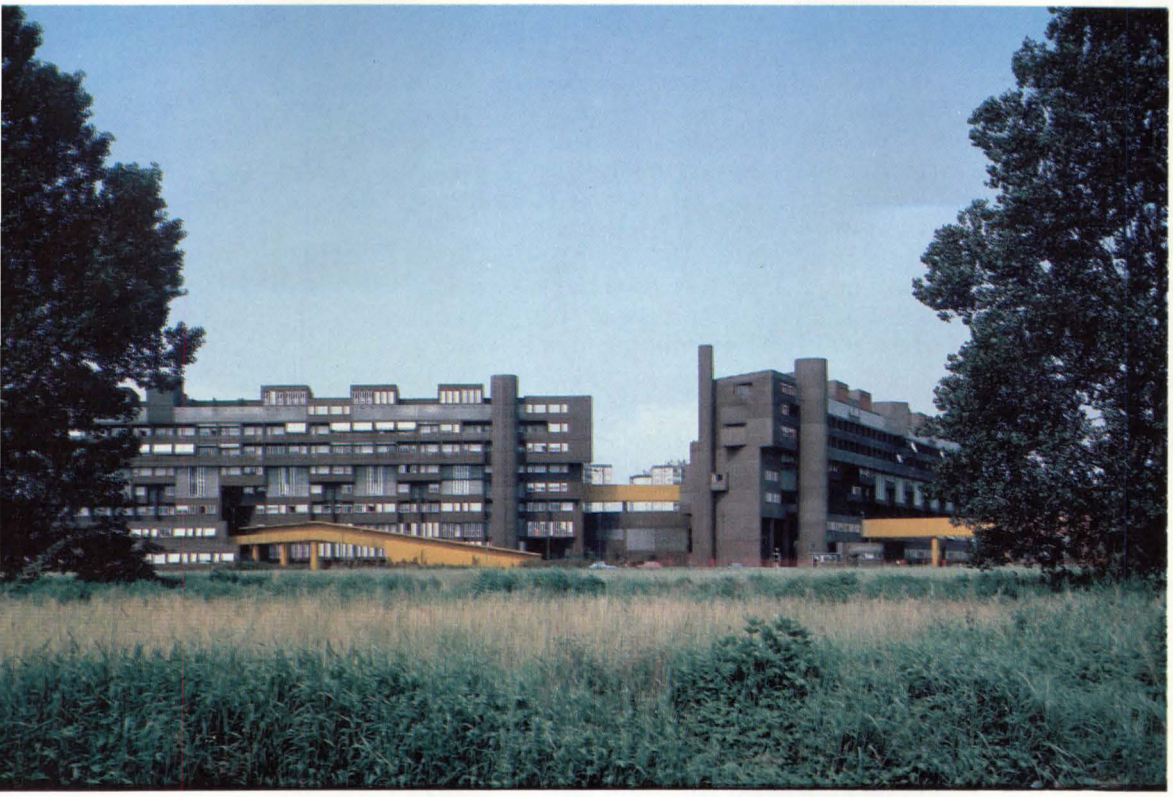


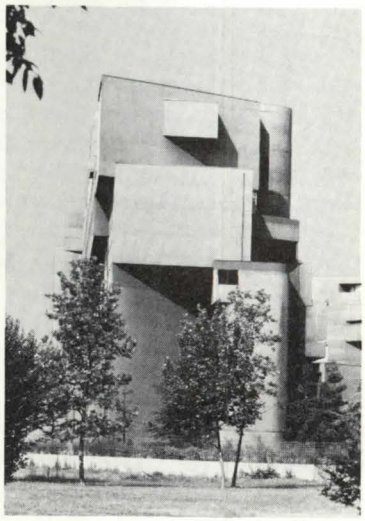
Photos: left and immediate right, Y. Futagawa Rebora

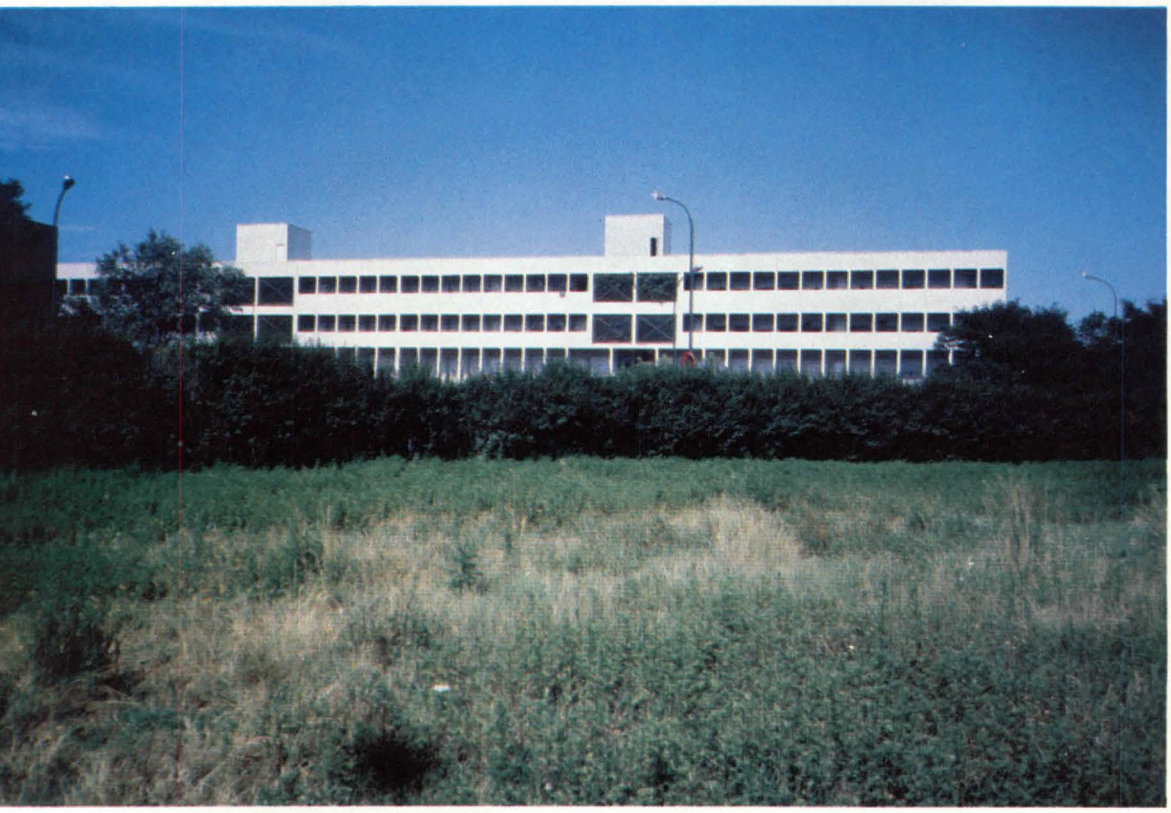


Rossi's housing block is seen from the west (facing page bottom left) and closer in from the east side parking (above). Long view down gallery (facing page middle right) is from northern end.

Aymonino's housing is seen here from its southern point (below), the joint at which the main entry (right) penetrates the complex. Foot bridge to parking area (facing page middle) is also at south side. Two views of the east end of block A1 (facing page top, below right) show richness of the scheme.







High School of Science, Pesaro

The parallels between the circumstances surrounding Aymonino's Liceo Scientifico G. Marconi at Pesaro and those at his Gallaratese housing in Milan are similar in many respects. In both cases, an architect whose work is based on the principle of its capacity to solve problems at a broad environment scale, rather than only at the level of simple function, has been thwarted.

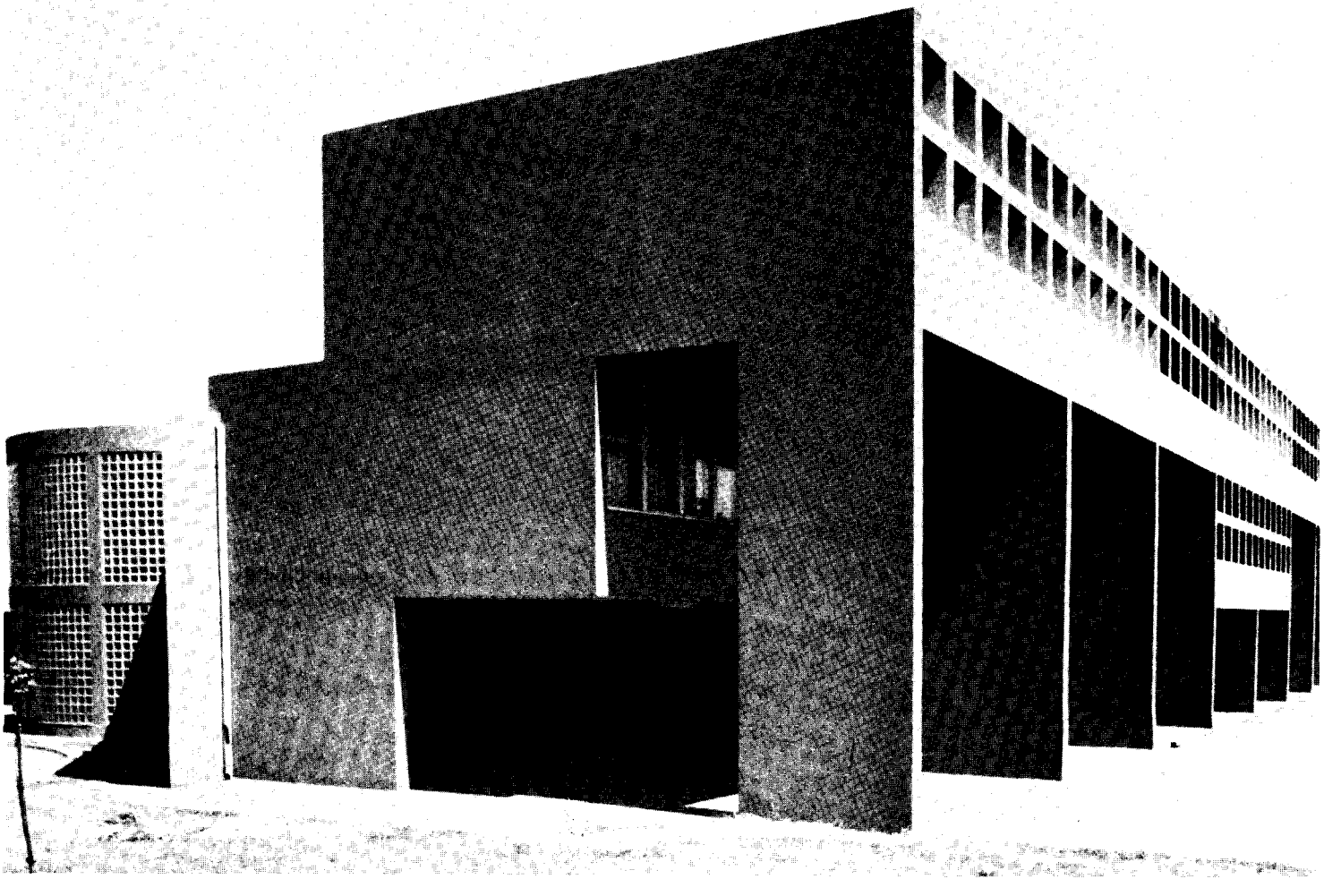
At Pesaro, on the Adriatic next to Rimini, the town was concerned about its mushrooming growth. In an attempt to halt further population influx, it began to instigate new areas for development and determined that one would be south of the city, the other inland from it in the foothills. Each of these areas would have a new educational center that would relieve the burden on overtaxed and outmoded facilities in the town. Aymonino was commissioned for the master plan for the campus south of the city.

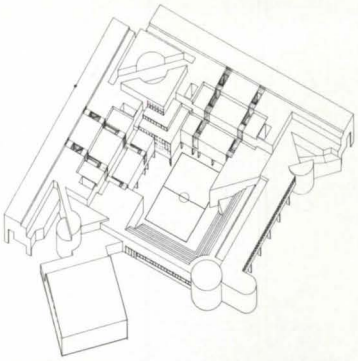
In his plan, Aymonino envisioned a scheme where the 1000-student high school and the other four components of the 4000-student campus—a vocational school, a high school of commerce and one for the humanities, and a civic center to be used by the town and schools—would be tightly integrated into one dense urban complex. As was the case at Milan, this would give a sense of place and community focus to a new, sprawling area of development where such an amenity was totally lacking. The architect hoped to see the facilities concentrated into a single structure, which he felt could coordinate the various programs for the benefit of all, and which would also permit development at a more comprehensive scale. Because of extremely complicated financial arrangements of the different schools, however, this was not to be. Instead, it was decided that the campus would be divided into four separate parts, with each school occupying its own discrete section.

The town agreed, however, to keep the new civic center on the campus, but it was not to be built first (Aymonino's design for it and the techical high school were finished in 1979). The technical high school was to be built first. Since the campus was to be constructed incrementally as separate units, the problem then became one of how the parts could be designed to be related eventually to each other as well as to the surrounding neighborhood. This was essentially solved through the design of a series of footpaths, covered walkways, and building arcades that would connect the buildings and would, as they were originally planned, extend into the center of the local community as a continuous reminder of the relationship and communication between it and the campus.

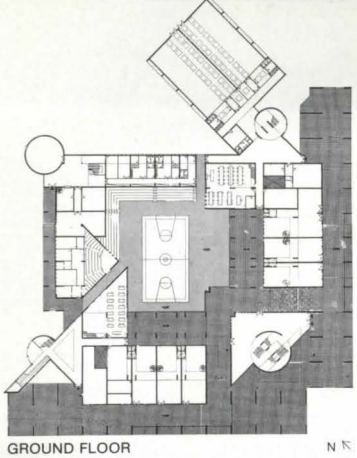
Consequently, "The design of the scientific high school evolved," Aymonino notes (in *A + U*, Feb. 1978, p. 25), "from two

Aymonino's school in Pesaro is intended to become part of a much larger urban academic complex. For now, only the high school of science is finished, seen here at its west corner (below), and (on facing page) from its west side (left) and its south corner (right).

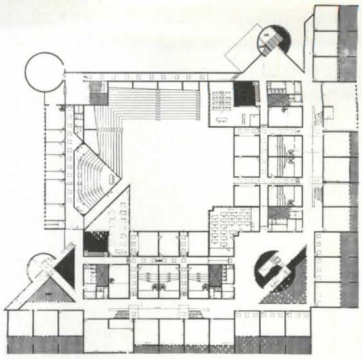




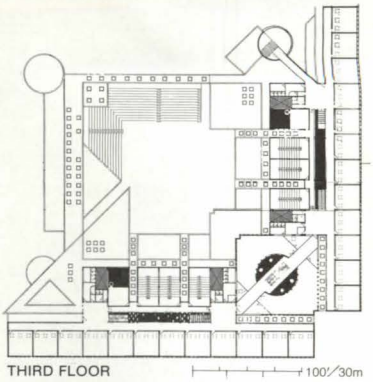
AXONOMETRIC



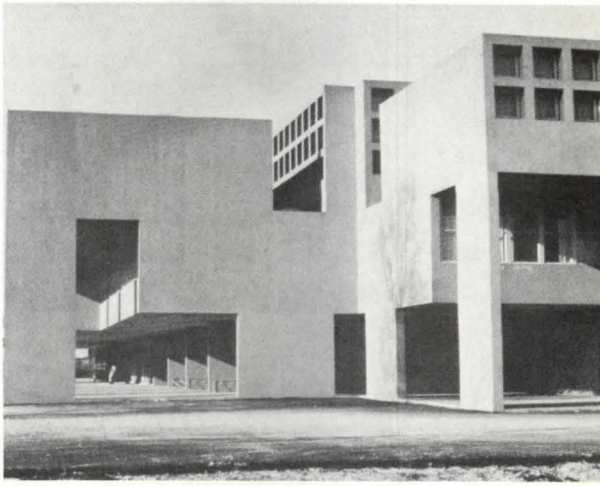
GROUND FLOOR



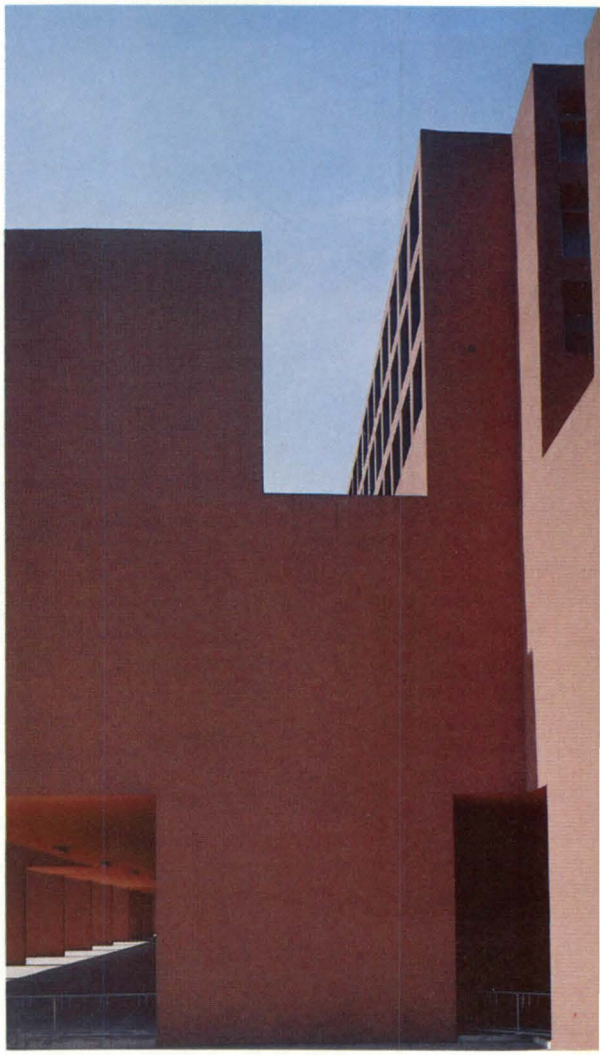
SECOND FLOOR



THIRD FLOOR



Studio Foto Molfa, from A + U #88.



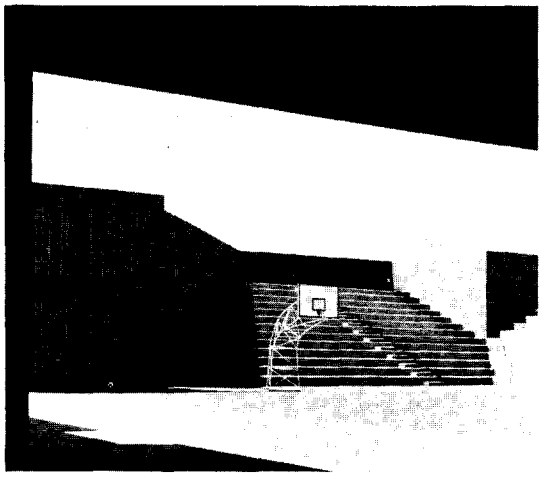
specific requirements: one was to create an angular relationship with respect to the layout as a whole, and the other was to take into account the possibility that the building might have to function as a self-contained unit without any architectural appendages, except for the gymnasium."

In its realization, this corner building is almost identical on the two sides that face in to the pedestrian zone of the campus. There, the large arcades have been designed so they can function, Aymonino says, either for commercial or for cultural uses. They have entrances extending into the interior of the building, where an open courtyard with amphitheater seating dominates the space. Both here and at the interior, the use of color is bold and dramatic, and the palette chosen is not dissimilar from that used at Milan. And, as at the Gallaratese, Aymonino has also used glass block here with sophistication and simplicity. However, this seems to be a value which, judging from its vandalization, is not shared by the students.

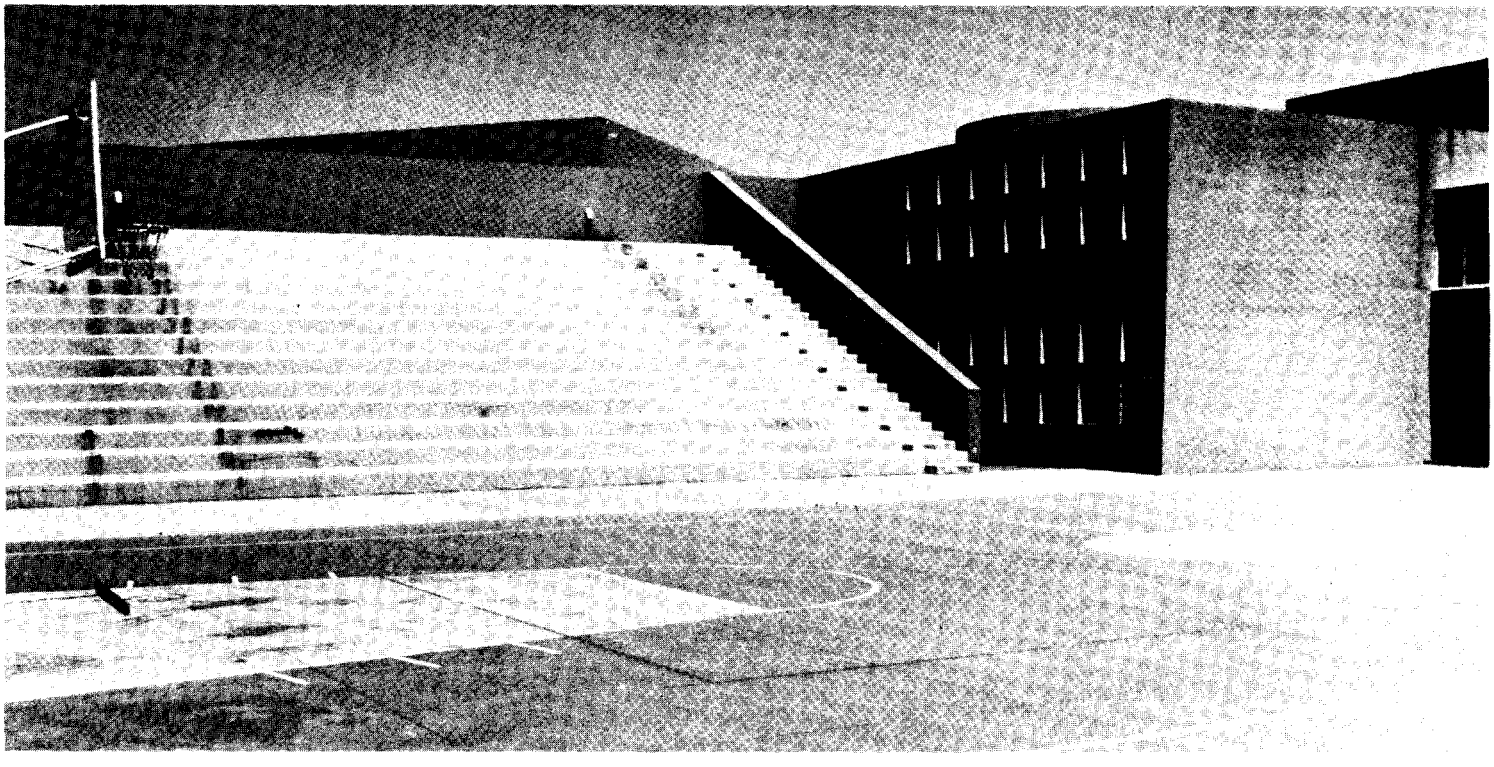
The school has been designed so that its 40 classrooms with their attendant laboratories and other related spaces can be separated from each other to form two different facilities if educational policies were to change or if such an arrangement would be desired for other reasons. Such built-in divisibility would occur on a diagonal running from the southeast corner to the opposite corner.

While the school is adaptable, then, at the architectural level of scale, it, like the Milan housing, has not yet had a chance to prove itself at the larger scale of the urban environment. For the present, it sits practically alone on a barren plane, seeming to express an eerie urge to participate in things that are not there.

Studio Foto Molfa, from A + U #88.



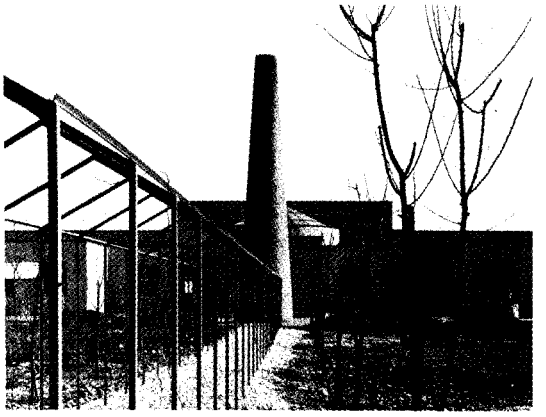
Hall at the second floor (above) shows complexity of interior spaces. The courtyard (left and below) is just inside the major entry (facing page top), off the gallery at the southeast (facing page bottom).



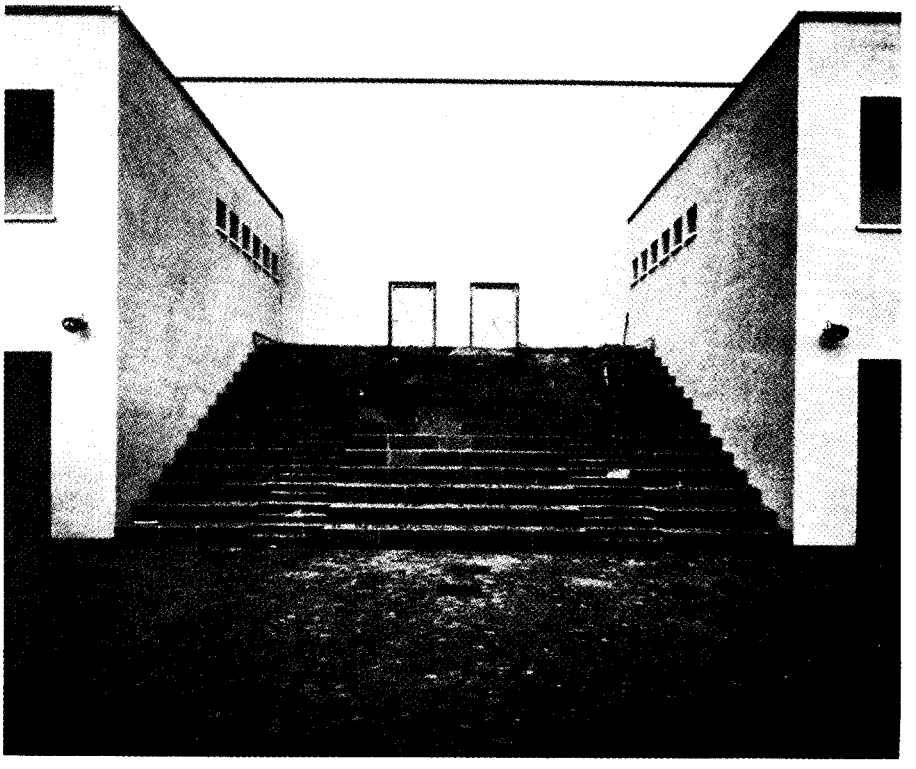
Elementary School, Fagnano Olona

It is surely only coincidental, but all of these buildings, except for the Teatro del Mondo (p. 64), are cursed by being in fairly awful locations. Rossi's elementary school is at one end of a dreary, post-war agricultural town 20 miles northwest of Milan. It faces one of the two major roads that go through the town and is sited where one might just as easily expect to find a farm supply store. For some people, the building itself does not seem to do much to help its site. In fact, one person (John Ashbery, in *New York*, Oct. 15, 1979, p. 81) said, "This murderously symmetrical hangar set on a flat, stubby field would make an Agway complex look cheerful by comparison."

Like all of Rossi's projects, however, the school has meaning and significance beyond its basic function. Rossi himself has said (in *Lotus International,* No. 15, p. 43), "The typological idea is a mixture of square and town, of house and town accentuated by urban elements proper: the large brick fireplace, the trees, the covered outside ways whether they are trellises or bicycle shed . . . the use of advanced technology (the window frames, the metal cupola) is accompanied by red and old materials . . . which link the house-school with the Lombard countryside. The large porphyry clearing and the garden recompose a village." Other interpretations also abound. Whether or not Rossi has ever seen the painting in Urbino of the ideal Renaissance city is not as important as is the almost uncanny morphological similarity between it and his school. Also, as archetypal ideals, the two can be seen as analogous to each other. The intention of each is to inform the physical world around them. On yet another level, the school has been analyzed (by Peter Eisenman in the Institute for Architecture and Urban Studies Catalogue No. 2, entitled *Also Rossi in America: 1976 1979,* p. 16) in a context where its cylindrical library is

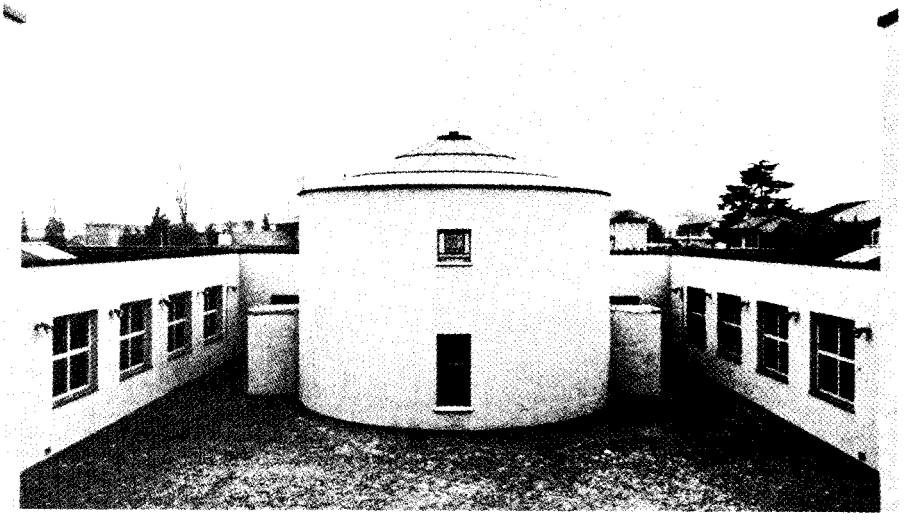


Rossi's school at Fagnano Olona seems to allude to the study of typologies in the likeness of the entry (right) to the primitive hut (bottom left) and in the similarity of the courtyard (bottom) to urban ideals (Ideal City, below). The opposite view of the courtyard is immediately below.



IDEAL CITY, ITALIAN 15C (URBINO, PALAZZO DUCALE)

FRONTISPIECE FROM LAUGIER'S *ESSAI SUR L'ARCHITECTURE*



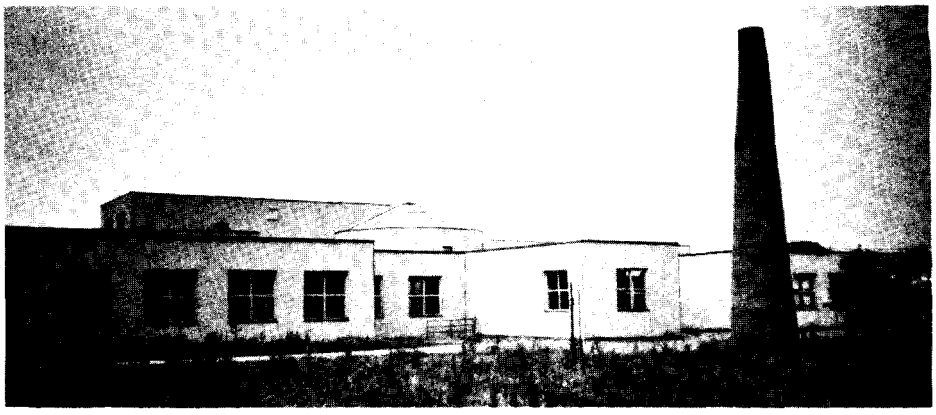
linked to both the baptistry and the gas chamber, and then obviously to life and death, ultimate concerns of poetry and art.

