p
ROGRESSIVE ARCHITECTURE
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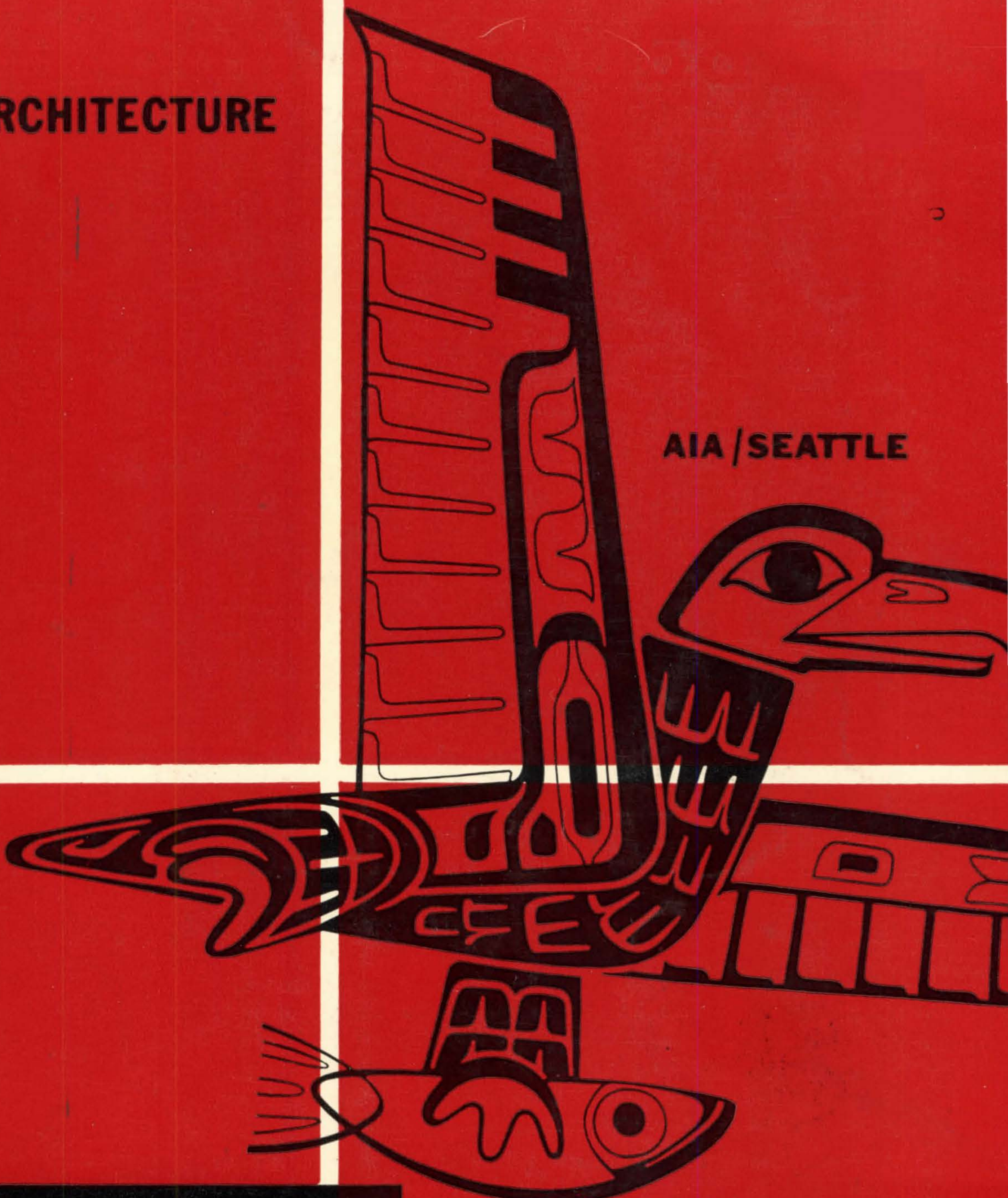
AIA / SEATTLE

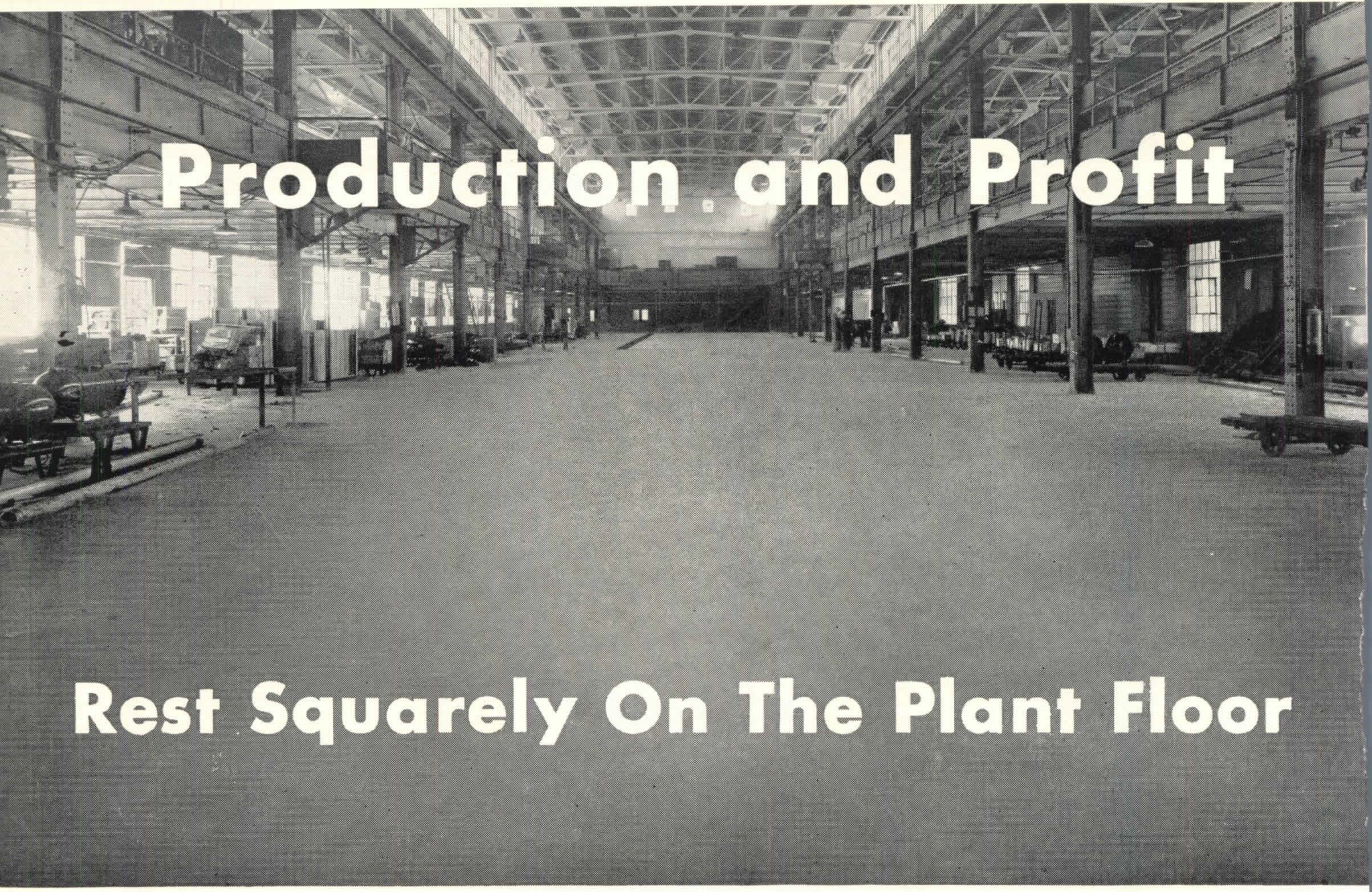


6

northwest architecture

june 1953

largest architectural circulation in the world



View of Masterplate Floor in The Bryant Heater Co. Plant, Indianapolis, Indiana. In excellent condition after 7 years of service. Archt.—Allen and Kelly; Contr.—Wm. P. Jungclaus Co.—both of Indianapolis, Indiana.

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Section of A Masterplate Floor
Note Thickness of Iron-Armored Surface

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PROGRESSIVE ARCHITECTURE

June 1953

resort hotel south of the border

Construction is expected to start later this year on the resort hotel (*rendering below*) designed by Kemper Nomland, Los Angeles architect, for a syndicate of Mexican businessmen. The site is near the western limits of Mexico, D. F., close to a golf club, the "Hipodromo de las Americas", and the Lomas Reforma boulevard, in an area now being actively developed.

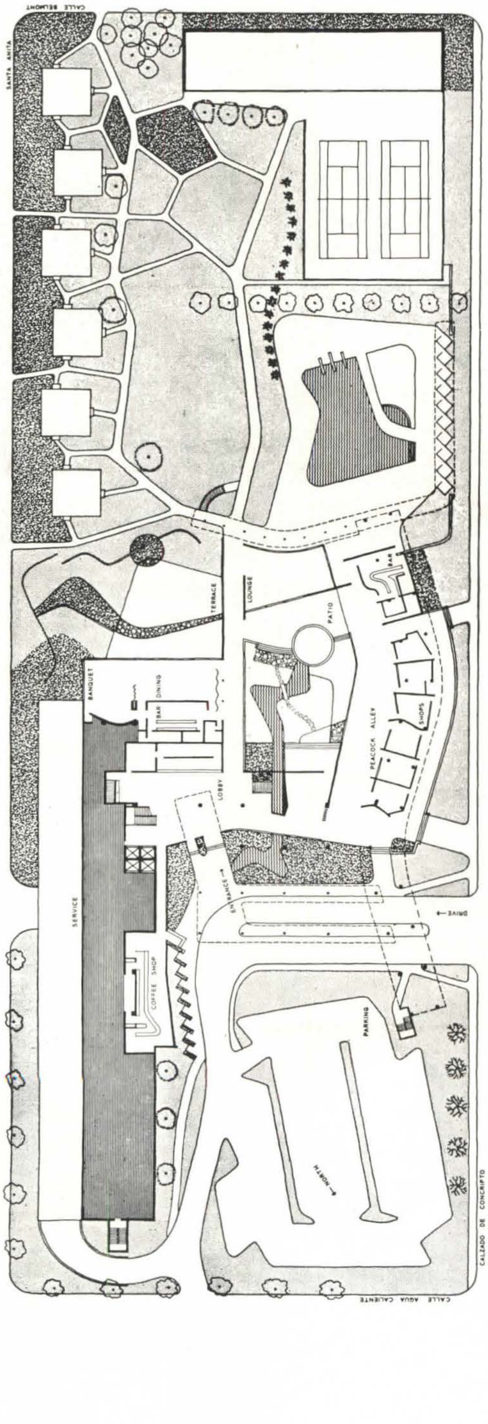
More than 300 guest rooms, each with private balcony, will be provided in the eight-story main building and over the luxury shops located in the curved wing at the front. The latter guest rooms are intended as the deluxe group, as the irregular contour will permit varied exposures and views. In addition, the syndicate contemplates private cottages at the side of the main building.

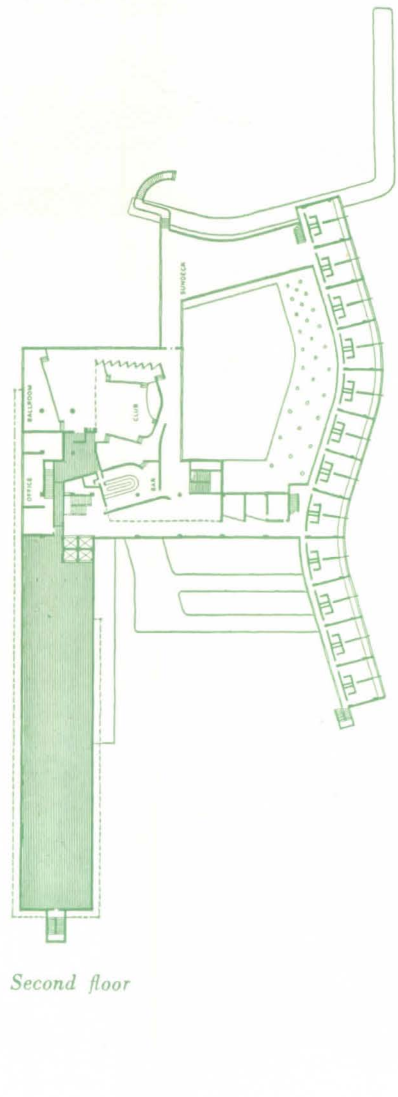
The main lobby will be located in the gallery connecting the curved wing and main building. The second connecting element, across a landscaped patio, will contain the main lounge, overlooking the

swimming pool and tennis and fronton courts beyond (*see plan of main floor*). Adjacent to the main building and opening from the lobby will be the dining and banquet rooms, with a bar, club room, and ballroom on the level above. Access to the sun deck over the lounge is from the bar and the club room. Moving stairways will connect public spaces on two levels.

Structurally, the main building is designed for a two-column reinforced-concrete system, with floor and roof slabs cantilevered on both sides. Every second bay will have a structural cross partition, or shear wall, to withstand seismic shock. The buildings are to be finished with local stone and the roofs will be finished with tile, for use as decks. The roof of the main building could be used for helicopter landing, the architect points out.

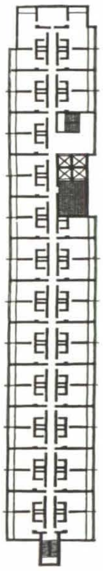
Decorative stone will be freely used and murals and sculpture will be favored for adornment of the public spaces. Extensive landscaping is indicated on the plot plan, uniting the hotel with the cottages and recreation facilities.





Second floor

Typical floor



Architecture of Seattle

This issue of P/A appears in the same month with the 85th Annual Convention of the American Institute of Architects in Seattle, Washington, the program for which is planned around the theme, "A New Country-A New Architecture." In the following pages we extend to our entire readership some of the aura of the Convention; the architectural aspect of the City of Seattle; and a look at a few of the buildings that, were you there, you would note as landmarks of the architectural past or hallmarks of current vitality. For delegates to the Convention, P/A and the Book Division of the Reinhold Publishing Corporation, in collaboration with the A.I.A., has prepared *A Guide to Seattle Architecture, 1850-1950.* This handbook, compiled and edited (with local assistance) by Victor Steinbrueck, Seattle Architect, will be distributed *gratis* to those who attend the Convention, for their guidance in seeing local work of merit—work that was selected through a poll of the Washington State Chapter's membership. For those who are not delegates, cannot attend the Convention, or are not A.I.A. members, we present herewith a summary of the discussion of Seattle's architectural background that appears in the guidebook.

•

Bountiful resources—game from the forests; fish from the sea and streams; berries and roots from the open places; the incomparable stand of timber—made the Pacific Northwest Indians one of the most favored of peoples. When the early white settlers arrived, Chief Seattle, and many other Indians in the Puget Sound area, lived, not in tepees or log cabins, but in huge wood houses of a sort not found elsewhere—flat-pitched, shed-roofed structures, *up to 900 feet in length,* built of sturdy poles and beams, with planks attached by cedar withes. Several families lived in a single structure, and several buildings formed a village.

Although navigators and trappers had visited the Pacific Northwest Coast intermittently since as early as 1543, it wasn't until 1850 that the first white settler, John C. Holgate, selected a timber claim in the Duwamish Valley, now an industrial section of Seattle. Other settlers soon followed, and in March, 1852, at the invitation of Chief Seattle, Dr. David S. Maynard, a graduate of the Vermont Academy of Medicine who had migrated to the region around present-day Olympia, arrived, opened a general store, and embarked on a lively business of shipping fish and timber to the booming gold town of San Francisco. In 1853, Henry Yesler, a Maryland-born Ohioan came to Seattle and established the first sawmill.

From the outset, the community was a mill and commercial center, never a village of log cabins. The simple, early, frame houses were built with walls of fir clapboards or board-and-batten and had cedar-shingle roofs—the pioneer tradition that is seeing brilliant latter-day evolution in contemporary work. Design was anonymous, the simple expression of a sincere and modest pioneering people. Sawmill and shops were built of heavy mill construction of wood posts and beams, giving Seattle an esthetic homogeneity it would never see again.

Built soon after The Great Fire of 1889, the Pioneer Building, at the northeast corner of First Avenue and Yesler Way—site of the original Yesler sawmill — was an attempt, through employing Romanesque-Richardsonian influences, to produce the dignity and worldliness for which the new Seattle was striving. Photo: Leggenhager

This Victorian apartment house (right), *built in the Eastlake District around 1890, displays a remarkably adept use of large glass areas, combined with the then-fashionable ornateness. Compare the general design approach with the contemporary apartment group on page 84.* Photo: Chas. R. Pearson

The Cascade Hotel (left), *though a stylish derivative, shows a willingness to experiment that was typical of the burgeoning city. Vertical column areas are minimized, and windows occupy the entire space between them.* Photo: Leggenhager

"By 1880," the guidebook comments, "Seattle had a population of 3,500, and was the largest of many mill towns on Puget Sound. . . With the changing pattern of new wealth came the changing pattern of a new and exuberant architectural style. Ostentation expressed itself in complicated forms and lavish ornamentation of Victorian Gothic and Queen Anne. Social prestige was achieved by grandeur expressed in towers, porches, dormers, bay windows, colored glass, scrolls, brackets, fretwork, fancy-cut butt-shingle patterns on gables and sidewalls, *ad-infinitum*."

In 1884, the Northern Pacific Railroad pushed through to Seattle, bringing new markets and communication to the community—a bustling center that was largely built of wood. In 1889, the local Great Fire destroyed 60 blocks, including the entire business and commercial district and the wharves. The following day, town leaders met to plan the future and voted to widen and straighten streets, improve grades, and rebuild of fireproof materials. While the city was rebuilding, new residents arrived by thousands. In August, 1894, the Washington State Chapter, A.I.A. was granted a charter, with 21 architects in Seattle and 14 from other Washington towns. Self-conscious symbols of the new prosperity appeared in imported architectural styles—Romanesque, Gothic, Renaissance, Georgian.

"Ships returning with gold from Alaska in the summer of 1897 touched off the rush of fortune seekers," the guidebook tells us. "Aggressiveness of the Seattle community and its merchants established the city as the fitting-out place. As business grew, so did architecture, with eastern firms contributing buildings as well as young men to Seattle. In the midst of the traditional work, it is important to call attention to at least three young architects at this time of whom it might be said that they cried in the wilderness. Ellsworth Storey came to Seattle in 1903 and did original and creative work appropriate to the region and the times *(see below)*. Andrew Willatsen arrived a few years later, fired with the zeal of Sullivan and Wright; his work was scorned by his colleagues *(below)*. W. R. B. Willcox, arriving in 1908, brought a clarity of understanding of architecture and the arts to the community which was to influence the next generation of architects, if not his own. Later he became head of the School of Architecture at Eugene, Oregon."

The Columbian Exposition of 1893 in Chicago introduced architectural "respectability" to the country as a whole. Seattle's Alaska-Yukon-Pacific

On this page are shown examples of work by two of the most remarkable architects who worked in Seattle in the early years of this century. The cottages at Colman Park (below) *were built in 1908. Ellsworth Storey, the architect, went to Seattle in 1903 and consistently did original and creative work appropriate to the area —"a voice crying in the wilderness."*

Another unsung hero was Andrew Willatsen, who went west imbued with the philosophies of Sullivan and Wright. Witness the residence in The Highlands (right), *built in 1909.* Photos: Leggenhager Chas. R. Pearson

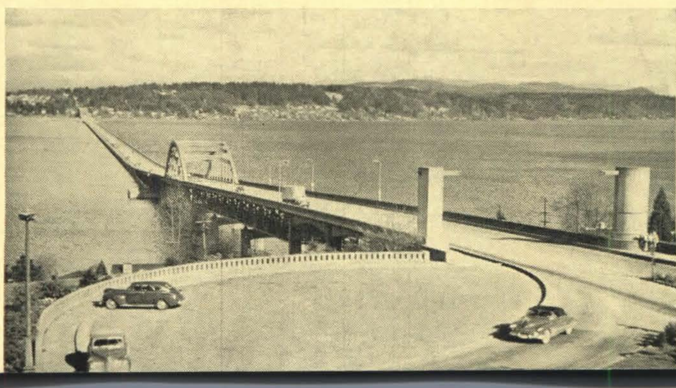
Exposition of 1909 reinforced the trend in the Northwest, where John Galen Howard of Howard & Galloway, San Francisco, used classic forms exclusively. The University instituted a Department of Architecture in 1913, and Bebb & Gould, the University architects, accepted Collegiate Gothic as appropriate.

In the period starting with the outbreak of World War I, commercial and public buildings evolved from the earlier eclecticism to a pattern of formal plans and carefully detailed facades. Then, in the 1930's, a more economical and simplified architecture emerged. Warehouses and industrial buildings were bare, direct structural expressions, with occasional distracting efforts at prettiness. During this time, architects and engineers began to work in closer relationship, as mechanical requirements multiplied, and need for more consistent structure became obvious. Government priming in public work helped relieve the burden of the depression. Then World War II again changed the building scene. Architects took government jobs or struggled under priority limitations in private work. Several large firms were instituted to handle war jobs and stayed on to plan post-war projects.

