Progressive Architecture

April 1977 A Penton/IPC Reinhold Publication

This pendant fixture, movable to many points in the room, provides both quality task lighting and substantial energy savings.

The Synercon™ 60 Ceiling System from Armstrong. A new standard of design flexibility produces a new high in energy savings.

The Synercon 60 Ceiling System from Armstrong is all new from the grid to the board, from the lighting options to the air handling. More important than even its newness, however, is its innovation. Innovation that serves to increase design flexibility, decrease energy consumption, and enhance lighting quality.

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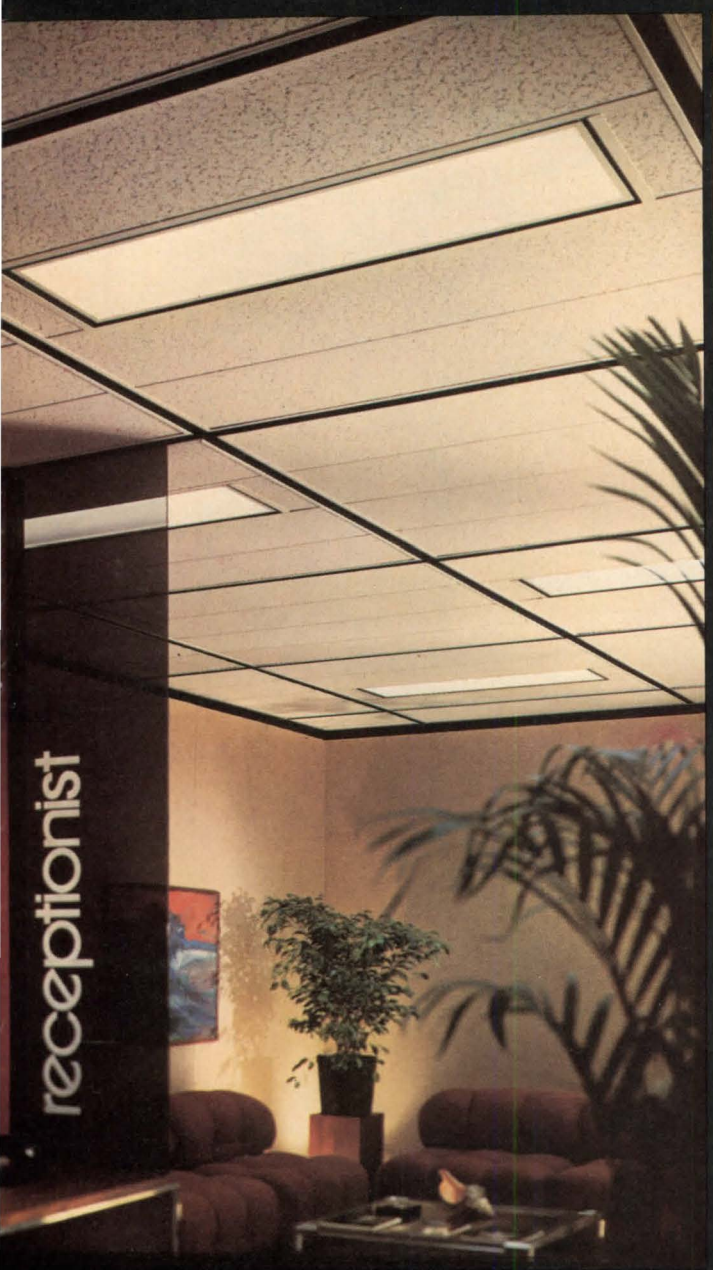
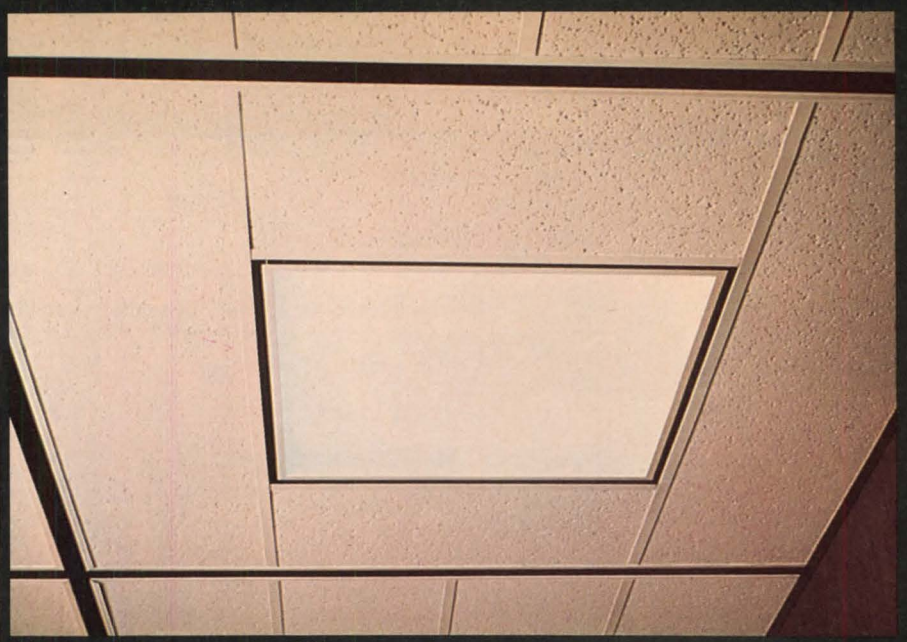


ighting includes 14" x 48" troffer (2- or 3-lamp) with standard
r polarized lens; parabolic louvered fixtures (8- or 16-cell).



Further lighting is this 29"-square fixture with high-pressure sodium lamp, offered with standard or polarized lens or parabolic louver.

Air-handling options include air boot and bar for constant-volume systems as well as two variable-volume systems designed for energy savings.

specially designed to control brightness without seriously reducing the lamps' efficiency. Optional polarized lenses with these fixtures can further lower energy requirements as well as improve lighting quality by reducing veiling reflections.

With all three systems, the lighting efficiencies result in both immediate and long-term cost reductions. To deliver 70 footcandles, the pendant fixture can require only .9–1.0 watts per square foot; the high-pressure sodium, only 1.4–1.5; the standard troffer, only 1.9–2.0.

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FROM THE INDOOR WORLD® OF

Armstrong

April 1977

Progressive Architecture

Cover: Alvar and Elissa Aalto's congress and conference center addition to Finlandia Hall (p. 68), completed in 1974, continues their Helsinki City Center Plan, developed between 1959 and 1964. Photo: George Miller.

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Aalto addenda

April 1977

Last September, just after Alvar Aalto's death, some of my thoughts on his work appeared on the P/A Editorial page. Further reflections are inevitably generated by the material we have assembled for this issue—a survey of Aalto's work that includes some newer work not previously published in America and some revealing comments by others on Aalto's place in our cosmos.

We are proud of the major article by Stuart Wrede, a young architect equally at home in Finland and the U.S. There are Aalto buffs all across this country who will dispute some of his points, but I doubt that anyone could have said so much, so succinctly, about Aalto's work—its roots and its ramifications. And it is his work that matters to us, more than anecdotes about his personal habits.

As Wrede's article reminds us, almost every element of Aalto's work can be interpreted in more than one way; almost every gesture can be traced to more than one source. I was, for instance, surprised at what Wrede had to say about Baker House at MIT. It is the only Aalto building I know at first hand, and I know it very well from living in it for four years. I have always thought of Baker House as fundamentally a response to its setting: it has a river side, shaped ingeniously for its views, and a radically different campus side, its main entrance dramatically indicated by the convergence of those extraordinary projecting stairways. Since it stands in a row of buildings, Baker House has only two exposed sides; as I said in the September Editorial, it would make no sense at all as a freestanding structure.

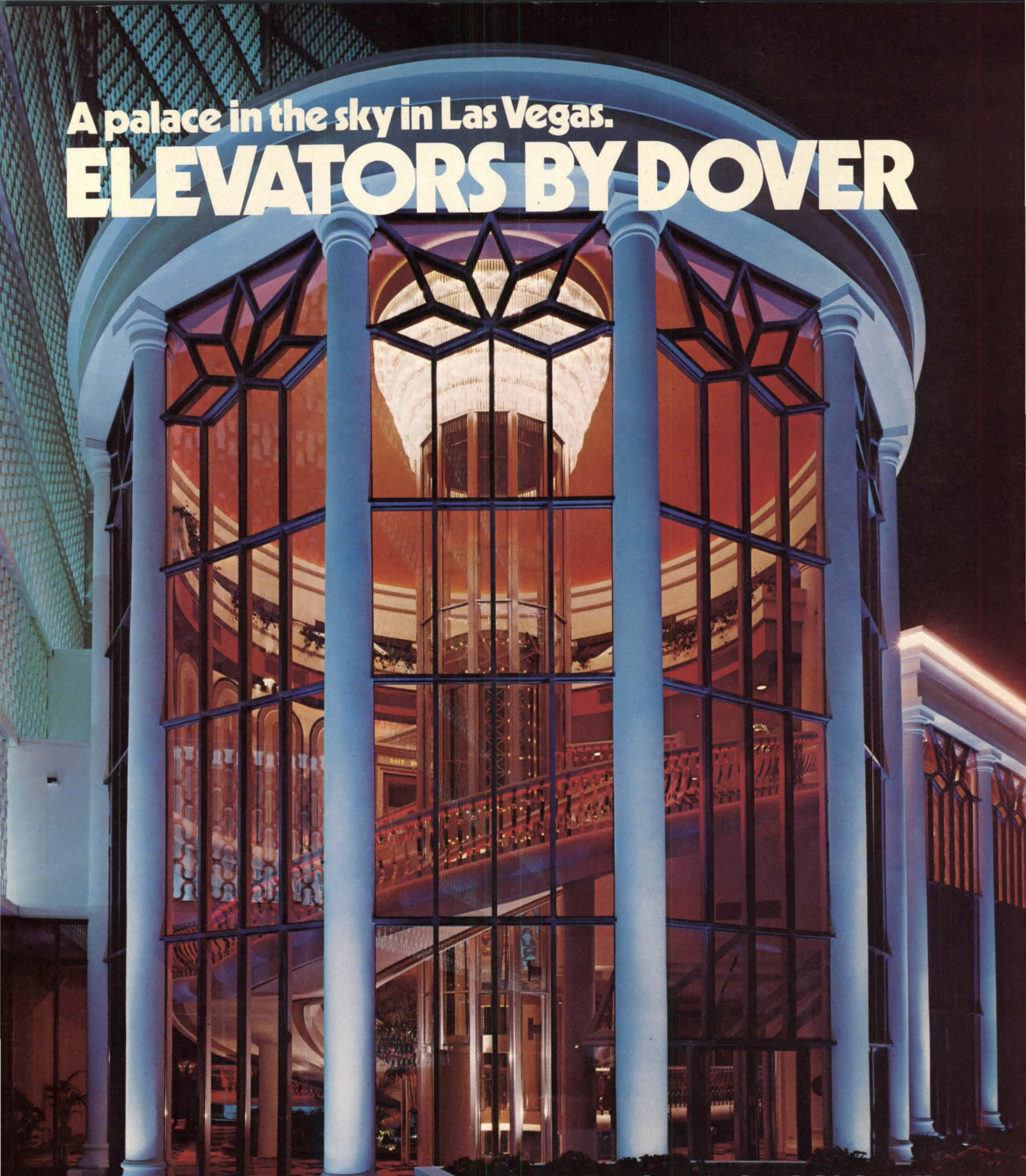
River front of Baker House, MIT, with dining hall at center.

Isn't it therefore a sensitive response to its situation? No, says Wrede, because its curves and jagged edges threaten to burst out of the neat rectilinearity of the buildings around it, and because of its "total disregard" for the architectural themes of the existing campus—all classically composed structures clad in muted limestone and cream-colored brick. He is right, too, though I had never consciously recognized these contrary aspects of the building. Yet I can't resist further argument: red brick, though never before used on buildings constructed by MIT, was after all the predominant material of the old motley row in which Baker House stands. Then, too, Aalto pointedly used a serene, rectangular form, clad in MIT-standard limestone for the pavilionlike dining hall, for which the curving brick wall is (some have said) just a contrasting backdrop. Perhaps Aalto was taking the occasion to make a statement about the interaction between the institution and its surroundings.

Aalto's red brick, a departure for MIT, was not without repercussions, and I am reminded now of something else I wrote in September—that the influence of Aalto on American architecture is "hard to trace," since it usually surfaces so mixed with other ideas. But the MIT campus has, in Eero Saarinen's chapel, one example of unabashed homage to Aalto. Early models for his auditorium-and-chapel development, unveiled a couple of years after the dormitory's completion, showed a Miesian box, but it was later transformed (I suspect with a nudge from Pietro Belluschi, the recently arrived dean of architecture) into a sharper counterpoint to the sleek auditorium—a cylinder of rough Baker House brick, its curves, color, texture, earthiness, and gravity all reaching out across windswept parking lots to anchor Baker House to its institution. It was as close as the many-sided Saarinen ever came to emulating his elder countryman, Aalto.

I hope you, too, are inspired by our pages on Aalto to follow your own thoughts about context, precedents, symbolism, the sequence of interior spaces, furniture construction—any of the whole realm of architectural ideas in which Aalto was a master. Perhaps that is the key to Aalto's lasting importance, and his particular pertinence today: His works ask you to consider *why* each wall or roof surface follows its rarely predictable course, why a certain shift in materials occurs, why each particular opening occurs where it is, why a handrail or a chair leg takes a certain turn. He calls our attention to all the particulars of any architectural situation. And he says that no amount of theory, no cookbook methodology, no elevated socio-economic intent can produce fine architecture; only the profoundest commitment to architecture itself and a transcendent understanding of the particular situation can do that.

John Morris Dixon



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Views

Stern questions

I compliment you on your article, Grand allusions (Feb. 1977 P/A). It's delightful to see such quality in line graphics, text, and photographs.

It troubles me that in this work, contextualism, historical allusion, and applied ornament are directly proportional to the expression of monetary wealth and arrogant need. While these 'post-modernist' principles can be a fine and beautiful thing when applied to architecture (and therefore the human psyche), they are difficult to fathom in a form so obviously exclusionary.

The need for high expenditure for high quality notwithstanding—an example of 'stylistic' change such as this may prove only to alienate further an already alienated society.

If we cut through the 'style' and 'look' and 'fragments or episodes', the 'axial organizations' and 'modulated layerings'—we make explicit architecture's allusions to people.

The architect should be saying to all those who will listen (and who would hear): take delight in this expression of thought and love, it is for you. Mr. Stern seems to be saying this in his work, but a design process that willfully subordinates natural direction to contrived ambiguity affirms a state of the mind—not of the art. This is as it should be I suppose, but then I don't see how this work, as a single entity, is any *less* a 'hermetically sealed (constricting) object', in its own way, than the work of any 'others'—more or (if possible) less approachable.

It is the basic dichotomy between real need and capricious need that is, in a certain way, at the cause of what Suzanne Stephens says is a 'lack of inner core determinacy'. Call it obscurity.

This is the wedge that probably always has, and probably always will, drive the intellectual practitioner and society apart—though they both have much to learn from each other.

Andrew A. Burns
South Salem, NY

I am moved by your coverage of Robert Stern's Westchester County Residence in the February P/A to offer a few comments regarding this house and Suzanne Stephens' article. Your stunning photographs speak eloquently on behalf of Stern's design. The building beckons the viewer to explore further, through the doors and along the sinuous curves into new spaces animated by light and color. The feeling is as though one need only float and dream to move from one space to another. It is a house of calm, of quality in every detail, and above all, of dreams and delight.

It is here that I take issue with your article for I feel that this aspect of the design is almost completely ignored. Ms. Stephens deals only in passing with this topic, and, even then, only in a derogatory manner, by describing the house as a "theatrical event" as if life were "taken from films." Her stated criterion for judging this design is whether it contains "a clear enough conceptual framework" applicable to other buildings; "an intrinsic code for the generation of architectural form." Ms. Stephens finds the house lacking on these grounds.

In fields other than ours the relevance of such an argument would be questioned. In the sciences, for example, observed facts are not dismissed as wanting because a theory has not been advanced encompassing them. Theories are judged on the basis of observed facts; observation is not at the mercy of theory. Why must it be that in architectural circles the pleasing is slighted when not accompanied by intellectual postulate? Are the discussions and manifestoes of the past 75 years really dealing with matters of interest to non-architects, or is their significance of the same order as the discussion of the number of angels on the head of a pin.

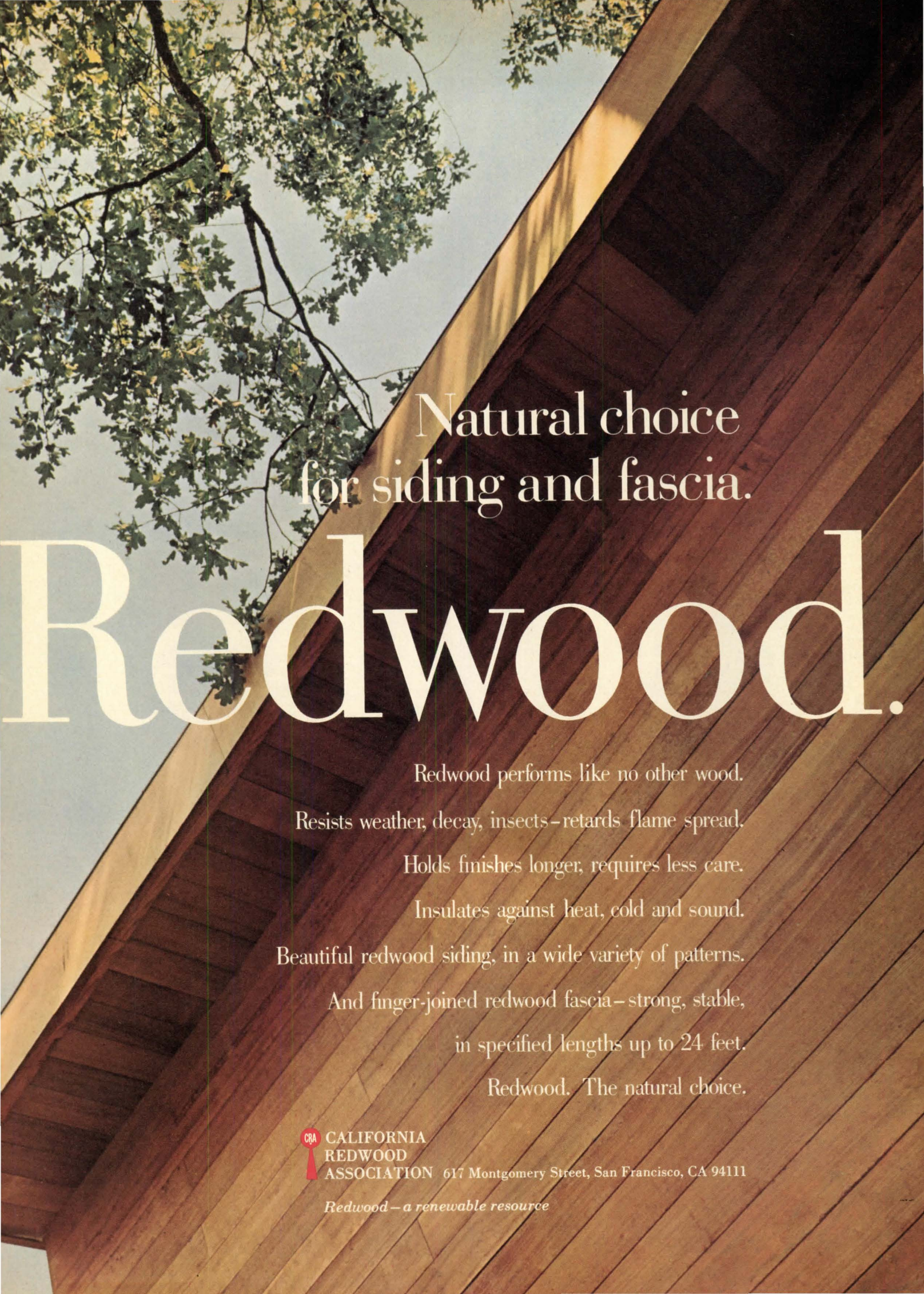
The question is whether the central objective of this profession is to design a built environment pleasing to man, or to develop a theory of the built environment. Each of us must answer this question for himself.

Robert W. Grzywacz, student
School of Architecture
Yale University
New Haven, CT

I loved the presentation in P/A; from what my friends tell me this may be a confirmation of my a) colossal naiveté or b) illiteracy. But, frankly, I respect criticism and I think Suzanne Stephens developed her ideas cogently. I wish she were a little less a lingering purist. But time heals all wounds, even those of stylistic battle.

Robert A. M. Stern
New York, NY

[continued on page 11]



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Views continued from page 8

Awards repercussions

I am very glad that John Dinkeloo, a juror for your 24th annual P/A awards (Jan. 1977 P/A), does not represent the majority of American architects. If architects are not interested in remodeling, preservation, restoration, vernacular architecture, single-family houses, housing for the elderly, and solar energy, I know that the National Association of Home Builders is.

With few exceptions I feel your awards issue was simply awful. As John Morris Dixon suggests in his editorial, I have "read the discussion" . . . and come away with a "serious concern for the state of architecture."

Norbert Schaaf, Architect
Michigan City, IN

So this letter won't seem entirely negative, I will begin by praising C. F. Murphy's project (Jan. 1977 P/A). Its linear form is a logical extension of Karnak, and in a monotonous desert environment there is a rich progression leading to the conference center. It is a solution that respects the heritage and environment of the client. Unfortunately, the other projects cited range from mediocre to regressive. Assuming that awards are given to projects that either work exceptionally well or are meaningful in content, why is it that so many awards were given to schemes that are neither? It seems that every year there is at least one New York Five house honored, yet Eisenman's houses are the same and the only change in the work of Graves is the amount of applied decoration.

Gimmickry was not overlooked, the numerous windmills and solar collectors might indicate a concern for energy conservation, but there was no corresponding change in lifestyle needed to bring about true conservation. A solar-heated 4500 sq ft house is not an advance for conservation or a meaningful contribution to architectural thought, but rather another example of conspicuous consumption.

The most discouraging citation went to Gilbert Rosenthal's house. A careful analysis of the use of imagery and the previously expressed preoccupation with subordination of the client (not the architect when it was a student project), indicates that it owes more to the Heimatlicher Hausbau movement in Nazi Germany than it does to English Romanticism. In idealizing trite forms, this house aspires to a bourgeois respectability that values conformity and conservatism over creativity and change. Historical allusions should add to the meaning of a building and evolve with its design. Here they were misunderstood and reduced to shallow symbols which formed the façades behind which a house was forced to fit. In its hurry to establish the trend-setting role implied in the magazine's title, the jury representing Progressive Architecture has again fallen into the trap of trying to clothe an obviously naked pretender to serious architectural thought.

Michael L. Watson, Architect
Washington, D.C.

This year's architectural design awards issue (Jan. 1977 P/A) troubles me greatly; not in terms of the quality of the work laureated, but rather in terms of what I find to be all-too-common delusions on the part of some members of the jury. It seems that almost no P/A awards jury finds it possible to resist the temptation to proclaim the 'irrelevance' of the single-family house, and it must be said that such sanctimony on the part of an architectural jury is appalling.

To his great credit, Craig Hodgetts did restate one of the most convincing arguments for the individual house, that of its nature as a testbed for architectural ideas and as a 'litmus of culture.' While this argument is of course a good one, it has been stated so repeatedly that I would rather pursue a slightly different one here.

In another sense, the 'problem' of the single-family house is one of the still-present, anguished architectural conscience of the late-60s. That anguish stems from what might be termed the ultimate self-negation (in architectural terms) of the arguments of the radical left, and the repetition of that rhetoric by John Dinkeloo and Sarah Harkness is an irony bordering on tragic humor.

To deny the architect his presently predominant role as the servant of middle-class values in what might admittedly be its most obvious manifestation, the individual house, is to deny the architect that role on a larger scale as well. If, as it may be supposed, that situation might seem desirable to some, it is probably laughable to suggest that it would seem so to Mr. Dinkeloo or Mrs. Harkness. To put the argument another way, if an architect's own house/fantasy for a Massachusetts "sheep meadow" is "irrelevant," then it is reasonable to maintain that a corporate headquarters for Aetna Life Insurance or one for Johns-Manville is no less so.

All of which is merely to state that I had hoped that such idle self-flagellation had already disappeared, and seeing that it evidently has not I would simply argue that serious architectural development is more valuable than lip-service to a convenient misunderstanding of the architect's present role in society. Given this, the rich potential of the house as a vehicle for that architectural exploration would seem to guarantee, rather than deny, the individual house an important place in American architectural culture.

Edward Levin
Instructor in Architecture
Carnegie-Mellon University
Pittsburgh, PA

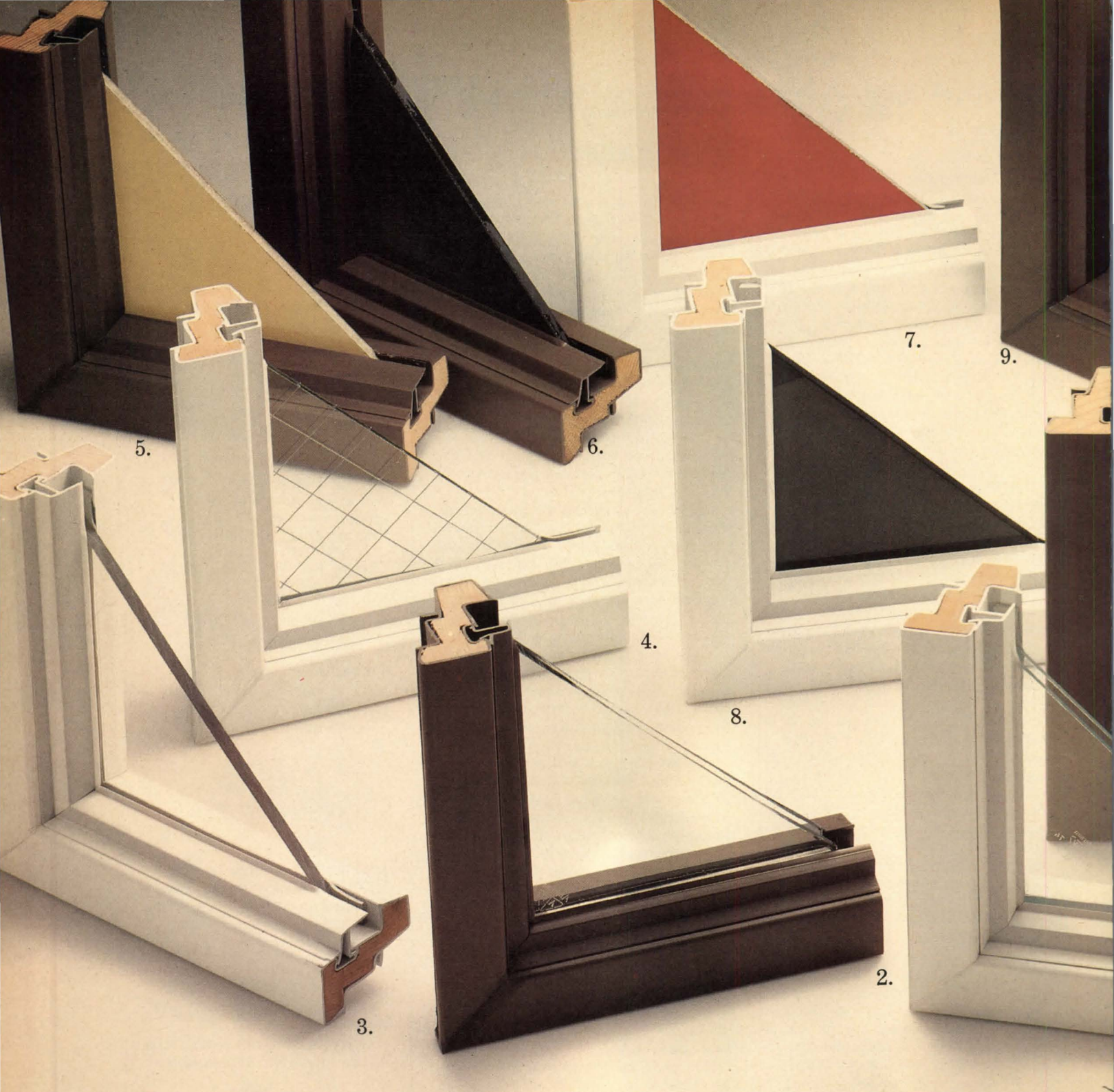
Dryvit walls—USA

Our company appreciated the reference to the Dryvit System as the exterior wall treatment for the Houlton Regional Hospital (Feb. 1977 P/A, p. 54). I would, however, like to offer a correction in that the Dryvit System is now manufactured and marketed in the United States by Dryvit System, Inc., of Warwick, RI. While the product originally came from West Germany some seven years ago, it is now manufactured and marketed entirely independently in the United States.

Douglas C. Creed, P.E.
Vice President
Dryvit System, Inc.
Warwick, R.I.

Correction

The original landscape architect of Piedmont Park in Atlanta, GA, (Jan. 1977 P/A, p. 32) was the Olmsted Brothers, successor to Frederick Law Olmsted.



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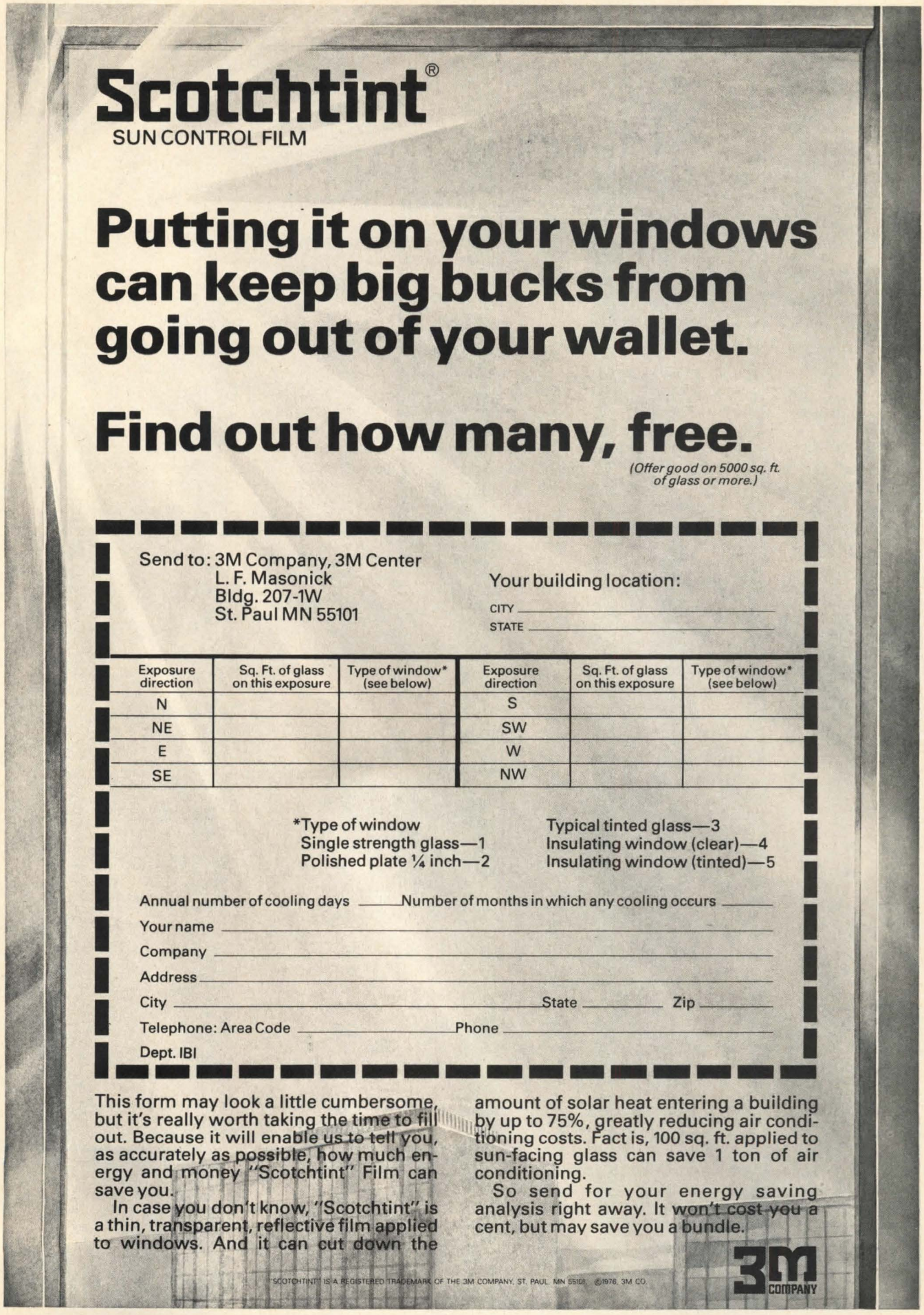

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A recirculating overflow gutter is the preferred system for competitive pools. (It is a requirement for pools in which national meets are to be held.) The absorption of turbulence by the gutter makes such pools quieter and results in faster swimming times. And with our recirculation duct removed from the gutter - an exclusive feature - we offer greater surge storage capacity than all other systems.

PassWall® is an economical system, offering the latest in pool technology. You can now obtain all the components for your pool from one source, with a single responsibility; the pool wall with recirculating overflow gutter, a superior line of deck equipment, complete filtration systems, chlorination and mechanical equipment, moveable bulkheads.

We've been manufacturing quality equipment for institutional and commercial pools for the past twenty years. When you specify Paragon, you'll be getting quality and reliability from a firm dedicated to excellence in design and manufacturing.

For further information, see us in Sweet's Architectural File 13.22, or contact us. Area representatives who can offer advice or assistance are located throughout the country.

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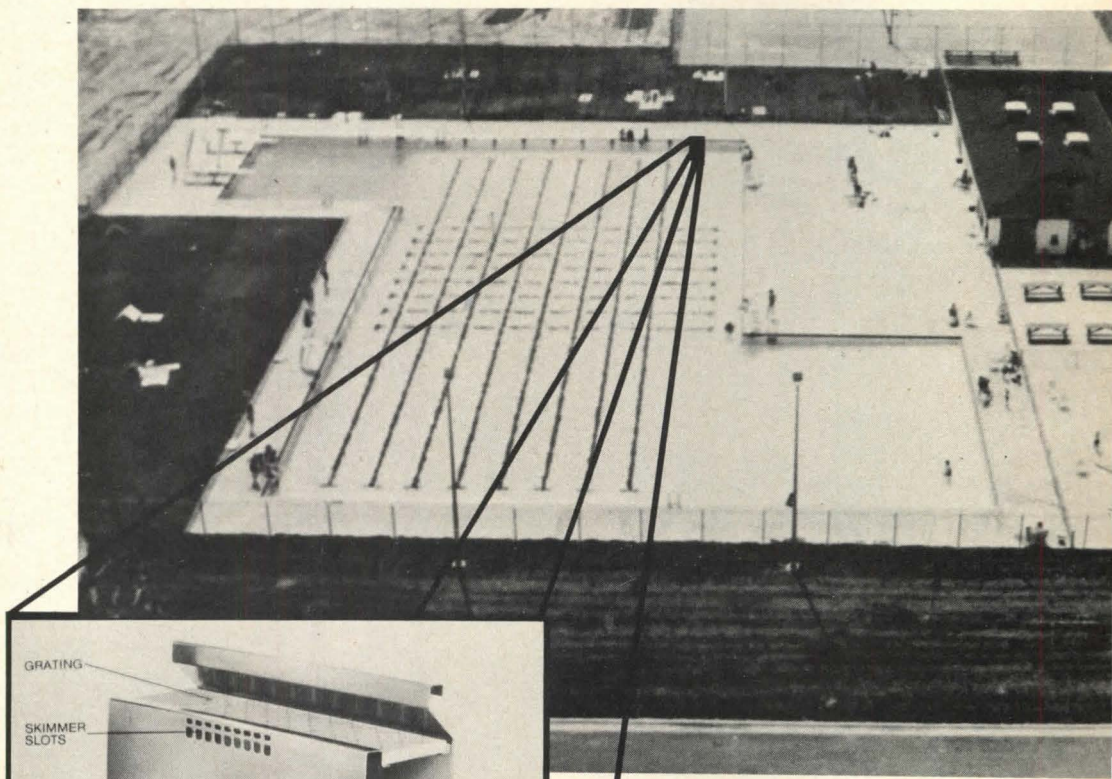
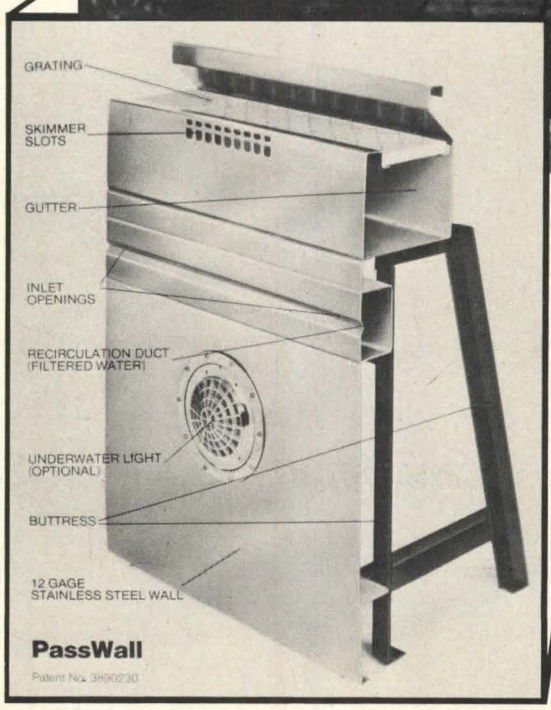


Colonial Park Pool
640 Lin. Ft. of PassWall
16,400 Sq. Ft. of Pool Area



PassWall
Wall and Gutter Section.

FROM PARAGON: 20 YEARS OF MANUFACTURING THE BEST IN SWIMMING POOL EQUIPMENT.

Kawneer Thermal Barrier Products

Thermal integrity for a changing world.

Today's building will live its life in a different world. Life cycle costing (rather than initial construction economies) has become a primary concern. This means that thermal considerations must receive more and more emphasis in architectural design. Building materials will need to be an integral part of interior climate systems.

To conserve our energy resources, the designer must look beyond conventional building materials and solutions in order to achieve thermal integrity. For example, in curtainwall designs, the aluminum glass-holding members themselves can make a vital contribution to thermal efficiency.

Kawneer pioneered the positive thermal break concept in windows and wall systems. By providing a thermal barrier, contact between inside and outside metal is eliminated. Heat transfer to the outside during cold months and into the building during warm months is minimized. Result: Expenditures for heating and air conditioning are reduced and energy is conserved. And, by offering an extensive line of thermal barrier products, Kawneer is able to give you a great degree of design latitude, providing thermal integrity without esthetic compromise.

All of these innovative products are covered in the Thermal Products section of Sweets Architectural File. Or, write for our new book, *Kawneer Thermal Barrier Products*, Kawneer Architectural Products, Dept. C, 1105 North Front Street, Niles, Michigan 49120.

Kawneer Thermal Barrier Products

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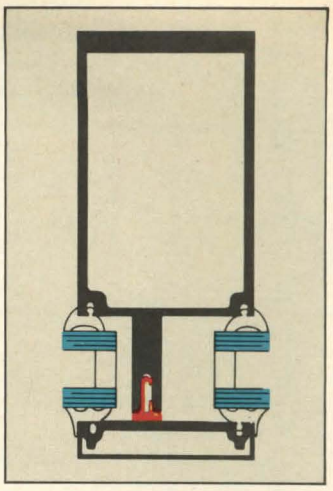
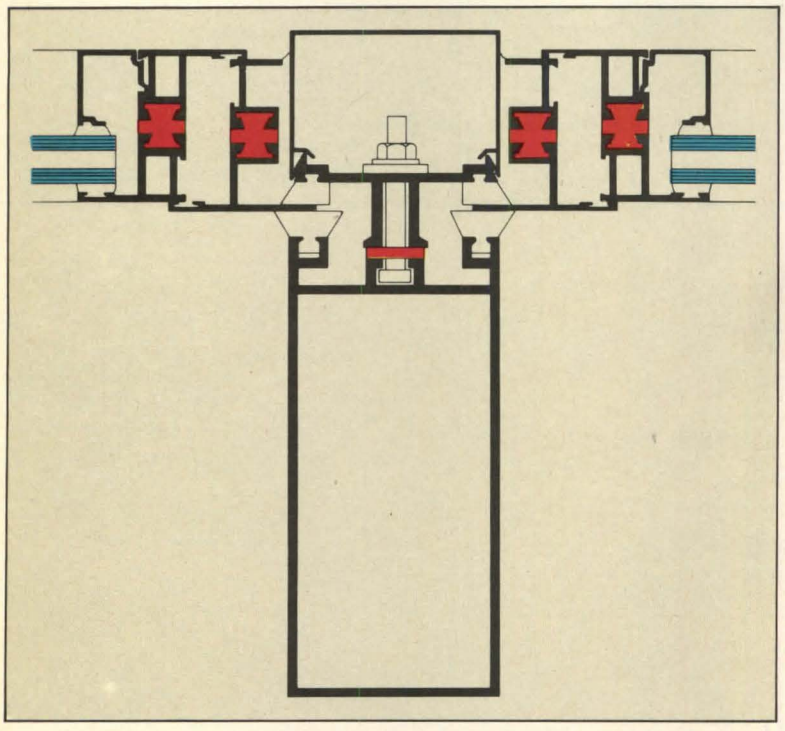
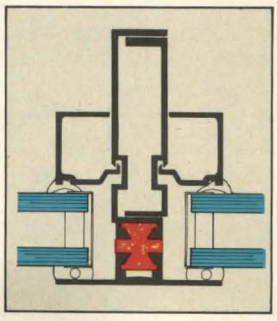


1602 I.G. Thermal Curtainwall — choose from a wide variety of thermal curtainwall systems for high-rise buildings and framing systems for store front and low-rise applications.

506 Thermal Windows — one of a diverse selection of windows that accommodate many functions. Shown here with thermally broken 8000 Stickwall.





SM 350T Thermal Framing — The patented seamless coupling mullion feature on this product provides a unitized framing system with unbroken sight lines.

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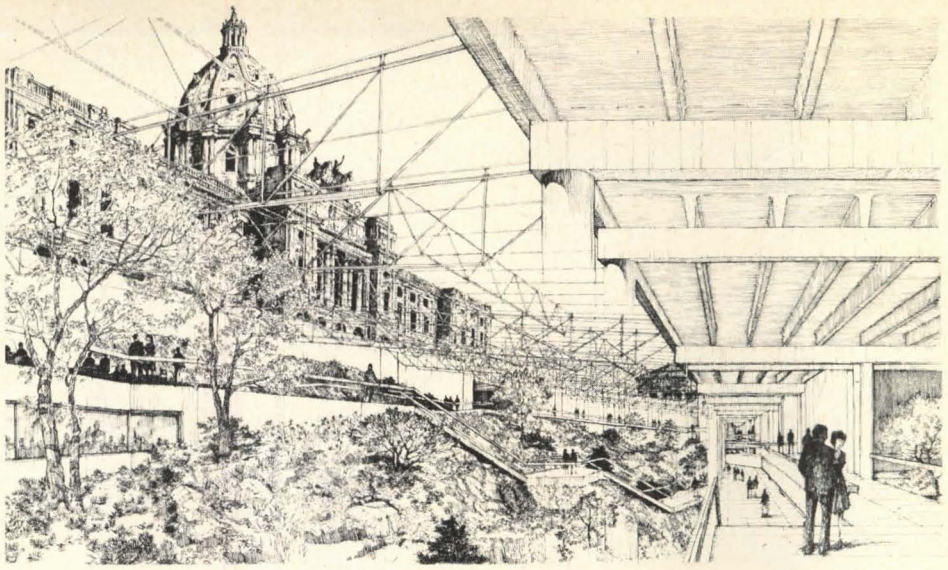
The special technology behind Ultron is responsible for its excellent resistance to abrasion. The carefully formulated nylon polymer system works together with the modified cross-section to resist abrasive wear. And with the added advantage of exceptional bulk, Ultron also offers maximum resistance to crushing and matting. When tested, Ultron not only demonstrated unsurpassed abrasion-resistance, but an exceptionally high degree of resilience as well. Best of all, Ultron retained exceptional surface appearance. And that, after all, is what counts in carpeting.

In the areas of static-control and soil-hiding, Ultron performance is equally outstanding. Because of its special properties, Ultron is able to keep static build-up well below the human shock level, and is also able not only to resist soiling and staining, but to hide the soiling that does occur. We've got a lot more to say about our proud new fiber and we'll gladly tell you everything. Just contact the Contract Carpet Department at Monsanto Textiles Company, 320 Interstate North Parkway, Atlanta, Georgia, 30339, Telephone (404) 955-4000.

ULTRON HAS IT ALL. SOIL-HIDING. STATIC-CONTROL.

ABRASION-RESISTANCE.

News report



Howard Associates, renderers

1

Keith Palmer

Bill Engdahl, Hedrich-Blessing

2

Chicago team wins Minnesota competition

C.F. Murphy Associates partner Helmut Jahn with James Goettsch, designer with the Chicago firm, has won the national competition to design an underground annex for the Minnesota State Capitol in St. Paul. The winning team will receive a contract for architectural services and a fee advance of $100,000.

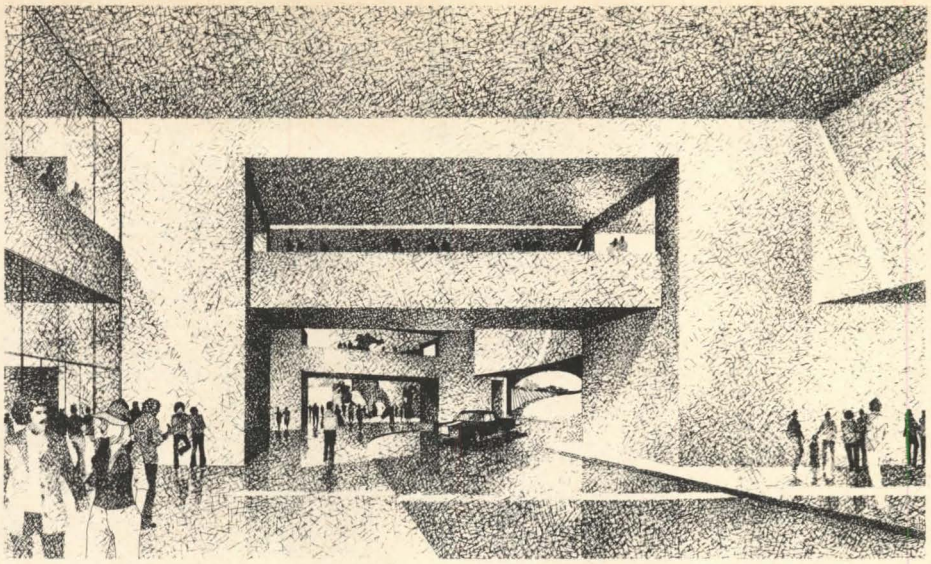
Four other firms entering the second stage of the competition, selected from 261 original entries, were Bernard Cywinski of Larkin & Cywinski, Philadelphia; K.M. Lockhart of K.M. Lockhart, Minneapolis; Robert Dellinger, Donald Lee, William Nichols, William McGee, and Robert Gunn of Dellinger/Lee Associates, Charlotte, N.C.; and Arthur Takeuchi and David Lai of A.S. Takeuchi of Chicago. Each team received $25,000 as a finalist.