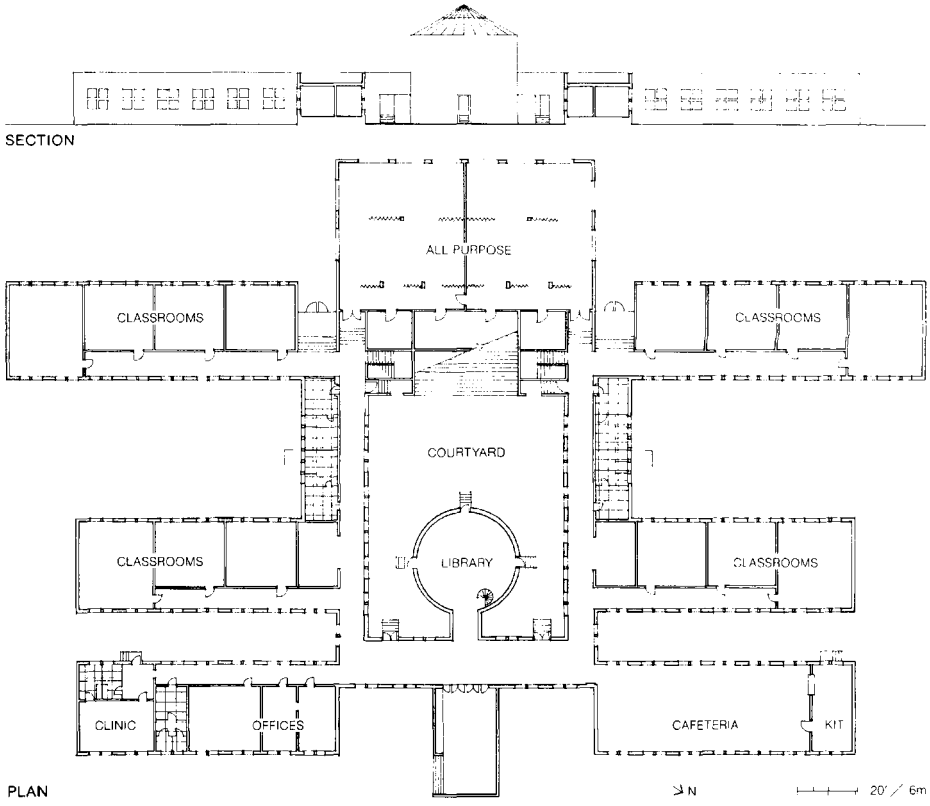
It may seem to be looking too hard for more relationships to this "simple" white brick building, but it appears also to be concerned with historical philosophies of typology. In the mid-18th Century, M.A. Laugier defined, in *Essai sur l'architecture,* a first form of architectural typology. He saw the basis of architecture as an activity stemming from nature. After outlining how and why man built the first primitive hut, Laugier says, "The rustic hut which I have just described is the model on which all the magnificent achievements of architecture have been imagined. It is by moving closer . . . to the simplicity of this first model that we . . . attain the true perfections." Laugier then explains how trees and branches are seen as the first columns, entablatures, roofs, and pediments and tells the reader, "This is what all the Masters of the Art have recognized . . . " His frontispiece illustrates the hut.

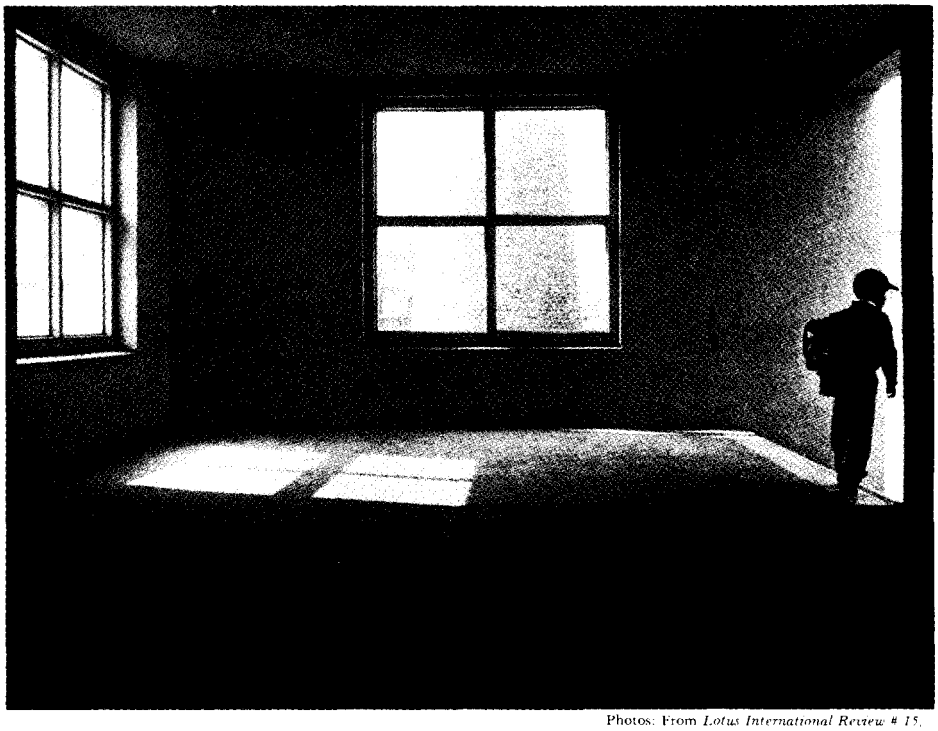
"The idea of the elements of architecture referring in some way to their natural origin was, of course, immediately extensible in the idea of each specific kind of building representing its 'species,' " Anthony Vidler explains (in *Rational Architecture: the Reconstruction of the European City,* p. 29). By the early 19th Century, he continues, people involved in building could discuss its organization "in the same terms as the constitutional organization of species; axes and vertebrae became virtually synonymous," and the transformation from vegetal to animal analogy was complete.

In the school in Fagnano Olona, Rossi is surely getting back to the "primitive hut" with a very direct and clear reference to Laugier's depiction of it. This is seen primarily in the trellised entryway at the front of the school, but it is also seen in the bicycle sheds. The transformation to animal typology is seen in the plan, and especially in some early sketches of it, where the anthropomorphism seems to take the guise of children's cut-out dolls.

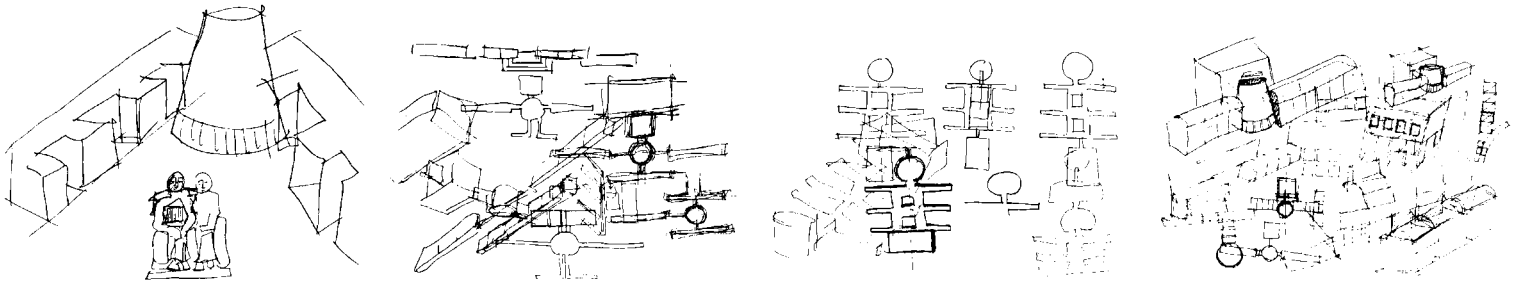
Thus, in reducing his architecture to primary forms, Rossi's work is allied not only to modern 20th-Century concepts of typology, but also to 18th- and 19th-Century ones, in effect tracing the history of the study of typology. Of the building itself, he has said, "Having started out from the preliminary drawings with the main corridor as the spine of an animal, the school at Fagnano Olona grew into a square theater . . . ." This is in reference to the inner courtyard where the library, the "mind" of the school, is seen as the "head" of the animal. All of the 44 classrooms and the built-in seating in the courtyard are focused to this point. Thus, Rossi makes one more analogy, this time to the concept of instruction, or knowledge, and the place of its storage and dissemination.



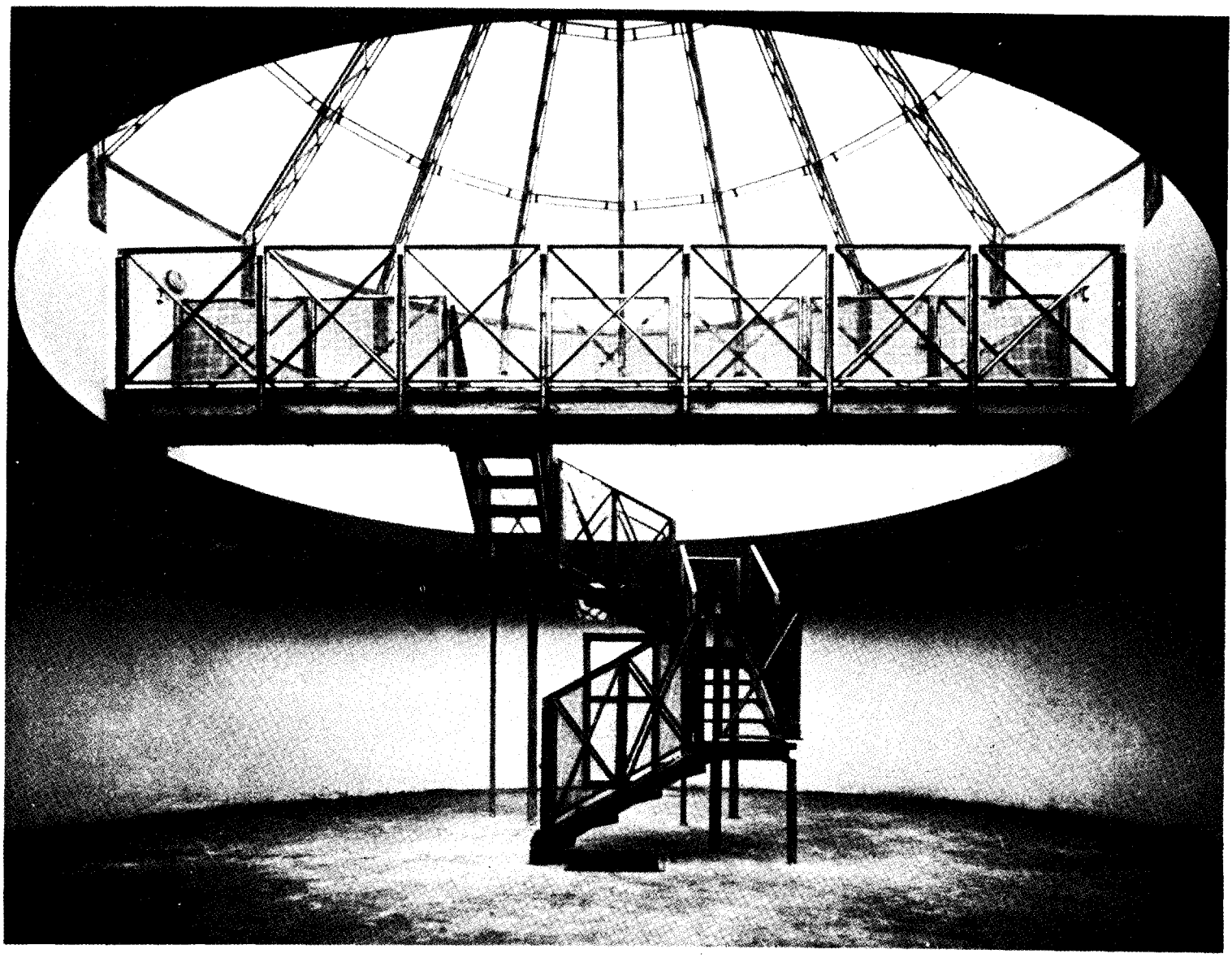




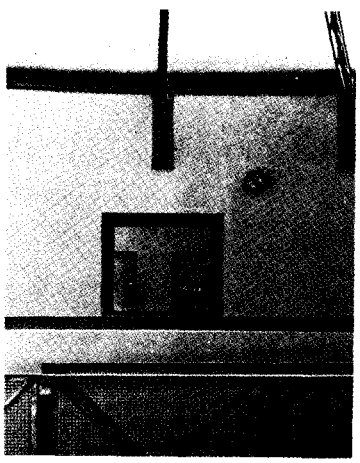
Photos: From *Lotus International Review # 15*, distributed by Rizzoli International, Inc.; except top, p. 60, bottom right, p. 63, from *A. Rossi: Projects and Drawings, 1962 79*, courtesy Rizzoli International Inc.; p. 61, p. 62 top, D. Morton.

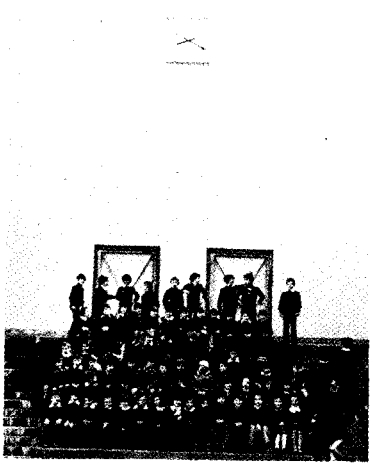


PRELIMINARY SKETCHES

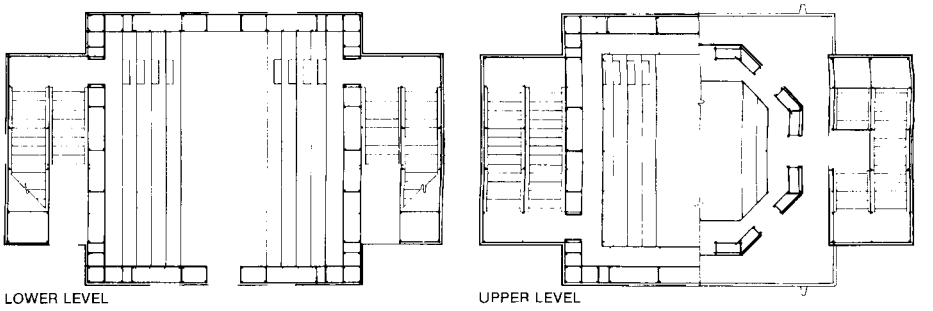


Another reference to the school's seeming concern with the history of typology can be seen in the "animalistic" design of the plan (facing page), which shows as particularly anthropomorphic in early sketches (top). Dome of library (above and right middle) is seen from outside (right). An empty classroom (left) faces entry; stairs (right) are in courtyard.





Teatro del Mondo

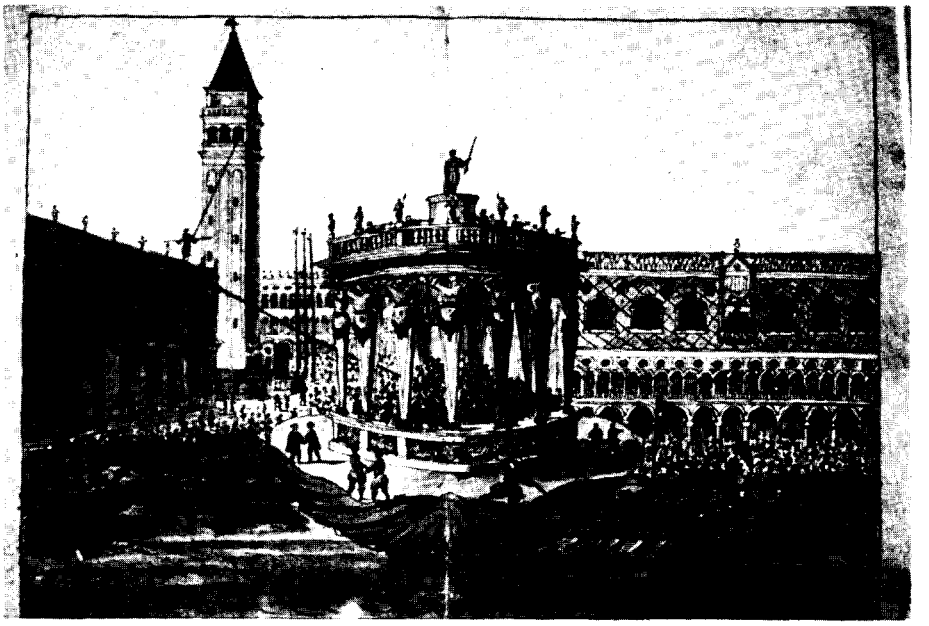


The name of Rossi's floating theater for Venice refers to the Theatrum Mundi in popular use there for festivals ever since the 16th Century. Besides its name, though, the only other things this one shares with those is that it is small and movable. The Teatro, first of all, is neither transparent nor round, as the old ones usually were. This one is an enclosed parallelepiped that rises to an octagonal, pyramid roof. It is the enclosed nature of the theater, furthermore, that gives it its most particular meaning.

Venice has often been called the most theatrical city in the world because of a pervasive quality that makes it so much like a stage set. This special aspect comes from the condition of particular, important buildings continually on view as focal points in an otherwise homogenized setting. Specifically, these buildings are often seen as "flats" from a distance, usually across an expanse of water. Thus they become part of a city "founded on the *techniques of appearance,* its possession of the connections and qualities peculiar to a theatrical space," noted Danieli Vitale (in *Lotus International,* No. 25, p. 56). Like the Doge's palace, Longhena's church of the Salute, Palladio's churches of San Giorgio, Zitelle, and Redentore, the theater is related to the city in contrast to that which is most particular to it, the intimate scale and homogenous quality of its general texture. The theater, although small, is large in scale and thus becomes monumental, and, Vitale notes, "finds its true relationship with the city through the latter's most stable and permanent elements," and thus "succeeds in denying its transitory nature."

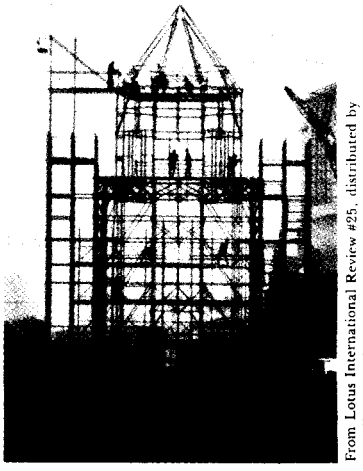
Like all of Rossi's buildings, the theater is also related to images and ideas stored within his memory. It has been likened to certain types of Lombard farm structures from his childhood and also to numerous water-related structures of Venice, such as the gondoliers' kiosks. The baptistery theme also appears. Rossi himself has likened the building to those "marvelous and very high wooden constructions, the old light-houses of the northern coast of America."

In terms of its techniques of construction, the theater is not related to any of those other "sources," but to something that is rather peculiarly Italian, namely the use of scaffolding in applications other than that of its primary purpose. Throughout Italy, it is common to see this material used as display matrix in galleries and museums. It is also often used to support temporary architectural constructions, as it was this summer with the flat, painted replica of Sansovino's church of San Gimignano that once faced the basilica of San Marco, and with Rossi's entry gate to the Biennale. In using this material for the theater, a nontheatrical material is thus used in a structure that is a theater, that uses techniques of the stage, and that also alludes to other constructions, such as the architectural flats, that have reference to the theater.



The 200-250-seat theater is constructed of iron tubes forming a structure that is welded at its base to a barge. The scaffolding is completely clad on the outside, and partially covered on the interior, with clear-sealed or painted yellow pine. Seating flanks the sides of the major, cubic space, and above it balcony seating is arranged in an octagonal formation below the octagonal cupola. Stairwells at the sides of the cube lead to the upper seating and to an outdoor terrace.

The theater is anchored at the Punta della Dogana (end of the customs building) where it can be seen from most of the major monuments of Venice, and vice versa. When the Biennale closes in December, it will be towed back to the Fusina shipyards where it was made.



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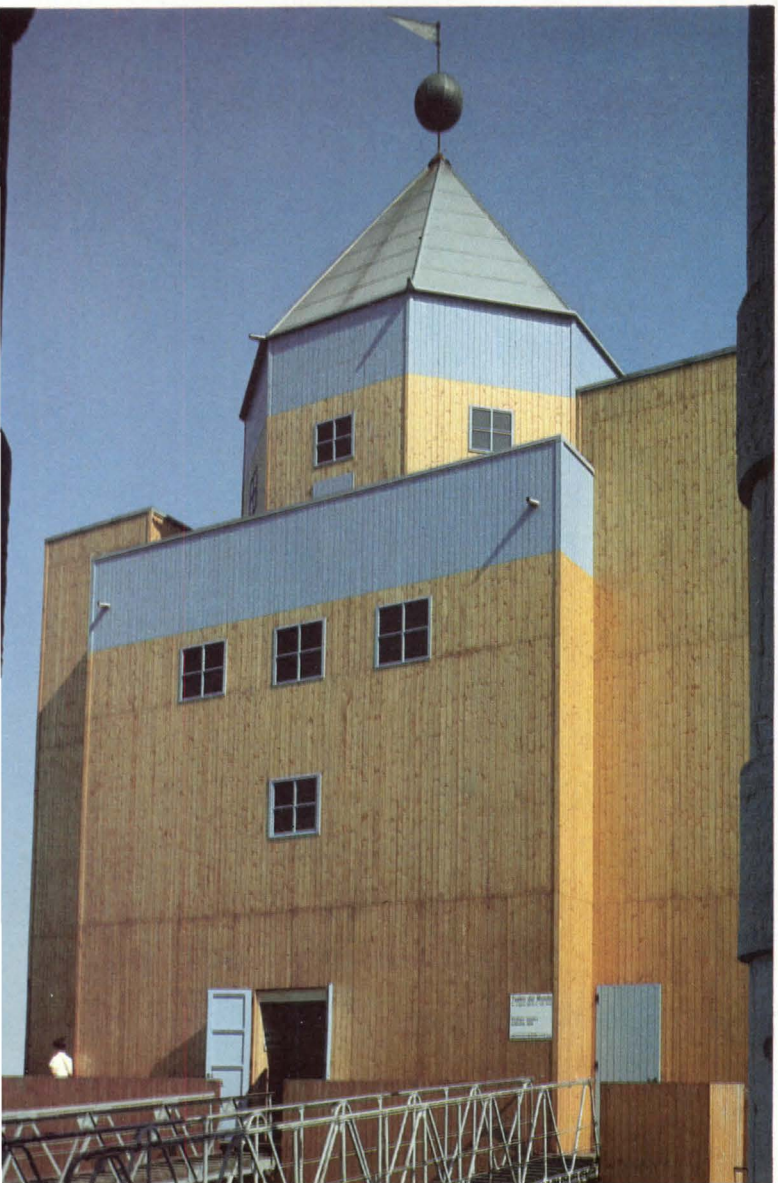
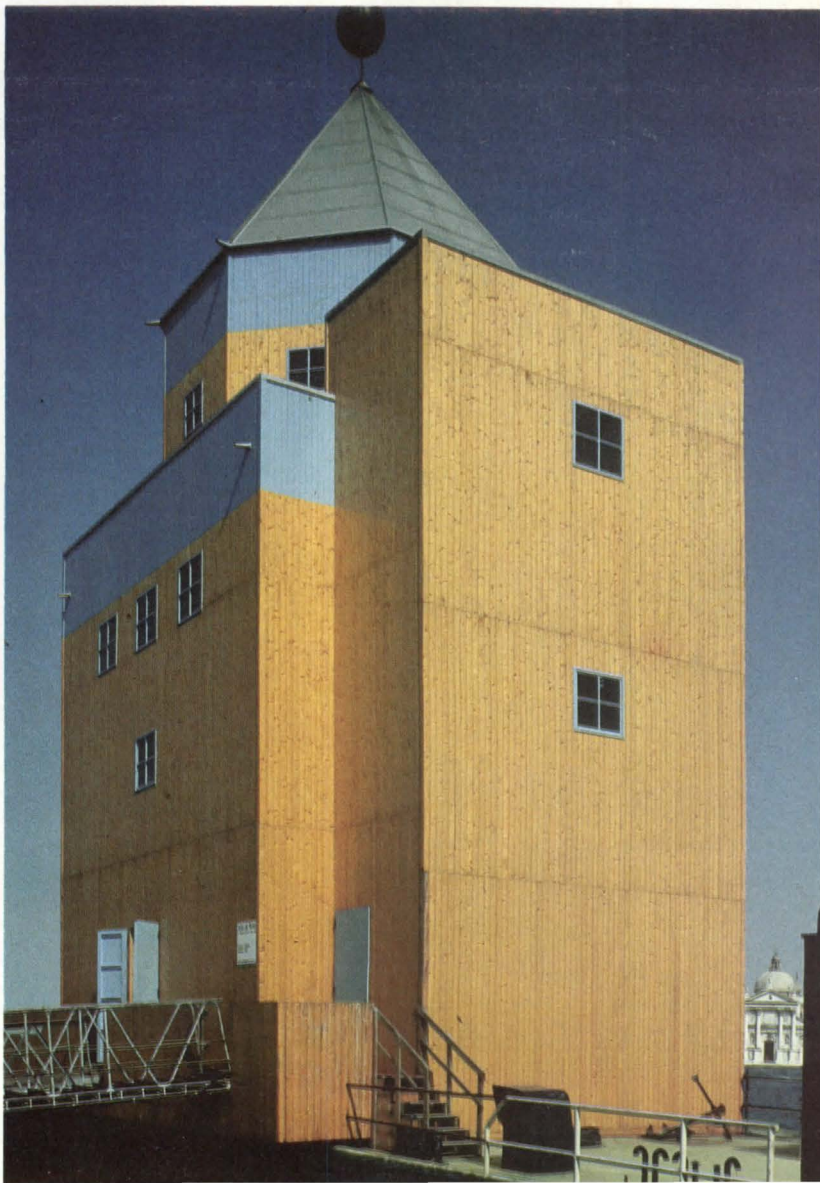
Rossi's Teatro del Mondo was done for the 1980 Venice Biennale. At the present, it displays an exhibition of Rossi's work, which is part of the larger exposition. The theater has clear references to the floating theaters used in Venice since the 16th Century (top), but in its construction of iron-tube scaffolding, it is quite dissimilar (above).





New York University Midtown Center, New York, and University of Pennsylvania offices, Philadelphia

In search of a play

Two university renovations by Voorsanger & Mills are visual metaphors that suggest larger contexts. Craftsmanship and a witty use of other arts contribute to the elegance of special places.

Paul Warchol, ©ESTO

Voorsanger & Mills are not atypical of the more promising young firms today. At 43 and 38, they are older than some and bring a little more experience in large-scale, establishment work. They have between them 12 years at I.M. Pei & Partners, two advanced architectural degrees from Harvard, one liberal arts undergraduate degree from Princeton, an architectural one from North Carolina, and short apprenticeships in offices from Richard Meier to Warren Callister. Mills is probably best known for the controversial "Pink House," P/A architectural design First Award winner in 1978.

Like others of the rising generation of designers, Bartholomew Voorsanger and Edward Mills are well aware of the formal and theoretical iconoclasms of the currently celebrated. Their work borrows heavily from a variety of historical styles; leans toward a mannerist disposition; wallows in color; revels in metaphor; and is composed almost heroically of gypsum board, plywood, and paint.

Like the work of most designers just out of the gate, theirs is uneven and occasionally overwrought. On the other hand, it is also frequently sophisticated with a feeling for light, color, and the crafted quality of objects that suggests a certain maturity. Further, the work is interesting for the issues it raises by sheer architectural ambition.

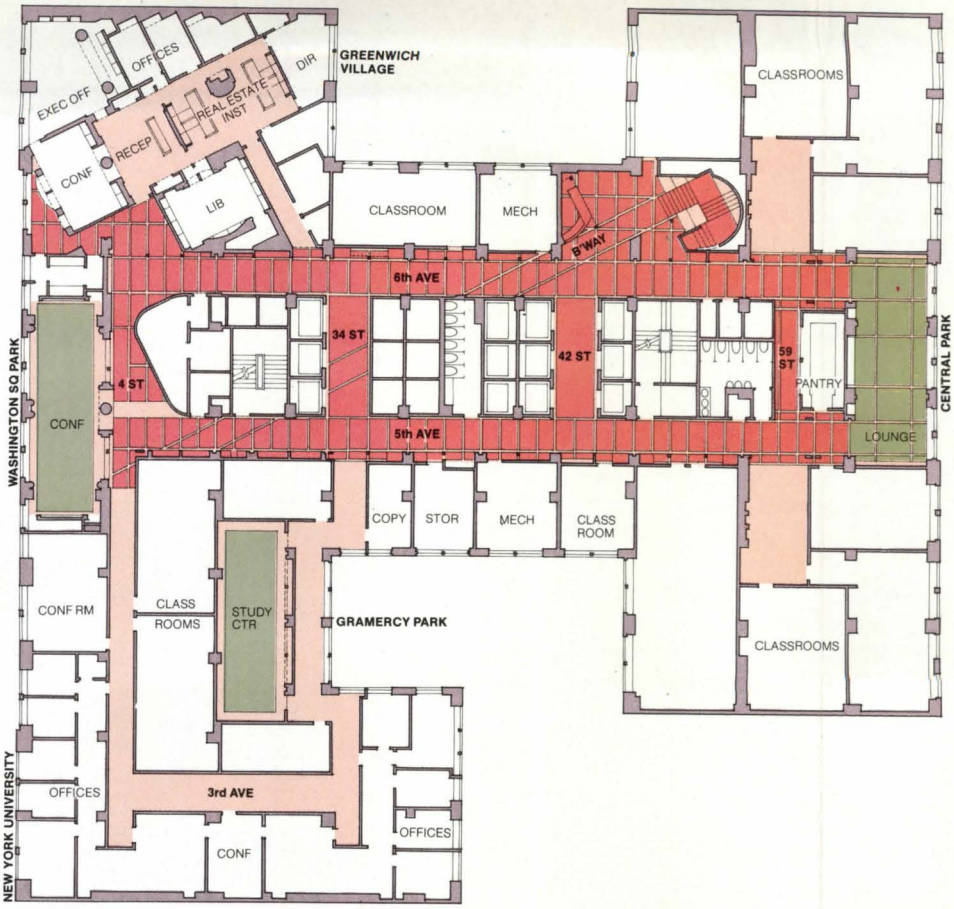
A high-rise campus

Two floors of a 60-year-old Emery Roth office building in Midtown was New York University's choice for an adult education campus. The firm was hired to redesign the spec footage for classrooms and offices. Their design concentrates on the public spaces on the lower of the two floors. The classrooms themselves and the whole of the upper story are straightforward, largely just cleaned up and extremely cost efficient.

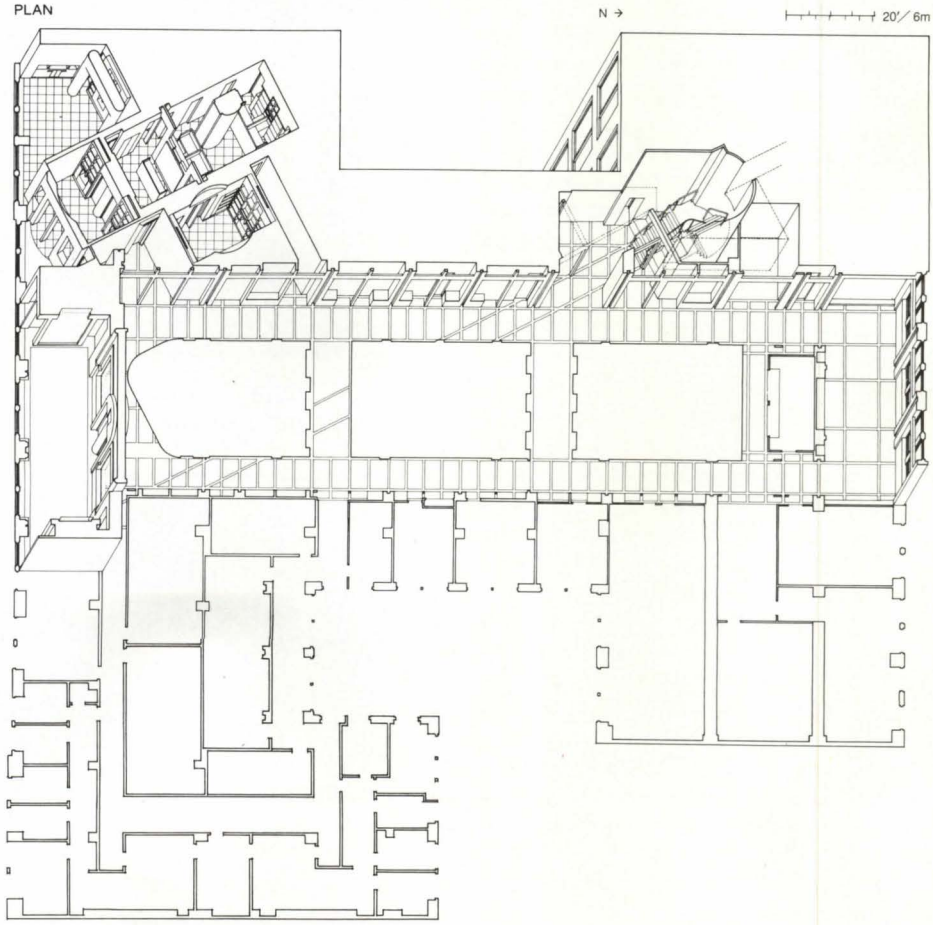
The public spaces are a microcosm of New York City. Its gridded streets are translated into a light and dark terrazzo floor pattern. Its vistas of buildings are represented in *trompe-l'oeil* murals by artist Richard Haas. Special places "on campus" represent special places in New York. The elevators let people off at the terrazzo "map's" version of the building's address, 11 W. 42nd. The reception area to one side is Times Square. The cafeteria is Central Park with an artificial turf floor, green walls, another Haas vista, and garden furniture with green vinyl cushions.

The large conference room (board room) is Washington Square, where NYU's main campus is located. It is an elegant room with custom-designed furniture and elaborated surfaces made more eloquent by the mixture of subdued warm and cool tints—greige, reddish mauve, blue-grays, white. At each end is a view—one north, one south—as if from the Washington Square arch itself.

The corridors are lined in an elaborate layering and intersecting of lines and planes providing benches that are reminiscent of Richard Meier's early houses. The planes are



PLAN



AXONOMETRIC PLAN

Facing page: Murals at both ends of the board room show views from the Washington Square arch. Tables are designed by the architects.

colored in sophisticated tints of tan, gray, and salmon; cooler in tone to the east, warmer to the west. Says Mills, this represents the sun rising on the east and setting on the west. Lighting is almost consistently indirect.