"Since 1946," the guidebook reports, "only the conservatism of clients forced eclectic work, with all firms anxious to do creative work." In this period, there was widespread growth of domestic architecture for the middle- and lower-income levels, through builder-developer projects that extended the original gridiron city pattern without regard for hills and waterways. Some architects still built stylish mansions for wealthy individual clients, and a few even ventured into Swiss and Scandinavian stylism, which, in wood use and broad protecting roof overhangs, at least was more appropriate to the region. Much of the residential work was a translation of Colonial and Cape Cod formulas, and not a little work proceeded in the strong, continuing western tradition of simple, low houses and bungalows. More and and more, however, individual architects experimented with new forms, producing provocative work. Though the University taught under the Beaux Arts system until World War II, many graduates were feeling their way toward the new architecture.

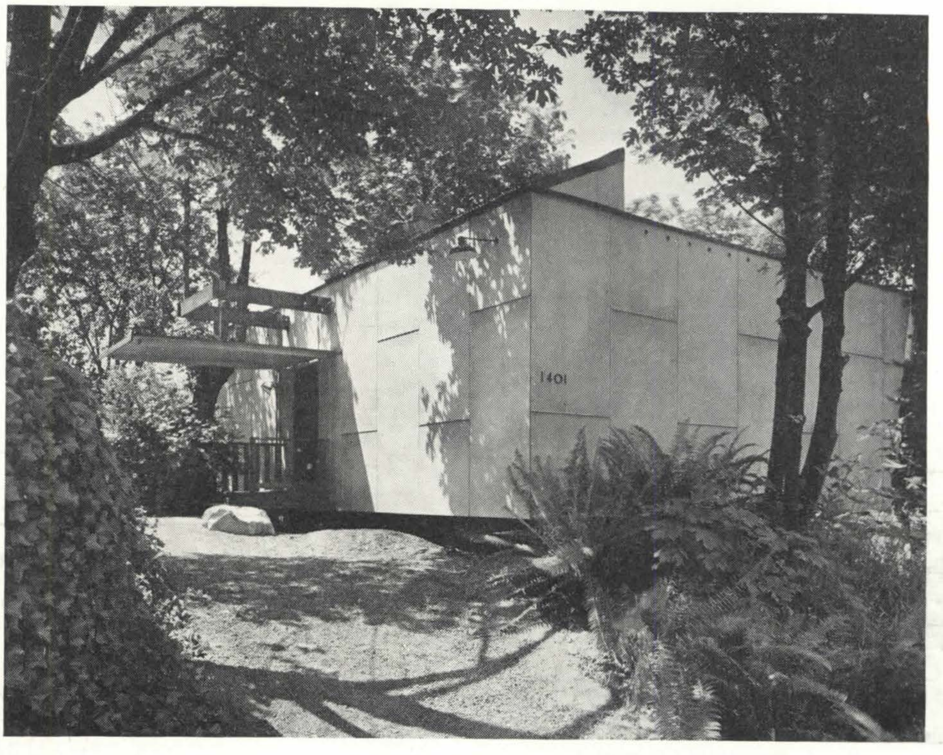
After the war, as materials flowed back into civilian production, residential building really boomed. Traditional styles were forgotten—except by lending agencies, builder-developers, and a few clients. Young new firms gained national recognition for the outstanding equality of their contemporary work.

The world's largest floating bridge, Lake Washington (1940). Concrete pontoons anchored to lake bottom, with certain units arranged to swing aside to allow passage of boats. State of Washington Highway Department. Engineers; Lloyd Lovegren, Architectural Consultant. Photo: Leggenhager

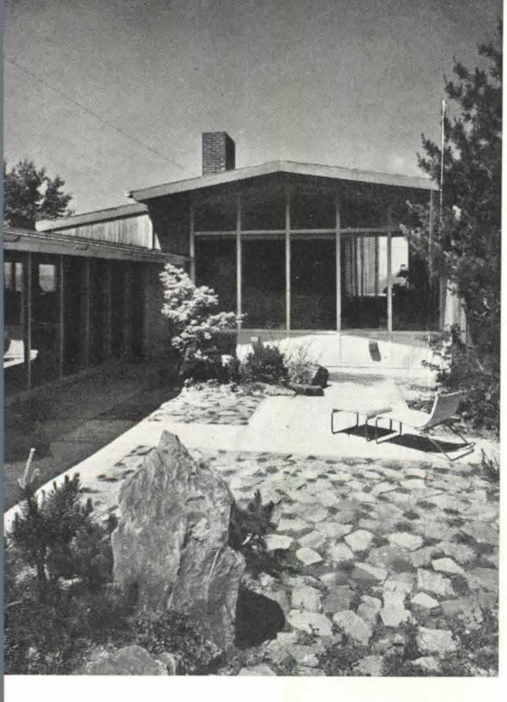


In this house at Bothell, Wash. (right), *Paul Hayden Kirk, the architect, employed native wood simply and directly; the deck for outdoor living echoes the relatively mild climate.*
Photo: Dearborn-Massar

The windowless street exterior of the architect's own home in Seattle (right) *belies the complete openness of the garden side (1950). Natural wood is combined with industrial materials; accents of bright color. Victor Steinbrueck, Architect.* Photo: Dearborn-Massar

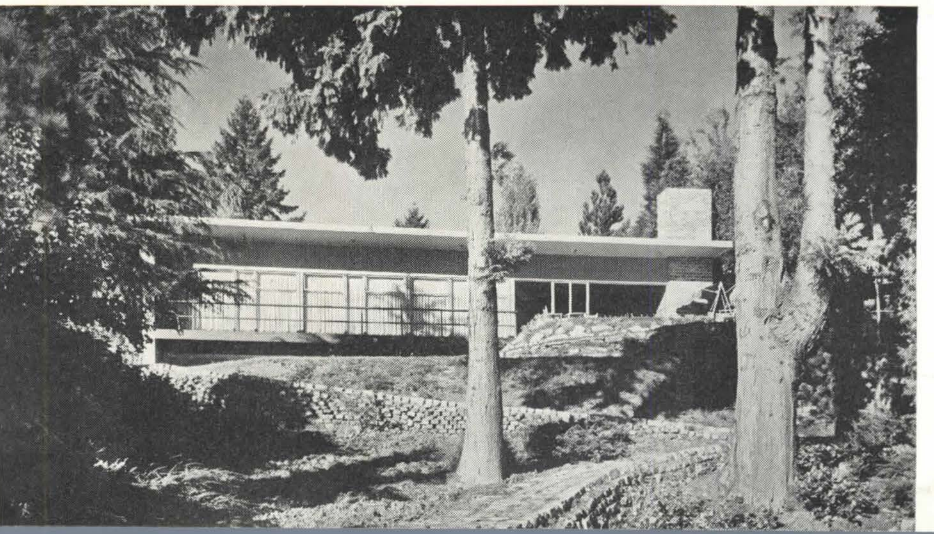


Although this house (below) *is in the city, its plan provides country-like outdoor living in a protected garden court, bordered by window walls (1949). Tucker, Shields & Terry, Architects.*
Photo: Dearborn-Massar

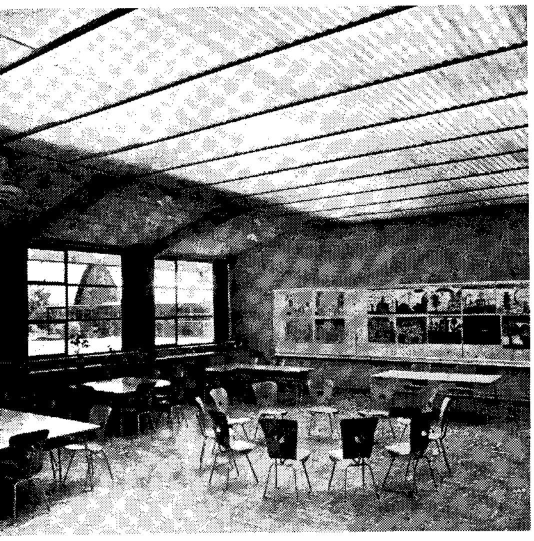


The window wall of this house at Hunt's Point (right) *makes the most of the lake and garden view (1950). Paul Thiry, Architect.*
Photo: Richard Garrison

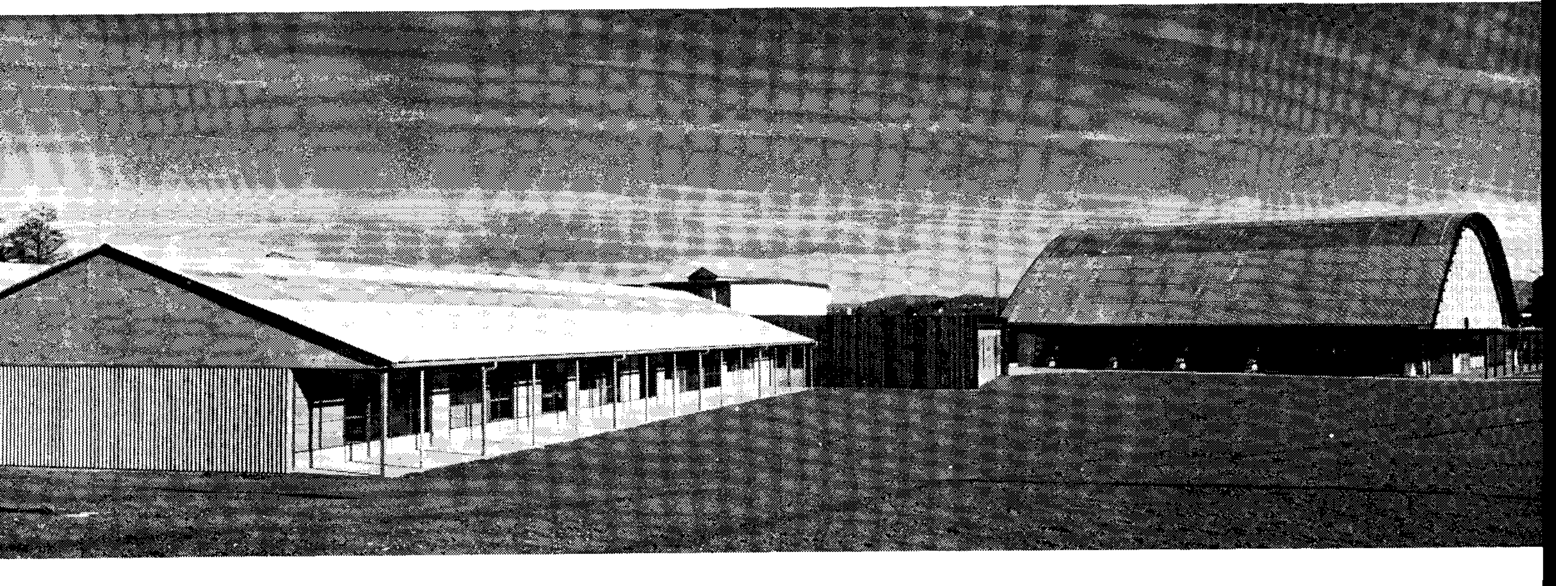
NORTHWEST **current work**

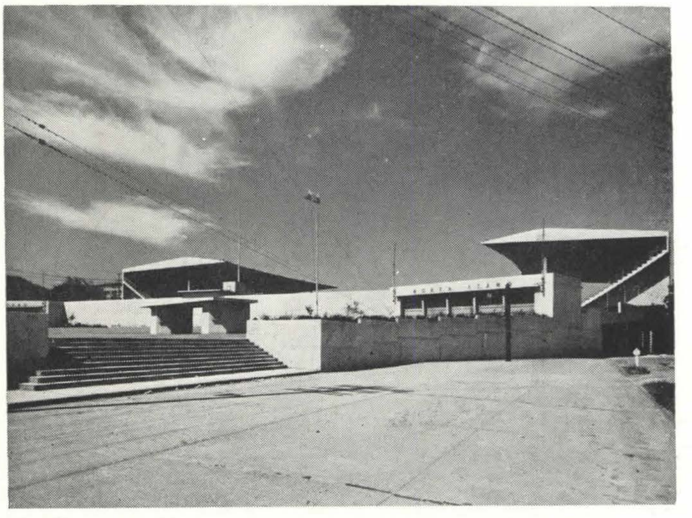


Yesler Terrace Housing Project (right); *Aitken, Bain, Jacobsen, Holmes and Stoddard, Architects (1941). The first Federally sponsored, low-income, slum-clearance housing project in Seattle is located on the site of one of the city's earliest residential developments. Each dwelling unit has a private, sitting-out area and yard and, through terrace site-planning and flat shed roofs of surrounding buildings, enjoys a dramatic view.* Photo: Dearborn-Massar

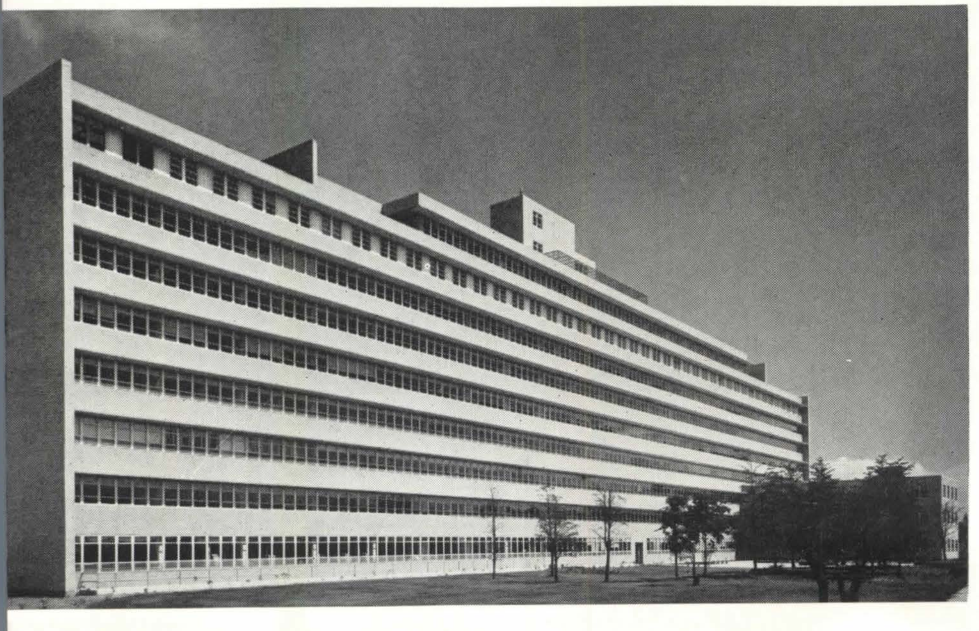


Both the Southgate Elementary School; (1950) and the Foster Junior-Senior High School (1952) are the work of Architect Ralph Burkhard (left and below). *Structural elements and equipment appear in the finished design, made up of elementary forms with a nice scale relationship between them.*
Photos: Dearborn-Massar
Chas. R. Pearson





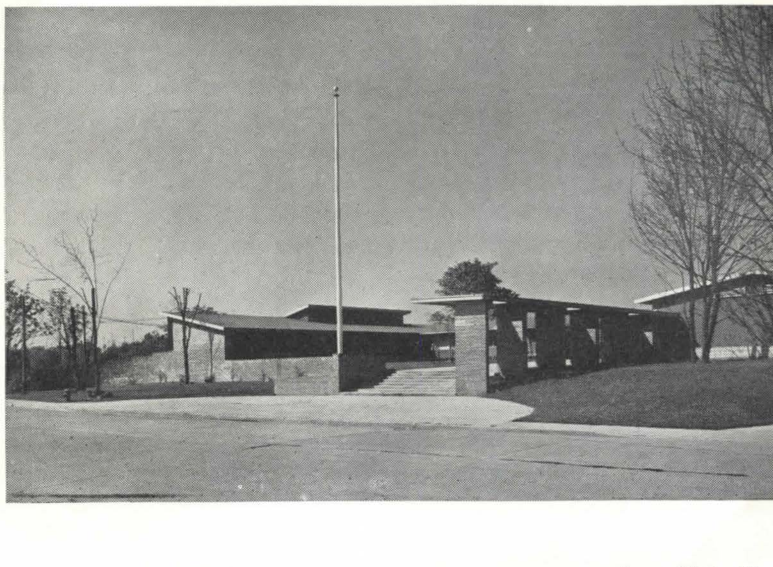
Memorial Stadium for a Seattle High School is of reinforced concrete with flat-slab and upset cantilevered beams supported on posts (1948). Design venturesomeness is a Seattle tradition. George Wellington Stoddard, Architect. Photo: Dearborn-Massar

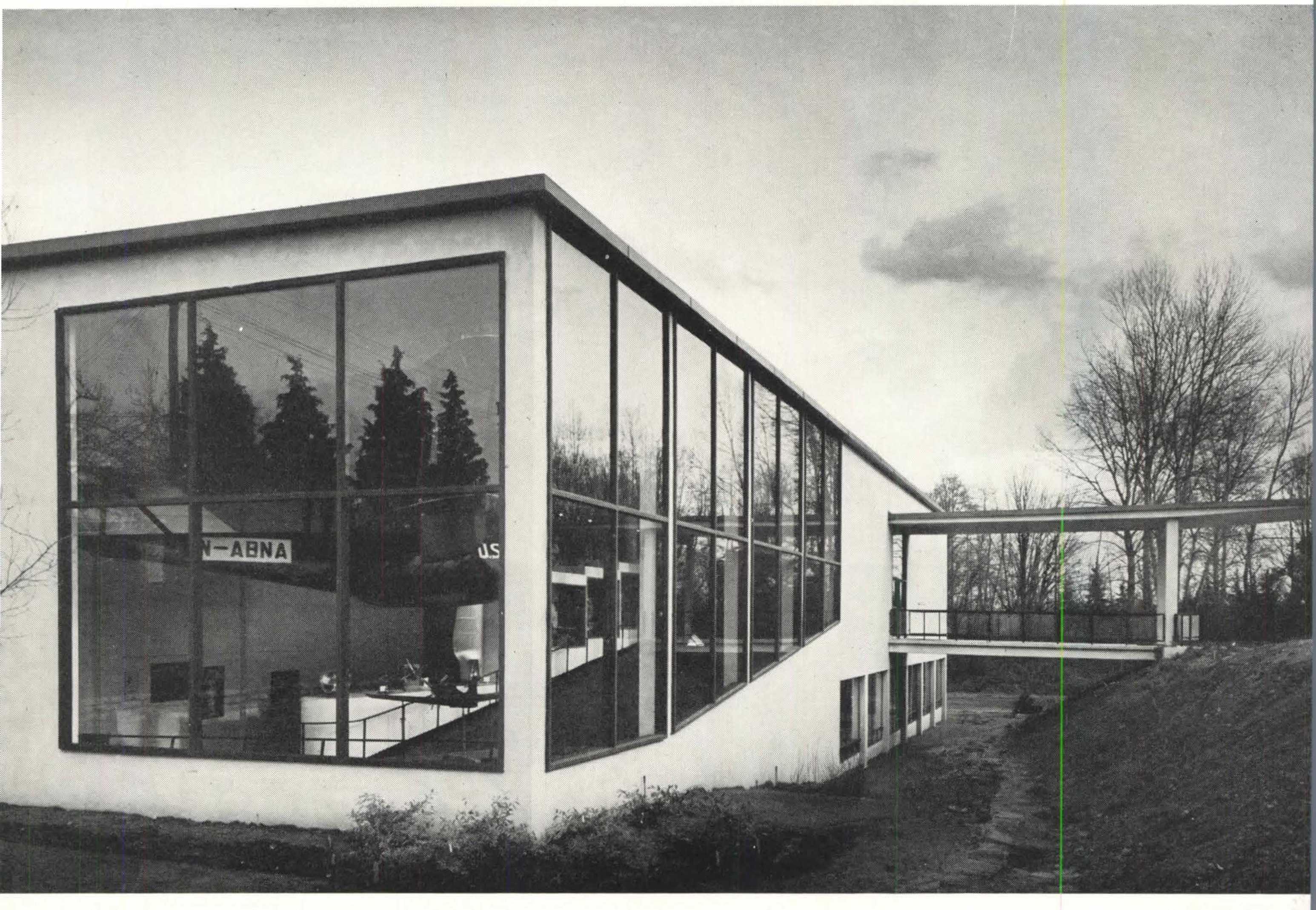


The Seattle firm of Naramore, Bain, Brady & Johanson designed this 300-bed Veterans Administration Hospital, Seattle (1948). Patients' rooms all face southeast overlooking a recreation area and enjoying a distant view of Mt. Rainier. Structure is the basis of the finished design expression.