The nine-man jury included a legislator, a judge, and an attorney as well as architects John Harkness of The Architects Collaborative, Cambridge; and Ralph Rapson of Minneapolis; engineer William LeMessurier of Cambridge; and landscape architects Daniel Kiley of Kiley, Tyndall, & Walker, Charlotte, Vt., and Peter Walker of San Francisco. Finalists and winner were selected at sessions open to the public, according to Minnesota law.

The Jahn/Goettsch winning scheme has a 690-ft-long skylight running the length parallel to and extending beyond the south façade of the Capitol so that the Capitol forms a visual backdrop and orientation point to the underground space. At 60-ft intervals off

1 Winning proposal by the Jahn/Goettsch team of Chicago—winners of a P/A citation for an underground city in the Mideast (Jan. 1977, p. 54); garden view (top) looking east. Entry **2** by the Takeuchi/Lai team, also of Chicago, one of the competition finalists.

Gordon Schenck

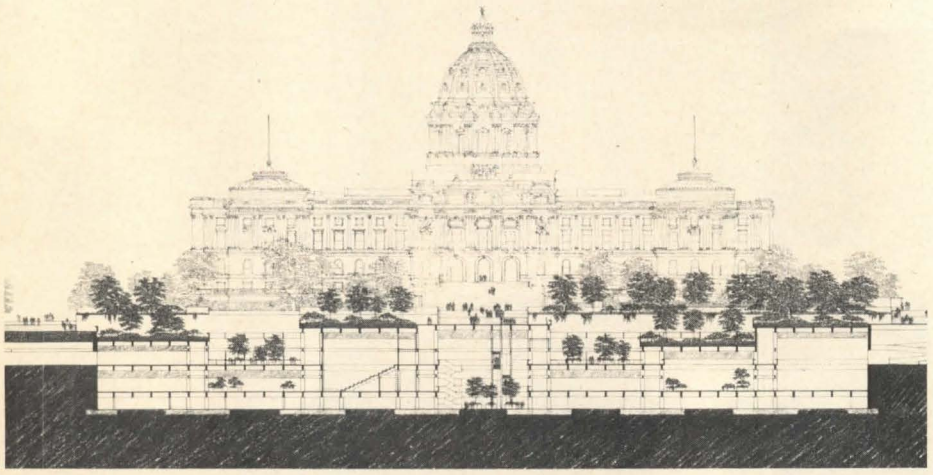


3

Gary Sherman

4

3 Dellinger/Lee proposal showing view of entry (top, right) looking into the museum;
4 Lockhart proposal with east/west section (below), team members included James McBurney, Michael McCarthy, Scott Wende;
5 Larkin/Cywinski team proposal.



Lawrence Williams

5

the skylit garden mall are branch corridors containing the required spaces: meeting rooms, public cafeteria, auditorium, and museum and classroom for the Minnesota Historical Society. Parking for 450 cars is provided on the lowest of the three levels.

The competition program called for a terratectural (underground) building which would preserve the integrity of the Capitol, completed in 1905, and grounds. The Capitol architect was St. Paul native Cass Gilbert, who was selected through a similar national competition in 1896.

'Shop Talk' theme for Aspen meeting

Gail Sheehy, author of *Passages,* will be a special guest at the International Design Conference in Aspen, CO, June 12–19. Using the exploratory approach of her book, the author will conduct autobiographical interviews with selected designers and architects also participating in the series.

The theme this year is "Shop Talk," and contrary to the practice of recent conferences, most the featured participants will be from the design profession or closely related fields. Among them will be nearly a dozen foreign designers including Ettore Sottsass, architect and designer, of Milan; John Tyson, corporate designer, of Toronto; Reyner Banham, historian, of London; and Moshe Safdie, architect, of Montreal.

Jane Thompson, associate in the architectural firm of Benjamin Thompson & Associates of Cambridge, is program

chairman. She is the former Jane McCullough, editor-in-chief of *Industrial Design* and architectural editor of *Interiors.* Reservation deadline is May 29; IDCA, Box 0, Aspen, CO.

Greene & Greene revisited in L.A.

There may never again be as much Greene and Greene collected under one roof as in the show which closed last month at the Los Angeles Municipal Art Gallery—just below Frank Lloyd Wright's Hollyhock house on Olive Hill. Organized by the University of Southern California School of Architecture and Fine Arts and the Municipal Art Department of the city, it was supported by a grant from the National Endowment for the Arts.

The exhibit opening coincided with publication of *Greene and Greene, Architecture as a Fine Art,* the definitive work on the Greene brothers (Charles and Henry) by Randell L. Makinson, curator of the Gamble House. (Peregrine, Salt Lake City; photos by Marvin Rand; introduction, Reyner Banham.)

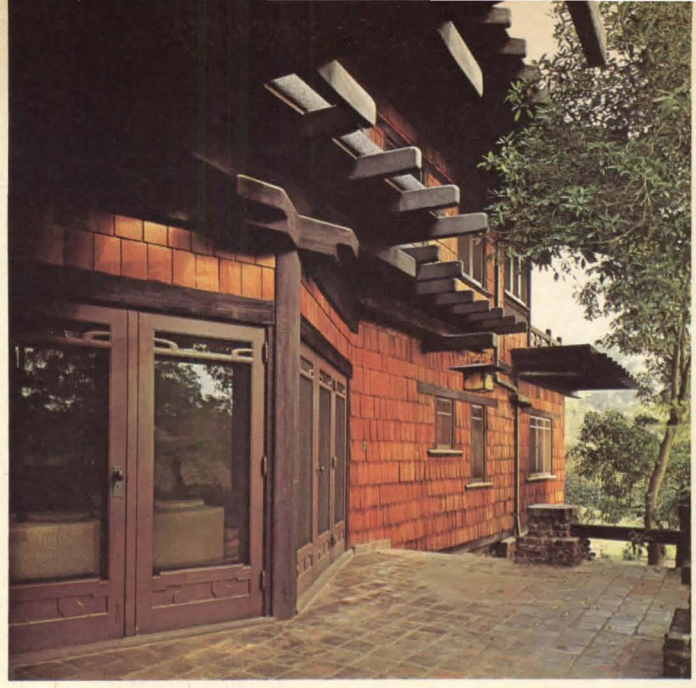
The robust exteriors of the Greene houses (handsomely caught in Rand's large blowups in color) with boulders and clinker brick bringing them down to earth, massive beams rounded at the ends, and the revealed structure feathered between with brown- or green-stained shingles all are striking in contrast to the refinement of Greene-designed furnishings. The grace of chairs and tables put together with ebony pegs and embellished with carvings and inlay of metal, wood, or semi-precious stones; the design in rugs as blurred as watercolor on wet paper; the flow of line and color in the stained glass windows, doors, and lighting fixtures, are again in contrast to the wood joinery and sculptural flow of the interior structure.

As Banham says, the Gamble house "is not so much craftsmanship run riot as a kind of controlled frenzy, in which nothing has been wrought totally out of reasonable shape, yet nothing has been left alone or left plain."

Makinson in his book follows the quest of the Greenes for appropriate forms through early stylistic confusion to what he calls "the ultimate bungalow," the height of which was 1907 through 1909. These were the years of the Greenes' most memorable houses: Blacker house, Pasadena, 1907; Gamble house, 1908; Pratt house, Ojai, 1909; Thorson house, Berkeley, 1909. The Ford, Irwin, and Spinks houses were of the same period.

By 1910 the public had lost interest in the shingle-clad bungalow, according to Makinson, and leaned instead toward Spanish revival with its plaster skin and tile roofs. This led eventually to dissolution of the firm of Greene & Greene, with Charles settling in the north and Henry remaining in Pasadena to design structures of wood.

A review of their work shows graphically their dependence on one another to reach what is one of the high points in American architecture. Without Henry's restraining hand it is unlikely that Charles would willingly have stopped elaborating on a design; without Charles' passion for total design we should have lost the richness so complicated, so sensuous, that it bursts out of the limits of the craftsman's movement to give us a few monuments beyond the dreams of a Stickley. [Esther McCoy]



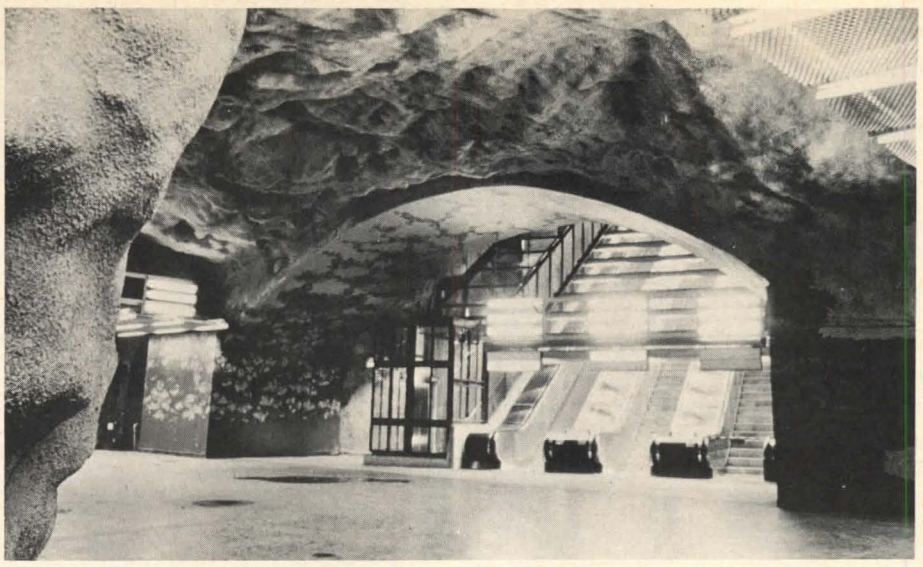
Greene & Greene's Blacker House (left), Pasadena, 1907, east elevation; Gamble House hall and living room (below), Pasadena, 1908.

Photos: Marvin Rand

Tennis anyone? AIA tournament

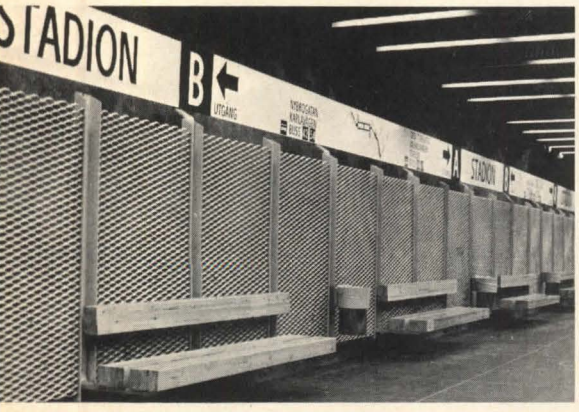
Olympic Architects National Tennis Championships at San Diego will be held June 3–5 at the Sheraton Harbor Island Hotel during the national convention of the American Institute of Architects in San Diego, Calif. Co-sponsors of this event of men's doubles and mixed doubles are Olympic Stain and the San Diego Chapter of the AIA. Entries must be received by May 20. Following the tournament a party will be held to present the awards. Further information is available in the AIA convention literature or from Olympic Tennis Tournament, P.O. Box 9640, Seattle, Wash. 98119.

Report from Stockholm



Stor Stockholms Lokal Trafik

Stockholm recent subways leave the rough tunnels as excavated.



Sten Vilson

Granite walls slightly camouflaged with screening.

Marc Treib

Rådhuset Station offers a contrast of textures.

Suspended ceilings provide both lighting and acoustic absorption.

Subways: the grotto effect

With underground travel an established fact, and the prototypical station engraved in our minds from prolonged exposure, it comes as a double shock to enter one of Stockholm's recent underground stations. There we don't find the usual tiled, arched wall and ceiling; and we seem to be instead in an unfinished station.

The first of these "grotto" stations, Masmo, opened several years ago, but the wall surfacing and color didn't provide the impact of the newer stations on the Täby line. The idea, formulated originally by head architect Michael Granit and his staff at the Stockholm transit authority, was to leave the rough tunnel as it was dug, while providing the necessary structural stabilization, to plaster over the interior and treat it as a continuous surface with artistic potential. The boarding area is approached in another manner: the platform is poured concrete and is covered by a suspended ceiling that provides both lighting and acoustic absorption. It's an intriguing idea both in its concept and realization.

But in actuality, the new stations are less a product of innovation than logical thinking and a reversion to techniques used for some time throughout the system in nonstation areas. The bedrock in Stockholm and most of Scandinavia is an excellent granite which renders interior structure unnecessary in most parts of the tunnels. Traditionally, the tubes between the stations have been left in their rough stage and sealed with a thin layer of concrete. Station areas, however, were treated in the traditional manner for aesthetics and for a psychological feeling of security. In this sense, the new approach is a dramatic departure.

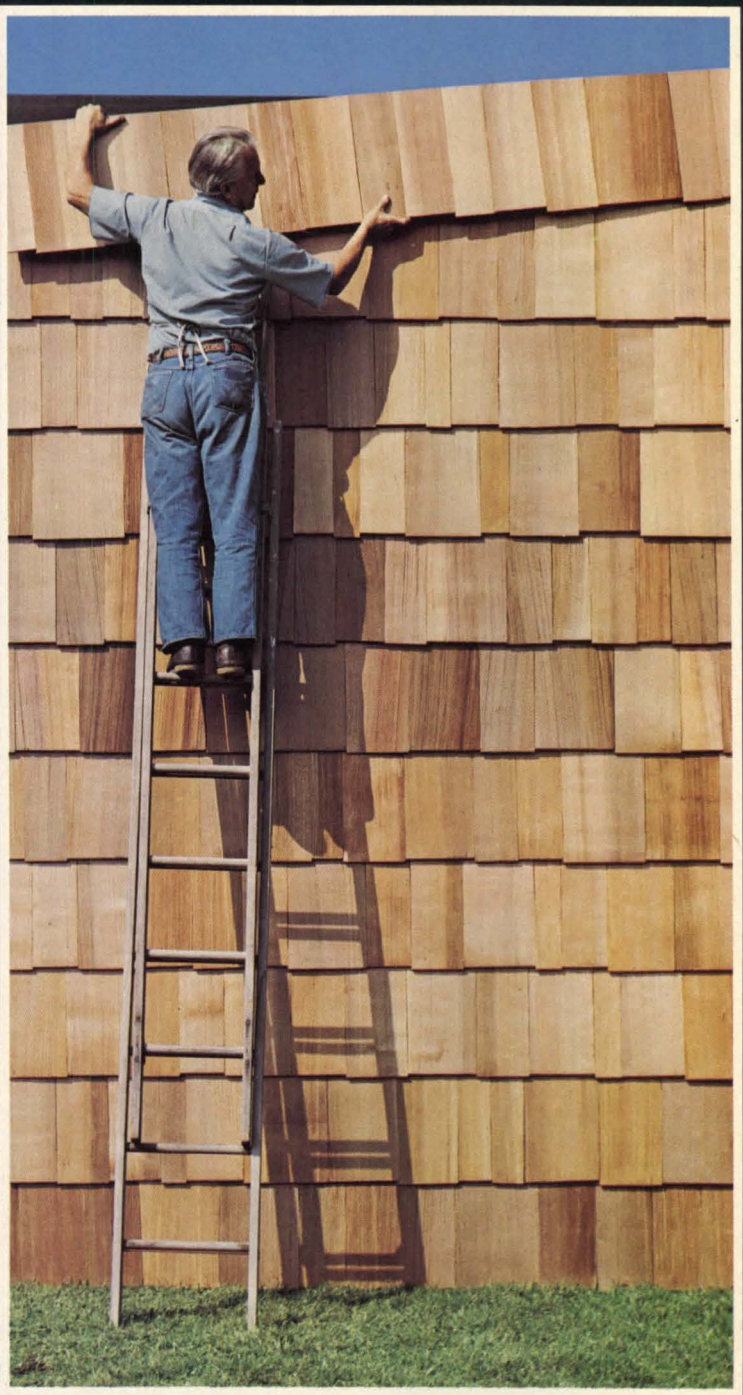
Acceptance of the grotto proposal, first taken rather skeptically, came as a result of the enormous saving in cost and construction time. A traditional station required considerable scaffolding while in the grotto stations all phases of the work after the initial tunnelling can proceed without delay.

The design concept, as explained by architects Michael Granit and Per Reimers, is that the entire line is regarded as one building. The variation and distinction of the "rooms" are products of collaborating artists hired by a Transit Art Board. [Marc Treib]

Mr. Treib teaches architecture at the University of California, Berkeley.

[News report continued on page 30]

Shakertown Panels win the cedar shake sidewall race.



What's the fastest way to install cedar shakes and shingles? With Shakertown Panels.

In fact, you can apply Shakertown Panels on sidewalls as much as 70% faster than individual shakes and shingles. But that's where the difference ends.

Because once they're in place, they look, last and insulate just like individual shakes and shingles. That's because 8 foot long Shakertown Panels are made of #1 grade shakes and shingles permanently bonded to a wood backing.

With Shakertown Panels you get all the things you like about individual shakes and shingles. Of course, there's one thing you won't get, and that's high labor cost. So why not find out more? Write us.

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more acclaim is coming for its "Best Supporting Performance."

Ten years of Ergonomic research by designer Bill Stumpf paid off in a new system of chairs you must sit in to believe. These chairs provide amazing back and circulatory support for any sitting position. It really takes an Osteopath or Vascular specialist to appreciate all that an Ergon Chair does do and doesn't do for a body. But the person whose body sits and works for any time in this chair knows that it is not a tiresome experience.

Already the Ergon Chair is a stunning success. The award-winning design, superb supporting performance and surprisingly low price add up to the fact that Herman Miller has brought forth a winner. A new classic.

Proving this to yourself is something you must do sitting down. Try any or all of the 5 basic models of the Ergon Chair (Executive, Management, Operational, Secretarial and Lounge). This can be arranged at any of our showrooms or participating dealers. For the location of the one nearest you, contact Herman Miller, Inc., Zeeland, Michigan 49464; Telephone (616) 772-3442.

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How properly installed the flammability performance

A. Standard polyurethane cushioning foam. B. A layer of VONAR 3 interliner coated on back of fabric. C. Standard nylon upholstery fabric.

The inside story.

To help you cope with present needs and future regulations on ignition of upholstered furniture, Du Pont presents the family of VONAR interliners.** The VONAR interliners have shown they can reduce both the likelihood of ignition of furniture as a unit, as well as reduce the burning rate of upholstered furniture in limited ignition situations.

Each VONAR interliner is a thin layer of specially formulated cellular elastomer which is added to furniture under the upholstery fabric. When used properly in furniture, the VONAR interliners totally envelop the cushioning material. Preliminary analyses of furniture to date indicate that the installed VONAR interliners have little or no effect on furniture comfort, aesthetics, or hand—and they can be added at reasonable cost.

VONAR interliners are available in three different application configurations from Du Pont licensed interliner manufacturers or their representatives.VONAR can be applied in any of three ways: as an envelope adhered to standard cushioning material, backcoated onto upholstery fabric, or sandwiched as a separate layer between the fabric and cushioning material.

*Du Pont trademark for interliner made by licensed manufacturers according to Du Pont specifications. Du Pont supplies the basic elastomer to such manufacturers, but Du Pont does not make interliners.

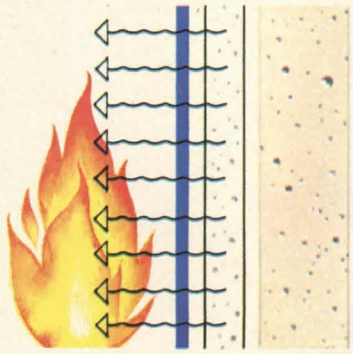
**Thus far there are three VONAR interliners, and they differ in thickness and performance. VONAR 3 has a 3/16" minimum thickness, VONAR 2 a minimum 2/16", and VONAR 1 a minimum 1/16". Tests by furniture manufacturers are necessary to determine which grade of VONAR will be appropriate in any specific furniture construction.

Tests have shown that the effectiveness of each VONAR interliner varies depending on which configuration is used, as well as upon types of upholstery fabric, furniture style, method of interliner application, etc. Since Du Pont only licenses manufacturers to make VONAR interliners, but does not make or install the interliners and has no control over the manufacture of furniture, Du Pont cannot be responsible for the performance characteristics (including flammability) of any type of furniture. Consult your furniture supplier for flammability information on specific types of furniture

The maximum contribution obtainable from VONAR interliners occurs when the interliners remain intact. If VONAR is ripped or cut, exposing flammable cushioning materials beneath it, the degree of protection provided by VONAR is diminished. For that reason, VONAR interliners are not recommended for rapid transit, public assembly seating or other use areas where there is concern about vandalism and intentional fire.

What VONAR interliners can do.

In preliminary tests, ignition of furniture as a unit, when properly constructed with VONAR, has been delayed significantly beyond the time afforded by the same piece of furniture without VONAR when subjected to cigarette or limited open flame ignition sources.



The process by which VONAR performs involves three stages:

1) When subjected to the heat of an ignition source, VONAR generates water vapor which helps cool both the fabric and the cushioning material, and helps reduce the exposure of the fabric surface to oxygen.

2) Under more intense heat, VONAR decomposes further, releasing a flame retardant.

3) Finally, decomposition of VONAR forms a char layer which helps insulate the cushioning material from heat and helps limit the oxygen flow to the cushioning material.

VONAR* interliners improve of upholstered furniture.

Ten and one-half minutes into this test the office chair constructed without VONAR is totally involved. The chair constructed with VONAR had ceased to burn when the paper fire went out (test details upon request).

The test described here does not demonstrate that all furniture using VONAR interliners will perform in this manner or will not burn under actual fire conditions. The test was not conducted to assign "numerical flame spread ratings" to any materials involved. The results show only that specific types of chairs which used VONAR interliner properly, performed as indicated under the test conditions. Since Du Pont does not make furniture or make or install interliner, we cannot assume responsibility for furniture performance.

Demonstrated performance.

Du Pont and others under our direction have subjected a number of upholstery constructions using VONAR interliners to both cigarette and open flame ignition sources.

Testing has been performed using cigarette ignition standards developed by the National Bureau of Standards for consideration by the Consumer Product Safety Commission. These tests have shown that VONAR will improve the cigarette ignition performance of most fabrics and constructions tested. Please note: there are some fabrics and constructions that will fail cigarette ignition even when VONAR is used properly.

Further tests designed to approximate actual limited open flame situations have shown the effectiveness of the interliners. For example, the photograph above of two otherwise identical chairs shows how the one without VONAR (left) became totally involved when exposed to an open flame generated by a wastebasket fire. The chair constructed with VONAR (right)) formed a char layer where contacted by flame. And it stopped burning when the wastepaper fire burned out, before the flames had reached the polyurethane foam cushioning. Du Pont will continue to test various furniture styles containing VONAR and report the findings.

Protection against imitations.

Specify VONAR interliner in furniture. The VONAR trademark means the interliner is made by a licensed manufacturer according to Du Pont specifications.

Du Pont assists licensed interliner manufacturers by testing samples regularly for formulation, thickness, and physical properties, and monitors proper use of the VONAR trademark with respect to interliners and furniture.

For more information, ask your furniture supplier about VONAR interliners. Or ask Du Pont. Use the coupon below, or write: Du Pont Company, Room 25331, Wilmington, DE 19898.

VONAR* Interliner

*Du Pont Trademark for interliner made according to Du Pont specifications.

Mail to:
Du Pont Company, Room 25331, Wilmington, DE 19898.

Please send me:
☐ further technical data and test results
☐ a list of furniture manufacturers using VONAR
☐ a list of licensed manufacturers of VONAR

Name_____ Phone_____

Title_____

Company_____

Address_____

City_____

State_____ Zip_____

DU PONT

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News report continued from page 24

P/A receives editorial citation

Articles on housing that appeared in last year's March and August issues of *Progressive Architecture* have received a Certificate of Merit from the American Business Press, which annually conducts an awards program considered the most rigorous in business journalism. The articles cited were those in the March issue on high-rise vs. low-rise housing and in the August issue on single family houses. Projects winning Awards and Certificates were selected from among 417 entries by a panel of 12 jurors.

Ross named a P/A West Coast reporter

New on the masthead of *Progressive Architecture* is Michael Franklin Ross, a practicing architect in Los Angeles and member of the editorial board of *L.A. Architect,* publication of a local component of the American Institute of Architects. Ross' activities as correspondent will supplement those of long-time P/A contributor Esther McCoy.

A.H. Han

P/A correspondent Michael Ross

Ross is senior projects architect with Daniel, Mann, Johnson & Mendenhall where his work has included a theater for Santa Barbara Community College, the Wally Findlay Gallery in Beverly Hills, and the Los Angeles Union Station revitalization. He came to DMJM from the New York office of Hardy Holzman Pfeiffer Associates; prior to that he worked in the San Francisco office of Skidmore, Owings & Merrill. He worked in Hawaii as an architect for two years and also produced multi-media educational programs.

Ross received a bachelor of architecture degree from Cornell University in 1966 and a masters in architecture and urban design in 1967 from Columbia University.

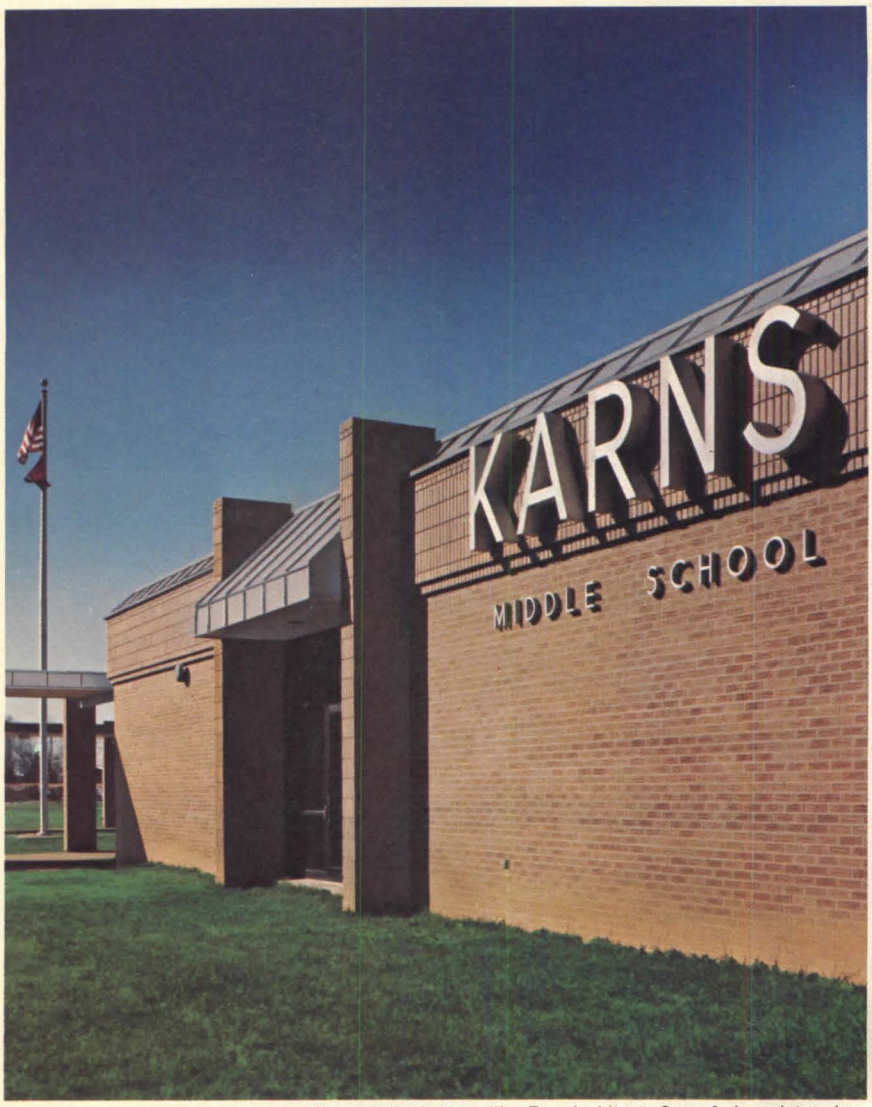
In 1968 he studied the arts and social institutions of Japan at the University of Hawaii. His awards include a Fulbright scholarship, which he took at Tokyo University, and a traveling fellowship during which he studied the morphology and evolution of European river cities. He is a member of the American Institute of Architects and has contributed articles to architectural journals since 1968.

Mayoral Awards for the arts

Architect Philip Johnson was one of some two dozen citizens honored by Mayor Abraham Beame for their contributions to the arts in New York. John-

[News report continued on page 32]

Reduce on-site costs
of coping, flashing, fascia, mansards



Karns School, Knoxville, Tn., Architect: Guay & Associates, Inc., Installation: Tri-State Roofing Co., of Tenn.

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News report continued from page 30

son was the only architect in the group, which included leaders in traditional fine arts as well as those in film, photography, fashion, and philanthropy. The First Mayor's Awards of Honor in Arts and Culture were presented at Lincoln Center, a project for which Johnson was one of the architects. During the ceremony, Mayor Beame announced that in 1979 New York will host the first International Exposition of the Arts, and he named Martin E. Segal, chairman of the New York Commission for Cultural Affairs, to take charge of its planning.

Women's exhibit: a timely tribute

The opening of the "Women in American Architecture" exhibit will be remembered not for any political or social manifestos but for the fact it was held at all—a *women's* show, as if it were different from mainstream architecture. The answer to the question, will women ever be assimilated completely into the profession, remains tantalizingly unforeseeable.

Norman McGrath

'Women in American Architecture' Brooklyn Museum installation.

Reactions varied to the exhibit, handsomely installed at the Brooklyn Museum, New York; many were
[News report continued on page 38]

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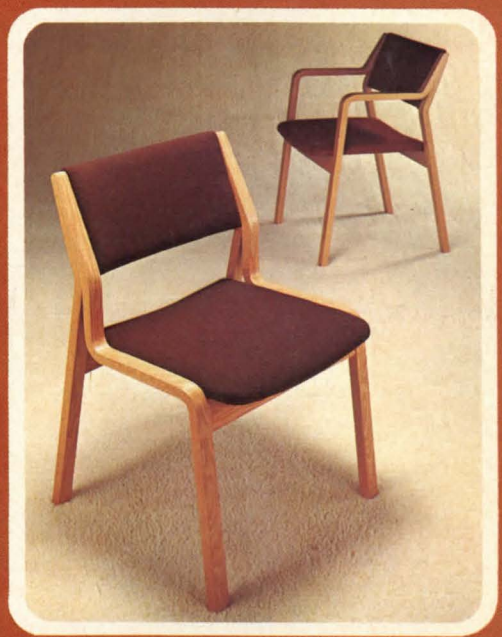

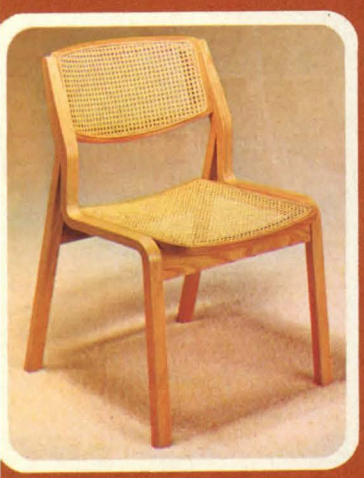

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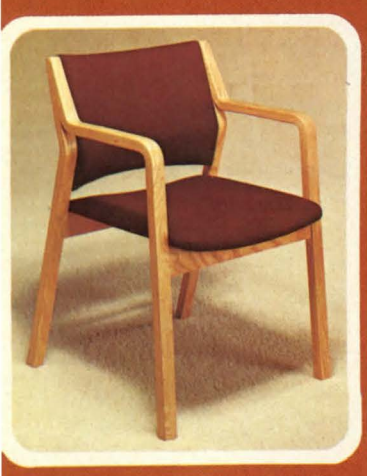
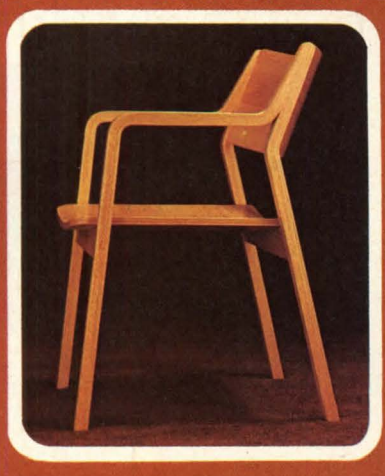
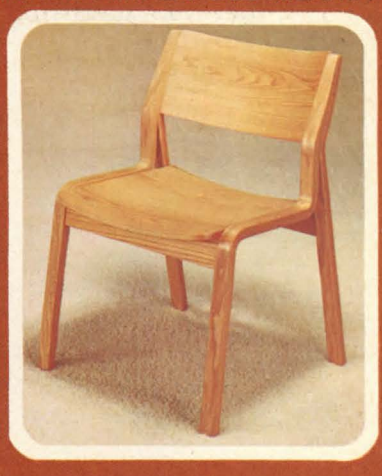






News report continued from page 32

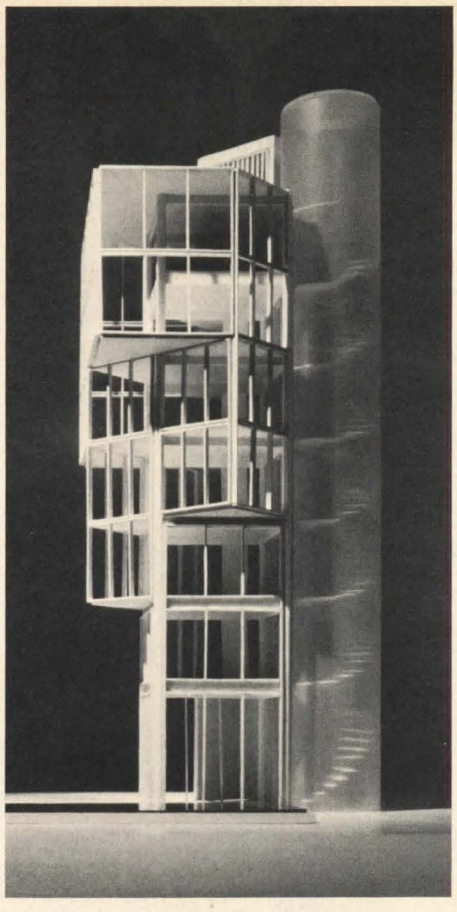
curious to see if there were noticeable differences between buildings designed by women and those by men; there are not, except that the majority of work shown represents commissions of smaller scope than one would expect to see from a broader group over the same period (1860–present).

Male viewers tried hard not to be patronizing in their approval or harsh in criticism. Aside from who was included and who excluded, the most talked about feature was the exhibit's installation on 100 drafting tables arranged in rows to fill the long, narrow gallery. The effect was of an uninterrupted, densely spaced drafting room; when filled with viewers, all in rows facing the same direction, the arrangement gave a strong suggestion of ceremony.

The intention thereby was to induce people to spend more time with the exhibits and to discourage cursory overviews. This treatment also made the works accessible to a large number of people—an estimated 600 attended the opening night—but the accompanying written explanations, some lengthy, drew negative reactions. One person complained that the exhibit appeared like the layout of its counterpart, the book *Women in American Architecture,* published by Watson-Guptill, New York, and compiled by the organizer of the show, New York architect Susana Torre with Marita O'Hare, administrative director of the Architectural League of New York. The League's Archive of Women in Architecture material formed the nucleus of the exhibition, which will remain at the Brooklyn Museum through April 15 and thereafter travel to Cambridge, Colorado Springs, Houston, and Chicago.

Chicago Seven playing the role

First there was the New York Five, and then the Los Angeles 12. Now arrives the Chicago Seven—seven Chicago architects (James Ingo Freed, Stanley Tigerman, Stuart Cohen, Benjamin Weese, Laurence Booth, James Nagle, and Thomas Hall Beeby) who staged a conceptual architectural show at Chicago's prestigious Richard Gray Gallery in December. Since conceptual architecture is not to be found on every Chicago street corner, we are witnessing here a phenomenon that requires some coming to terms.



Laurence Booth's irony on a high-rise house.

The exhibit is, of course, one more play for the recognition accorded its coastal brethren. Like the L.A. 12, the Chicago Seven have little in common stylistically or theoretically, except a desire to goad the East Coast intellectual/publishing axis into paying more attention to the "regions."

But there is something more, something peculiar to Chicago in 1976, which neither has begun or ended with an art show. And this is Chicago's image as a "Mies city." The exhibition is an attempt to open up Chicago in its own eyes and in the eyes of others.

Chicago is not nor ever has been a monolithic city, but as some of the best post-war work came from Mies van der Rohe or from his students, Chicago acquired such a reputation. Later, with its insecurities, Chicago began to feel only as good as its ability to fulfill that reputation. A twist, but not an unnatural one.

The breakthrough generation bequeaths its revolution to the functionaries, playing it safe. Chicago is not a "Mies city" any more than it was a "Sullivan city" or "Root city." They were all foreigners who came to Chicago because it had money and just enough prominence and need to support them without the established, ultra-refined communities of scholars and artists to interfere.

Chicago, through it all, has remained a meat-and-potatoes, give-me-the-bottom-line city suspicious of intellectuals, high culture, elegance, and—most emphatically—outsiders. Some of this, perforce, has rubbed off on architecture.

It was in Chicago, not Germany, that Mies said: "You don't have to invent a new architecture every Monday morning." It was as an old man that he said it. As a young one, he couldn't get rid of Sunday night fast enough. So when the Chicago Seven staged a show, it was like coming out of the closet. The Mies disciples cannot see anything in architecture except program and structure (a view so narrow, it must be sending the misunderstood Mies revolving in his grave). A conceptual architecture show is a much-intended slap in the face to such disciples.

Hedrich-Blessing

Thomas Beebe: salvaging symbolist content.

These architects are indeed enacting the roles of yippies, militants, and conscientious liberals—as their name facetiously but appropriately implies.

Not that it really matters in this context, but the show wasn't bad at all. The task was to create a house liberated of client and anything but the most rudimentary functional requirements; but it had to be one that was buildable. (It's not certain whether this last-minute retreat from fantasy has to

[News report continued on page 43]

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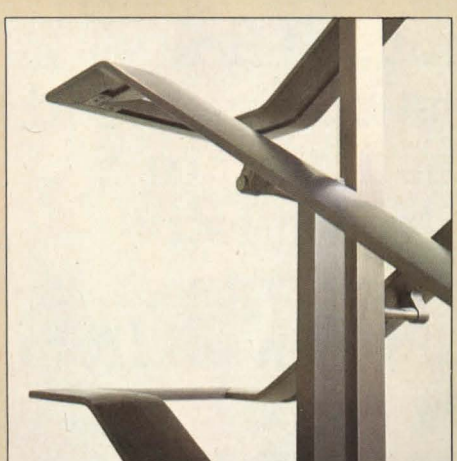

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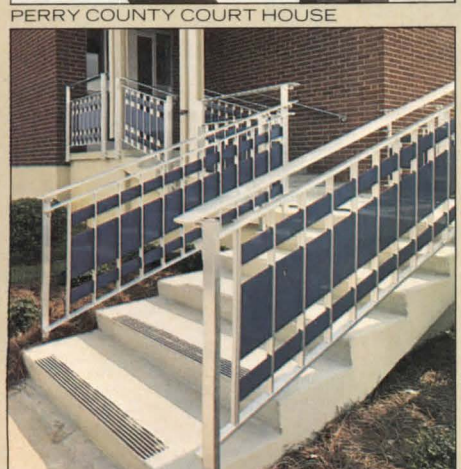

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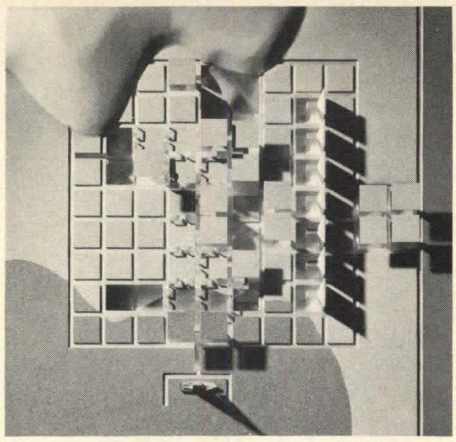
News report continued from page 38

do more with the feet-on-the-ground Midwest approach or with the architects' recession-and-greed-driven desire to find patrons to actually construct the things.)

Beeby's almost symbolist drawings bear the least resemblance to his built work, which is sheer glass and steel. Disillusioned with the possibility of any building ever really remaining abstract, Beeby has chosen to invest in the poetic metaphors and architectural conventions of the past as a way of salvaging the symbolic content of architecture. His Midwestern farm as Palladian villa is pieced together with heavenly domes, eternal hearths, and a virgin on a unicorn.

Freed has gridded an ideal landscape setting nature in uneasy juxtaposition to man's conquering reason. Mathematical typologies, allusions to architectural prototypes at Paestum, Isfahan, etc., and polarities of form play the game out to its inconclusion.

Cohen, inspired by John Hejduk's



Nathaniel Lieberman

James Freed: house in an ideal landscape.

wall houses, extends the concept to involve Venturi's idea of the building behind the billboard. It is perhaps the most direct challenge to Chicago's "Mies-and-potatoes" presumptions.

Booth and Weese make disparaging visual commentary on contemporary society. Tigerman suggests a man-centered myopia to the eternal struggle/embrace with the rest of the natural world. And Nagle has designed a modified de Stijl house.

Not all managed the delicate transubstantiation of architectural drawings as art rather than illustration, but then the polemic of conceptual art covers them on that score in its sanction of documentation. The fact that the gallery was willing and that traffic was especially heavy indicates not only a growing interest in architecture but also an interest in Chicago architecture's growth. [Nory Miller]

Ms. Miller is managing editor of Inland Architect.

How to start a preservation effort

Communities needing a catalyst to begin a preservation effort may apply to the National Endowment for the Arts for assistance. Under its City Spirit program the NEA will assign an experienced professional to visit the city or community for several days to "facilitate" discussions and guide the process of exploration. Private and public tax-exempt groups may apply as well as local public agencies.

National Trust buys McCormick Building

The National Trust for Historic Preservation has purchased the historic McCormick Apartments (1917) at 1785 Massachusetts Ave., N.W., in Washington, D.C. and will convert the building into its headquarters.

The five-story Beaux-Arts structure is a National Historic Landmark and was purchased from the Brookings Institution for $1.34 million. The building is historically significant because it is where Andrew Mellon founded the National Gallery of Art.

Located a block off Dupont Circle, the building contains six apartments and rooms for 40 servants (who arrived and departed via their own interior circulation system). It was designed by J.H. DeSibour, a prominent architect, for Stanley McCormick, son of the inventor of the reaper.

Among the building's famous tenants were Lord Duveen, who took an apartment to show Mellon a collection of 42 paintings that Mellon bought for $21 million; Washington hostess Perle Mesta; diplomats Sumner Welles and Robert W. Bliss; and financier Thomas Fortune Ryan.

Jack Boucher—HABS

McCormick Building acquired by the National Trust for Historic Preservation to be used as the Trust's national headquarters.

The National Trust's plans for the building are to convert it into first-class office space. The Trust is expected, at the start, to lease two floors while reserving three for its own use.

The architectural firm of David N. Yerkes & Associates, with Nicholas A. Pappas as partner-in-charge, is developing the plans. Construction is to start in the fall and be completed a year later. The conversion is estimated to cost $1.9 million.

In 1971 and 1972, the building served as headquarters of the American Institute of Architects, while the Institute was building its new quarters.

[News report continued on page 46]

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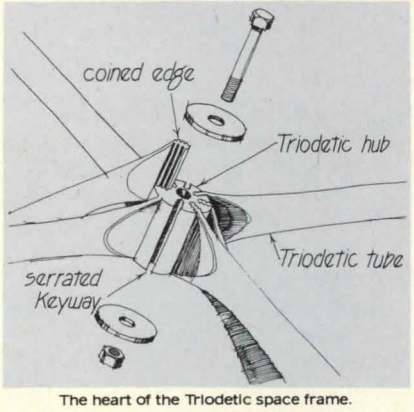

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News report continued from page 44

Personalities

C. Edson Armi, assistant professor of art at the University of Chicago, has received the Founders' Award of the Society of Architectural Historians.