Mixed in with New York quotations are a handful of unrelated images: a "little white cottage" with small-paned windows overlooking greenery (the president's conference room); a blue-domed staircase; an English manor-house library.

And throughout the "campus" are mannerist whimsies. For instance, the doorway to the board room is bisected by a thick, round column with a two-dimensional slice of keystone sitting on top like a flattened capital. On the interior this keystone is inset, on the exterior protruding, as if, in construction, someone had given it a shove. Keystones—Michael Graves's influence is a keen factor for the emerging generation—figure again in the Real Estate Institute offices where they are framed in absentia to demarcate lobby from bullpen.

Vox populi

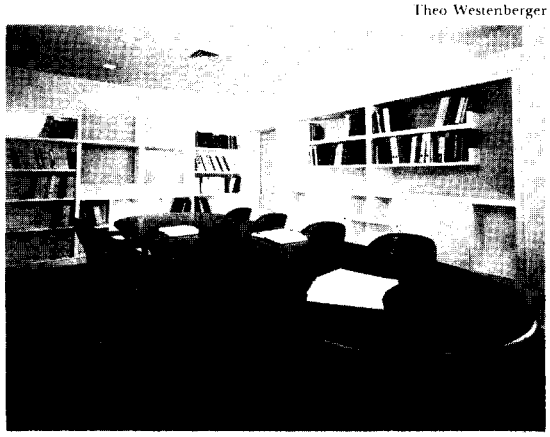
At the University of Pennsylvania, the firm converted the second floor of a Harbeson Hough Livingston & Larson classroom building to faculty offices for the political science department. Again the architects drew a distinction between important public spaces and the remainder. The entry lobby, central hall, and conference room are elaborated. The corridors are much calmer, and the offices, though a fair-sized 12′ x 12′ x 12′, have only exposed concrete block walls, acoustic ceilings, and old but refinished gray metal furniture. According to the university's director of construction, Paul Greenberg, this is "the cheapest office space per square foot in the university."

The metaphor here is of government and politics. The plan of the central area is long, thin, and bipolar. Cool colors such as blues, greens, and grays cover the walls at one end; warm earthy oranges and browns are at the other. At the warm end is a conference room; at the cool end, a statue of Benjamin Franklin, resurrected from the basements where it had stood since its transfer from a cemetery years before. It is a particularly endearing statue, both ill-proportioned and weatherbeaten and perhaps the only time Franklin has been portrayed with the sweetness and vulnerability of an adolescent. Franklin sits on a platform. In front is a free-standing frame inscribed with a quotation; behind is a truncated amphitheater.

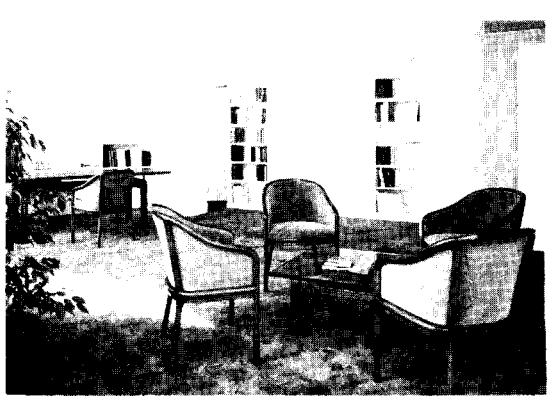
To the architects this represents several things. The bipolar arrangement is symbolic of the interest groups whose competition for

Nathaniel Lieberman

Theo Westenberger



Nathaniel Lieberman



This page: "Sixth Avenue" (top); the president's cottagelike conference room (above); library (left top); and the president's office (left bottom).
Facing page: Entrance to the offices (top left); entrance to the board room (top right); and the "Central Park" cafeteria (bottom).

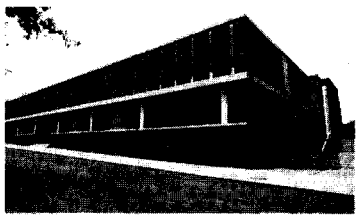
Nathaniel Lieberman

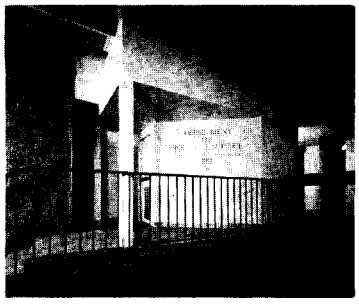
Theo Westenberger

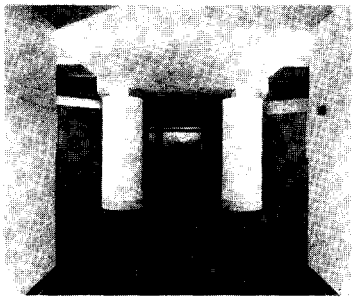
Nathaniel Lieberman

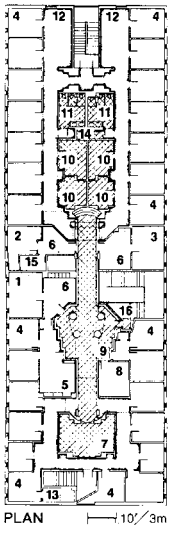
UPenn offices, Philadelphia

This page: Exterior photo of building (top), second-floor entrance to department offices (middle), and their grand hall (bottom). Facing page: The recycled Ben Franklin statue (top) and a detail of the polygonal lobby (bottom). Entry is slightly to the right of the picture.









Legend

1 Political Science chairman
2 Graduate chairman
3 International Relations chairman
4 Faculty office
5 Departmental office
6 Administration
7 Conference room
8 Data lab
9 Corridor
10 Teaching assistant
11 Bathroom
12 Research fellows
13 Storage
14 Janitor's closet
15 Electrical closet
16 Entrance

power they see as the basis of politics. The Franklin end is also meant to stand for the birthplace of democracy, Greece, with the cool colors intended by the architects to recall the direction north and the Mediterranean Sea. The warm end is meant to represent the direction south and Rome, the meeting room analogous, they say, to the Roman Senate.

These opposites meet in the central space, which the architects regard as the forum or agora, where the colors collide, compromising in the center in a gray wall with salmon wainscoting and a rust-colored carpet. This central space is the most agitated not only in color, but in form. It is polygonal to begin with; the walls, which do not reach full height, are serrated. The ceiling above (existing) is a series of large beams running diagonally. Within the space stand four very fat columns (made from two thin columns and one water pipe that were existing, with one added). The columns are arranged in pairs of two, one pair with yellow rectangular capitals, the other with blue hexagonal ones. Their arrangement is splayed, with a sculptured suspended ceiling making a curved transition. The entrance to the department opens to one side between them.

Although this interior is smaller and simpler than Midtown, there are some playful formal effects. Opposite the door to the chairman's office, for instance, is a protruding blind door in mock acquiescence to symmetry. Framing and intersections show up here to designate the conference room doorway and Franklin's niche. Indirect light is again used to the advantage of the coloration, and the plan is even more gracefully classical.

Formal flaws

Like Midtown, UPenn presents a clear visual identity and comprehensive arrangement of spaces in which no student is likely to get lost or feel anonymous. Midtown is more deft formally and UPenn more coherent, but both suffer from two not very surprising flaws. One is overelaboration: certain spaces seem to get away from the architects. At Midtown, the offices bog down amid the frames and keystones and grids and arcs. So does the "forum" at UPenn with its columns, capitals, and colors, its cookie cutter shapes and high-flying beams.

The other problem is an approach to making plans in which entry is an afterthought. The logic and simplicity of these plans is apparent only after the visitor is actually inside and moving around. In each case, entry (though decorated on the outside at UPenn) is into an amorphous situation from which a direction has to be taken before the design really "starts."

Nonetheless, the special rooms at Midtown really do have character. The cafeteria is playful; the conference room dignified and even lush. The subtly lit view down the corridor at UPenn toward that ludicrous Ben Franklin lends a presence that few faculty offices anywhere must have. And the exercises in color and carpentry, while far less strident than supergraphics, do exactly what both are intended to do: distract from the essential poverty of the situation.

The question of meaning

The metaphorical role, on the other hand, is more problematic. The race away from abstraction that is occupying the texts and talents of quite a number of architects these days opens the door to a range of critical susceptibility avoided until recently in most artistic endeavors with the possible exception of literature. In other words, *what* architecture communicates becomes a legitimate point of contention. It becomes not only proper but necessary to ask of such communication: "Is it true?" "Is it wise?" "Is it significant?"

Voorsanger emphasizes the centrality of the issue by suggesting that "the dissociation of architecture from meaning leaves people with a profound sense of alienation." The difficulty is in making sense of what the architects are presumably substituting. The most immediately apparent quality of their metaphorical explorations is the seeming lack of idealism of any kind, especially considering the potential subjects, education and government. When asked, the architects make it clear that expressing any beliefs about their subjects never entered their minds. "We're so busy observing the way things are," says Mills, "that we haven't stopped to make a comment on the way things should be."

At first this sounds very contemporary, deadpan, New Wave, until one takes a closer look. What are they observing about education at NYU?—that it exists in New York City. While true, this is a fact that lacks significance as does the rather silly explanation of the spatial color distinctions as relating to the rising and setting of the sun. At UPenn they are onto a more ambitious idea, that the essence of government is the resolution of conflict. But the addition of Greece and Rome as opposing elements is ambiguous and probably not intended, and Franklin's presence at one end makes far better visual sense than symbolic.

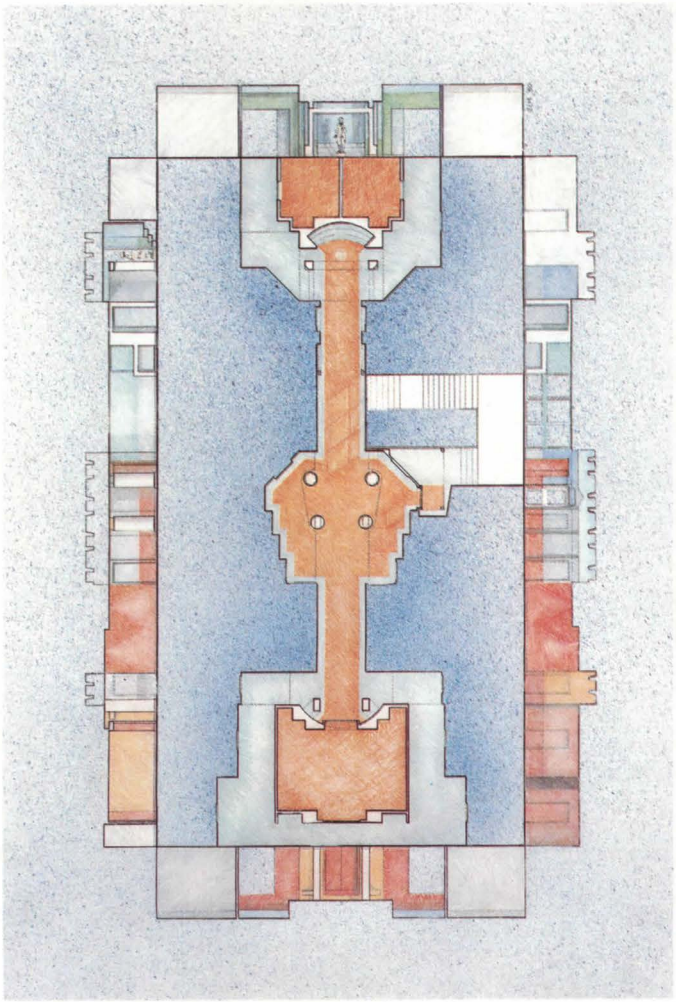
Leaving aside the inexplicable sloppiness of the geography (even in ancient times Greece was further south than Rome), the impression remains that the architects are not very interested in their subjects. What they are interested in is using subjects as vehicles of organization and identity, and that is what works well. But this is not the pursuit of meaning in architecture; this is "theme" architecture, not unlike seafood restaurants with fishnets strung across the ceiling. Voorsanger & Mills' themes are far more imaginative than that cliché, but they are no more substantive. The point is hardly limited to these works and these architects. Communication, by whatever means, presupposes having something to say. [Nory Miller]

Photos: Theo Westenberger

Data

Project: *NYU Midtown.*
Architects: *Voorsanger & Mills, New York. Principals: Bartholomew Voorsanger, Edward Mills. Richard Velsor, project architect; Crane DeCamp; Patrick O'Malley; Steven Davis; Jeffrey Frankel; Wanatha Garner.*
Program: *42,000 sq ft of classrooms and offices.*
Consultants: *Cosentini, HVAC/electric; Fisher & Marantz, lighting; Page, Arbitrio & Resen, signage; Richard Haas, murals.*
Cost: *$39.50 per sq ft.*

Project: *UPenn Political Science Offices, Philadelphia.*
Architects: *Voorsanger & Mills, New York. Principals: Edward Mills, Bartholomew Voorsanger. Steven Davis, project architect; John Silvistrini; John Holland.*
Program: *12,000 sq ft.*
Consultants: *Sharpless & Whiting, HVAC/plumbing; G.T. Stephenson, electrical; Whitehouse & Katz, signage; Virginia Naude, sculpture conservation.*
Costs: *$27 per sq ft.*



PLAN AND ELEVATIONS

House in the hill

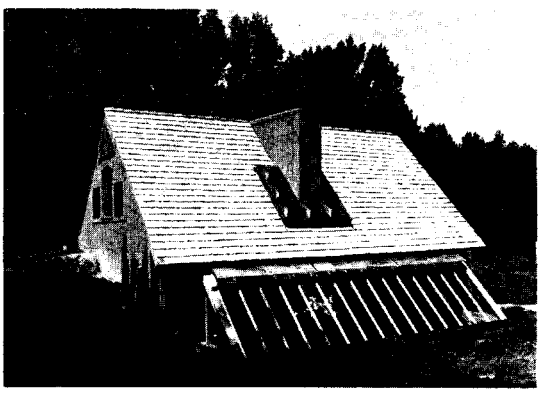
Based on a scheme that won a first award in the initial Innovations in Housing competition, a compact house combines several aspects of energy design.

As with almost all designs, a few things changed along the way. When the First Award was given in the 1978 Innovations in Housing program—sponsored jointly by P/A, *Better Homes and Gardens,* and the American Plywood Association—it went to Daryl E. Hansen of Minneapolis. Hansen's scheme, on which this house is based, called for several effects that were deleted or changed in the process, most having to do with either construction practicality or possible marketing pitfalls. Even so, the resulting house, built by R.B. Fitch, Jr., of, and in, Chapel Hill, NC, is a comfortable-looking and buildable one.

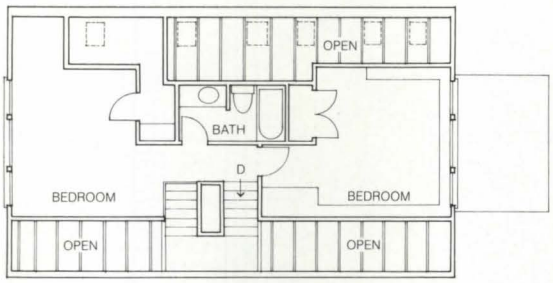
Hansen's scheme was selected because of the admirable list of options he spelled out in his entry (P/A, Aug. 1978, p. 67). It was also very thoughtful in terms of energy considerations, including a greenhouse, berming, rock bed heat storage, shading, venting, and optional active solar collectors. Many of these features were incorporated in the built version, to one degree or another. The vented greenhouse was built partially below grade on the living room/den side of the house, as planned, and the house is bermed on two other sides. The rock'bed storage was traded for 86 polyethylene tubes in the greenhouse, each 3½ in. in diameter, 6 ft long, filled with a melting compound of calcium chloride salts. The compound turns from solid to liquid at 81 F, and each tube is capable of storing 2500 Btu.

Venting in the greenhouse is automatic, controlled by thermostat, and rolling shades permit full coverage outside. A large deciduous tree or more, suggested for natural shading in Hansen's design, did not get to the final stage, at least not yet. Windows are double glazed, and the house is heavily insulated, with 8-in. batts in both walls and ceilings.

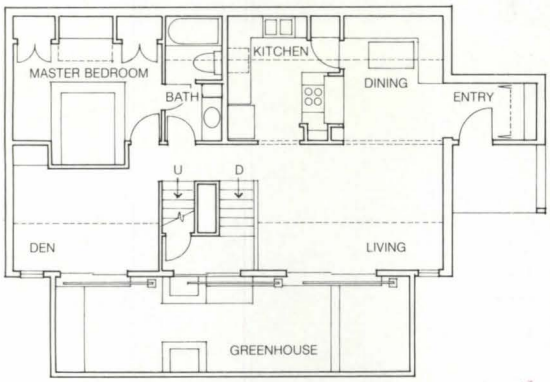
The skylights installed are substituted for the more greenhouse-looking glazing in the original scheme, and some were added over the north living areas. The open edges of the second floor, allowing space on the two floors to flow together in Hansen's version, were closed off for marketing reasons. Instead of the more spartan full-panel ap-



Greenhouse area (right) has a brick paver floor below the surrounding grade and is lined along the north side with heat storage tubes. Berms cover a large percentage of the first-floor walls on the west and north sides, curling around to the northeast corner.

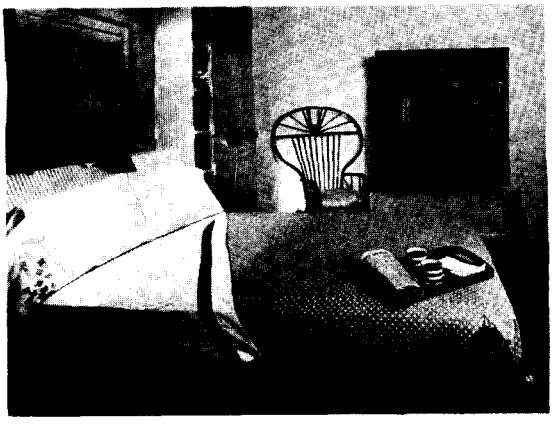


SECOND FLOOR



FIRST FLOOR

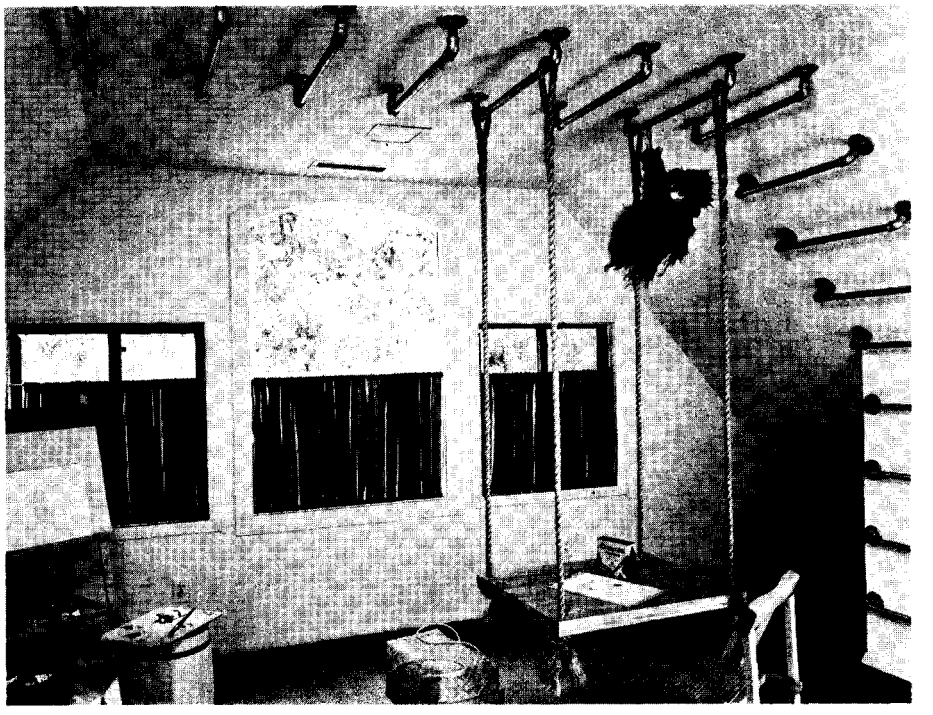
N 10′/3m



pearance of the original, reverse batten plywood siding was used, along with a cedar shake roof. The trim condition where the roof meets the walls had to be altered to allow a slight overhang, more practical for water runoff.

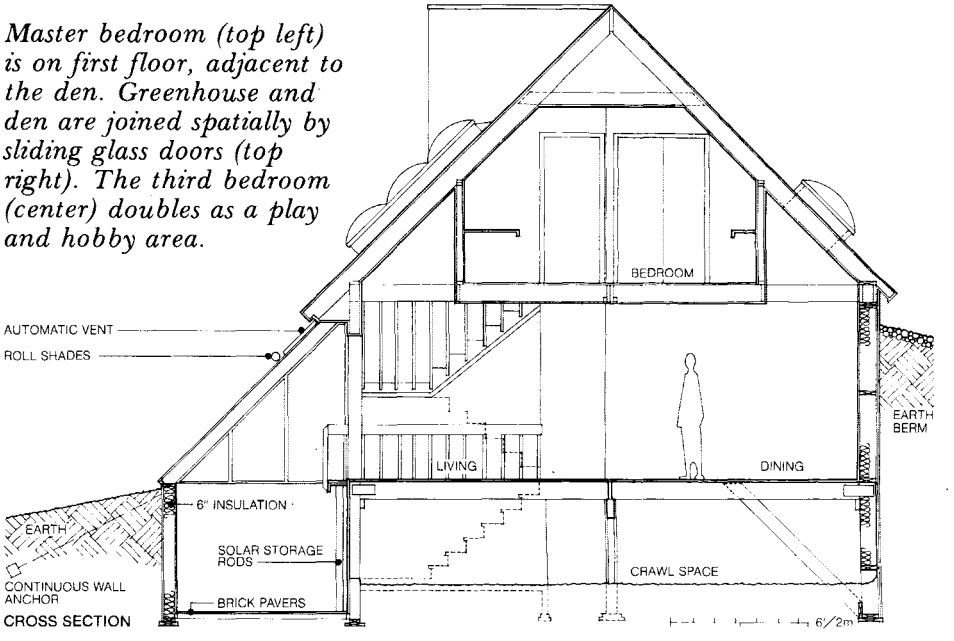
According to builder Fitch, the house is functioning well. The heat storage tubes may be encased in a clear plastic box, to facilitate heat buildup. Another possibly advantageous step, Fitch agrees, might have been the inclusion of a vent of some type low in the greenhouse to help clear warm air through the existing high vents. Still, by the owner's estimate, the house is saving him roughly 50 percent of his energy bills.

As the energy analysis on the opposite page implies, insulating shutters would probably help, in addition to the shading. Also shown in the figures is the fact that the house would probably be even more efficient a bit farther north, where the heating season would make use of its most advantageous features. The heat pump that supplements the passive features would also be fine in such areas. Such are the possible tuning touches that might be needed to adapt this scheme to other climates. Others are suggested by the energy analysis. [Jim Murphy]



The Energy Analysis of this building is the fourth in a continuing series of analyses that will be published in P/A over the next several months. The earlier examples have been used as the basis for setting the format for those which follow. An extensive review on perfecting the project was conducted last June in Berkeley, Ca, by educators, energy specialists, and architects from throughout the country. *Readers are encouraged to comment by mail on the analyses on a continuing basis.* The project staff at the University of California consists of: Vladimir Bazjanac, Harvey Bryan, Peter Brock, Ed Pineda, Cale Brentrup, and Bruce Dexter.

Master bedroom (top left) is on first floor, adjacent to the den. Greenhouse and den are joined spatially by sliding glass doors (top right). The third bedroom (center) doubles as a play and hobby area.



CROSS SECTION

Energy analysis

This analysis was prepared in the Center for Planning and Development Research, College of Environmental Design, University of California, Berkeley; Vladimir Bazjanac, Ph.D., Project Director. The work is funded by the U.S. Department of Energy.

This analysis of the Innovations in Housing house examines the performance of a compact, inexpensive, reproducible house and discusses the response of the building features to different climates. It also investigates several ways to improve the energy performance of the house.

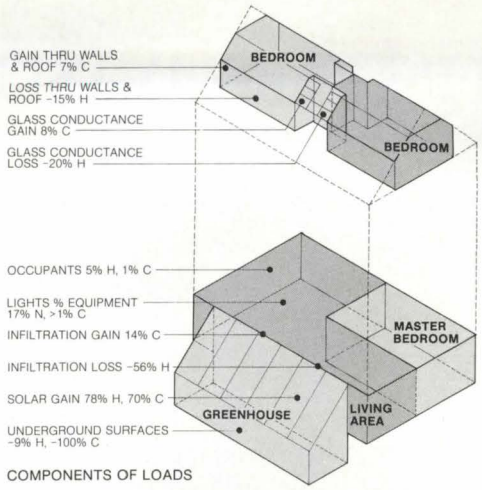
This house is thermally best suited to temperate climates. The A-frame-like shape of the house reduces the area of the skin and thus minimizes conductive losses. Berming reduces heat loss in the winter and acts as a cooling element in the summer.

The greenhouse offers a benefit to energy conservation during the heating season, but potentially presents a burden during the cooling season if the glazing is not fully shaded. However, it heats itself effectively in all climates and provides additional 265 sq ft of floor area, energy free, in the heating season.

The design of greenhouses is deceptively complex and sensitive. To reduce overall energy consumption in buildings, greenhouses must be carefully designed. In the greenhouse, as designed, much of the solar radiation strikes lightweight areas and not the thermal mass. This causes diminished storage of heat overnight. A larger window area (in place of berm) and additional mass in the greenhouse would increase the heating benefits of the greenhouse. If the greenhouse is to be operated as a heat source, it is preferable to place double glazing on the outside and single glazing between the greenhouse and the living room.

The greenhouse has a negative impact on the cooling load in all climates. Truly effective operation of any greenhouse requires careful management of the interface between the house and the greenhouse: opening and closing windows, doors, and shutters according to the dynamics of the heating and cooling conditions.

Shading is very effective; it can reduce the cooling load by as much as 9 million Btu per year (23 percent) in the house placed in a warm climate (Charleston), and by 7.5 million Btu per year (39 percent) in a cold climate (Madison). The nighttime use of thermal shutters can be very effective in cold climates, where heat loss is substantial; it can make the greenhouse more effective in the reduction of the heating load.



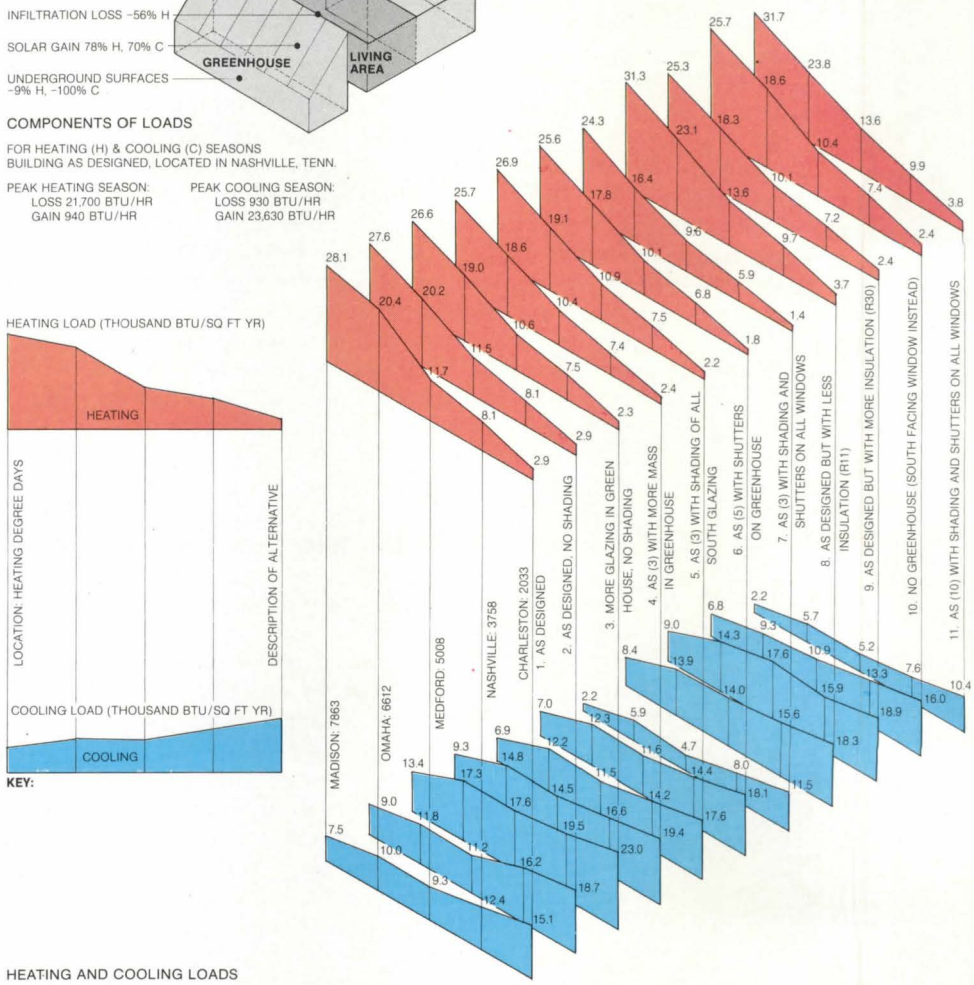
COMPONENTS OF LOADS

FOR HEATING (H) & COOLING (C) SEASONS
BUILDING AS DESIGNED, LOCATED IN NASHVILLE, TENN.

PEAK HEATING SEASON:
LOSS 21,700 BTU/HR
GAIN 940 BTU/HR

PEAK COOLING SEASON:
LOSS 930 BTU/HR
GAIN 23,630 BTU/HR

ENTRY VIEW: APA HOUSE



HEATING AND COOLING LOADS

The major source of heat gain is solar radiation in both seasons. The major source of heat loss in winter is infiltration, which indicates that this building is effectively insulated. The percentages shown in the illustrations indicate the proportion of total gain or loss for peak load hours.

The plots of heating and cooling loads show the performances of different design alternatives in different climates, ranging from hot to cold. The particular cities were chosen from the available TMY weather tapes. The trends in the energy performance of these alternatives remain constant, although the climates change. It is evident that such buildings may respond better in all climates to managed energy conservation features, such as consistent use of shading and thermal shutters on all windows, than to the inclusion of passive features, such as the greenhouse and additional mass.

The use of thermostats, lights, shades, and shutters is scheduled to reflect the occupancy by a family of four. Thermostats are set to 65 F for heating, and 78 F for cooling, with daytime and nighttime setbacks.

The analysis of the energy performance of this building does not include the performance of mechanical systems in the building. It is based on annual simulations with DOE-2.1, using custom weighting factors and residential infiltration. Its accuracy is limited to the accuracy of DOE-2.1 in representing building's thermal behavior and does not necessarily conform to the energy profile of the existing building (P/A, April 1980, p. 100). A detailed report is available upon request.

"The Avante-garde in Russia" installation, Los Angeles

Constructivism in LA

Barbara Goldstein

Frank Gehry's installation for the most comprehensive exhibit of Russian Constructivist art ever assembled in the U.S. is a Constructivist set design in itself.

Encompassing all of the arts from literature to painting, costume, music, and architecture, the Russian Avant-Garde was one of the most influential art movements in Eastern Europe during the 20th Century. Despite its brief period of development and its subsequent repression by the state, the visual repercussions of the Russian Avant-Garde have continued to resonate throughout the world. Today its stylistic influence is keenly reflected in California, both in contemporary graphic arts and in the constructivist tendencies of many "new wave" architects. It seems fitting that the comprehensive show, "The Avant-Garde in Russia 1910-1930: New Perspectives," should originate in the Los Angeles County Museum of Art and that it should be designed by Frank Gehry.

This is the first major show of Russian Avant-Garde art to consist entirely of work gathered outside the Soviet Union. Therefore, it is the first show free of official state censorship. Curators Stephanie Barron and Maurice Tuchman spent four years assembling the more than 400 works of art. Architectural models, stage sets, and costumes were reconstructed. Paintings, sculpture, books, periodicals, photography, and ceramics were gathered. The curators also worked very closely with the architects, Frank Gehry, Greg Walsh, and Paul Lubowicky.

The exhibition is organized into 12 discrete, informative zones, displayed on two levels of the museum. To convey the spirit of the times, the curators and architects organized the work both chronologically and according to categories, interspersing photographic enlargements and books with the art displayed on the gallery walls. A staircase links the two floors and doubles as a poignant photographic portrait gallery of the artists, identifying them and describing their fates.

Greeting the visitor at the entrance and visible through the museum window at night is the central feature, a platform recreating the collapsible trick furniture and costumes from Varvara Stepanova's "Tarelkin's Death." Combining the work of designers, artists, and writers, it epitomized the communal efforts of the Russian artists. Floating in front of this are the exhibition's normal administrative functions—guard's post, umbrella stands, and sales desk. Around it, in chronological order, are displayed the works of the Neo-Primitivists, Cubo-Futurists, Rayonists, Suprematists, and Constructivists.

The display techniques unify the exhibition and reiterate its themes. First, the colors chosen for the displays are characteristic of the paintings and pamphlets of Suprematism—white, pale gray, black, red, and pale yellow. Signs identifying each gallery space are stenciled on the upper entry wall at a diagonal, another common graphic device of the period. Enlarged historical photographs, from the collection of Szymon Bojko of Warsaw, provide a political perspective.