Photo: Dearborn-Massar

The Holly Park Community Center, built of brick (1943) is a playful composition of related basic forms. Jones, Ahlson & Thiry, Architects. Photo: Dearborn-Massar



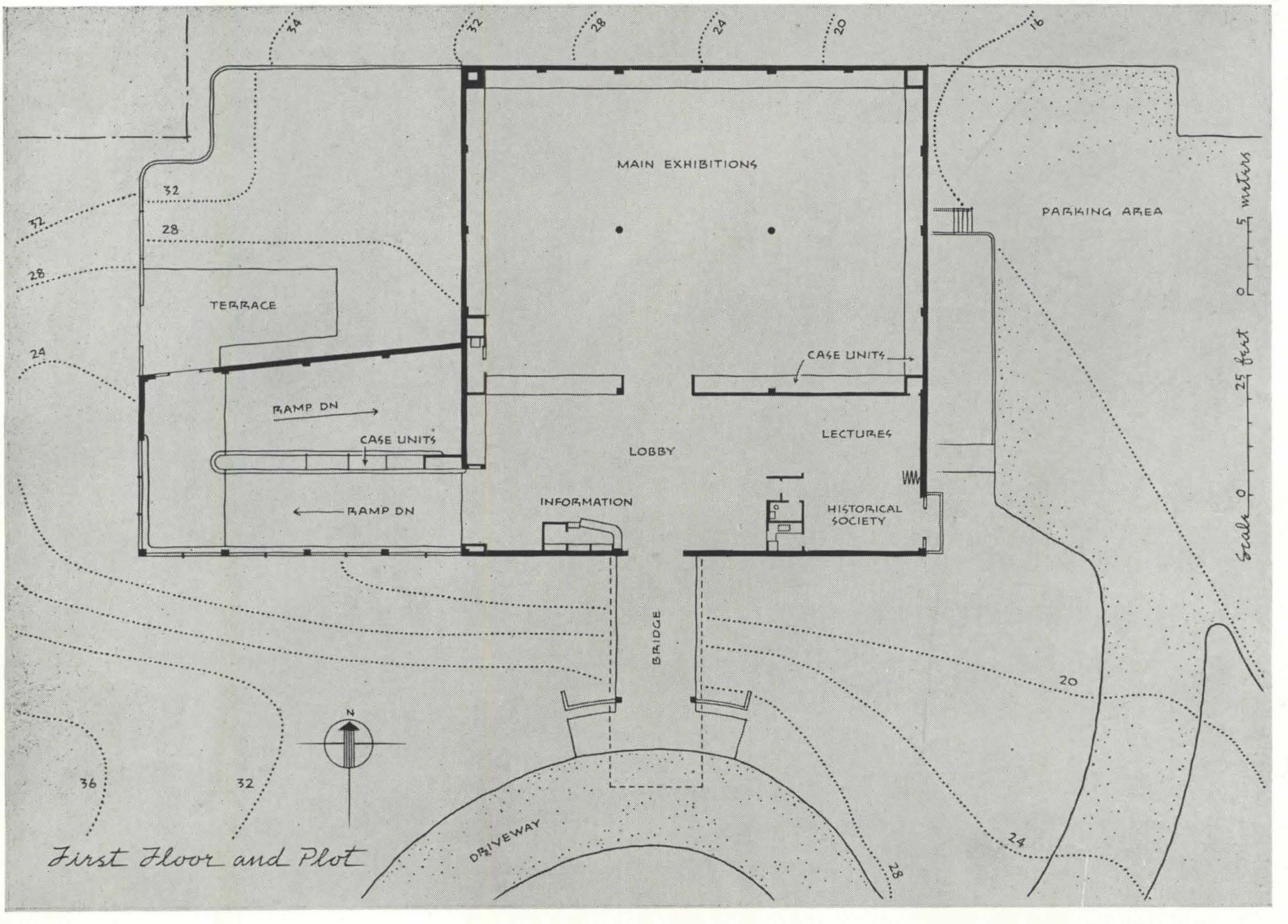


museum

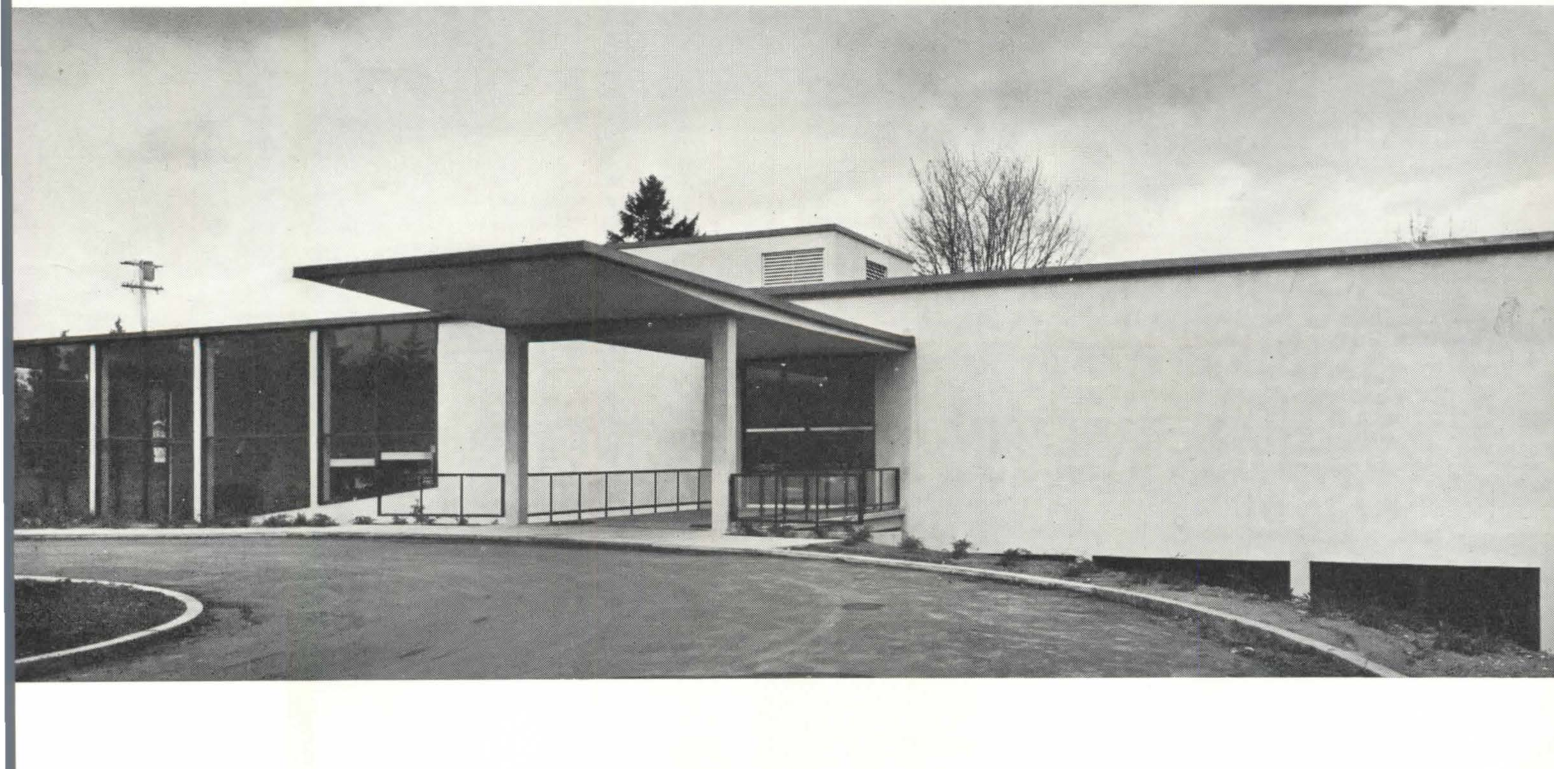
location	Seattle, Washington
architect	Paul Thiry
structural engineer	Sigmund Ivarson
mechanical engineers	Bouillon & Griffith
electrical engineer	Beverly Travis
general contractor	Kuney-Johnson Construction Co.

An unusual set of factors conditioned the design of the Museum of History and Industry. The program itself was exceptional—a museum to house both historical and industrial exhibits. Then, a special requirement was that a gift of $50,000 from the Boeing Aircraft Company be used to construct a wing to display Boeing's first flying boat—the B-1 of 1919, an all wood plane that carried the first contract international mail between Seattle and Victoria, B. C. Far from the least extraordinary factor was the typically irregular Seattle site donated by the City, which included the dried-up channel of a former small-craft canal.

The dual nature of the museum is curiously appropriate to Seattle, since the arrival of the white man in the '50s and the start of the community's industrial development were simultaneous. The plan solution consists of assigning the historical museum, along with the Historical Society lounge, to the upper floor; and industrial exhibits to the lower floor, the abrupt site slope allowing above-grade conditions at both levels. To satisfy the need to build a "wing," the architect worked out the ingenious ramped passage between upper and lower floors, the flying boat being suspended from the ceiling above the turning. The entrance bridge straddles the old canal ravine. On the lower level are a children's museum, a library, offices, and workrooms.

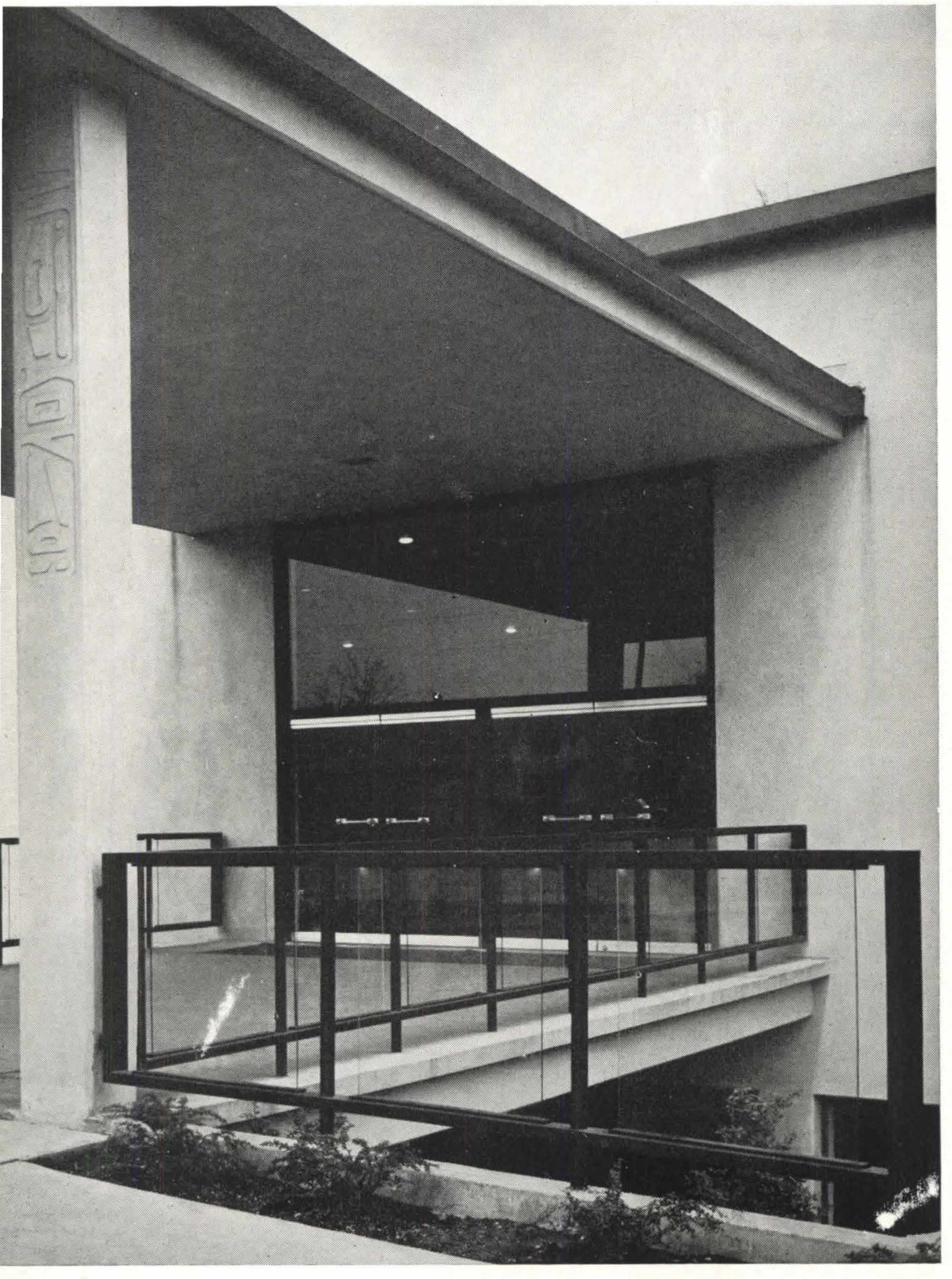


First Floor and Plot

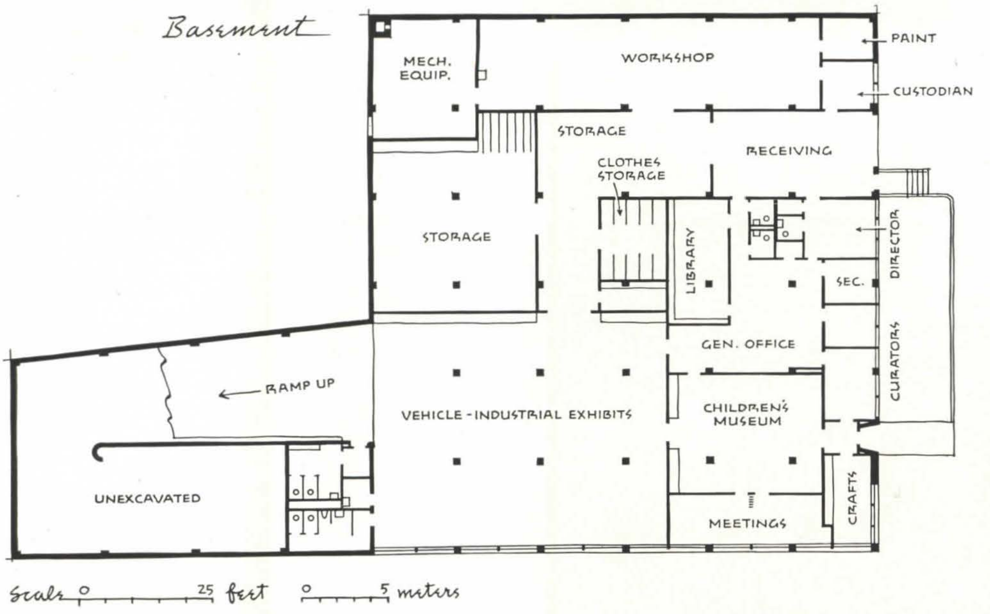


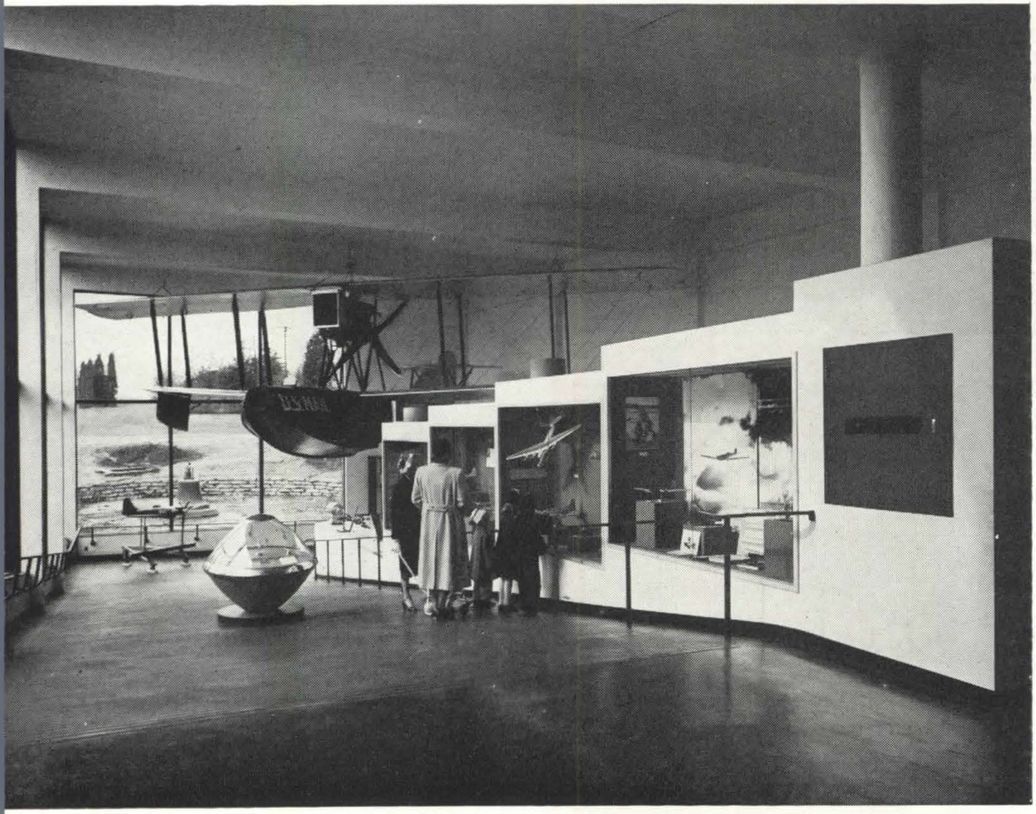
The railing at the entrance bridge consists of an iron frame and panels of 3/8" tempered-plate glass. The architect-designed incised reliefs on the canopy posts were inspired by Northwest Indian art. The reliefs were shaped in the concrete with 3/8" bandsawed plywood fastened to the forms prior to pouring. A similar decorative motif is used above the children's entrance.

Photos: Chas. R. Pearson

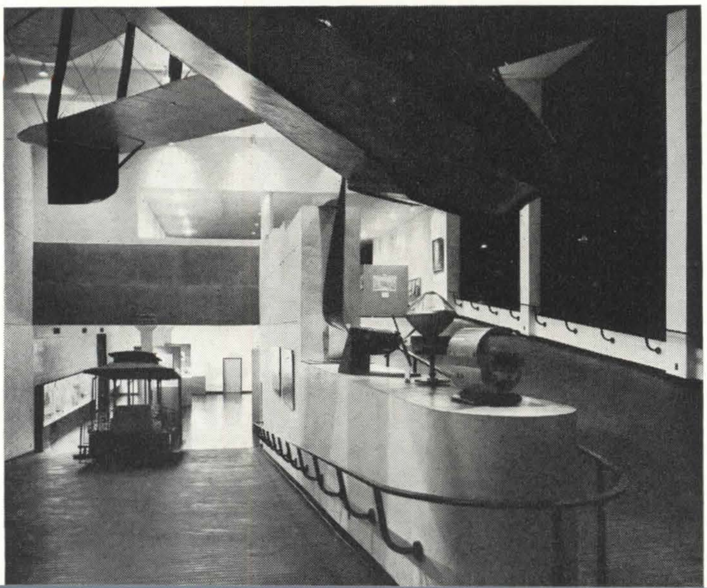


From the attendant's desk of the main lobby one looks toward the ramp, with the historic Boeing mailplane in the background; at right of photo is the jamb of the door leading to the historical exhibition hall. The concrete floor is stained and waxed.





Industrial and civic displays are allotted the lower gallery (above). Items subject to damage because of temperature change, light, etc., are shown in glass-enclosed, tube- or incandescent-lighted wall cases; while freestanding exhibits in the middle of the gallery offer complete flexibility for changing displays.



The ramp surface is scored to prevent slipping; heat-absorbing glass is used on south and west walls. Display cases hold additional aircraft items, and an old Seattle cable car appears to be starting uphill from the lower level. Since the building is serviced by electric-lift truck that maneuvers the ramp with ease, an elevator was not needed.