Calendar

Through May 23. "The Royal Pavilion at Brighton," Cooper-Hewitt Museum, New York City.
Apr. 17–20. Environmental Design Research Association annual conference, Urbana-Champaign, IL.
Apr. 20. Seminar/workshop on barrier-free architecture, sponsored by the Long Island Chapter, AIA, New York Institute of Technology, Old Westbury.
May 5–6. Institute on hospital interior space design, American Hospital Association headquarters, Chicago, IL.
May 6–7. "Practical Perspectives on Recycling the City: The Entrepreneur as Hero," conference sponsored by the Association for Rational Environmental Alternatives, Houston, TX.
May 6–June 18. "Women in American Architecture: An Historical and Contemporary Perspective," Hayden Gallery, Massachusetts Institute of Technology, Cambridge.
May 14. Underground America Day.
May 27–29. Aspen Energy Forum 1977, Aspen, CO. Conference, sponsored by the Roaring Fork Resource Center, has solar architecture for its theme.
June 5–9. American Institute of Architects convention, San Diego, CA.
June 6–10. International Solar Energy Society, American section, annual meeting, Orlando, FL.
June 19–27. Eighth annual World Game workshop, University of Pennsylvania, Philadelphia.
June 20–22. Construction Specifications Institute convention and exhibit, Denver, CO.
June 22–24. NEOCON, National Exposition of Contract Interior Furnishings, Merchandise Mart, Chicago.
June 24–26. Toward Tomorrow's Fair '77, University of Mass., Amherst.
July 22–25. American Society of Interior Designers national conference, Houston, TX.
[News report continued on page 50]

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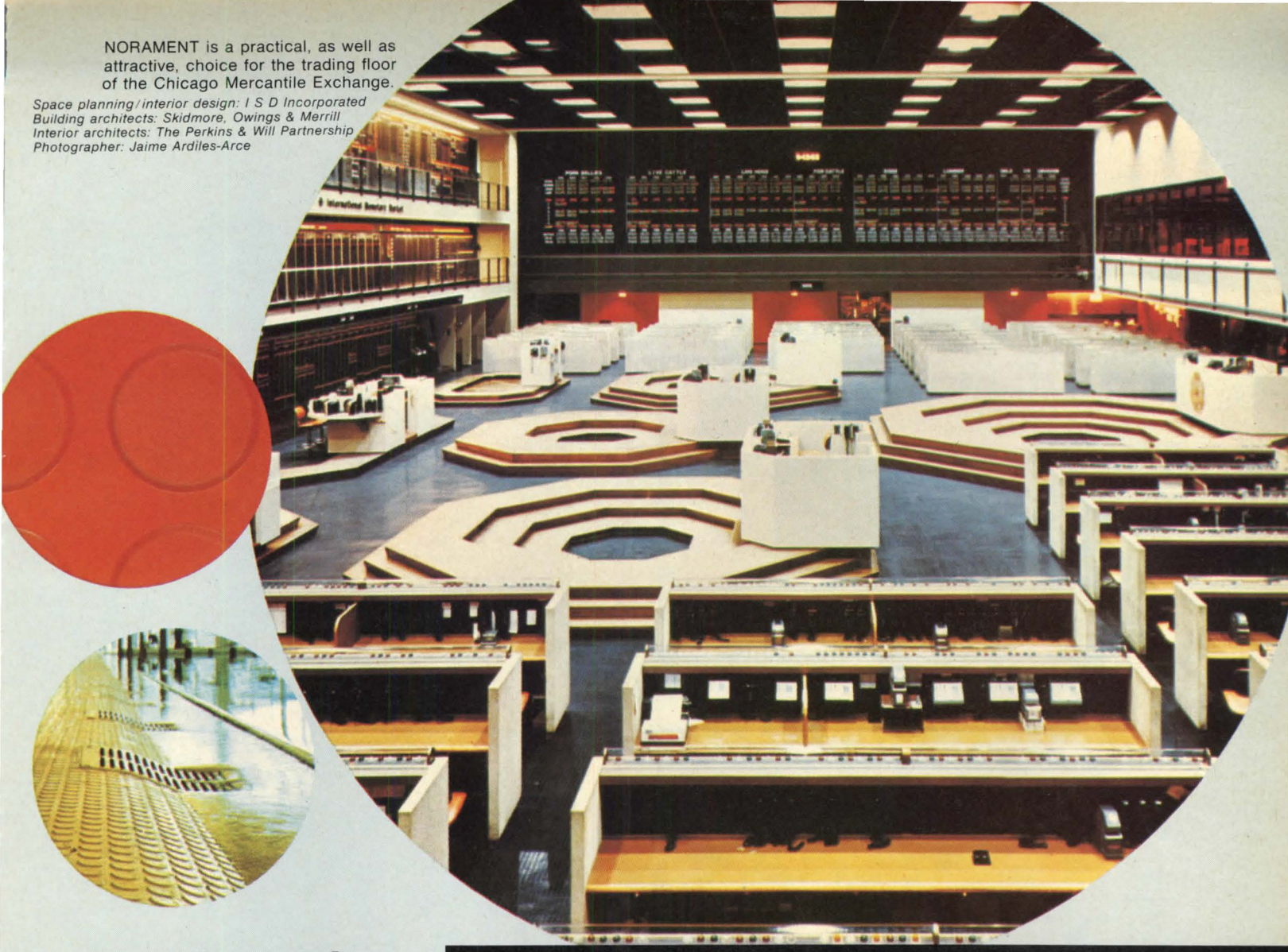

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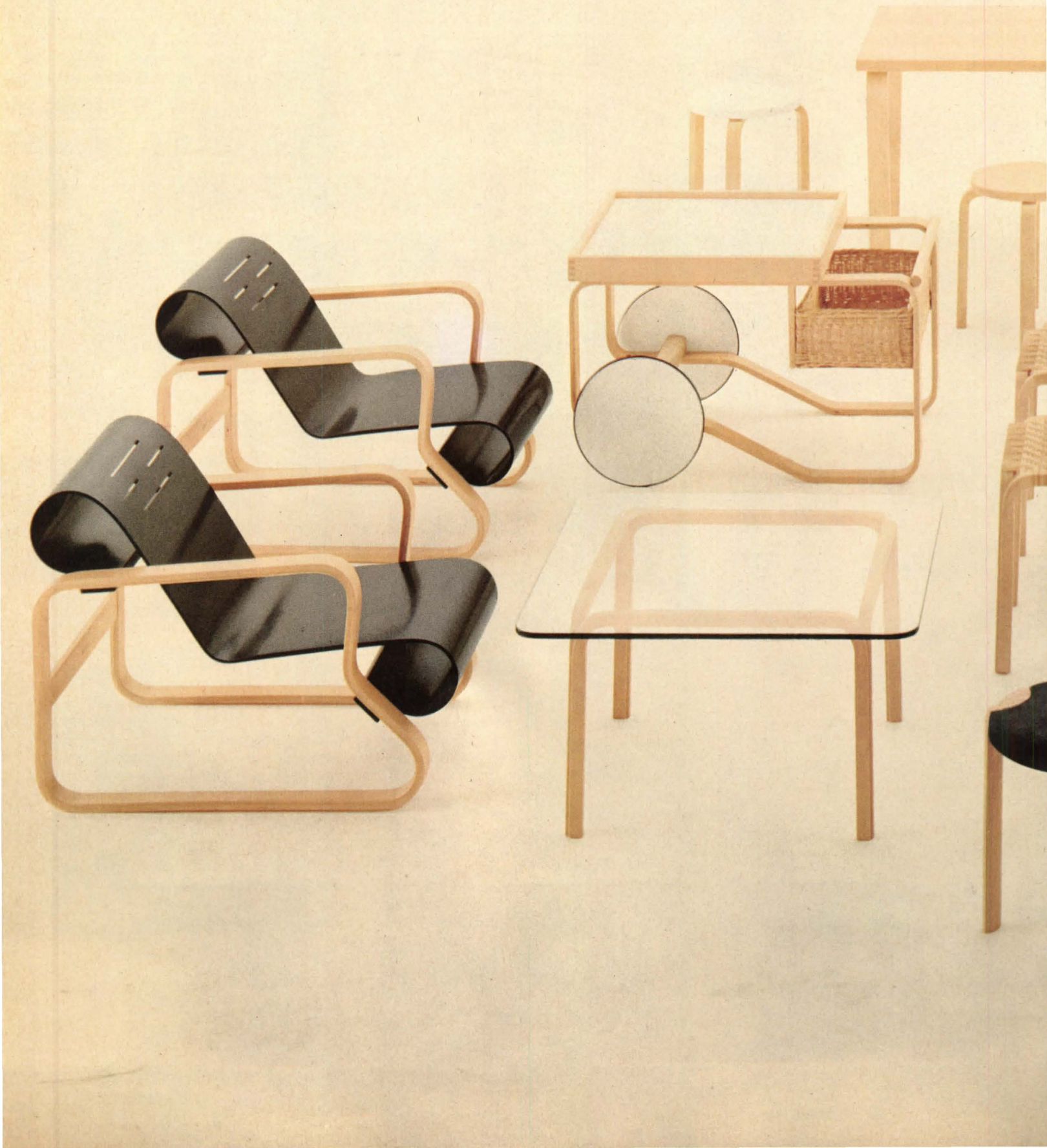

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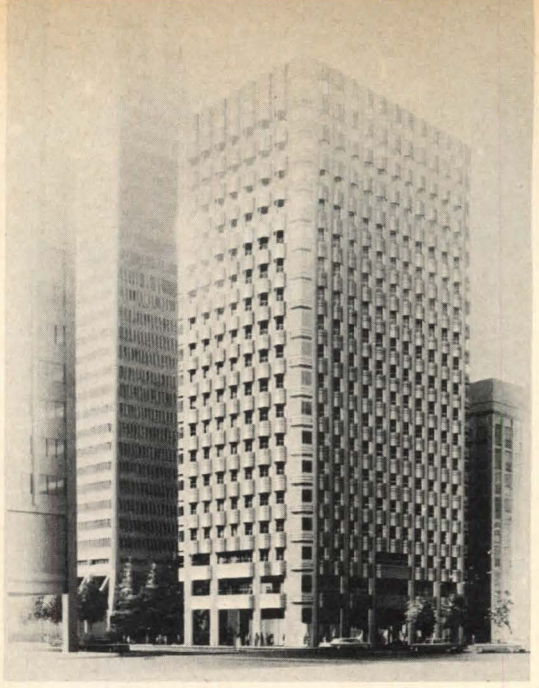

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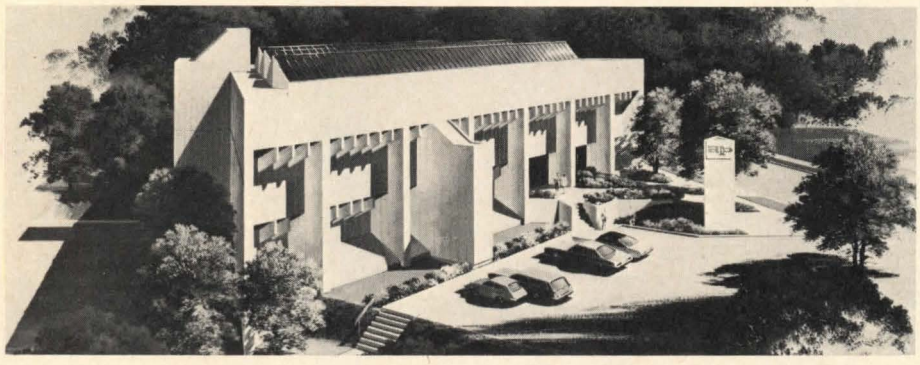

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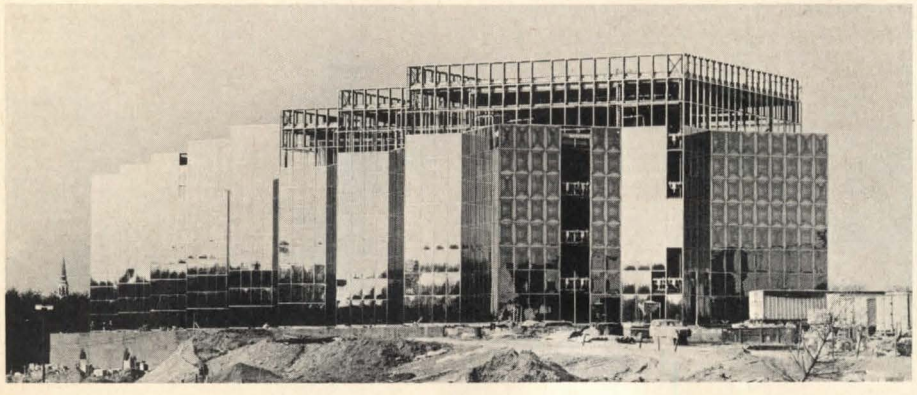


3A

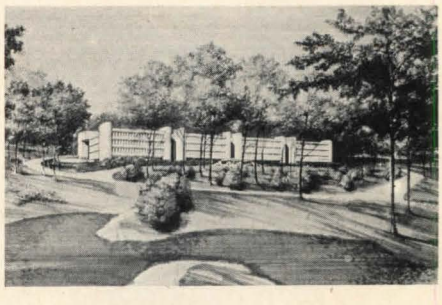
B

1 San Francisco high-rise—A 19-story office building in San Francisco's financial district will enter construction this spring. The architect is William L. Pereira Associates, which also designed the controversial Transamerica Pyramid high-rise nearby. The building replaces the Niantic House, built in 1851.

2 Power company's solar project—Cobb/Adams/Benton of Birmingham is the architect for a solar demonstration project of the Alabama Power Company. The company office building in Montevallo, AL., will have solar collectors and energy conservation features. Computer studies indicate a 27 percent energy saving over a similar conventional building. The $1.2 million project is part of the demonstration program of the federal Energy Research and Development Administration.

3 Reynolds expanding—World headquarters (A) for R.J. Reynolds Industries will be completed later this year in an industrial park not far from downtown Winston-Salem, N.C. The architect is Odell & Associates of Charlotte. Expansion of Reynolds Plaza downtown has been announced with the Winston-Salem firm of Hammill-Walter & Associates designing the 16-story office tower and galleria (B) adjoining the existing 48-year-old building. Construction will begin in 1978 following removal of other structures on the block.

4 Suburban corporate headquarters—Xerox Corporation is building a 250,000-sq-ft headquarters, to cost less than the originally estimated $25 million, in the residential suburbs of Stamford, CT. The architect is Charles Luckman Associates, New York. The three-story linear building will be sited on 25 wooded acres.



4

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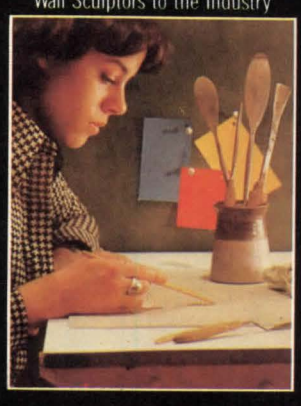

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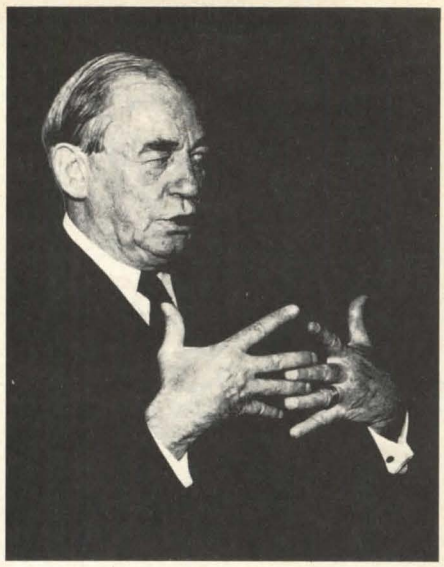
On Aalto



When Alvar Aalto died last year at the age of 78, the world lost a rare master of architecture, whose contributions ranged from lamps to city plans. P/A's survey of his career, culminating with key recent works, opens with testimonial statements—on the following pages—concerning the special pertinence of his example to us in America today.

Academic Bookstore, Helsinki. Photo: David Morton

Robert Venturi: Learning from Aalto

Alvar Aalto's work has meant the most to me of all the work of the Modern masters. It is for me the most moving, the most relevant, the richest source to learn from in terms of its art and technique.

Like all work that lives beyond its time, Aalto's can be interpreted in many ways. Each interpretation is more or less true for its moment because work of such quality has many dimensions and layers of meaning. When I was growing up in architecture in the 1940s and 1950s Aalto's architecture was largely appreciated for its human quality, as it was called, derived from free plans which accommodated exceptions within the original order, and from the use of natural wood and red brick, traditional materials introduced within the simple forms of the industrial vocabulary of the Modern architecture. These contradictory elements in Aalto's work connoted—rather paradoxically it seems now—qualities of simplicity and serenity.

Aalto's buildings no longer look simple and serene. Their contradictions now evoke complexity and tension. Aalto himself has become an Andrea Palladio of the Modern movement—a mannerist master, but in a low key. Among the complexities and contradictions I see in his work are its conventional architectural elements organized in unconventional ways, its barely maintained balance between order and disorder, and its effects of plain and fancy, of the modest and the monumental at the same time.

Now that we can survey Aalto's whole *oeuvre* the conventionality and consistency of his work is very apparent. There is little change in the direction or development of his work over the years in comparison with the varied evolutions in Le Corbusier's work, or even in comparison with those changes between early and late Mies van der Rohe. Moreover, the elements of Aalto's architecture—the windows, hardware, columns, light fixtures, furniture, materials (except for the wood and brick)—are conventional in their [continued on page 102]

Romaldo Giurgola

At the end of World War II, while it was yet impossible to perceive the immensity of destruction, a debate on the merits of rebuilding towns on new sites went on in Italy. Architects of the Bauhaus logic, aggressive as ever, generally favored the construction of new places, down from the medieval hills into the valleys, close to rails, airports, and industries.

At that time, *Casabella* translated one of the very few writings of Alvar Aalto: commenting on the destruction of war, he suggested that if the only relic of a burned-down house was the brick chimney stack, that alone was a good reason to build again at the same place, piece by piece, mending the human fabric from those scattered fragments of life. For Alvar Aalto needed a sign to begin, his aspiration was toward a place, a new place with a tie with the past, however tragic.

His architecture became a dimension of the possible: his form would be deduced from the environment, not against it or assimilated with it, in a kind of sublimation process where the genesis of form becomes as subtly perceptible as natural laws are perceptible in the environment. As a consequence, his buildings are exceptionally limpid and perfectly adjusted. They are no less positive and structured than a theoretical concept—his work being most coherent and yet least supported by theoretical declarations.

Since the days he worked for the Gothenburg Fair with Gunnar Asplund, with whom he shared common roots of historic and natural form, to his plan for Helsinki, made in the footsteps of Engel and Saarinen, his work was always within the stream of the Modern Movement, beginning with William Morris and encompassing the organicism of Frank Lloyd Wright, as well as the lyric expressions of Le Corbusier. And yet Aalto's work goes beyond these sources. Aalto was able to maintain the integrity of each experience in the identity of place and in the humanization of architecture. For him architecture meant creating spaces in which the humanity of man could appear pure and luminous. The beauty of his architecture is in that humble submission to chance, in the acceptance of risk that only artists dare. As any honest artist, his only aim was "good," not beautiful work.

Among the innumerable failures of contemporary architecture: the approximations, the vulgarities, commentaries, sterile concepts, and abstruse theories, Alvar Aalto and Finland remain with the single consistence of a poetic humanistic expression, maintaining the value of the Modern Movement in architecture.

Romaldo Giurgola is a partner in the firm of Mitchell / Giurgola Associates, New York and Philadelphia, and a professor at the Columbia School of Architecture.

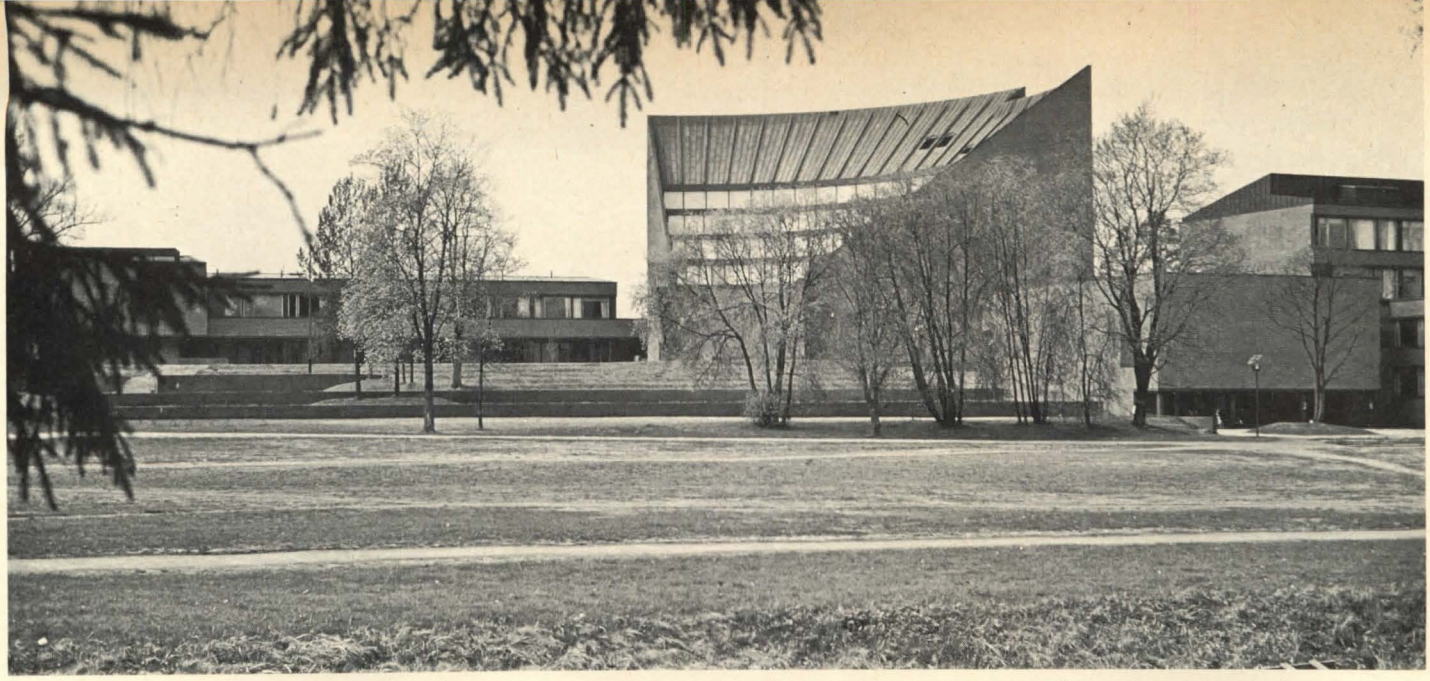
Gunnar Birkerts

I can only talk about Alvar Aalto from that level at which the personal and professional intersect. Whenever I look at his work or stand inside one of his buildings I experience an unavoidable resonance. He is, without a doubt, my most profound architectural influence. This is the first time that I have tried to write about his importance for me.

Aalto is not a self-proclaimed master. I see him as a natural genius who worked without dogma and never sought to contrive solutions. He has been the only great humanist in times of International Style and Bauhaus. Aalto, always the architect, never stopped being the artist and sculptor. He worked from an idea and invariably carried it through to a total design solution.

I have always considered Aalto as a regional architect. His work is not necessarily exportable to every other part of the world. He was sensitive to the limited wealth and resources of his native Finland. The natural siting of his buildings, the choice of materials, and the recognition of that rare commodity in Finland, natural light, all reflect this. Aalto is the master at creating meaningful space through the use of light.

Architecturally, he was able to synthesize Finland's needs into perfect solutions. I doubt whether Fifth Avenue in New York, or Miracle Mile in Chicago, could call forth the



Institute of Technology, Otaniemi. Photo: David Morton

best of Aalto. I say this even as I recognize that his sensitivity and design methodology could have responded with strength and purpose to the problems of urban America.

An analytical search would reveal that all the ingredients of design are present in his work. Simplicity and complexity, symbolism, metaphor, illusion, and contradiction, etc., are all accounted for. What fascinates and consoles me is that Aalto did not isolate and identify these in his conception. They seem to have taken their places naturally. Therefore, most attempts to put Aalto into words have not been successful. He made no public exposition of his design methodology and philosophy. Perhaps that is the reason why his work and ideas resonate so strongly within me. I am free to respond to his work without Aalto or someone else telling me how or why. Aalto speaks clearly through his work.

Gunnar Birkerts, is principal of Gunnar Birkerts & Associates, Birmingham, Mich., which has a commission to design a new U.S. Embassy for Helsinki.

George Baird: Between Loos and Wagner

I have written elsewhere (*Alvar Aalto,* Thames & Hudson, 1968) of Aalto's relative detachment from the modern European architecture of the so-called "heroic period." Now that he is dead, it begins to appear that the end of his career may prove provocatively "detached" from mainstream architecture now, as its beginning was from the vanguard monuments of 50 years ago.

Like other concerned observers of modern architecture's current disintegration, I have recently been taking a closer second look at the historical situation out of which that architecture grew. In particular, I have been reviewing the important pre-1914 Viennese work in which the names of Adolf Loos and Otto Wagner loom so large.

Loos, of course, is generally viewed as a precursor of modern architecture per se, while Wagner tends rather to be seen as a major representative of a previous style. Yet is it not interesting to note how intensely concerned both

[continued on page 104]

Ake T. Tjeder of Artek

What we know today as Scandinavian Modern began as a movement in Sweden in the late 1920s known as "Vackrare Vardagsvara," which meant something like "surround yourself with beautiful things in the home," such as flatware, textiles, furniture, etc. One of the leaders of that movement was Gregor Paulsson, a teacher who was a friend of Aalto's. That movement and other influences caused Aalto to wonder why everyone couldn't have well-designed things in their homes. From talking to young people who were starting new homes, often in small apartments, Aalto became aware of the need for smaller-scaled furniture to fit those spaces. No one in Finland was dealing with the problem of furniture at that time, and what was available was too big and clumsy for the new homes.

One of the prime tenets of the "Vackrare Vardagsvara" movement was its concern for using good, available materials. Aalto was certainly aware of this attitude, and it is reflected in his consistent use of Finnish birch. This wood was readily available, it was strong, it could be bent, and to Aalto it had a most pleasing color.

Aalto's first international recognition came with the construction of the Paimio Sanatorium and with his designs for the furniture used there. But the Paimio Chair and other furniture became the furnishings of the intellectuals instead of those for the people, as Aalto had always wished. Now, however, more than 40 years later, the furniture is used, especially in Finland, for the purpose for which it was originally intended.

Today, production at Artek is going fast. The biggest markets are in Scandinavia, Italy, and the U. S. The most produced items are the side chairs and stools, of which about 50,000 are made each year. After those, about 12,000 to 15,000 tables are produced per year. The demand for armchairs continues to rise, with about 8000 to 9000 now being made each year. All of the furniture is still handcrafted, now under the supervision of Elissa Aalto.

Ake T. Tjeder is the managing director of Artek, the company that produces the Aalto furniture in Helsinki. This statement was taken from a P/A interview with him at ICF in New York.

Klaus Dunker

Only rarely does one architect influence others directly through his buildings. We have accepted and indeed flourished on a method of architectural dialogue that is almost entirely based on printed media, rather than on personal experience in spatial encounter with buildings. This second-hand method, by implication, encourages an architecture of the intellect over one based on the senses.

Long before I saw one of Alvar Aalto's buildings, I was fascinated by his work. A quality seemed to spring from the pages that was absent from other published architecture. It was almost a primal quality, such as is found in vernacular architecture; the buildings seemed to have grown rather than to have been constructed. The drawings, in particular, were simple line drawings that derived from a compulsion of purpose rather than from geometry, tradition, or abstract ideas. Some were pieces of art that offered the imagination a yarn that could be woven to infinite variation.

Years later when I saw the actual buildings I was at first disappointed. They did not correspond to what I had imagined. They were much smaller in scale. Much more finite, [continued on page 106]

Nory Miller

It is one thing to be told that Aalto is a humanist and another to realize just how much his buildings are paying attention to you as you walk through them: how the steps and the railing of the main staircase at Finlandia move out to greet you and bring you upstairs—or how the different materials of the reception counter in Seinajoki's City Hall tell you where one function stops and another begins.

Every time you do something, outside or inside the building, that piece of the building is designed specifically to deal with that action. For instance, climbing the exterior staircase at Aalto's town hall in Saynatsalo: Aalto has broken the free stair wall at intervals on one side and inset a separate material at the base of the brick wall on the other that zig-zags up along with the staircase. It is as if you and the building are climbing together. At Otaniemi, he inserts this zig-zag pattern at the corner of a building which slopes up a hill. Even without a corresponding pathway, the building—like a person—has to climb that hillside.

Aalto's famous wrapped columns—at Finlandia, Seinajoki, the National Pensions Institute, for examples—gave me that same sensation of being *with* a building not *in* it. There is, indeed, a functional reason why Aalto wrapped columns in textured tiles; the tiles protect them from wheeled carts and other abrasives. But the wrapping has another effect as well. It dissociates the columns from floor and ceiling—dissociates them from their identity as structural members and brings them down to our scale. It makes it seem as if the columns too are walking through the lobbies of his buildings along with us. Their nonrectilinear placement accentuates this feeling.

Aalto's architecture is very complicated, certainly in comparison to his fellow modernists. Dark is contrasted to light, rectilinear to free-form, wood to granite to brick to plaster to marble. Patterns are introduced and reworked in veritable fugues. Movement is implied, blocked, *redirected*, contained, and recontinued. There is visual, kinesthetic, textural abundance, no matter how small the space or meager the budget.

In photographs, so many materials, shapes, and patterns—compressed into two dimensions—can look somewhat messy. Yet when you are actually there, in the building, there is a serenity and even a seeming asceticism that goes much further than his sparing handling of color or his devotion to honesty of materials. One essential lesson to be taken from Aalto is that simplification and lining things up are *not* the only paths to unity.

You don't need to be taught what to look for in Aalto's work. All you need is a capacity for sight, touch, motion, and feeling.

Nory Miller is managing editor of Inland Architect; *she has contributed articles to P/A and other publications.*

Martin Price

Alvar Aalto was most involved with solving problems for people and less with causes of form. He was never satisfied just to solve problems functionally and rationally from a technical point of view. He extended rationality into the area of human and psychological needs. He used to describe tubular steel chairs as being technically rational because they were light in weight and could be mass produced easily. But he felt that they were not rational from the human point of view because they conducted heat and cold too well, the shiny chromium surfaces reflected light too brightly, and they were not acoustically suitable.

He stated that the purpose of architecture ". . . is still to bring the material world into harmony with human life." The atmosphere now seems to be right for what Alvar Aalto has been providing for over 40 years.

Alvar Aalto's work can be least appreciated through words, plans, drawings, and even photographs. These techniques work better for more formal intellectual objects. His works must actually be experienced to gather in the subtleties and the nuances that were designed for people.

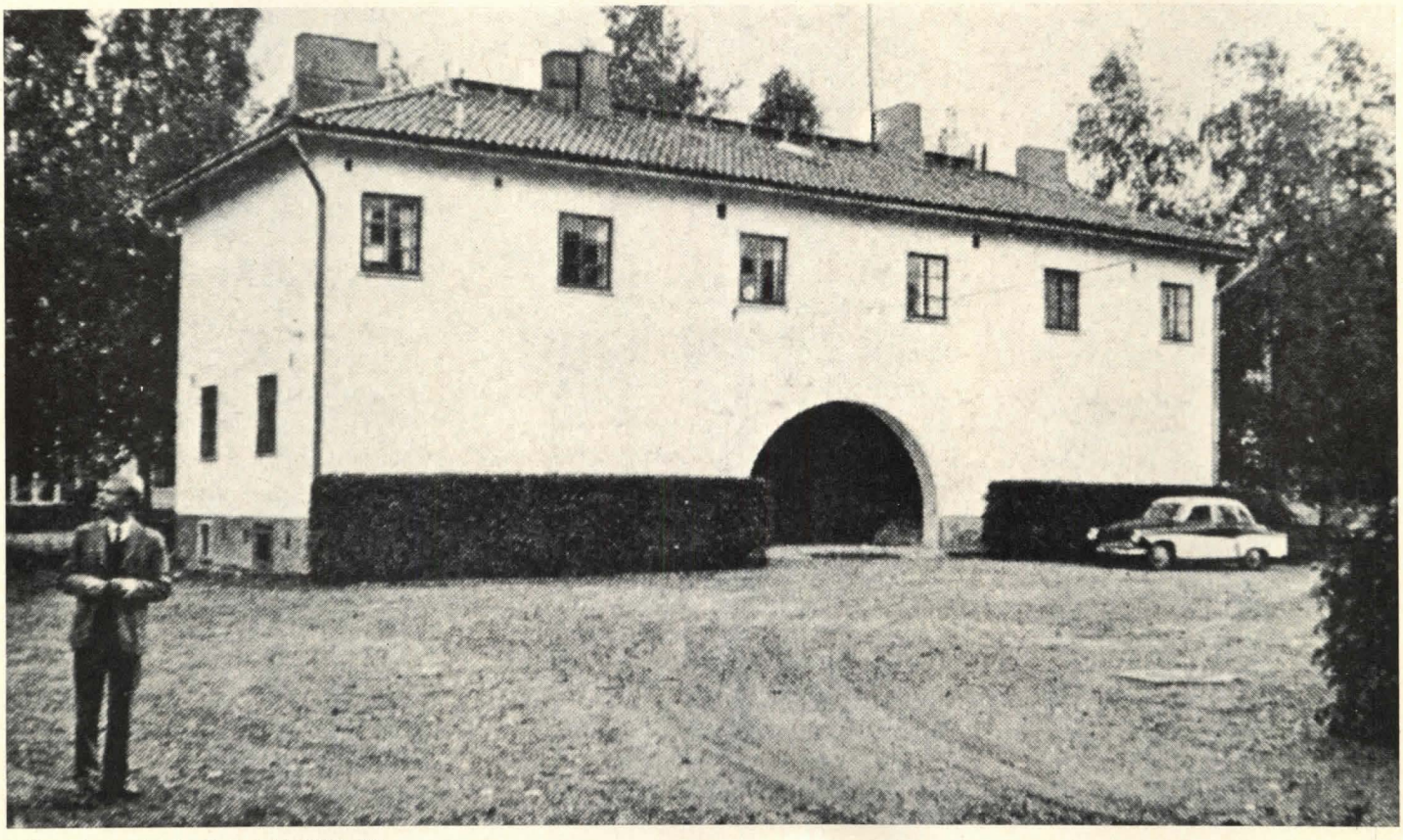
His buildings are always harmoniously sited—like a grafting to the urban or rural fabric—and become a harmonious composition between man-made forms and natural forms. But it is in the magnificently crafted interiors that unfold to express how successfully he has made man comfortable.

His interiors are comfortable because they are carefully scaled to people; surfaces become details, and are not bland but are rich in textures, either of natural materials or of rhythms of lines or of variations and highlights from natural light. These textures result in ornament which satisfies people's emotions, in decorations which are organically related to materials and functions. And Alvar Aalto's interiors are touchable. Even leather is used for handrails or door pull coverings for the warmth and richness of touch. A softening of geometry with continuous undulating lines like those found in nature avoids the boxlike spaces that people just do not like.

Martin Price is a Fort Worth architect and lecturer at the University of Texas at Arlington.

An archeology of Aalto

Stuart Wrede



1 Soujeluskuntatalo, Seinajoki, 1921–22.

While this article makes no pretense of being a comprehensive analysis of Aalto's ouevre, it tries to trace some of the motifs, mainly formal, evolving through his work from the beginning of his career to its end. In the process, it gives a brief picture of the context in which his architecture occurred.

Author: Stuart Wrede is a Finnish architect who is a visiting fellow at the Institute for Architecture & Urban Studies, New York.

Alvar Aalto's death last spring closed an important chapter in the development of Modern architecture. He was the last of the great masters, whose careers began, essentially, in the 1920s but who lived to influence post-World War II architecture.

Alvar Aalto graduated from architecture school in 1921, only a few years after Finland became an independent country. Though the country was still economically backward and in the infancy of industrialization, it was closely linked to the cultural currents prevalent in Europe. Thus from the turn of the century on, Finland was beginning to experience the same increasing tempo of architectural development that was taking place in the rest of Europe.

National Romantic Movement

The first fresh impulses came with the National Romantic movement, initiated by the painter Akseli Gallen-Kallela, which in architecture found its fullest embodiment in the work of Lars Sonck and the firm of Geselius, Lindgren and Saarinen. However, at the hands of lesser talents the style rapidly degenerated into a shallow picturesqueness. Sigurd Frosterus, who had just returned from Belgium where he had been Henry van de Velde's chief assistant, and Gustave Strengell, an architect and critic, successfully initiated a polemic, in conjunction with the competition for the new Helsinki railroad station of 1904[1], for a new architecture based on rational principles.

This led to an essentially Viennese-German ascendancy (Wagner, Hoffmann, and Behrens, etc.) that lasted until World War I.

The war put a damper on architectural development everywhere, and isolated Finland. At its conclusion, Finland emerged independent from Russia. Postwar Vienna spawned Art Deco via Paris but this never became a factor in Finland. Instead, Finnish architecture came under strong Swedish influence. Sweden and the rest of Scandinavia had stayed out of the war and had continued building while everything stood still on the rest of the continent. A simple, elegant classicism had emerged by 1920 throughout Scandinavia.

New-classical style of the 1920s

Aalto's projects of the 1920s are in this new-classical style and show the influence of Erik Gunnar Asplund, who was just then emerging as an important architect in Sweden. Though it has a different roof configuration, the small building that Aalto designed in Seinajoki in 1921–22 (illus. 1) can be seen as related to Asplund's Courthouse in Solvesborg (illus. 2) of a few years earlier, and Aalto's winning scheme for the Viipuri Library of 1927 (illus. 3) clearly shows the influence of Asplund's Stockholm Library (illus. 4) in its exterior vocabulary.

But Aalto took impulses from many sources in these early years. The architect Hilding Ekelund, who did some of the finest projects in the new-classical style and later became one of the more articulate spokesmen for Modern architecture in Finland, has also talked[2] of the important influence exercised by Adolf Loos in the 1920s on the younger architects. Thus, though Viennese influence in Finland had all but waned after the war, it nonetheless made its subversive but positive presence felt via the architecture and ideas of Loos.

The Loos influence on Aalto is perhaps most clearly discernible in the Finnish Theater building (illus. 5) in Turku of 1927–28, especially in the elegantly detailed metal doors (illus. 6) and in the extreme severity of façade and massing.

Ancient sources

But there is another side to Aalto as well. In a 1922 essay in the Finnish Architectural Journal[3] entitled "Motifs From Times Past" Aalto writes: "When we visit a medieval church, look at an old manor house, or contemplate a hundred-year-old vernacular building, we find there is something that reaches out to us—a *mood*. It may partially have its cause in the handicrafted surface treatment, in the building materials' artistic purity, in the simple lines that harmonize with the landscape, and partially the mood is created by the materials' one-hundred-year-old patina and fine worn surface." These lines, written one year out of school, obviously from the heart, seem to be of key importance in shedding light on Aalto's architectural sensibility and future development.

Another light is shed by Aalto's freehand sketches from Greece of 1929[4] (illus. 7, 8). They show his fascination with the ancient amphitheaters and the fragments of fine worn and eroded ruins lying about the landscape. These sketches, drawn with an economy of line and suggestive force, rival those of the best artists of the time and betray a mature sensibility which, I would argue, begins to inform his architecture only 15 years later. They are important keys to his post-World-War-II work.

An interesting contrast is provided by comparing them to Le Corbusier's sketches and photographs from Greece published in "Vers une architecture."[5] Le Corbusier concentrates his attention on the Parthenon, emphasizing the precision of the parts that go to make up the perfect whole, and draws a parallel to the present products of engineering. He looks at the Greek ruins as if they were brand new, while Aalto is obviously relishing what time and the elements have done to them. For Le Corbusier, the Parthenon is the symbol of Greek achievement. For Aalto, the amphitheater appears to fill that role.

But already a year or two before his trip to Greece, Aalto had switched his allegiance to the new architecture then sweeping Europe. In the same year that he designed the Finnish Theater building in Turku, he designed an apartment building (illus. 9) in the same city. The change in façade from one to the other is in many ways minimal, but the effect is decisive.

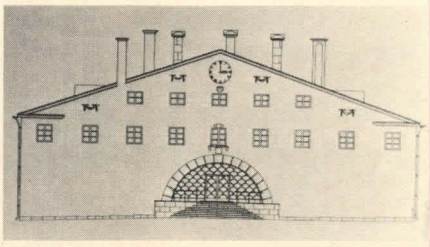
Viipuri library

The Viipuri Library, won in a 1927 competition with a scheme in the classical style of Asplund (illus. 3), was completed in 1935 in the international style (illus. 10). It is very interesting not because it is necessarily a masterpiece, but because it is rather a collage of a building reflecting in its disparate bits and pieces the rapid development Aalto's work was going through in these years.

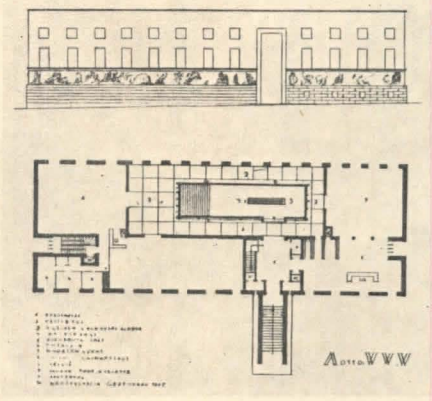
Elements of the original plan (illus. 3) remain, such as the double-story reading and lending room (illus. 11), though in a somewhat different form. The building has been sheared into a major and minor wing pinned together by the main and children's entrance coming in perpendicularly to both. A victim of all the changes is the awkward circulation system of the final scheme (illus. 10, 12).

The building is most famous for its innovative details, especially the round skylights above the reading room and the undulating wooden ceiling of the lecture hall. The ceiling (illus. 13), which one suspects to have been added to the design at a rather late stage, seems to have its origins in two sources. The first is in the curving wood and plywood surfaces that Aalto was experimenting with in connection with his furniture design (illus. 14). It is indicative of Aalto's ability—to appear again and again—to jump scale and inform his larger architectural work with his smaller design work in wood, glass, and even stone. The constant interaction, especially in the 1930s, between small scale innovations and large scale ones gives Aalto's work a special richness and depth. The second and perhaps most direct source is his own losing competition entry of 1930 for the Michael Agricola Church in Helsinki (illus. 15). The ceiling of the church is made up of shallow brick vaults spanning the space. However, the altar area is recessed into a niche at the end of the church, whose ceiling curves continuously from the ground until it meets the wall of the main space somewhat below the vaulting, still leaving a fundamental discontinuity with the main vaulted ceiling. It is this conceptual gap that Aalto bridges at Viipuri, thus creating a continuously flowing surface from floor to floor.

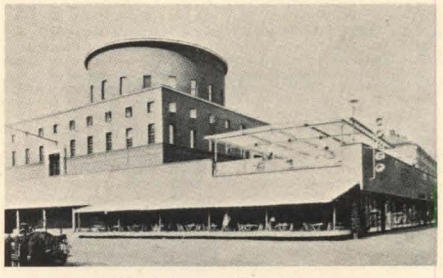
Most publications on Aalto show the



2 Asplund, Courthouse, Solvesborg, Sweden, 1919.



3 Library, Viipuri, scheme of 1927.



4 Asplund, City Library, Stockholm, Sweden, 1921–28.

acoustical diagram of the hall with the speaker's voice reflecting off the ceiling (illus. 13). I suspect, however, that the ceiling is a much more effective poetic symbolization of the flow of sound than it is a true projector of sound.

The undulating ceiling of the lecture hall and the seldom discussed children's entrance vestibule (illus. 12) are the first examples in Aalto's modern work of the discontinuity of exterior and interior space in section and in plan. This formal motif, discussed by Venturi[6], is to become an important theme in Aalto's later architecture. Though these devices were common in pre-modern architecture, it is clear at least that the ceiling in the lecture hall is no hangover from Aalto's earlier work. However, the children's vestibule, with the toilets occupying the residual space, appears more an updated version of an old device. This clearly shows Aalto's fundamental disregard for modernist orthodoxies that held the continuity of exterior and interior to be of fundamental importance.

Paimio sanatorium

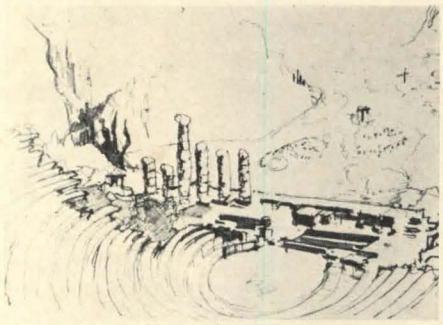
In the fall of 1928 Aalto won the competition for the tuberculosis sanatorium at Paimio (illus. 16). It was an ideal commission for it allowed him to design everything from furniture to bathroom sinks. The implied fan-shaped arrangement of building volumes, which were to become a theme running through Aalto's work, pointed to a new loosening up of the rather rigidly rectilinear plans of modern architecture until then. The most striking element of the building was the essentially free-standing balcony wing with its tough concrete cantilevered balconies (illus. 17). Again, like the pilotis of the Turun Sanomat building of 1928, it seemed to presage future developments, surprisingly not in the work of Aalto but in that of Corbusier.[7] As a spin-off of the building program Aalto produced an undisputed little masterpiece, the bent plywood Paimio chair (illus. 18), which can fairly lay claim, with only a few rivals, to being the most elegant modern chair ever designed.

The 1930s

From 1929 to 1936 were lean years for Aalto as far as new work was concerned. He was, of course, busy with the building of both the sanatorium and the library, as well as doing pioneering work with bent wood and plywood in both furniture and sculpture. As can be seen from the initial example of the undulating ceiling at the Viipuri Library, this small-scale design and artistic activity was to be important for

5 Finnish Theatre Building, Turku, 1927–28.

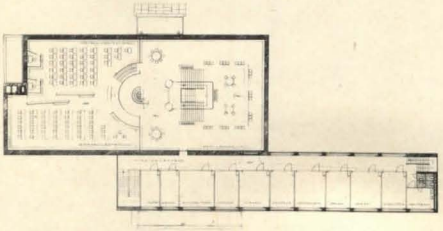
6 Door, Finnish Theatre Building, Turku, 1927–28.



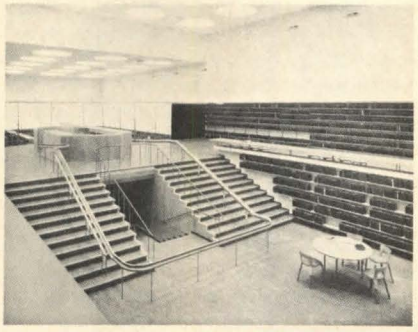
7 Sketch from Greece, 1929.

8 Sketch from Greece, 1929.

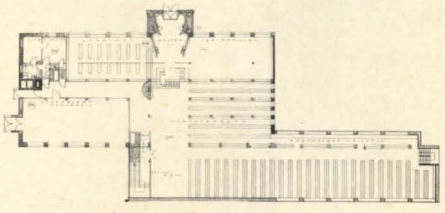
9 Apartment building, Turku, 1928.



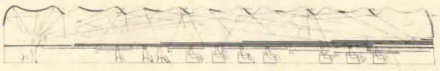
10 Main level, Library, Viipuri, 1935.



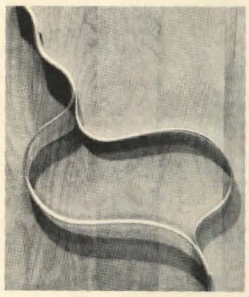
11 Library, Viipuri, 1935.



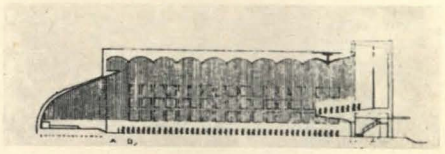
12 Lower level (children's entrance at top), Library, Viipuri, 1935.



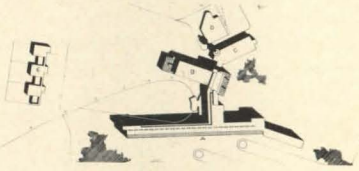
13 Lecture Hall, Library, Viipuri, 1935.