Paintings are arranged in casual groupings, in close proximity to graphic works of the same period. Most notably, the Suprematist room, devoted to the work of Kazimir Malevich, is hung in an attempt to reproduce the historic "0-10" exhibition of 1915. Many of the works from the original exhibition are here, including the corner piece, occupying the position traditionally held by the icon in a Russian home. A lonely bentwood chair sits at the base of one wall. Adjacent is an enlarged photograph of the original Malevich installation.

The installation as a whole bears many of Frank Gehry's trademarks—the careful assembly of ordinary rough materials, the creation of framed views through three-dimensional space, and one example of distorted perspective. Despite such devices, however, the installation is remarkably unobtrusive, allowing the work to speak for itself.

Working within the vocabulary

On the first floor of the exhibition, partitions stop short of the ceiling, revealing exposed studs above. This relates to the aesthetic of Constructivist theater sets and also opens the space visually, providing views to adjacent areas. In addition, the 10-ft height provides a scale more in keeping with the small objects of which the bulk of the show is composed. Display cases, too, are treated in a "Constructivist" mode—publications, small sculpture, and ceramics are displayed in simple, unfinished plywood and clear acrylic boxes.

Barbara Goldstein teaches at the University of Southern California in Los Angeles and is a P/A correspondent.

In the area devoted to the work of Tatlin, Puni, and Rodchenko, the space is left very open, allowing the viewer to see the work from many angles in three dimensions. A model of Tatlin's Third International Monument is lit to cast a huge shadow against the wall, giving some idea of its intended scale. Taking a cue from a historical photograph, the construction is also displayed in a corner where a plastered wall meets a wall of plywood panels, as photographs show the work displayed against wooden panels.

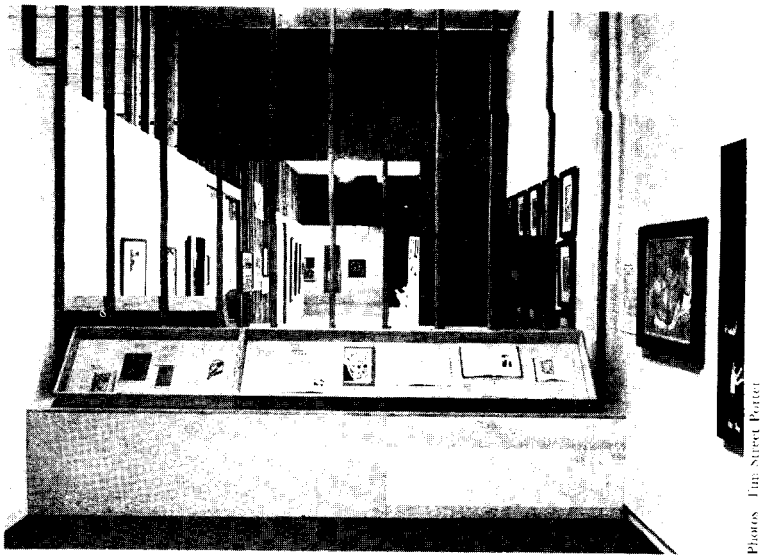
The work of El Lissitzky is displayed in a large, doughnut-shaped space with a mysterious yellow cube dropped at a slight angle into the center. Around the cube are examples of El Lissitzky's graphic, architectural, and other applied art. The cube itself is a full-scale reconstruction of a Proun, a room consisting of painted walls and ceilings embellished with architectural reliefs and integral lighting. The experience of being within such a space (loaned by the Stedelijk Museum) is one of the most memorable aspects of the exhibition.

The second floor of the exhibition is devoted to Productivist work: architectural models, sculpture, and an audio-visual presentation. This floor is less successful than the first, partly because of the nature of the gallery itself, which has low ceilings. The material displayed, largely applied arts—ceramics, fashion, and architecture—lacks the dynamic quality of the fine arts and does not seem well enough integrated with the main body of the work. Of particular interest, however, are the ideas of Chernikhov, Leonidov, and the Vesnin brothers displayed as architectural models, reconstructed under the supervision of Professor K. Paul Zygas from the University of Southern California School of Architecture.

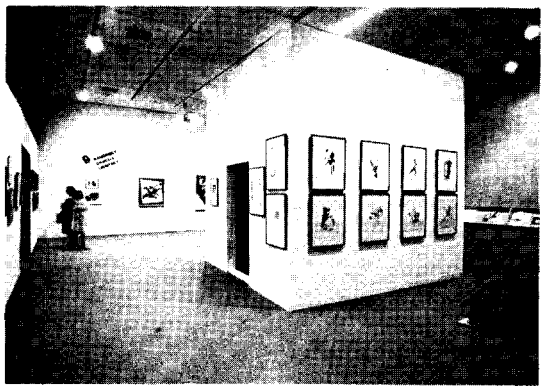
Superb catalog

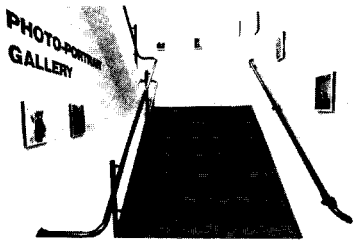
In addition to the exhibition and catalog, there were several related events: Agit-Prop theater in local libraries; three performances of Mathiusin's futurist opera "Victory Over the Sun"; and a two-day symposium.

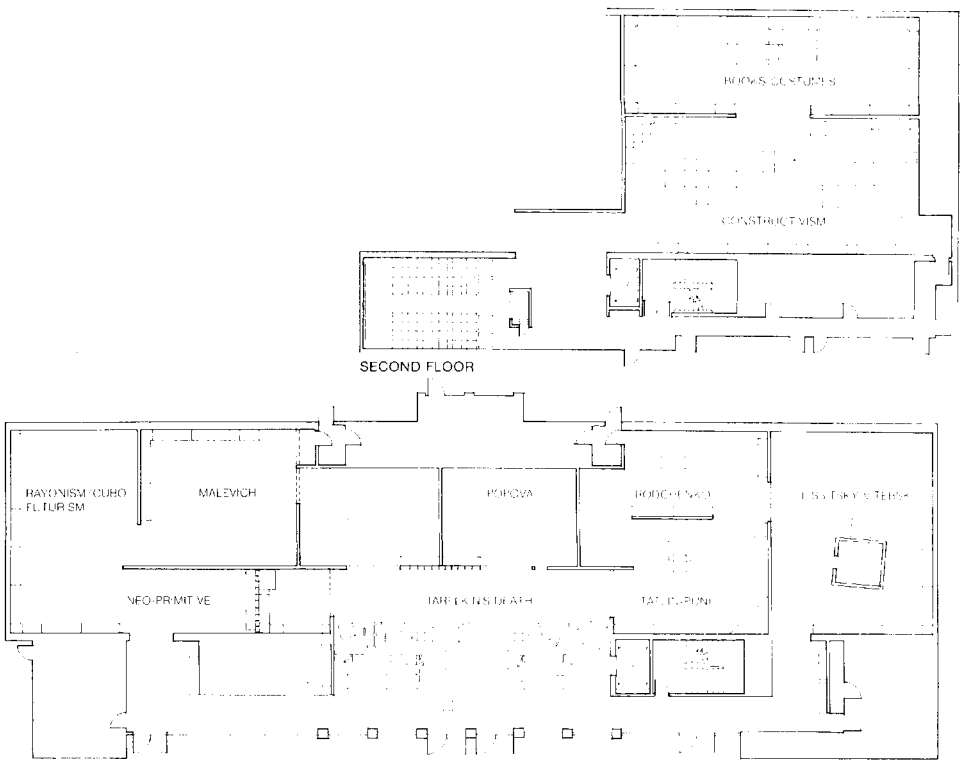
There is a superb catalog, edited by Jeanne D'Andrea and Stephen West, containing 19 scholarly essays, a list and photographs of the objects displayed, and bibliographies. It is designed by Louis Danziger in a style reminiscent of Suprematist graphics and is available through the MIT Press in both hardcover and paperback. The exhibition travels to the Hirshhorn Museum and Sculpture Garden in Washington, DC, November 20, where it will be shown until February 15, 1981.□



Photos: Tim Street-Porter

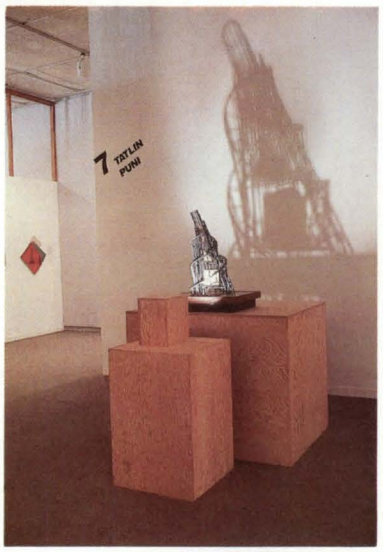






"The Avant-Garde in Russia" installation, Los Angeles

Photos: Tim Street-Porter



Data
Project: *"The Avant-Garde in Russia" exhibit, L.A.*
Architects: *Frank Gehry & Assoc., Santa Monica. Frank Gehry, Greg Walsh, Paul Lubowicki, Heather Kurze.*
Program: *14,052 sq ft.*
Client: *Los Angeles County Museum. Exhibit arranged by curators Stephanie Barron and Maurice Tuchman. Funding in part by National Endowment for the Humanities, Shubert Foundation.*

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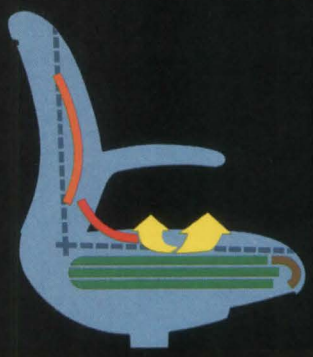

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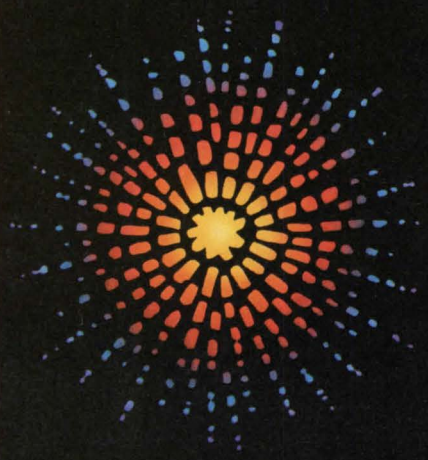

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Testing sprayed fireproofing

Alvin D. Skolnik

Few materials used in building construction are subject to performance demands more critical than sprayed-on fireproofing of structural members. Bearing in mind that the most crucial test of a fireproofed system is an actual fire, materials tests should simulate not only real building fire conditions, but also the abuse experienced during construction and after.

Alvin D. Skolnik, FCSI, is Director of Research and Specifications, Skidmore, Owings & Merrill, New York.

The ASTM E119 fire tests provide *only one* piece of information on sprayed fireproofing performance; namely, its degree of fire resistance as part of a structural system. More tests and standards are needed because the ASTM E119 test does not completely represent the manner in which materials are subject to damage and construction abuse in normal practice, nor does it test the resistance of materials to such abuse.

Basically, there are two classifications of testing. First, there are laboratory prequalification tests such as ASTM E119. There also are laboratory tests under which a product may be subject to standardized conditions of abuse to determine whether, if properly field applied, the product has the quality to resist damage in service. Second, there are field tests to determine whether a product has been applied so that one can reasonably expect performance in service to be that which was predicted by the laboratory tests.

In November 1979, under the jurisdiction of ASTM Committee E-6, the "Proposed Methods for Testing Sprayed Fire-Resistive Material Applied to Structural Members" was published. Proposed methods do not have status as a standard and are published on behalf of the sponsoring committee in order to solicit comments. After the commentary period, it is hoped that a standard will be adopted and issued under a fixed alphanumeric designation. Apparently a consensus will not be reached leading to adoption of the E-6 proposed test methods under a *single standard*. That document contains procedures for determining the following physical characteristics to be used as an index of performance:

1 *Deflection:* Spalling and delamination under bending stresses is evaluated when the substrate to which material has been sprayed is subjected to deflection forces.

2 *Bond impact:* Adhesion and resistance to spalling and delamination are evaluated when the floor to which material has been applied is subjected to impact loading.

3 *Cohesion/Adhesion (Bond strength):* Adhesive force required to separate the material from the substrate or the cohesive force within the material is measured, indicating the ability of materials to remain in place and resist separation during service.

4 *Compression:* Compressive strength of the material and its resistance to deformation under comprehensive loads is measured.

5 *Corrosion:* The test determines if the presence of these materials increases, decreases, or has no effect on the corrosion characteristics of steel.

6 *Air erosion:* Resistance to dusting, flaking, spalling, and delamination are evaluated when floor construction is subjected to tangential air streams in plenums.

7 *Abrasion:* The amount of material removed is measured when the material is subjected to abrading forces.

8 *Impact penetration:* Penetration or the material removed by pendulum impact is measured.

The E-6 Committee now anticipates publishing *individual* Standard Test Methods for fireproofing. ASTM E605 covering Thickness and Density has been published, as has ASTM E736 covering Cohesion/Adhesion. Scheduled by ASTM for an August ballot were ASTM E759 on Deflection, ASTM E760 on Bond Impact, and ASTM E761 on Compression. Standards for Air Erosion and Corrosion are undergoing revision and will take more time to reach standard status. The inability to reach consensus on standards for Impact Penetration and Abrasion may delay their publication for a longer time.

ASTM E605 (Thickness and Density) and ASTM E736 (Cohesion/Adhesion) provide an appropriate basis for measuring those properties for sprayed fibrous and cementitious materials both in the laboratory and in the field. Thickness and density tests are also covered in the Uniform Building Code Standard No. 43-8.

Field quality control should include visual inspection of substratees, thickness and density tests, cohesion/adhesion tests, inspection of patching work, and visual examination of finished application. While at this writing there is no Bond Impact field test which has standards status, procedures such as in the previously discussed E-6 Committee's proposed test methods can be described, unless ASTM E760 gained standard status through the August ballot. Frequency of each test must be stipulated. The Association of The Wall & Ceiling Industries—International (formerly The International Association of Wall and Ceiling Contractors/Gypsum Drywall Contractors International) and the Sprayed Mineral Fiber Manufacturers Association have each published separate documents titled "Inspection Procedures for Field Applied Sprayed Fire Protection Materials" in which test frequencies are suggested. In the absence of any code requirements such as the UBC 43-8, a comparison of these documents will provide the specifier with appropriate test frequencies.

Selection of products meeting the laboratory prequalification tests and diligent field quality control will contribute to improved and more reliable fireproofing installations. It is important that the applied materials remain in place undamaged, firmly bonded, without dusting or deterioration which reduces the intended fire protection. □

No high ground

Fire protection of buildings is a complex interplay between reality, research, economics, regulation, and design. The facts are not easily generalized, while the codes are often too general. Judgment and trust are still the only safeguards. There is no high ground.

Out of control, fire is a vicious, persistent, resourceful opponent of buildings and people. Like all of nature's destructive forces, it feeds on neglect, carelessness, ignorance, greed, and stupidity. Such ingredients make it difficult to generalize useful knowledge about fires. Dozens of fires have, however, provided clues to predicting the performance or reducing the potential hazard of fire. Several of these are depicted on the opposite page. The influence such fires have on the codes and resulting designs have led to the dark reputation of "design by disaster." As the account below indicates, however, the results of a fire are not always lethal.

Apartment Complex, *October 13, 1979, Williamsburg, Va*

An early morning fire in this apartment apparently resulted when a cigarette ignited a living room couch. The occupant of the apartment told investigators that he had entertained visitors the evening prior to the fire, and that he had slept for part of the night on the couch. He said he had been smoking.

Shortly after 5:00 a.m., the occupant of an apartment above the apartment of fire origin was awakened by a smoke detector sounding in the apartment of origin. He alerted another occupant of the complex, who discovered smoke coming from the door of the apartment of origin, entered the apartment, and found its occupant asleep in the bedroom. He woke up the occupant, and the two men escaped unaided. The occupant of the apartment of fire origin was treated for smoke inhalation.

The fire did not spread beyond the apartment of origin. Loss was estimated at $5000.

Reprinted from *Fire Journal* March 1980, p. 19.

It is rarely the individual fire, even if there is loss of life, which allows for the perception of general fire problems and solutions. The observance of many fires over a long period, however, does show significant statistical trends.

The National Fire Data Center tells us, for example, that "twenty times more deaths are caused by fire than by floods, hurricanes, and tornadoes combined" (see P/A, Feb. 1980, pp. 106-114). The deaths per million population rate in the U.S. is nearly twice that of Canada, which is ranked second for industrialized nations. The seven most populous states—California, Illinois, New York, Ohio, Pennsylvania, and Texas—account for about one-third of the annual fire fatalities, with rural communities and large cities dominating statistics. The top five cities for 1974-1977, in order, were Newark, NJ, Birmingham, Al, Boston, Cleveland, Oh, and Louisville, Ky.

Although nearly half of the fires occur out of doors, the majority of deaths occur in buildings. The statistics released in July of 1980 by the National Fire Protection Association showed a total of 271 multiple-death fires in 1979. There were 1084 lives lost in these fires; 244 of the fires and 939 of the deaths were in residential occupancies. Well over half of these are in one- and two-family dwelling units. Nearly 20 percent are caused by a cigarette in upholstered furniture in the living room, by far the most common cause of death by fire in residences. The second most lethal cause is a cigarette in bedding and mattresses, which accounts for 7 percent of the deaths. Of course, statistics such as these do not reflect unrecorded fires that occur daily, nor do they reflect the number of injuries involved.

As one might suspect, the greatest number of fires in residences are related to heating and cooking. Also not surprising is the fact that the dollar losses for residential structures is nearly equaled by the smaller number of those in nonresidential structures.

Department Store, *Jan. 20, 1979, Kingston, NY*

The one-story building was of masonry-block construction with a metal-deck roof. Automatic sprinklers were provided, equipped with waterflow and control valve tamper alarms supervised by a local answering service.

The area of fire origin was the 15,000-sq-ft stockroom. Storage consisted of polyurethane-upholstered and wood furniture stored in four portable racks . . . along with mattresses stored end on end two tiers high in a similar rack. Other household furnishings were stored in cartons or paper wrappings in racks and directly on the floor. Clearance between the sprinkler heads and the stock was reported to be 3 ft.

At about 1:15 p.m., employees left the stockroom for a break. At 1:30 p.m., an employee passing through the area saw fire and noted that the sprinklers were not operating. The employee notified the manager, and he, along with other store workers, began to fight the fire using portable extinguishers. This action was ineffective. About this time, the sprinklers were operating. The fire department received a call from the store telephone operator at 1:39 p.m. and was on the scene at 1:42 p.m. The first engine hooked up to the sprinkler siamese connection. Two small handlines were used to complete extinguishment of the fire, which the sprinklers already had under control.

Fire damage was confined to the furniture and some of the mattresses stored in the racks. There was considerable water damage to the remaining stock and carpeting in offices and display areas. Cause of the fire was deemed suspicious, pending an investigation. The estimated loss was $65,000.

Reprinted from *Fire Journal,* Nov. 1979, p. 22.

The national loss estimate for 1979 by NFPA is based upon a survey of public fire departments. There were an estimated 2,845,500 fires in 1979 causing nearly $6 billion in property loss. In the commercial area, the greatest number of fires was in stores and offices (64,000), and in the industrial sec-

NFPA

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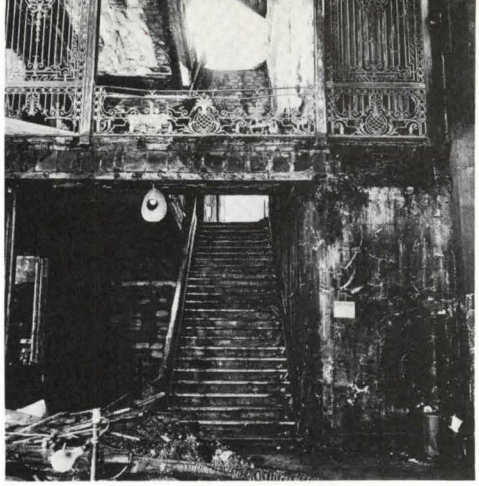

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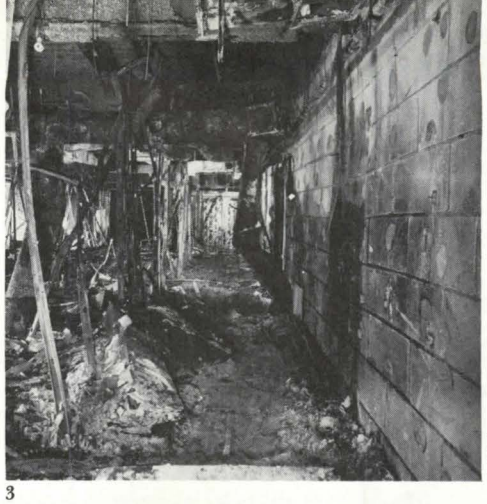

NFPA

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NFPA

The Detroit News

5

1 On Saturday night, November 18, 1942, in Boston, Ma, a fire at the Cocoanut Grove nightclub took 492 lives. Overcrowding, insufficient exiting, and combustible interiors were blamed. As a result, many codes reevaluated standards for such problems. 2 Just after midnight, June 5, 1946, the first-floor cocktail lounge of Chicago's LaSalle Hotel caught fire and spread to the lobby and then upward, fed by the combustible finish. The majority of the deaths were in the upper floors where people were trapped with improper egress and impaired ventilation. 3 Just after five o'clock, August 5, 1970, new offices in the upper stories of One New York Plaza in New York City caught fire. Extensive damage was done during the five hours it took fire fighters to control the blaze. The fire was fought over 30 stories in the air and valuable knowledge was gained about effective emergency strategies for tall buildings. 4 On Saturday, May 28, 1977, 164 people lost their lives in a fire at the Beverly Hills Supper Club in Southgate, Ky. The conditions which led to the disaster parallel the Cocoanut Grove fire in many ways. The overcrowding, inadequate exiting, interior finishes, and lack of emergency planning were blamed for many of the fatalities. There was no automatic alarm system or automatic sprinkler system in the building. 5 The fire at the General Motors transmission plant in Livonia, Mi, on August 12, 1953, cost over $50 million and six lives. The fire began from sparks from a cutting torch operation and spread rapidly throughout the huge plant. Over 4000 employees were successfully evacuated. The fire has had a profound effect on the standards for built-up roofing in this country.

tor it was in warehouses (64,500). About half that number (around 30,000) were reported in public assembly buildings and a similar number for institutions. There were reported to be 22,500 fires in educational institutions and about half that number in hotels.

While these statistics are very clear about building type and certainly indicate priorities as to where the concern should lie, the location and cause of these fires are difficult to generalize. Where all residences have bedrooms, kitchens, etc., the commercial and industrial buildings have very few similarities in configurations. The numbers, therefore, do not tell researchers very accurately what kinds of losses to concentrate upon. In many cases, this kind of emphasis happens only in the insurance side of the industry.

Fire design

Statistics might quite accurately predict the general character of the next thousand fires, but they are practically worthless in describing the location or cause of the very next fire. Ironically, owners spend millions of dollars each year protecting buildings from fires that never occur or remain small and are brought under control with little damage.

Architects devote hours detailing buildings to comply with fire code occupancy requirements. The occupancy reflects the risk involved and prescribes stair widths, door size, and so on. These code requirements are written for a general occupancy which may also represent a wide variety of risks. A multistory apartment building of residential occupancy, for example, could house everyone from an infant to an elderly adult. The economic class that occupies the building quite possibly will change over the life of the building, as will the materials of which the furnishings are made.

As clear as it is that such generic occupancies encompass a full range of risk, it should also be clear that different kinds of uses demand different modes of fire security and egress. High-rise buildings, for example, usually depend on relocation of people, not evacuation. Knowledge of the building is very important. Hospitals have a trained staff to aid in the event of fire, while schools rely on fire drills. Perhaps the worst situation is a hotel or night-club, where there is a high likelihood of smoking and drinking, and a transient population which is unfamiliar with the building and its escape routes.

Of course, the fire does not know what the occupancy of a building is nor does the smoke that is a product of the burning. Most people who are comforted by knowing the hours of fire protection built into the containment characteristics of a particular door, roof, wall, or ceiling do not recognize the swiftness with which a fire can travel. Some clues are the travel distance to an exit (which can be measured in seconds) and the time consumed reaching the building from the firehouse (usually less than five minutes).

The fire that begins as a cigarette sleepily discarded into bedclothes lights a combustible mattress and can be transformed into belching flames in minutes. A fire less than two feet high has a potential for being either hand extinguished or even for simply going out. Above two feet, the fuel type, "fuel package," container, and its envelope determine the size of the blaze. The heat and smoke rise to the ceiling. The smoke travels as a thickening black cloud across the ceiling, seeking an escape route. In minutes, the hot gases and flames transform a smoke-filled room abruptly into a fire chamber, and "flashover" occurs.

At the site of fire, a number of defenses can be designed to combat it, some "passive" and some "active."

Prevention: Of course, the first step is to try to keep the fire from occurring. Eliminating the source of flame will accomplish this goal as will reducing the available fuel or the available air to support combustion. Education is the prime target for fire prevention.

Detection: After the fire has begun, the greatest importance is to detect it quickly so that action can be taken. Automatic heat and smoke detectors are useful in accomplishing this goal, as is surveillance by people (P/A, March 1975, p. 78, "Smoke gets in your Van Eycks").

Alarm: Ideally, detection and alarm occur simultaneously. The alarm must be loud enough to hear and recognize as a fire alarm. It can be a "whoop," a bell, a buzz, a recorded voice, or a live human one.

Suppression: Suppression can come automatically in the form of a sprinkler or extinguishing system, or it may be a readily accessible fire extinguisher (or fire hose in industrial uses) hastily used until the fire department arrives.

Containment: Until the emergency is under control, the goal is to contain or control as much of the fire and smoke as possible while still permitting people to escape. The fixed enclosure of the space is the literal container of the fire, and the operable doors, windows, and ventilating openings are the control mechanisms. The contents of the room and its enclosure provide the fuel. The shape and size of the container and its openings help direct the fire's growth, as does the air motion and pressure.

Combustibility: From the moment of its inception until the time it is extinguished, the fire consumes the materials in the container. The speed with which they are consumed determines the extent of damage the structure will undergo. (Spec clinic, this issue).

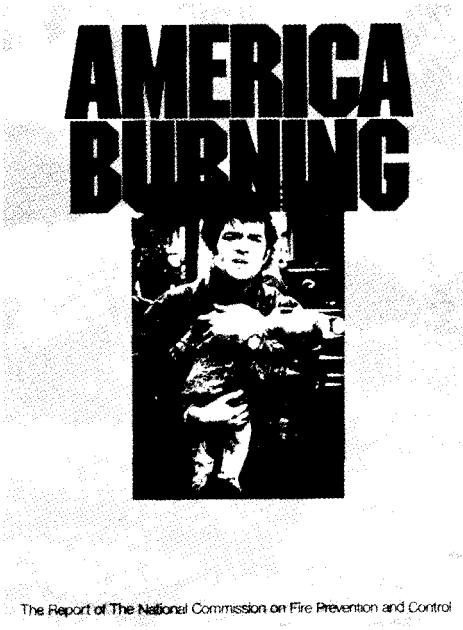
Fire fighting: The fire fighter must supplement those defenses already in place with the skill he brings to the fire. Although careful thought is given to the structure and egress of a building, too little thought has been given to access to the fire by the fire fighters and to fire fighting safety. Frequently they must fight against a security system intended to thwart burglars.

Fire politics

An introductory sketch of fire protection design is incomplete without understanding the give-and-take role of people, better described as "fire politics." Anyone who has ever tried to reconcile the conflicting requirements which make a design acceptable under the building code, the fire code, the occupational safety code, and to the insurance companies has witnessed one form of fire politics.

Although fire regulations have many similarities, they can differ for each municipality, if only because of the person who oversees them. The regulations are also affected locally by the fire department and nationally by the standards-writing bodies, such as the National Fire Protection Association (NFPA), which compose many of the standards eventually adopted locally. A total of 20 volumes make up the National Fire Codes published by NFPA.

When the Life Safety Code is written by NFPA, it is accomplished by a committee from the industry. The interests represented on such committees can be as follows: manufacturers, users, installer-maintainers, labor, testing officials, enforcers, insurance experts, consumer groups, and independent experts. No given interest group can occupy more than one-third of the voting seats on a committee (usually about 30 people). The object is to get a consensus of all those involved. The present chairman of the Life Safety Committee is New York architect Armand Burgun. He is also newly elected chairman of the NFPA Board of Directors.



USFA

(Above) The report of the National Commission on Fire Prevention and Control in the early 1970s has had a profound effect on the organization of the governmental response to fire. (At right) Part of the result of the commission was a research program at the National Bureau of Standards. Shown here is a chart from a new technique called Fire Safety Evaluation System (FSES) developed at NBS for evaluating fire protection adequacy of health care facilities.

SAFETY PARAMETERS VALUES

PARAMETERS	PARAMETERS VALUES						
1. CONSTRUCTION	COMBUSTIBLE				NON-COMBUSTIBLE		
	WOOD FRAME		ORDINARY				
FLOOR OF ZONE	UNPROTECTED	PROTECTED	UNPROTECTED	PROTECTED	UNPROTECTED	PROTECTED	FIRE RESIST.
FIRST	−2	0	−2	0	0	2	2
SECOND	−7	−2	−4	−2	−2	2	4
THIRD	−9	−7	−9	−7	−7	2	4
4TH & ABOVE	−13	−7	−13	−7	−9	−7	4
2. INTERIOR FINISH (Corr. & Exit)	CLASS C	CLASS B	CLASS A				
	−5	0	3				
3. INTERIOR FINISH (Rooms)	CLASS C	CLASS B	CLASS A				
	−3	1	3				
4. CORRIDOR PARTITIONS/WALLS	NONE OR INCOMPLETE	<1/3 HR	>1/3 <1.0 HR	≥1.0 HR			
	−10 (0)*	0	1 (0)*	2 (0)*			
5. DOORS TO CORRIDOR	NO DOOR	<20 MIN FR	>20 MIN. FR	>20 MIN. FR & AUTO CLOS.			
	−10	0	1 (0)***	2 (0)***			
6. ZONE DIMENSIONS	DEAD END MORE THAN 100'	DEAD END 30'–100'	NO DEAD ENDS >30' & ZONE LENGTH IS:				
			>150'	100'–150'	<100'		
	−6 (0)**	−4 (0)**	−2	0	1		
7. VERTICAL OPENINGS	OPEN 4 OR MORE FLOORS	OPEN 2 OR 3 FLOORS	ENCLOSED WITH INDICATED FIRE RESIST				
			<1 HR	≥1HR <2 HR	≥2 HR		
	−14	−10	0	2 (0)*	3 (0)*		
8. HAZARDOUS AREAS	DOUBLE DEFICIENCY		SINGLE DEFICIENCY		NO DEFICIENCIES		
	IN ZONE	OUTSIDE ZONE	IN ZONE	IN ADJACENT ZONE			
	−11	−5	−6	−2	0		
9. SMOKE CONTROL	NO CONTROL	SMOKE PARTITION	MECH. ASSISTED SYSTEMS				
			BY ZONE	BY CORRIDOR			
	−5 (0)***	0	3	4			
10. EMERGENCY MOVEMENT ROUTES	<2 ROUTES	MULTIPLE ROUTES					
		DEFICIENT CAPACITY	W/O HORIZONTAL EXIT(S)	HORIZONTAL EXIT(S)	DIRECT EXIT(S)		
	−8	−2	0	3	5		
11. MANUAL FIRE ALARM	NO MANUAL FIRE ALARM		MANUAL FIRE ALARM				
			W/O F.D. CONN.	W/F.D. CONN.			
	−4		1	2			
12. SMOKE DETECTION & ALARM	NONE	CORRIDOR ONLY	ROOMS ONLY	CORRIDOR & HABIT. SPACE	TOTAL SPACE		
	0	2	3	4	5		
13. AUTOMATIC SPRINKLERS	NONE	CORRIDOR	CORRIDOR & HABIT. SPACE	TOTAL SPACE			
	0	2 (0)**	8	10			

FIRE SAFETY EVALUATION SYSTEM: TYPICAL EVALUATION PANEL

NBS

Prominent members of such committees are the manufacturers, who fully realize the importance of codes and standards in determining acceptable designs. If the code doesn't provide an economically advantageous climate for their product, the product may not be used. If the code does prefer a product, that code becomes a marketing tool. The fire field is therefore rife with controversy. The rules for the manufacturers go something like this:

Never deny the importance or value of other opposing products. Stress, however, the overriding value of your own product. Pick a favorite fire to demonstrate that your product succeeded where others failed. Cite test data and/or statistics proving the point. Develop a strategy that proves the economic superiority of the product. Prove it will save lives and reduce property damage. In short, create an airtight case.

As in any good chess game, the opponents are usually highly competent and worthy of each other. Ground is hard won and only endures for certain until the next battle. Everyone is drawn into the fray eventually, with some prejudices more readily visible than others. It is also true that some people in the industry are frustrated by such a nonengineering, human frailties approach to what they see ideally as an engineering problem.