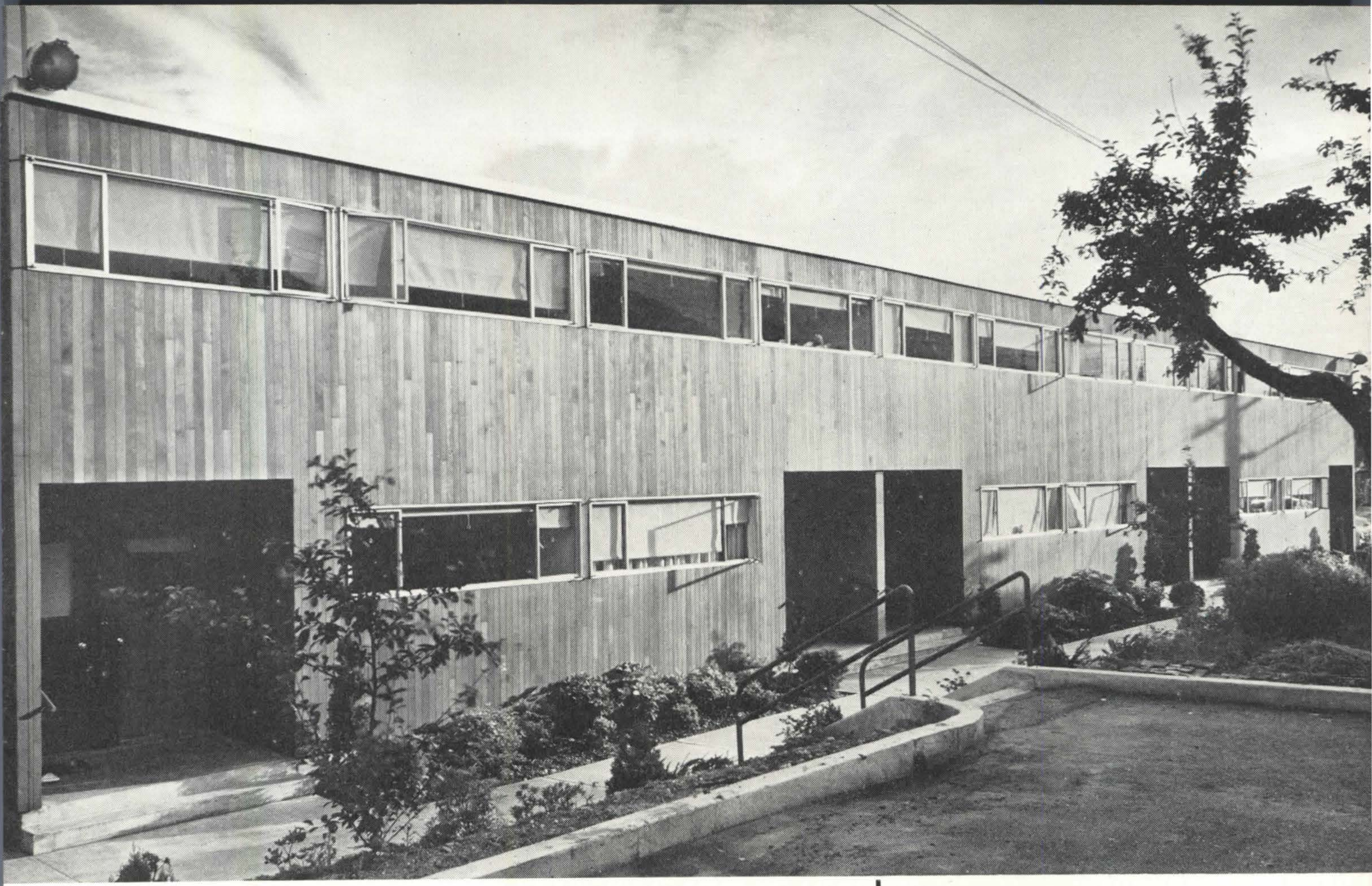
The upper-level main gallery (top) *is artificially lighted and mechanically ventilated. The center is clear space for freestanding objects, cases, or staged displays (the exhibit of Seattle's Bon Marche department store, for example).*

construction

Foundation: concrete with spread footings. **Frame:** reinforced concrete. **Wall surfacing:** exterior: resin-base paint—Armor Laboratories; interior: plaster; rest rooms, toilets: ceramic tile. **Floor surfacing:** stain and wax. **Ceiling surfacing:** plaster, putty coat. **Roof surfacing:** 5-ply asbestos-felt built-up roofing—The Philip Carey Manufacturing Co. **Insulation:** perforated and unperforated fiberboard—National Gypsum Co. and The Flintkote Co., Building Materials Division. **Partitions:** plastered steel studs—Penn Metal Co., Inc. **Windows:** aluminum sash—Tecler Aluminum Co.; plate glass: regular and heat-absorbing—Pittsburgh Plate Glass Co. **Doors:** interior: hollow-core, slab; folding overhead—Richard-Wilcox Manufacturing Co.; entrance: vertical steel, rolling—Kinnear Manufacturing Co. **Hardware:** lock sets—Schlage Lock Co.; door closers—LCN Closers, Inc., Dor-O-Matic Division of Republic Industries, Inc., Yale & Towne Manufacturing Co.; hinges—The Stanley Works. **Paint, stain:** resin-base paint—Armor Laboratories.

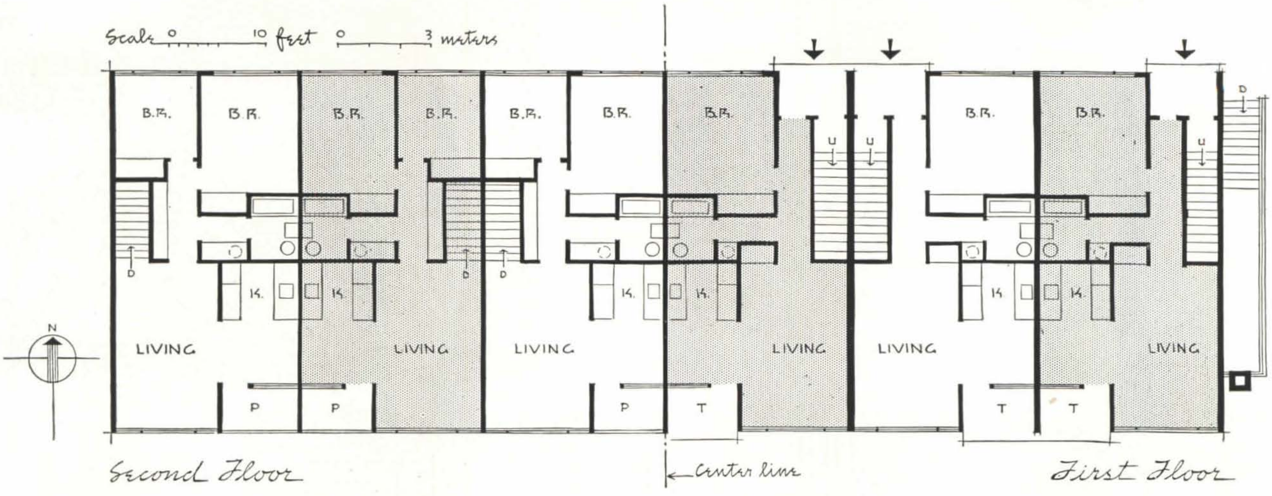
equipment

Lighting fixtures: offices: concentric-ring type—Silvray Lighting Co.; storage area: reflector—Smoot-Holman Co.; display area: recessed adjustable—Swivelier Co., Inc. **Electrical distribution:** service entrance switch and panelboards: circuit breaker types—Trumbull Electric Department of General Electric Co.; cable—General Cable Corp.; wiring devices—Bryant Electric Co. **Plumbing and sanitation:** lavatories and water closets—American Radiator & Standard Sanitary Corp.; toilet seats—C. F. Church Manufacturing Co.; flush valves—Sloan Valve Co.; accessories: drains and hose bibs—J. A. Zurn Manufacturing Co.; galvanized-steel pipe—National Pipe Bending Co.; wet-pipe sprinklers—Grinnell Co., Inc.; drinking fountains—The Halsey W. Taylor Co. **Heating:** radiant and forced-air types; steel boiler—The National Radiator Co.; galvanized-iron ducts; controls — Minneapolis-Honeywell Regulator Co. **Air conditioning:** blowers—Western Blower Co.; 5-ply filters—American Air Filter Co., Inc.



apartments

location	Seattle, Washington
architects	Bassetti & Morse
associate architect	Wendell H. Lovett
engineer	Harvey Johnson
general contractor	C & B Builders



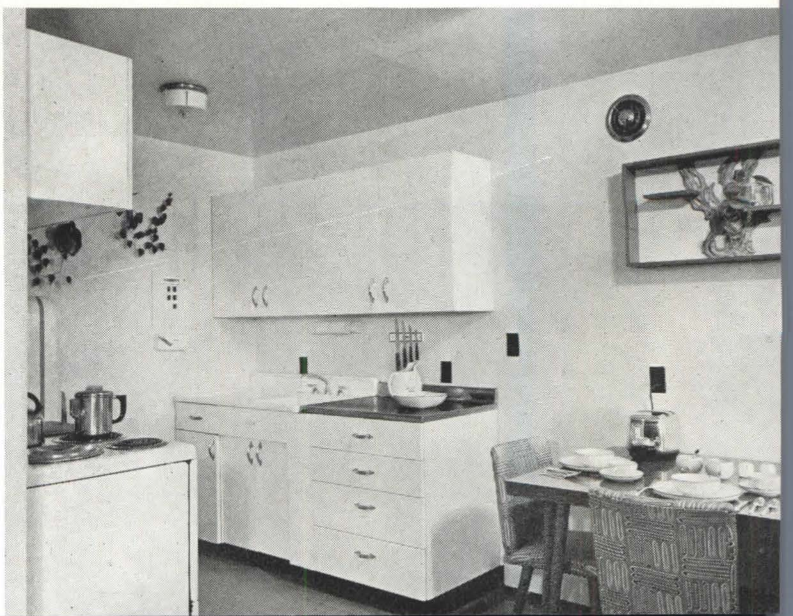
Even within the frequently rigid design limitations imposed by local FHA offices for loan approval, some architects manage to produce confident and imaginative architecture. Such an instance, we believe, is the 608 apartment block shown here—simply stated, nicely proportioned, well oriented—with a pleasing counterpoint of openness and enclosure; light and dark; smooth and textured surfaces. The building won second place in the commercial category, in the Washington State A.I.A. 1951 contest for architectural excellence.

As the architects state it, "the program was simple—to design a 608 apartment house to suit the lot and to have maximum occupancy and minimum cost without sacrificing decent standards of living."

Clean as the design is, they feel that they could have accomplished something even more efficient—and more interesting looking—if they could have used an exterior balcony along the north wall for access to upstairs apartments. However, FHA vetoed this. As a result, all units, though they occupy the full depth of the building, must be entered by hallways and stairways. Also, to make most economical use of cubage, the one-bedroom units had to be relegated to the first floor, with all two-bedroom apartments upstairs—a feature the architects regret, since they feel that direct access to garden and playground is particularly desirable for families with children.

Accommodated to the long, gently sloping site, the symmetrical plan is organized within a plain rectangle, with one of the narrow ends toward the street on the west. All entrances occur along the north side, as do the bedrooms, lighted by long, narrow aluminum sash, with a fixed central panel and operable casements at either side. These, in conjunction with the large window areas and doors on the south or garden side, provide cross ventilation for all apartments. Wall surfaces on the south are asbestos-cement panels, while elsewhere, stained vertical T & G siding of cedar (one of the handsomest and most time-honored of local materials) is used. A small basement, beneath the eastern third contains boiler room, laundry, and tenant storage room.

The structural system is standard, platform, frame construction, selected for cost economy; interior walls are finished with plasterboard. Flooring throughout is either hardwood or linoleum, and ceilings are plaster on lath. For sound control, walls between apartments are insulated, and there is also sound insulation between the first and second floors; wool-type insulation is used for thermal correction. All sash are aluminum, as is the roof fascia. Doors are flush-panel type. The building is heated by an oil-fired, hot-water system, employing baseboard convectors.

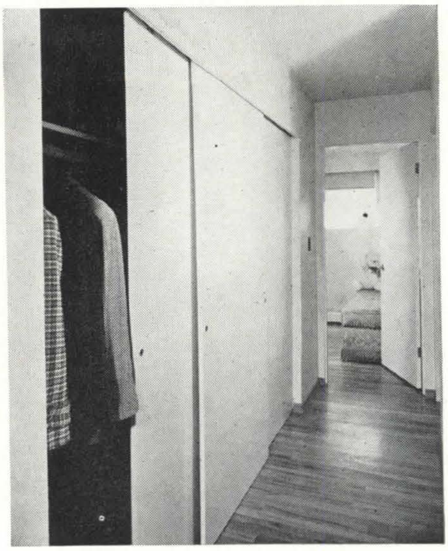


The kitchen-dining unit is typical for all twelve apartments. The kitchen area itself is shielded from the living space by a wing partition.

Photos: Dearborn-Massar

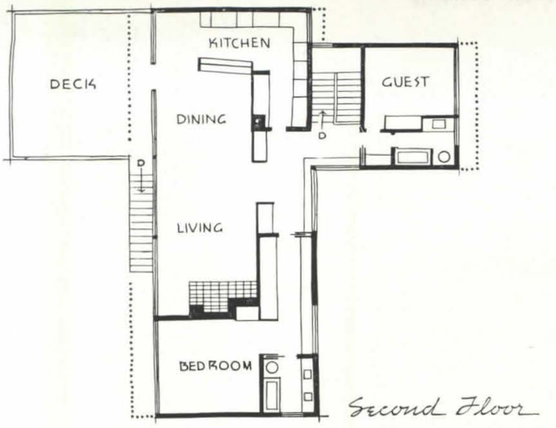
Each apartment has a private, outdoor sitting area reached by a door between the view window of the living room and the dining corner (right and below), *not unlike the planning of the 1890 apartment shown on p. 72. Downstairs, these are small terraces; upstairs, porches, with wire-mesh handrails.*

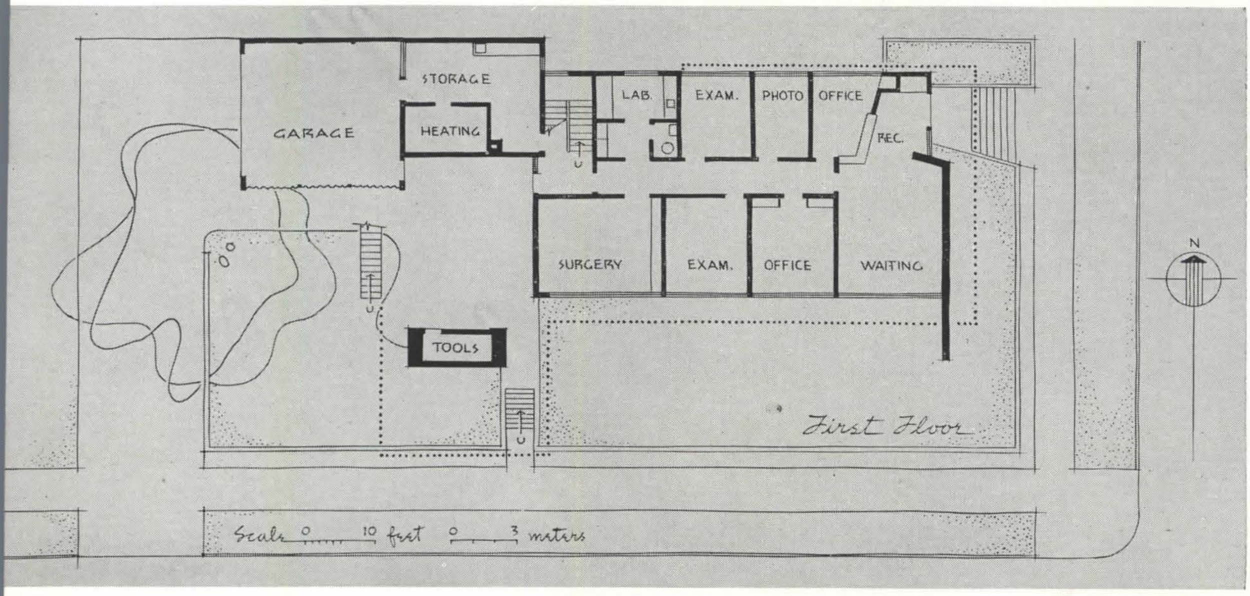
In the upstairs apartments, the corridor leading back to the two bedrooms (right) *is bordered by storage closets, with sliding doors. A small basement occurs beneath the eastern third of the structure and contains the boiler room, a laundry, and a tenant storage room.*



clinic-residence

location	Seattle, Washington
architects	James J. Chiarelli and Paul H. Kirk
structural engineers	Stevenson & Rubens
mechanical engineer	C. A. Pangborn
general contractor	Olav Boen





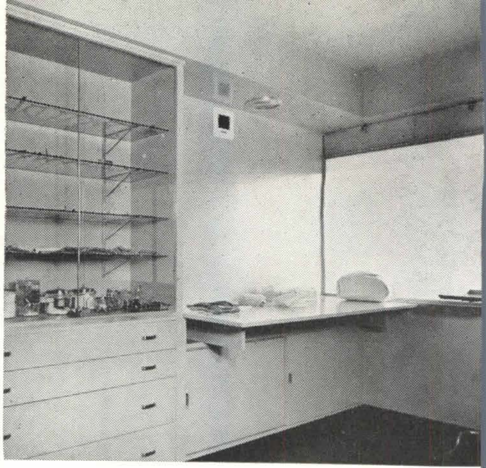
This clinic-residence rejects any stylized form and exemplifies the dynamic energy of the Northwest. Seattle, once a stronghold of a Gothic-Revival tradition, arose as one of 16 Pacific Coast mill towns. When prestige demanded an elaborately rococo mansion, the only limitations were those of degree. But in the shadows of a style replete with historic association, Architects Chiarelli and Kirk here archieved a significant, yet unpretentious, treatment of two functions— a plastic surgery clinic and an apartment. Their fundamental problem was "... to divorce the apartment from the clinic in perspective and orientation." The clients' comment that in "... walking upstairs, the clinic and its problems are left behind," is evidence of successful handling.

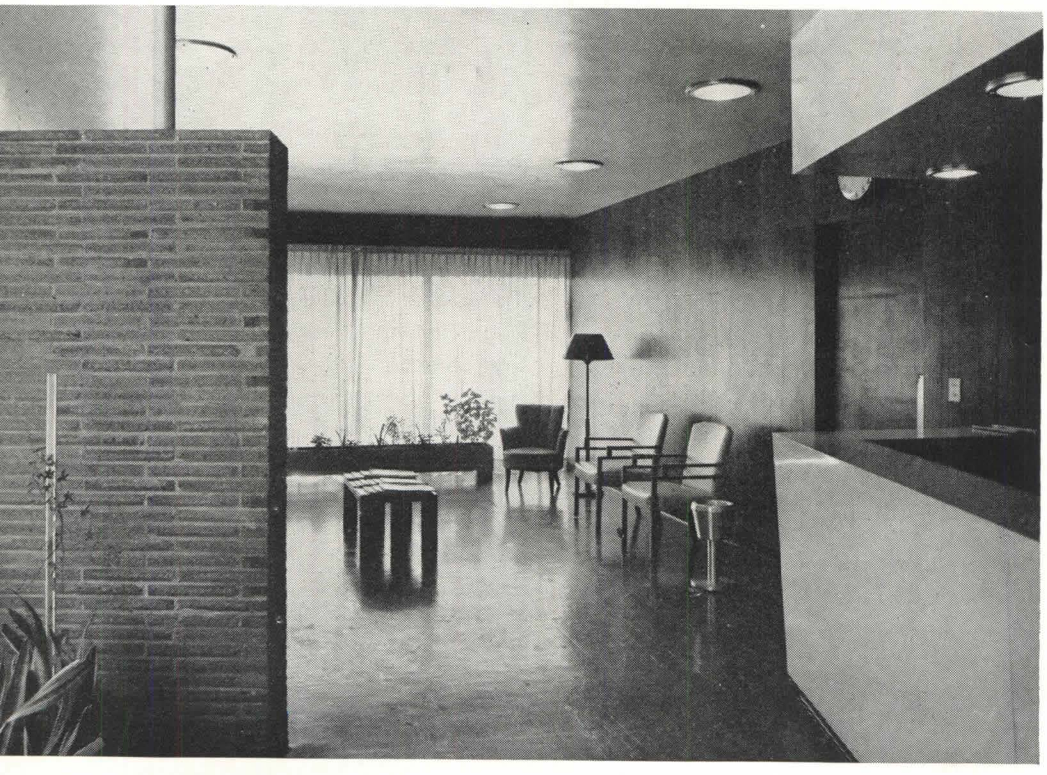
When the Great Fire of 1889 destroyed the wharves and commercial districts of the city, the use of wood was immediately restricted. Despite dictates of style then, fire (and sometimes earthquakes) initiated new structural thinking.

Cantilevered on two steel girders, the apartment commands a view of metropolitan Seattle and the Olympic Peninsula. On the open west, elevation, three-inch aluminum columns are the structural supports for the composition roof. These members, whose strength had to be proved to skeptical building authorities, are counterposed against pink Roman brick and white stucco, accenting texture and color contrasts.

Below, the clinic, absorbing the sunlight from the south, looks in the direction of the County Hospital. It rests on a concrete slab, and heating coils are used in the floors and ceiling, with wool-type bats to insulate walls throughout. "Were it to be redone," say the architects, "the ideal system for the comfort of the nurses would be radiant ceilings with conditioned air." And within, African mahogany plywood for the paneling and cabinetwork blends into the richly-muted harmony of beige and off-white wall colors. Easily maintained surfaces of parquet and rubber-tile floors, painted-plaster walls and ceilings, aluminum hardware, and recessed incandescent fixtures evidence the apparent simplicity of living and absence of display. The design of the clinic-residence seems to reflect the unique patterns of contemporary life in the Northwest.