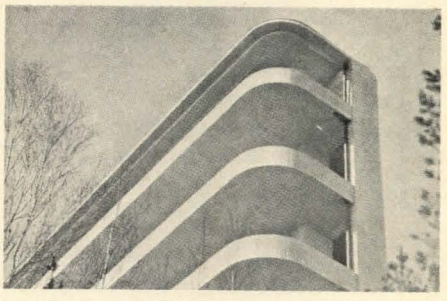
14 Experiment with bent wood.



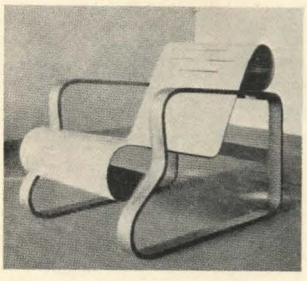
15 Michael Agricola Church, Helsinki, 1930.



16 Sanatorium, Paimio, 1929–30.



17 Sanatorium, Paimio, 1929–30.



18 Paimio chair, 1929.

Aalto's architectural development.

During these years he entered a substantial number of competitions, but notwithstanding his success in the late 1920s he won none of them. These competitions—there were about six of them [8]—are interesting for they show Aalto attempting to define his personal architectural approach and vocabulary, not always successfully. They are very useful to study, however, as the source of architectural themes that appear in his later work. The plan for the Tallinn Museum (illus. 19), in particular, with its interesting circulation system and arrangement of spaces[9], is a clear prototype for some of Aalto's important post-war work. But if today many of these projects appear significant, it is because we know where they were leading.

In 1934 Aalto designed his own house (illus. 20) in Helsinki and sheathed part of the exterior in thin vertical strips of wood. He was clearly a pioneer in developing a modern wood aesthetic, and in the process he began to establish a personal identity for himself on the international architectural scene. This initial restrained and severe use of wood in his own house was followed in 1936 with a veritable "symphonic poem" in wood, his winning competition entry (illus. 21) for the Paris World's Fair. Though it undoubtedly was a tour de force, it seems in hindsight a little too sentimental and picturesque, a forerunner of a whole "woodsy" tradition. But it was a huge success; it further enhanced his international reputation as a provider of an alternative to the sterility of the Bauhaus, and it led to the creation of the whole myth of his Finnishness.

Aalto's work in furniture led to a very fortuitous circumstance: his association with Harry and Maire Gullichsen in setting up the Artek company to produce his furniture. The Gullichsens became very important patrons of Aalto. Not only did they aid in setting up Artek, but they commissioned Aalto to do a number of industrial projects, such as Sunila (illus. 22), and in 1938 to design their house, the Villa Mairea in Noormarkku (illus. 23).

In this beautiful house Aalto elaborated on the themes he developed in both his own house and in the Paris exhibition. But a new theme makes its appearance at a small scale in the unusual sculptural articulation in the mass of the fireplace (illus. 24). It is a kind of erosion, a play with negative form defined by the solid out of which it has been carved. Its source may perhaps be traced to a sketch of an eroded fragment of a ruin (illus. 8) made by Aalto in Greece in 1929. In 1935 Aalto designed the grave for the architect Ahto Virtanen (illus. 25). It was a rectangular slab of marble with the segment of a Greek vase carved into it as a negative. This led directly to the fireplace at the Villa Mairea. But the same formal motif is used by Aalto in plan at the scale of a building in his post-war work both in his own office (illus. 46) and in the congress hall addition (illus. 59, and p. 68) to Finlandia Hall. This is again a prime example of small scale work informing his architecture, as well as of the continuity of certain themes and preoccupations in his work, going back to his important 1929 trip to Greece.

If Aalto's experiments with bent plywood can be said to have informed his ceiling at Viipuri, then his glass bowls (illus. 26) designed for the Savoy restaurant in 1937 informed his winning competition entry for the Finnish Pavilion (illus. 27) at the New York World's Fair of 1939. The Savoy vase not only undulates in one plane (the vertical) but the glass membrane leans out beyond the vertical, as does the undulating wood and plywood exhibition wall at the fair. The free-flowing shores of the Finnish lake district are often mentioned as the source of inspiration for the vase, but there is a much more direct source. A section cut through the base of a tree where the roots branch out—the section where trees are cut—produces a rich variety of undulating shapes, which a perceptive Finn could hardly miss.

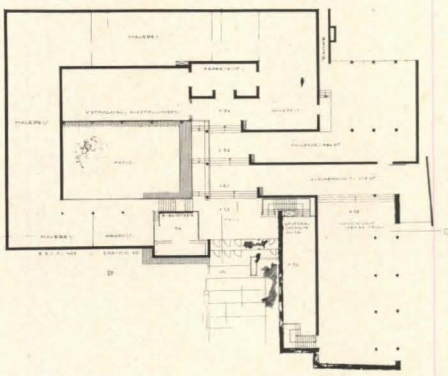
Though it was merely a job of designing an interior for an existing high-ceilinged rectangular space, the New York pavilion must in many ways be considered Aalto's first mature work. It was the first project where most of the disparate themes of his architecture to date came together to create a truly personal work that can be seen to be a key prototype for his post-war architecture.

If we study the plan of the New York pavilion (illus. 28) we see that Aalto skews the main exhibition space in relation to the exterior walls, creating a very deliberate tension within the existing neutral context. To further heighten the tension he plays off the undulating exhibition wall against the straight line of the restaurant balcony. And of course the undulating wall leans out beyond the vertical, further increasing the tension. Though each element appears to be in disequilibrium, the totality achieves a dynamic balance.

What we are witnessing here, and what we will see again and again in his post-war work, is something that goes beyond what Venturi[10] regards as the formal tension arising out of the elegant accommodation of disparate functions. It is, I think, clear that Aalto deliberately sets out to create these tensions. Given that any architectural problem can be solved successfully in a number of different ways (and Aalto, unlike Corbusier and Mies, seldom if ever neglected to solve the functional aspect of a building successfully in order to pursue purely formal goals), what becomes interesting and revelatory of the architect's ambitions and sensibility is the formal choices he makes in solving his problem. This does not deny the fact, however, that the range of formal strategies available to the architect helps him to solve his functional problems.

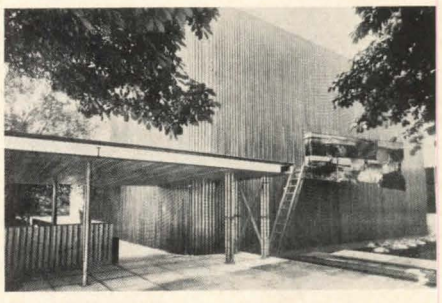
If we look back over a number of the projects discussed so far, the fan-shaped arrangement of buildings at Paimio, the sheared wings of the Viipuri Library, the implied spiral circulation of the Tallinn Museum, we can see that one of Aalto's underlying goals in almost all of them is to achieve a dynamism and/or tension in plan.

The fan shape makes its appearance in Aalto's work from 1928 on in a number of other projects. Depending on the project, it can be read formally in two different ways: as the dynamic thrusting out from a central locus, or as a pie-shaped segment sheared out from a full circle. Both readings imply a tension. Thus, in addition to the Paimio plan, we have: the 1928 competition for a weekend house in the shape of a segment of a donut (illus. 29), the competition entry for the Zagreb University Hospital of 1930 (illus. 30) where the operating auditoriums are segments of circles, another weekend house competition of



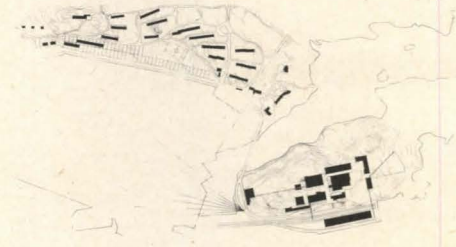
19 Main level, Museum, Tallinn, Estonia, 1936.

20 Aalto House, Helsinki, 1935–36.



21 Finnish Pavilion, Paris World's Fair, 1936–37.

22 Housing and factory, Sunila, 1936–39.



1932 in a pie shape (illus. 31), the 1934 housing project for Stenius Oy where a series of housing slabs radiate out from a point defined by the tip of the longest one (illus. 32).

The strategies employed in these projects are relatively less sophisticated and often only partial compared to the complex and total crescendo achieved in the New York pavilion.

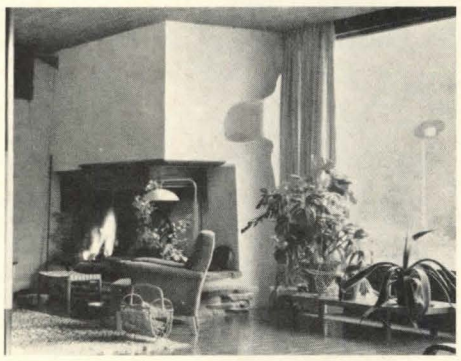
One important point might be made about Aalto's housing of the 1930s and his larger scale planning projects. He was more concerned about their siting in the peculiar Finnish landscape of low moraine hills and granite outcroppings than he was in social innovation. He essentially accepted the modernist program and did not attempt to improve upon it. His sensitive siting of housing in the landscape such as that at Sunila (illus. 33), was to exercise an enormous influence on a whole generation of Finnish housing and planning projects, and certainly his influence is evident in Aarne Ervi's housing at Tapiola (illus. 34) of 1962.

Having come to the end of his pre-war work one might venture an assessment. The radical break with the past brought about by the Modern movement was obviously enormously liberating for Aalto's talents. At the same time, his first-hand experience with a more traditional approach, both through his schooling and his practice, protected him from becoming a victim of its more stultifying orthodoxies. His International-style interlude was short, though via his housing at Sunila (illus. 33) it lasted until the end of the 1930s. It took him ten years—from 1928 to 1938—to feel his way to a rather personal, mature style, and even then, partially because of the war, it was not until the late 1940s and early 1950s that it was really allowed to take shape.

Aalto in America

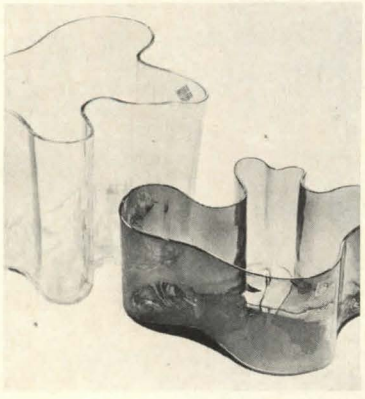
I think that it can convincingly be argued that the heightened level of tension that appears in Aalto's New York pavilion was elicited by his first confrontation with the dynamic but somewhat hysterical (at least from a Finnish point of view) capitalism and mass consumer society of America. Certainly his fan-shaped partis up to that date represent a more gentle and harmonious tension. His Paris pavilion seems almost to lack that tension completely—his energy being expended in exotic wood detailing. Thus Aalto's meeting with America represents a kind of recharging of his energies similar to his confrontation with the Modern movement ten years earlier,

23 Villa Mairea, Noormarkku, 1938–39.

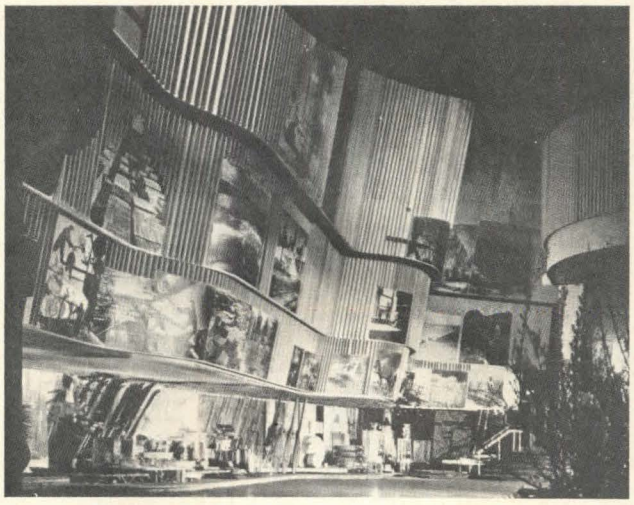


24 Villa Mairea, Noormarkku, 1938–39.

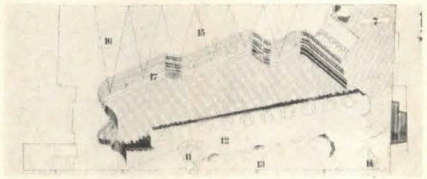
25 Grave for Ahto Virtanen, 1935.



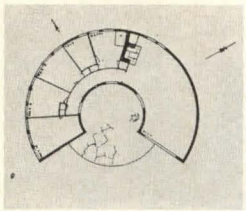
26 Glass vase and bowl, 1937.



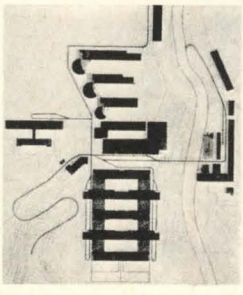
27 Finnish Pavilion, N. Y. World's Fair, 1939.



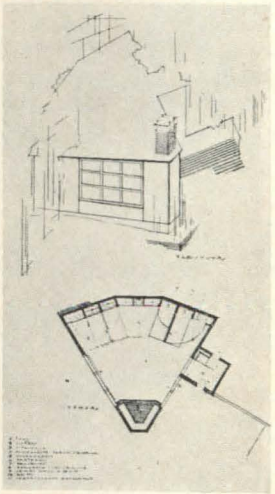
28 Plan of balcony-restaurant, Finnish Pavilion, N.Y. World's Fair, 1939.



29 Plan, weekend house, 1928.

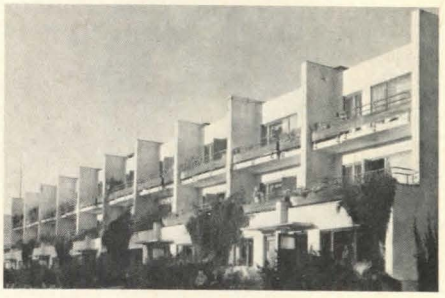


30 Site plan, University Hospital, Zagreb, Yugoslavia, 1930.



31 Plan, weekend house, 1932.

32 Housing project for Stenius Oy, 1934.



33 Housing, Sunila, 1936–39.

34 Ervi, housing, Tapiola, 1962.

which resulted in the Paimio Sanatorium and the Viipuri Library.

But it was a different kind of confrontation. Whereas the Modern movement had elicited a very positive response from Aalto, his response to America had a negative undercurrent that is perhaps evident (though it is always difficult to make such direct interpolations) in the design of the dormitory (illus. 35) of 1947 for MIT, where he served as visiting professor on and off from 1941 until 1949.

Perhaps the clearest example of the underlying confrontation represented by the dormitory is its total disregard, in the sense of trying to pick up any themes from the existing campus, for the context it is placed in. In the inner tensions of the plan, it is in fact almost threatening to its surroundings.

Imagine that in a great muscular spasm, the curved front portion of the MIT dormitory broke free of the limp constraint imposed upon it by the solid, angular back and stretched out, knocking over trees and adjoining buildings in the process. Not likely to happen, but it is precisely this kind of implied tension, the threat of disequilibrium, which Aalto creates in the MIT building. It is a kind of architectural equivalent of Michelangelo's slave struggling to free himself from the block of marble out of which he was created.

The tension of the curved front façade playing against the straight angular back façade is a kind of reversed motif from the New York pavilion, the two façades defining a solid object rather than a void. But two other formal motifs are clearly implied in the building, both deriving from Aalto's small scale work in wood. The partition walls of the dormitory rooms facing the river are notched at all the points of curvature in the front façade. This has no essential functional purpose, and is in fact a diagrammatic blowup of how one would detail a curved wooden surface with notched strips of wood, such as in the ceilings at Viipuri or the Maison Carré (illus. 36). Its purpose appears to be to increase the shearing tension caused by the curvature of the façade. Equally, the staggered ends of the building imply a series of planes sheared apart when subjected to a curvature—a clear reference to some of Aalto's experiments with curved laminated wooden surfaces (illus. 37).

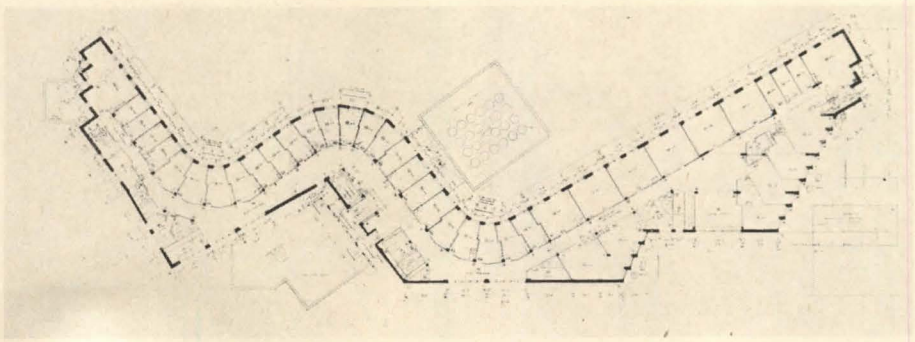
The motifs Aalto developed in his American buildings, motifs that the cultural context of Finland might not so readily have elicited from him, were obviously so powerful and useful that they came to strongly inform most of his subsequent work. But never again was he to design such a raw, almost grating building as Baker House at MIT.

The little-known town center project of 1944 (illus. 38) for Avesta, Sweden, (unfortunately never built), is more representative of Aalto's subsequent post-war work in Europe. The six-story town hall, located almost at the center of the site (a whole city block, part of which is a park) acts as an anchor to the rest of the complex—an L-shaped wing with an auditorium complex at its end, pressed back from the corner by the insertion of a small free-standing pavilion. The implied pushing back skews the L-shaped wing slightly in relationship to the street grid, thus creating a tension not only in the internal disposition of the building but in the project's relationship to the neutral city grid.

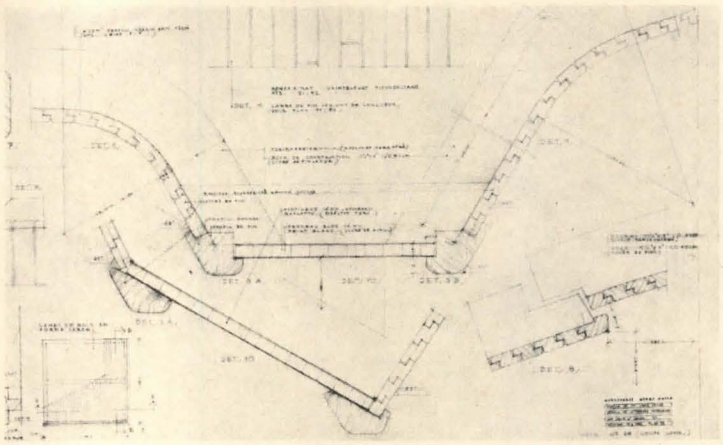
The 1950s

The Avesta plan is in many other ways also the prototype for most of Aalto's subsequent town hall and civic center schemes. The open courtyard, the collage type layering of roof planes, and the distinct articulation of the important public areas, are all developed here fully.

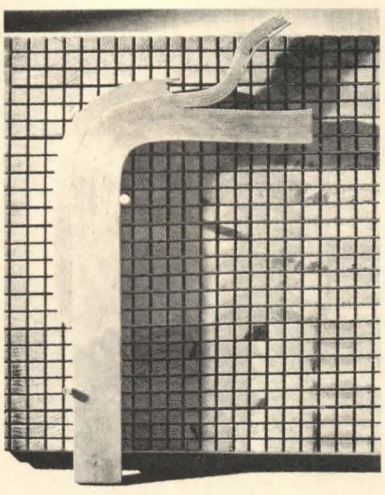
The 1950s was a remarkable decade for Aalto. Throughout those ten years he won



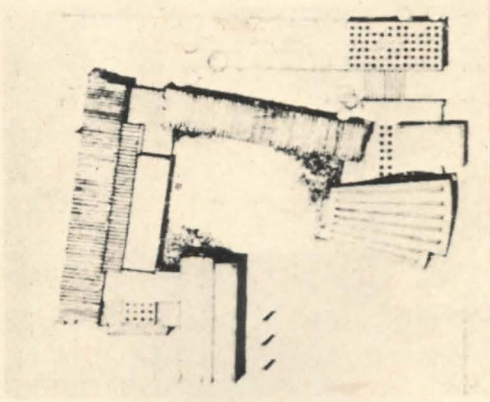
35 Baker House Dormitory, M.I.T., Cambridge, Mass., 1947–48.



36 Ceiling detail, Maison Carré, Bazoches-sur-Guyonne, France, 1956–59.



37 Experiment with wood.



38 Town Center, Avesta, Sweden, 1944.

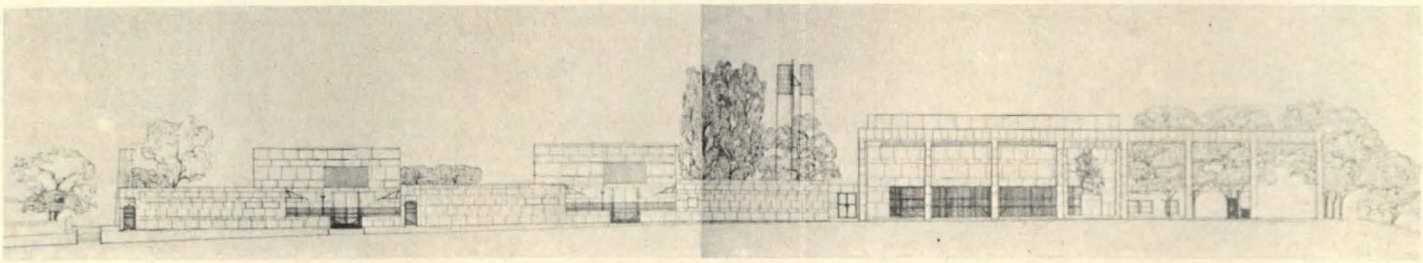
a large number of competitions, and by its end had produced a body of work which essentially defines the range of his subsequent oeuvre. From 1960 on he mostly embellished upon the major achievements of this decade, becoming successively looser and more confident in his solutions as they evolved.

The influence of the Mediterranean came again to the fore in his work. Whereas most Scandinavian new classicism of the 1920s, in which Aalto participated, had been inspired by Italy's "Architettura Minore" (the non-monumental classical buildings of the Italian cities), Aalto in the early 1950s became inspired by the timeless peasant vernacular of the Mediterranean countryside. In a trip to Italy in 1948 he visited San Gimignano and in a trip to Spain in 1951 he sketched country villages and farmhouses. The impressions of his 1929 trip to Greece seem to have reasserted themselves, and Aalto's early fascination with the texture and the aging of materials again became evident. He began to use brick, and later, marble, glazed tiles, copper, and even bronze.

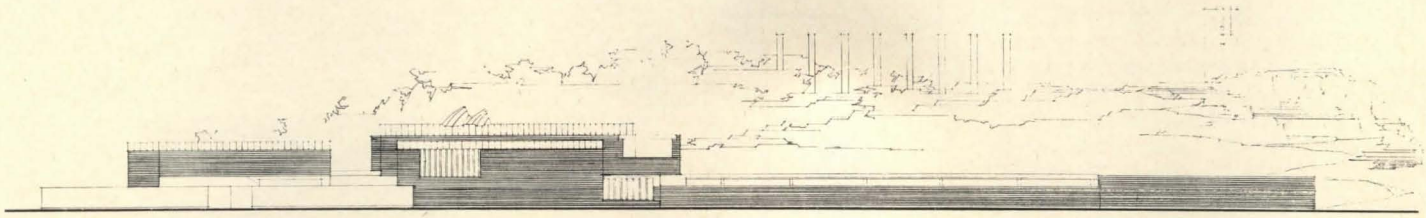
Aalto was not alone in finding new inspiration in that rich source. Both Le Corbusier and Gunnar Asplund had in the late 1930s done projects based on Mediterranean vernacular sources, and Asplund's Woodland Crematorium (illus. 39) in south Stockholm of 1940 especially had an important influence on Aalto's work. This is seen less in plan than in massing and façade articulation, and it is evident in such diverse buildings as the Malm Funeral Chapel of 1950 (illus. 40) (never built) and the staff and student dining hall at the Teacher's College in Jyvaskyla (illus. 41). The little marble pavilion (the staff dining hall) is a kind of miniature of Asplund's great loggia and can be seen as both an homage to him and surely as a witty reference.

The Lyngby Crematorium (illus. 42) of 1952, a competition project for Denmark unfortunately never built, takes as its source of inspiration the high-walled cemeteries of the Mediterranean. Within high walls Aalto has organized the various chapels and courtyards called for in the program requirements of the project.

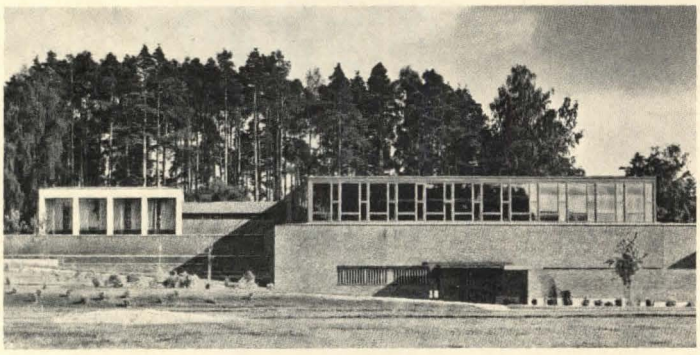
The Saynatsalo Town hall (illus. 43) is perhaps Aalto's most universally loved post-war building because of its highly picturesque quality, which is inspired to some extent by Aalto's knowledge of Mediterranean hill towns. In the interlocking of building masses about the assembly hall one may even detect a trace of Frank Lloyd Wright's influence.



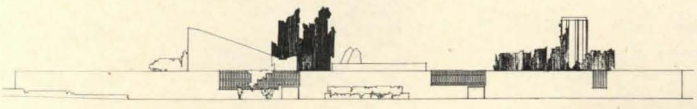
39 Asplund, Woodland Crematorium, Stockholm, Sweden, 1940.



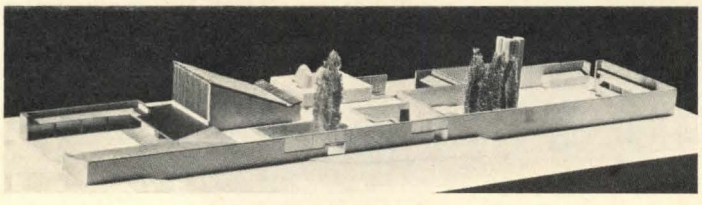
40 Malm Funeral Chapel, Helsinki, 1950.



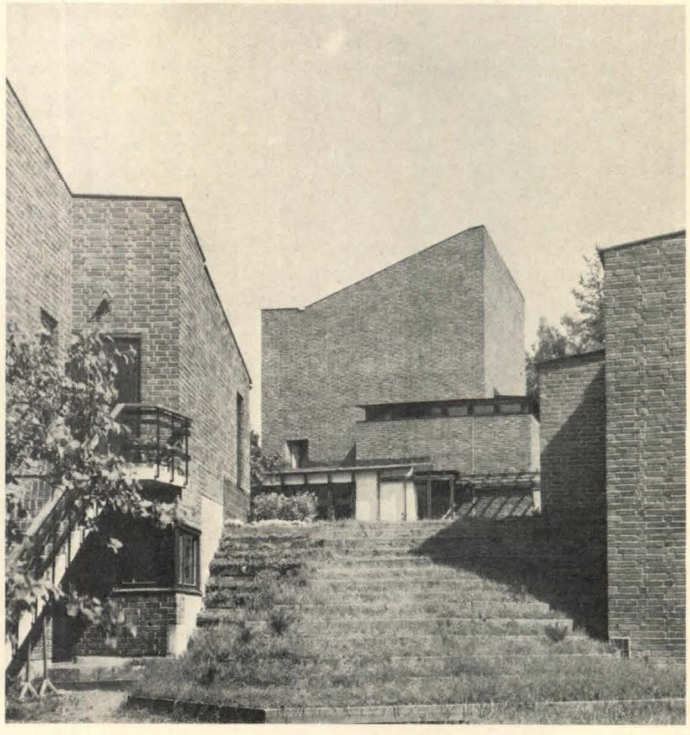
41 Dining Hall, Teachers' College, Jyvaskala, 1953.



42 Lyngby Crematorium, Lyngby, Denmark, 1952.



43 Saynatsalo Town Hall, 1950–52.



But when studied in plan (illus. 44) the building displays many of the motifs common to Aalto and, as Peter Eisenman has demonstrated, is anything but a purely picturesque composition.[11] The circulation system of the building, composed of the corridor around the courtyard and the staircase going up to the assembly hall, describe an elegant spiral-counterspiral movement. The courtyard can be read as eroded out of the solid square building, with the library left undetached as a separate fragment but still providing a hard-edge definition to the periphery of the complex. Again there is a tension set up by the hard outer edge and the soft inner walls, as well as by the spiral circulation system. George Baird in an essay on Aalto[12] has talked about the metaphors of ruins that pervade Aalto's post-war architecture, citing as examples his almost obsessive use of highly permanent materials, his encouragement of grass and vines to overgrow his building, and his tendency to site his buildings in rural isolation, as at Saynatsalo.

There is no doubt that ruins are an important motif in Aalto's work; the evidence is well supported by his sketches from Greece and even his early writings. But presented in isolation, this thesis tends to give a too one-sided picture of Aalto's concerns. For if his concern that his buildings stand up to the ravages of time can be seen as only judicious, even betraying a sense of optimism about the future, the suggestion that all his post-war buildings are metaphors of ruins seems to imply a pessimism, even perhaps a sense of defeatism, on the part of Aalto. Given that there is a streak of pessimism and certainly a streak of melancholia in most Finns, it seems however highly unlikely, from what one knows of Aalto, that this kind of brooding quality should be the dominant theme of his work. Seen instead as one pole among the motifs pervading his work, this theme gives us a rather remarkable picture of his true complexity.

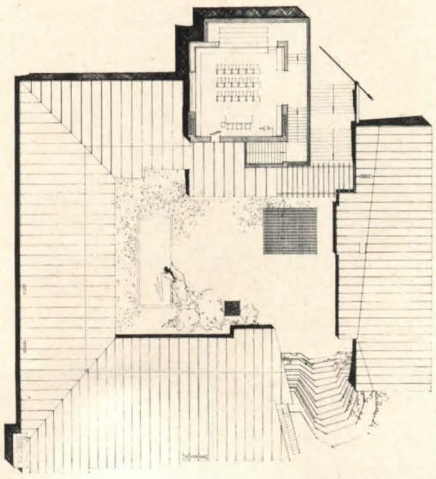
The erosion of form represents but one pole (let us call it the negative) in Aalto's work. It is counteracted by a positive pole—the outwardly thrusting form of his whole range of fan-shaped partis and dynamically undulating wall surfaces. It is, finally, the tension between these two forces in his post-war architecture that gives it its evocative range and poetic force.

Given Aalto's concern with both the fan shape and eroded form, it seems natural that the amphitheater, which in a sense represents an ambiguous combination of both motifs, should have had a special significance for him.

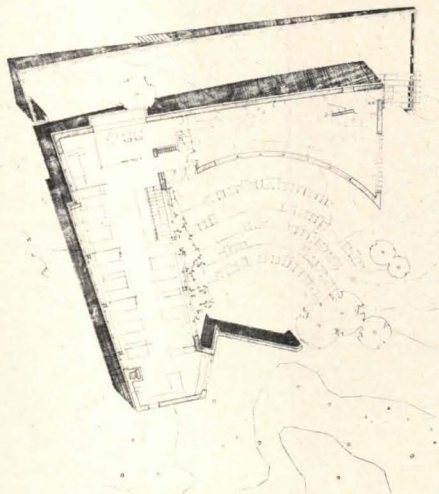
In 1955 Aalto designed an office for himself (illus. 45,46) in a suburb of Helsinki. This small, essentially L-shaped building is composed of the residual space between outer walls that follow the rectilinearity of plot line and inner walls that are defined by an open courtyard in the shape of an amphitheater. It is perhaps most poetically a metaphor of the whole inexorable process of growth, decay, and growth, which is the essence of architectural endeavor. It captures the whole culture of the Mediterranean, where great monuments have decayed into ruins, leaving traces indelibly imprinted on the landscape. Later secondary buildings spring up adjacent, responding to the form of the original, and through the process of time what was a positive form is transformed into a negative. To me the office building is both Aalto's simplest and most poetic, and one cannot help marveling at the extreme modesty of the architect's gesture.

He uses the amphitheater form again, this time as a positive form containing auditoriums, as the centerpiece for the Technical University (illus. 47) at Otaniemi of 1961–64, where it is embedded into a key point in an otherwise rectilinear organization of buildings.

A variant on this motif of clashing two elements together is apparent in the Pensions Building of 1952–56 (illus. 48, 49), but this time the clash is in a sense between the building itself and the V-shaped site. By pushing the building mass tightly into the tip of the V, Aalto makes the site appear much tighter than it is. This is further emphasized by his arranging the building masses orthogonally to the open end of the V, which opens onto a long, sloping park, and thus diagonally to the sides, causing a highly fractured building façade and a shearing of building masses. The corner of the main L-shaped office block is cut off by the edge of the site, not on a diagonal but in a series of angled corners, creating the effect in plan of a dra-

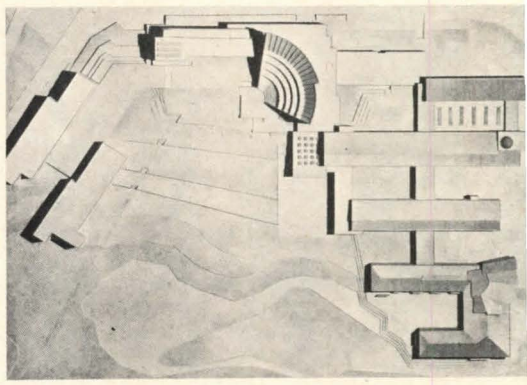


44 Roof plan, Saynatsalo Town Hall, 1950–52.



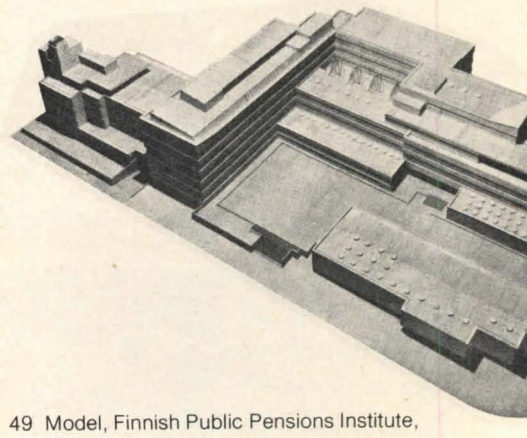
45 Main level, Studio House, Helsinki, 1955.

46 Studio House, Helsinki, 1955.



47 Technical University, Otaniemi, 1961–64.

48 Finnish Public Pensions Institute, Helsinki, 1952–56.



49 Model, Finnish Public Pensions Institute, Helsinki, 1952–56.

matic confrontation, a kind of a Procrustian bed treatment, of what protrudes beyond the plot line.

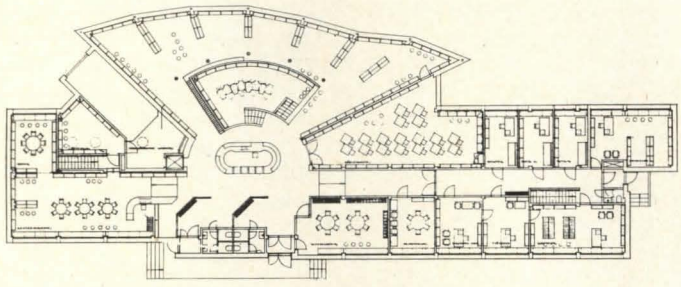
In his post-war buildings Aalto's use of the fan motif takes on new subtleties. The range of distortions is increased and most often the shape is generated out of the heart of an essentially rectilinear building, such as in the Seinajoki Library (illus. 50) of 1963 or the Wolfsburg Cultural Center (illus. 51) of 1959. Thus he achieves a kind of double effect: not only the dynamic thrusting out of the fan shape, but the clash of the diagonal with the rectilinear.

Vuoksenniska church

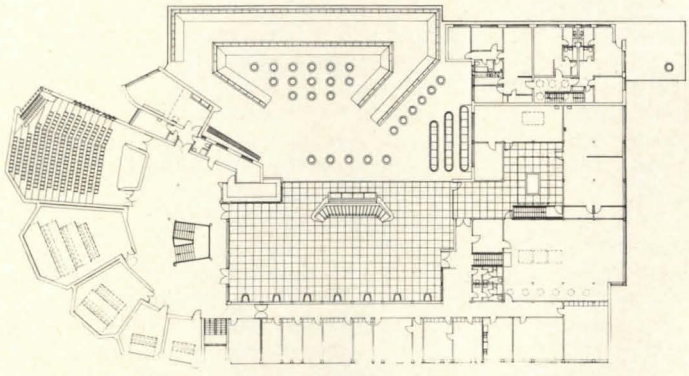
The church at Vuoksenniska contains perhaps the most remarkable interior space Aalto created (illus. 52), but from another point of view its plan (illus. 53) is also remarkable, for it comes as close to being a formally unbalanced building as anything Aalto ever did. In its play of the modulated wall against the straight wall and its skewed relationship to an orthogonal reference plane the plan bears a resemblance to the New York pavilion.

Whereas the New York pavilion was composed within an existing rectangular room that resisted its further distortion, Vuoksenniska Church has no such exterior container. The implication of the plan is that the modulation of the outer wall and the curve of the roof beams respond to the projecting voice of the speaker in the front corner of the church. But on closer examination this reading doesn't always hold up. Not only do the two columns in the middle of the main room appear to be an obstacle to this projection, but one is left wondering what accounts for the skewing of the room's inner wall in relationship to the implied orthogonal reference plane defined by the outer wall of the attached service wing. One comes to the conclusion that a kind of reverse reading is more appropriate, though still not satisfactory. This assumes that there are three parallel force vectors (of increasing intensity the further from the altar they are) coming in perpendicular to the orthogonal reference plane, and accounting for the skewed inner wall and the tri-partate bulging of the outer wall. The curved beams of the ceiling deflect the forces back towards an implied locus beyond the altar. As these three implied forces have no bases in reality, either through any broader site reference or internal functioning of the building, one finds the composition somewhat disconcerting.

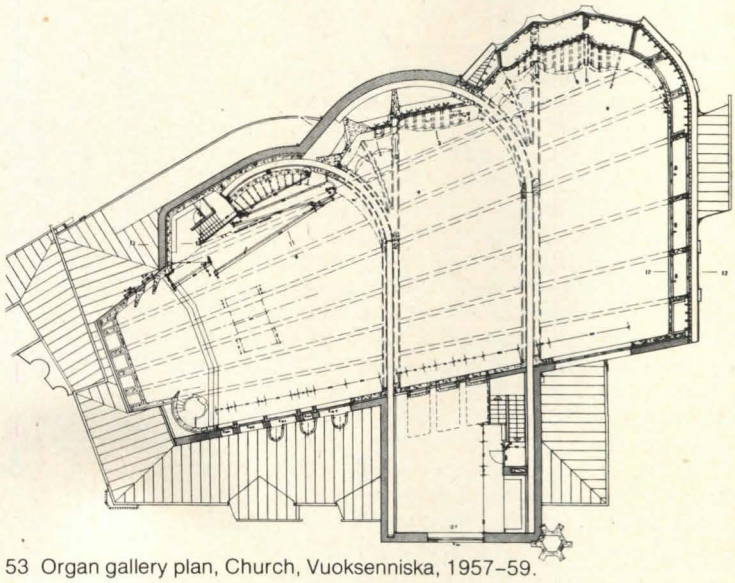
In order for the composition to be balanced, either formal reading assumes that one also read the curved roof beams as



50 Main level, Library, Seinajoki, 1963–65.

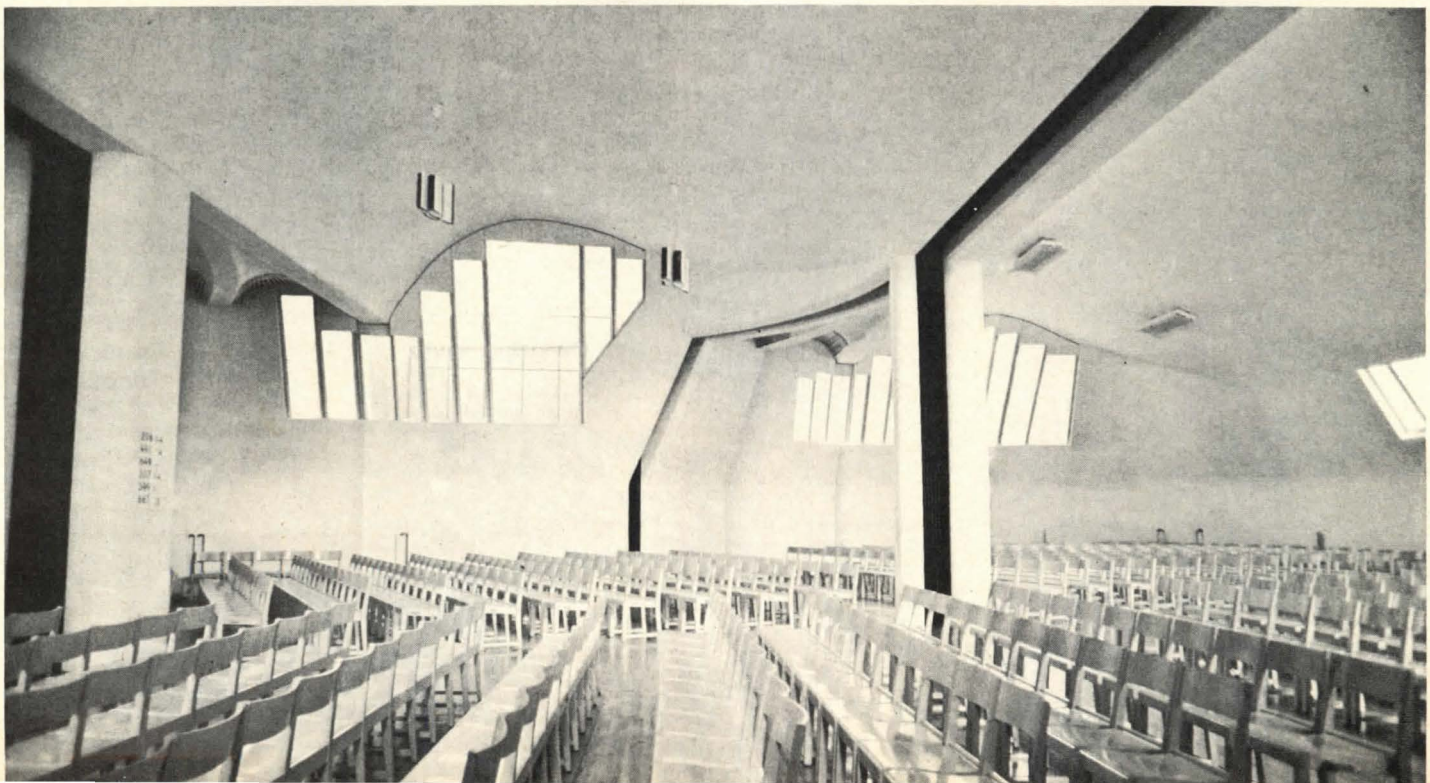


51 Cultural Center, Wolfsburg, Germany, 1959–62.



53 Organ gallery plan, Church, Vuoksenniska, 1957–59.

52 Church, Vuoksenniska, 1957–59. Photo: Nory Miller.



being in tension and anchored in place by the two parallel bearing walls that tie them back to the orthogonal reference plane. But even then one cannot help feeling that the composition implies the existence of a larger building of which it is merely a pendant. This feeling is further reinforced by the suggestion given by inner church wall, when seen from the outside, that it has been sheared off. Both Le Corbusier's Swiss Pavilion (illus. 54) and his side chapel at LaTourette (illus. 55) come to mind as more normative solutions to this compositional problem. LaTourette and Vuoksenniska were designed almost at the same time, so it is unclear whether Aalto would have known of the design, but he certainly was aware of the much earlier Swiss Pavilion. Thus from one point of view Vuoksenniska may be seen as a kind of virtuoso, highly mannered play on a theme by Le Corbusier. It is as if Aalto were saying "Look no hands!" as he pedaled his bicycle past Le Corbusier's. For there is no doubt that Aalto was highly competitive and for him the only competition in sight was Le Corbusier.

At another level one may presume that Vuoksenniska was Aalto's response to Ronchamp. Though one can perhaps see why the building profoundly upset Henry-Russell Hitchcock[13], one cannot also help thinking that in this particular case the end justified the means.

Last works

Aalto's versatility reached its peak with the winning design for the Essen Opera House (illus. 56), a competition of 1959 that unfortunately has not yet been built, despite the fact that every working drawing has been produced. Looking at the almost scaleless free-form original model (illus. 57), with its sloping roof broken only by the hint of the fly tower, one feels that its design flowed as freely and effortlessly from his pencil as the Savoy vase. The simple, elegant form belies the complicated program it contains. Nor does one have the feeling that the program has been stuffed into a preconceived shape. The functioning of the building appears as elegant and effortless as the form.

Aalto continued designing prolifically until the end of his life, developing a series of libraries, museums, office buildings, and civic centers. Each new design built upon the previous one, enriching the vocabulary and the variation of plan and detail. Few architects have had such a rare opportunity to create a series of prototypes and, in addition, the opportunity to elaborate upon and develop each into a type.

Conclusion

Aalto's need to create tension in his buildings, to create dynamic spaces and forms, must stem from some deep inner poetic urge. One senses that it was both a creative and a destructive urge. Though many other architects have aspired to give expression to similar feelings in this century, few have developed the necessary vocabulary or have been able to use it with such precision, logic, and discipline. In his talent and his artistic temperament, one senses that Aalto was in many ways a kindred spirit to Le Corbusier, though he did not succeed in universalizing his architectural vocabulary the way Le Corbusier did. At some point one would wish to see a comprehensive comparative analysis of the work of the two architects.

Aalto's influence on his fellow architects around the world remains highly elusive at best. The influence is extensive, yet only partial. It has been Aalto's use of materials and detailing that have gained the widest following, rather than the underlying principles he employed in achieving volumetric and spatial solutions. His architecture has generally been seen as too personal, too dependent on his own remarkable talent to be easily followed.

Surprisingly, or maybe not so surprisingly, one senses that it is perhaps in the United States that the formal motifs of Aalto's architecture are having their deepest impact, and this is no doubt due to the writings of Venturi. It is clear that many of Aalto's underlying motifs inform both the work of Venturi and Charles Moore, though the spirit of their work is very different from Aalto's due to the many other associations they draw upon. It is an interesting fact nonetheless that these formal motifs should find more fertile ground in the cultural context of the United States at the present time than in Finland.