Recent history: Government response

The last ten years have been a period of great change in the fire protection industry. Probably the most influential single document during that time was the report of the National Commission on Fire Prevention and Control delivered in 1972. The report, entitled simply "America Burning," crisply detailed the nature of the American fire problem and emphasized the predominance of residential fire deaths, as well as the dominant reasons for death—smoke inhalation and asphyxiation. In addition to describing the problem, the commission made recommendations for the future.

As a result of the Fire Prevention and Control Act of 1974, the U.S. Fire Administration exists today within the Federal Emergency Management Agency (FEMA). It serves as the lead Federal Agency responsible for controlling the U.S. fire problem. Its programs include the new National Fire Academy.

As of January 1980, the National Fire Academy opened its doors in Emmitsburg, Md. As the name implies, the resident facility (formerly Saint Joseph College) will offer an opportunity for fire fighters and other fire management personnel throughout the country to receive common training and share ideas.

Also consistent with the commission's suggestions, the USFA con-

tains the Office of Planning and Education, intended to increase public understanding of the fire problem, and the National Fire Data Center. Beyond the collection of data, the center develops residential fire protection equipment and fire department management strategies. The USFA also works closely with the Center for Fire Research of the National Bureau of Standards, thus completing the suggested areas of work of the commission.

The Center for Fire Research: Classical fire research in the past was devoted to the testing of materials. Today's $9 million budget (only about half of which comes from USFA) of the NBS Center for Fire Research is very broad in scope and helps describe the nature of the fire problem.

Fire phenomena: Fire protection engineers and practitioners in the field criticize the lack of basic research into fire and its growth. Generally speaking, the fire experience works back to theory and not the reverse. While the physics and chemistry involved are quite advanced, the dynamics of flame growth and spread in buildings are still to be solved. Somewhere in the study of energy contained in flames of various heights, the rate of energy *release* of each burning material, and the volume of smoke produced is a science that will yield a precise predictive engineering methodology. The *energy-absorbing* characteristics of the suppression and control devices can then be precisely matched to the fire risk.

Fire modeling: Many industry experts see the key to fire-safe design lies in the ability to model a fire accurately through use of the computer. The great impact, of course, will be in the replacement of materials testing with such a computer model, greatly reducing the cost of such testing to industry.

Test method development: There is a constant need to evalute test methods. UL's Tom Castino explains: "The biggest test we run doesn't alone predict all of the answers." Tests as basic to fire protection as ASTM E119 (simulating structural fire performance) are widely felt to be outdated. Newer areas of concern are such fields as the toxicity of smoke. At present there is no nationally accepted test for measuring the toxicity of smoke (P/A, May 1977, p. 103). Until this work is done, there can be no performance standards written on the subject. An entire, separate program exists at NBS to study the toxicity of combustion.

Ignition source control: Since the mid-1970s, the increase of deaths has been linked to the energy problem and the use of auxiliary heating or cooking devices such as poorly installed wood stoves. Study of these appliances is critical to control of residential fire.

Suppression: It is only in the recent past that sprinklers have been extensively tested at NBS. As their role increases in buildings, and possibly in residences, the need for their thorough understanding is critical.

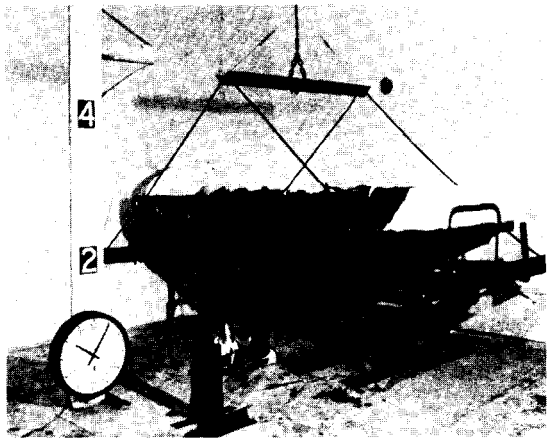
Arson: In the last decade, arson has increased at an alarming rate. The arson laws now even include cars. Each night the news seems to contain another fire of mysterious origin. The purpose of this research is to be able to detect arson more dependably.

Decision analysis: Each design or code restriction has economic ramifications. Sophisticated mathematical techniques are being applied that compare the cost benefits of various systems.

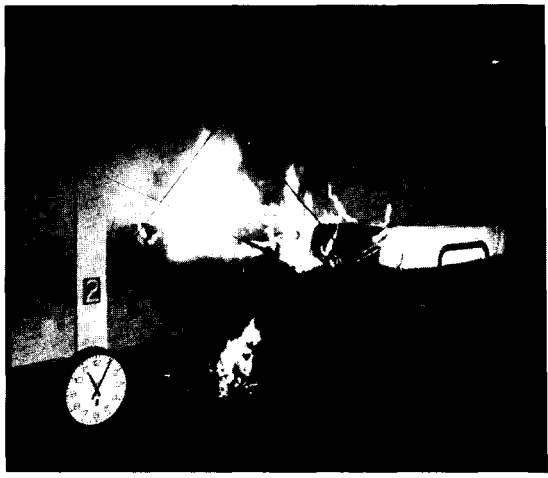
Design concepts: The work being conducted at the Center for Fire Research in this area is already having a profound effect on the design field. In the complex area of health care facilities, for example, NBS researcher Harold E. Nelson and others have been in the process of developing an evaluative technique called Fire Safety Evaluation System (FSES), which compares equivalent total systems of fire protection. Each mode of detection, suppression, alarm, containment, egress, etc., is rated to yield a total number which is judged acceptable or rejected. The system is expected to be included in the appendix of the 1980 Life Safety Code as an alternative evaluation method.

Smoke control: The "America Burning" report pointed very clearly to the real reasons for death in an uncontrolled fire. Flames were last. A person is much more likely to die from asphyxiation, the inhalation of hot gases, products of incomplete combustion, or toxic byproducts of the fire. Prominent fire protection engineer Chester Schirmer states the problem: "We know so little about smoke control because we know so little about smoke production (and is quick to add that "such deaths would not have occurred if the *fire* had been properly controlled").

It has been a decade since George Tamura of the Canadian Research Council originated the concept of using forced-air-handling equipment of the building to control the smoke produced in a fire. (An association of manufacturers, called the Smoke Control Association, is promoting the idea in the U.S.) Researchers have been able to study such concepts in existing buildings by injecting a tracer gas into the air and then collecting air samples throughout the building. John Klote at



E.I.DuPont de Nemours



The photos above were taken during burn tests at Factory Mutual test center. In each test, a standard 1.8 pounds per cu ft mattress was used. The top mattress was protected by a 3/16-in. layer of specially formulated neoprene foam used as a fire barrier. Both fires are five minutes old.

the Bureau of Standards is conducting research in this area, as is John Fathergill, a Washington engineer. The research encompasses computer modeling of smoke and air movement, smoke penetration through acoustical tile, as well as a manual of mechanical designs for smoke control.

While many of these areas have been developing in the past 10 to 15 years, the most recent areas of interest include a behavioral study group and a group of researchers studying the problems the disabled have in case of fire. Nelson explains: "We are trying to bring our knowledge of human beings to the point where it is a design tool."

Recent history: Plastics

Perhaps the largest and most publicized single controversy within the fire protection field in recent years centered around cellular plastics in the late 1960s and early 1970s. In 1973, the Federal Trade Commission called into question the standard test procedures then being employed by the industry as

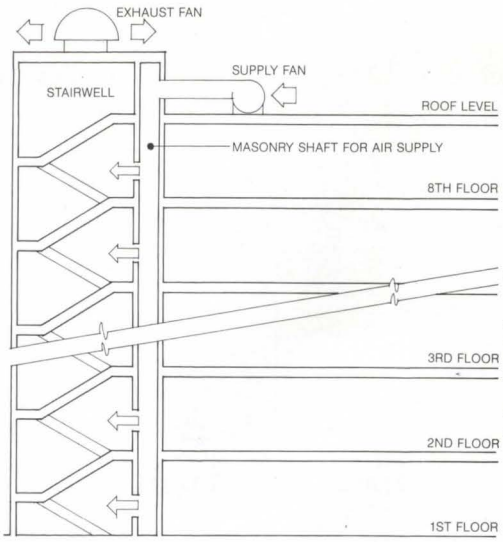
well as the data and nomenclature being used to describe various types of plastics. The first result was a consent agreement in which the Society of the Plastics Industry, and 25 companies involved in the production of cellular plastics, agreed to cease and desist from using such test-related terminology as "nonburning," "self-exhausting," and "noncombustible" to describe cellular plastic products. They also agreed that any reference to numerical flame-spread ratings would be accompanied by the following statement: "This numerical flame-spread rating is not intended to reflect hazards presented by this or any other material under actual fire conditions."

A further result of the agreement was the funding and establishment of the Product Research Committee, which proceeded to spend $5 million over five years on plastics fire research. The Committee report is just now about to be released by committee chairman John Lyons, formerly director of the Center for Fire Research at NBS. In conjunction with this program, intensive study was given to the viability of the generic tests being used to measure flame-spread and burning characteristics of materials, especially cellular plastics. The attempt is being made to develop effective, nationally recognized, large-scale room tests that would augment the tests already available for that purpose. In practice, the rapid flame spread, extreme heat, dense smoke, and toxic gases or chemicals generated by burning certain plastics has been recognized, and such plastics now require protection in conventional building construction.

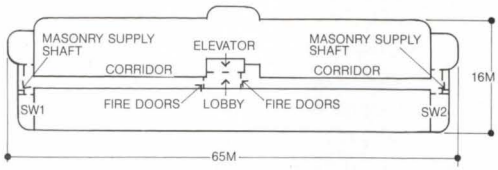
The response of the plastics industry has been so extensive that the FTC has recently abandoned the Trade Regulation Rule that it conceived in 1973. The whole question of testing and description of products that was raised by the issue, however, has rippled into the whole of the research and testing community, as well as that of the materials and products manufacturers.

A more recent area of concern for the plastics industry has been in residential and office furnishings. As the statistics for fire deaths demonstrate, there appears to be a direct relationship between fire deaths and flammable furniture or bedding ignited by cigarettes. At the moment, the only national fire standard covering any product in which resilient materials are used is the Consumer Product Safety Council's FF472 which relates only to mattresses. The CPSC, however, has been active in recent years trying to evaluate the establishment of a mandatory federal regulation for the fire safety of upholstered furniture.

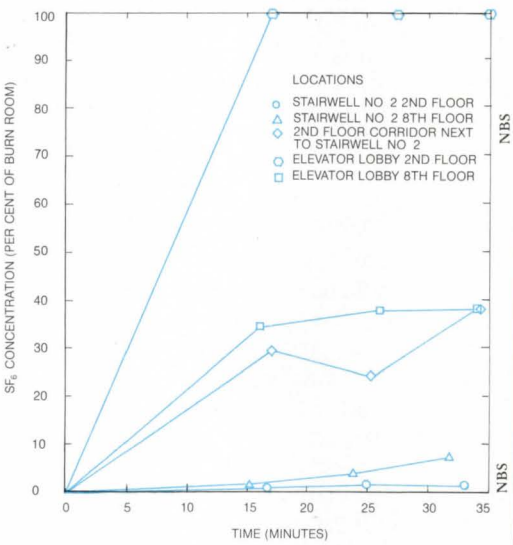
In response to the CPSC, an association of furniture manufacturers, suppliers, and retailing establishments has formed the Upholstered Furniture Action Council (UFAC). UFAC has established a program of voluntary compliance, which it certifies with a UFAC compliance identification card. The Business and Industrial Furniture Manufacturers Association (BIFMA) is also studying the problem. In the new Boston Fire Prevention Code, the fire department has specific authority to regulate interior finish as well as upholstered furniture. The future may lead to performance standards that might eliminate the use of certain materials entirely, modify others, and/or increase the use of thermal barriers protecting flammable resilient materials.



TEST BUILDING CROSS SECTION

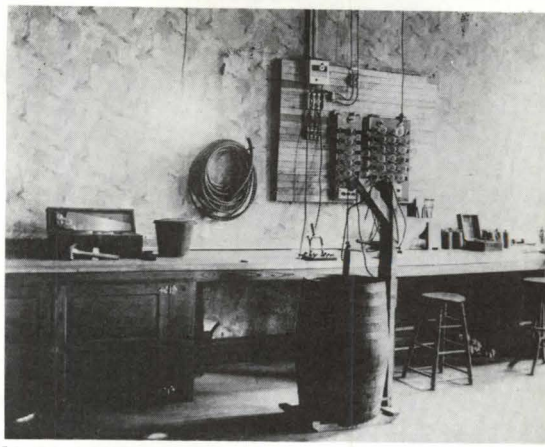


TEST BUILDING PLAN



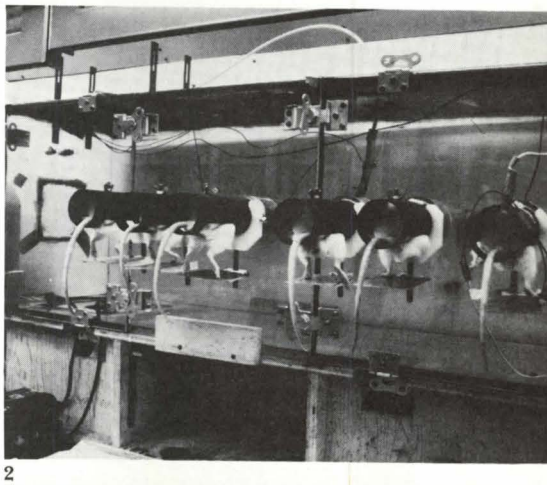
NBS

GRAPH OF TRACER GAS LOCATIONS
3



Underwriters Laboratories

1



NBS

2

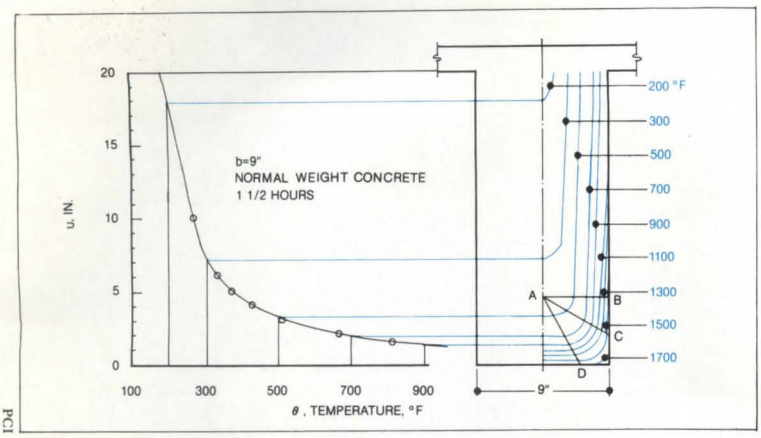
Richard Rush

4

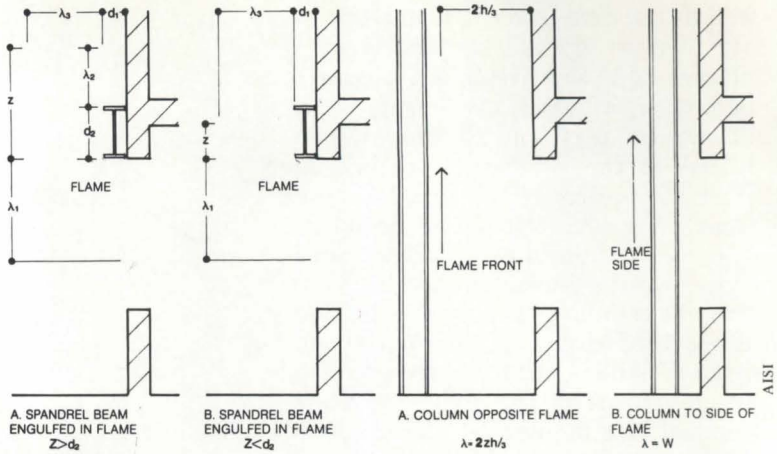
Research and testing progress: ***1*** *The first Underwriters Laboratory is shown vintage 1894.* ***2*** *Toxicity of smoke is tested at the National Bureau of Standards with live rats.* ***3*** *Smoke problems are also studied in real buildings using tracer gases.* ***4*** *Large-scale fire tests are conducted by Factory Mutual to study paper storage.*

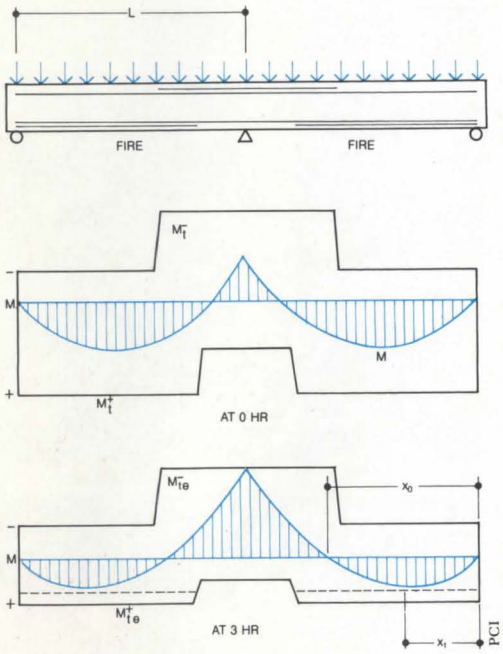
Rational design and the computer

While fire has given the newer materials industry a fight for its life,



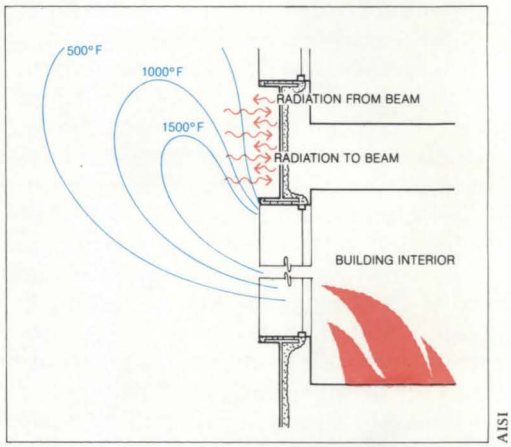
EXAMPLE OF CONSTRUCTION OF ISOTHERM DIAGRAMS FOR A CONCRETE BEAM





MOMENT DIAGRAMS FOR CONTINUOUS 2 SPAN CONCRETE BEAM BEFORE AND DURING FIRE EXPOSURE

(Above) The concrete industry has developed rational design procedures for the fire protection of concrete. Using these methods it is possible to predict the interior temperature of beams as shown. (Left) Tests have shown that under fire conditions, the heat causes the redistribution of moments in a continuous beam. (Above and right) the steel industry has developed its own methodology for estimating the temperature a member might achieve during a fire. It is possible to omit external protection from a member if it can be moved, shielded from the heat, or filled with water.



SCHEMATIC DRAWINGS OF FLAME SHIELDING EXPOSED STEEL

the older building materials have become emboldened by positive fire experience, research, and testing both in the U.S. and abroad.

As reported in the April 1978 P/A article, "Innovation in Steel," the steel industry has been busy establishing the technology for Fire Safety Structural Steel, or FS3. While the basic principles have been augmented and simplified in this country, the document was written primarily by Margaret Law in Great Britain. In simple terms, the theory allows steel designers to eliminate external fire protection of steel if the member can be shielded from flames, moved out of reach of heat and flames, or filled with liquid that will remove the heat from the flames. In order to accomplish this type of design, it is of course necessary to compute the temperature of the member in question from the geometrical and material information describing the fire's container.

A similar mode of thinking has gone into the development of rational methodology for the design of spray-on fire protection, and concrete encasement of steel. With the aid of such techniques, it is possible to employ thicknesses of such materials exactly matching the performance demand, rather than conforming to specified prescriptive thicknesses.

In the late 1960s and the 1970s, work that began in the laboratories of the Portland Cement Association by Armand Gustaferro was continued by him privately to produce a "rational design" procedure for concrete fire protection design. The first such design was the HUD office building in Washington, DC, in 1965. Harold Nelson was at GSA at that time and played an important role in these developments.

The essential problem of such design is to try to protect the reinforcing steel. Structural engineers are able to induce (negative) bending stresses away from the flames by varying restraint conditions. Channeling the larger stresses to the top of fire-exposed members reduces the hazard of overheating steel. It is possible, therefore, on occasion to enhance the fire protection of a concrete beam by adding steel without reducing concrete.

The Department of Buildings for the City of Chicago now requires such rational design calculations for all major buildings. In 1977, the Research Committee of the International Conference of Building Officials (ICBO) approved a report that permits the use of such concrete rational design methods as an alternate to endurance testing.

The importance of rational design technology for fire-safe structures cannot be overestimated for the future of both fire protection and structural engineering (P/A, April 1974, p. 82, "Design Approach to Fire Safety in Buildings," by T.Z. Harmathy). The steel and concrete industries are leading the way in modeling, engineering analysis, and design by computer. When the computer modeling of fire reaches the sophistication that it must eventually reach, it will be inserted directly into any structural model and possibly a future computer model, which will incorporate all structural materials as well as all potential loading and hazards. Indeed, the computer has already opened doors that were impossibly time-consuming and complex to open because of the dynamic nature of the fire load.

Underwriters Laboratories' Tom Castino sees great potential for the computer in fire analysis and engineering, and explains: "Full application of these techniques is years away." The significance of UL's enthusiasm could mean a strong thrust towards predictive standards to augment prescriptive ones.

A computerized control system enables the owner to monitor or control any device which can be activated by a small electronic impulse. In very large systems, the security, fire protection, and mechanical equipment can all be controlled from a single station. In smaller systems dedicated to fire alone, all of the electronically activated fire protection systems can be programmed into a single console.

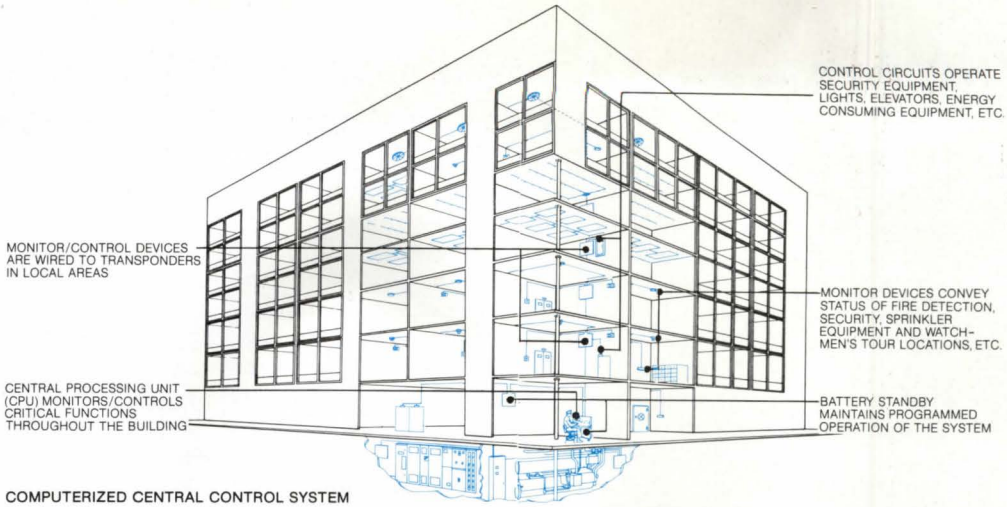
Central control: As important as computer technology must eventually be in the design of fire-safe structures, the industry gives equal importance to the effects of the microprocessor and microelectronics on the "active" role which fire protection products play. As the costs of all manner of solid-state equipment plummet, so do the costs of computerized central control systems.

Such systems, using modularized circuitry, hold the potential for all of the fire, security, and energy sytems to be monitored from a central control station. Any task which can be accomplished with a small electrical impulse can be monitored or controlled from the control panel of such equipment. Of course, all of these functions need not be contained in one unit. Where fire control is the only requirement, it is possible to monitor the use and maintenance of the fire detection devices, alarms, sprinkler system, smoke vents, smoke-actuated door closers, elevators, mechanical systems, and lighting, and also provide telephone communication or audio instructions to the occupants. A rechargeable battery provides fail-safe continual service.

The control panel itself provides instantaneous information to the fire fighter. By observation of what detector, alarm, or sprinkler has been activated, the fire fighter can diagnose the location of the fire and probably how hot it has become. In many of the larger installations, the fire fighter can also take positive fire-fighting actions with push-button speed.

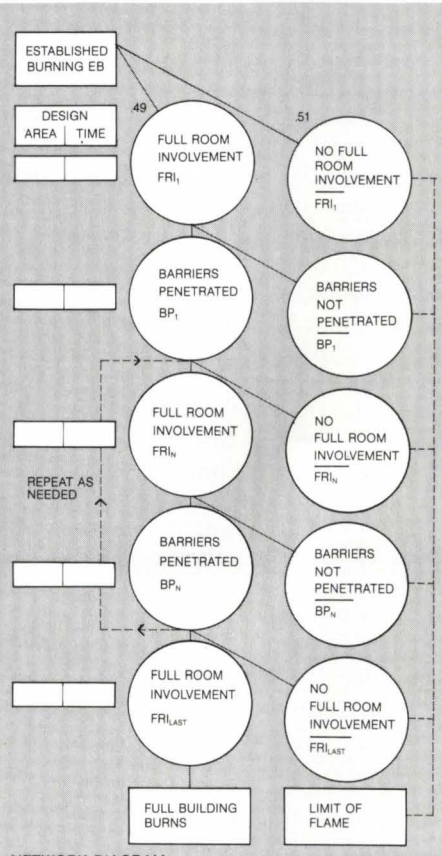
The fire protection engineer

A final significant historical development in fire protection in the past decade has been the growth of fire protection as an educational discipline which is taught, learned, and practiced as Fire Protection Engineering. The University of Maryland has an accredited degree program in Fire Protection Engineering. Illinois Institute of Technology and Worcester Polytechnic Institute also have extensive programs. WPI's Center for Fire Safety Studies will be running a Master of Science in Fire Protection Engineering program starting this fall.

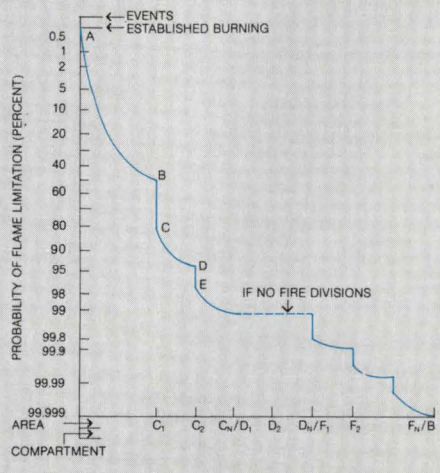


Simplex Time Recorder

COMPUTERIZED CENTRAL CONTROL SYSTEM

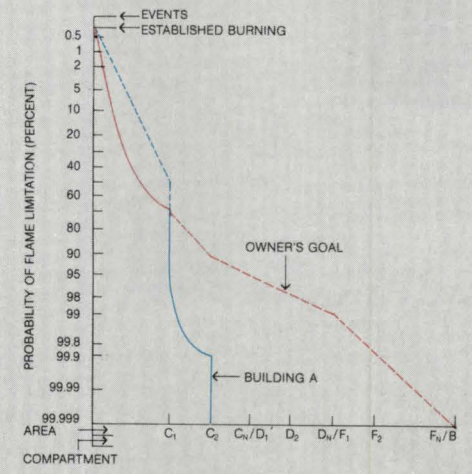


NETWORK DIAGRAM

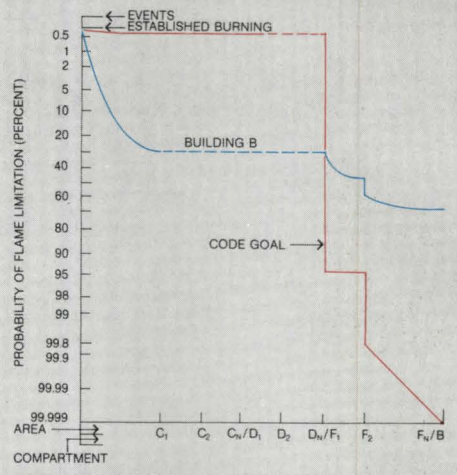


NOTATION TERMINOLOGY
L:LIMIT
R:ROOM
C:COMPARTMENT
D:FIRE DIVISION (2 ENERGY HOURS)
F:FLOOR
B:BUILDING

FIRESAFETY EVALUATOR 3, CUMULATIVE LIMIT OF FLAME MOVEMENT : SAMPLE BUILDING DESCRIPTION



FIRESAFETY EVALUATOR 3, CUMULATIVE LIMIT OF FLAME MOVEMENT: COMPARISON OF BUILDING A WITH OWNER'S GOAL



FIRESAFETY EVALUATOR 3, CUMULATIVE LIMIT OF FLAME MOVEMENT : COMPARISON OF BUILDING B WITH CODE GOAL

The "L curves" shown above demonstrate the descriptive capability of the system. Each protective strategy has value in increasing the probability of extinguishment and slowing the flame spread of the fire. A horizontal line is uncontained fire spread. A vertical line is a wall or other containment strategy. By evaluating each element of a design with the balloon chart such as that shown above, the owner's desires, code requirements, and design options can be graphically compared.

Rexford Wilson

A hybrid trained in the basics of all building construction engineering, the fire protection engineer has been employed for insurance inspection and loss prevention for the last 30 or 40 years. In the last decade, however, the role of the fire protection engineer as part of the architectural team has increased to the point where good fire protection engineers who "speak architecture" are in great demand. One of the largest and oldest FPE firms is that of Chester Schirmer in Chicago. Says Schirmer, "There are not enough FPEs to deal with all of the buildings. There is a crying need for FPEs."

Another prominent FPE is Rolf Jensen of Chicago. Jensen can still recall the humble backroom beginnings of his national chain of offices while he was still teaching at the Illinois Institute of Technology. Says Jensen simply, "I walked into a void." He traces his success to the ability to say yes to architects. Architects were so accustomed to hearing fire experts tell them they could not do something that Jensen's positive approach, "let's tell him what he can do," rapidly delivered loads of business into his hands.

Today, most large buildings have a fire protection engineer. Rolf Jensen, for example, has done Chicago's Watertower Place and McCormick Place. Chester Schirmer did the fire protection for the Sears Tower. Boston fire protection engineer Rexford Wilson served as the FPE for the John Hancock building in Boston, the innovative Hyatt Regency Hotel in Cambridge, and the new Children's Hospital in Washington, DC.

Of course, large buildings are not the only ones which require assistance of a fire specialist. Any architect who demands a variance from a code may seek such aid either for the purpose of justifying his design to the code officials or—even better—to help create an effective design from the beginning. Most fire protection engineers agree that the code is the last thing they look at when they help design the fire protection of a building. *First they produce a safe and effective design, then they match it to the code or seek a variance.*

Design methodology: In the field of fire protection engineering, the last ten years have begun to see the emergence of a framework that may eventually offer a commonality to all such designs. This methodological tool is called the "L Curve." It was originally conceived in the early 1970s by Harold Nelson, at NBS, and has been simplified and enhanced through the work of Rexford Wilson and others. According to Wilson, "Fire behaves by scientific laws and can be engineered and designed rationally."

The "L curve" is the graphic representation of the fire protection design. By plotting the fire spread versus the probability of extinguishment, all detection, suppression, and containment possibilities are given values with regard to extinguishing the fire. Using such a curve, the building code and insurance requirements can be graphed, the clients' ideal design goal can be shown, and the different design system possibilities can be drawn. The effects of each individual ingredient of the system can be clearly represented. While the specific effect of each is dependent upon a value judgment, Wilson has found remarkable agreement among designers as to the values attributed. Wilson explains: "We can't tell where the fire will start, but we can tell where it will stop." A fire protection methodology textbook is being developed under the auspices of the Society of Fire Protection Engineers. It is being written by Robert Fitzgerald and coauthored by Rexford Wilson and Rolf Jensen.

At the other end of the fire protection engineer's role is a negotiating function: get the building accepted by the code official. Explains Schirmer: "We speak the same language as the code official." More often he deals with a committee. He continues, "More and more building officials want to go to a board of appeals." Even more generally the fire protection engineer plays an active role in codes and standards writing on various levels. This also requires a great deal of judgment and no small amount of persuasion.

Sprinklers: Problems or solutions?

Today's struggle over fire protection incorporates most of the "active" elements of fire protection and centers around suppression and detection.

The sprinkler as a fire-suppression device is over 100 years old (P/A, April 1974, "The Schoolhouse is Raining," p. 93). Its history includes myriads of ingenious attempts at the most effective sprinkler head design. The record of the sprinkler in the industrial sector of building design has been so impressive that it has been a common means of property protection for many years. The sprinkler is a tool that is designed to interrupt the burning process before a room becomes fully involved in fire. Says Chester Schirmer: "A fire protection engineer without a sprinkler system is like a carpenter without a hammer and saw. Sprinklers aren't the only tools, but they are the most important ones."

Jack Rhodes of Factory Mutual also lauds them: "Sprinklers over the years have proven themselves." Factory Mutual has promoted the sprinkler actively and even played the key role in designing the sprinkler head in 1950 which soon became the model for the conventional standard heads available today.

A sprinkler head is quite simple in construction. Simplicity is a necessity. Not only must the head be dependable and inexpensive to construct and maintain, it must, above all, be effective at suppressing the fire beneath it (and last at least 50 years).