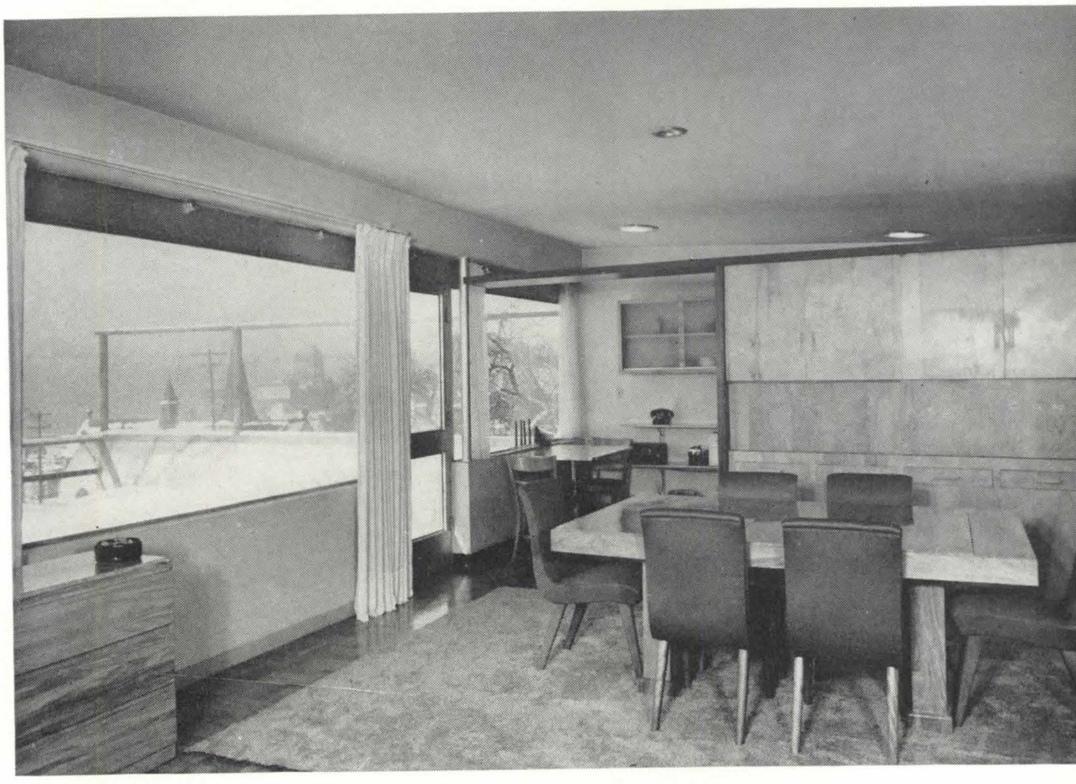
northwest architecture: clinic-residence

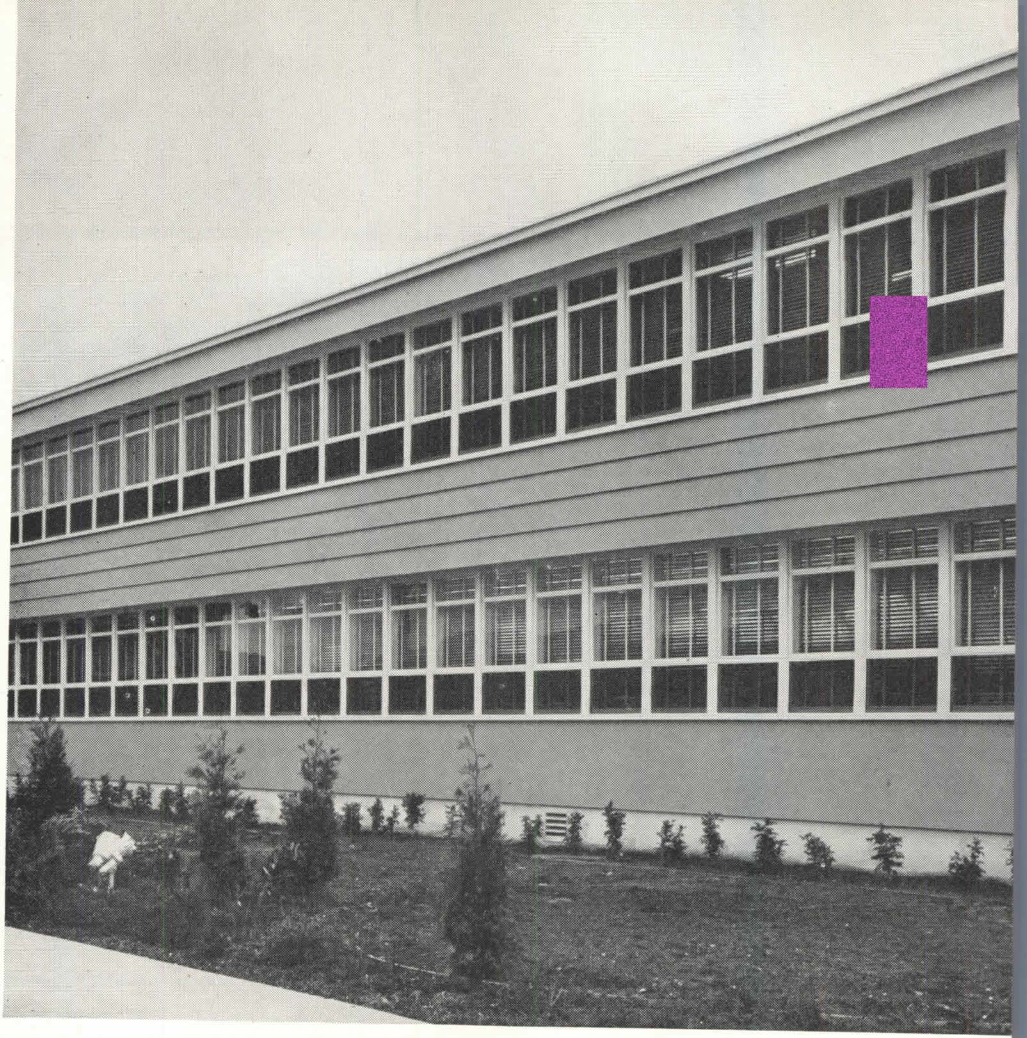




Entering patients pass reception area to waiting room finished in African mahogany veneer and Roman brick (left). *High level of light is maintained in the surgery by neutral shades of beige and off-white combined with recessed, incandescent aluminum fixtures* (above).
Photos: Dearborn-Massar

Second-floor apartment and small terrace overlook metropolitan Seattle and Puget Sound (right and below). *The three-inch aluminum columns of the window wall are capable of carrying more than four times maximum roof load imposed.*

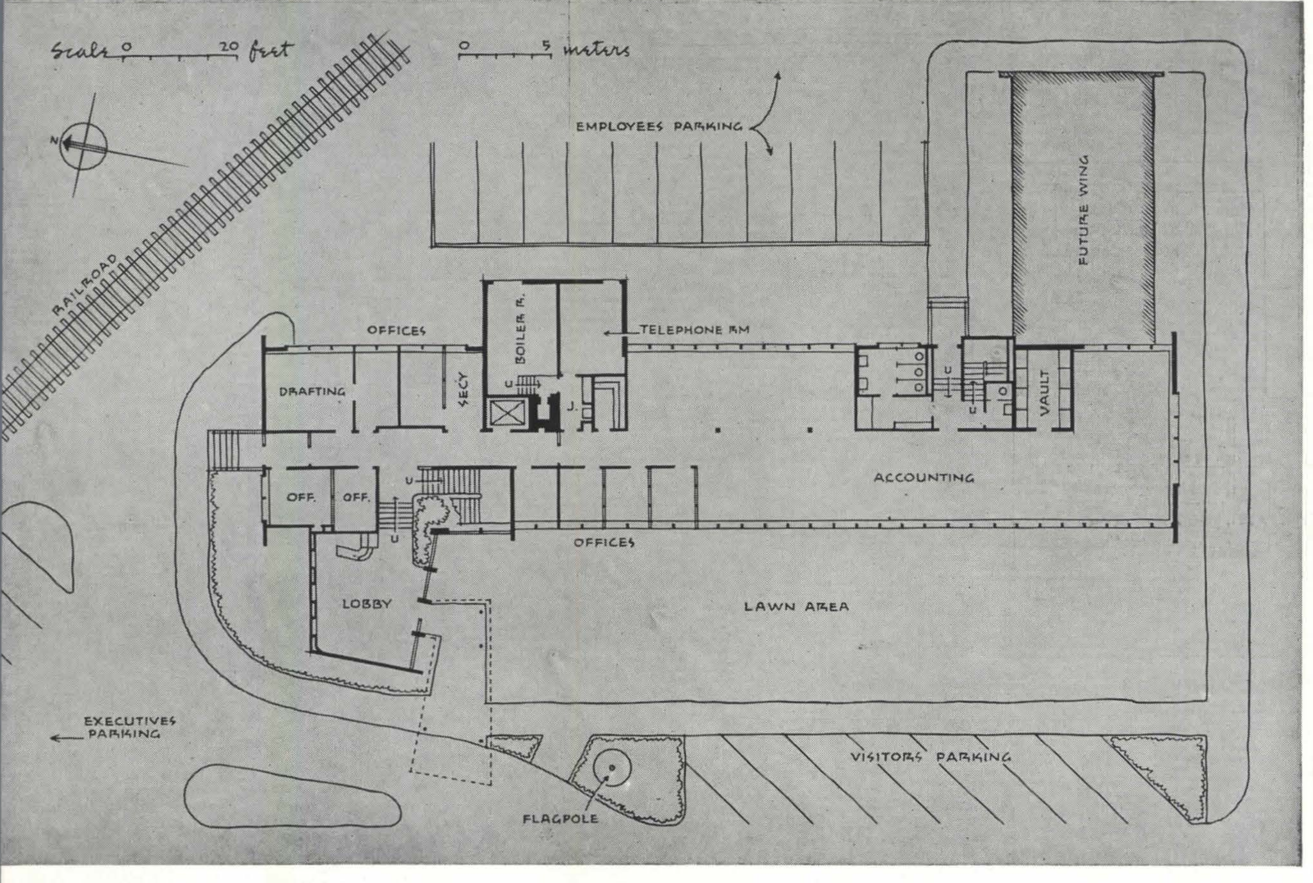




office

building

location	Olympia, Washington
architects	Naramore, Bain, Brady & Johanson
associate architect	A. E. Hennessy
supervising architects	Wohleb & Wohleb
structural engineer	George Runciman
mechanical engineer	Richard Stern
landscape architect	Beverly Travis
electrical engineer	Roberta A. Wightman
interior furnishings	Bon Marche Contract Division
general contractor	Cawdrey & Vemo



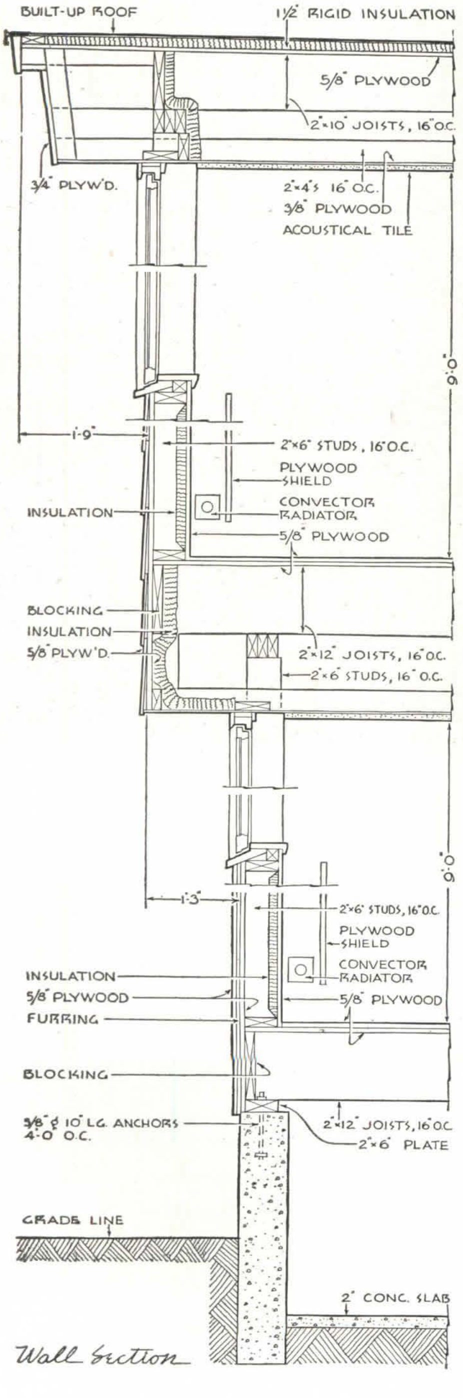
Using 120,000 square feet of plywood and 25 different interior wood finishes, this office building's primary emphasis in design was to exhibit the many and varied applications of plywood and lumber. Developed as an administrative supplement to the company, it houses the West Coast operations for a nationwide distributor. In a state in which lumbering is the principal industry, the architects felt it appropriate to employ the owner's product to best advantage.

Since shipments are made by water, sawmills stand at the more accessible ports. This site is on waterfront fill, surrounded by company oil tanks, warehouses, and railroad spurs. The site is large enough to set the building back for approaches and landscaping; the architects considered a north-south orientation best for ideal illumination and for the future planning of an east wing. On the north, visitors, executives, and employes all enter through the display-reception area. Architects considered its placement "... to get a better perspective of the building and to permit the use of wood and the modular structure to be fully viewed." The four-foot module, by nature of its uniformity, permits application to any office arrangement and future expansion, still expressive of the office machines.

Since the owner's yard furnished all the structural framing material, this meant not only a large selection but also perfect stock with which to work.

Structurally, the framing of wood posts and beams is conventional. Emphasis was given to structural details planned to counteract effects of local seismic shock; double layers of 5/8" plywood were first glued together, then glued to the joists of the first and second floors. Familiar design details utilize plywood in every possible way. (See also the article on p. 94.) Everywhere, from soffits, finishes, and cabinetwork, to doors, desks, and wastebaskets, standard practice applications of plywood may be seen.

Exterior frame walls, sheathed in plywood with aluminum foil-blanket insulation, are finished in plastic-faced painted plywood. Interior partitions are stud, with soft and hard plywoods and paneling of western woods applied to them. Corridor walls use 1/2" plasterboard behind plywood; the space between is filled with a wool-type insulation. Interior millwork is of solid birch, except that rooms paneled in hardwood have matching doors and trim. The roof includes 1-1/2" glass fiber over 5/8" sheathing, all covered with composition roofing. Acoustically treated ceilings use perforated tile mounted on



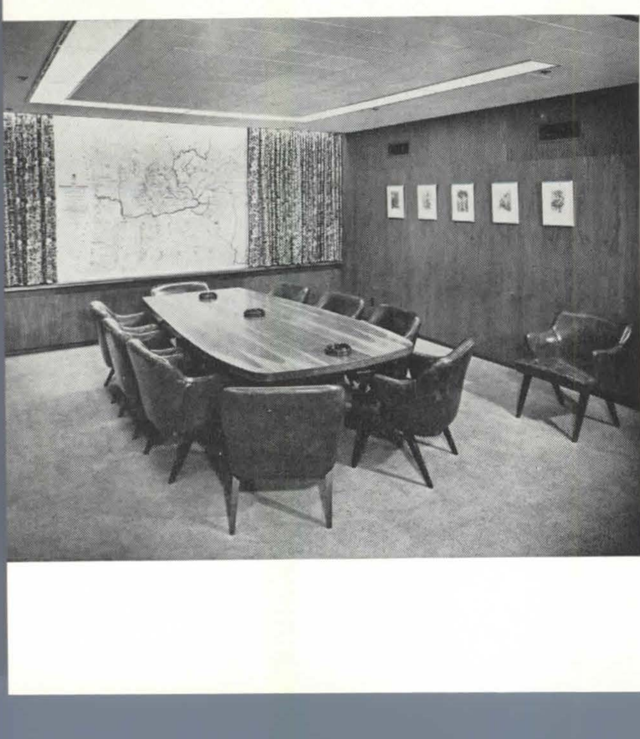
Wall Section

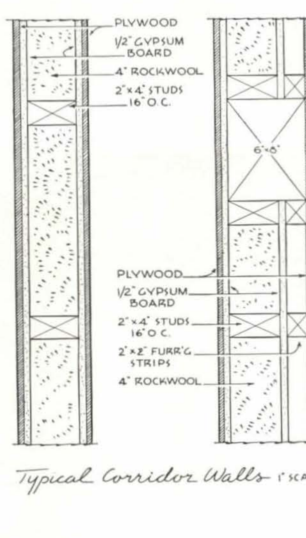
Interior garden and main lobby stairs are visible from beneath canopy of reception area (above). *West wall section* (left) *indicates multiple applications of lumber and plywood.* Photos: Richards

5/16" sheathing, and floors are surfaced with oak plank, asphalt and ceramic tiles.

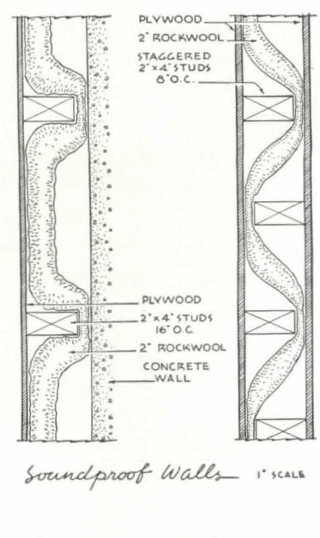
Plant steam is supplied to a heat exchanger, and hot water is then circulated through the building to convectors and finned-pipe radiators. The lobby and main stairhall are treated with heat-absorbent plate glass; all other windows are wood sash with double-strength panes. Recessed and surface-mounted fluorescent fixtures and exterior floodlights are some of the 30-odd lighting mechanisms chosen for specific functions in this office-exhibition building.

Looking along plywood-paneled, second-floor corridor (right). *All interior millwork of solid birch.* (Typical wall sections at right, below.) *Close-up of Northwest Room, for company conferences, shows oldtime map of the region. Room adjoins the office of the senior vice president, and is separated from it by a folding plastic partition* (below).





Typical Corridor Walls 1" SCALE



Soundproof Walls 1" SCALE

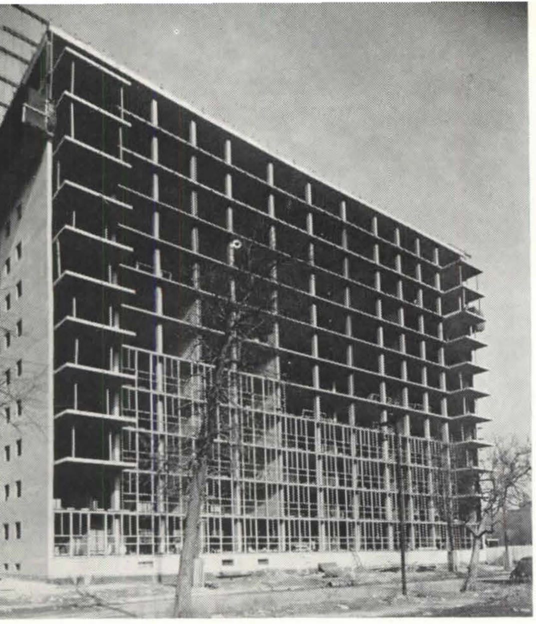
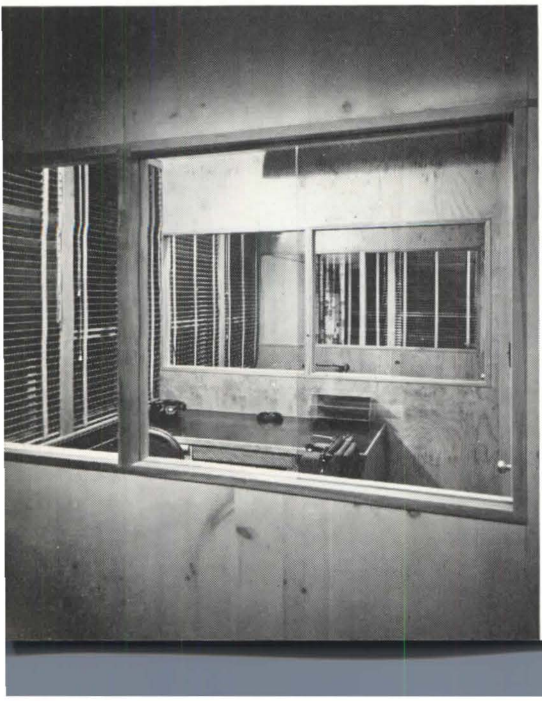


Figure 1—in the construction of this apartment building, plastic-faced plywood forms for concrete not only allowed greater reuse of the forms but also produced smoother concrete surfaces.

Figure 2—partitions between the lumber buyers' offices in the Georgia-Pacific Plywood Office Building are surfaced with plywood panels, to which thin veneers of knotty pine and birch have been applied. Even when more unusual veneers are specified (aspen, avodire, ebony, holly, koa, lauan, etc.), these panels can be afforded by those with relatively modest building budgets.



plywood: recent developments

Plywood did not really gain wide acceptance as a building material until the hard-usage requirements of World War II demanded intrinsic improvements in this product that eventually raised its acceptance to unprecedented heights.

As everyone knows, a plywood panel consists of an uneven number of wood veneers with the grains crossed alternately—face veneers always running parallel with the length of the panel. Because of this type of lamination, the excess long-grain strength is transferred to the weaker cross-grain dimension, thereby developing an extremely high-strength-weight ratio when compared with ordinary wood. Also, because of the cross bonding of alternate plys of wood, plywood is a dimensionally stable material. Changes in moisture content affect plywood dimensions far less than wood itself and far less than many other materials. It is impossible to split plywood panels and nailing can be very near the edges. As it is usually cut in panels 4′ x 8′, erection is rapid and of low cost when compared with conventional wood construction.

In its early history, plywood was manufactured with vegetable, blood, albumin, starch, and other weak-type adhesives. During World War II and since, notable improvements in glues and manufacturing techniques have resulted in more durable panel materials. Thus, even interior-type panels, intended for inside structural applications, will resist occasional wetting—that may be encountered on roof decking or subflooring during construction, for example—even though the glues for interior types are not waterproof. The use of phenol-formaldehyde, resorcinol, melamines, and melamin-urea adhesives for exterior-type panels made in hot presses, produces a product that cannot be delaminated under any conditions.

For use as siding, wall sheathing, roof

* *Plastics Engineer, Georgia-Pacific Plywood Company*

by William A. Merigold*

sheathing, and subflooring, the FHA has set up permissible standards for stud, stringer, and rafter spacing for various thicknesses of plywood panels. These have permitted contractors greater freedom in the use of plywood and have produced large savings over the use of lumber and boards for the same purpose.

Rigid performance requirements have characterized the manufacture of fir plywood along the West Coast. These firms producing hardwood-faced plywood follow similar quality standards in producing panels faced with the southern woods, i.e. tupelo, gum, poplar, and others. Although these are equally allowable in the construction field, they are more often used in the furniture industry.

plastic-faced plywood

Born of necessity, this product represents one of the outstanding modern improvements in upgrading plywood to a new place of usefulness. Early in the war, the services had immediate need for tens of thousands of helmet liners. These were made of phenolic-impregnated canvas blanks, which were die cut to form the shape of the helmets and then baked over a form. Millions of pounds of left-over impregnated scrap were left, to be turned into a fortune if a use could be found for the scrap. One of the large paper manufacturers directed its entire research department to the solution of this problem. After a year, the researchers had developed a resin-impregnated fiber sheet which could be molded under heat and pressure. Two plywood manufacturers on the West Coast were persuaded to try its application on plywood and after a short period of acquiring the know-how, plastic-faced plywood was born.