In looking back over the Finnish architectural scene since the war, it is remarkable how little influence Aalto's formal motifs have had there. This is even more perplexing when one realizes that the people who worked in his office are among the best known Finnish architects, such as Viljo Revell and Aarne Ervi. But on the other hand it is perhaps not so surprising. As Asko Salokorpi has suggested[14], Aalto's talent loomed large in a small country, and most of the talented younger generation found his architecture too personal and wanted to establish their own identity.

But in town planning, in the use of materials, and in detailing, Aalto's influence in Finland was extensive up to the mid-1960s. At that time a very self-conscious reaction against him and the older generation set in among a younger group of architects. They were interested in an architecture of standardization, mass production, and social enlightenment—a rational architecture that aspired to a Miesian aesthetic, tempered by the reality of Finnish materials and construction methods. Their influence has made itself increasingly felt up to the present time. In town planning their critique, from a sociological and economic point of view, of the low-density landscape-oriented planning of housing estates was effective.

But while this intra-professional polemic was taking place, other forces, both technical and economic, over which the architects seemed to have little control, began to have a large influence on the Finnish physical environment. The rising prosperity and economic activity of the 1960s led to an increasingly large migration of people to the cities, with the consequent construction of a large amount of new office buildings in the centers of the cities. The large construction and buildings material companies proceeded to industrialize housing production for efficiency's sake (apparently not for economy's sake, as the cost of new housing kept skyrocketing at the same time).

Surprisingly, this process of industrialization was one that the architects appear to have been only marginally involved in, and though they are often still asked in as designers, they are locked into fairly inflexible systems. Equally, because of the rapidly rising cost of land, builders were anxious to raise the densities of their developments. But instead of the socially enlightened, well-designed, high-density developments envisaged by the younger architects, the reality (with perhaps one notable exception or two) often became more like an instant high-density slum with a smothering uniformity of design imposed by the building systems employed. For if Tapiola had many weaknesses from a sociological point of view, its great strength lay in the rich variety of small-scale, well-designed housing units.

The 1960s

By the late 1960s, as it became more and more apparent that not only were the new housing estates for the most part disastrous, but that the fabric of the older inner cities was being torn apart by unsympathetic and scaleless new office and apartment buildings, a strong, historically based conservation movement sprang up. It was led by former students of Nils Erik Wikberg, a professor of the history of architecture and one of the few people who had succeeded in maintaining a larger perspective on the development of Finnish architecture. The fight has not been merely over the saving of Helsinki's remarkably cohesive 19th-Century center and National Romantic residential quarters, but also over the small wooden towns along the Finnish coast, whose fragile fabric was

threatened by increasing new development and zoning laws that allowed for a much higher density of usage. The movement has received support among a wide public, who perceived the alienating quality of new buildings long before the architects did.

The profession in Finland is involved currently in a deep process of reassessment of everything from town planning to design. Whether it will be able to improve the situation, or whether it has gotten beyond control, remains to be seen.

Goran Schildt, in his introduction to *Alvar Aalto*[15], has talked of Aalto's humanist philosophy, of his concern that technology not be allowed to dominate mankind, and his determination to show a viable alternative not via written polemics but through built example. Aalto and his many colleagues in architecture and design succeeded in this task to a remarkable degree. All of Finland was their tableau. Their work led to the belief in the myth that captured the imagination of the world, and to a great extent the Finns themselves—the myth of a country where the citizens lived harmoniously with nature in idyllic Tapiolas with their Aalto civic centers and furniture, their Arabia pots and pans, their Marimekko dresses. And although this did not represent the whole picture, it caught the imagination because there was a good deal of substance to it.

But by the late 1960s events increasingly took their own course and gradually proved the myth a lie. Thus, seen in the larger Finnish context, Aalto's production in the late 1960s and 1970s became more and more an isolated phenomenon.

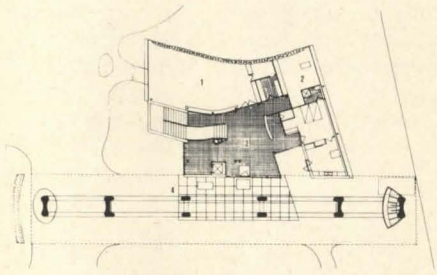
But Aalto, from his vantage point in distant Finland, was carrying on, via his buildings, a dialogue with the world. Besides providing him with a remarkable opportunity to build, one senses that Finland also allowed him a perspective, an overview from a distance, that might have been difficult to achieve in more cosmopolitan centers where world events and cultural fads had a more immediate impact.

But less than a year before his death the world, in a sense, came to Alvar Aalto. In the summer of 1975 the leaders of almost the whole industrial world, of both ideological camps, came to Helsinki to hold the European Security Conference. The conference was held in the new congress hall (illus. 58—also see p. 68), designed essentially for that purpose by Aalto, their symbolic host, as an addition to his previously built Finlandia (concert) Hall. One wonders whether the eloquent humanist message of the building had any impact on them; for if it did not we may perhaps have a secure future, but it will be in the bleak man-made environments that increasingly dominate the world.

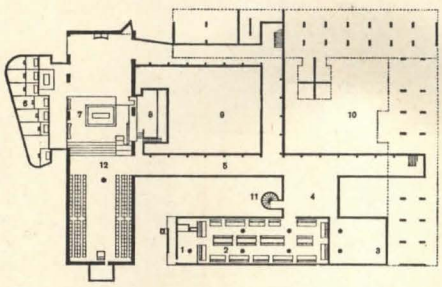
One wonders also if they took note of another ambiguous but symbolic message from their host. For, however we may read it, as skepticism tinged with a supreme sense of irony and perhaps a touch of pessimism, Aalto designed this addition in the form of a giant fragment of a ruin (illus. 59).

Notes

1 Asko Salokorpi, *Modern Architecture in Finland*, Praeger Publishers, New York, 1970.
2 In a conversation with the author, 1976.
3 First published in 1922 in *Arkitekti / Arkitekten;* later published in "Skisser," a collection of Aalto's writings and drawings; to appear in English translation by MIT Press in summer, 1977.
4 See note 3.
5 Le Corbusier, *Towards a New Architecture*, Praeger Publishers, New York, 1970.
6 Robert Venturi, *Complexity and Contradiction in Architecture*, Museum of Modern Art, New York, 1966.
7 Henry-Russell Hitchcock, "Aalto versus Aalto, the other Finland," *Perspecta 9/10*, Yale University, New Haven.
8 Leonardo Mosso, *Alvar Aalto*, Otava, Helsinki, 1967.
9 Peter Eisenman, doctoral dissertation (unpublished), "The Formal Basis of Modern Architecture," Cambridge University, 1963. A rigerous analysis of the floor plans of Tallinn Museum and Saynatsalo Town Hall demonstrates the logical but complex formal systems underlying the buildings.
10 See note 6.
11 See note 9.
12 George Baird, introduction and notes to *Alvar Aalto*, Thames and Hudson, London, 1968.
13 See note 7.
14 See note 1.
15 Karl Fleig, editor, *Alvar Aalto*, Editions Girsberger, Zurich, 1963.

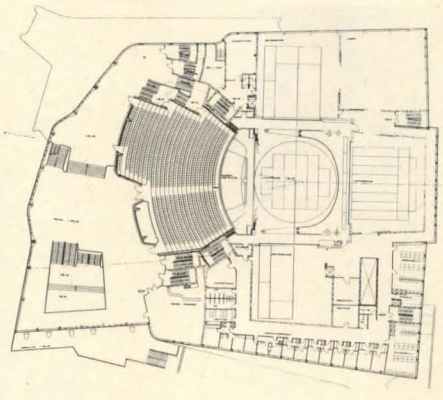


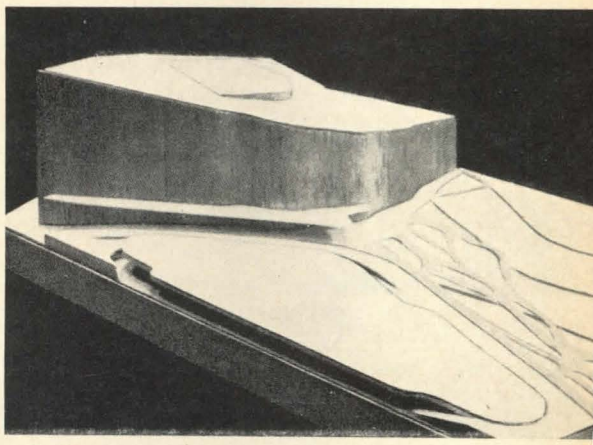
54 Le Corbusier, Swiss Pavilion, Paris, France, 1930–32.



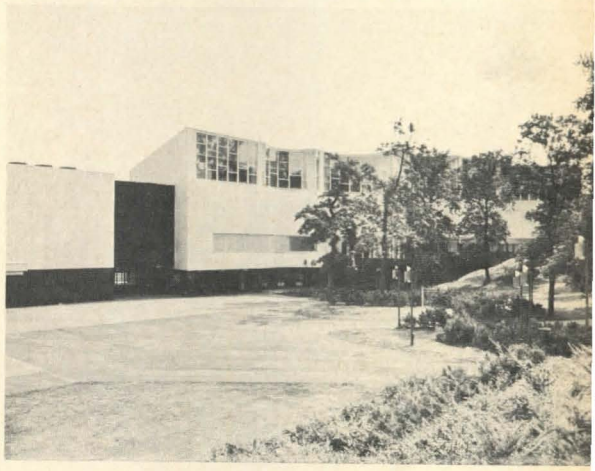
55 Le Corbusier, Monastery of La Tourette, Eveux-sur-Arbesle, France, 1956–60.

56 Auditorium level, Opera House, Essen, Germany, designed 1961–64.



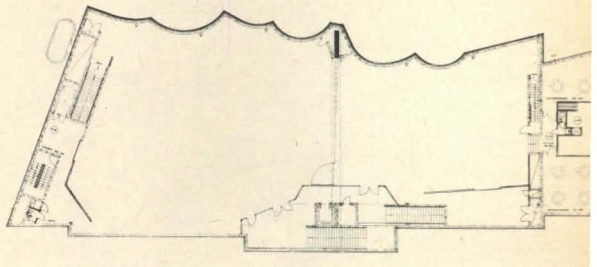


57 Opera House, Essen, Germany, designed 1961–64.



58 Congress Hall addition, Finlandia Hall, Helsinki, 1974, Photo: George Miller.

59 Congress hall level, Congress Hall addition, Finlandia Hall, Helsinki, 1974.



A lesson in perceptible dimension

Michael A. Rubenstein

Two most recently completed works of the Aalto office are the Congress Wing addition to Finlandia Hall in Helsinki and the Alvar Aalto Museum, Jyvaskyla. Here, the buildings are seen through the duality of imagination vs. pragmatism.

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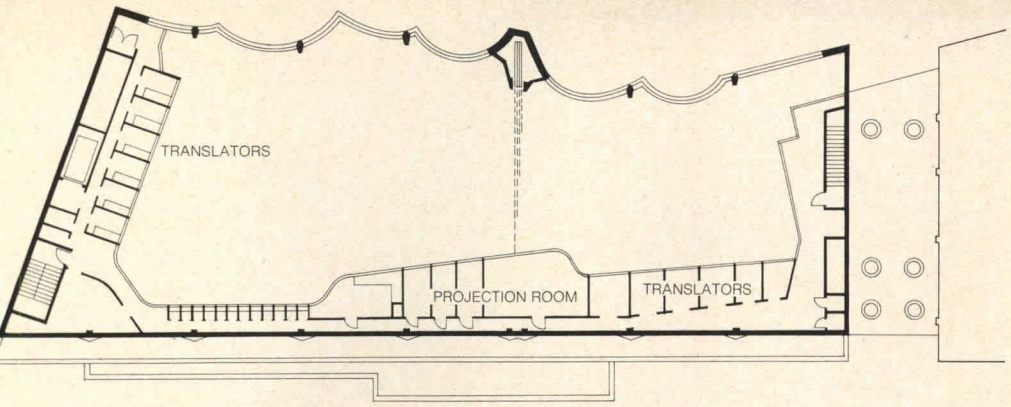
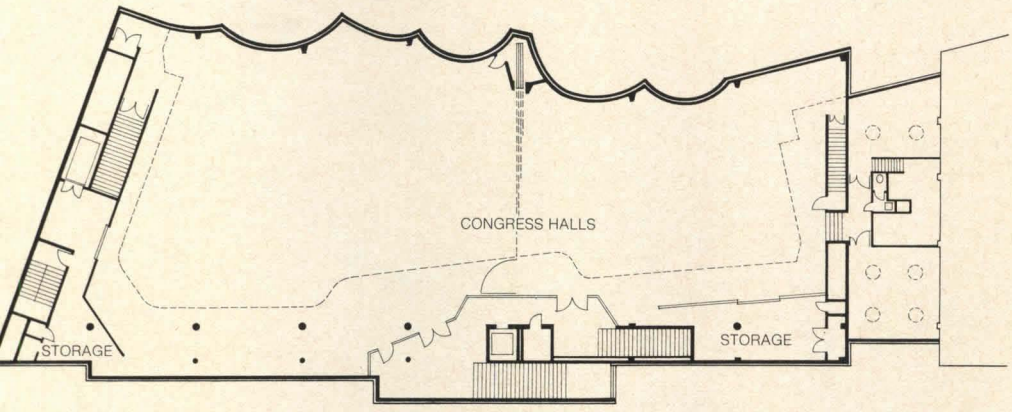
Within the Aaltos' design process, imagination is tempered with a self-imposed pragmatism. A sense of modesty, arising out of their continual delight in human measure, contained the moment of inspiration with suitable thrift. The duality can be observed both in the limiting of their architectural goals and in their method of building. Their creative qualities, deriving as they did from an overriding human concern, were drawn from the same allegiances that nurtured the isolated creativity of Strindberg and Bergmann, Munch and Greig, as well as Sibelius.

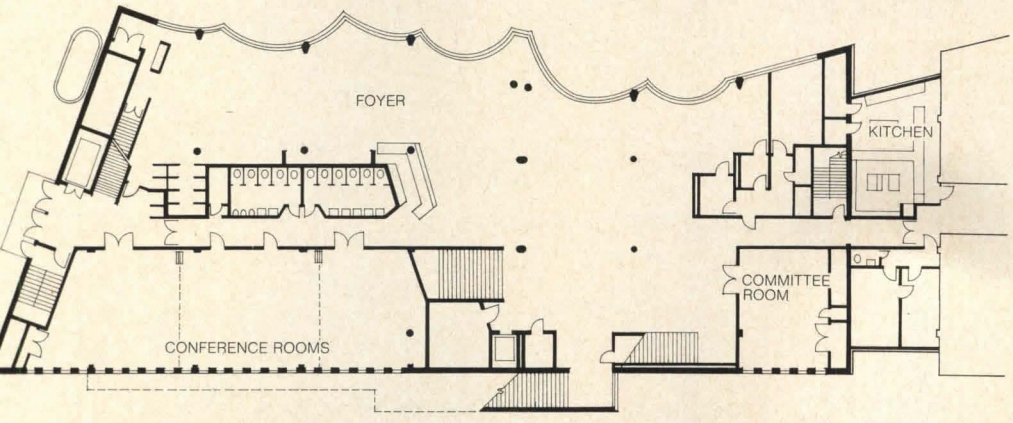
In Finland, one becomes alert to the tangibility of the dimensions that make up the urban environment. The human scale of the spare, well-proportioned grid of Jyvaskyla where Alvar and Aino Aalto set up their first office in 1925 is quickly perceived. In Helsinki, the opposing phenomena of shortness and grandeur offered by the Esplanade is similarly remarkable. Perhaps this special civic scale engendered the awareness of perceptible dimension that is basic to all of their design efforts.



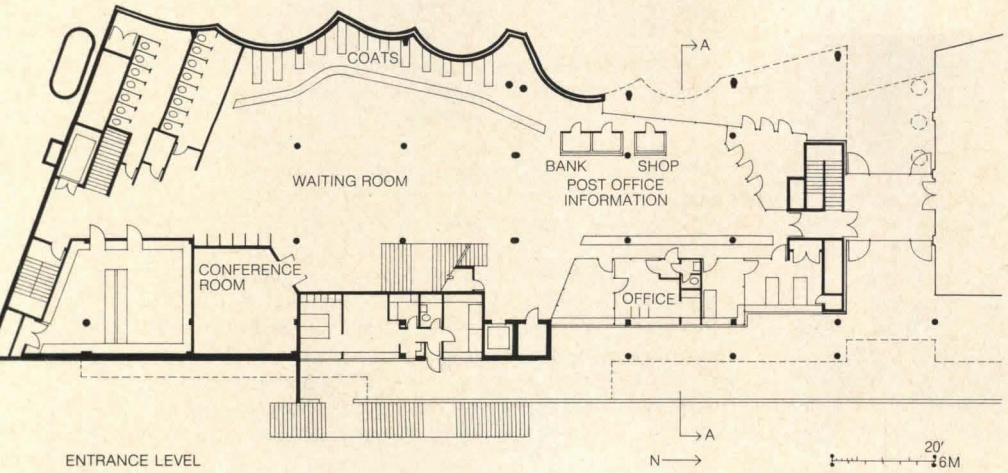
BALCONY LEVEL



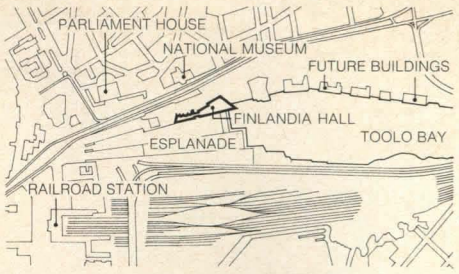
CONFERENCE HALL LEVEL



FOYER LEVEL



ENTRANCE LEVEL

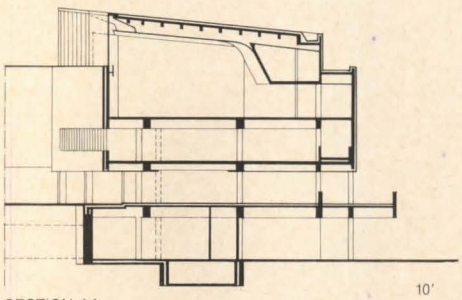


SITE PLAN N ⟶

Congress wing, Finlandia Hall

Finlandia Hall, designed in 1962 by Alvar and Elissa Aalto, was completed in 1971 (P/A, Aug. 1972, p.50) and enlarged by the addition of a congress wing in 1974. It is the first building to be completed within the Helsinki City Center Plan developed by Aalto between 1959 and 1964. The basis of this plan takes advantage of the relocation of sizable freight yards from the center of the city that will clear the way for a series of highly articulated public plazas atop garages. This, in turn, would allow the center of Helsinki to become a pedestrian precinct while bringing the openness of Toolo Bay and Hesperia Park downtown. The final achievement of this plan, a specific example of the sense of civic scale mentioned above, is to be the construction of a grand north-south boulevard to organize the entrance traffic of the city which is approachable only from the north. By being elevated, the boulevard will display the riches of the new Helsinki to the visitor as he arrives.

In addition to the concert-congress facility, an opera house, art museum, and central library are to be located along the west bank of the bay in a rigid, geometric manner that answers to the speed of movement perceivable from the new accessway, as well as to the scale of the bay and the three plaza-garages. While the bay façades form a semi-continuous linear promenade along the water, the opposite sides, facing west and fronting onto Hesperia Park, deviate sharply in the plan and reflect appropriately enough the more romantic, smaller scale of particularized contextual problem-solving having to do with people on foot, steep grades, old well-regarded trees, and individualized building programs. Further west and up the hill, the site of Finlandia Hall is dominated by the red granite mass of J.S. Siren's Neo-classic Parliament House of 1930 and the rough-hewn dark granite and sandstone of

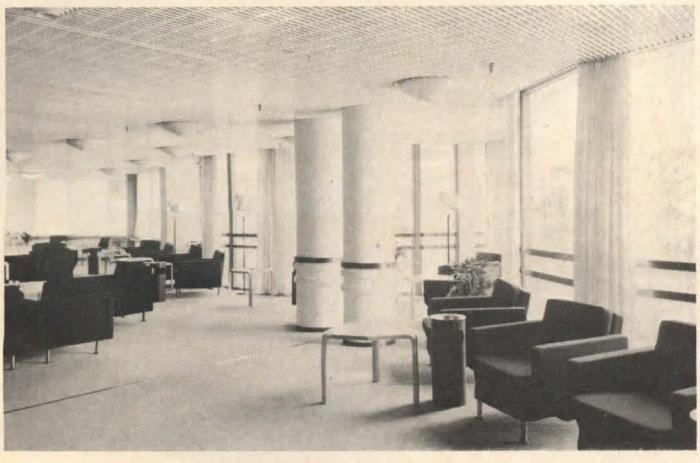


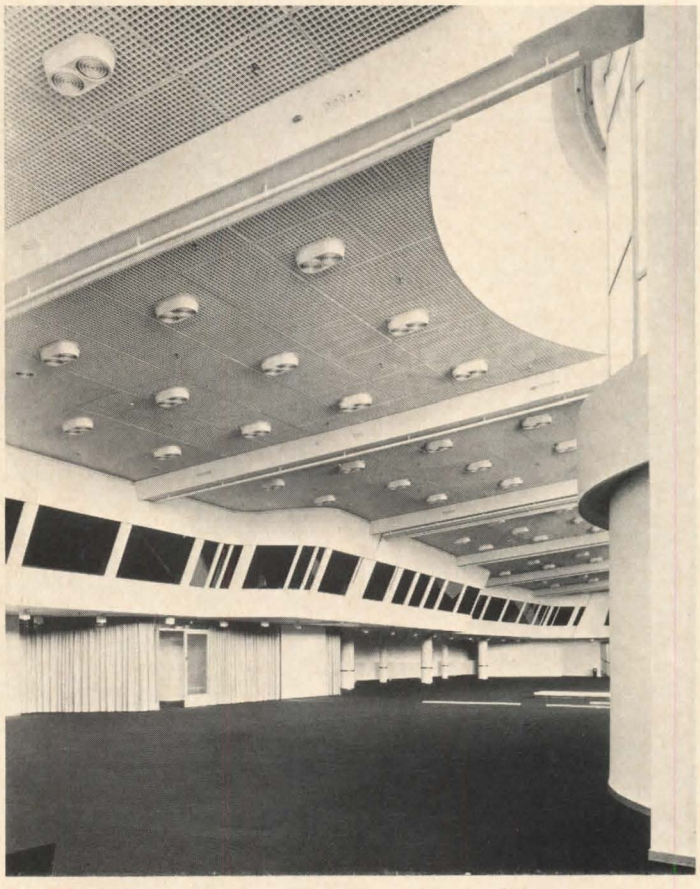
SECTION AA

Gesellius, Lindgren, and Saarinen's National Museum of 1910, designed under the influence of H.H. Richardson, with a careful eye cast towards the German medieval church tower.

The east façade of Finlandia Hall, and the later congress wing as well, is rigid, sleek, simple, horizontal, and white as perceived from the bay and the future plazas. The west façade, facing Hesperia Park, is another matter. Here, heavy contours, large masses of trees and the native rock outcroppings of the city provide reason to break the façade into a series of moderately scaled articulations that give individual place to the entrance way of each function: the 1750-seat concert hall, the 350-seat chamber recital hall, the restaurant, and finally, in the addition to the original building, to the congress hall. The scale of the façade modulations is in harmony with the careful stepping down required of the pedestrian as he proceeds through the shifting contours of the park from Mannerheim Way.

By the time of the addition some ten years later, the Aaltos, perhaps influenced by the location of individual trees or the elegance of the old City Museum directly to the south, but more probably swept up in a moment of ecstasy, scupted the west façade of the congress wing into a series of six unaligned, uneven, concave shapes. These do not have their match anywhere in the Aalto oeuvre for a sense of, and an





Color photos: George Miller

The main conference room (above) opened up for 900. The Translators' booths and projection rooms are located on the balcony above.

One of the public levels (left) used for informal meeting and relaxation, with a view onto Hesperia Park. The west windows are protected by a fine metal sunscreen hung from the stucco and marble work above.

Within the curves of the congress wing, the marble cladding of the earlier façade drops back to allow the liquid stucco to form the curved surface. The marble corner panels hold the sharp edges which give the building its crispness. Through the glass, which reaches to an almost nonexistent fascia, the mechanism can be seen for the retractable partition that divides the conference floor into two rooms seating 900 in total. The first two public levels are designed as places for informal meetings. Movable partitions are also built in here to divide these floors for a variety of conference situations. The connection to Finlandia Hall is made through the restaurant facility of the earlier building. The common kitchen was enlarged to accommodate new use.

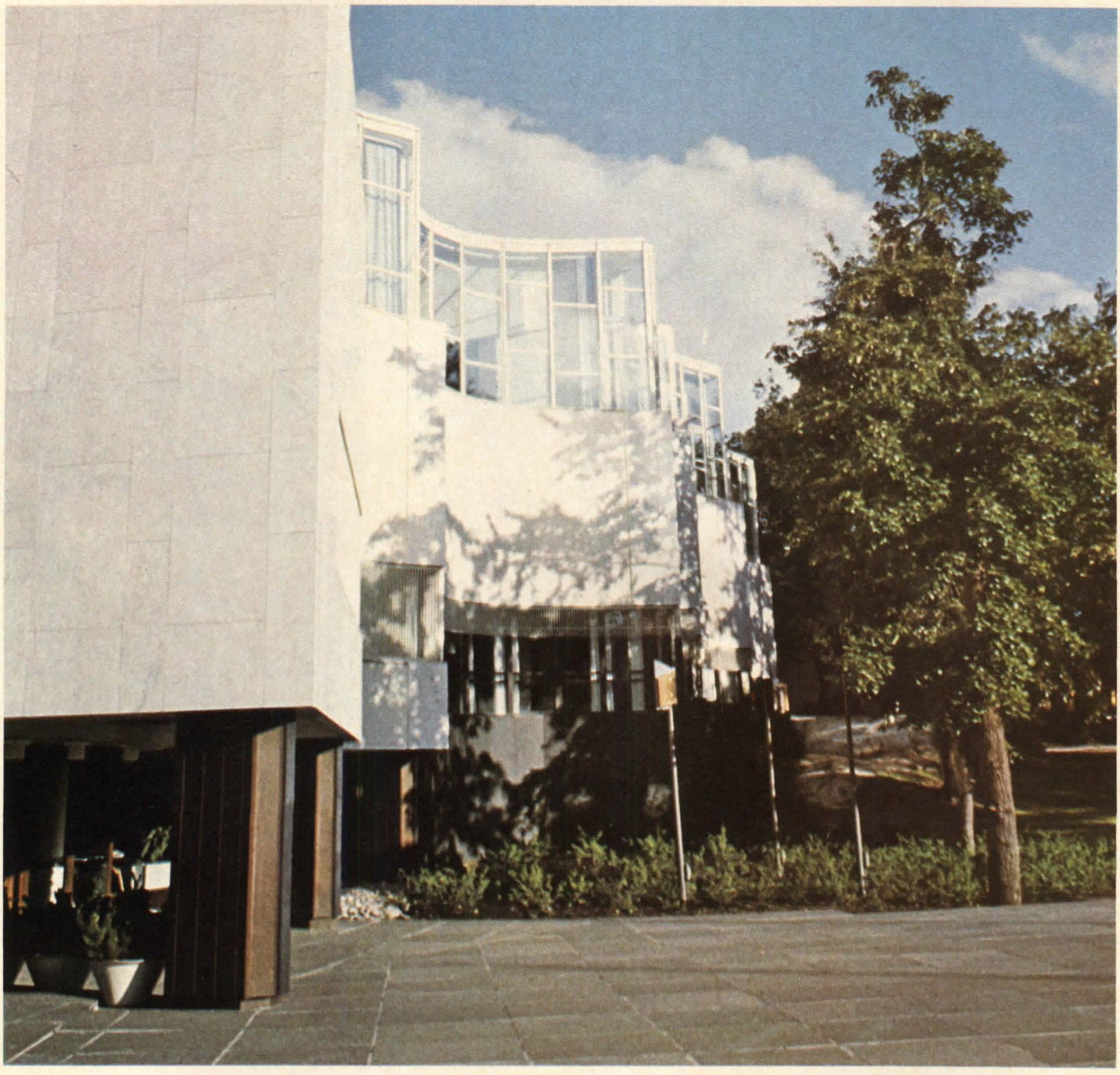
expression of, the lyric as well as the lighthearted joy of life. By this one building, their architecture can be judged to exist within the realm of art rather than at the parade ground of art history.

The play of shadows cast by the large trees on the white stucco surfaces that enclose the congress facility are a reminder of the music more appropriate to the concert hall next door, yet one realizes that the facilities of Finlandia Hall are used not only for an occasional evening concert but were built for continual meetings, congresses, and conferences, as well as for the formulation of the 1975 Helsinki Accords. Notwithstanding anything else, the sense of programmatic thrift is remarkable.

The lightness of the newer congress hall fixes the somewhat ponderous nature of the earlier part of the building in a stylistic continuum that relates more to the 1958 Kultuuritalo in Helsinki or the churches of the same period at Vuoksenniska and Wolfsburg. The later addition is, naturally enough, more at home with the more delicate liberaries of Rovaniemi and Seinajoki, both of 1963, and Mount Angel of 1966.

The interiors of both buildings, as in all of the Aaltos' buildings, reach towards the precious northern light and take advantage of its strength through modulating clerestories that offer a continual sensation of sun, cloud, and shadow. The calibration of the procession's length—the time it takes to go from the front door to the coat room, removing a heavy overcoat on the way, and ease from there towards stairs that were designed to make an old person feel respected—indicate once more the lessons learned in perceptible dimension. The glistening of dark blue porcelain tiles, the groupings of light woods, the plaster, a suppressed color palette, the furniture, and the special lighting fixtures are what one comes to expect of the Aaltos' buildings. They form a sort of second language that frees the architects' creative inquiry for the elaborations of spatial experimentation. This becomes a comfort for the observer who, knowing the language after a while, is similarly released to ponder the further joys that the architecture offers.

Finlandia Hall is a building in the city that has a setting in the country—one of the splendid opportunities of building in a small capital that has no pretense about its size. It is, as a city building, more successful than the blended office façades designed for Helsinki in the 1950s after the in-the-round National Pensions Institute. The restraints of the city seem to have been a heavy burden on the architects indeed.



Alvar Aalto Museum

No such restraint is seen in the design of the Taidemuseo at Jyvaskyla, completed in 1973. This small building, later referred to as the Alvar Aalto Museum to the chagrin of the architect, has, barring the public lavatories, no single rectangular space. All of the rooms adjust their shapes first to the site condition of the building as it burrows into the hillside, and then to the modulations of dimension, which allow the spaces to become liquid, restless, nonfinite, and to seem neither large nor small as they flow one into another through the building. The constant adjustment of wall plane scales each vista and acts as a foil to the somewhat regularized column grid that is expressed upstairs in the main gallery. This system suggests the division of the main space into three primary exhibit areas. The three east-facing clerestories, which define the potential of this division by light as well as by subtle level change, allow the architects to structure the main gallery space in such a way that no matter what form the curatorial adjustments take, there still remains the imprint of a generous architecture made with natural light.

Practically all of the Aaltos' museums share a similar organization of movement. As early as 1936, in the Tallinn Museum in Estonia, the visitor is oriented first and continually to a neutral, intermediate place in which to rest the eye. This area gives onto a controlled, natural landscape which is in balance dimensionally with the sum of the gallery space. One can start and return to this area continually. The organization is used as well in the large Shiraz project of 1970. In fact, if one thinks further to the other public buildings, the act of arrival and orientation is handled similarly at Finlandia Hall, at all of the Wolfsburg buildings, and at the Institute of Technology at Otaniemi as well. It is as if the public circulation takes place in the palm of a hand that consists of several fingers of various function. The strength of this concept is that one arrives into the middle of the system immediately, without wondering about it at all. It is a key to the sense of comfort of the Aaltos' buildings.

The gallery space of an Aalto museum is always located to receive light from above. On a tight site, this implies that storage and entrance functions share the ground floor with the coat room and public lavatories, which are always easy to find from the front door. In this building, and typi-

Color photos: Nory Miller

In the exhibit hall (upper left and above), natural light is modulated by being bounced between a grid of exposed beams which trisect each of the clerestories. At the exterior, (right) the end light of each clerestory is seen to be taller. The present darkened gallery space (rear, upper photo) should be seen in contrast to the pleasantly lit adjacent area where light is introduced from domes. The surface applied bullet spotlights are a distraction not usually found in the Aaltos' buildings. The coffee bar, (left) is seen from under the main stairs. Windows open onto the garden with its waterfall. The small terrace was designed for dining in good weather in order to try to unite the two museums.

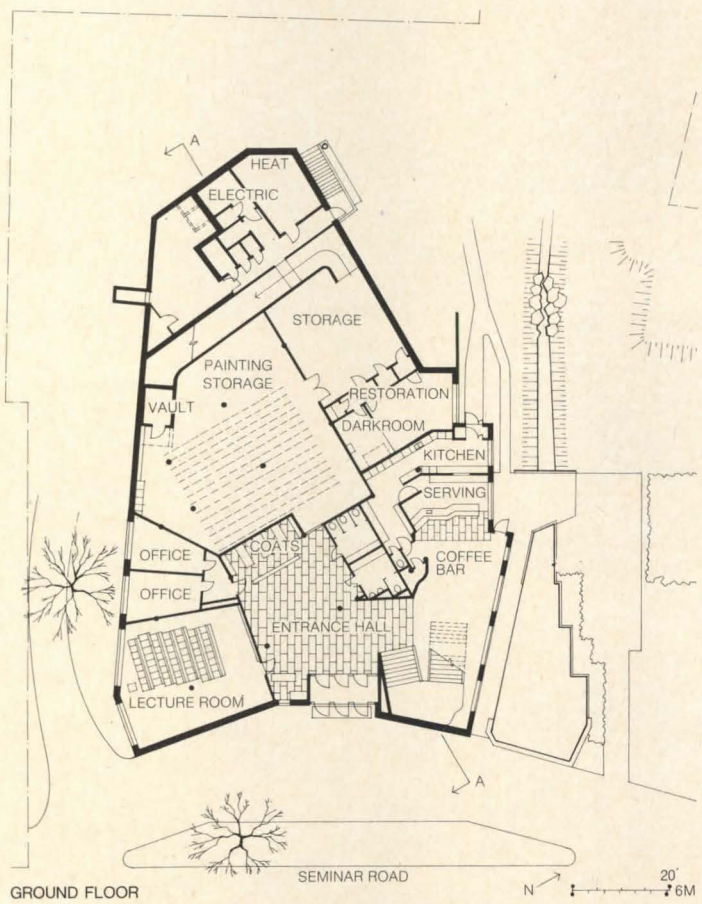
cally, a finely detailed baroque sculpture of a stair takes the visitor from this darker level to the beginnings of light above. At present in this museum, the north light that illuminated the passage, and which in theory would join it to a naturally lit reference point, has been temporarily eliminated by movable panels that block both view and light. While this allows additional wall hanging space, it creates a rather dark area, unbalances the quantity of light from the clerestories and diminishes the clarity of movement in light, the theme of the Aaltos' approach to museum design.

Behind these panels, the view of a small but intricately detailed garden is now blocked. The garden vertically unites the levels of the steep site with a waterfall and attempts to make a horizontal connection with the Central Finnish Museum, which was completed by the Aaltos in 1961 on the adjacent lot. This northern garden façade is alive with windows, various setbacks, indents, and the clerestories on the roof—small units busy with interest. By comparison, the sober entrance elevation is made particularly more so. Three dark doors and a small bronze plaque give the only indication of entrance to the building. This treatment, which perhaps was intended to relate the entrance to the large-scaled detached villas typical of Seminar Road, on which it fronts, is a puzzle.

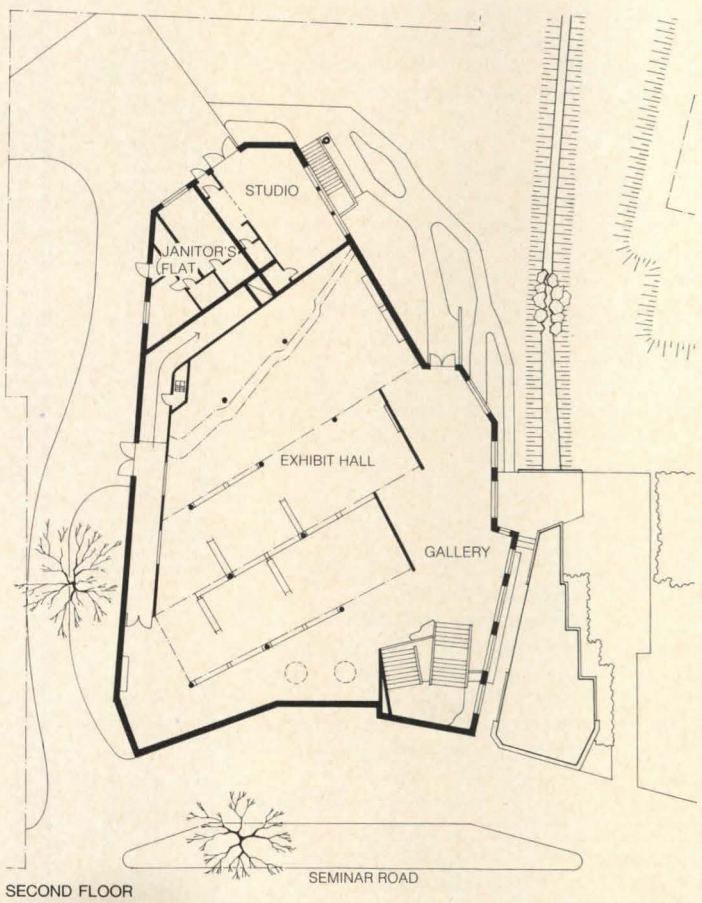
Within the building, a fairly complex series of functions is accommodated in independent fashion. There is a studio for use by a local artists society and a janitor's flat at the back. The side opposite the garden is given over to deliveries, which are serviced within by a complicated ramp structure that allows independent access to each of the gallery spaces above so that the staff can rehang one show without disturbing the others.

The art of subtle modulation is practiced throughout; from the small coffee bar on the main floor that faces into the garden to the stair with its intricate landing and handrail details, from the delineation of the end light in the stepped clerestories to the double layered wood screen that hangs over the largest gallery space and recalls the Pavilion of the 1939 Worlds Fair.

Like the congress wing of Finlandia Hall, this late work of the Aaltos is alight with the touch of architects who are totally immersed in the human experience. The work stands perhaps as a reminder to the rest of us of the joys that architecture is capable of bringing, given patience rather than efficiency, love rather than interest, and a commitment to art rather than to theory. One feels at home in Finland!



GROUND FLOOR



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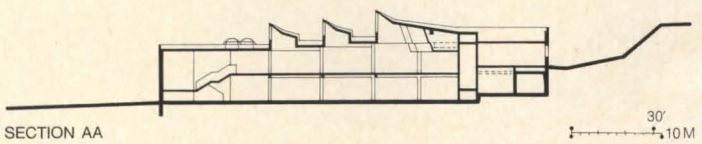
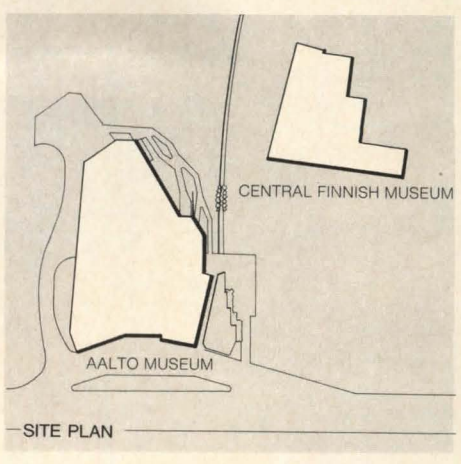


SECTION AA



SITE PLAN

The garden façade (left) is seen from the grass terrace in front of the Central Finnish Museum. In plan the main stair, with a large window at the landing, functions as part of the site plan with its carefully contrived level changes. The building is clad in a bland, off-white mix of brick and porcelain tiles. Windows are wood.

Furniture and furnishings

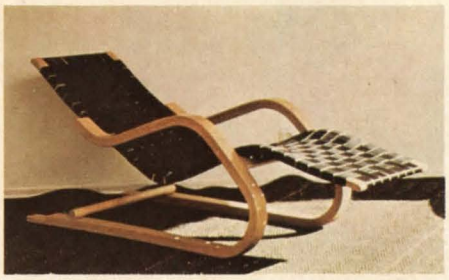
This article, produced by the Finnish Society of Crafts and Design, examines the integration of design and technology in Aalto's furniture and furnishings.

Alvar Aalto's contribution towards the creation of the environment we live in spans a vast range, from town planning through the whole scale of building, down to what he usually called "articles not tied to architecture": furniture, light fixtures, textiles, glass pieces (illus. 1, 2, 3, 4, 5).

Abroad, Aalto's image has often been considered typically Finnish, yet the national element is, in fact, limited to his use of Finnish (Scandinavian) blond birchwood. His designs reveal no heritage from traditional Finnish interiors, no ingraining of folklore; they are completely universal, and most are still contemporary in feeling 20, 30, 40, or 50 years after emerging from the drawing board.

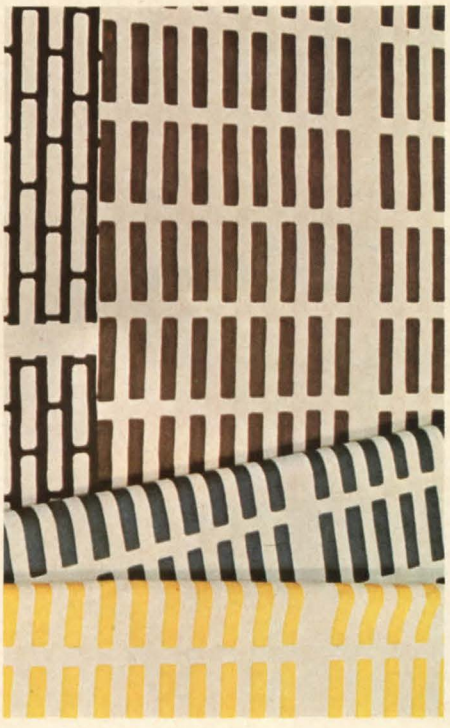
Comparison is sometimes made between Aalto's furniture and Thonet's curved Vienna chair of the 1840s, and the similarity is indeed in the bending of wood, which is the pervading feature of Aalto's furniture. Semi-scientific experiments with the natural properties of wood were started by Alvar and Aino Aalto as early as the 1920s, and in 1931 one of the results was shown at an exhibition in Helsinki (illus. 6). The chair had a molded veneer seat, but the legs were still of metal tubing, in the functionalist manner. At the same time an early sample of small stackable wooden chairs was shown (illus. 7), and these were to presage another feature on which production would be based for a long time afterwards. These pieces were made by the furniture manufacturers Huonekalutehdas Korhonen Oy, in Turku—a family business which today still manufactures the furniture.

It was around this time, 1928–33, that Aalto was working on the Paimio Sanatorium in southwestern Finland, which was the first of his projects to attract international notice. Because he wanted to supply the hospital with furniture that was comfortable and acoustically more pleas-



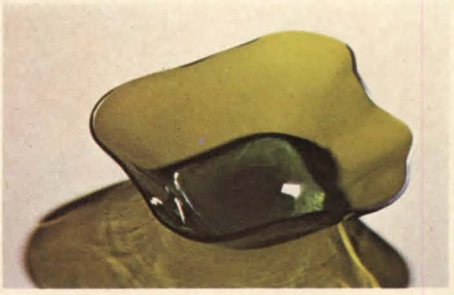
1 Easy-chair, 1937

2 Armature no. 337, 1960s



3 "Siena"-fabric, 1954

4 Vases, 1936–39
5 Bowl, 1937



6 Chairs, 1929 (below)

7 Stackable chairs, 1930 (below)

8 Chair from Paimio, 1929–33

13 Chair no. 400, 1935–39

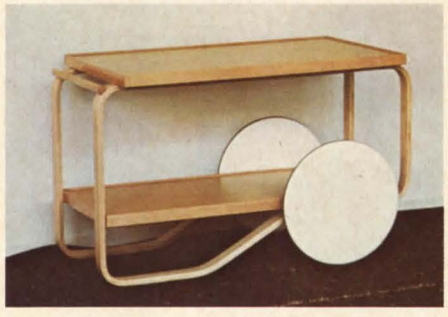
ing than the tubular metal furniture then in common use, he devised a laminated wood easy chair with elastic elements completely devoid of metal (illus. 8). However, the well-known classic among the early furniture, the "Paimio" chair, only constituted a stepping stone towards the technique that was to replace steel springs completely with a self-bearing elastic wood construction. With the "Paimio" chair the laminated wooden frame that supports the veneer seat forms a closed curve, as it does in a serving table (illus. 9), the serving trolleys (illus. 10, 11), and in the three-cornered consoles used for a number of different types of shelves. But very soon Aalto arrived at one open-bearing construction for a wide selection of armchairs (illus. 12, 13).

In Aalto's architecture the structural elements often play a prominent part in the design, and in his furniture the same attitude is often applied to technical details. Thus it is not surprising that some of the technical experiments resulted in something that might appear as art in its own right (illus. 14). In fact, such constructions have been used for purely decorative ends on the walls of some buildings. However, the results of the experiments are primarily seen as openly shown details in pieces of furniture. This holds true especially for the detail of prime concern to all furniture designers of all times, which is the connection of vertical parts of the bearing elements to the horizontal level.

In the mid-1950s, though, Aalto presented some designs where pieces of wood were joined together by a socket-shaped fitting and, as an exception, made an easy-chair where this "foreign body" was used as a dominating highlight (illus. 15). But usually he made it a point of honor to attach wood to wood without any connecting fitting, and purposeful experimentation combined with playful fantasy led him from one solution to another.