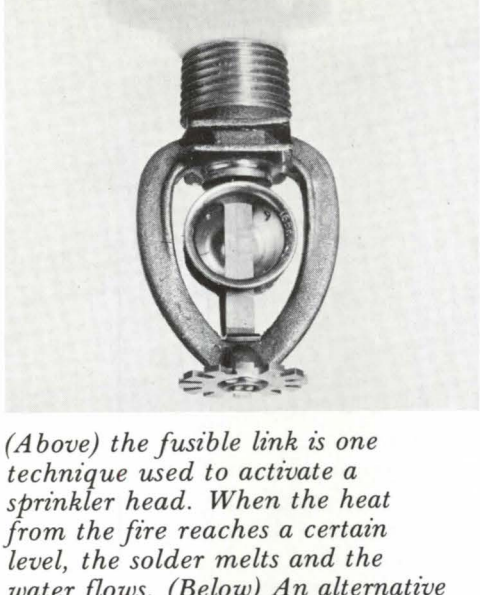
There are four basic configurations for a sprinkler head. It can be designed to hang down and discharge its spray directly downward; it can point upward and reflect the spray downward; it can reflect the spray to one side. It can incorporate a mask of some type that will drop away when heated and allow the resulting exposed head to activate. Each head has a fan-shaped reflector which controls the shape of the spray.

Sprinkler systems are either dry pipe or wet pipe. A wet pipe system, as the name implies, is constantly filled with water and discharges immediately from sprinklers opened by fire. A dry pipe system is used primarily in freezing conditions and is filled with a pressurized gas (air or nitrogen) which discharges before releasing the water.

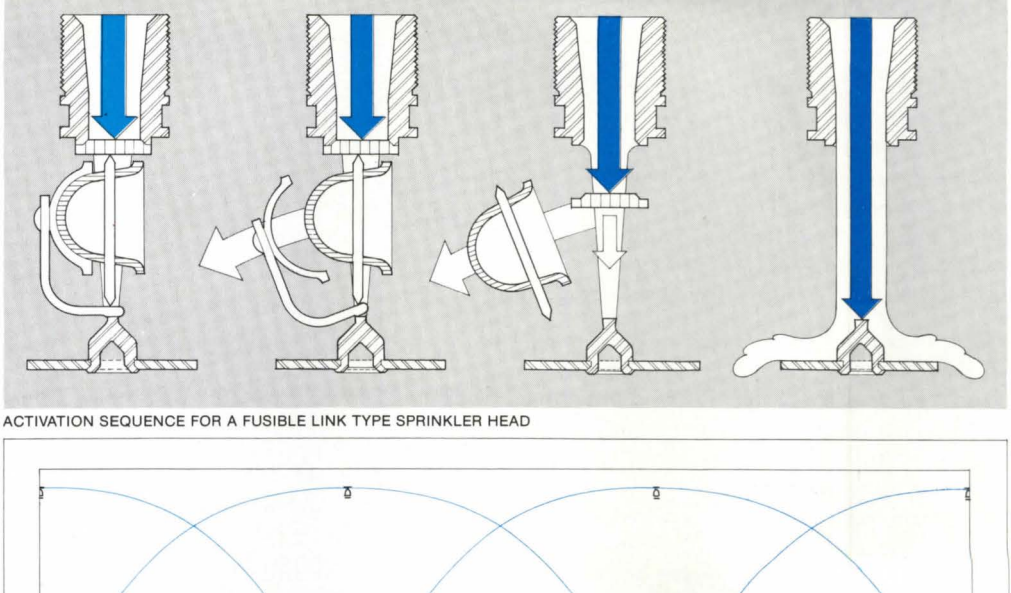
The key to each sprinkler head is the temperature-sensitive mechanism which releases the flow of water. There are two main types of fixed-temperature systems: a fusible link and a glasslike bulb filled with liquid. The fusible link involves two small metallic elements soldered together. When the temperature rises to a certain degree, the low-temperature solder melts and the link separates, releasing the water. With the bulb option, the liquid heats up, expands, breaks the bulb, and releases the water. By varying the kind of solder used or the liquid in the bulb, the temperature of actuation can be altered. It is also possible to activate many sprinklers with a detecting device that triggers them based on the rate of change of temperature.

Most sprinkler systems are designed so that each head is independent of the next. It is quite common for only two or three heads to be used to suppress a fire and limit fire damage. Systems can also be devised that permit a "deluge" of water from a number of heads at one time for a high-hazard situation.

The classic problem with sprinklers has always been reliability. Not only the mechanical reliability, but the possibility of human failure either to maintain the system properly or to turn it on again after it is turned off temporarily. It is also possible for

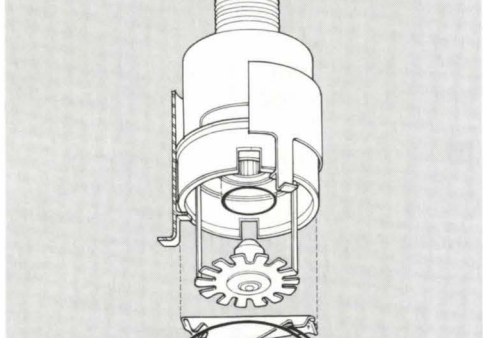


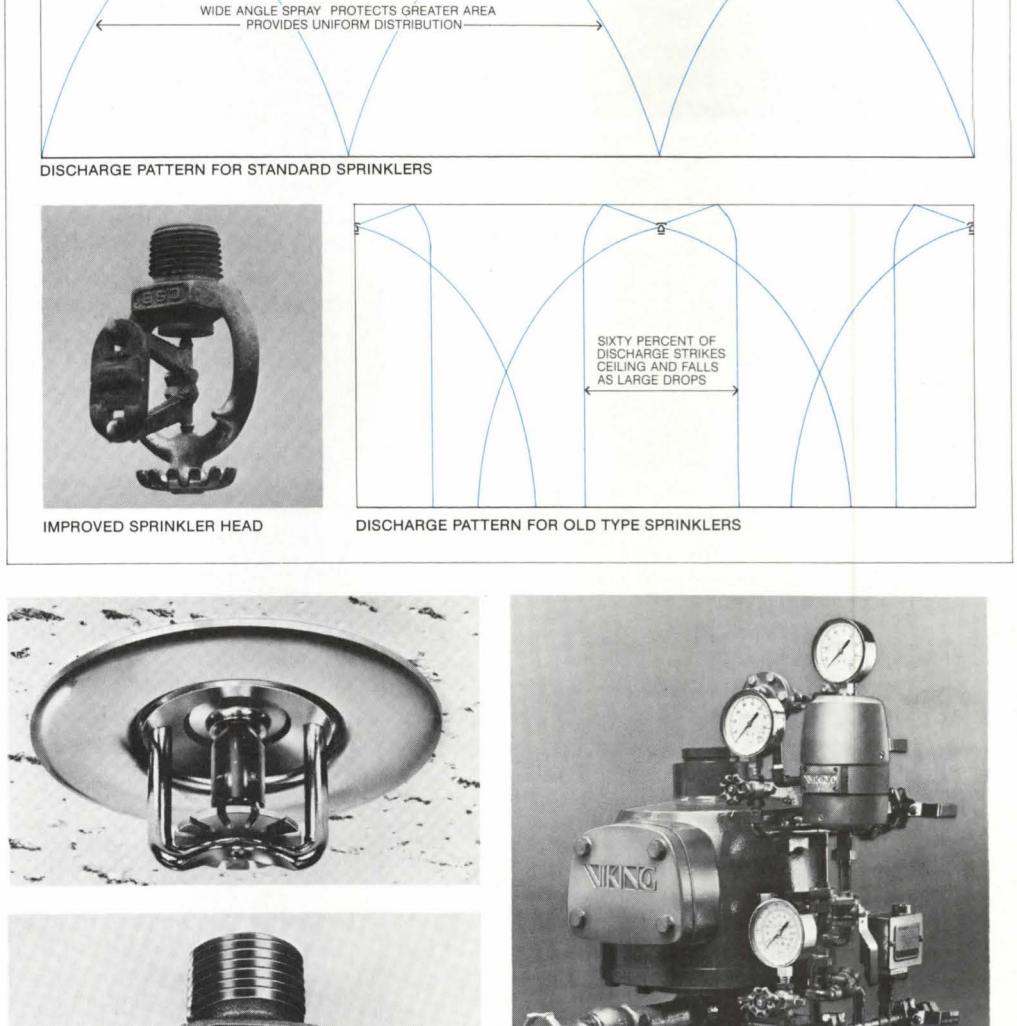
Grinnell



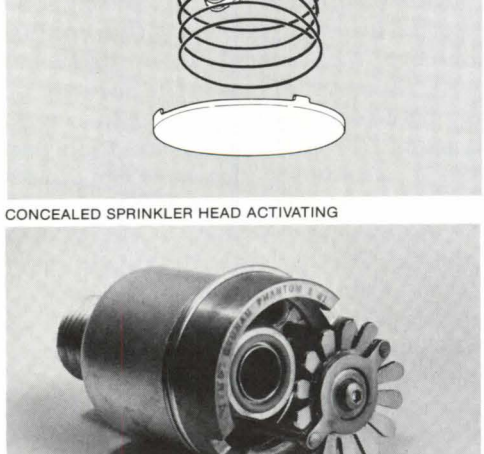
ACTIVATION SEQUENCE FOR A FUSIBLE LINK TYPE SPRINKLER HEAD

(Above) the fusible link is one technique used to activate a sprinkler head. When the heat from the fire reaches a certain level, the solder melts and the water flows. (Below) An alternative design shields the head from view until it is needed. (Right) Research at Factory Mutual in the early 1950s yielded a design with improved spread and coverage of fire. Older methods relied on the ceiling to serve as a reflector for spray.



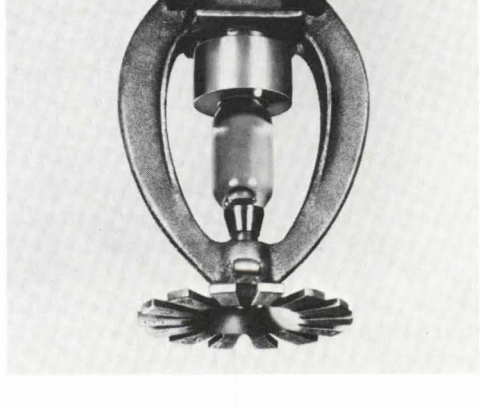


Factory Mutual

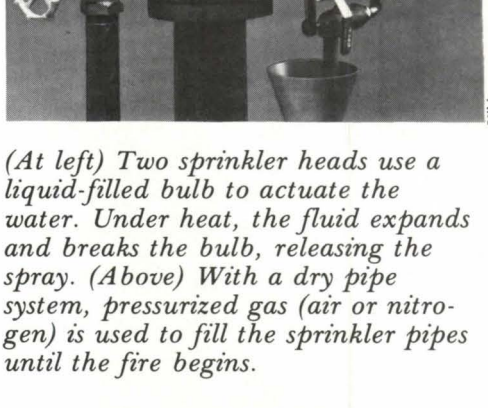


CONCEALED SPRINKLER HEAD ACTIVATING

Grunau



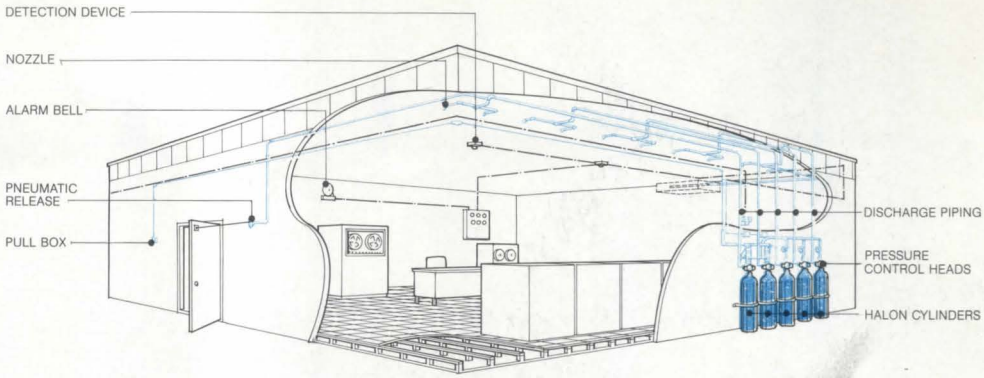
Grinnell



Viking

(At left) Two sprinkler heads use a liquid-filled bulb to actuate the water. Under heat, the fluid expands and breaks the bulb, releasing the spray. (Above) With a dry pipe system, pressurized gas (air or nitrogen) is used to fill the sprinkler pipes until the fire begins.

One solution to fire protection for a computer room is to use Halon gas in pressurized tanks instead of water. The gas reduces combustion while still supporting life. It is also widely used where irreparable damage would occur by actuating conventional water-charged automatic sprinklers.



COMPUTER ROOM PROTECTION SYSTEM USING HALON 1301 Fenwal

temperature-sensitive heads to do extensive water damage due to false alarms or vandalism. In computer areas, nervous owners frequently seek other suppression alternatives to augment water systems.

In the past, sprinkler systems were about the most effective means available for protecting property, especially in factories and industrial situations. In recent years, several forces have brought them into commercial buildings, and now there is interest in bringing the sprinkler into the one- and two-family dwelling. When the sprinkler enters these new sectors, it does so usually at the expense of some other device or material in order to provide the economic incentive. The good suppression potential it carries over from industry buys time for the escape of occupants and the arrival of the fire department.

No sprinkler system, however, was ever been devised to be independent of all other types of fire control. It therefore must play a role in a larger scheme that includes the safety and egress of the people within the building and attempted suppression or containment of the fire.

If the sprinkler system does work at wetting the fire and the surrounds, it also has served to contain the fire. If this is accepted as fact, then one could quite logically reduce the necessity for fire containment in the envelope in the space; i.e., a lower fire rating all around. A glass wall, for example, will contain the smoke if a high fire rating is not necessary. One could also argue that a working sprinkler will add escape time for the adjacent spaces and allow increased egress distance. Here are some of the other areas of dispute:

Sprinkler tradeoffs: Local Law Five of New York City specifies, among other things, that any building over 100 ft high have floors which are either sprinklered or divided into compartments no bigger than 7500 sq ft. The Life Safety Code is another example. It designates four options for an apartment building: 1 No sprinkler, no complete detection. 2 Total detection. 3 Sprinkler in corridor and just inside the door. 4 Total sprinkler. All the options have different complementary compartmental, egress, and smoke control elements.

The concrete industry, segments of the masonry community, and the manufacturers of spray-on fireproofing or other forms of fire protective encasement of steel beams all object to trading off any form of "passive" fire protection, citing the importance of the structure of the building, the imperfection of any mechanical system, and the possibility of arson, explosion, or earthquake. They would use sprinklers only for secondary defense.

Automatic smoke vents: If both a smoke vent and a sprinkler system exist in a space, the sprinkler is usually heat activated but the vent can be activated manually or by either smoke or heat. When they are both heat-activated (P/A, April 1972, p. 114) the question is, which one should activate first. If the sprinklers go off first, the temperature in the space may be reduced and the vents may never open, and vice versa. One device may reduce the effect of the other. Of course, the vent has the added advantage of enhancing fire fighting access. Both devices can be activated simultaneously at added cost.

Automatic door closer: The door closer dispute centers around the hospital and health care center (P/A, Sept. 1976, p. 58). For nearly all hospitals, sprinklers are required in the halls, and in many cases also in the rooms. These same hospitals have smoke-activated automatic door closers in the halls to contain the smoke. The question is, should the room door also have a smoke-activated automatic door closer as replacement for or in addition to the sprinkler? The answer to any health facility's fire protection seems to depend very much on the specific situation. What is the relative mobility of the occupants? How many people can occupy the room? Is smoking permitted in the room? How large is the staff and how frequent are the rounds? What kind of trash containers or ash trays are used? What is the material composition of the mattress? What kind of fire load do the other furnishings represent? The Southern Building Code has apparently given its reponse to all of these questions and is moving to replace automatic door closers in institutions with sprinkler heads.

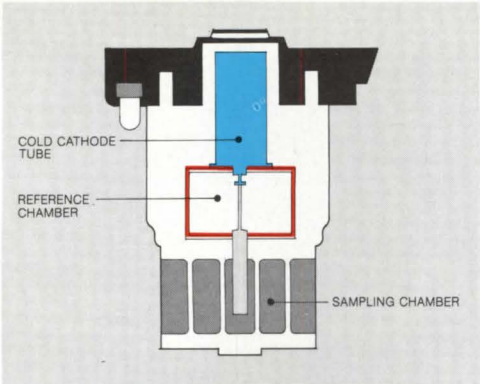
Residential sprinklers: Because of the enormity of the fire problem in residences, the U.S. Fire Administration has recently been sponsoring the testing of sprinklers for residential use. NFPA, UL, Factory Mutual, and NBS have all participated, as have the Los Angeles Fire Department and others. In order to accommodate residential uses, a new sprinkler head must be developed which is smaller and faster than existing versions. The system must be inexpensive to install and operate at conventional house water pressure. It could be located in those areas of high risk, such as the furnace room, kitchen, bedroom, and living room. Of course, there is an additional cost to the consumer. The USFA estimates the expense to be around 1 percent of the house cost. That cost must be justified.

Because the head is reduced in size, a new type of trigger mechanism must be created. Only two manufacturers have acknowledged that they are working on a potential design of the residential sprinkler head. Factory Mutual, however, has done extensive research on the head design already.

Opponents allude to the danger of false alarms and the liability to insurance companies for an intentional false alarm. They point out that in the residence, the smoke detector may economically compete with the sprinkler. The detector is at present cheaper and runs no risk of false alarm damage. Should the house, ideally, have both? There are many other questions. One is the region and climate. Is the house dry and fire prone? What are the materials of construction? How close is the nearest fire department?

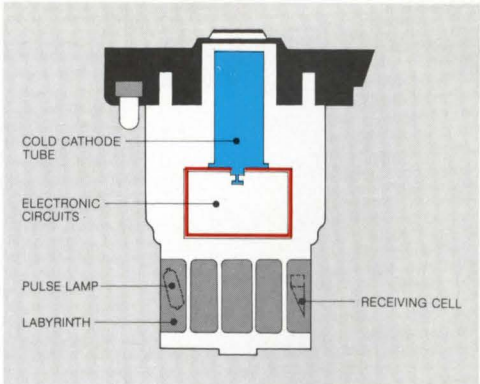
The City of San Clemente, Ca, has recently adopted an ordinance which requires automatic sprinklers to be installed in every new home. Down the road, the emphasis is on smoke detec-

P/A with the aid of Pyrotronics



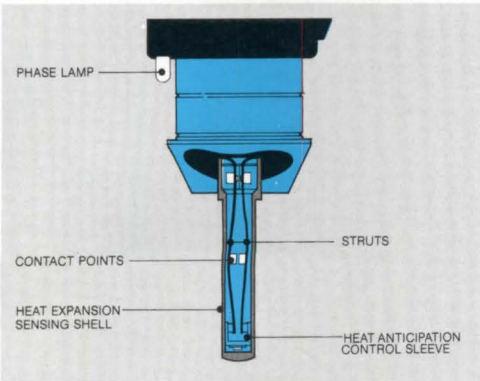
IONIZATION TYPE OF SMOKE DETECTOR

A. Most common application: Rapid detection of visible smoke and flame in: private residences and apartments, hotels, museums, nursing homes, computer rooms, power generating stations, and equipment rooms, etc.



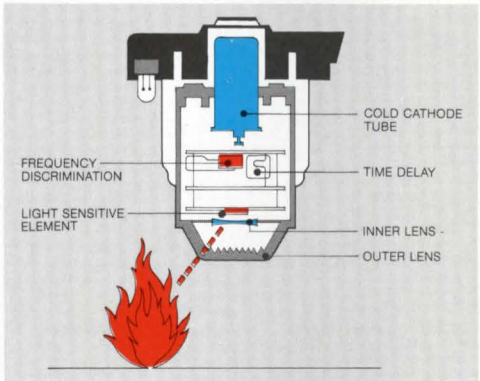
PHOTOELECTRIC TYPE OF SMOKE DETECTOR

B. Most common application: Detection of large quantities of visible smoke in: residences, underfloor space in computer rooms, equipment rooms, generator rooms, cable tunnels, etc.



RATE COMPENSATING THERMAL TYPE DETECTOR

C. Most common application: Commonly used in restaurant cooking facilities, occupancies of public gathering, laboratories, or industry, etc.



FLAME ENERGY ACTIVATED (INFRARED) DETECTOR

D. Most common application: Wherever volatile liquids are a hazard: aircraft hangers, oil pumping stations, pipe lines for gasoline, oil, or kerosene, etc.

TYPICAL DETECTOR CONFIGURATIONS
AN OVERVIEW OF DEVICES USED FOR EARLY DETECTION OF SMOKE OR FIRE

DETECTING DEVICES

SMOKE ACTIVATED DETECTORS
The smoke detector is designed to respond to the visible or invisible products of combustion.

A. Ionization Type: This type of detector responds when minute combustion particles enter an ionized sampling chamber and interrupt a small current between electrodes.

B. Photoelectric Type: Most detectors of this type are operated by the refraction of light caused by smoke particles (the Tyndall principle), or the interception of light falling on a photo cell.

THERMAL ACTIVATED DETECTORS
C. The presence of heat causes the expansion of solid materials or air and effects the speed of detector response depending upon its mechanical design. Such design is the key to thermal detectors and there are a number of different strategies. They are designed to either be sensitive to a fixed temperature, which when reached will sound an alarm, or to a rapid rate of change in temperature (rate compensating). They are the oldest type of detectors.

FLAME ENERGY ACTIVATED DETECTORS
D. Such detectors are able to sense the invisible presence of light generated by flames or combustion. An infra-red detector contains a series of lenses in combination with a frequency discriminatory device and is able to distinguish the presence of flickering flame. Ultra-violet light detectors are also available which can detect ultra-violet forms of light generated from combustion, even in full sunlight.

tors. The City of Los Angeles has passed City Ordinance No. 153,849, which requires that "every dwelling unit, efficiency dwelling unit, guest room, and suite in a building . . . shall be provided with smoke detectors." A similar smoke detector ordinance exists in Montgomery County, Md.

Where do you stand?

Where does *Progressive Architecture* stand on these issues? Where can any designer, code official, or fire marshall stand? The only place to stand is in the middle, and to the side of redundancy of system and safety. As this article we hope demonstrates, the problem of fire protection is truly a design problem. It is a problem of judgment entrenched in the specifics of the situation and dependent upon as much knowledge of that situation and the technologies involved as possible.

There are very clear "political" overtones to many of the fire protection questions discussed here. They continue to be political rather than purely scientific or even engineering realities because someone must make a judgment somewhere between the probability of a fire happening at all, and how much of a life-safety and financial wager deserves to be placed on that eventuality. No test is accurate enough to measure the response that any particular building will have to any particular fire. We can, however, ensure that enough redundancy exists that the odds are very good we can handle most fires. As Rolf Jensen states it, most buildings can be "grossly safe."

The truth is that if architects knew as much about fire as code officials, fire researchers, and fire fighters do, they would be trapped in a design process for each building that would probably take years to consider fully. When there is no broad base of scientific fact that makes a decision absolute, judgment must prevail. When this occurs, architects rely on their consultants, as well as the rest of the whole political, technological, and economic machine that is the fire industry. The center of that issue is trust.

Are you confident that the rest of the fire industry has nothing but the safety of individuals and the property of your client in mind? If you cannot put your trust in the good intentions of the rest of the industry, all that is left is your knowledge, your judgment, and your responsibility to get involved and change things. [Richard Rush]

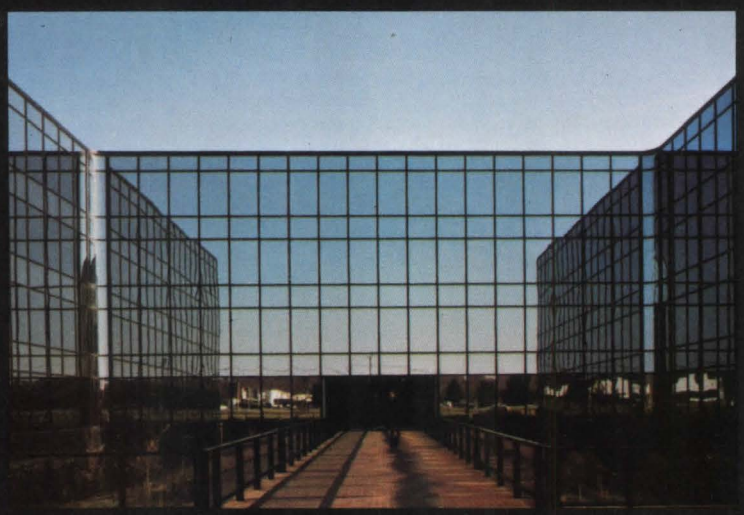
Acknowledgements

We wish to thank the following individuals, organizations, and manufacturers for sharing their opinions and knowledge with us: Albi Manufacturing; Algoma Hardwoods; AISI; Automatic Sprinkler System Corp. of America; BRK; Bilco; Cal-Wood; Cookson; Douglas Randall Div. of Kidde; Dualite; E.I. duPont de Nemours & Co.; Factory Mutual Engineering; Federal Signal Corp.; Fenwal Div. of Walter Kidde; Flintkote; W.R. Grace; Grinnell Fire Protection Systems Co.; Grunau Co.; Armand Gustaferro; Honeywell; Industrial Risk Insurers; Inryco; Rolf Jensen; Johns-Manville; Johnson Controls; Walter Kidde & Co.; Kinnear; Mesker; National Automatic Sprinkler & Fire Control Assn.; NBS; National Cellulose; NFPA; New York Fire Department; PCA; PCI; Pyrotronics; Reading Door Closer Corp.; Republic Builders Products; Rixson-Firemark; Robertshaw; Rusco; Chester Schirmer; Simplex Time Recorder Co.; Smoke Control Assn; SPI; 3M; Underwriters Laboratories; U.S. Fire Administration; U.S. Gypsum Co.; The Viking Corp.; Von Duprin; Rexford Wilson; Witco Chemical Corp.

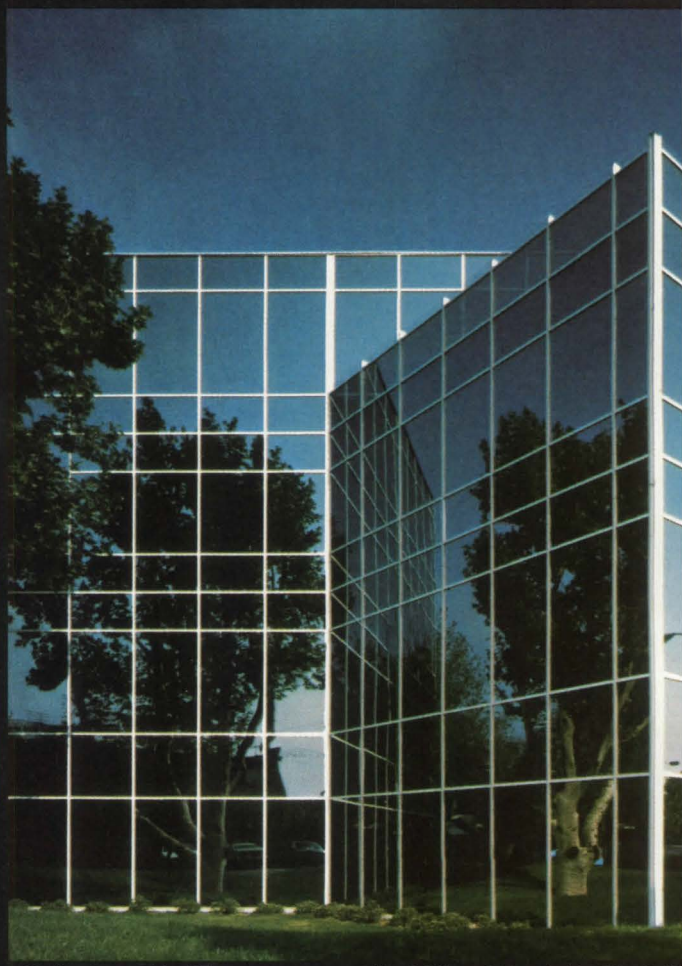
For Fire Protection product and literature information see p. 108.

Guardian reflective glass:

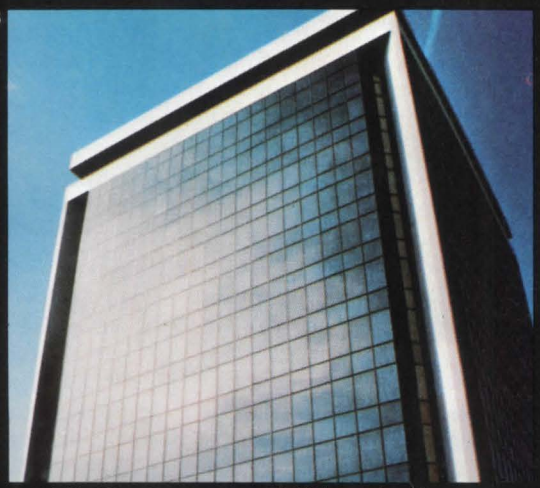
1,2



3,4



5



1. Melville Office Plaza
Melville, Long Island, New York
Arch: J. Grammas & N. Green
Glaz. Contr: Levitt Bros.
SS-8 Silver Reflective

2. 3D/International Tower
Houston, Texas
Arch: 3D/International Inc.
Glaz. Contr: Cupples Products
SS-14 Silver Reflective Insulating

3. Bingham Farms Office Bldg.
Bingham Farms, Michigan
Arch: Seymour J. Levine
Glaz. Contr: Benz Glass
TE-10 Earthtone Reflective

4. Four Seasons Office Building
Sherman Oaks, California
Arch: Landau Partnership
Glaz. Contr: Sitelines
SS-8 Silver Reflective

5. Fluor Arabia Office Build
Al Khobar, Saudi Arabia
Arch: Welton Beckett Ass
Glaz. Contr: Cupples Prod
TE-10 Earthtone Reflective

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5th Avenue Office Bldg.
gary, Alberta, Canada
h: Dale-Chandler-Kennedy
z. Contr: Zimmcor Co.
3 Silver Reflective

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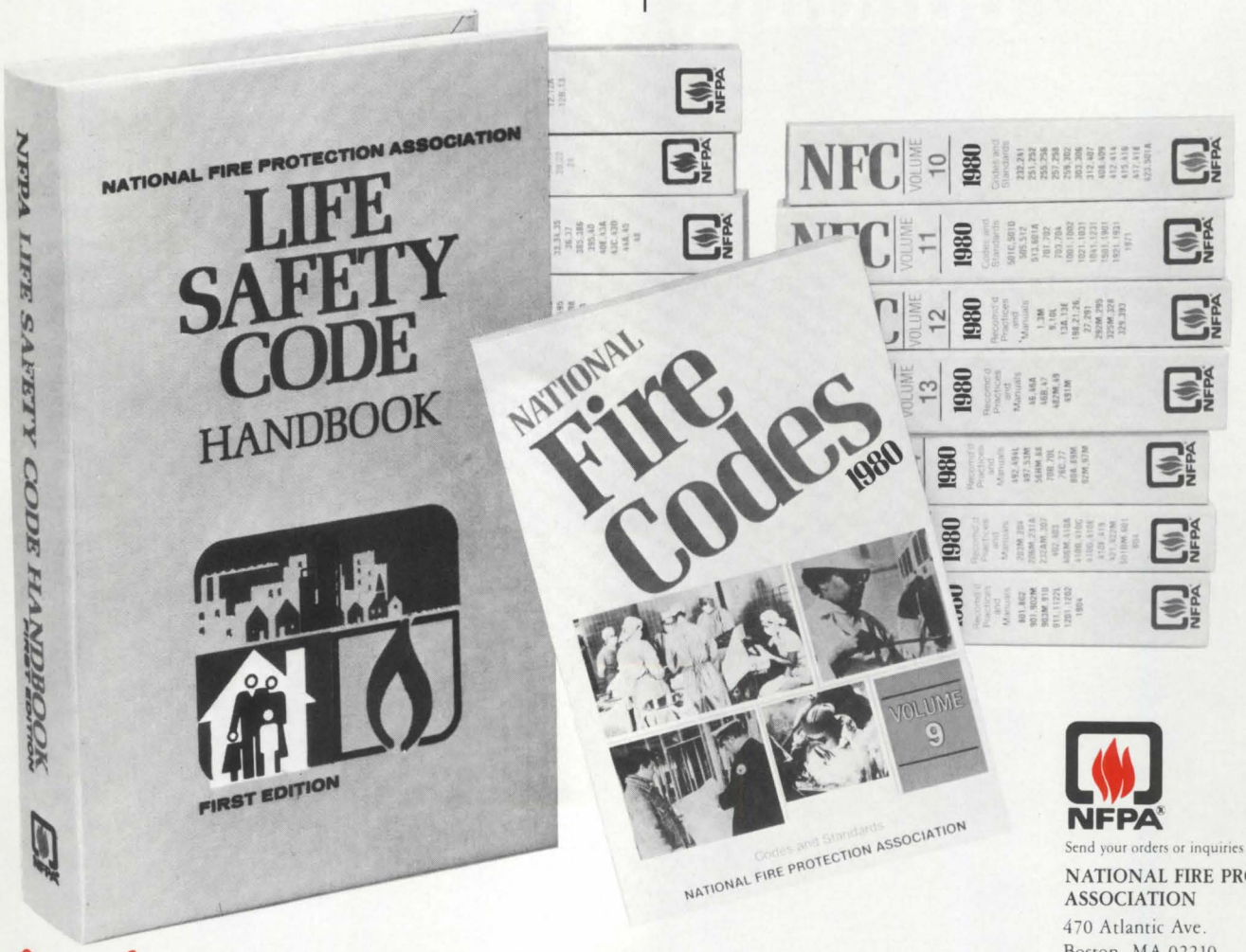

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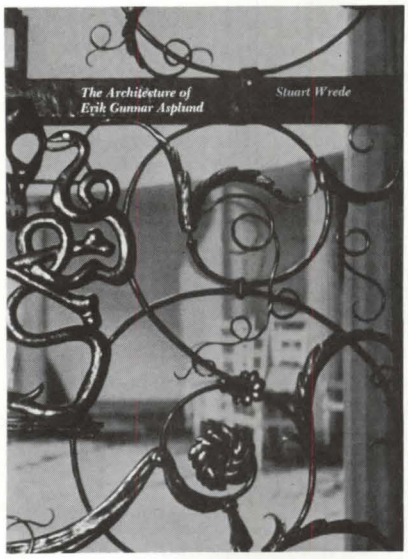

The Architecture of Erik Gunnar Asplund *by Stuart Wrede. Cambridge, Ma, MIT Press, 1980. xviii, 258 pp., illus., $25.*

Reviewed by Leonard K. Eaton, professor of architecture, University of Michigan, Ann Arbor.