Plywood surfaced with this material proved to be resistant not only to all kinds of weather but also to water absorption, abrasion, fungi, molds, alcohols, hydrocarbons, acids, and organic solvents. This development brought plywood to a new place of usefulness. Realizing its value, the services used millions of square feet of plastic-faced plywood for countless field-service items. After the war, when helmet-liner scrap was no longer available, impregnated-cellulose fiber was substituted, along with other improvements, to make this material even more valuable. It is used for plastic-faced concrete forms, where it has increased the reuse of forms and produced smoother surfaces (*Figure 1*); for exterior walls on houses and industrial buildings, as well as for paneling in dwellings, blinds, shutters, flush doors, kitchen cabinets; and many other interior and exterior uses. It saves the cost of painting and presents a smooth, hard, dense, amber-colored surface that refuses to wear out.

plastic-surfaced plywood for painting

Realizing that most plywood expands and contracts slightly with the weather and needs frequent painting, its manufacturers developed another type of plastic-faced fir plywood specially designed for any type of painting. This facing actually prevents cracking or checking on the surface, requires far less paint (due to the resin in the sheet), does not have to be painted as often, and is engineered for years of service. Its uses include outside siding, either large panels or lapped siding *(see Georgia-Pacific Plywood Office Building, page 90)*, and any type of interior fixture that requires painting. The plastic face of one brand contains latex, which is believed to give it superior quality. This material can be sawed, milled, or drilled without chipping the edges.

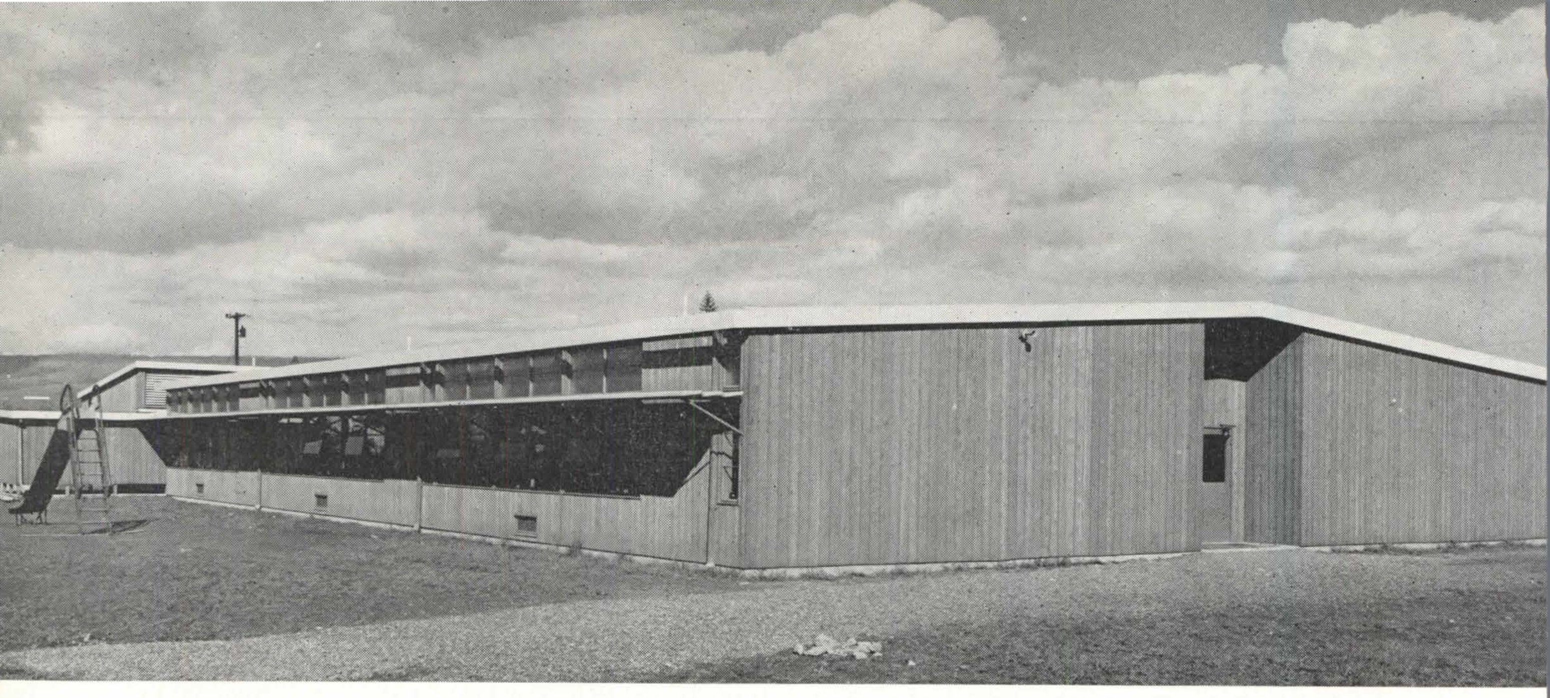
sculptured or brushed plywoods

Recently, many designers have preferred interiors with wood-paneled walls — as abundant evidence in the housing field shows. To satisfy this design requirement, real-wood textures on plywood (that would have been thought scarcely possible a few years ago) have been developed. One type is a striated panel on which vertical uneven lines are carved out by machine; another type has a design impressed on its face by means of an embossed platen; some panels have a pattern created by brushing out the soft wood with wire brushes—giving the hard wood a raised appearance; still others are of upland Western hemlock, with its swirls, burls, and tight knots brushed out to create the desired effect. Practically all use a two-tone finish. After a base coat of one color has been brushed on and dried, a second color is applied and immediately wiped, leaving only the higher grain in the original color. Many large housing developments have used these panels for entire rooms or single walls.

"fancy-faced" plywood panels

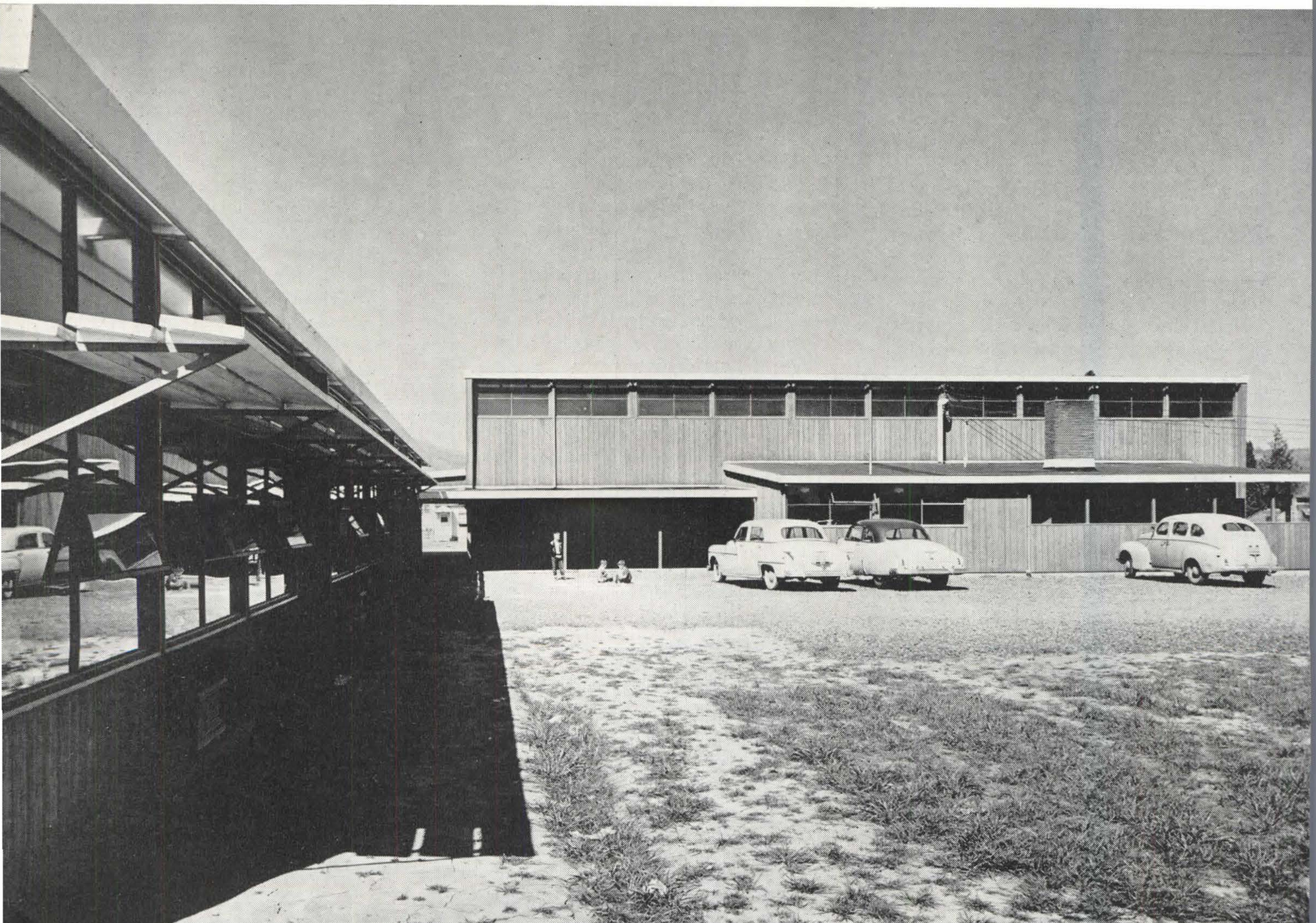
These panels may have either hardwood or fir plywood as a base. To the base, however, are applied very thin veneers of unusual woods, ranging from 1/28" to 1/80" in thickness *(Figure 2)*. Available veneers are amaranth, aspen, avodire, ebony, elm, holly, koa, lacewood, lauan, myrtle, oak (plain or combed), English oak, pollard oak, okume, pearwood, primavera, redwood, burl, rosewood, teak, tigerwood, tulipwood, walnut (American and Circassian), mahogany, and zebrawood. Plywood panels of ¼" to 5/16" thickness, with faces of any of the above woods, can be afforded by people building in the $10,000 to $15,000 home class. These owners can have just as fine a finish as if they had bought the old solid-wood type. No longer need these woods be used in solid panels so that they are only within the reach of those building $30,000 to $100,000 houses.

Most woods of this type can be had in the following grain patterns: plain, ribbon stripe, broken stripe, mottle, fiddleback, curly, birds eye, quilted, combed, quartered, rotary, burled, crotch, and many others.



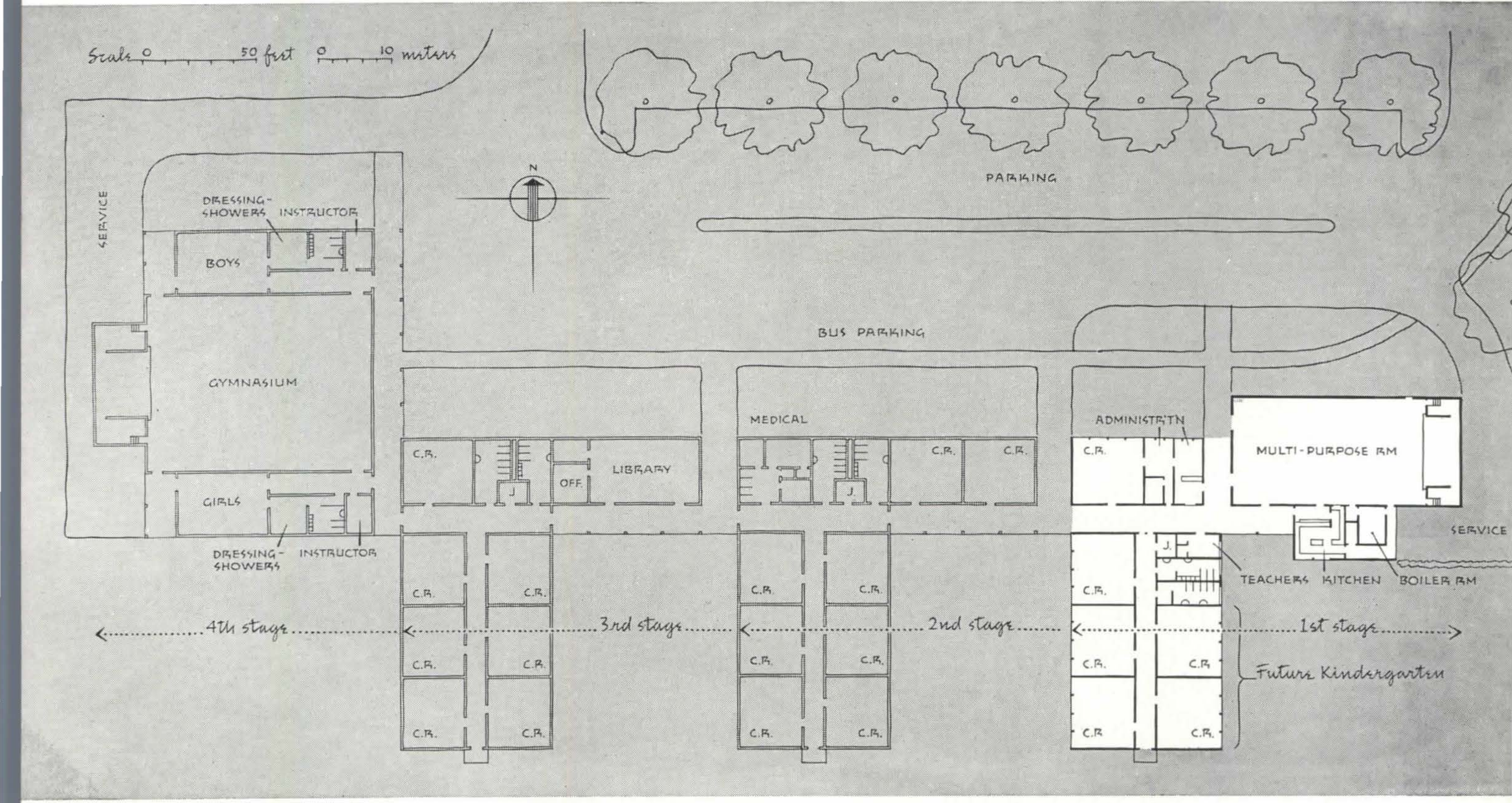
elementary school

location	Sheridan, Oregon
architects	Wilmsen & Endicott
engineers	Myers & White
general contractor	Foothills Construction Company



When the new wings are built, the classroom that appears in plan beside the administration offices will become additional office space; and the two classrooms east of the corridor will constitute the kindergarten.

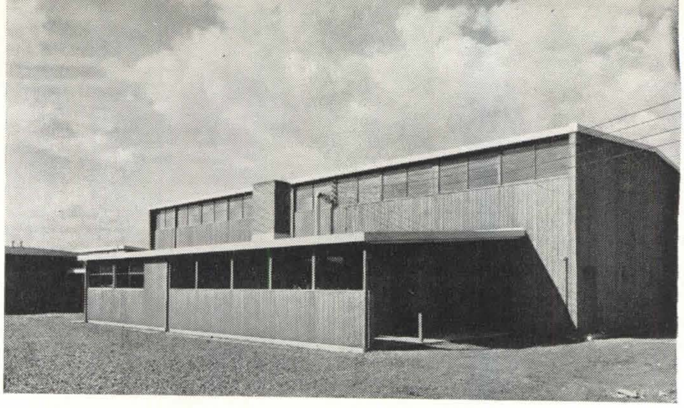
Photos: Ackroyd Photography, Inc.
Carroll C. Calkins



In the master plan, in the plan of the initial unit, in the materials used, and in finished design expression—this elementary school seems particularly appropriate to the Northwest, and especially to the Oregon coastal valley in Yamhill County where it is located. Not unusual in this area is a six-month period of winter rain, and there is a year-round prevailing wind that comes off the ocean and down the Coast Range from the west. In the master plan of the eventual school (18 classrooms accommodating 450 children from first to eighth grades), the classroom wings are aligned on a north-south axis and serve as shields for the courts. Even in the initial unit, a wing-wall is included to shelter the open corridor from the west. In the materials used—fir frame, exterior walls of cedar boarding, and interior finishes of plywood—one finds a roster of the area's prime local products. And in finished design, the completely unaffected handling echoes the straightforward work of the early tradition. All roofs slope—a proven device for carrying off abundant rain water.

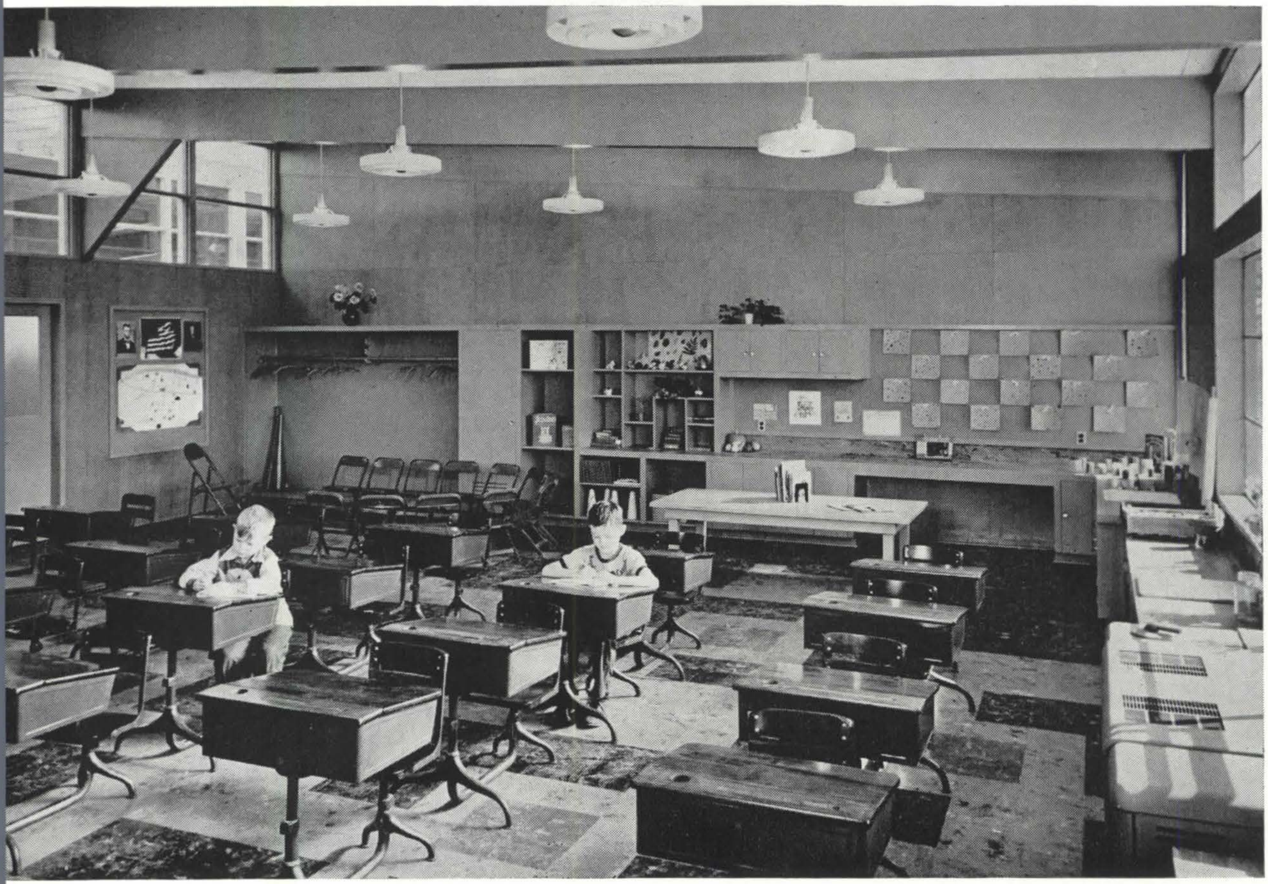
The first unit includes a multi-purpose room; a double-loaded classroom wing,

Looking along the east wall of the classroom wing toward the multi-purpose unit (acrosspage), *the three-part window detail is apparent—clear glass at the bottom; louvered outlooker; and obscured-glass top panel.*



The multi-purpose building (left and above) *has a low wing on the south containing service rooms, cafeteria kitchen, and boiler room.*

Exposed frame under the continuous corridor skylight (below) *forms a dramatic pattern as well as helping to diffuse the light.*