The first was the bent "knee," which found its application in innumerable types of furniture, from stools to dining tables. The birchwood, the solid wood, is here sawn up at the ends in the direction of the

9 Table from Paimio, 1929–33



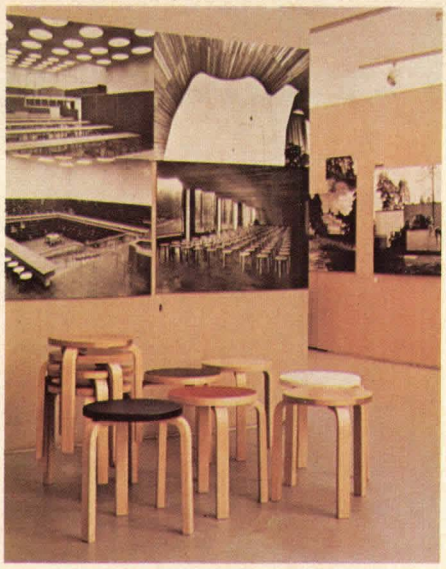
10 Serving-car no. 98, 1933

11 Serving-car, 1936–37

12 Chair, 1929–1933

14 Relief, 1947
15 Chair, 1955

Aalto: Interior architecture

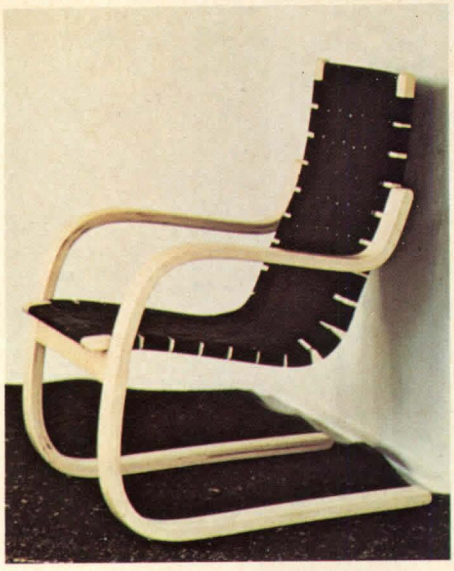


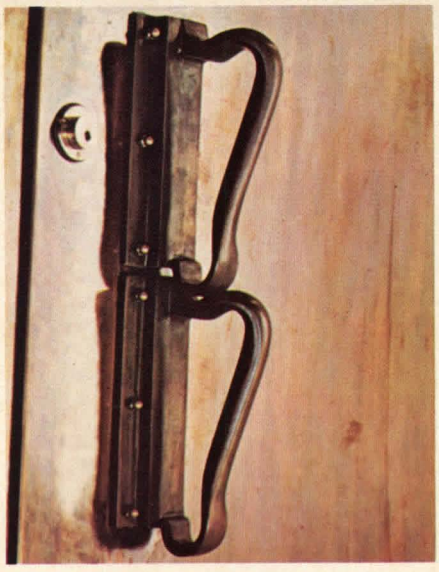
16 Stools no. 60, 1930–33 (left)
17 Chairs no. 68, 1933–35 (above)
18 Table no. 304, Chairs no. 66, 1933–35 (below left)
19 Stools no. Y-61, 1947 (below)

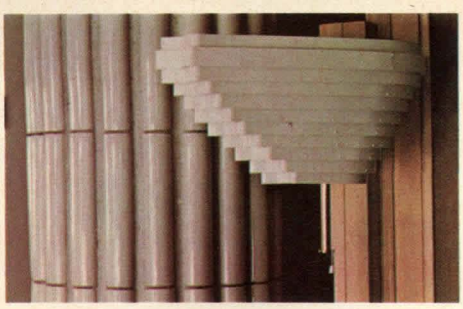
20 X-stool, 1954 (below)

21 Stool no. 63, 1947 (below)

22 Easy-chair no. 45, 1947 (below)







23 Easy-chair no. 406, 1946 (far left)
27 Door handle, 1954 (left)
28 Armature no. A-110, 1951 (above)

24 Row-chair, 1930

25 Chair, 1954 (above), 26 Chair, 1962 (below)

fibers, and thin wood discs are glued into the grooves, after which the piece is bent to the desired angle—usually a right angle. As the bent and compressed piece dries, it becomes absolutely firm in the shape it has been given. This method was used for much of the furniture designed for the Paimio Sanatorium and the library at Viipuri (illus. 16, 17, 18), and these types have since come to dominate a very wide range of Finnish interiors.

The following step in the development of what Aalto has called "the little sister to the column" came much later and is more complicated. Here the initial idea is realized at two levels and the joint becomes three-dimensional (illus. 19). The "column" branches out into a right angle at the horizontal plane to form either the frame for a webbed seat or the support for a solid seat or table top attached with screws.

Finally, the series evolves to a third stage with a fan-shaped joint that attaches the column in an organic way to the horizontal level by gluing, and this, in principle and in practice, was a perfect solution. Like the earlier joints, this one was also used in small chairs and in three- and four-legged, round, square, or hexagonal stools (illus. 20), as well as in different table models.

Aalto, however, did not limit himself to orthodox acceptance of these three main types of joint. His fantasy had to have greater play than that. Of his more unique solutions, there is a stool in which the leg at the "knee" bends at an angle sharper than 90 degrees, so that an open slit is cut out of the bend and the lamination (illus. 21). This new angle corresponds to the tilted surface in the lateral level of the seat frame—a laminated ring in the form of a frustrum of a cone.

Aalto enjoyed using webbing as a material for the chair seat and back support. He combined it with different designs (illus. 22, 23) and devised more expensive alternatives using plaited rattan (illus. 24) or leather strips. At an even more luxurious extreme there are padded armchairs where the light-colored wood is effectively contrasted with austere black leather (illus. 25, 26).

For Aalto, furniture was "an architectonic accessory," and to him it was a matter of course to harmonize the interiors in his building with the architecture. It was not uncommon for this to be achieved through using his own standard pieces, but he often found that special architectonic solutions made special demands on the accessories. Consequently, a number of particularly demanding buildings coincided with a flood of new furniture, lamps, and fittings where he personally designed the tiniest details, such as hinges or door handles (illus. 27).

But above all, Aalto's interest was concentrated on light fittings. Without a doubt this relates to the fact that his choice of colors is very restrained and that the interiors are essentially built up out of a play of light and shadow, both in daylight and under electric light. Among the elements Aalto loved to manipulate are deep light wells in the ceiling, and gratings in front of light sources in ceilings and on walls (illus. 28). As was usually the case, the practical combined with the aesthetic in these pieces, and even if many of them were produced expressly for a particular building, most of the lamps have been incorporated into standard production without difficulty.

Thus Aalto's design stands for us as a complete entity, aesthetically stimulating, socially and technically workable, with a lasting topicality and application that traverses all boundaries. His design language needs no interpretation, it speaks to us all.

Sources: The furniture has been produced in Finland since the late 1920s under the direct supervision of Alvar Aalto, and now under the supervision of Elissa Aalto. The pieces in current production are available in this country through ICF, Inc. (International Contract Furnishings). The fabrics are available through Unika-vaev USA, a subsidiary of ICF, Inc.

Wood renditions

While facets of the wood industry could fill volumes, P/A has chosen two distinct areas of interest to the architect, led off by an update on recent legislation.

Probably no group of enterprises has been so besieged by external pressures as the forest products industry. Public communications, handled smoothly and expertly now, were not always the first priority of forest products companies. By the assessment of industry spokesmen, controversies which have arisen over the recent years might well have been averted had the public been made more aware of industry practices and advances. In the sweep of environmental concern characteristic of recent years, many preconceptions and misunderstandings surfaced, alongside the healthy and valid questions. To many outside the field, the producers of forest products were viewed collectively as voracious machines bent on gobbling up every last twig on American slopes. Although some of this reputation may derive from much earlier operating modes, modern forest management techniques do not leave an excuse for such suspicions.

To begin with, as the industry points out, wood is the only major building commodity that can be continually renewed. Reforestation and intensive high-yield forestry have exemplified silviculture's advancement into a more and more refined science. Forest management, as a concept, has become very sophisticated; with proper management and planning, the nation need not ever run out of timber lands for recreation, wildlife, *or* wood products. But there is still work to be done.

In August of 1975, the U.S. Fourth Circuit Court of Appeals upheld a 1973 lower court decision narrowly defining the 1897 Organic Act for the National Forests. The effect of this action was to ban the selling of trees in West Virginia's Monongahela National Forest unless they were "dead, physiologically mature, large, or individually marked." The U.S. Forest Service, an arm of the Department of Agriculture, applied the ban throughout the Fourth Circuit (Virginia, West Virginia, North and South Carolina). In December 1975, Alaska's U.S. District Court agreed with the "Monongahela decision," and the entire Ninth Circuit (including Washington, Oregon, and California) was threatened. The result, if applied to all 154 National Forests, would have limited forestry practices in numerous ways. At stake were several harvest/reforestation practices—objected to by preservation groups—mostly associated with the concept of even age management for areas of forest land. One method, clearcutting, faced strenuous objections before it was more fully understood. It involves removal of all trees from a parcel of land, and the results were often thought of as comparable to strip mining, or worse. Unlike strip mining, of course, clearcut areas could be "healed" in a short time through reforestation.

The purpose of all even age management is bolstering the healthy, superior trees by providing the best light and growing conditions. All of the major timber companies are deeply committed to developing these superior trees, both in the forest and in their greenhouses and nurseries. Experimental trees without parents are even being grown in laboratories, directly from cells of superior trees. Characteristics such as faster growth and better health are becoming realities as genetic development of trees begins to catch up with similar processes in the nation's food crop plants.

Under the Forest Management Act of 1976, Congress has redressed some of the setbacks of the 1897 Organic Act. It has stressed land management, and left responsibility for that practice with the managers. In so doing, the bill strengthens the emphasis on even age management, allowing both judicious clearcutting and replanting, and methods depending on reforestation by remaining seed-generating trees.

Some problems for portions of the timber industry may still remain, however. The bill mandates sale by sealed bid, an unpopular method in western timber country, if not in the south. Many western towns have built their economies on local mills. Auctions, the area's preferred sale vehicles, allow small operations to know competition possibilities more openly, and to bid accordingly, keeping their operations going. Under the sealed bid requirment, a large outside interest might conceivably buy out a crop, forcing a local mill to suffer either an extra expense in obtaining logs or, worse, collapse for lack of raw material. The Secretary of Agriculture *can* waive the sealed bid procedure if, under guidelines being drafted as this is written, he deems the local economy to be endangered sufficiently.

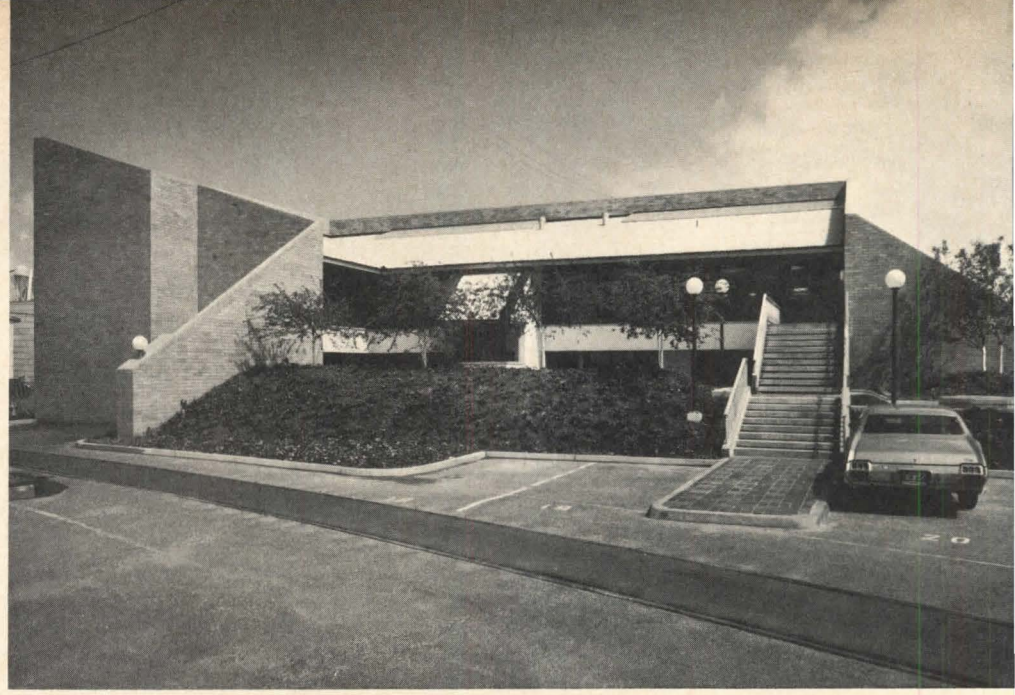
Photo courtesy Weyerhaeuser Co.

One other long-term and more complex problem is in the area of forest management. Since 59 percent (296.2 million acres) of U.S. commercial forest land is in private hands outside the forest products industry, the commitment to management is diluted by lack of incentive for those landowners. For a large company owning thousands to millions of acres of forest, the careful cycling of the crop is assurance of long-range harvests. But to a small owner, his acres must continually be producing income. Some states have finally developed tax laws that allow the crop to be taxed at harvest time, not yearly on the "value" of the timber stand. Industry and government, now committed to the practice of extended planning, are working on ways to aid the smaller landowner in the forest managment process. Still, it's a slow fight, and industry is anxious to increase its yield to keep up with the nation's ever-increasing demand for wood and wood products.

It should be pointed out that industry is not the sole beneficiary of timber operations. Timber bought and harvested from the National Forests annually brings $400 million to government coffers. Unfortunately, almost all of it goes directly to the U.S. Treasury, and the Forest Service and its parent (U.S.D.A.) must wait in line for congressional appropriations like every other agency. Only a small fund is allowed for salvage or reforestation of a sale area.

The following pages are devoted to two specific facets of wood's architectural interest. The profession has always taken more than a casual interest in both. Treatments for wood, both for performance and for appearance are of vital concern. And detailing in wood products has long been both a technical challenge and a visual and aesthetic delight. [Jim Murphy]

Even-aged forest management encourages the growth of strong, healthy trees in the continual renewal process.

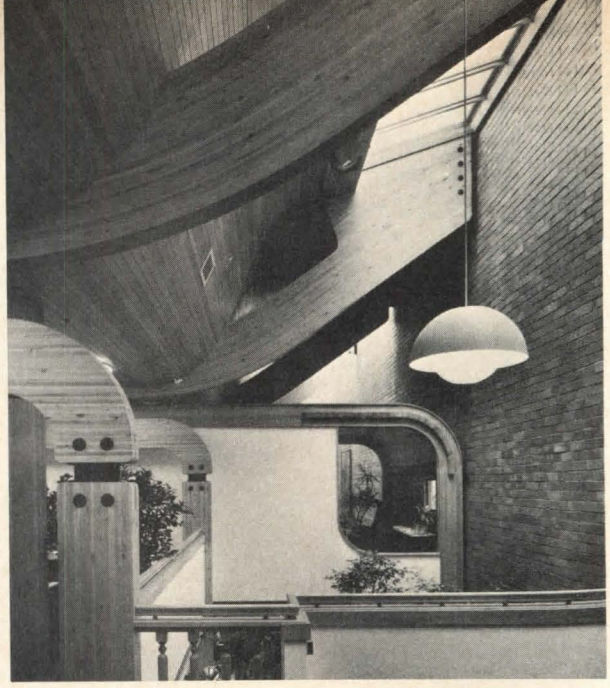


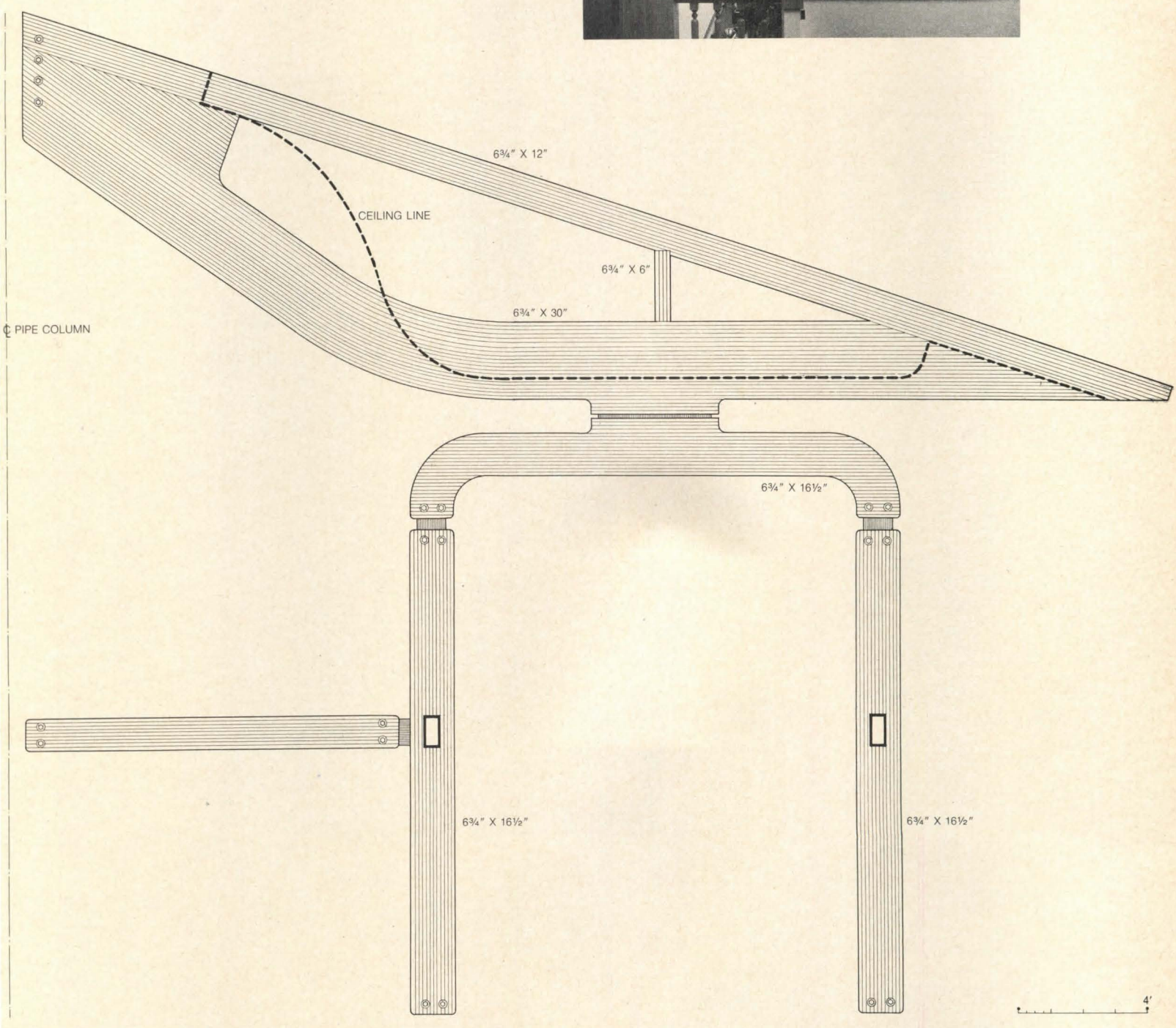
Attention to the details

Wood, because of its workability in field applications, and its warmth, has long been a favorite material with architects. On the next few pages P/A highlights some varied details of diverse wood products. These are obviously just representative samples of a virtually endless selection—a testimony to the versatility of the materials. Details range from the innovative to the *seemingly* obvious. Some are adequately illustrated by photographs, some by simple detail drawings. All, from the most complex to the least, are design solutions to specific problems or desired effects.

In the headquarters for the E.A.Nord Co. shown on these two pages, the architects Champion/Turner Partnership designed the main structural bents of hemlock (because the company's product, doors, is made of that material). The glue-laminated members extend above an undulating wood ceiling and below the bents to two laminated columns 14 ft apart, centered on each bent. Steel

spline plates connect members both to other members and to floor and wall connections. The effect is to give the interior spaces a housing of crafted, furniturelike frames within the outer building shell. Structural engineers: Martens/Kratz & Assoc.; interior furnishings: William Overholt; contractor: Newland Const. Co.; client: E.A.Nord Co.; photography: Julius Shulman.

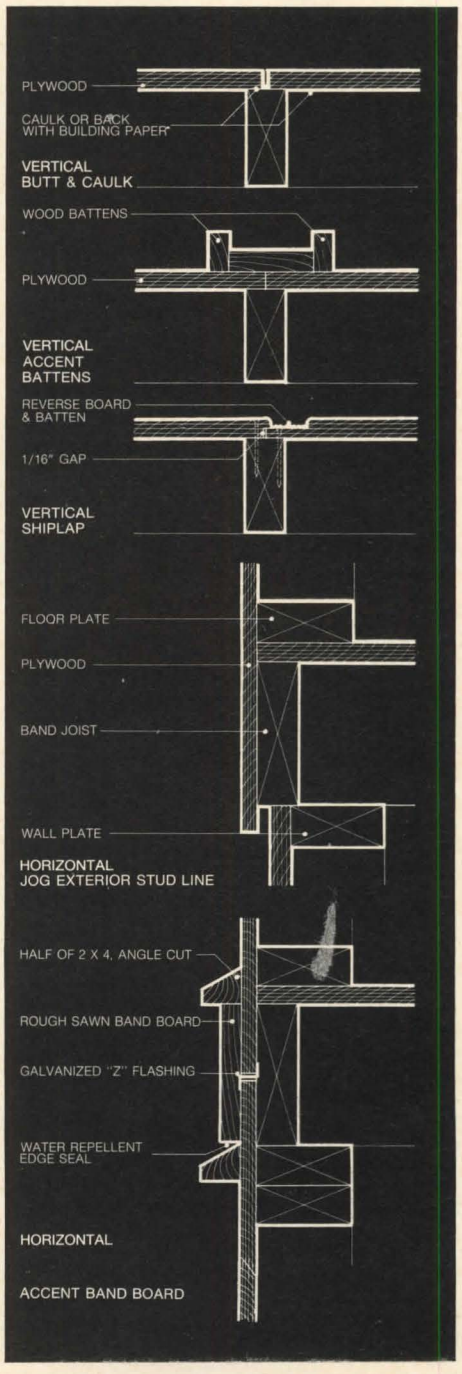




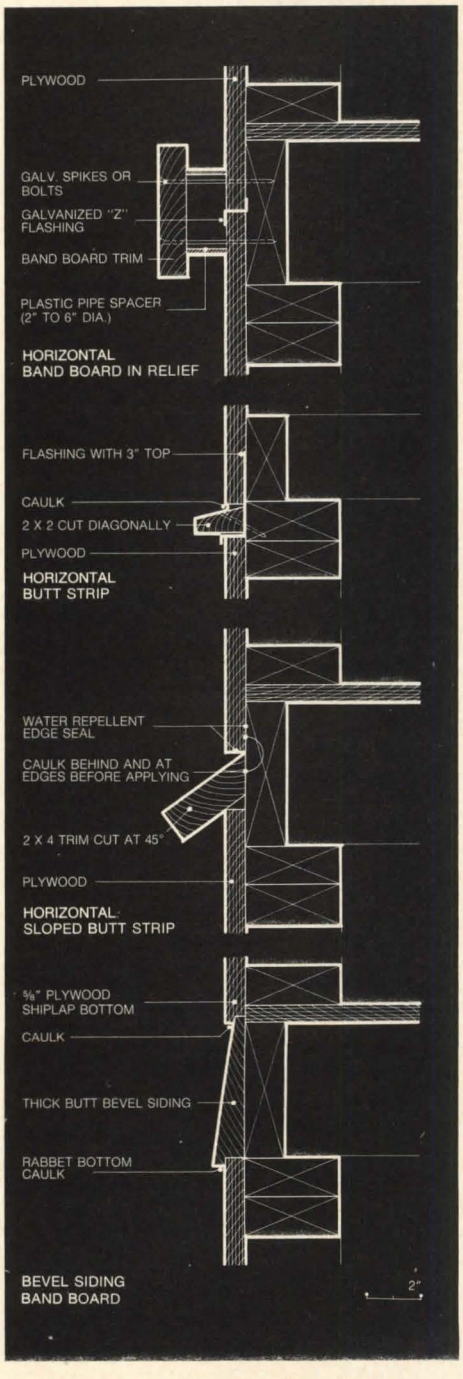
BENT ELEVATION

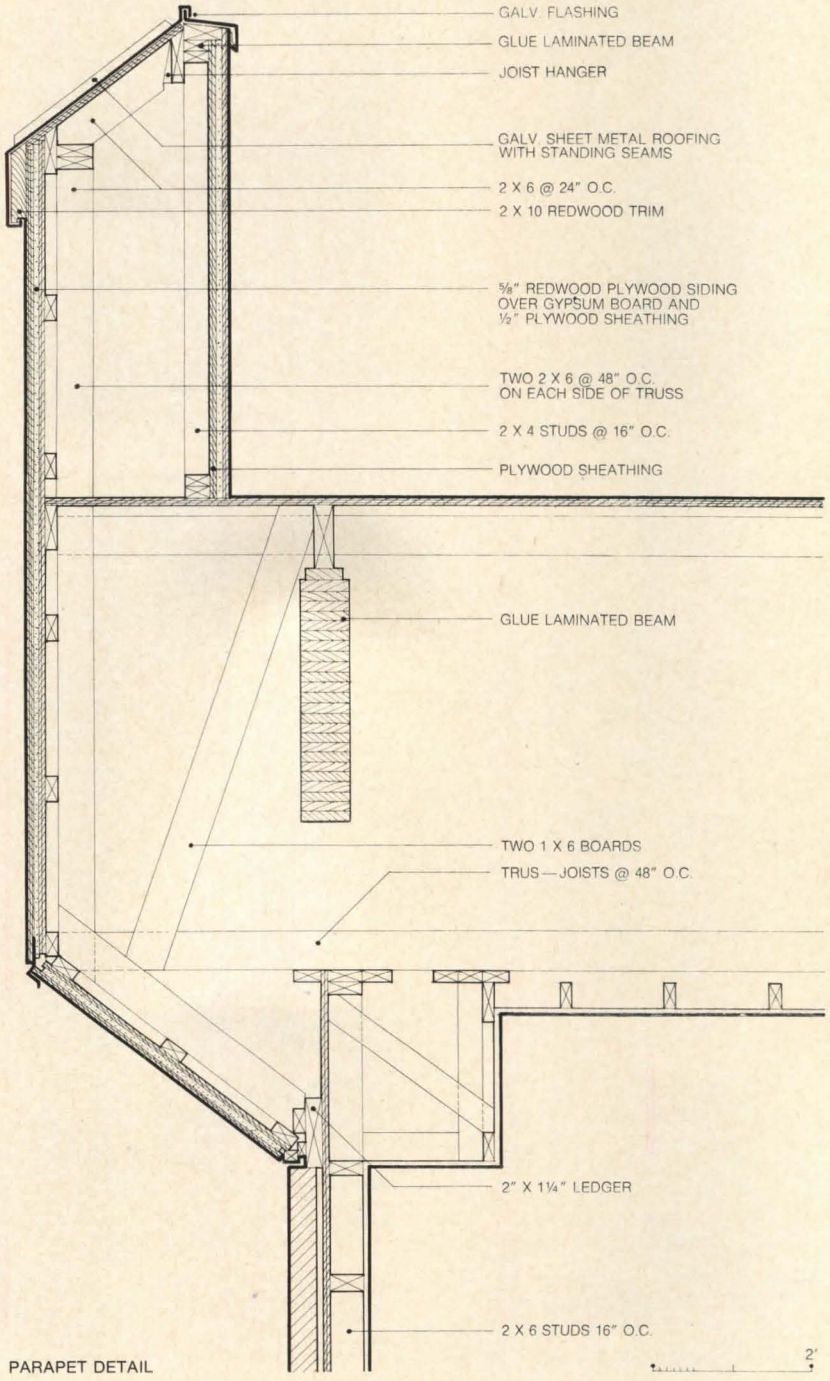
Technics: Wood detailing

Two houses by California architect Donald McDonald demonstrate various methods for enhancing the beauty of exterior plywood. Details below and at left on the opposite page are examples of ways to handle both vertical and horizontal joints, recommended by the American Plywood Association. All details and photos by Charles R. Pearson are through the courtesy of the APA.

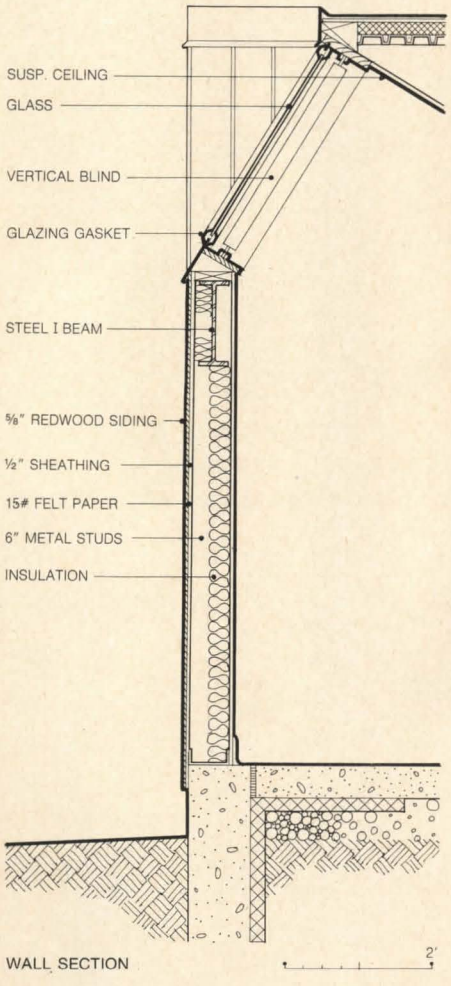


California school by Allan M. Walter & Associates (right, and detail below, right) combines brick walls and a redwood plywood parapet/fascia/soffit detail, capitalizing on the materials' warmth to avoid typical institutional look. The structure also uses glue laminated beams, centered over masonry walls, with wood outrigger fascia supports. Photograph courtesy of Simpson Timber Co.





PARAPET DETAIL



WALL SECTION

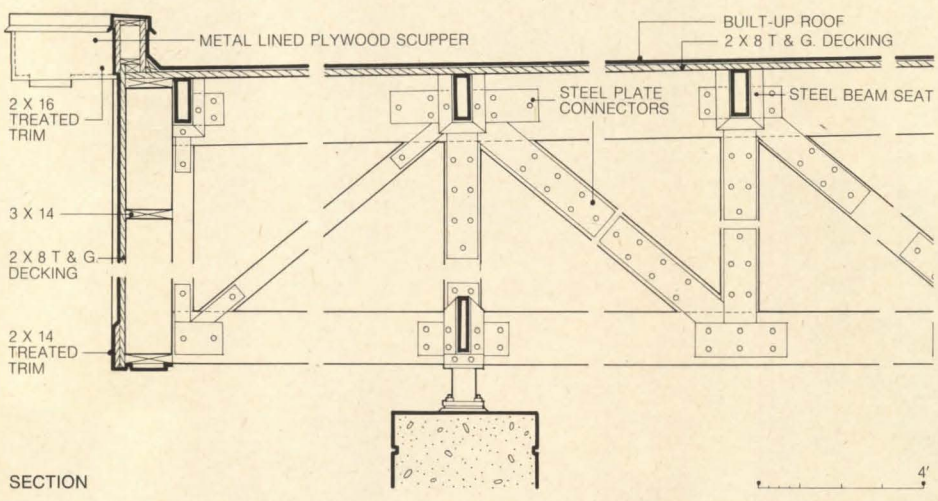
Andover (Mass.) Medical Center, a project by architects Drummey Rosane Anderson and Homer P. Young, Jr., achieves a sensitive massing and warmth through the combination of sloping bronze glazing, textured redwood plywood, and colored doors. Twenty doctors will occupy the structure, each requiring a separate entrance, and circulation to the central core. Photos by Charles L. Norton, courtesy of the California Redwood Ass'n.

Still another product enjoying an enduring popularity is the shingle. In this house by Seattle architect Ronald E. Thompson, AIA, he uses Western Red Cedar round cut fancy butt shingles to flow with the curves and create an overall texture or shadow pattern. Shingles and shakes may be applied either individually, as in this case, or in panels up to 8 ft in length. Photos by Art Hupy courtesy of Shakertown Corporation.

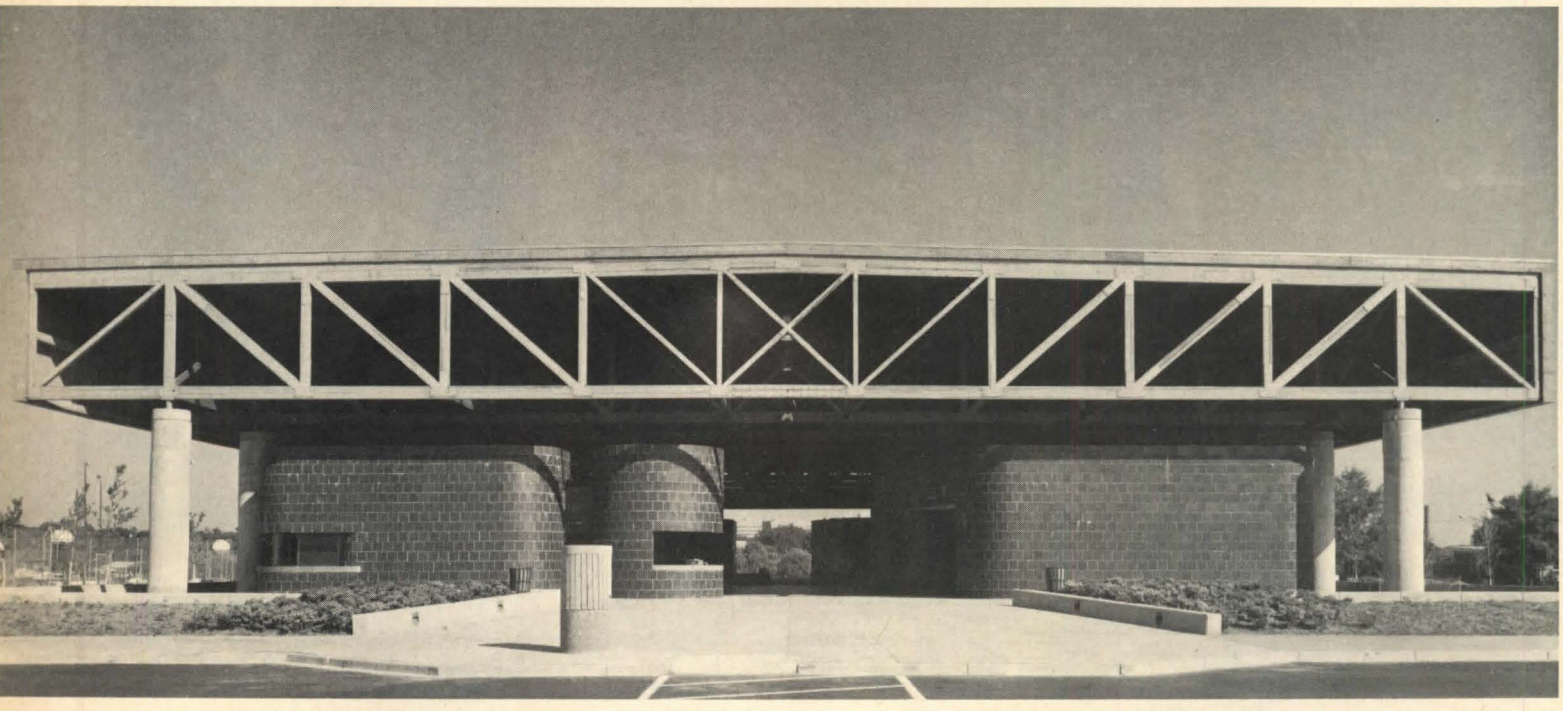
Technics: Wood detailing

Two other examples of shakes and shingles: A house in Mendocino, California by Charles Warren Callister, and the headquarters for Olympic Stain, Calvin/Gorasht Architects. Photos: Bruce Harlow, Morley Baer, courtesy Red Cedar Shingle & Handsplit Shake Bureau.

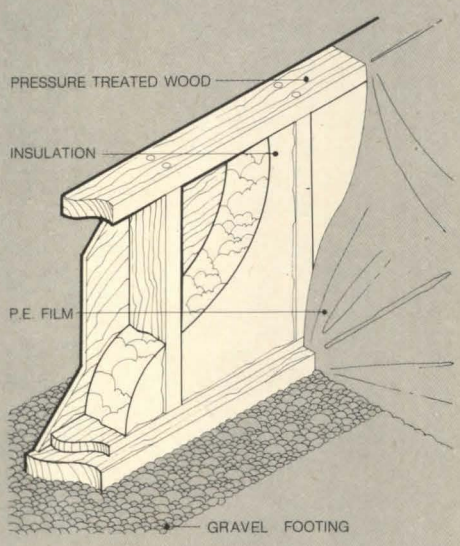
Roofed pavilion (below) for Anacostia Park, Washington, D.C., by Keyes, Condon, and Florance makes use of massive trusses which bear on concrete columns. Freestanding silo tile enclosures house office, toilet, snack bar, and storage facilities. Trusses span 120 ft over the activities areas. Truss and structural design was by James Madison Cutts; photos by Ronald Thomas.



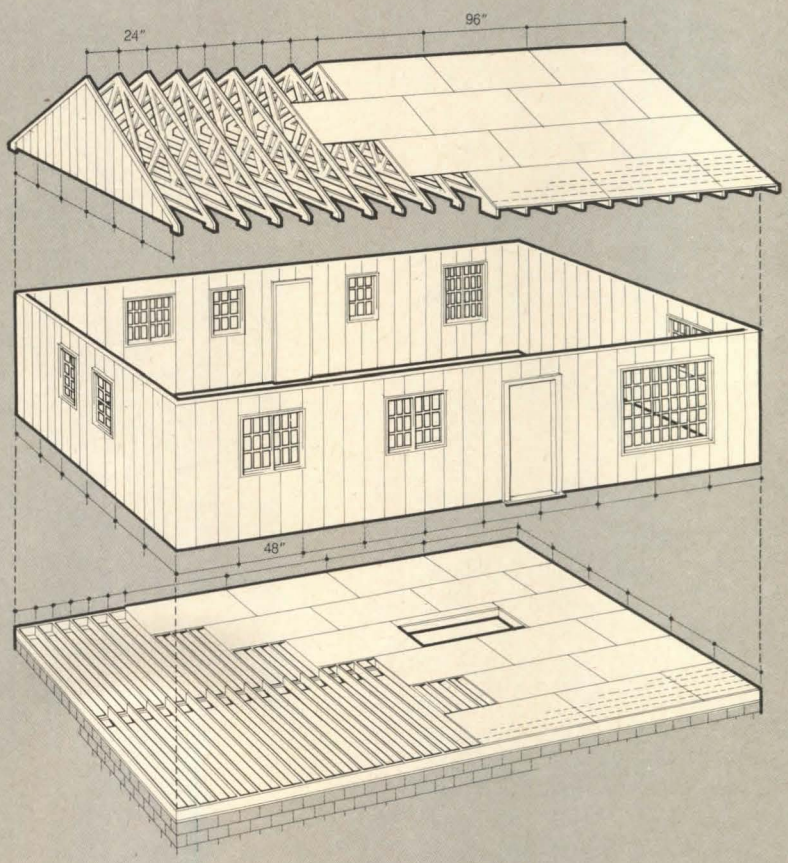
SECTION

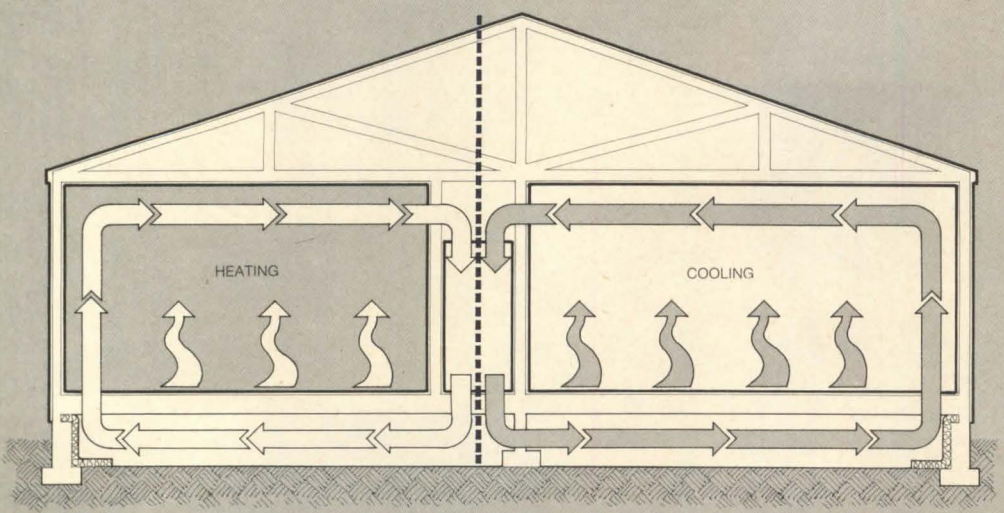


Never out of consideration is the tradition of post and beam or beam on girder, with wood or glass infill. In Downers Grove, IL, fire station 3, Wight & Company, Inc. has created a clear, straightforward, yet quite elegant expression (right). Photograph is by Harr of Hedrich-Blessing, courtesy of Western Wood Products Association.



All-weather wood foundation (above, left) uses pressure-treated studs and plywood to form foundation walls which bear directly on gravel footings. Foundations may proceed in any weather as soon as site excavation has been completed.

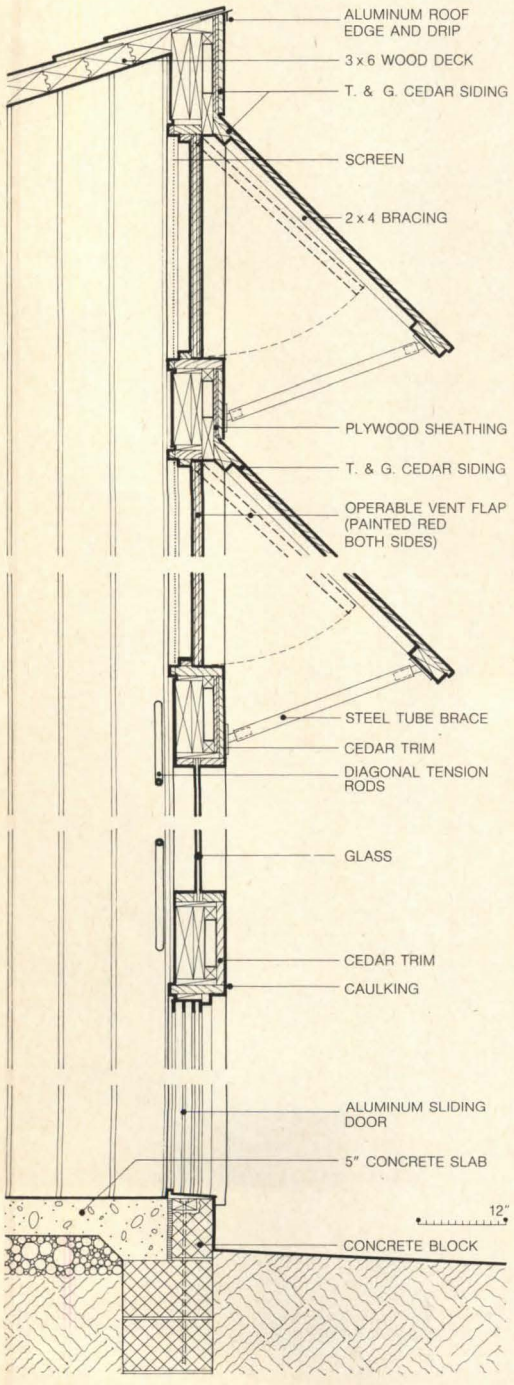




Several concepts (all within shaded area, this page) advanced by the Western Wood Products Association. Above, a house based on a 24-inch materials module instead of the standard 16, saves wasted material and speeds construction. System (left) using entire underfloor area as a plenum for the circulation of both heated and cooled air is said to maintain more even temperatures floor to ceiling, with cost savings by not requiring normal duct work.

Technics: Wood detailing

Dining Hall for the Camp Louise (PA) Girl Scout Camp, by architects Bohlin & Powell displays innovative yet inexpensive detail throughout. From its interior structural system with diagonal steel tie rods (far right) to its movable air vent flaps, the hall is simply but effectively worked out. Under permanent canted louvers which cut sun, movable painted plywood flaps allow natural ventilation currents to flow out from the lower rear part of the hall to the higher (shown in detail, below).



Protecting wood from its enemies

You could expect architectural wood to last nearly forever if you could protect it from its natural enemies: decay, insects, fire, and the elements. Actually, redwood and cypress do have defenses against the rot and bugs—natural chemicals that create an inhospitable environment—and the permanence of these woods is well known.

The natural agents that destroy wood are nature's way of recycling it. Resistive woods are the exception. For the others, man must supply the protection that nature has omitted. It's worthwhile to do this, since properly treated wood should last about seven times as long as untreated wood. This has obvious implications for the architect who is concerned with life-cycle costs. It also has obvious implications for ecology—the millions of trees that needn't be cut down to replace outworn structures.

There are various protective and preservative treatments for wood. Paint, in its infinite variety of colors and shades, is the most obvious. Stain is also commonplace. Like paint, it serves the dual functions of protection and beauty, but unlike paint it allows the natural grain and texture of the wood to show through. The protection of paint, of course, is only skin deep—although it can be a very tough skin—and stain too is effective only at or near the surface.

This article will deal mainly with pressure-impregnating materials, which permeate the very sapwood and dense heartwood of the lumber, and some of which continue to protect indefinitely. The article is based on information from many industry sources, but mainly on the publications of the American Wood Preservers Institute, material from the Society of American Wood Preservers, and the Wood Preservation Correspondence Course of Osmose Wood Preserving Co.

The destroyers

The most potent wood-destroying organisms are certain decay-causing funguses and insects such as termites, carpenter ants, some beetles, and marine borers.

The funguses live on cellulose (the cell wall) or lignin (the cement that holds the cells together) in the wood, breaking down its structure. We see this as rot or decay. In general, funguses need oxygen, moisture, favorable temperatures, and a food supply to survive (even so-called dry rot funguses need moisture); eliminate any of these necessities, and decay is arrested. Since it is not possible to control the oxygen, moisture or temperature, the approach must be to eliminate the food supply. This is done by introducing preservative chemicals into the wood.

Subterranean termites, which are responsible for most termite damage, live in the ground but wood is their meat and potatoes. If necessary, they build mud shelter tubes up over foundation walls in order to reach their wood. Even wood which has less than 20 percent moisture—which would make it relatively immune to fungus attack—is not safe from subterranean termites, because they can get their water from the ground or other sources. Nonsubterranean termites are less prevalent, but harder to locate and need contact with outside moisture.

Carpenter ants are attracted to wood more for nesting than for food, but may be very destructive. They usually prefer wood that is naturally soft or that has been made soft by decay.

The various marine borers are found in brackish and salt water, and attack any wood between the water line and the mud line. No wood is known to be naturally immune to their attack.

Counterattack

A number of external techniques may be used to combat these animal pests, and with some success. But the only sure protection is adequate treatment of the interior of the wood itself with appropriate chemicals.