This volume is probably the first biography of a significant modern architect which sees its subject as a proto-Post Modernist. Its author, Stuart Wrede, has been a visiting critic and instructor at several American colleges and universities, including Columbia, and Professor Kenneth Frampton of Princeton has written a foreword. The tone of the book is academic but not dry. It will be an important addition to the small, but rapidly growing number of works in its category.

Erik Gunnar Asplund was born in 1885 and died in 1940 at the height of his career. Famous for a few brief years in the 1930s, he is certainly a worthy candidate for the respectful treatment which this biography accords to him. At the time of his death, he was the leading Swedish architect and especially well known for the Woodland Crematorium outside Stockholm. This design, which at first glance seems to belong to the International Style, on close examination turns out to be much more Neoclassical in feeling. Here it is well to note that the commission was originally given jointly to Sigurd Lewerentz and Asplund and that the former had an important influence on the planning. To this work, which remains one of the finest pieces of architecture in the 20th Century, must be added two other significant buildings of the 1930s: the State Bacteriological Laboratories, the commission for which Asplund won in an invited competition of 1933, and the Law Courts Annex of Gothenburg of 1934–37. For all of these buildings Wrede makes the kind of interpretation which we have come to associate with the Post-Modern critics. The bacteriological laboratory is seen as a joint refrigerator which becomes ". . . in the context of its times, a monument of our modern power over life and death, its dominating form within the space equivalent to the interior stupas in the early Buddhist cave temples in India" (p. 155). This same kind of symbolic interpretation is extended to the Law Courts Annex, where the lamps ". . . clearly allude to the scales of Justice and are the symbolic detail that probably provides the key to an interpretation of the plan of the main floor . . ." (p. 170). So also the curving shape of the main chapel at the Crematorium evokes the burial cave and the womb.

Does this kind of reading of Asplund's major buildings in any way weaken the quality of the book? I would answer that it does not. It is simply an indication that we are in for a new kind of historical interpretation of a great many leading figures of the last 200 years. Technically the book is an outstanding job. It considers Asplund's beginnings in Swedish

[*Books continued on page 106*]

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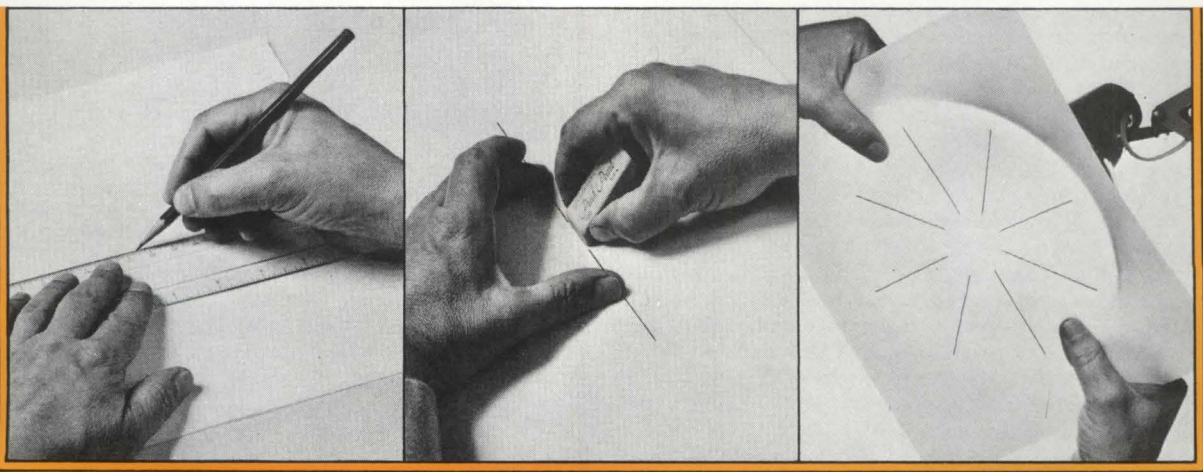

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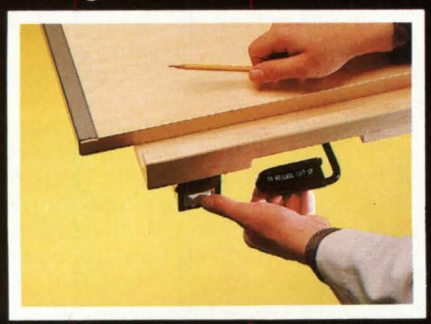

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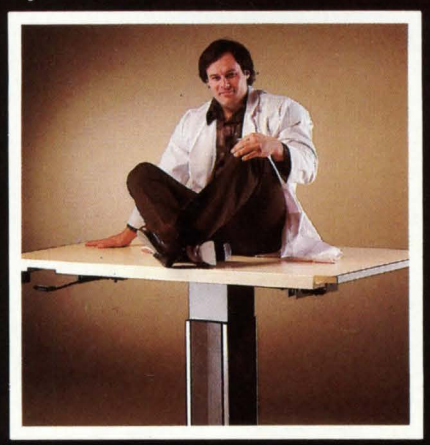

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Books continued from page 103

National Romanticism, his encounters with Le Corbusier and the International Style, and his break from it in the few works which were very much his own in the 1930s. Wrede also stresses his importance as a leader of the architectural profession in Scandinavia and his contacts with the young Alvar Aalto. There is no doubt in my mind that if Asplund had lived he would have gone on to do even finer work. The only emendation I would make is the author's curious failure to note the resemblance between Asplund's Public Library for Stockholm (1926) and Boullée's projects for the City Gates of Paris, which the library recalls more than it does the Newton Memorial, to which it is compared. There is also, as Wrede correctly notes, an affinity with Schinkel.

In format, this book is a model of architectural history. The text and illustrations are beautifully integrated. While few of the photographs are spectacular, all of them are adequate for their purpose and make a clear statement about what is happening architecturally. They are supplemented by numerous plans and drawings, which, by the way, reveal that Asplund was a superb draftsman (one would like to see a volume of his travel sketches). Since most treatments of Asplund up to the present have been in Swedish, this book is particularly welcome. It can be recommended in the highest terms.

Other new titles

Contemporary Architects, *edited by Muriel Emanuel, New York, St. Martin's Press, 1980. 1,000 pp., illus., $70.*
This immense volume puts together for the first time information on the world's foremost contemporary architects. The book contains detailed information on 600 internationally known architects, planners, theorists, landscape architects, and structural engineers. For each person listed, there is a biography, a complete list of constructed works and projects, a signed critical essay, a statement by those subjects living, a bibliography of articles and books on and by the person, and a representative illustration of the person's work. For the purposes of this book, the meaning of the word "contemporary" has been extended to include not only currently active individuals, but also those who have been important to the professions from the beginnings of the Modern movement.

Time-Saving Standards for Building Types, 2nd ed., *edited by Joseph De Chiara and John Hancock Callender. New York, McGraw Hill, 1980, xvii, 1276 pp., illus., $49.50.*
This standard reference source of design criteria for all major building types has been thoroughly revised, greatly expanded, and brought completely up to date. Among the new building types included in this new edition are parking garages, fire stations, police stations, research laboratories, heliports, housing for the handicapped and for the aged, and nature centers. Conveniently arranged in 11 major sections, the reference gives thousands of separate entries covering the full range of questions likely to arise in planning or designing more than 100 major building types. All the basic design criteria needed for a full working knowledge of the functions, organization, and major components of a particular type are also given. The work also provides illustrations, plans, diagrams, schematics, and tables of a great variety, each clearly rendered to help in the design of buildings.

Acoustical Designing in Architecture, *by Vern O. Knudsen, revised by Cyril M. Harris. New York, the American Institute of Physics (for the Acoustical Society of America), 1980, 408 pp., illus. with charts & graphs, $15.*
This classic textbook in the field of architectural acoustics, which was first published in 1950, is now available in a paperback edition. The book has been completely revised for its new edition by Cyril M. Harris to reflect the numerous changes in details of application over the last 30 years. Obsolete material from the original edition has been deleted, and where needed, illustrations have been replaced with recent examples. In some instances, changes have been entered by way of footnotes, rather than by resetting the text, to make the book more available to students by keeping cost down. □

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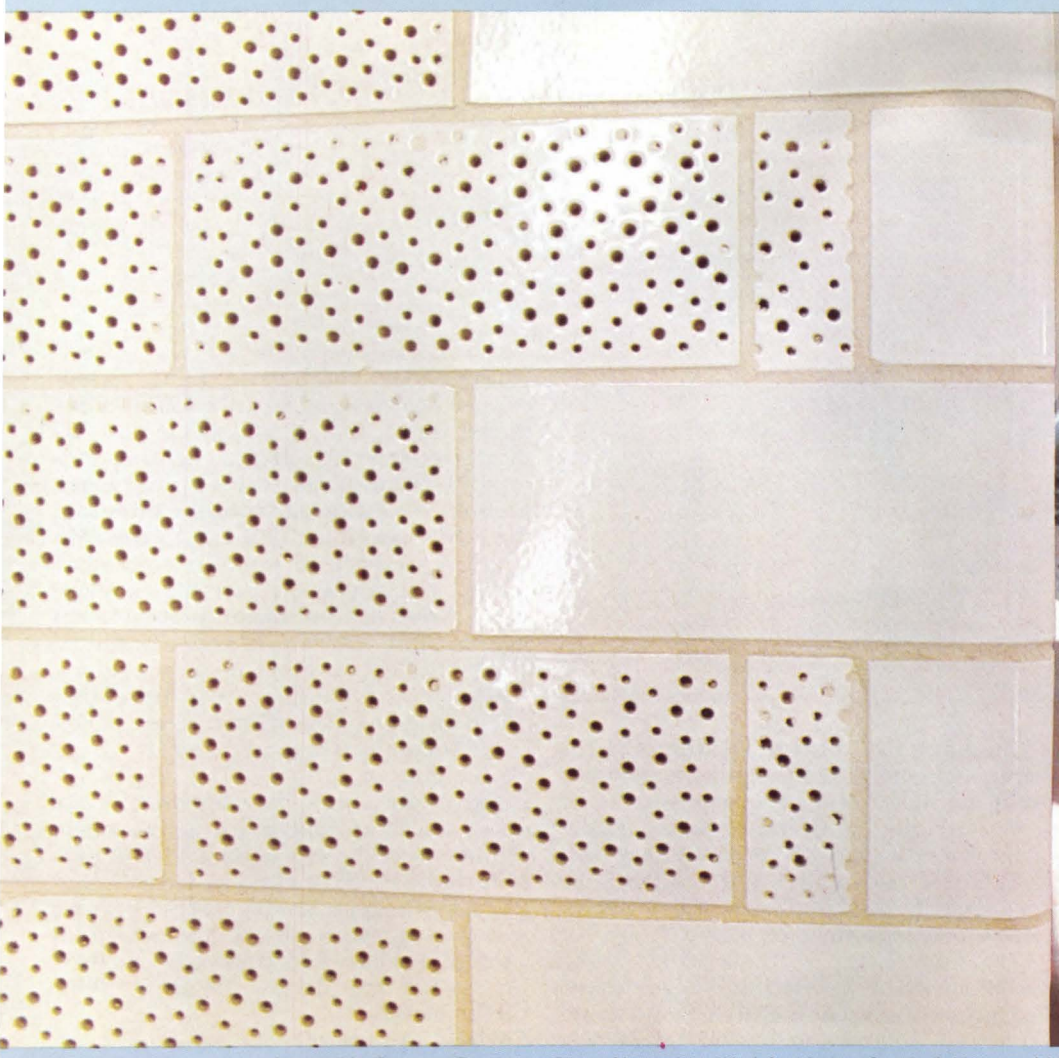

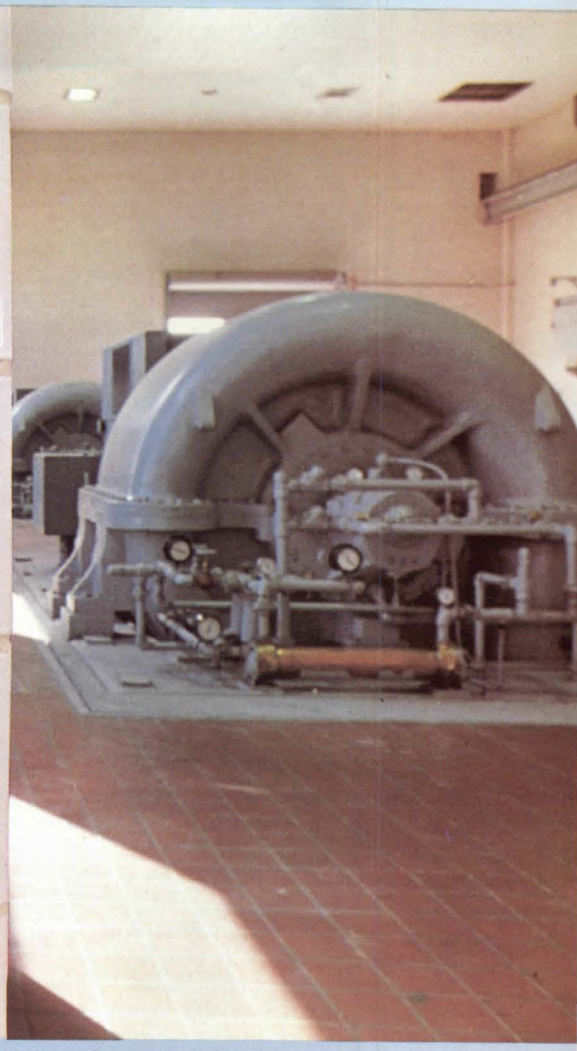

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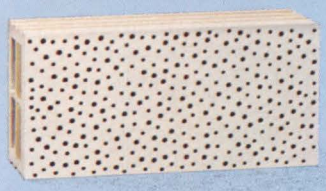

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Products and literature

The following items are related to the technics article about fire protection of buildings. They are grouped here for the convenience of the reader.

Fire safety products

Series 7000 fire alarm systems include 7000, a modular hardwired alarm system that starts with 60 zones and can be expanded as needed; 7500, a two-wire system that monitors up to 250 zones, surveying each zone every five seconds; and 7000 EVAC, an emergency communication system that permits direct voice communication to an individual area without interrupting the standard alarm. Johnson Controls, Inc.
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Halon 1301 fire extinguishant is a liquid that turns to a vapor and works chemically to stop combustion. Unlike water and some chemicals, which themselves can cause damage, the vapor is relatively harmless and can be used to protect electronic equipment, museum contents, bank records and other expensive or difficult-to-replace items. Du Pont Company.
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Firepac® 11 fire protection system is a self-contained system consisting of a smoke detector, a single zone control panel, and a storage container of Du Pont's Halon 1301 extinguishant. Used in a properly designed system, the extinguishant is said to be safe for use in occupied areas. It will protect an area up to 1500 cu ft; two systems can be connected to double the area of protection. Fenwal, Div. of Walter Kidde & Co.
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Fire Barrier FS-195 sheets expand when exposed to heat or flame and act as insulation in floor and wall pokethrough electrical devices. The material's properties are not significantly degraded by exposure to high temperatures, humidity, very dry conditions, or water. When exposed to high intensity heat, it forms a char strong enough to withstand hose stream tests required in ASTM E119. 3M Company, Technical Ceramic Products.
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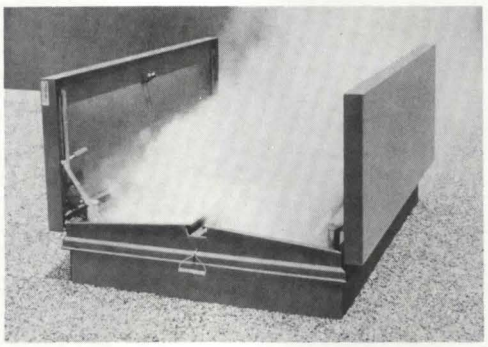

Automatic fire vents open when the fusible link is exposed to a predetermined temperature. Smoke is vented instead of accumulating, and fire is more easily contained within an area. There are single-leaf and double-leaf models, and acoustically insulated ones. Bilco Co.
Circle 104 on reader service card

K-13 spray-on insulation is made up of cellulose fibers, chemically treated to resist fire, combined with a binder during application. According to the manufacturer, the material is approved by Factory Mutual Research Corp. and has a UL Class 1 rating. It acts as a protective coating to delay ignition and reduce surface burning of wood, cellulosic fiber, and combustible cellular plastic building materials. The material also is used on structural steel in conjunction with sprinkler systems to prevent structural failure temperatures in high fire hazard areas. National Cellulose Corp.
Circle 105 on reader service card

The Delta 1000 fire alarm is part of an integrated protection system that includes security and energy management. Zoned smoke and heat detectors pinpoint the fire area. It monitors water pressure and supply valves of a sprinkler system and actuates alarms. It also monitors emergency equipment such as fire pumps and standby generators. It has added functions required for high-rise buildings. Honeywell.
Circle 106 on reader service card

System 3 alarm control monitoring detects fire, supervises alarm systems, reacts to manual alarms, and combines with the building security functions. It can be used in industrial buildings, educational facilities, institutions, nursing homes, and similar installations. Pyrotronics.
Circle 107 on reader service card

Intumescent coatings expand, when exposed to heat, to form a foam. They retard flame spread and keep the surface underneath from heating up rapidly. In addition to providing extra minutes for escaping from the building, the coatings reduce damage to the substrate. There are formulations for interior or exterior use, either flat or semigloss. Areas of application include walls near heating sources, kitchens in the vicinity of cooking ranges, corridors, stairwells, and building exits. Albi Manufacturing Div., StanChem, Inc.
Circle 108 on reader service card

Controls for smoke barrier doors close doors automatically when a fire alarm sounds. Free Swing Model FS101 permits doors to be opened or closed manually. Hold Open Model HO101 permits free passage through the doorway until a fire alarm closes it. Both are UL listed for rated fire doors. Reading Door Closer Corp.
Circle 109 on reader service card

Vonar® interliners can be used in spring construction or foam core mattresses for added fire protection, especially important in nursing homes and hospitals. In early stages of fire, the liner releases water vapor, cooling surrounding materials and reducing oxygen availability. As it burns, it releases flame retardants. In the final stages, it forms a char that protects the inner core of the mattress. Du Pont Co.
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Plenum cable insulated and jacketed with Teflon® is usable in many states without conduit, providing savings up to 50 percent. It is suitable for cables used in communication, security systems, and business machines. According to the company, this is an approved exception to the National Electrical Code, which generally requires cables to be enclosed in conduit. Du Pont Co.
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[*Products continued on page 110*]

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- ☐ Koh-I-Noor Drawing Leads, Lead Holders, Pencils, Pointers, Sharpeners, K-1073.
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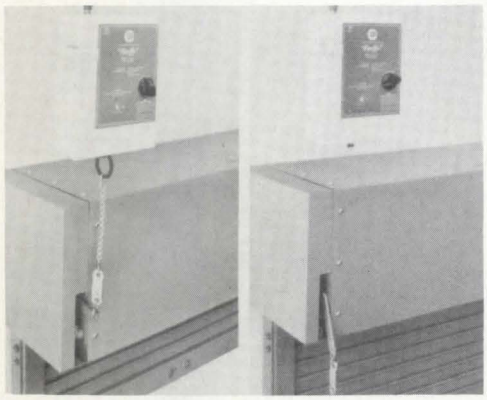
Products continued from page 108

Super Fire-Halt® gypsum board, Type X, has an incombustible gypsum core reinforced with glass fibers. It is suitable for wall and ceiling construction, for column and beam fireproofing, and in special construction assemblies requiring specific fire resistance ratings. Facing can be manila, predecorated vinyl, or gray for use as a backboard. The Flintkote Co., Building Materials Marketing Div.
Circle 113 on reader service card

Zonolite® Monokote® fireproofing is a cementitious plaster that is mixed with water and spray applied directly to steel, concrete, and other substrates requiring fire protection. It provides a hard, dust-free surface that will not crack or spall. It has fire ratings from 1 to 4 hours, depending upon the application. W.R. Grace & Co., Construction Products Div.
Circle 114 on reader service card



"Firefly" latched (l.); released (r.).

Firefly® time-delay release device for fire doors delays action for a preset time up to a minute to allow for the possibility of the alarm's being set off by a momentary blackout or a fire alarm test. It prevents having to reset fire doors because of a short interruption of electricity. The device can be wired into any 115-V fire alarm or smoke detector. The Cookson Co.
Circle 115 on reader service card

Life Alarm® 2001 is a life safety system for fire detection that combines automatic alarm and heat/smoke sensing with prerecorded voice communication directing occupants to a safe area. The fire area is indicated on a master control panel. The system can be combined with portable two-way communication telephones for firefighters to keep in touch with control centers. It can also set off an alarm in the municipal fire station and shut down HVAC systems to slow progress of the fire. Simplex Time Recorder Co.
Circle 116 on reader service card

The Phantom sprinkler head is recessed into the ceiling and is concealed by a flush cover plate. When there is combustion heating, the plate falls away, the link fuses, and the sprinkler deflector drops down. It can be installed easily on wet pipe systems, according to the manufacturer. The cover plate adjusts to standard ceiling tiles and is available in several finishes. Grunau Sprinkler Manufacturing Div.
Circle 117 on reader service card

The KDR-1000 fire alarm system has optional devices such as smoke, flame, and heat detectors and bell, horn, and light alarms. It can activate annunciators, suppression systems, evacuation programs, door closers, and fan switches. Up to 128 zones of protection can be provided. Douglas Randall Div., Kidde, Inc.
Circle 118 on reader service card

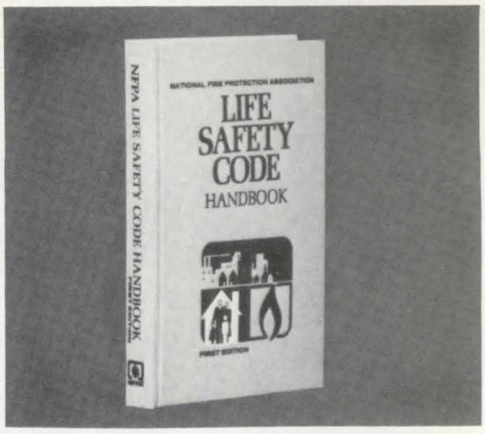
Fire Monitoring System 1000/AC, which operates on existing a.c. power lines, is suitable for new or existing buildings. The manufacturer says that the cost of installation compared with a system having its own wiring is substantially lower. Components include the operator's control module, which provides complete indication and control functions; a printer clock module, which prints a record of all events; and a central processing unit, which receives and analyzes signals from the remote stations. Robertshaw Controls Co., Control Systems Div.
Circle 119 on reader service card

Fire-rated access doors having a UL 1½-hour B rating are suitable for use in wall areas where fire ratings are important. They have continuous hinges for smooth operation, automatic closers, and are self-latching. They come in standard sizes from 12 in. square to 48 in. square and are equipped with flush, key-operated cylinder locks or with direct-action knurled knobs. Inryco, Inc., Milcor Div.
Circle 120 on reader service card

Fire safety literature

Dry pipe sprinkler brochure explains the specific design criteria used in the development of the Latching Differential Valve and describes the difference in operation of various dry valve designs. It includes a description of the accessory components of the company's dry pipe system. The Viking Corp.
Circle 200 on reader service card

Fire Resistance Directory, January 1980, contains designs of columns, beams, floors and ceilings, roofs and ceilings, and walls and partitions that have been tested in accordance with UL 763 (ASTM E119), "Standard for Fire Tests of Building Construction and Materials." It also lists companies that are qualified to use the UL classification mark. The directory is 680 pages and costs $6.75, prepaid. Order from Underwriters Laboratories, Publication Stock, 333 Pfingsten Rd., Northbrook, Il 60062.



Business and Industry Catalog 1980 of fire safety educational and training material has a section that lists publications related to life safety and building design. It includes a description of the Life Safety Code® Handbook, which explains how to meet code regulations. National Fire Protection Association.
Circle 201 on reader service card

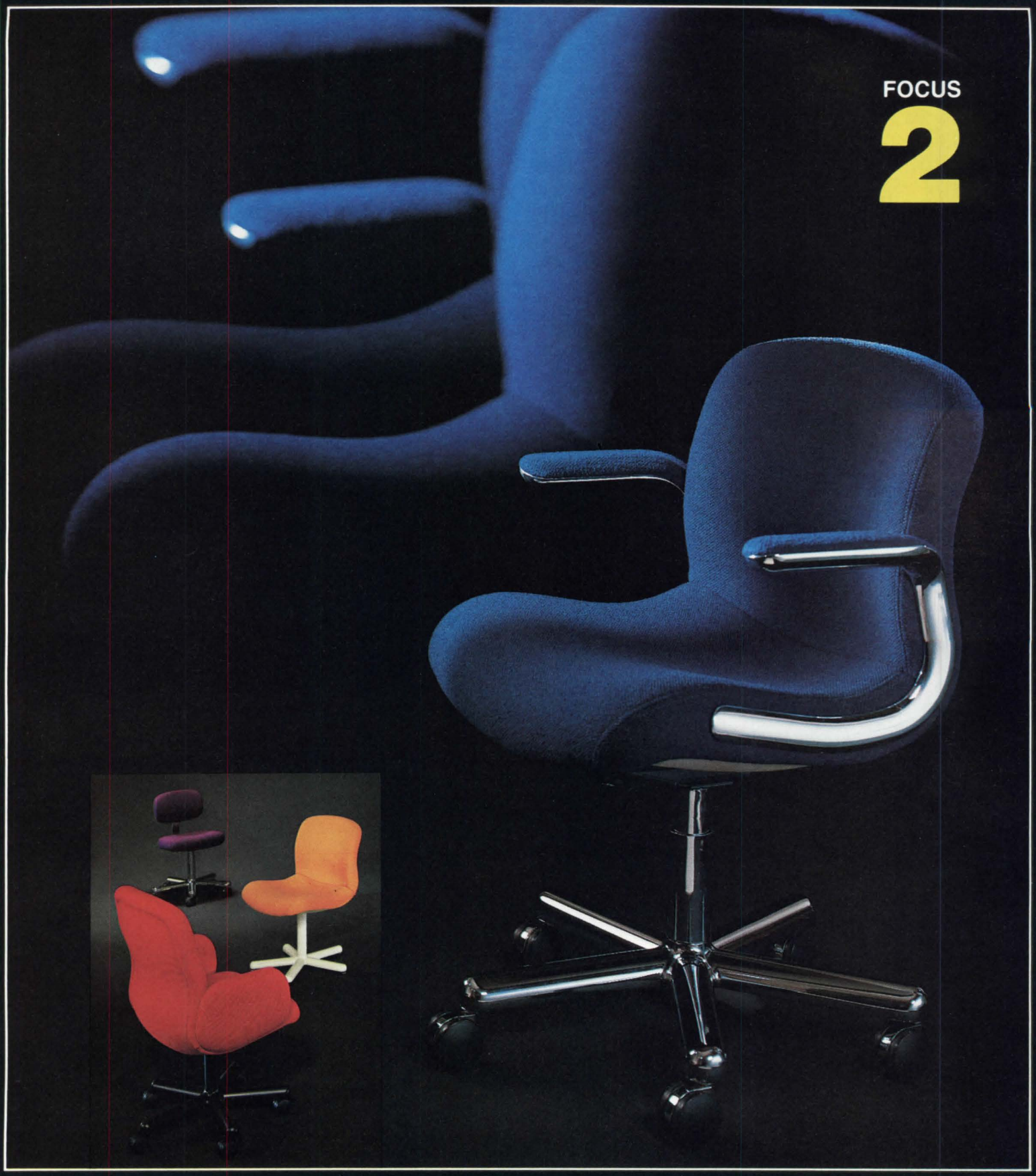
Factory Mutual Resources: A User's Catalog, 1980–81, lists publications, films, and training aids for property conservation. Although many listings are for building owners, the 55-page catalog has several of interest to architects on design considerations related to fire safety. Factory Mutual Engineering Corp.
Circle 202 on reader service card

Fire doors are included in an eight-page brochure that describes and illustrates UL-approved frames and sliding doors. Fire Doorater® charts help the specifier to select doors, frames, and hardware suitable for specific applications, based on UL label criteria. Overly Manufacturing Co.
Circle 203 on reader service card

The 751D-AC/DC fire and smoke detector responds to both fast burning and slow smoldering fires. The unit and its components are described in a six-page brochure that also includes a wiring guide and electrical specifications, as well as architectural specifications. BRK Div., Pittway Corp.
Circle 204 on reader service card

'Fire Door Digest' is a guide to selecting fire doors, door frames, and hardware. The 12-page illustrated brochure provides classification and specification information. Republic Builders Products Corp.
Circle 205 on reader service card

Fire protection sprinklers, devices, and accessories shown and described in a 16-page brochure include ceiling and sidewall sprinklers in several styles. Among the accessories are alarms, valves, ceiling plates, guards, and release devices. Information is supplied about application and operation along with specification data. Grinnell Fire Protection Systems Co., Inc.
Circle 206 on reader service card
[*Literature continued on page 113*]



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PPG: a Concern for the Future

Circle **No. 342**

PPG INDUSTRIES

Architect: Robert Bridges Associates, New York

Literature continued from page 110

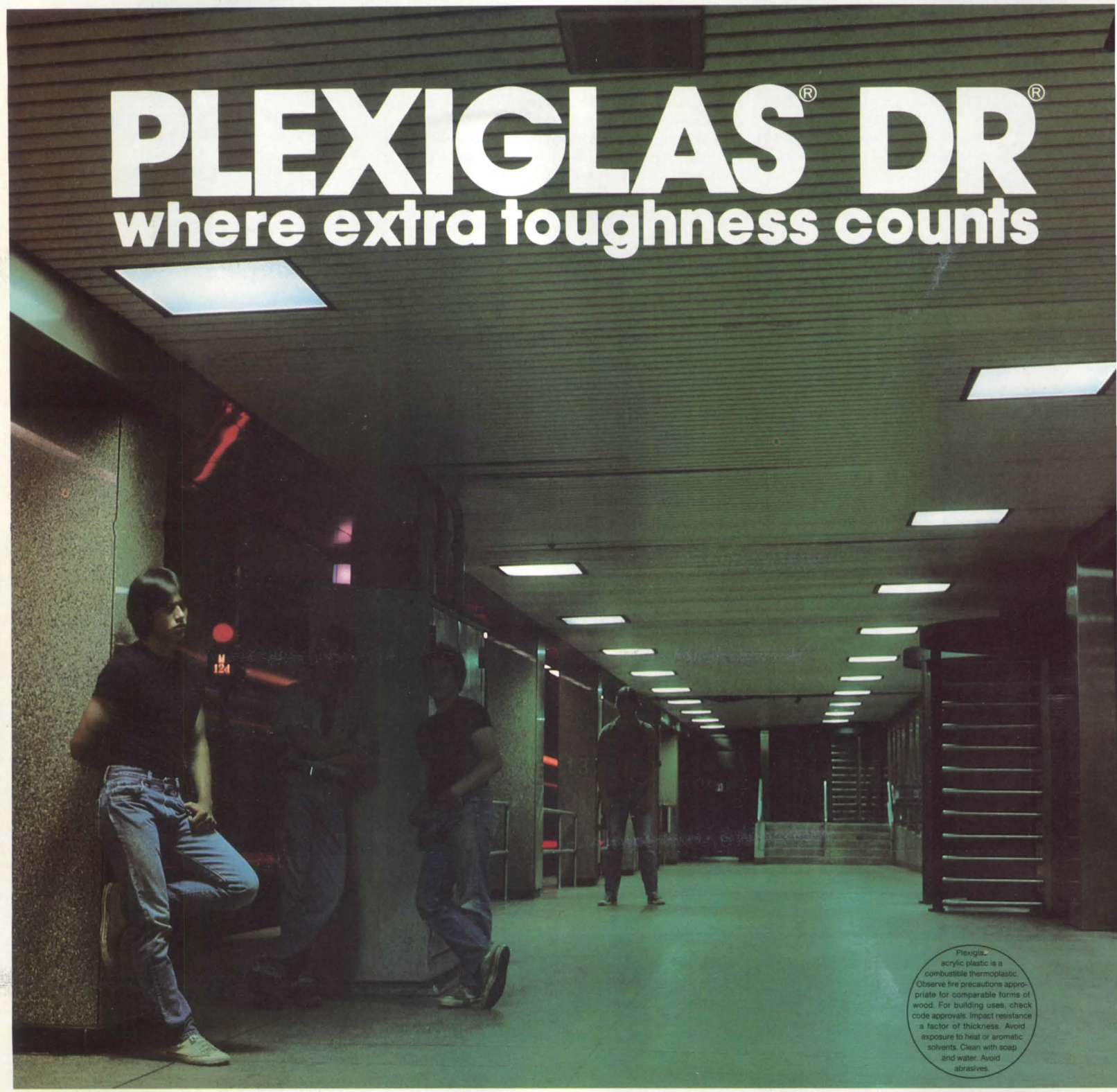
Development of Low-cost Residential Sprinkler Protection. This report explains a program that investigated development of low-cost residential sprinkler systems. There were nine combinations of sprinkler size and water pressure investigated in realistic living room fires. Results of the tests and conclusions drawn are included in the 75-page report. Copies are available for $5.25, prepaid. Order No. PB-283015 from National Technical Information Service, 5285 Port Royal Rd., Springfield, Va 22151.