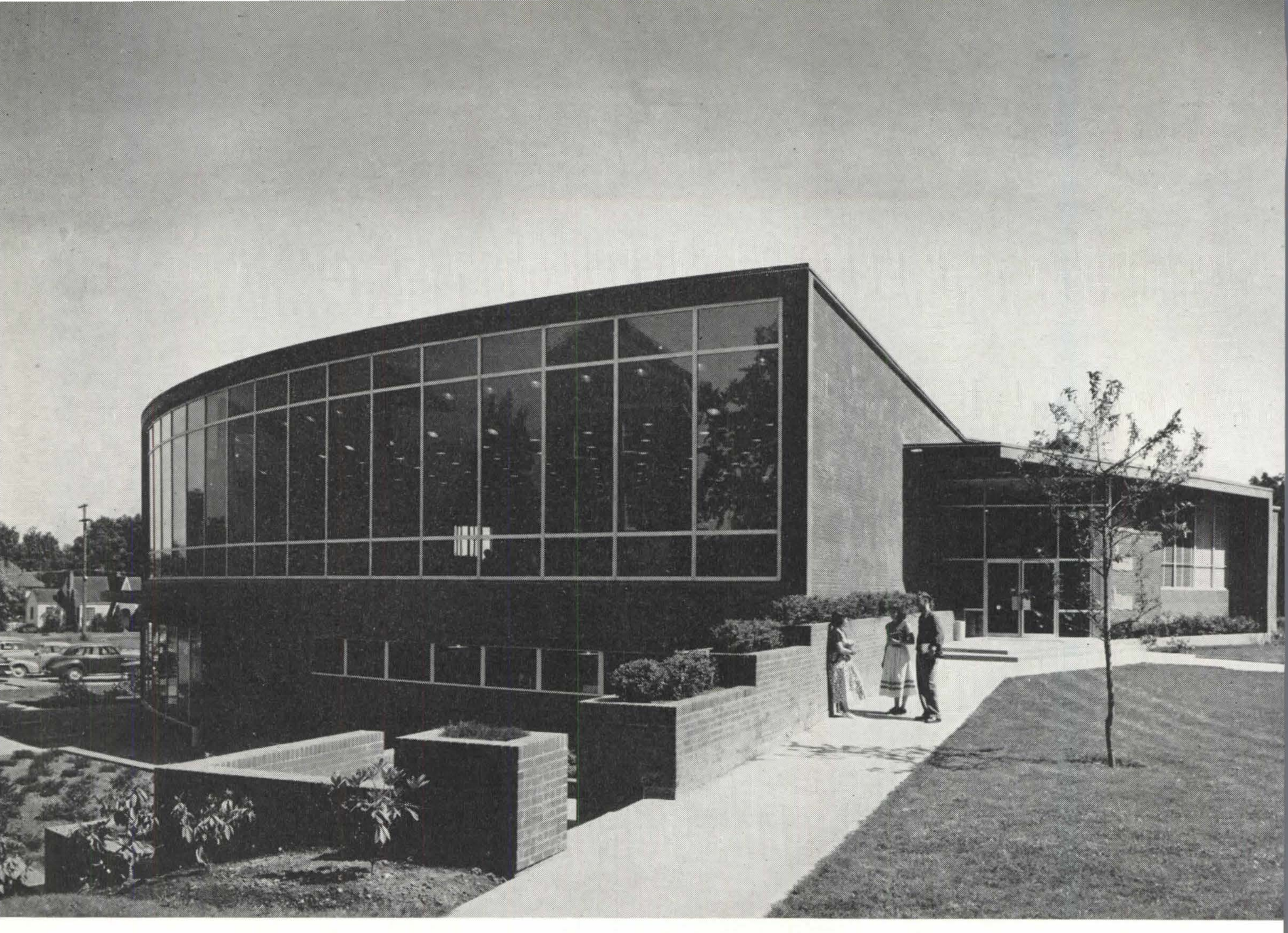


The window band along the top of the corridor wall of the typical classroom borrows light from the ridge skylight. Artificial lighting is incandescent throughout, with concentric-ring fixtures used in the classrooms.

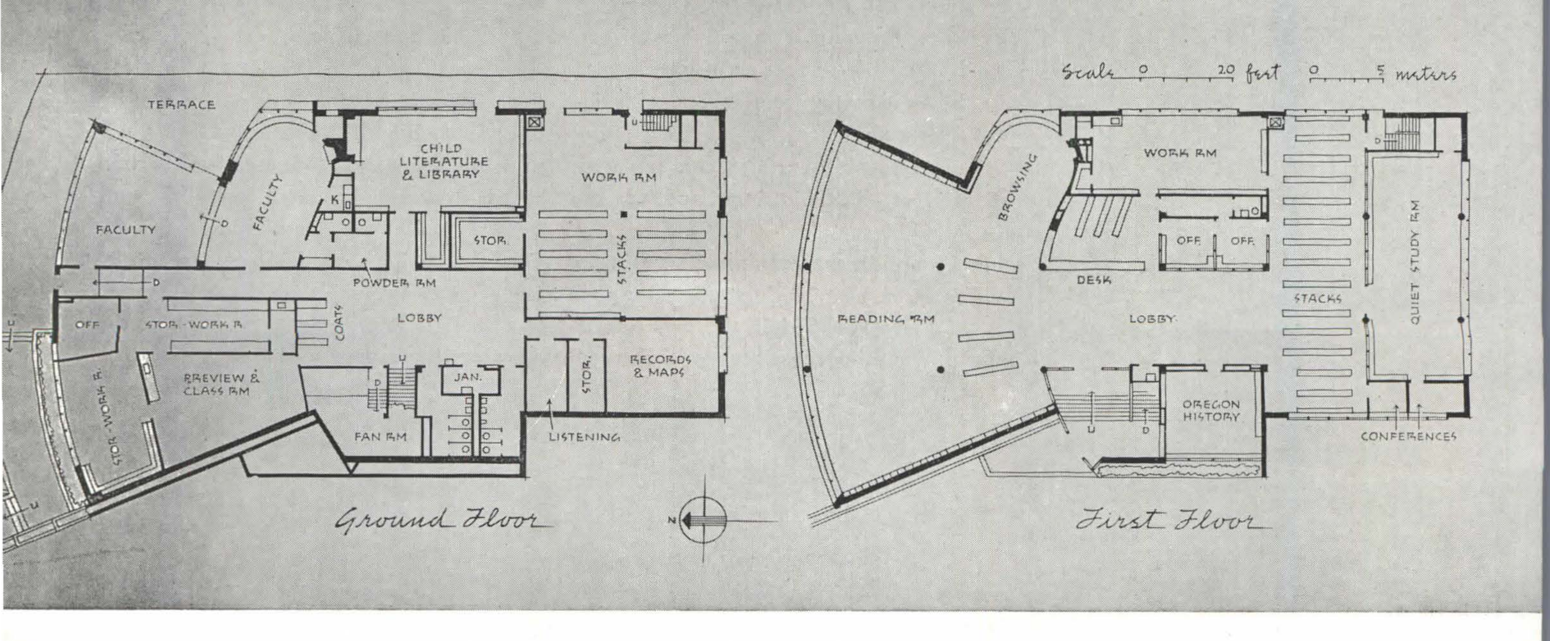
with rooms oriented east and west; an open access corridor; and, on the north side, a unit of accessory rooms. In the future additions, toilets will occur in the north unit, allowing six classrooms in each north-south wing. Classrooms receive bilateral lighting through corridor-wall clerestories that are lighted from a continuous, aluminum-framed skylight in the roof ridge. To break the direct sun angle and cope with sky glare, the east and west windows of the rooms have a lower portion of clear glass, shielded by structural outlookers, with obscured glass above.

The present multi-purpose room serves as cafeteria, small auditorium, and an enclosed and heated play shed. When used by adult groups in the evenings, there is no need to enter, heat, or light any other portion of the school. After the big gym is built, this multi-purpose room will be used solely by primary grades.

Design throughout was based on rigid economy and was worked out on a 16-in. module, for stud spacing, for application of 48″ x 96″ wood-fiber-base ceiling board, and for the 96″ pre-glazed steel sash. The ceiling board is applied to 6″ x 18″ girders on 2″ x 4″ stripping, providing an air space for electrical conduit. The concrete-slab floors have an asphalt-tile finish. Counters throughout are surfaced with vinyl-plastic sheeting. The roof is insulated with glass-fiber rigid insulation and surfaced with built-up roofing. The heating system is low-pressure steam, with oil-fired boiler; unit ventilators occur in classrooms, while unit heaters serve the multi-purpose room. Construction cost, exclusive of architects' fee, land cost, or cost of classroom furniture, came to $6.42 per sq ft (counting the open corridor space as half).



college library

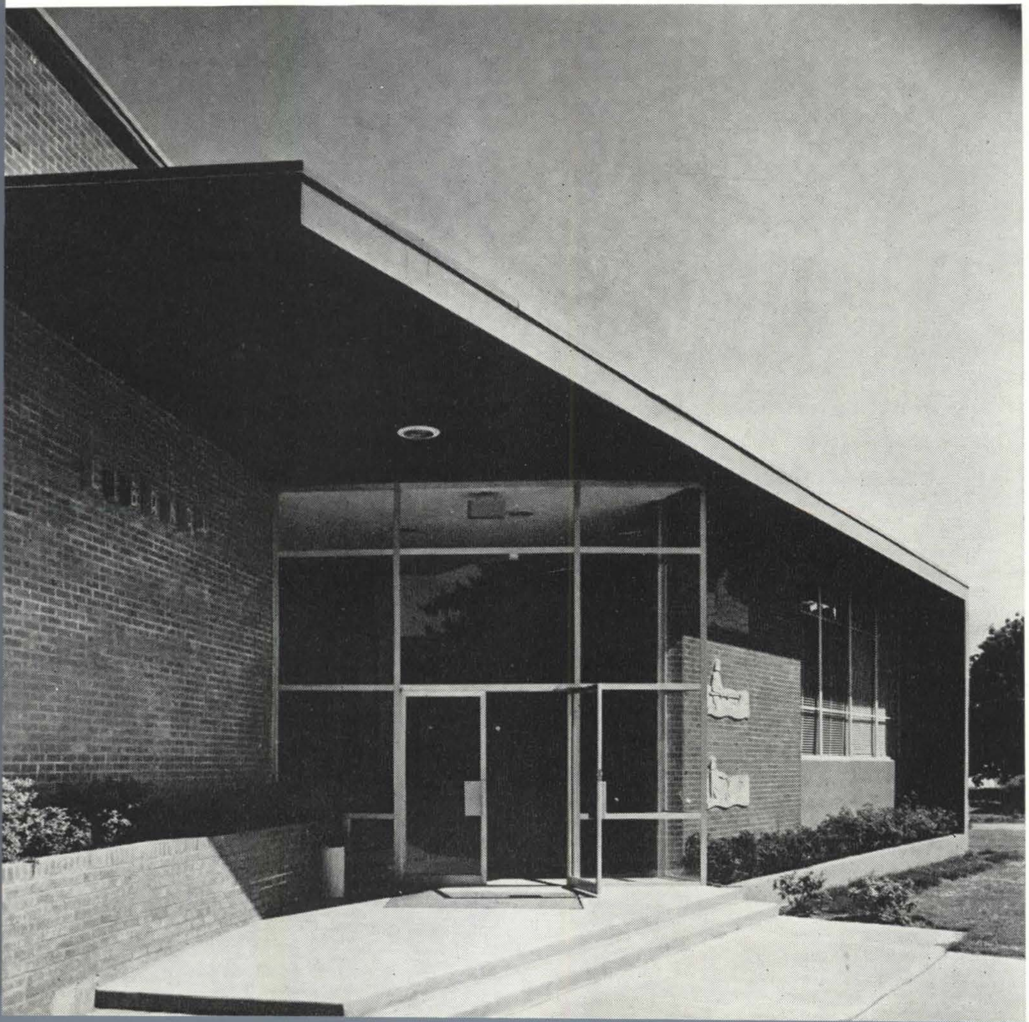


location	Monmouth, Oregon
architects	Wolff & Phillips
structural engineer	Leslie E. Poole
mechanical engineer	W. Bruce Morrison
electrical engineer	Geo. Pettingell, Grant Kelley & Co.
landscape architect	David E. Thompson
general contractor	E. E. Batterman

Regarded by the townfolk as "a notable departure," this library for the State Teachers College breaks the precedent of an existing traditional style on the campus. By its extraordinary expanse of glass, the main reading room (oriented north) enjoys ideal lighting. Yet, harmonizing with other campus buildings in material and scale, the building with its great curved glass wall and sculptural massing of the elements does not seem obtrusive. Even the sloping site proved well suited for the specific needs of the library (going from eight feet below the curb to a point level with it).

Of three schemes evolved, the one selected realizes the desired traffic control. Diverse activities within the building required that major emphasis be placed upon the reading room, stacks, offices, book-film-review, and classrooms. Particular attention had to be paid to a limited number of attendants needed for control. In the design, one person may simultaneously observe the entire reading room, stacks, and entrance from within the office. This grouping permitted the solution of several problems. Only half of the stacks were planned for the lower level, and a gallery-museum, a faculty terrace, and quiet-study area were included.

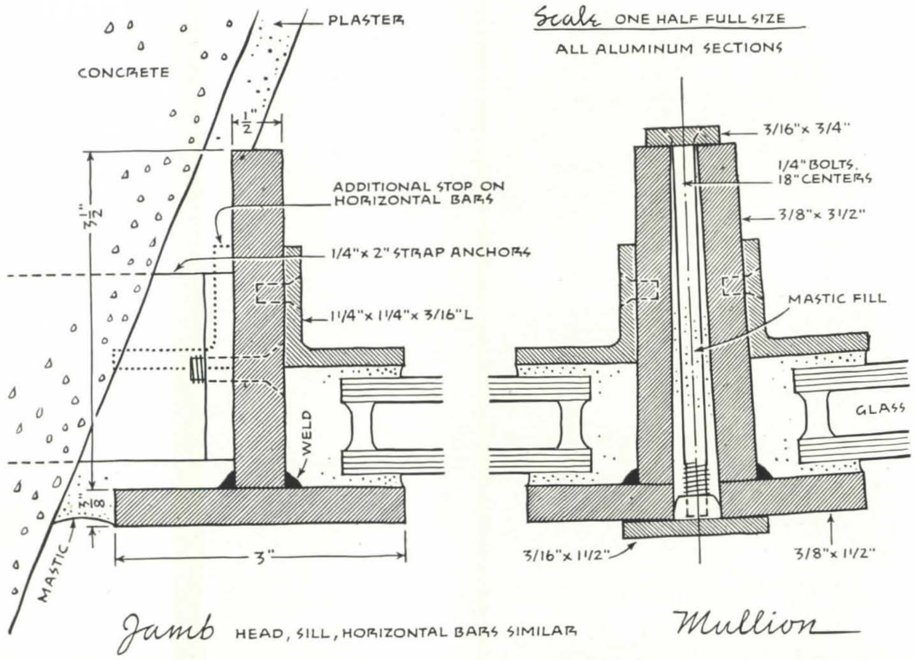
The architects surmise that enthusiastic public acceptance of the library stems from the quasi-monumental massing of brick and glass—suggesting to many the nostalgia of surrounding older halls.



Entrance, reading room, and stacks all may be controlled by one person from main desk and offices (right). *By placing half of the book storage below, space was made available for a quiet study on the main floor, adjacent to stacks* (below). Photos: Carroll C. Calkins

Due to the difficulty of obtaining high-priority steel for long spans, the roof, walls, and floors are of reinforced concrete. Since expansion was not an immediate consideration, the system could be used freely and give continuity to the structure. Brick with cast-stone trim was used for the uniform exterior treatment. A color scheme of deep plum shades and forest greens was chosen by faculty members, feeling that . . . "deep tones brightened rather than dulled," the lighting effect; harmonizing rubber and asphalt-tile floor colors then were selected.

Ceilings are light colored, treating the problem of noise by perforated acoustic tile throughout, except for the use of acoustic plaster in the main reading room. Interior partitions are of plaster-covered gypsum block, of steel, and of fabric applied to accordian-type folding units. Window sash are aluminum and employ double-insulated glazing; incandescent fixtures, designed to supplement natural light, are uniformly recessed. Completely air-conditioned and insulated by wool-type bats, the building is heated by a low-pressure steam system having strip convectors and transfer units.



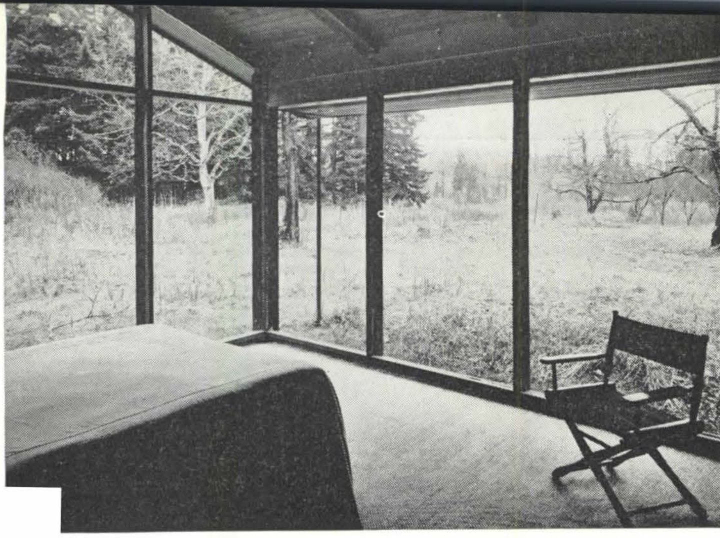
Reinforced-concrete columns support the cantilevered roof slab. Continuous aluminum frame with double-insulated glazing provides ideal light for main reading room overlooking campus.

house

location	Salem, Oregon
designer	W. F. Severin
general contractor	James Minty

This disarming little house was planned as the first of two houses, with the idea that when the new unit became the parents' home, the house shown here would be used by their children. Built on an 80-acre Willamette Valley property that has been in the owner's early-settler family for 100 years, it makes direct use of local materials, as the pioneer work did, and has a simplicity and honesty that have nothing to do with ostentation.

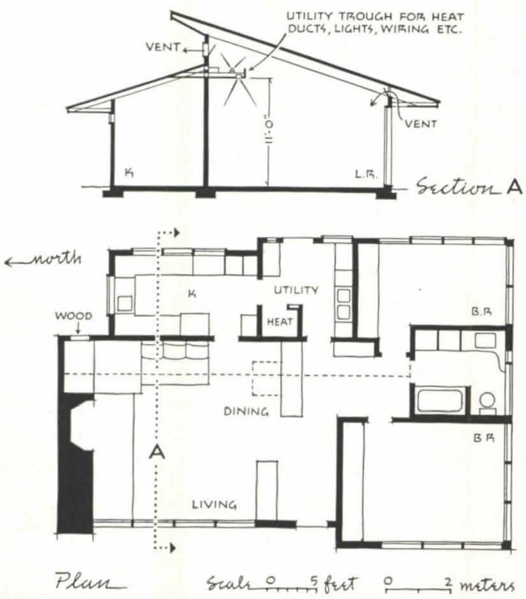
Entirely of dry construction—hemlock and cedar boards throughout—the structural system is organized on a 4-ft. module. All lights and vents are set into frames that are load-bearing, part of the working structure rather than applied. According to the designer, these frames gave him complete design freedom in both horizontal and vertical directions. The introduction of light through a ridge clerestory facing east was "a means and not a cliche," the designer explains. A dense grove is just to the east of the house, and "without the use of this upper glazing, entrance of morning light would be delayed." In section, notice how the screened vents in the deep western overhang, in conjunction with in-opening vents on this wall and casement is along the clerestory, provide cross-ventilation.