A wood preservative, as the term is used in the industry, does three things: it penetrates the wood fibers; it eliminates the food supply, and it is present in sufficient quantity to give long-lasting protection. It is a toxic material. Preservatives may be oil-borne or water-borne. Among the oil-borne products:

Creosotes. These are distillates of various tars, sometimes mixed petroleum oils. They are usually highly toxic to all wood-destroying organisms and are relatively insoluble in water, but tend to leave a strong odor and to bleed through, making surfaces unsatisfactory for painting.

Pentachlorophenol. Penta is an organic compound that is usually used in a 5 percent solution with light or heavy oils. It is highly toxic to destructive organisms; has good penetration qualities; is highly resistant to leaching; with light oils lends itself to blending with water repellents and dip treating of millwork, and usually results in a cleaner, easier to handle wood product than creosote. However, it is highly toxic to humans and animals, and direct contact with treated wood or its fumes is highly toxic to plants and flowers. It has a long-lasting residual odor. Penta-treated wood cannot be painted until the oil evaporates. The heavier the oil, the longer the wait.

Naphthenate solutions. These are oil solutions of copper or zinc naphthenate. They are usually applied by brush, spray, or dip. Copper naphthenate is a very good preservative but is bright green, difficult to cover with paint. Zinc naphthenate is easy to paint over, but is less effective as a preservative. Both have a persistent, strong, objectionable odor.

Copper-8-quinolinolate (solubilized). This is an odorless, oil-borne preservative that provides excellent decay resistance. It is not toxic or irritating to humans or animals. It is the only wood preservative permitted by the

The 15 buildings of The Point condominium, Annapolis, Md. (above left), are finished in natural wood, blending with wooded, creekside site. To meet local code requirements for multi-family buildings, the balconies, stairways, handrails, and bridge entrances were pressure-impregnated with fire-retardant solution which also protects against weather and humidity. Designer-planners: Berkus Group. Similar FR treatment was used on exteriors of 50-acre Douglas Plaza office community, Irvine, Calif. The two four-story principal office buildings (one shown here) are sheathed in scored, resawn redwood plywood; smaller buildings have resawn cedar siding. Architect-planners: Ware, Malcomb & Garner.

U.S. Pure Food and Drug Administration for wood that is in intimate contact with food. It is not recommended for in-ground use.

Water-borne preservatives. This group is used mainly for construction lumber where the wood must be clean to handle, odorless, and paintable. These preservatives must be applied by pressure-impregnation. Most formulations tend to be leached out by water, but some are unaffected and retain their wood-preserving characteristics. Since they are applied in a water solution, the wood must be air- or kiln-dried after treatment to reduce the moisture content. Most of these preservatives are marketed under proprietary brand names.

Acid copper chromate. It is toxic to decay and insects, and is clean, odorless and paintable. It is corrosive to metal and is not recommended for ground use.

Ammoniacal copper arsenite. It is toxic to decay and insects; is clean, odorless, and paintable; is very resistant to leaching and therefore suitable for ground contact use, and will not bleed through concrete, plaster, or paint.

Chromated copper arsenate, various formulations. It is toxic to decay and insects; is clean, odorless, and paintable; will not leach, so is suitable for use in-ground or in water; will not bleed through concrete, plaster, or paint, and has good resistance to electrical conductivity.

Chromated zinc chloride. It is reasonably toxic to decay and insects; is clean, odorless, and paintable, and has good fire retardancy at high retentions (concentration in the wood). However it resists leaching poorly, so is not recommended for ground contact; is corrosive to metal fastenings, and has high electrical resistance.

Fluor-chrome-arsenate-phenol. It is toxic to decay and insects; is clean, odorless and paintable; is somewhat fire retardant, and does not corrode metals. However it is subject to leaching, so is not suitable for ground contact.

Architectural uses

The technology of pressure-treating wood has been known for more than 100 years. And pressure-treated products such as railroad cross-ties, utility poles, marine and foundation piling, fence posts, and bridge timbers treated with creosote or pentachlorophenol have been with us a long time. Their architectural use was limited by their oily surfaces, odor, and lack of cleanliness and paintability. Development of water-borne chemicals about 25 years ago changed this, and the improvement offered by permanent, non-leaching preservatives opened the architectural market still more. Architectural application of water-borne pressure-treated lumber has more than tripled in the last ten years. The resulting product can not only be painted, but it can also be stained or laminated after treatment.

Common architectural applications of the water-borne treated lumber are plates and sleepers in contact with masonry, all wood in contact with the ground or water, and lumber that is used within 18 in. of the ground and termites. Other uses include buildings with high humidity such as industrial process buildings, indoor swimming pools and ice-skating rinks, and patios and decks, fencing, retaining walls, siding, playground equipment, gazebos, exterior laminated beams, and landscape timbers.

An important development is the use of pressure-treated wood in the all-weather wood foundation system (see illustration, p. 87) These foundations can be prefabricated and can be installed in wet or freezing weather (unlike concrete) by normal carpentry crews, incorporating a drainage system that assures warm, dry under-floor spaces. Several thousand homes have been built with these foundations and field reports indicate excellent performance.

Fire retardancy

Lumber and plywood are pressure-impregnated with metallic salts, such as ammonium phosphate, ammonium sulfate, or boric acid, to reduce their combustibility. In a fire, FRTW (fire-retardant treated wood) starts releasing water vapor and non-combustible gases at a temperature below the ignition point of untreated wood. This delays combus-

tion. The treatment also causes the wood surface to insulate itself with a hard layer of carbon char. Finally, when the wood does burn, it doesn't support combustion; it stops burning when the flame is removed. It doesn't generate much smoke. It retains its structural strength during a fire longer than unprotected steel in many cases.

A material's combustion properties are indicated by its fire-hazard classification. This is a rating that is established by the ASTM E84 tunnel test—a ten-minute test which measures flame spread, fuel developed (combustible gases), and smoke generated. These properties receive numerical ratings, based on an arbitrary scale which assigns 0 to asbestos-cement board and 100 to untreated, select-grade red oak.

If all three factors rate 25 or less in the ten-minute test, it may be extended for an additional twenty minutes. Treated wood which maintains a flame spread rating of 25 or less and which shows no evidence of progressive combustion after the full thirty minutes, is entitled to the Underwriters' Laboratories designation FR-S. This designation, rather than the numerical ratings, may be shown in UL's Building Material List and may also be used on UL labels. However, when the performance is considerably better than the minimum FR-S requirement, some manufacturers prefer to stick with the numerical ratings.

Generally, use of FR-treated wood in a building gains a lower insurance rate compared to similar buildings made with untreated wood. The treated wood is allowed by many building codes in locations where untreated wood is barred.

FRTW comes in interior and exterior grades. Most interior grades are water-leachable—the salts are soluble and slowly wash out—so it should not be specified for high-humidity interior locations and certainly not for exteriors. Exterior-grade FR treatment uses a different kind of chemical—a resin binder that is insoluble in water. Currently available exterior grades provide a very high degree of decay and termite resistance as well as fire resistance.

Appearance of the two grades is somewhat different. Interior-grade FR treatment usually darkens the wood and raises the grain, since it is water-based. Also the surface may have marks that may have to be removed by sanding or refinishing. These marks are left during the kiln-drying process; long, thin sticks are used to separate the individual pieces during pressure treatment and they are left in place during the drying. Exterior-grade FRTW shows practically no discoloration or grain raising.

The American Wood Preservers Institute recommends that the architect specify that FRTW be dried to a moisture content of 19 percent or less for lumber and 15 percent or less for plywood. This will alleviate the corrosion of fasteners by the treatment salts in the presence of moisture; in any case, manufacturers recommend that steel and galvanized fasteners should be primed with a zinc-rich paint.

If FRTW is to be painted, AWPI recommends that it be dried to 12 percent or less moisture content. FRTW will take stains without impairment of its retardant ability. Generally the stains should be oil-based, not water-based. Interior-grade FRTW requires the formation of a film-forming finish to prevent the blooming of crystals on the surface. FRTW may be handled and cut like untreated wood, but it calls for carbide-tipped saws because of the abrasive character of the impregnating chemicals. It may usually be

Recommended Preservatives and Retentions

	Water-Borne Preservatives[1,2]					Oil-Borne[3]		
	Chromated copper arsenate (CCA-Types A,B,C)	Ammoniacal copper arsenate (ACA)	Acid copper chromate (ACC)	Chromated zinc chloride (CZC)	Fluor chrome arsenate phenol (FCAP)	Pentachlorophenol[3]	Creosote & creosote-coal tar	AWPA Product Standards
AWPA Preservative Standard	**AWPA Standard P-5**					**P-8 P-9**	**P-1, 2 -12, -13**	
Product & Use	Minimum Net Retention in lbs./cu. ft.[4]							
Lumber and timber								
Above ground								
Soil or fresh water contact	0.25	0.25	0.25	0.46	0.22	0.40	8	C2
Non-structural	0.40	0.40	0.50	NR[5]	NR	0.50	10	C2
Structural-foundations, bridges, etc.	0.60	0.60	NR	NR	NR	0.60	12	C14
In salt water	2.5	2.5	NR	NR	NR	NR	25	C14
Plywood								
Above ground	0.25	0.25	0.25	0.46	0.22	0.40	8	C9
Soil or fresh water contact	0.40	0.40	0.50	NR	NR	0.50	10	C9
Piles								
Soil or fresh water use and foundations	0.80	0.80	NR	NR	NR	0.60	12	C3
In salt water								
Severe borer hazard — Limnoria[6]	2.5[8] &1.5	2.5[8] &1.5	NR	NR	NR	NR	NR	C18
Moderate borer hazard — Pholads	NR	NR	NR	NR	NR	NR	20	C18
	Dual Treatment							
For both Pholads and Limnoria a dual treatment can be specified								
First treatment	1.0	1.0	NR	NR	NR	NR	—	C18
Second treatment	—	—	NR	NR	NR	NR	20	C18
Poles								
Utility								
Normal service conditions	0.60	0.60	NR	NR	NR	0.38	7.5	C4
Severe decay & termite areas	0.60	0.60	NR	NR	NR	0.45	9.0	C4
Building poles — structural	0.60	0.60	NR	NR	NR	0.45	9.0	C23
Posts								
Fence, guide and sight								
Round, half-round and quarter round	0.40	0.40	0.50	NR	NR	0.40	8	C14
Sawn four sides	0.50	0.50	0.62	NR	NR	0.50	10	C14
Guardrail and sign (Including spacer blocks)								
Round	0.50	0.50	NR	NR	NR	0.50	10	C14
Sawn four sides	0.60	0.60	NR	NR	NR	0.60	12	C14

Source: Society of American Wood Preservers

1 Trade names of water-borne preservatives. Chromated Copper Arsenate (CCA): (Type A) Greensalt, Langwood; (Type B) Boliden CCA, Koppers CCA-B, Osmose K-33; (Type C) Chrom-Ar-Cu (CAC), Osmose K-33 C, Wolman* CCA, Wolmanac CCA. Ammoniacal Copper Arsenate (ACA): Chemonite. Acid Copper Chromate (ACC): Celcure. Chromated Zinc Chloride (CZC): none. Fluor Chrome Arsenate Phenol (FCAP): Osmosalts* (Osmosar*), Tanalith, Wolman FCAP, Wolman FMP

2 Where cleanliness, paintability or odor are factors, and in certain salt-water areas, the approved water-borne preservatives should be used. Creosote, creosote-coal tar solution, and oil-borne penta are not recommended in these cases.

3 Penta in light or water-repellent solvents, and liquid petroleum gas carriers can provide clean, paintable surfaces. The processor should be advised when painting after treatment is intended.

4 AWPA Standard C1 applies to all process and types of materials. Minimum net retentions in this chart conform to AWPA Standards for all softwood species in the cases of lumber and plywood. Retentions for piles, poles and posts are based on AWPA Standards for southern pine. When other species are used for these items, AWPA requires different retentions. All water-borne retentions are oxide basis.

5 NR — Not recommended.

6 Limnoria Tripunctata are usually the most destructive marine borers. They are active over a wide geographic range, but most severe attack occurs in warmer waters up to 38°N latitude. Isolated severe Limnoria attack sometimes occurs above this latitude. Water-borne CCA and ACA are effective preservatives against Limnoria Tripunctata, Teredo and Bankia.

7 Pholads are usually less damaging than Limnoria and do most damage in warm Gulf Coast, Southern California and Southern Florida waters. Creosote-coal tar is effective against pholads.

8 The retentions are based on two assay zones — 0 to 0.50 inch and 0.50 to 2.0 inches.

glued and some woods may be laminated. But in all these matters consult the manufacturers, as products differ.

Not all wood species can be treated with FR salts, and not all accept the treatment equally. Furthermore, individual manufacturers may not treat all of the amenable wood species. A recent listing by AWPI shows the following as treatable woods: ash, aspen, basswood, birch, cottonwood, Douglas and white fir, Western hemlock, Western larch, lauan, soft maple, red oak; also, Ponderosa, jack, Northern, Southern, Western, yellow, white and red pine, yellow poplar, redwood, Sitka and white spruce, and virola.

The strength of wood is for the most part unaffected by FR treatment, but bending strength is an exception. It may be increased or decreased, depending on the species and how it has been dried. It is recommended that the allowable bending stress be reduced 10 percent and that allowable fastener loads be reduced as well.

In writing specifications for pressure-treated wood—either preservative or fire-resistant—the architect may call on a number of standards. Most are based on AWPA (American Wood Preservers Assn.) standards, so it is usually most convenient to refer to AWPA standards, unless another is specifically mandated.

It is best to keep the specification as broad as possible, to avoid unnecessary hassles. Specify the appropriate standard—i.e., AWPA C2, for lumber; designate the wood species you consider appropriate for the purpose; specify acceptable grades and stress ratings; specify dryness, if the requirement is stricter than the standard; for waterborne salt-treated lumber and plywood, you may require that it be stamped with the AWPB (American Wood Preservers Bureau) quality mark. It is usually unnecessary to spell out numerical values for penetration and retention of preservative, since the above items will assure that the product meets your performance requirements.

Code recognition for fire-retardant treated wood

BOCA (Building Officials Conference of America)	Type 1A	Type 1B	Type 2A	Type 2B	Type 2C	Type 3A	Type 3B-3C
Partitions-Walls: used in exit access hallways-corridors-vertical separation of tenant spaces and all other non-bearing interior walls	P1	P1	P1	P1	P1	—	—
Roof construction: 15'-0" or less in height above floor	—	—	P2	P2	P2	—	—
Roof construction: 15'-0" or more in height above floor	P2	P2	P2	P2	P2	—	—
Furring strips:	P	P	P	P	P	P	P
Backing:	P	P	P	P	P	P	P
Roof covering: (B & C)	P	P	P	P	P	P	P

ICBO (International Conference of Building Officials)	Type I	Type II	Type IV 1 hr	Type IV N	Type III Heavy timber	Type III 1 hr & N
Temporary partitions:	P1	P1	P1	P1	—	—
Partitions-Permanent: non-bearing 1-hr	P1	P1	P1	P1	—	—
Exterior walls: Framing	—	—	—	—	P1	P1
Exterior walls: Exterior wall surface	—	—	—	—	—	—
Roof covering: (Class B)	P	P	P	P	P	P
Ceiling hangers: Wall set out framing	—	—	—	—	P	P
Arcades:	P3	P3	P3	P3	P3	P3
Service Stations:	—	—	P3	P3	P3	P3

SBC (Southern Building Code)	Type I	Type II	Type III	Type IV	Type V
Partitions 1 hr:	P1	P1	—	—	—
Roof construction: 2 story height limit	P2	P2	—	—	—
Furring strips:	P	P	P	P	—
Exterior walls: Non-bearing wall panel (NCX)	P	P	P	P	P
Roof covering: (Class A & B)	P	P	P	P	P

NBC (National Building Code)	Type A	Type B	Protected non-combustible	Unprotected non-combustible	Heavy timber	Ordinary	Wood frame
Partitions: In multi-family houses partitions located entirely within dwelling units or separating units	P1	—	—	—	—	—	—
Partitions: Permanent	—	P1	P1	—	—	—	—
Floor area increase: Located outside the fire limits buildings may be increased in floor area by —	—	—	—	—	50%	50%	33½%
Roof construction: Buildings located outside fire limits	—	—	—	P2	—	—	—
Scaffolding:	—	—	—	P	—	—	—
Roof covering: (Class A & B)	P	P	P	P	P	P	—

P — Fire-retardant treated wood is permitted.
P1 — For exterior walls & partitions, fire-retardant treated wood is permitted for studs, plates, sills, & blocking
P2 — For roof assemblies, fire-retardant treated wood is permitted for structural members including purlins & decking
P3 — For arcades & service stations, fire-retardant treated wood is permitted for framing members and surface covering
Source: Koppers Company, Inc.

Stain, bleach, repellent

Wood's natural appearance, which is a basic element of many architectural designs, may be enhanced by stain and other surface treatments. They preserve the natural color of the wood, or deepen it without hiding its grain and texture, and even out the color variations between pieces. Stain also protects the cellular structure of exposed lumber and plywood from the destructive effects of sun, rain, and wind, yet allows the wood to breathe so that moisture can escape. Only redwood is naturally able to withstand the elements without help.

Raw lumber often presents a non-uniform face, both when it is fresh and as it weathers. The variation between raw pieces of the same species may be great. And no two pieces weather at exactly the same rate, so there is a period of years when there may be considerable streaking and variation until the weathering process is complete and the appearance has stabilized. Many find this festure of wood attractive. But more often, the architect conceives his design in a particular color framework, and he prefers to have the wood treated to get what he wants. These are the common surface treatments:

Semi-transparent stains. These allow the grain and texture to show through. A variety of colors is available. For a high degree of transparency, use clear-blending types. Since semi-transparent stain may not completely screen out ultraviolet radiation, some deterioration of the wood substrate and stain film takes place over a period of time. In the case of oil-based stain, the film gradually erodes and chalks; this is a normal mode of failure, which leaves a surface that is suitable for refinishing. Semi-transparent latex-based stains tend to fail by flaking, which leaves a difficult surface for recoating.

Because wood is a natural product and subject to natural variations, one cannot predict exactly how it will take any stain and what the color of the finished product will be. Therefore it is essential that the architect, when choosing semi-transparent stains, first do a brushout on wood from the jobsite with stain samples.

Opaque stains. These have more pigment and, like paint, hide the wood's natural color, but, unlike paint, do not obscure its texture. They require no primer and are easy to recoat. This type is applicable where there are contrast or color differences between or within pieces that need to be obscured, or where a solid, uniform coating is wanted.

Stains may be applied on the job by brush. However, factory-applied machine staining offers advantages. It produces a more uniform finish, free of lap marks, and is less expensive. First the stain is flooded on and forced into the wood with pressure rollers; then it is brushed thoroughly into the grain and evenly distributed. Fire retardant materials may be applied by this same process, followed by stain application.

Bleaches. These agents speed the natural weathering of wood—compressing years into months—by reacting chemically with it, aided by sunlight and moisture. They contain a small amount of pigment, to produce a uniform appearance while the accelerated aging is taking place. For an instant weathered appearance, the amount of pigment may be increased. The color change is nearly always permanent. For this reason, the bleach should contain a mildewcide to prevent discoloration that mildew might cause.

Water repellents. A water repellent finish mellows the effects of weathering. On redwood, it eliminates the dark stages that redwood sometimes goes through and slows down the fading process. Water repellents are best applied by brush, usually in two coats, which may provide a lifelong finish in drier climates. Color loss during weathering may be compensated by applying a light-bodied stain. Repellents should contain a mildewcide to prevent discoloration. They are toxic, so should not be sprayed, especially near plants.

Paints. Of course, paint is the most common surface treatment for wood. However, since it was our intention in this article to describe the treatments that do not hide wood's natural characteristics, let it suffice for now to acknowledge paint's leading role as a protector and beautifier of wood.

As the world becomes more deeply enmeshed in technology, there is a deep impulse that returns us to the beauty of natural construction materials like wood. And as we are forced to accept the fact that the supply of other resources is finite, the appeal of this renewable resource grows. It is good to know that we have ways of assuring its longevity and beauty. [Henry Lefer]

Meanwhile, in California

While this article was in preparation, P/A became aware of a situation in California which could eliminate all architectural coatings containing solvents. In effect, such a ruling by the California Air Resources Board (CARB) would limit all coatings to latex, or water-borne, banning all commonly used oil- and alkyd-based coatings. The purpose of this action is to prevent such products from emitting hydrocarbons into the air. However, while work has been quietly going on to perfect this "model rule," little factual data have been amassed to back such a ban. As industry and professional people learned of the "open" meetings, however, their concerns have been largely disregarded as biased (industry) or emotional and lacking in factual material (professionals)! And unless the combination of industry/professional people can produce such facts as will prove the board shouldn't take drastic and hurried steps, California architects may be unable to specify these materials *within months.* Some of the effects: no more oil-based paints in high-wear areas like school halls, restrooms, doors, or anywhere; no more semi-transparent stains; no suitable coatings for redwood and Western Red Cedar; no suitable coatings for decks and porches; no coatings at all if application temperature is below 50 degrees F (water-borne coatings cannot be used at lower temperatures). Any responsible and comprehensive data on solvent emissions? P/A would welcome seeing it, and sharing it. [JM].

Acknowledgments

We acknowledge with thanks the help we received from American Forest Institute, American Institute of Timber Construction, American Plywood Assn., American Wood Preservers Institute, J. H. Baxter & Co., Boise Cascade Timber and Wood Product Group, California Redwood Assn., Koppers Corp., National Forest Products Assn., Olympic Stain, Osmose Co., Pope & Talbot, Potlatch Corp., Red Cedar Shingle and Handsplit Shake Bureau, Simpson Timber Co., Southern Forest Products Assn., U.S. Dept. of Agriculture, Western Wood Products Assn., Weyerhaeuser Co., and Willamette Industries (see Productor Literature p. 118).

Using the CSI Manual of Practice

William T. Lohmann

The best tools are often the simplest—and those often overlooked. The author discusses the CSI Manual of Practice from its beginning to its present edition.

In the past decade, specifiers have been besieged with tools of the most sophisticated order: automatic typewriters, computer consoles, thousands of pages of master specification text, voluminous books on specification writing, microfilmed product literature, correspondence courses and seminars. Salesmen have outdone themselves. Most of us have hurried toward the 21st century, taking for granted (and sometimes ignoring) the "simple tool" on the shelf.

The "CSI Manual of Practice" is not simple, of course. One of its two volumes discusses components of the bidding and contract documents, general and supplementary conditions, technical writing practices, and production techniques. The other establishes detailed organizational formats for the documents.

The core of the Manual is in Volume 2. The "CSI Format—Master List of Specification Section Titles," originally issued in March 1963, represents the first successful effort to establish a flexible industry-wide standard for organizing specification nomenclature. It classifies all specification sections under 16 major divisions and has been adopted by many governmental and private agencies.

Earlier attempts at standardization were short-lived. In 1925 the Illinois Society of Architects published a portion of the Dewey Decimal System, implying that its nine headings under "Specifications for Buildings" might be useful. However, few architects chose to write sections on "Heavy Metal Trades" or "Brush, Broom and Swab-Using Trades." Sleeper's "Architectural Specifications," copyrighted in 1940, were more appropriate but proposed an ungainly 66 divisions. In 1961 Gale reduced the number of unrelated titles to 44.

Following introduction of the Format, CSI produced a series of documents on the principles of specification writing. The first of these, "Bidding Requirements for Private Work" was issued in 1965. Within a year six additional documents were released and bound together in a single volume titled the "CSI Manual of Practice." Four more chapters were added before a revised version was published in 1970.

The current (1975) edition of CSI Document 56104, still called the "CSI Manual of Practice," has been expanded to 20 chapters and nine guides for preparing Division 1 sections. Its volumes can be purchased together or separately, bound or in looseleaf form, with or without binders. Additional documents on metric conversion, office master specifications, information sources, and abbreviations complement the material in the Manual. It has to be one of the best values in the market today.

Consider the discussion on proper use of Division 1 for administrative and work-related general requirements. Long misunderstood by most practitioners, its function in the documents is clarified by establishing standard titles and content for sections on alternatives, methods of measurement and payment, project meetings, submittals, quality control, temporary facilities, material and equipment, and contract closeout procedures. The key section entitled "Summary of Work" is designated as the location for a detailed description of the work, pre-ordered items, separate contracts, work sequence, use of the premises, and similar requirements.

When used with the August 1976 edition of AIA Document A201, "General Conditions of the Contract for Construction," a knowledge of Division 1 content assumes new importance. Detailed descriptions of shop drawing submittals, progress schedule, cleaning requirements, schedule of values, and testing, among others, have been deleted from the AIA General Conditions. A similar revision is under way for NSPE Document 1910–8. "Standard General Conditions of the Construction Contract."

Of no less importance are the chapters in the Manual which demonstrate standard section and page formats. The now-familiar "Part 1: General," "Part 2: Products," and "Part 3: Execution" sub-headings have been incorporated in the PSAE "Masterspec" text. Other chapters in Volume 2 describe application of the 16-division Format to performance specifications, to mechanical and electrical systems, and to civil engineering projects. The tool should not be allowed to rest upon the shelf. It is the answer to today's demand for definitive, consistent construction documents. Who needs ambiguities, duplication, and excessive verbiage?

For more information, contact your local CSI chapter or The Construction Specifications Institute, 1150 Seventeenth Street, N.W., Washington, D.C. 20036. □

Author: William T. Lohmann, AIA, FCSI is Chief Specifier for C.F. Murphy Associates, Chicago, Illinois.

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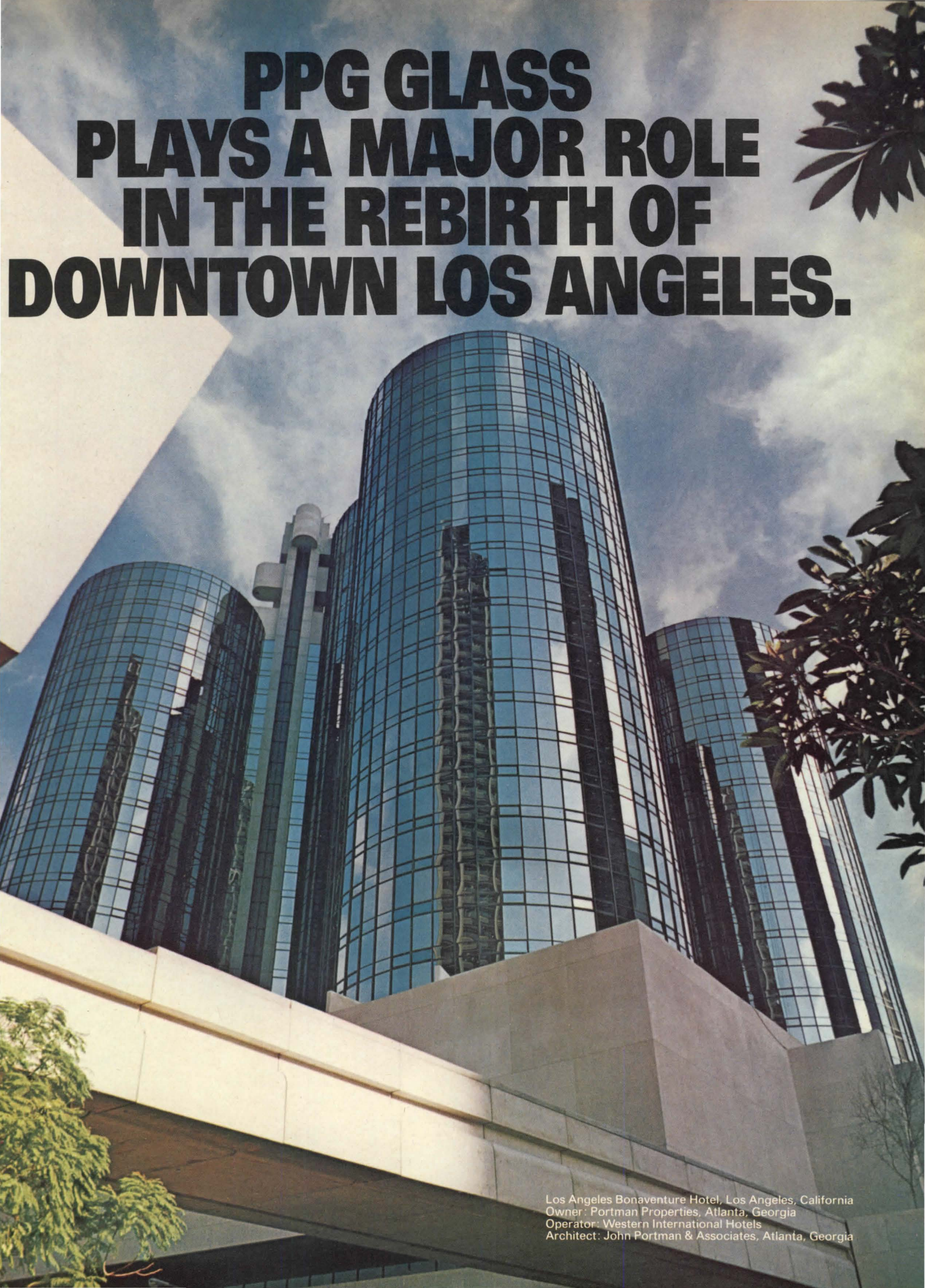

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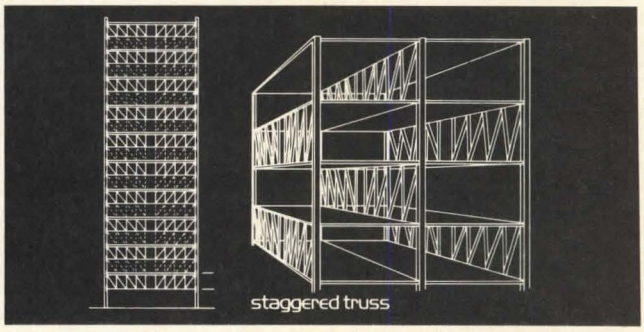

In the staggered truss system, story-high steel trusses, arranged in a staggered pattern, span transversely between exterior columns.

Elm Park Tower, Worcester, Mass., is a 16-level, 195-unit residential building for the elderly. The 153,900 sq ft structure is being constructed at $24.84 per sq ft.

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Story-high trusses

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Structural Engineer:
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The trusses, 54 ft long and 10 ft high, are fabricated in the shop and shipped to the construction site ready for installation.

There's another factor favoring the use of the staggered truss framing system with open-web joist floor-ceiling assemblies: open spaces above the ceilings simplify installation of the mechanical and utilities systems.

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The Statute of Limitations—and beyond

Bernard Tomson and Norman Coplan

While the court allowed the action when an architect was sued for negligence several years after the project was completed, it ruled in favor of the architect.

The time within which an architect may be sued by his client for alleged malpractice has been a subject of uncertainty as reflected by the volume of litigation on this issue. One aspect of this controversy relates to the question whether the time limitation for such a suit, as specified by the statutory law of the jurisdiction involved, is extended or "tolled" for the period that an architect is assisting his client in seeking a remedy for a defect in the project which becomes evident after its completion. Several courts have ruled that where defective plans of an architect result in defective construction and the architect renders additional services to the owner after completion of construction for the purpose of remedying such defect, the time within which the architect must be sued does not commence to run until his efforts to remedy the situation have been completed. The rule as so applied has been characterized as the "continuous treatment" doctrine.

Until a recent decision in New York, there has been no judicial determination of the question as to whether the "continuous treatment" doctrine should be applied to a situation where the defect in construction was occasioned by the contractor's improper workmanship or materials, but the architect was being sued on the theory that he had not properly administered the construction contract. In the case of *Central School District No. 2, Town of Oyster Bay* v. *Flintkote Company,* this issue was directly presented. The plaintiff School District in that case had contracted for the construction of a school building which was to contain a "20 year" built-up flat roof. Upon the building's completion, the contractor supplied to the School District a bond guaranteeing any necessary repair work for a period of 20 years. Soon after occupancy of the school, roof leaks were noticed in three separate sections. In response to the complaints of the School District, the contractor undertook to repair the roof over the course of the following three years during which period the leaks persisted. The owner retained an independent roofing consultant who reported that the roof as installed did not meet specifications. Thereafter, an action for damages was commenced against both the architect and the contractor.

In its action against the architect, the owner pleaded that the architect had been guilty of negligence in supervising the construction and installation of the roof and in certifying that the roof was installed in accordance with contract specifications. However, since more than three years had elapsed since the building had been completed when suit was instituted, the owner's suit against the architect, under the Statute of Limitations of New York, would have been barred unless the court was prepared to apply the "continuous treatment" doctrine. The School District urged the application of that doctrine on the ground that it was entitled to rely upon the architect's efforts to provide a remedy for the situation before instituting suit. In this respect, the Court said:

"Generally, a cause of action for malpractice accrues when the last act of malpractice is performed, whether one is concerned with medical malpractice or professional malpractice by an architect. An exception to the general rule arises when the course of treatment which includes the wrongful act has run continuously and is related to the original condition or complaint, in which case the cause of action accrues only at the end of the treatment.

"Is the (exception) applicable to the case at bar?

"In the judgment of the court that question must be answered in the affirmative. However, the answer to that question is not easily arrived at since the harm 'treated' by (the architect) was not of his own creation. The roof leaks did not occur because the plans and specifications prepared by (the architect) were inadequate or defective. Rather the leaks occurred because the roofing subcontractor failed to apply the roof in conformity with the plans. While it may be that application of the doctrine should be limited to situations where the original harm was caused solely by the negligence of the party rendering the continuing treatment, the court is of the view that for statute of limitations purposes it must be assumed that the alleged negligent supervision by (the architect) constituted a proximate cause of the leaking roof. . . .

"After the leaks began to appear (the architect) over the course of several years dealt with (the contractor) on behalf of the plaintiff . . . it would be unfair and unreasonable to require the plaintiff-client in this situation to question the tactics of the architects or to interrupt corrective efforts by the service of a summons and complaint. Consequently, the court holds that the 'continuous treatment' doctrine applies to the instant case and that, therefore, the causes of action against the architect are not time barred."

Although the plaintiff was permitted to proceed with its action against the architect several years after the project had been completed, its efforts were unsuccessful as the Court found that the architect had not been negligent in his duties of inspection and supervision. The Court pointed out that the mere fact that the contractor deviated from the plans and specifications did not establish fault on the part of the architect. The Court further pointed out that an architect has limited obligations of inspection and supervision as distinguished from "day-to-day" inspection furnished by a clerk of the works, and that the clerk of the works, under the facts of this case, was a representative of the owner and not of the architect. □

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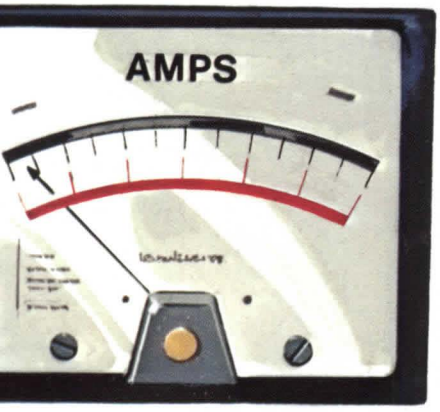

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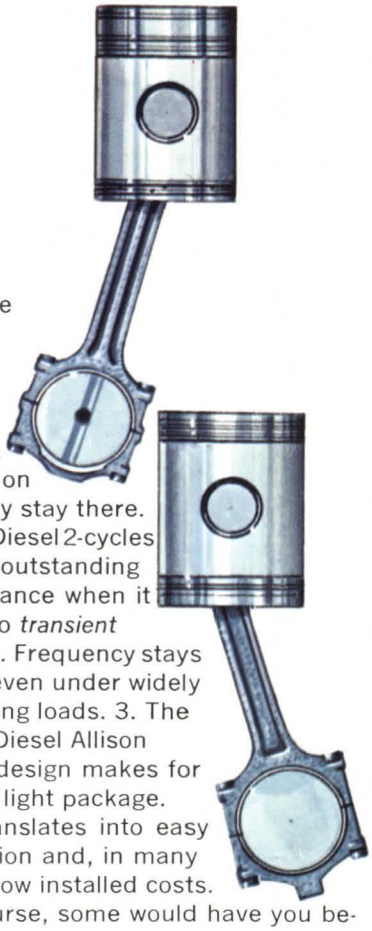

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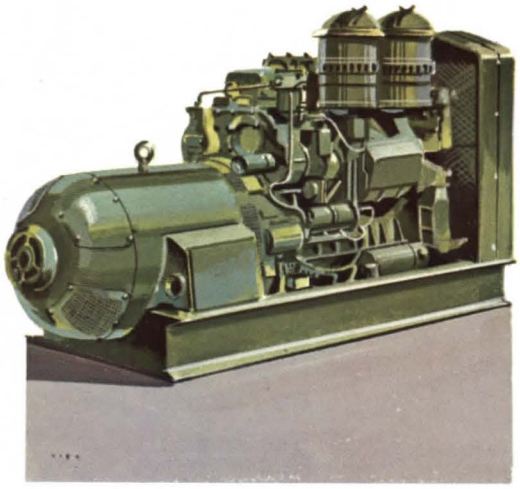

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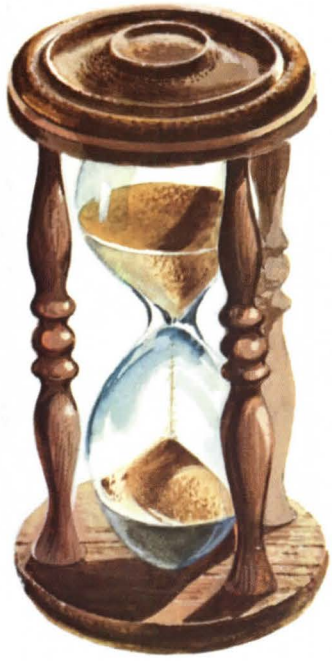

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Venturi on Aalto, continued from page 54

forms and associations. They derive from the industrial and Cubist forms and symbols of the Modern style: in a text book on classic Modern architectural elements, Mies's pure steel sections and travertine slabs and Le Corbusier's idiosyncratic—if now almost universal—forms in *beton brut* would be included, but Aalto's diverse but conventional elements would predominate.

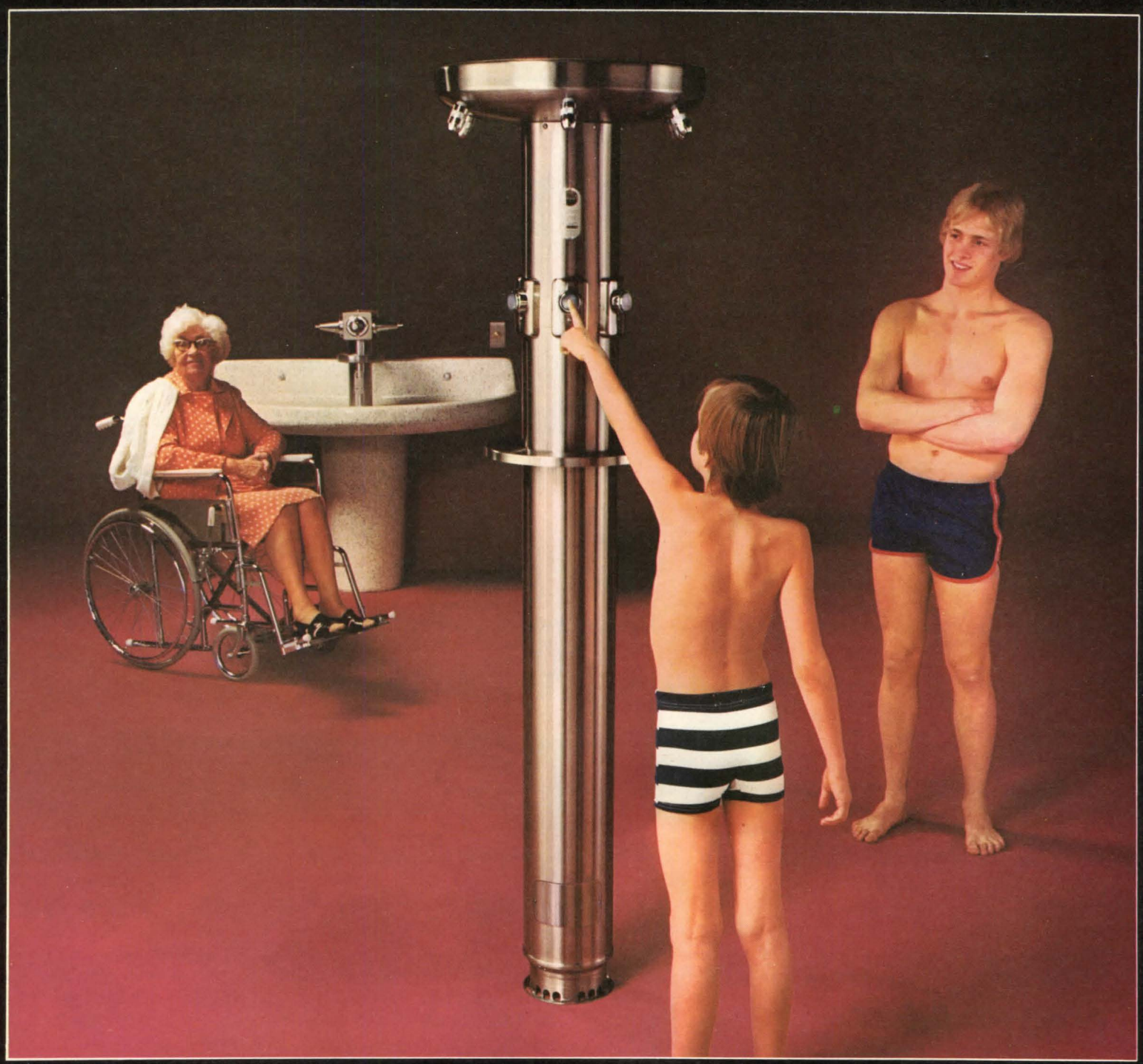
The quality of Aalto's elements comes not from their originality or purity, but from their deviations—sometimes very slight, sometimes gross—in their form and context. And their power comes from the tensions their deviations produce. The handrail in the stairway of the offices for the "Turun Sanomat" looks conventional, but on second glance you see it as slightly unusual in form and application, and highly special in the refinement of its design. The concrete windows in the Enso-Gutzeit Building resemble those in the rather dry and correct grid of a passé SOM office building, but they are slightly off the norm in their proportions and scale, and highly "incorrect" in their application on the rear façade.

The order of Aalto's architecture is also full of tensions. A comparison again with other Modern masters might clarify my point: Mies is well known for his simple and consistent order which program and human activities serenely conform to; Le Corbusier is known for his Classical order with dramatic exceptions and complex juxtapositions involving touches of *terribilitá*; Frank Lloyd Wright for his rich but highly motival order. Aalto's order is based on tension rather than serenity or drama or consistency. It derives from exceptions within the order as in the rear façade of the Enso-Gutzeit Building, or in distortions of the original order as in the plan of the high-rise apartments in Bremen, or from an ambiguous order just on the verge of disorder as in the complex plan of the Wolfsburg Cultural Center or as reflected in an architect-friend's complaint to me once: why does Aalto have to use three different light fixtures in one small room?

I think we can learn timely lessons about monumentality from Aalto's architecture because architectural monumentality is used indiscriminately in our time and it wavers between dry purity and boring bombast. Aalto's monumentality is always appropriate in where it is and how it is used, and it is suggested through a tense balance again between sets of contradictions. The auditorium at the Technical Institute at Otaniemi combines collective scale *and* intimate scale, expressionistic forms *and* conventional forms, plain *and* fancy symbolism, and pure order interrupted by inconsistencies planned for the right places.

But Aalto's most endearing characteristic for me, as I struggle to complete this little essay, is that he didn't write about architecture.

Robert Venturi is a partner in the firm of Venturi & Rauch, Philadelphia, author of Complexity and Contradiction in Architecture *(Museum of Modern Art, New York, 1966) and co-author with Denise Scott Brown and Steven Izenour, of* Learning from Las Vegas *(MIT Press, 1972). This statement was originally written for publication in* L'Architecture d'Aujourd'hui *and is printed here with their permission.*



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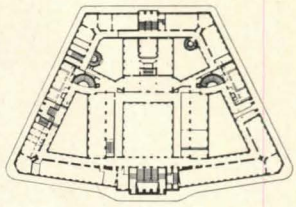
Baird on Aalto, continued from page 55



Otto Wagner, Post Office Savings Bank and ground plan (above); Aalto's Public Pensions Institute site plan and model are illus. 48, 49, p. 64.

Loos and Wagner were with three issues which have recently emerged as being of major current concern: 1) the specifically *architectural* character of urban form; 2) the role of applied art and ornament in architecture; 3) the authenticity of the symbolism of institutions in the modern world.

Although conventional interpretation of architecture takes no notice of it, Aalto has himself acknowledged "the strong influence of Viennese thinking" on Scandinavian education ("Between Humor and Materialism," reprinted in *Synopsis,* Birkhauser Verlag, 1970). In attempting to see this influence in sharper focus and to clarify the possible significance of Aalto for our own exploration of these issues, I have set side by side for comparative analysis Wagner's Post Office Savings Bank of 1904–06 and Aalto's Pensions Institute of 1952–56. I suggest that anyone pursuing the comparison will find it highly illuminating of Wagner, of Aalto, and of current debate on these issues.

For example, while the Institute is clearly "modernist" in its architectural composition, it is somewhat Wagnerian as an urban element. (It is particularly interesting, in this respect, as contrasted with other, less successful urban schemes of Aalto, such as Seinajoki and Wolfsburg.)

And cannot the "Modern" technical virtuosity of Wagner's Bank be seen to have an ironic counterpart in the traditionalist "materiality" of Aalto's Institute?

Indeed, is not Aalto's bronze and marble symbolization of the institutions of the welfare state directly descended from that same historical tradition in which is also situated Wagner's Savings Bank surmounted by protective angels?

To be sure, it is Loos and not Wagner to whom "modern" architects usually appeal, in looking back to their roots. And Loos's criticisms regarding these issues were directed—if not at Wagner—then certainly at Wagner's disciples. Yet given the new urgency of these questions, it surely becomes evident that Aalto's most subtle intuitions lie precisely in that difficult area of inquiry *between* Loos and Wagner. This suggests that we can expect the posthumous influence of Aalto—albeit indirect—to be profound.

George Baird is a practicing architect in Toronto and teaches architecture at the University of Toronto.

Dunker on Aalto, continued from page 56

real, and ordinary. Only after living with the buildings in their own environment did I discover new dimensions.

One does not sense from the plans and photographs of his summer house in Muurastalo the thrust of opposition to nature that it declares. It is first of all a structure integral to its purpose. It is a place for man and for nature, and as such it is in opposition to nature. Brick was an alien material to Finnish houses and buildings. An atrium was the most contradictory form to be found in an isolated spot. The whitewashed brick walls were the most vivid contrast one could encounter after a pathless walk over a sparsely treed rocky island. It only dawned on me slowly that the place is a complement to nature, a symbol of man as part of nature. Later, I missed this rigor in other structures that tried to be coquettish with nature.