'Designing Fire Protection for Steel Columns' is a 28-page publication on evaluating the ability of structural steel to withstand fire exposure. It discusses factors that influence fire resistance ratings of steel columns in frequently used sizes and shapes; fire protection materials used most often on steel columns; and accepted methods for calculating fire resistance of protected steel columns in accordance with the ASTM E119 fire exposure standard. American Iron and Steel Institute.
Circle 207 on reader service card

Thermafiber fire-protective insulations for curtain walls and perimeter framing are described in an eight-page brochure, which also shows typical applications. It describes results of fire-containment tests and provides information about the product's sound attenuation properties. The material is also used to protect steel columns and beams from fire. Detail drawings show how beams and columns are fireproofed by boxing them in instead of spraying on insulation. United States Gypsum.
Circle 208 on reader service card

Rigid polyurethane foam fire safety guidelines, SPI Bulletin U-100R, lists safety precautions to be taken during construction and safety design guidelines for architects and contractors. The two-page information sheet, published by the Urethane Safety Group of the Society for the Plastics Industry, emphasizes the importance of protecting exposed polyurethane from accidental ignition by covering it with a flame barrier as soon as possible after installation, preferably the same day. Witco Chemical Corp., Isocyanate Products Div.
Circle 209 on reader service card

'A System for Fire Safety Evaluation of Health Care Facilities' describes a quantitative evaluation system for grading health care facilities in terms of fire safety. There are three major areas: Occupancy risk, building safety features, and safety redundancy. The design is intended to ensure that the failure of one part will not result in a failure of the entire system. Order No. PB 80 195 795, at $10 a copy prepaid, from: National Technical Information Service, 5285 Port Royal Rd., Springfield, Va 22151.
[*Literature continued on page 117*]



A Lighting Lens Material for Extra Toughness, Extra Protection and Extra Savings

When you choose a material for your lighting lenses and diffusers in such high-risk areas as subway stations, pedestrian walkways, parking garages and lots, and other public areas, you look for impact resistance. Plexiglas DR high impact acrylic provides the EXTRA TOUGHNESS you need to withstand accidental breakage or acts of vandalism.

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For the latest information on Plexiglas DR for lighting lens and diffusers, circle the reader service number or write to Rohm and Haas Company, Independence Mall West, Philadelphia, PA 19105, Attn: Marketing Services.

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Circle **No. 348** on Reader Service Card

Literature continued from page 113

SPI literature catalog lists publications about plastics used in buildings. Literature of possible interest to architects includes papers on rigid PVC housesiding, plastics in construction, plastics in furniture, and plastics for architects and builders. Copies of the catalog are available from The Society of the Plastics Industry, Inc., Literature Sales Department, 355 Lexington Ave., New York, NY 10017.

'On Fire Protection . . . ' is a 24-page brochure that describes various types of sprinkler systems: wet pipe, dry pipe, low differention dry pipe, and several types using rate-of-temperature-rise detection. Diagrams illustrate the various designs. Automatic Sprinkler Corp. of America.
Circle 210 on reader service card

'Fire Protection through Modern Building Codes,' in its fourth edition, is divided into two parts. Part I is a discussion and analysis of fire protection regulations of greatest significance and general interest, covering building size, structural fire protection, and means of egress. Part II consists of practical regulations, based on the principles discussed in Part I, formulated from studies by well-known research groups and from existing building codes. It covers types of construction, special occupancy requirements, fire protection requirements, fire resistive materials and construction, and exit requirements. Copies of this 350-page paperback are available free by writing on firm letterhead to: The American Iron and Steel Institute, 1000 16th St., NW, Washington, DC 20036.

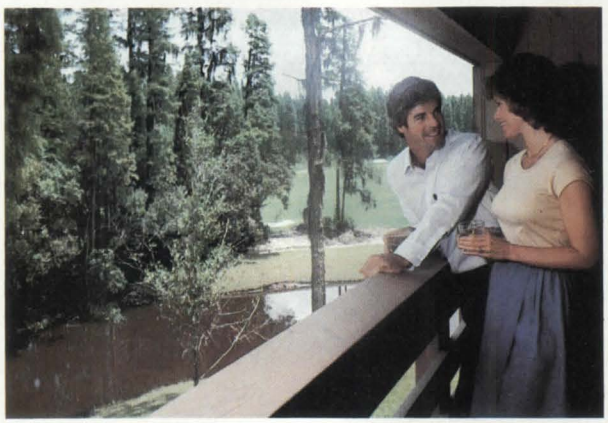
'Handbook of Property Conservation.' Although this is primarily a source of information on being prepared for all types of building emergencies, two sections are related to fire protection: sprinklers and alarms. Various kinds of automatic sprinklers are compared, with explanations of how they work, and information is provided on maintaining such a system. The chapter on alarms discusses the five basic types and their capabilities. The 260-page book, at $4.95 a copy, is available from: Factory Mutual Engineering Corp., 1151 Boston-Providence Turnpike, Norwood, Ma 02062.

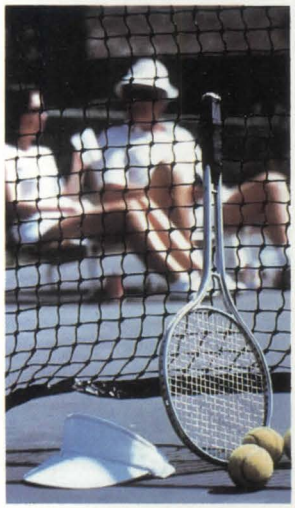
'Fire Resistance of Architectural Precast Concrete,' prepared for the PCI Committee on Fire and the PCI Architectural Precast Concrete Division Management Committee, summarizes the behavior of architectural precast concrete in fire. It presents design data for calculating the thickness of many types of walls to provide fire endurance. Tables and design charts provide information for determining the thickness of panels. Suggestions are also offered for the treatment of joints between wall panels, the protection of connections, and fire-stopping between floors and wall panels. Request copies of the 16-page report, at $2 each, from the Prestressed Concrete Institute, 20 N. Wacker Dr., Chicago, Il 60606.

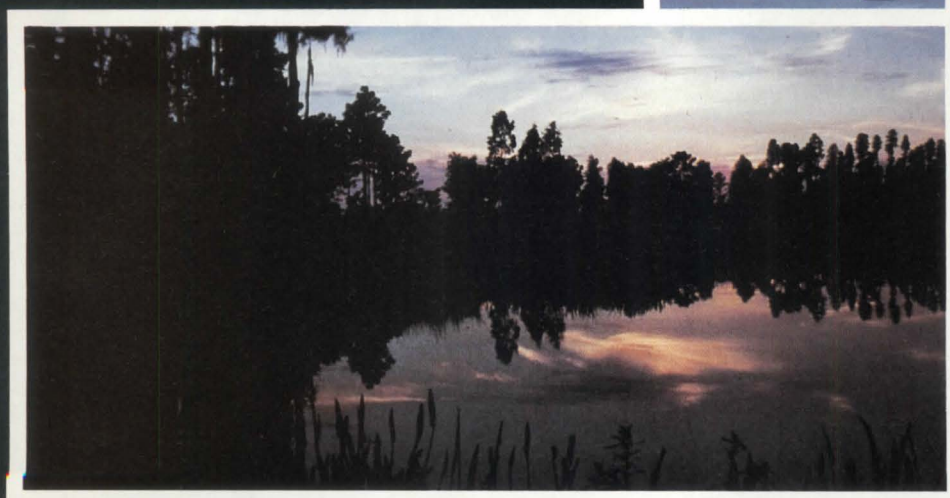
'Stairwell Pressurization Systems.' In order to keep smoke and gases generated by fires from rising, stairwells of tall buildings are being pressurized. Several designs now being used in the U.S. are discussed. There is a report on field tests of two of the systems. Order No. PB 297 479, at $6 a copy prepaid, from: National Technical Information Service, 5285 Port Royal Rd., Springfield, Va 22151.

Fire exit hardware that is UL listed is described and illustrated in a 16-page brochure. The door operators allow safe exit, yet keep doors closed to contain a fire. Hardware includes rim, mortise lock, concealed and surface vertical rod types. It can be used on A, B, C, D, or E labeled doors. Von Duprin, Inc.
Circle 211 on reader service card

'Fire and Life Safety for the Handicapped: Conference and Preparatory Workshop Reports.' The 13 reports from the panels and workshops held in preparation for a conference in November 1979 are contained in this 154-page publication prepared by the
[*Literature continued on page 120*]







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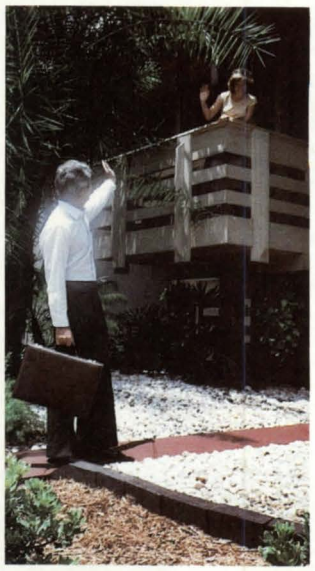

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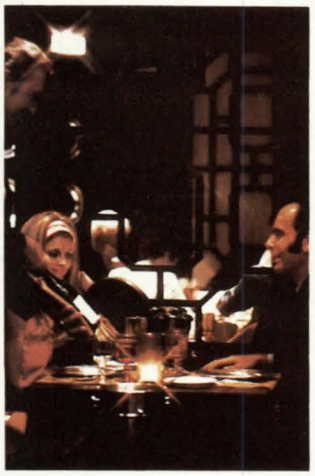

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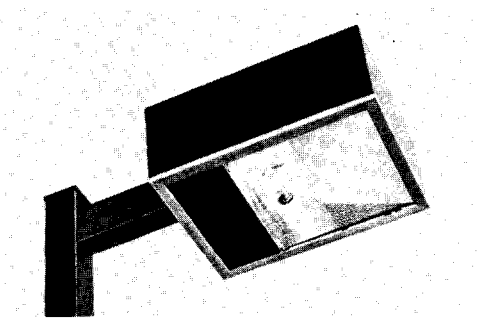
Literature continued from page 117

AIA Research Corp. and the Center for Fire Research, National Engineering Laboratory, National Bureau of Standards. Also included are the speeches in the plenary sessions and comments by some of the participants. Copies of the report, at $5 each, are available from: The Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

'Design for Fire Resistance of precast prestressed concrete,' is intended to provide an analytical method of evaluating the fire endurance of structures made of precast and prestressed concrete. Problems and their solutions are presented. There is an explanation of the symbols used in equations and a glossary of terms. Graphs and detail drawings support the text. Request copies of this 90-page report, at $5 each, from the Prestressed Concrete Institute, 20 N. Wacker Dr., Chicago, Il 60606.

Other products

Lonfloor is a three-layer laminated PVC flooring, including the backing cloth. It is 100 mils thick and comes in ten plain smooth colors, eight smooth marbelized colors. The flooring can be installed on or below grade on concrete, on metal, or on composition plywood substrates. On special order, the flooring can be manufactured to meet fire retardant standards set forth in ASTM E-84-76a. Lonseal, Inc.
Circle 121 on reader service card



Carmel 4 exterior lighting for shopping malls and parking areas of schools, hospitals, and institutions, can be mounted at a height of 20–30 ft. A reflector controls the direction of the illumination. The hinged lens allows easy access for bulb replacement or cleaning. Elsco Lighting Products, Inc.
Circle 122 on reader service card

Americana I Berber high-loop tufted carpet of 100 percent wool is a 12-ft broadloom suitable for contract or residential applications. The carpet comes in four neutral colors each with a range of subtle hues: Mojave Beige, Desert Sand, Limestone, and Smokerise. Goodlin Carpet Co.
Circle 123 on reader service card

Modular Distribution Systems (MDS) include Power-T-Duct, a factory prewired, multi-outlet assembly for power and lighting circuits. Power is delivered to the system through Communi-Power Poles, partitions, walls, or poke-through units. Also part of MDS are Main Feeder Duct for telephone cable distribution and Communi-T-Duct for point-of-use telephone service. Electro Products Div., 3M Co.
Circle 124 on reader service card

Venus stacking table has a tubular steel frame that also forms double legs at each corner. Top is natural oak. The table is available in either 36-in. square or 45-in. round models and can be stacked ten high. Fixtures Manufacturing Corp.
Circle 125 on reader service card

ReActa seating automatically reacts to normal changes in sitting posture. Contoured back and seat are of high-resilience foam. Arms are self-skinning urethane, available in a choice of three colors, and have fabric-covered inserts. The chair has a five-prong base with casters. There is a companion word-processor chair. Madison Furniture Industries.
Circle 126 on reader service card

Pumparound® coil run-around package offers building owners and operators single-source responsibility for
[*Products continued on page 122*]

The sky's the limit.

Grinnell® Sprinklers Can Meet the Challenge of Your Most Challenging Designs.

When Bullock's in San Jose, California's Oakridge Mall installed the first fabric roof ever used in a department store, they chose Grinnell sprinklers.

The problem that faced the owners, the architects and the insurance company was how to provide needed sprinkler protection that could respond quickly and effectively to a fire when the sprinkler lines were suspended from cables as much as 17′ below the fabric roof.

The fiberglass fabric roof coated with TEFLON* made conventional pipe hangers impossible. The only practical manner to support the sprinkler system was from the suspension cables which were an integral part of the overall building design.

This innovative design called for an innovative technology, which was met by the use of Grinnell's Model F931 Quick Response attachment. This sprinkler combines the time-tested Duraspeed Sprinkler with an additional heat detection device sensitive to a temperature rate of rise at 20°F. per second.

The Quick Response device attaches in a matter of seconds to a Duraspeed solder-type sprinkler. Thus, standard pendent sprinklers as well as horizontal sidewall models were available for use in this overall design.

This unique fast-acting sprinkler attachment, listed by Underwriters Laboratories, proved its capabilities in a test program witnessed by the owner's representatives and representatives of the insurance authorities.

Not only did the sprinkler attachment prove to be effective in the laboratory test, but it also demonstrated the flexibility needed to adapt to the demands of the structure's unconventional roof lines.

When it comes to sprinkler designs from the traditional to the avant-garde, Grinnell has the technology to provide sprinkler protection to match your most demanding design requirements.

For additional information, please write:
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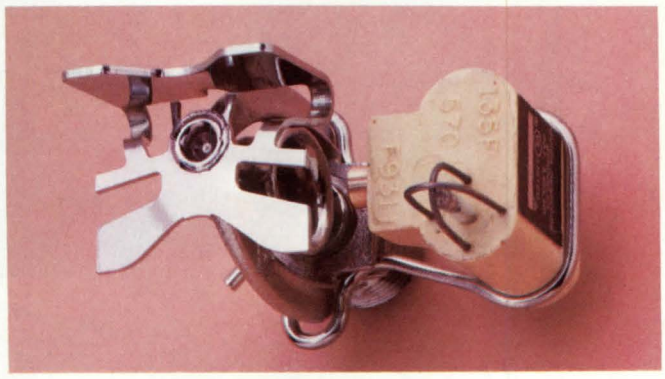
*TEFLON® is Du Pont's registered trademark for its fluorocarbon resin and film.



Above: Bullock's Department Store in San José, Cal. Note Grinnell Quick Response Sprinklers installed in a sprinkler line suspended from a cable below the fabric roof. Photo courtesy of Virgil R. Carter, Architect, Environmental Planning & Research, Inc.
Right above: Grinnell's Model F931 Quick Response Sprinkler.

GRINNELL
GRINNELL FIRE PROTECTION SYSTEMS COMPANY, INC.
Protecting Life and Property Since 1850

Circle **No. 325** on Reader Service Card

Products continued from page 120

run-around, heat-recovery systems. The pre-engineered system recovers energy from exhaust air without cross contamination. Pumparound is designed for structures where large volumes of tempered air must be exhausted to the building's exterior. The system recovers the otherwise wasted heat and directs it through the package arrangement to the ventilation air. It can be used with the company's Weathermaker air handler or with built-up air delivery systems. Carrier Machinery and Systems Div.
Circle 127 on reader service card

Communication systems for the visually and aurally impaired include the Schmidt reader, which can enlarge copy from two to forty times; the Flexiscope large screen visual amplification; and the Handicapped Learning Center. The Center is a 7.5-sq-ft work surface with a TV monitor and a camera. Options include a talking calculator, microfiche reader, audio/video recorders, typewriter, scanning table, variable speech recorder, slide projector, amplifier, and video cassette player/recorder. It can be used as an aid in teaching students requiring special assistance. EduTrainer.
Circle 128 on reader service card

Tascon™ pendant lighting fixtures can be used individually or as components of a ceiling system. The fixture and its track can be moved to almost any point in the ceiling. The use of Tascon pendant lighting instead of lighting panels permits more acoustical materials to be used in the ceiling to improve sound control. Armstrong World Industries.
Circle 129 on reader service card

Dining chair and matching table fold for compact storage. Frames for both are chromium. The table top is natural beech, and the chair seat cover comes in a choice of fabrics and leathers. DUX.
Circle 130 on reader service card

A corner model washfountain, Series 500, provides space for three users, with the equivalent of two spaces required for a wheelchair. The washfountain has low-profile operating valves, tamper-resistant fasteners, a soap tank concealed in the pedestal, and terrazzo bowl and backsplash to withstand hard use. Valves close automatically after a 10-second sprayhead flow to conserve water. It is available for schools in a junior height, with the bowl rim 30 in. from the floor. Bradley Corp.
Circle 131 on reader service card

Building materials

Major materials suppliers for buildings that are featured this month, as they were furnished by the architects.

New York University Midtown Center, New York (p. 66). *Architects: Voorsanger & Mills, New York.* Paint: Benjamin Moore. Vinyl: Wolf Gordon. Gypsum wallboard: U.S. Gypsum. Tiles: Armstrong. Carpets: Mohawk, V'soske. Terrazzo: Port Morris Co. Lighting: Edison Price, CGL, Neo-Ray, Berkey Color Tran, Solux. Furniture: JG, Navedo Woodcraft, Allcraft Fabricators, Knoll, Brickel, Heywood-Wakefield, Cramer. Signage: Howard Walode. Blinds: Levelor Lorentzen.

Department offices, University of Pennsylvania, Philadelphia (p. 70). *Architects: Voorsanger & Mills, New York.* Paint: M.A. Bruder & Sons. Gypsum wallboard: U.S. Gypsum. Acoustical tiles: Conwed. Floor tile: Kentile. Carpets: Lees. Bathroom tile: Robertson-American. Lighting: Keeline, Kurt Verser. Furniture: Stendig, Steelcase, Vector, J.G., Thonet, Neiman. Signage: ASI-Designing Sign Co.

Building smarts

Trying to learn about the quality and features of national construction products by yourself can be difficult and time-consuming. The Construction Products Manufacturers Council, Inc. (formerly Producers' Council), has the solution.

Through local chapter seminars, the Council (supported by groups such as AIA, ACEC, ASID, IBD and NSPE) sponsors panel discussions on a wide variety of generic building products. Qualified experts from various Council member companies explain products like barrier-free design, metal curtain walls, insulation, and glass and glazing to architects, engineers, designers, contractors, developers and owners. New programs are created and older ones are updated frequently to meet changing market needs.

These 3-hour meetings are normally held three or four times a year at most of 40 local Council chapters (usually at an early or late hour, so there's a minimum of work interference). The Council also works directly with professional groups in outlying areas (satellites) where no chapter exists.

For more information, or a complete listing of the educational programs available, write: *Manager Education Services, Construction Products Manufacturers Council, Inc., 1600 Wilson Blvd., Arlington, VA 22209, or call 703-522-0613.*

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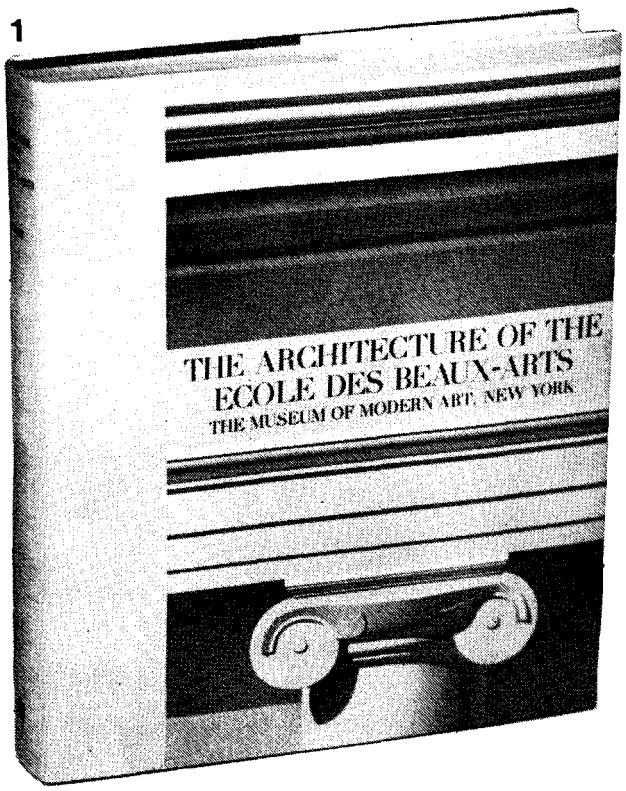

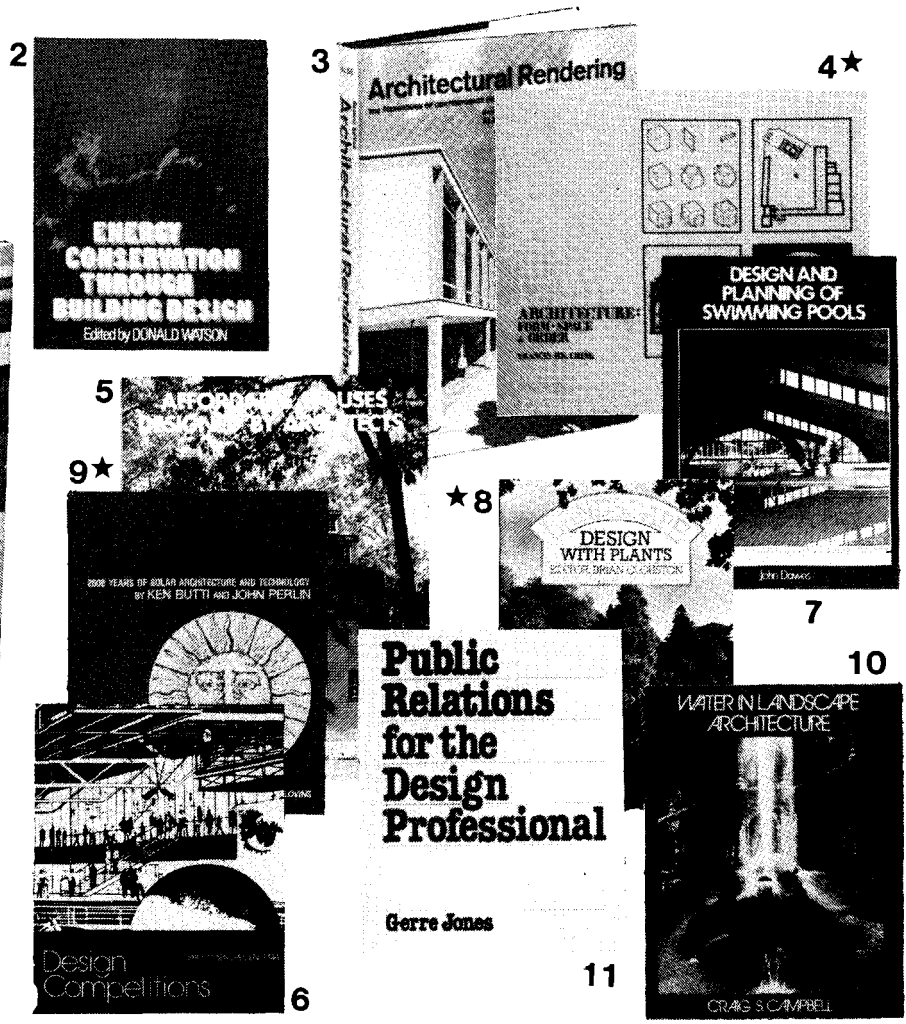

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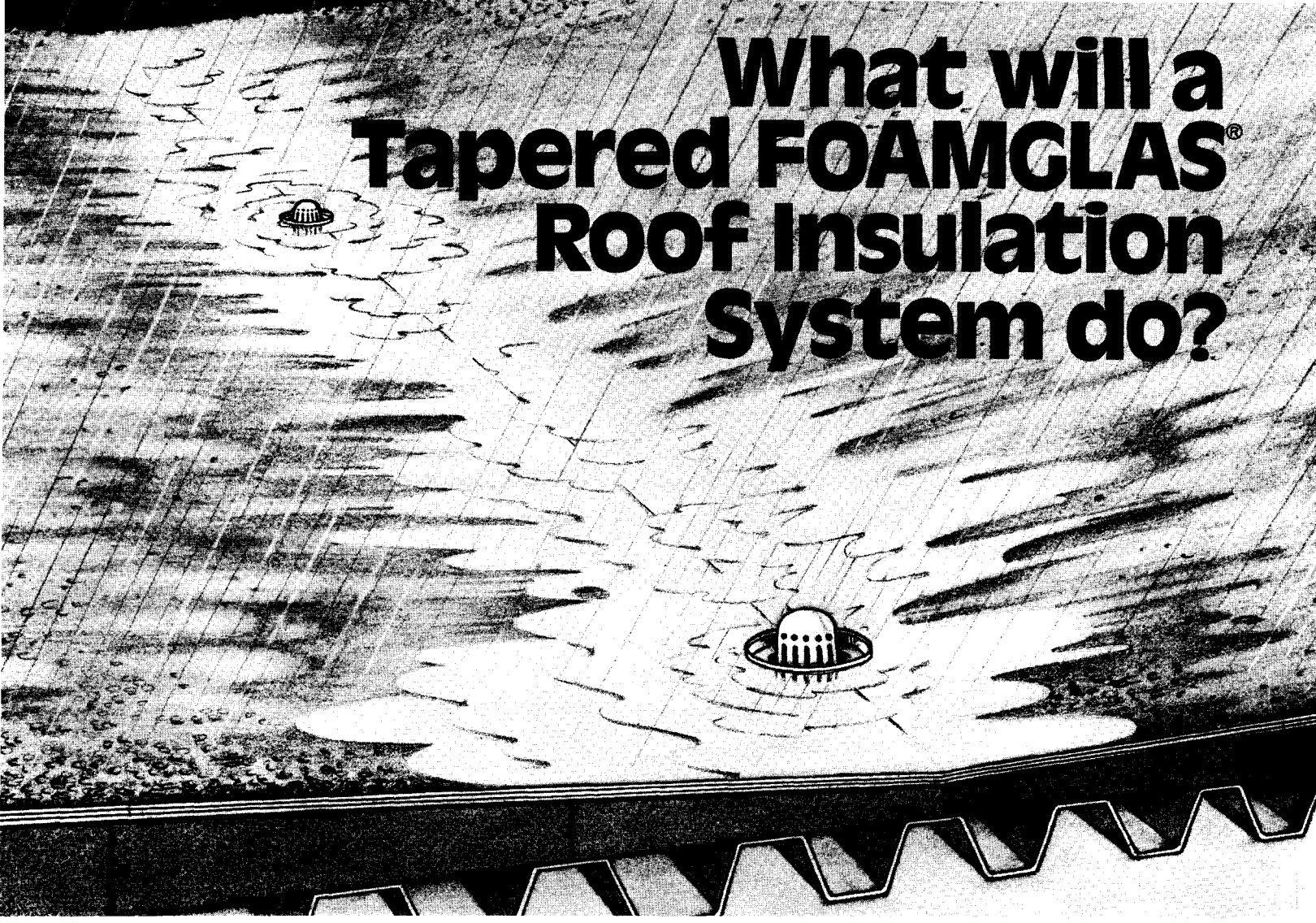
P/A in November Preservation and remodeling balance sheet

Now that business interests all over America have recognized the economic potential of older structures, it has become crucially important to examine the quality of preservation and remodeling efforts for commercial purposes. In this issue P/A's editors will tote up the pluses and minuses of six very telling instances of commercial re-use and rehabilitation in typical downtown situations in cities such as Pittsburgh and Des Moines.

How products get designed will be the subject of a challenging Technics article in this issue, tracing the roots and motivations behind development of new and expanded building product lines, analyzed through selected cases.

Arcade Square, Dayton, Oh.

P/A in December will include an examination of important new trends in the design of tall buildings—an area of greatly revived activity today. Concerns ranging from structural systems to corporate imagery to office interiors will be covered critically, with pertinent examples.



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[*continued on page 130*]

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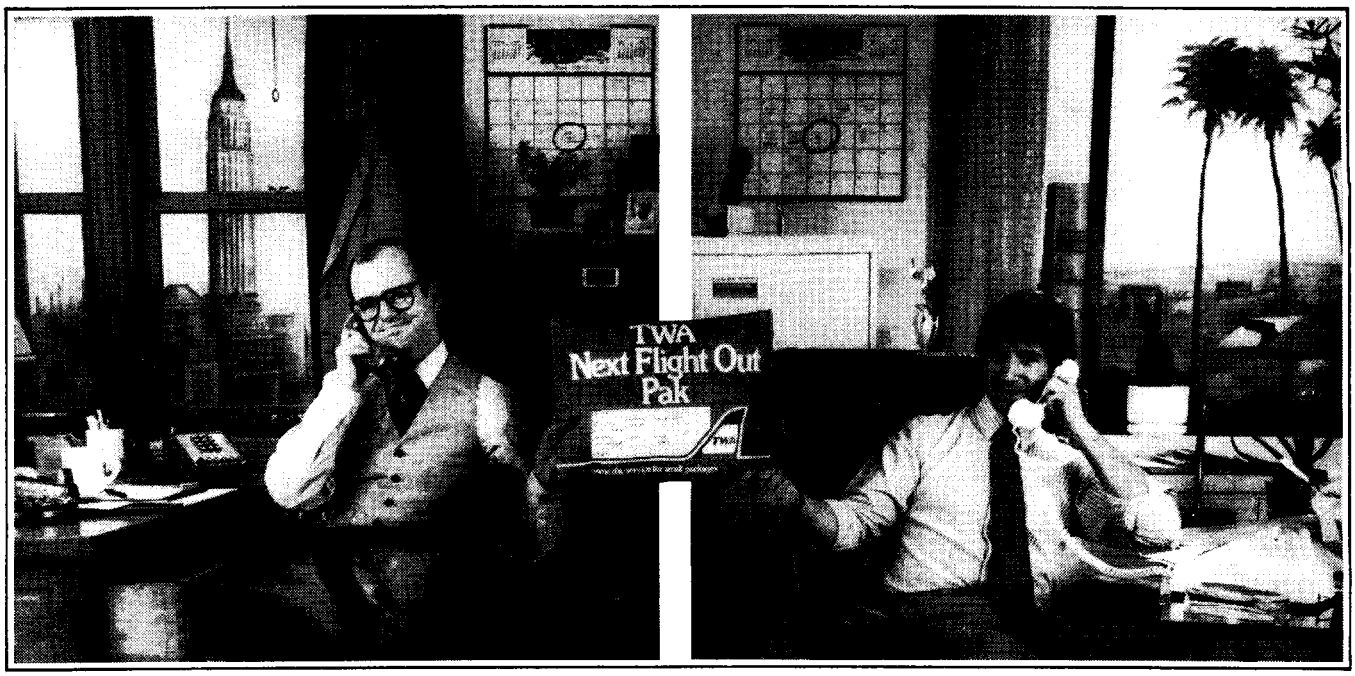

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