It did not occur to me from the pictures that Saynatsalo town hall is a true town center, a place to live, to shop, to browse in the library, to get a haircut, to pay the taxes, and to get a health checkup, in addition to being a place for the local council. It is a microcosm of civilized life. In contrast to the overt monumentalism of many other town and city halls, it gives every part of life value and, most importantly, respects the individual. Aalto's is an architecture for the individual, not the people.

These examples try to illustrate an attitude toward making a building—of asserting one's position in nature and society, of being able to listen to others and to treat them as equals, and of being willing to think anew. These concepts are what I admire in Aalto's buildings, and what give them the beauty, the harmony, and the timelessness.

Aalto himself was even less known than his buildings. He did not write much, and one is curious to know what he was like. I knew him only a little, but three occasions remain memorable.

Wolfsburg, 1956: In a church basement, a building committee bends over drawings and a model. Alvar and Elissa present the design for the church steeple. A lady speaks up slowly and reluctantly: "But the steeple cannot be seen from the town. It is behind the church." Silence; Aalto, quietly, sincere: "Yes, madame, you are right," and, leaning back to Elissa, "We should change that."

Muuratsalo, 1959: Two foreign students are visiting. Aalto is in best spirits (he had just received a telegram—first prize in the Essen opera house competition). There is a lively discussion in French, and a question: "What is there to see on our travels south through Finland?" The master takes a sketch book, a thick pencil, draws a map of Finland, locating places with multi-syllabic names on the map. Only later we notice: all that is worth seeing are his own.

Munkkiniemi, 1963, 2 o'clock in the morning, the night before the due date of the Castrup Rauxel competition: Two architects are downstairs in the kitchen trying to stay awake for another night. Alvar, leaning on the door-frame, a glass of claret in his hand, smiling at the boiling kettle says, "You can't win a competition by drinking *tea.*"

Klaus Dunker, who now practices in Toronto and teaches architecture at the University of Toronto, worked in Aalto's office from 1964–66.

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Products and literature

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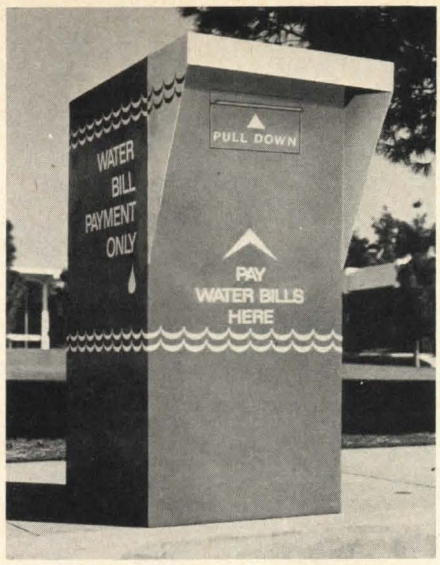
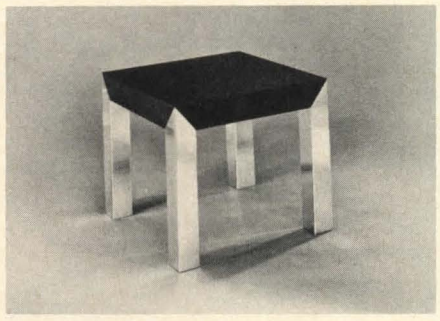


Curb-side safe depository



Saranac Table

Halogen hospital bed/examining lamp. The Series 500 compact lamp housing is made of high-impact plastic. On-Off button is located in the recessed, ventilated top and arms provide a 44-in. reach suitable for both patient use and as an assist to in-bed examination. Sunnex, Inc.
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Saranac Table Series features mitered 2⅝-in.-square chrome legs. Top surfaces are available in a choice of eight lacquer colors (glossy or lo-glare), four woods, or five burls, in sizes that range from 24″ x 24″ x 21″h to 96″ x 48″ x 29″h. Intrex, Inc.
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Curb-side safe depository. Outside door has double wall thickness of 18 ga steel—three bolt key locking device. The inside safe door has 2½-in. wall thickness with combination lock. Saw-tooth edge of deposit door foils "fishing out" attempts. Inside of cabinet (three sides and the top of safe) is filled with concrete. Outside finish is automotive enamel. Size of deposit door and slot, type of safe, and graphics may be ordered to meet special requirements. The Kingsley Depository Company.
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Air handlers. Available in cooling coil capacities of 3½, 4, and 5 tons, the equipment features a modular concept and can be used for up-flow, down-flow, and horizontal applications, states the maker. The Singer Company.
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[continued on page 112]

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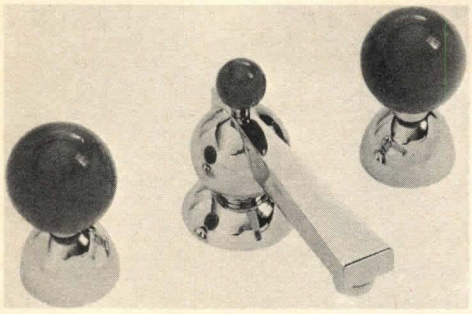

Bath fixtures and accessories

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Circle 104 on reader service card

Bath fixtures and accessories. Sculptured chrome and lucite handles in ten colors, including clear, make up this collection. A selection of complementing bath accessories, towel holders, soap dishes, tank levers, etc. are also available. Artistic Brass.
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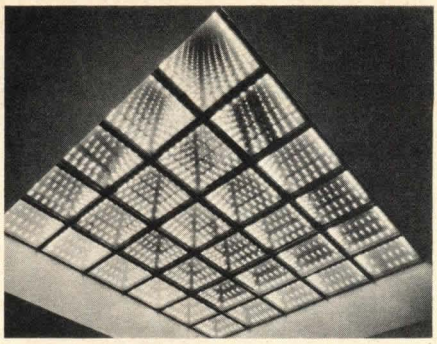
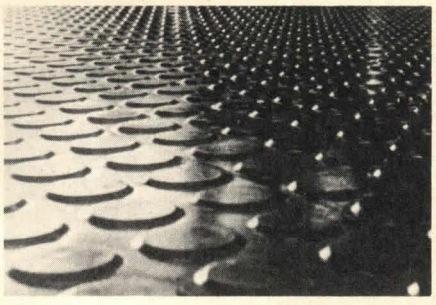


Innervision 1001



Synthetic rubber floor covering

Innervision 1001 may be used as an entire ceiling surface or in groupings on the ceiling or wall. Each modular element contains 24 incandescent lamps reflected by special mirrors. The 2′x2′ modules are supported by a black inverted "T" grid system. Neo-Ray Lighting Systems, Inc.
Circle 106 on reader service card

Floor Adhesive 23 bonds linoleum, asphalt tile, vinyl and cork tile, indoor/outdoor carpeting. It is water resistant, odor-free, and nonstaining, and may be used on plywood, particle board, felt, on-grade and below grade concrete. Meets OSHA requirements and Flame Spread Specification E-84-70. Wilhold Glues, Inc.
Circle 107 on reader service card

Wall storage components. Configurations range from open shelving to glass-door display cabinets and storage sections with solid wood doors or drawers. The bedroom system features night tables with built-in lighting and a drop down bed. The units are available in rosewood or walnut with white interiors, or all white or a combination of white and yellow. The interchangeable cabinets are 24-in. deep; drawer interiors are plastic coated; hardware is finished in polished nickel-plated steel and clear anodized aluminum. Omni Products.
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[continued on page 114]

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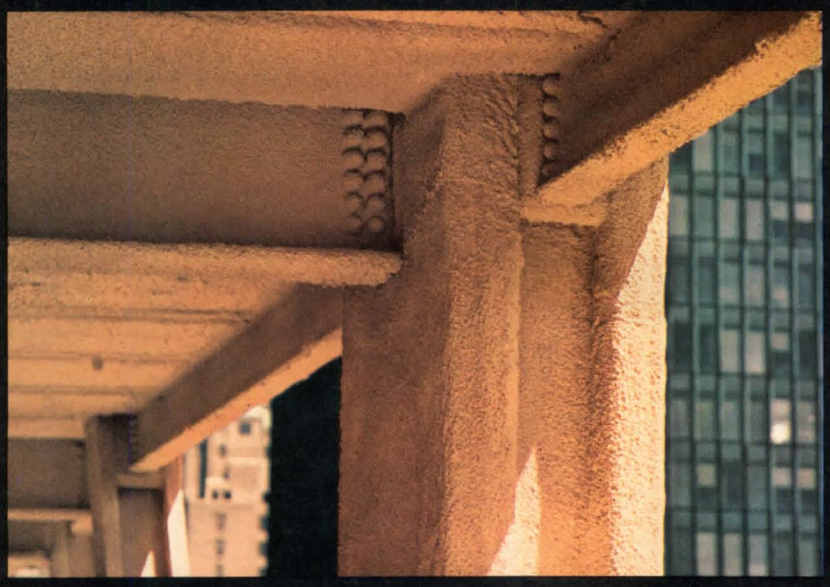

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Products continued from page 112

Cane chair

Low pressure sodium luminaire is fabricated of heavy gauge aluminum alloy with highly polished aluminum reflector. The Trim-Sox® dual 90 luminaire has an acrylic lens and removable power module. Switching of dual lamps can be accomplished either at the fixture with photorelays, or by switching at a central point. In addition to the street lighter, the Trim-Sox® is available in wall mounts, warehouse lighters, aimable floods, ceiling mounts, ball globes, and bollards. Custom designs are invited. Trimblehouse Corp.
Circle 110 on reader service card

Pendant lamp

Cane chairs are designed with beech seat and back frames, genuine woven cane seat and back, and sturdy bright chrome frames. They are available with or without arms, with S-style frames or pedestal caster bases, plus many optional features. Fixtures Manufacturing Corp.
Circle 111 on reader service card

Pendant lamp, made of heavy gauge spun aluminum, houses a maximum 300 reflector lamp. The inner surface is matte white. Dome shape pendant measures 12" x 14" and is available in polished brass, polished chrome, matte white, matte black, satin bronze, and wet red. Habitat Inc.
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Circle 113 on reader service card

Cellular plastic pipe. A basic blowing agent, Celogen AZ is used to produce this building drain and telephone conduit. The manufacturer states that cellular pipe retains many of the properties of solid pipe while weighing considerably less, having higher thermal insulation, and costing less. UniRoyal Inc.
Circle 114 on reader service card

Textured fiberglas tubs/showers. Called the "finishing touch," the new surface is integrally molded into all the company's four-piece tub/showers and shower stalls. Each fixture also offers sculpted-in soap and toiletry shelves. Owens Corning Fiberglas.
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Microl Management System. A microprocessor-based controller whose primary task is to reduce peak power demand. The system may also be used to reduce overall power consumption, monitor and record exact energy usage, perform plant temperature control, time-of-day scheduling, etc. MicroControl Systems, Inc.
Circle 116 on reader service card
[continued on page 117]

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Products continued from page 114

Urethane foam seals now come in angular, triangular, or other shapes in addition to the round, square, or rectangular shapes previously available. Foam may be continuously molded with an integral plastic skin that clads the foam against abrasion damage and air infiltration. Additionally, a third composite such as small rods may be included to enable the foam seals to be mechanically mounted to doors, windows, or jambs rather than adhesive-mounted. Schlegel Corporation.
Circle 117 on reader service card

Literature

Color on stainless. A full-color brochure illustrates process for adding color to stainless steel. Called Kolorin, it is a process which was developed in Europe and is now being offered in the U.S. Brochure outlines the technique involved in the application and also describes some of the various uses such as new design possibilities for architecture, hardware, appliances, furniture, graphics, interiors. Keystone Corporation.
Circle 200 on reader service card

Fabric samples. Known as the Design Reference Catalogue Series, the designer will have a large swatch to examine, in all its colorways on one card. The Catalogue Series include every fabric sample in the company's line with a description of the fabric's contents and detailed fenestration data. Swatch cards can be removed from three-ring binder for demonstration. Catalogue will be updated whenever a new product is added to the line. Lazarus Fabrics.
Circle 201 on reader service card

Pneumatic collection systems for handling trash and soiled linen, as well as automated trash disposal systems are shown in Bulletin 86-17-76. It includes illustrations of typical arrangements of various systems and components, and schematics of waste disposal systems. Trans-Vac Systems.
Circle 202 on reader service card

Carpet specifier's guide describes Ultron nylon, lists regulatory requirements for carpet, including flammability testing and performance certification, that apply to carpet; specification technology relating to durability, appearance retention, and static control for carpet; carpet construction requirements and special requirements in each use situation. Monsanto Textiles Company.
Circle 203 on reader service card

Floor coatings guide gives chart for selection of proper floor coating, and provides information about surface preparation of uncoated concrete, steel surfaces, and wood surfaces. Request form 6318. Rust-Oleum Corporation.
Circle 204 on reader service card

Bathroom fixtures. A compact full-color catalog illustrates the variety of color and design techniques available for the bath and gives a series of full-room architects' sketches as suggestion for new home or remodeling use. Two new lines, one a combination vanity/lavatory unit in a variety of sizes and finishes; the other, Classic Brass, a distinctive line of plumbing fittings in both classic and contemporary finishes. Crane Company.
Circle 205 on reader service card

Solar collectors. Technical bulletin SE-1-76 for designers provides information on fiberglass-plastic sheets used to cover flat plate solar collectors. It details both available data and questions still to be answered by research in progress. The bulletin contains detailed tables and graphs on radiant energy transmittance and reflectance, as well as overall solar and diffuse transmittance. Filon, Div. Vistron Corp.
Circle 206 on reader service card

Building panels. Glasweld is a flat, inorganic, fiber-reinforced cement panel coated with an all-mineral enamel color surface. Qasal is an integrally colored (white, onion skin, gray) inorganic fiber-reinforced cement panel. Flexweld is the uncoated base sheet of Glasweld and has been used for sandwich panel skins, a substrate for metal, tile, and high pressure laminates, and as a backing for Glasweld sandwich panels and laminations. Catalog further describes and gives application. Glasweld International.
Circle 207 on reader service card

Literature

Cleaning and sanitation systems. Hydro-San washers and Therma-San dryers, from compact units to sectionalized, conveyorized systems complete this line. Most models are available as either free-standing cabinets or for recessed installation. They come in single-door entry or double-door pass-through to accommodate either loading or unloading from the same or from opposite sides. The company also manufactures a complete line of sterilizers. Both catalogs are available from Vernitron Corporation.
Circle 208 on reader service card

Glide Guide is a drawing board accessory for use with a horizontal straight edge. It lifts straight edge above drawing without use of cardboard strips, strings, and powders, and is said to prevent ripped edges and feathering. May also be used as a vertical straight edge. Smooth vinyl surface. Reversible for right or left hand use. Glide Guide.
Circle 209 on reader service card

Carpets. An eight-page full-color brochure illustrates many examples from the complete collections of Dhurries, 12-ft Boucles, cut and uncut Jacquard Wiltons, Berbers, stock and custom designs as well as ten selections from the 75 designs in new Nada Collection. It also includes information on custom design service. Stark Carpet Corporation.
Circle 210 on reader service card

Aluminum construction products. 1977 brochure features Econosnap roof edge system designed for single-ply roofing systems. Other items included are gravel stops, reglets roof expansion joints, fascia panels, and Permasnap coping. W.P. Hickman Co.
Circle 211 on reader service card

Indiana Limestone Handbook is expanded to include new engineering data on support angles and anchors, thermal value charts and graphs, as well as new information on sealant joints, damproofing, and water repellent treatments. Indiana Limestone Institute.
Circle 212 on reader service card

Wood and wood treatments
The items below are specifically related to the technics article beginning on p. 78 and are grouped here for the reader's convenience.

Wood light pole. A full-color brochure illustrates complete line of wood poles, gives installation and technical information. Mounting hardware options are also detailed. ITT Landmark Lighting.
Circle 213 on reader service card

Semper 1 is the name of a new line of products which combines the beauty of hardwoods with the durability of polyester. It is available in seven patterns of warm, natural woods in mosaic designs. Suitable for use in restaurants, lounges, party and family rooms, or dining areas. Wood Mosaic.
Circle 214 on reader service card

Cedar shakes and shingles. Available to architects, builders, and remodeling contractors is a 12-page full-color catalog which shows a time and cost-saving system of applying panelized cedar shakes and shingles, states maker. Included are color swatches, diagrams detailing construction, actual roof and sidewall installation photos. Shakertown Corporation.
Circle 215 on reader service card

Wood stains. Semi-transparent stain, solid oil stain, solid acrylic stain, and overcoat for all types of wood surfaces are covered in this brochure. Recommended uses, product data, and specification information are given. Olympic.
Circle 216 on reader service card

'Plywood construction for fire protection.' Such topics as "Meeting the building codes," "How to build for fire protection," the basics of fire protection, keeping up with technology, and how to save on insurance are some that are covered in this brochure. American Plywood Association.
Circle 217 on reader service card

Teak contains natural oils that makes it resistant to wood borers and dry rot. It is able to withstand constant exposure to sun and salt water without suffering structural damage, making it suitable for use in boat construction. It is also suitable for furniture and indoor paneling use. Descriptive leaflet is available. Teak Marine Inc.
Circle 218 on reader service card
[continued on page 120]

EVERYONE'S AHEAD BEHIND AN AMARLITE CURTAIN WALL.

The Architect is ahead because, by specifying Amarlite curtain walls to be combined with environmental glass, he has made the professionals on the Amarlite Anaconda curtain wall team available to assist him from conception to conclusion of the project. And in addition, he has provided his client with a building of thermally improved excellence, without compromising his own esthetics.

The Owner is ahead because the Amarlite Anaconda curtain wall team has helped with cost studies, bidding, engineering and even installation. And because Amarlite's thermally improved curtain walls cut down on air conditioning and heating needs, which can mean far less cost up front.

The Manager is ahead because the Amarlite thermally improved curtain walls, designed to prevent heat transfer, keep the building evenly comfortable. Which means they reduce day-to-day heating and cooling operating costs, reduce interior climate system adjustments, and reduce tenant complaints to a bare minimum.

The Tenants are ahead because they're totally comfortable. Warm all winter and cool all summer since Amarlite's continuous thermal spacers isolate the curtain wall from interior to exterior, providing a highly efficient thermal barrier.

So if your project calls for architectural aluminum that meets the demands of today's market—anything from curtain walls to storefronts and Safetyline™ doors—pick up the phone and call Amarlite Anaconda. Then you, too, will be ahead.

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Circle No. 306, on Reader Service Card

Literature continued from page 118

Glulam systems. A 40-page color brochure shows various applications, gives technical data, stress tables, section properties, simple span beam table, cantilever beam design table, arch table, cross-section of beam and column connections, and more. American Institute of Timber Construction.
Circle 219 on reader service card

Wood flooring. Descriptive data on architectural (custom made), specialty (parquet) and Vinylwood II (vinyl covered wood) are included in literature. Solid plank wall paneling in specified widths and lengths in a wide range of both domestic and exotic wood species are also described. Wood Mosaic.
Circle 220 on reader service card

Wood columns/spindles. Plain or fluted columns, 8 to 20 ft in length are designed for both residential and commercial use, both interior or exterior. Spindles come in nine basic designs in sizes from 7½ in. to 8 ft, with 2-, 3- and 4-in. nominal thicknesses. Literature is available from E.A. Nord Company.
Circle 221 on reader service card

'The All-Weather Wood Foundation: Why, What and How' contains much technical information and cross sections of installation techniques. American Plywood Association.
Circle 222 on reader service card

'Redwood Exterior Finishes.' This booklet has been prepared to help architects and builders, choose the most appropriate finish for any redwood surface outdoors. It divides finishes into three categories: natural treatments, stains, and paints. It tells where each finish may be used, what color changes to expect, and gives rules for finishing. California Redwood Association.
Circle 223 on reader service card

Cladwood/Castwood. Cladwood is a medium density particleboard covered with an overlay of wood fibers. The overlay and particleboard are saturated with moisture resistant phenolic resin, then bonded and molded under heat and pressure. Cladwood siding, in ⅜-in. and ⅝-in. thicknesses, is molded with numerous designs such as smooth or rough sawn board and batten, V-groove, striated, and others. Castwood is a medium density particleboard covered front and back with a wood fiber overlay, bonded with moisture resistant phenolic resin, and molded to your design under intense heat and pressure. The end product is a stainable, paintable surface that is used for molding furniture components such as doors, drawer fronts, and sofa end panels. Publishers Forest Products Co.
Circle 224 on reader service card

Pressure treatments that protect wood from decay and insects, fire, and corrosion are detailed in brochure. Chart gives types of treatments, individual uses, advantages, and limitations. Koppers Company, Inc.
Circle 225 on reader service card

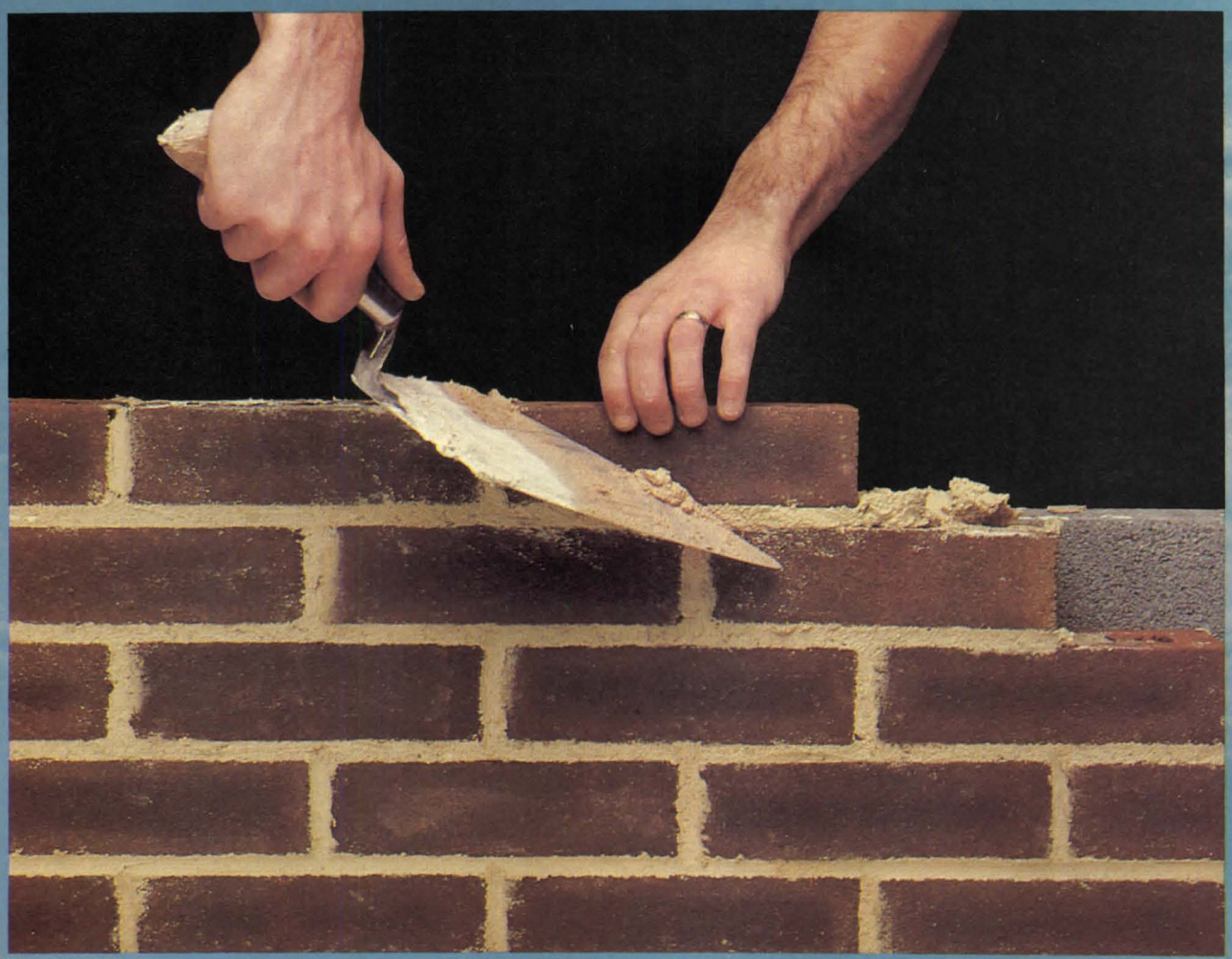
Exterior plywood siding. Brochure illustrates and describes some of the more than 130 different Western Red Cedar panels to choose from. Technical specifications, prefinishing and finishing information, and application instructions are also included. PenPly.
Circle 226 on reader service card

Teak flooring strip is available unfinished only. It can be used to make up many patterns including straitline, brick, herringbone, etc., or you may design your own patterns. Size is 2"x10"x⅜". Bangkok Industries.
Circle 227 on reader service card

Pressure-treated wood. *AE concepts in wood design* is published bimonthly and is available without charge to individuals holding degrees in architecture, architectural engineering, or civil engineering. The magazine contains such information as a listing of member companies, a product listing of pressure-treated wood, and a preservative listing categorized by preservatives that members usually treat with. It also contains articles of interest to professionals. American Wood Preservers Institute.
Circle 228 on reader service card

Wood preserving. This company has put together a packet of leaflets and brochures describing its fire-retardant and wood preservative treatments, and its various lumber and wood products for use above ground, underground, and in the water. J.H. Baxter.
Circle 229 on reader service card

SAVE MONEY ON YOUR NEXT BUILDING. HAVE IT BUILT BY HAND.



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For more information about a masonry system that will lower your building costs, write to IMI.

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Notices

Appointments

John F. Hartray, Jr. has joined Booth, Nagle & Hartray/Ltd. (formerly Booth & Nagle/Ltd.) of Chicago as a principal.

Maurice Freedman, PE has been elected principal of Sasaki Associates, Inc. of Watertown, MA, and Coral Gables, FL.

Lafayette R. Beamon, AIA has been appointed vice president, principal in charge of the new Atlanta, GA, office of Jenkins-Fleming, Inc.

Raymond Lo, AIA has been named director of architectural design for Robert & Company Associates, Atlanta, GA.

Carl D. Reinhardt is the new director of housing and residential development for Jones/Mayer & Associates, Inc., St. Louis, MO.

F. Jack Harden, AIA has joined Gee & Jenson Engineers Architects Planners, Inc., West Palm Beach, FL.

Steven Peters and **Donna Johnson** have been named associates of Pierce Goodwin Alexander, Architects, Engineers, Planners of Houston, TX.

Walter Cunningham has been appointed senior vice president, director of engineering for 3D and 3D/International (Diversified Design Disciplines) headquartered in Houston, TX.

Abraham D. Levitt has been named a partner of Jarmul, Brizee & Levitt, Architects and Planners (formerly Seymour Jarmul & Bernard Brizee) of Lake Success, NY.

Virgil R. Carter, AIA and **Harold C. Kallaway** have been appointed vice presidents of Environmental Planning & Research, Inc., San Francisco.

[continued on page 124]

BEAUTY CONTEST?

Twenty stainable beauties and they're all money-making winners.

We'll let you be the judge, but we think it's a toss up. They're all beautiful in their own way. And they're all PENPLY exterior Western red cedar panels. PENPLY makes over 20 varieties of cedar siding. When you combine our selection with the many colors and types of stains available, it leaves a lot of room for future beauty contestants that will help to sell your buildings and homes.

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For further information see Sweet's General Building and Light Residential Files, section 7.6PEN; or call Sweet's Buyline for the name of your nearest wood products distributor. When you buy from PENPLY you deal with professionals who are sensitive to on-time deliveries and consistent quality. For quality Western red cedar siding go directly to the source.

PENPLY

Wood Products from ITT Rayonier Inc.

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Port Angeles, Wa. 98362
1-800-426-7017

Circle No. 334, on Reader Service Card

Notices continued from page 122

Thompson, Ventulett, Stainback & Associates, Inc., Atlanta, Ga., has named the following new principals in the position of design group director: A. Byron Chapman, III, AIA; H. Preston Crum, AIA; Sidney S. Daniell, AIA; Marvin Housworth, AIA; and W. Donald Rutland, AIA.

Jack Dunbar has joined Depolo, Inc., architectural interior design, New York City.

Reorganizations

The Clark Enersen Partners is the new name for Clark & Enersen, Hamersky, Schlaebitz, Burroughs & Thomsen of Lincoln, NB.

New addresses

E. George Kneider Architects, 4824 Yonge St., Toronto, Ontario, M2N 5N1, Canada.

G.H. Forbes Associates Architects, 231 S. Woodward, Birmingham, MI 48011.

New firms

Douglas T. O'Donnell, PE and Myron B. Silberman, AIA, ASCE have formed **O'Donnell & Silberman Associates, Inc.,** P.O. Box 124, 604 E. 4 St., Marshfield, WI 54449.

Frank J. Matzke, FAIA, former executive director of the Illinois Capital Development Board, has formed a consulting practice at 4 Oakbend Court, Springfield, IL 62704.

F. Daniel Cathers, AIA and William W. Lukens have opened **Cathers/Lukens Architects,** The Farmhouse, Great Valley Corporate Center, Morehall Rd., Malvern, PA 19355.

Michael S. Adams, AIA Architect-Planner, focused on health services/health facilities area, 1204 Hollis Ave., Cherry Hill, NJ 08002.

Thomas Lee Dues, RA, Melvin Anderson, RA, Mark R. Graeser, and Ronald Brandenburg have established **Endeco Associates Architects,** 31 Rue Royale, Dayton, OH 45429.

Robert J. Crowner Architect, 1341 W. 6 St., Erie, PA 16505.

James B. Phillips and Kent D. Dounay have formed **Design Group, Inc.,** 4131 N. 48 St., Phoenix, AZ, providing architectural, environmental planning, and interior design services to commercial and industrial customers.

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There's nothing ordinary about Kreolite® Wood Block factory floors! . . . In fact, they're very special and they deserve your special consideration. For instance: They have so many advantages over other types of floors (see panel at right), that we strongly recommend custom designing so that no feature will be overlooked. Therefore, when you choose Jennison-Wright End Grain Wood Block factory floors, be sure that they are given pre-installation planning so that they'll perform as they should. Our design engineers will expertly perform this service—at no charge, of course.

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Architectural Technology Faculty: Applications being accepted for position anticipated to be open Fall 1977. Baccalaureate degree in architecture and office experience required; registration and teaching experience desirable. Includes duties in instruction, other duties as assigned by program supervisor, and normal duties of all faculty members. Rank and salary dependent upon qualifications. Send resume by June 1, 1977, to Associate Dean Eleanor J. Bushee, School of Technical Careers, Southern Illinois University, Carbondale, Ill. 62901. SIU-C is an equal opportunity/affirmative action employer.

Design Director: If you are an UNUSUALLY CREATIVE DESIGNER of commercial interior environments, with fresh ideas, complete command of presentation techniques, materials and resources, and a track record of some noteworthy professional achievements—and if you have the ability to efficiently manage the work of a 5 or 6 person design staff—then we want to talk to you and see your sketches. We are a New York City based interior planning and design firm with an active roster of current clients and significant growth projections. Compensation entirely commensurate with abilities. Mail resume. All responses acknowledged. Box # 1361-125, *Progressive Architecture.*

Faculty: The Syracuse University School of Architecture has openings for positions in the following areas: 1. *Architectural Theory and History* including Modern Architecture. Ph.D. in Architectural History preferred. 2. *Environmental Control* sequence covering H.V.A/C electrical and lighting. First professional degree in architecture or Engineering. State certification preferred. 3. Two positions in the Core Program of the undergraduate *Architectural Design Studies.* Registration preferred, Rank: Assistant or Associate Professor depending on qualifications and experience. Please send resumes and references to Julio M. San Jose, Associate Dean, Attn: Faculty Search Committee, 417 Slocum Hall, Syracuse University, Syracuse, NY 13210. Syracuse University is an Equal Opportunity/Affirmative Action Employer.

Faculty Opening: Graduate School of Architecture and Planning, Columbia University, seeks Assistant Professor to teach in pioneer program in historic preservation, starting fall 1977. Expertise sought in one of following areas: Architectural Conservation and Technology (laboratory training, technological expertise, materials research, desired); Archaeology and/or Anthropology (experience in "above-grade" archaeology desired); Planning Techniques as they relate to Historic Preservation (degree in planning or law and relevant experience desired). All applicants should have degree in architecture, teaching experience. Apply to: J.S. Polshek, Dean, 402 Avery, Columbia University, NY, NY 10027, by April 30, 1977. Columbia Unviersity is an Affirmative Action/Equal Opportunity Employer.

Faculty Position: The University of Colorado Graduate Architecture Program anticipates a position at the assistant/associate professor level to teach Architectural Theory—Design methods including computer applications. Position available September 1977. Masters degree plus registration or intent required. Teaching and professional experience desired. Send vitae and three references to Robert Utzinger, Director of Architecture, College of Environmental Design, University of Colorado, Denver, 1100 14th Street, Denver, Colorado 80302. The University of Colorado is an Affirmative Action/Equal Opportunity Employer.

Faculty Positions: A young and developing architectural program seeks faculty committed to innovative multi-disciplinary, rigorous architectural education. Normally, persons participate in one studio-seminar and one lecture or seminar course. The College desires persons with expertise in Architectural Design, Site Planning/Design, Design Methodologies/Programming, Building Systems, Human Behavior/Design Relationship, Environmental Force/Design Phenomena and Design Graphics. Rank and salary commensurate with qualifications. Interested persons should send vitae, letters of recommendation and other supporting information to the Dean, College of Architecture, University of North Carolina at Charlotte, UNCC Station, Charlotte, N. C. 28223. UNCC is an Equal Opportunity Employer.

Manufacturer's Reps. Wanted: Several territories now open for nationally advertised Plaster In A Roll™ by Flexi-Wall Systems. Please reply to: Dept. PA, Flexi-Wall Systems, P.O. Box 477, Liberty, S. C. 29657.

Marketing Architect: Opportunity for personal growth. Florida or NCARB registered marketing representative for established A/E design firm operating throughout Florida. Must have experience and desire to do marketing of design services and be self motivating. Send resume and references to Thomas Montero, AIA, A & E Design, Inc., 5644 N. Dale Mabry, Tampa, Florida 33614.

Project Architect: Registered, with three years experience in design and project management. Position also open for Design Architect with one year design experience. Registration desirable. Kenco Associates, Inc. is a multi-disciplined, A/E Consulting firm that requires talented ambitious personnel to help meet its growth objectives. Paid insurance, vacations, holidays, and sick leave benefits. Submit resume & salary history to: Kenco Associates, Inc., Rt. 2—Box 798, Ashland, Kentucky 41101 or call—606/928-6486. An Equal Opportunity Employer.

Project Designer: A leading, design-oriented A-E firm with diverse, nationwide practice, serving major corporate, governmental, and institutional clients seeks imaginative design architect with five to ten years experience, to work directly with design partner in development of concepts, coordination with clients, and control of detail refinement. Must have been associated with design of one or more prominent buildings and be able to substantiate personal design contributions. Excellent opportunity for growth with firm. Replies will be handled confidentially and must contain sufficient information to establish a basis for further discussion. This position is open at midwest headquarters only. Send resume and other data to Box # 1361-126, *Progressive Architecture.*

Sales Reps Wanted: Architectural Metal Work-Interior. Major manufacturer of sheet metal perimeter

[continued on page 130]

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THE COMPUTER PROGRAM THAT NOW DOES MORE TO SAVE ENERGY AND MONEY.

The new, improved E CUBE 75 produces an accurate, three-part Life Cycle Energy Analysis at low cost. With many new features it computes the hour-by-hour energy requirements of your building or planned building for an entire year—taking into account all weather, design, operation, and occupancy factors.

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1 Fabrics for Interiors

By Jack Larsen and Jeanne Weeks,
208 pp., illus., . . . $14.95

Completely geared to current trends, this book can make the difference between costly mistakes and successful, personalized interiors. It explains functions and requirements of fabrics for windows, furniture, walls and ceilings.
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3 Architectural Presentation Techniques

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Two architects offer practical solutions to the design of a house that operates independently within its environment. This "Autonomous House" is not linked to utility lines for gas, electricity, water, or drainage; but instead uses the energy of sun, wind and rain to service itself and process its waste.
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5 Architectural Rendering: The Techniques of Contemporary Presentation

By Albert O. Halse, 326 pp.,
illus., 2nd edition, 1972 . . . $26.50

This completely up-dated revision of the most widely used guide to architectural rendering covers all working phases from pencil strokes to finished product — and shows how to obtain the desired mood, perspective, light and color effects, select proper equipment and work in different media.
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6 Color for Architecture

By Tom Porter and Byron Mikellides,
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This book makes a detailed plea for a greater use of color in the built environment, both for aesthetic appeal and on the grounds of human requirements. Studies of the nature of color are presented against a color chart which is of practical use to architects and environmental designers.
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7 Housing

By Macsai, Holland, Nachman,
Yacker, 483 pp., illus., . . . $30.00

This book on the subject of multiple housing serves as a refresher course for the architect, a handbook for the novice, a reference book for the student, a course guide for the professor and as background for the housing official.
Circle B607 under Books.

8 Secrets of Noise Control

By R.K. Miller, A. Thumann,
Dr. C. Bragden
268 pp., . . . $19.95

Comprehensive handbook for applying the tricks of the trade of noise control. Silencing techniques are illustrated by use of actual problems encountered in the field with worked out solutions. Interpretations of legal enforcement make this book essential.
Circle B608 under Books.

9 Interior Lighting

By James Nuckolls,
371 pp., illus., . . . $22.00

In this book technical information is directed to the designer who needs to know *why* lighting is applied, as well as *how* to do it. The text is not meant to replace engineering references but rather to augment them for the designer who works with the art as well as the science of lighting.
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10 Apartments, Townhouses, and Condominiums

Edited by Elisabeth Kendall Thompson
228 pp., illus., . . . $18.50

This heavily illustrated volume takes into consideration a number of new criteria in its examination of both low- and high-rise buildings, as well as townhouses. In-depth coverage of garden complexes on suburban sites, designing for low and moderate income groups, conversions, large scale developments, apartments and condominiums for resort areas, and interiors round out this useful, up-to-date volume.
Circle B610 under Books

11 Frank Lloyd Wright's Usonian Houses

By John Sergeant,
207 pp., illus., . . . $24.50

In this well-illustrated and thoroughly documented book, the late period of Wright's prolific career is reassessed and his philosophy of building with nature rather than against it is analyzed. Wright's Usonian houses, his Taliesin working communities and his plan for Broadacre City has a new relevance as energy conservation and ecological integrity have become the dominant concerns of the environmental design professions.
Circle B611 under Books

12 Designer's Guide to OSHA

By Peter S. Hopf, A.I.A.,
288 pp., illus., . . . $19.50

This practical volume translates OSHA's tens of thousands of words into easy-to-use drawings, diagrams, charts and graphs. With OSHA violations increasing, engineers obviously need a working guide to compliance with government job safety and health standards. This book fills that need. All material is presented in the same sequence as the OSHA regulations are written.
Circle B612 under Books.

13 Handbook of Industrial Noise Management

By Richard K. Miller
210 pp., . . . $19.95

This book is intended for those who wish to apply industrial noise management techniques and save money on noise abatement costs. The data are essential in determining an understanding of the legal and economic implications of noise control. Includes cost tables and decision matrixes.
Circle B613 under Books.

14 Energy and Form

By Ralph L. Knowles,
198 pp., illus.,. . . $27.50

This is a scholarly, theoretical book, a major work that will be used for years to come. The projects described concentrate on reducing environmental problems in individual or groups of buildings by controlling shape and structure, scale and surface, volume ratio, location and orientation, isolation and insulation.
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15 Office Building Design

288 pp., illus., . . . $21.50

This thoroughly revised edition of a popular *Architectural Record* book offers the most up-to-date coverage available on low- and medium-rise office buildings, high-rise office buildings, high-rise technology, and selected office building interiors.
Circle B615 under Books

16 Alternative Natural Energy Sources in Building Design

By A.J. Davis & R.P. Schubert
252 pp., illus., . . . $6.95

This third printing, in paperback, updates the primary concerns when energy conservation and alternative natural energy sources are integral and decisive components of building design. Includes a reference listing that deals more specifically with the outlined criteria and relevant area beyond the scope of this book.
Circle B616 under Books.

17 Drawing File for Architects, Illustrators and Designers

By Marc Szabo
251 pp., illus., . . . $12.50

This book provides over 200 pages of figures — in the most common and natural positions, activities, and types of wearing apparel, as well as dozens of drawings of boats and cars, all of which can be copied freely — by direct tracing, photostats, or photocopying machine. The pages tear out easily to form an easily accessible fingertip scrap file.
Circel B617 under Books.

18 Rendering With Pen and Ink

By Robert W. Gill,
368 pp., illus., . . . $7.50

This paper-back edition is a copiously illustrated guide to the techniques and methods of rendering, including sections on perspective, projection, shadow, reflections, and how to draw cars, ships, aircraft, trees, and human figures. The author also describes the very wide range of instruments and equipment currently in use.
Circle B618 under Books.

19 Trees

By Robert L. Zion,
168 pp., illus., . . . $12.95

An inexpensive paperback version of the book with virtually everything you want to know about using trees to complement the buildings you design. Both aesthetic and practical considerations are given, including tree characteristics, as well as cost considerations, planting, maintenance, rate of growth, and city and seashore recommendations.
Circle B619 under Books.

20 Building Construction Illustrated

By Frank Ching,
320 pp., illus., . . . $17.95

Charmingly hand-lettered by the author, this book presents step-by-step techniques in residential and light construction. Containing over 1,000 drawings, it covers materials, finishes, fastenings, posts, trusses, slabs, wood joists, light steel/aluminum, structural calculations, planning and site work, cost estimating, and construction sequencing.
Circle B620 under Books.

21 Architectural Graphics

By Frank Ching,
128 pp., illus., . . . $9.95

This book presents graphic techniques available for conveying architectural ideas. Included is know-how on equipment and materials; drafting; architectural conventions for orthographic, paraline and perspective drawings; devices for rendering tonal/textural values and context; graphic symbols and lettering; freehand sketching and diagramming; and effective presentation of design proposals.
Circle B621 under Books.

22 Hotels, Motels and Condominiums

by Fred Lawson,
238 pp., illus., . . . $39.50

This is a book on design, planning and maintenance. It is an exhaustive, international survey with hundreds of on-site illustrations and examples. A must for all architects, engineers, owners, developers and financiers worldwide.
Circle B622 under Books

23 Specifications: An Introduction for Architecture and Engineering

By Chesley Ayers,
448 pp., . . . $13.50

This is a comprehensive introduction to the field of architectural and engineering specification writing which has, in previous editions, established itself as a leading reference work. The entire field, and every phase of the specification writer's work, is thoroughly covered, including legal citations by name and number, industrial specifications, value engineering, computerized specifications, and government safety regulations.
Circle B623 under Books

24 Women in American Architecture: A Historic and Contemporary Perspective

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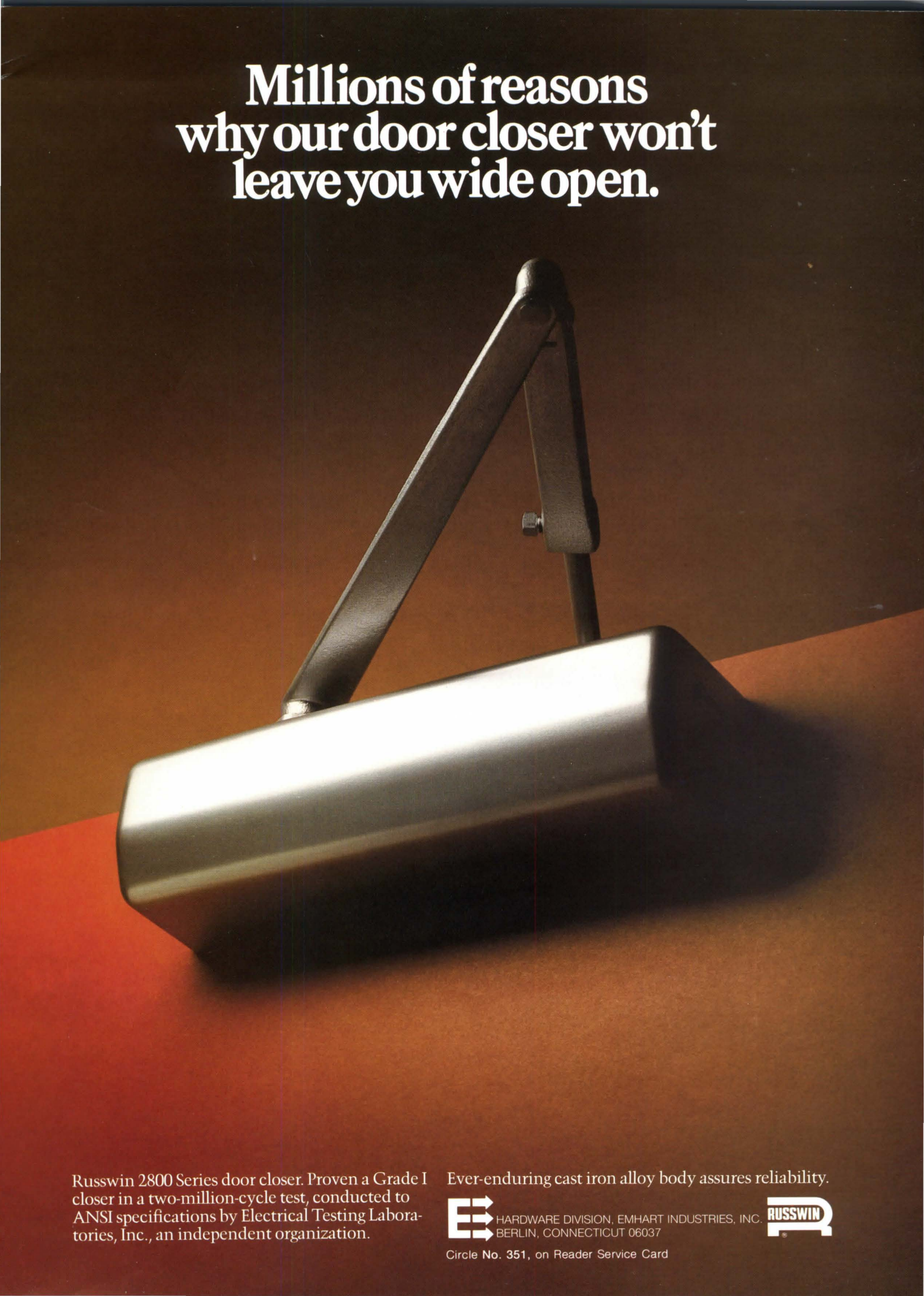

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