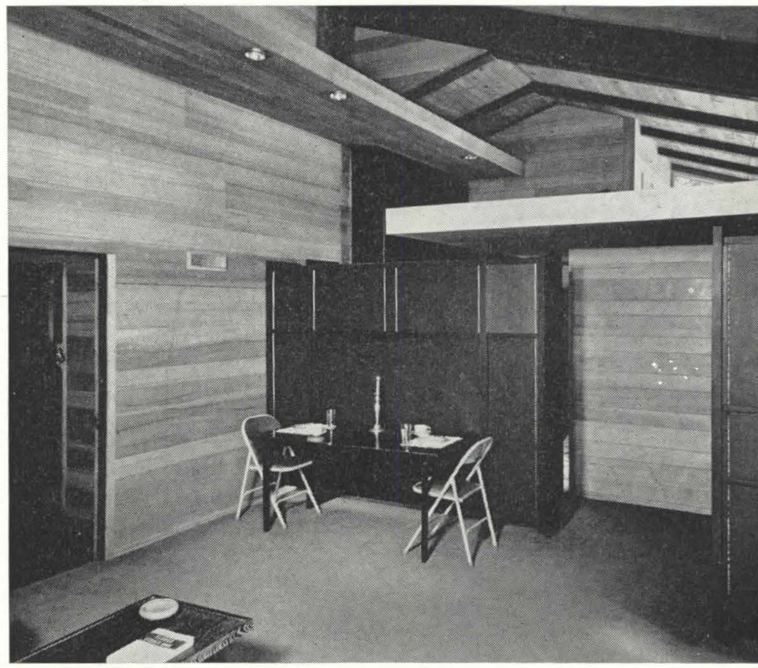


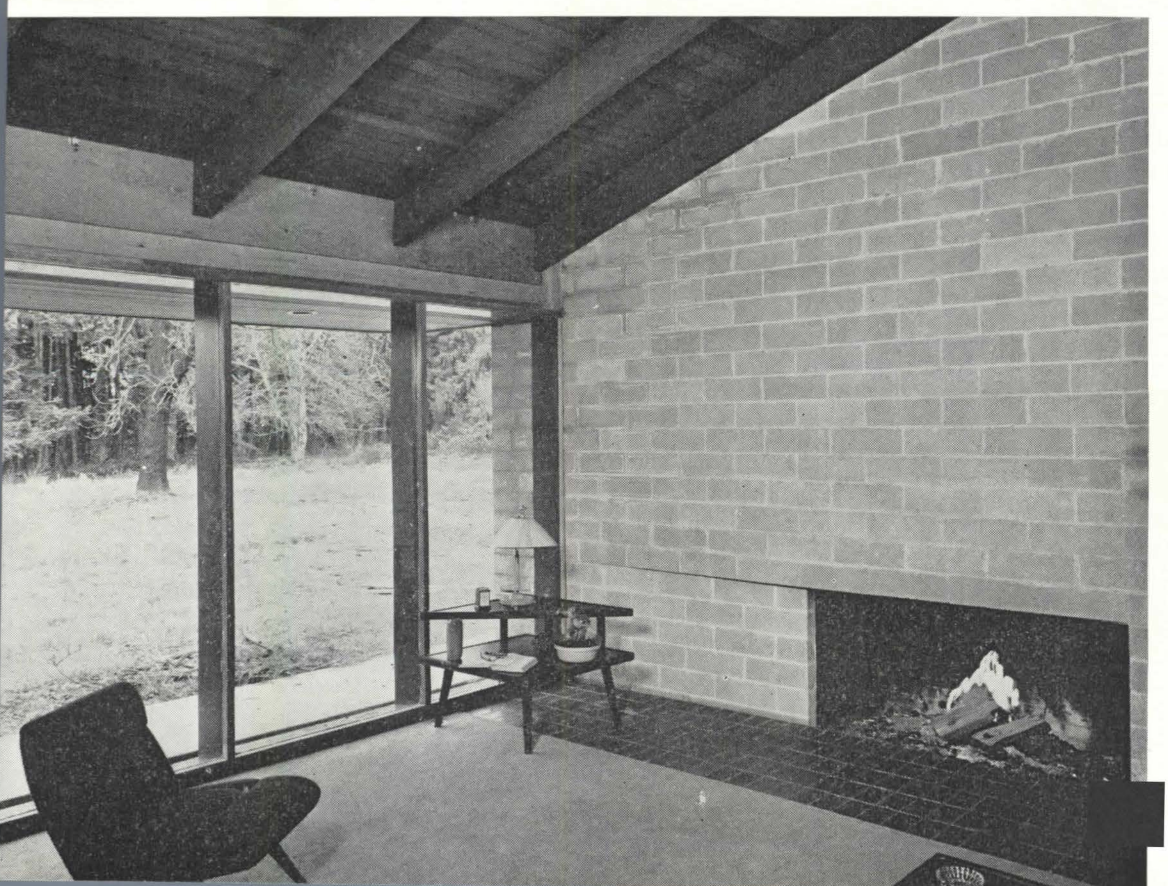
northwest architecture

To an exceptional degree, this house realized the concept of joining indoors and outdoors—an inviting possibility in this area, where the climate is gentle, and nature lavish. Since the site is both extensive and secluded, such extraordinary openness could be employed without sacrificing privacy.

Photos: Carroll C. Calkins







at last—A MAJOR ADVANCE IN GAS VENTING

by Alan Kinkead*

The venting of gas appliances finally has been placed on a sound scientific basis. The trial-and-error and rule-of-thumb concepts, the superstitious beliefs and conflicting regulations—all can be discarded in favor of a few fundamental principles and a logical set of rules. This development, of vast importance to the gas industry and the heating business, is the result of extensive engineering research.[1] The effect of this work will, in time, bring about standardization of code regulation, simplify the work of installers, and strengthen the competitive position of gas appliances in the home-heating market.

In the early days of gas heating, "out of sight" was "out of mind' with respect to the invisible products of combustion of gas-burning equipment. Many appliances were installed in the belief that any type of passageway from the appliance to the outdoors was adequate. In time, of course, rusted or crumbling vent pipes, damaged walls, and discolored furnishings brought about the realization that gas venting was a more complex matter than building a chimney for a fireplace. Slowly and haltingly, the gas industry began to seek ways and means of overcoming the two major problems of gas venting: condensation and spillage. A pioneer in this early industry-wide effort was Frank Wills, whose calculations were the starting point of the current study and research.

The first orderly attempt to solve these problems was a purely theoretical approach based on the physical laws involved in venting. Unfortunately, this theoretical work was not subjected to experimental analysis; a few invalid assumptions were made, and incorrect conclusions resulted. Later, an attempt was made to solve the problem by *strictly* experimental means, without regard to the theoretical laws involved. This effort was also doomed to failure and resulted in certain erroneous beliefs that have plagued the industry ever since. Among the incorrect conclusions drawn from this work was the statement that the materials of vent construction have little effect on vent capacity—this despite the obvious fact that heat loss *must* have some bearing on the matter!

Engineering research, recently completed, correlates the underlying theory of venting with scientifically-controlled experimental work. The fundamental laws governing venting were determined, then experimental work was performed to verify these laws and to evaluate any unknowns involved. An extensive amount of research work still is being conducted on this subject, but the work which has been completed clearly establishes the basic principles and rules which apply. We now know precisely why and how a vent operates and can point the way toward the establishment of proper standards and improved practices for the venting of gas appliances.

The first step in this work was a study of the underlying factors involved in venting. From accepted physical laws we know that the weight of a gas varies inversely with its absolute temperature: the hotter the gas the lighter its weight per unit of volume. Vent gases flow through and up a vent because they are hotter—and hence lighter—than the ambient air. Furthermore, their rate of flow will vary directly with their temperature—the hotter they are in relation to the ambient air, the faster they will flow. Hence, it is obvious that the heat content of the *flue* gases, which are the products of combustion in the appliance *before* they enter the vent, represents the available power to operate the vent. It follows then that the first requirement of a vent is to conserve this available power and obtain its maximum utilization throughout the length of the vent—in other words, to keep the vent gases hot.

There are, however, other properties of a vent which influence the flow of gases and these must be evaluated if we are to complete our study of the underlying factors involved. We can assume from the laws governing the flow of fluids that the height (H) of a vent is one of the factors and that the area (A) will also influence the flow. We also know that, with a vent of given diameter and height, any change of resistance (R) of this vent will affect the flow. We then find that the important factors involved in the flow of gases through a vent are:

- B=heat content of the flue gases.
- b=heat loss through vent walls.
- A=area of the vent.
- H=height of vent.
- R=resistance of vent and draft hood.

The next step is to determine the relationship of these important factors and express this relationship in the form of an equation. From the fundamental law of gravity $V=\sqrt{2gh}$, it can be shown that the volume (Q) of gases flowing through a vent is directly dependent upon the area of the vent, the square root of the height divided by the square root of the resistance and a temperature term related to the temperature of the vent gases. Since the volume of a gas (at constant pressure) varies in proportion to its temperature, we can express the volume in terms of the heat content of the flue gases (B) and arrive[2] at the following simplified equation:

$$B=Ac\frac{\sqrt{H}}{\sqrt{R}}(Ta-k)+b$$

where:

- B=the heat content of the flue gases in Btu's
- A=the area of vent in square inches
- H= the height of the vent in feet
- R=the resistance of the vent in velocity heads
- Ta=the average temperature of the vent gases in the vertical portion of the vent in degrees Fahrenheit
- b=the heat loss through the walls of the vent up to the midpoint of the vertical vent in Btu's
- c and k are constants related to ambient temperature and altitude.

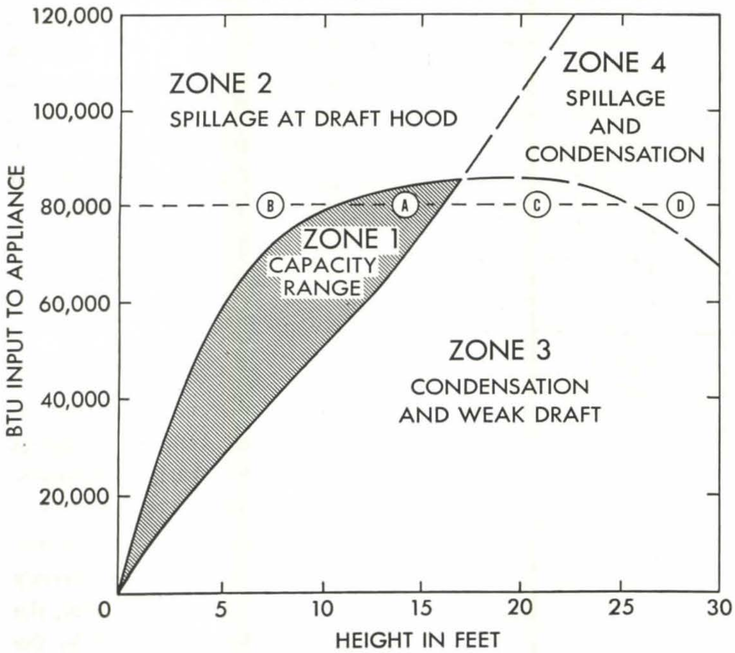
*President, William Wallace Company, Belmont, Calif.

[1]Recently completed by William Wallace Company, with the help of the Stanford Research Institute.

[2]As reported in the proceedings of The Pacific Coast Gas Association, Vol. 43, 1952.

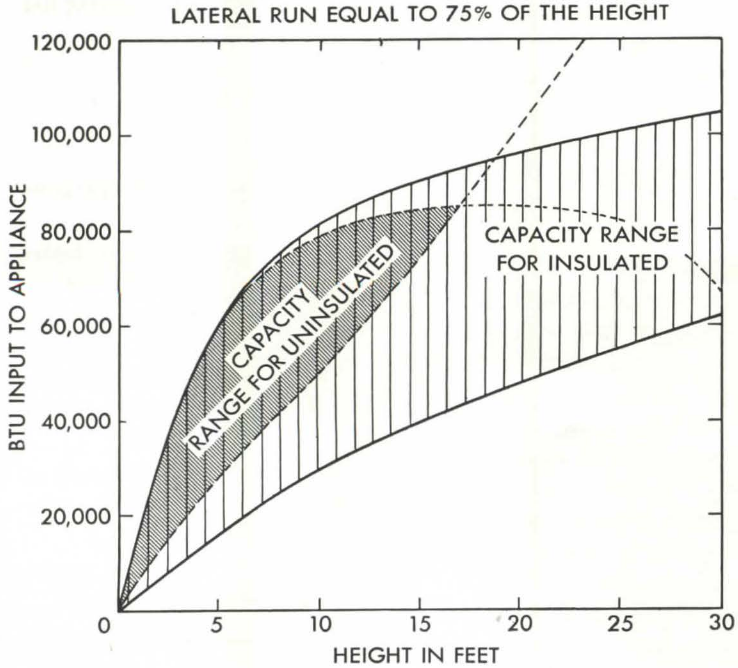
A study of this equation shows that the important variables are the average temperature (Ta) of the flue gases, and the heat loss (b) through the walls of the vent. It is obvious that—with a vent of given area, height, and resistance—the amount of heat content it can handle (expressed by B) will be determined by Ta or b or, in a sense, by the extent to which the vent *conserves* the available heat in the flue gases. Thus, our equation clearly proves that the average temperature (Ta) in the vent represents the "power" available to make the vent operate, and that the lower the heat loss (b) the greater will be the "power" with which to vent. If this "power" is allowed to fall below a certain point, the vent will not carry off the required volume of flue gases (deter-

CAPACITY FOR 4" UNINSULATED VENTS
LATERAL RUN EQUAL TO 75% OF THE HEIGHT



Using Kinkead's equation, this chart shows maximum- and minimum-capacity curves for an uninsulated *vent for which we assume a Btu input of 80,000, a maximum temperature of 460 F, leaving the draft hood, and a minimum temperature in the vent of 180 F (to avoid condensation). These curves illustrate the following four conditions that may exist in gas venting: (1) If the intersection of the Btu input and heights falls in* ZONE 1, *the "Capacity Range," the appliance will be properly vented* (Point A, *80,000 Btu input and 15' high). (2) If this intersection occurs above both the maximum and minimum curves,* ZONE 2, *there will be spillage at the draft hood* (Point B, *80,000 Btu input and 8' high). (3) If this intersection lies under both the minimum and maximum curves,* ZONE 3, *condensation is likely and the draft will be weak* (Point C, *80,000 Btu input and 22' high). (4) If the intersection is above the maximum and below the minimum,* ZONE 4, *there will be both spillage at the draft hood and condensation in the vent* (Point D, *80,000 Btu input and 28' high). While this last zone probably represents the worst-possible venting condition, the curves clearly demonstrate that improper venting to some degree will result from the use of an uninsulated vent except between the narrow range of heights from approximately 10'-17'.*

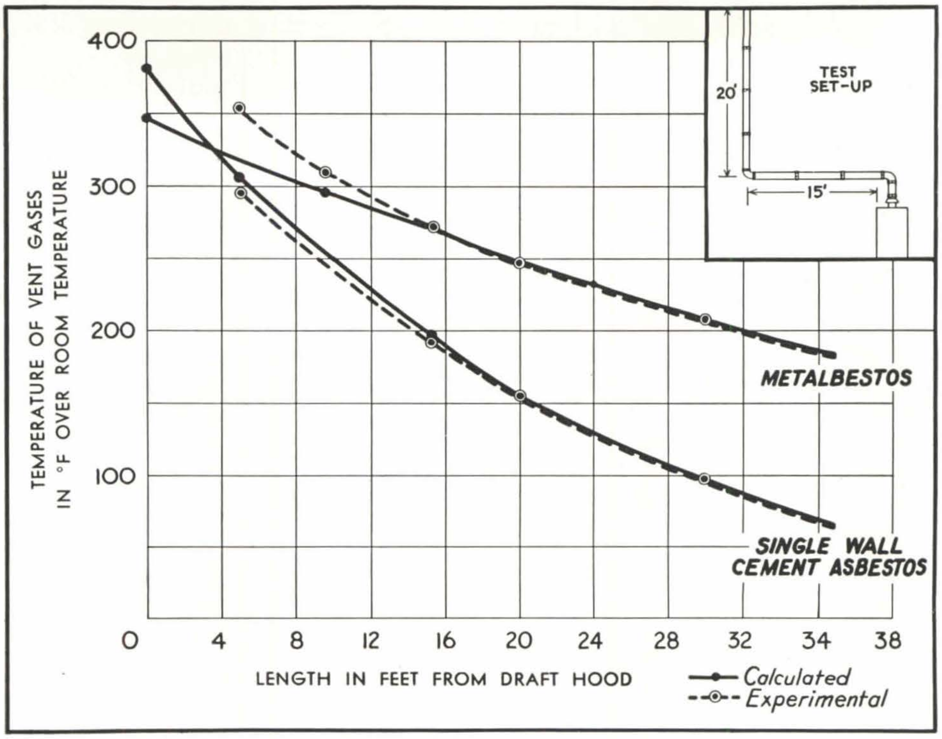
CAPACITY FOR 4" VENTS
LATERAL RUN EQUAL TO 75% OF THE HEIGHT



This chart shows how heat loss through the walls of a vent affects the "Capacity Range" of a gas vent. The solid lines are the capacity curves for Metalbestos, a double-wall, insulated vent. The dotted lines represent the capacity curves of uninsulated vents such as single-wall sheet metal, cement asbestos, and terra cotta.

It can be seen that the greater "Capacity Range" of the insulated vent safely covers a good part of the dangerous ZONE *4 of the uninsulated vent. It also covers part of the "spillage zone" and a large portion of the "condensation zone" of the uninsulated vent.*

For the 80,000 Btu input, the use of an insulated vent increases the safe height to 38' (off chart). *In this case, the safe range of heights is 10'-38' as compared with 10'-17', four times greater than the range of the uninsulated vent.*



As a basis on which to design gas-venting systems, the validity of Kinkead's equation has been proved conclusively by extensive tests with both laboratory and actual field installations. In the above chart, notice the close correlation between the calculated values derived from the equation and those obtained by actual experimentation.

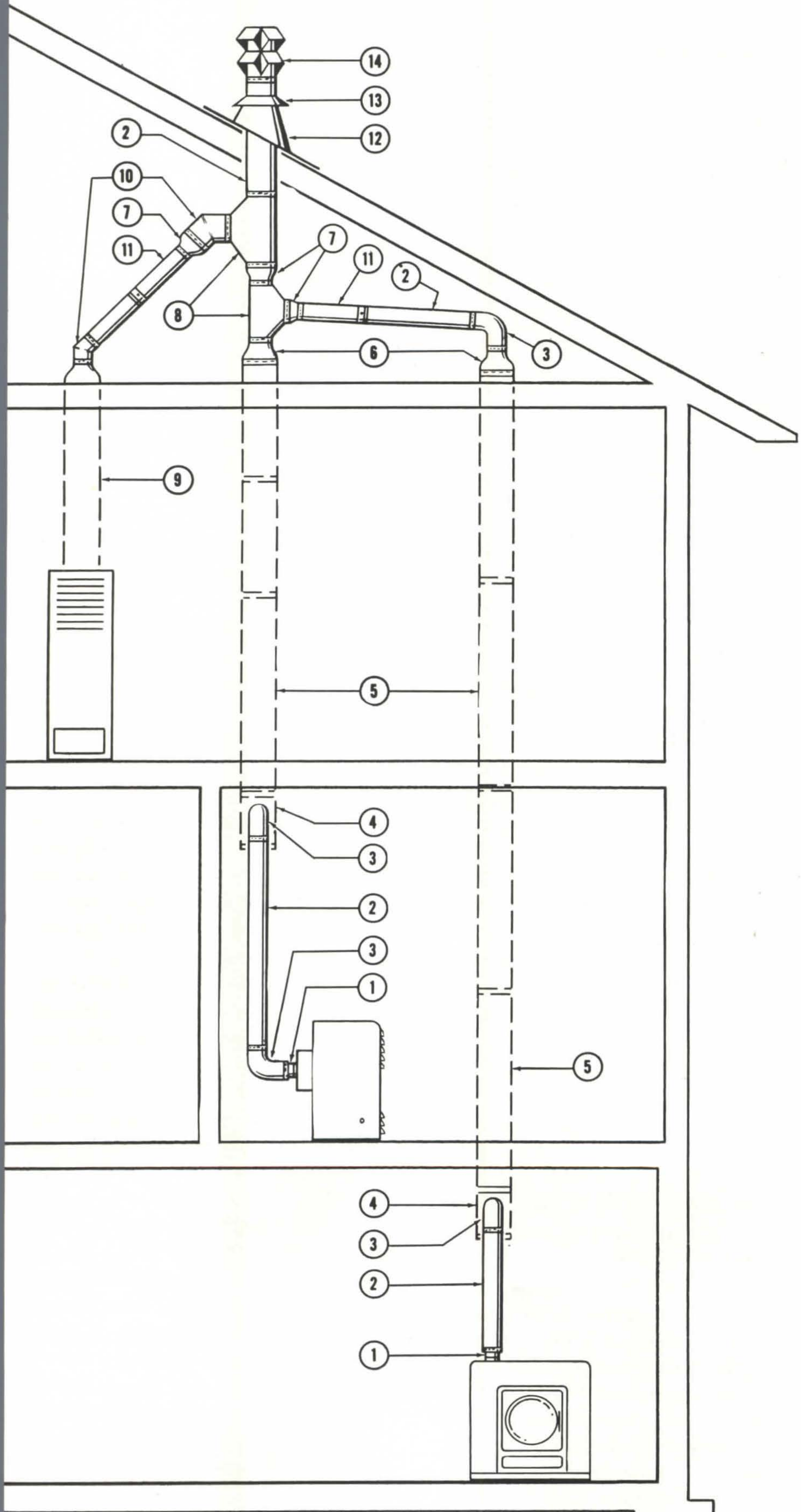
mined by B) and spillage will result. Since, for a given installation, this reduction in "power" simply means a lowering of the average vent gas temperature, condensation will also result if this temperature is reduced to the dew point. If we agree that the function of a vent is to remove all the products of combustion to the outside air—without spillage or condensation—then the equation defines vent capacity. It can be used, therefore, to design a vent of proper capacity for an appliance of given Btu input.

Before this equation is used to design a vent, however, it is desirable to understand its maximum and minimum limits—to determine the range of practical usage allowing for actual operating conditions. For a given gas appliance, the term B is fixed: it represents the amount of heat being delivered to the draft hood, which is established by the input rating and heat transfer efficiency of the appliance. With the left side of the equation fixed, the temperature (Ta) in the vent (and hence the capacity) can be varied by changing the area, height, heat loss, or resistance of the vent. For a given venting problem, the height of the vent is approximately established by the conditions of installation. So also is the resistance which, for practical purposes, is established by the number of tees and elbows required to run the vent to the outside. Thus, the area and the heat loss are the two key factors involved in the design of an adequate system.

In order to evaluate the practical limits within which the area of a vent may be varied, we can assume that the heat loss is constant. In other words, the design and the materials of construction of the vent pipe are fixed as well as the height. Then a *de*crease in the diameter (or area, A) of the vent will cause a corresponding temperature *in*crease (Ta). As the area is decreased, the temperature will finally reach a value close to that of the flue gases entering the hood. Any further reduction in A would raise the temperature higher than the available temperature, which is impossible. At this point we have reached the minimum diameter that will work—any further reduction would cause the flue gases to spill from the draft hood. Just before this occurs, we can say that the vent is operating at its *maximum capacity.*

If, under the same conditions as above, we increased the diameter, then with each increase would come a corresponding decrease in the average temperature of the vent gases. A point finally would be reached where any further increase would reduce the temperature of the gases to the dew point and condensation would begin. Just before this occurs, the vent can be considered as operating at its *minimum capacity.* Thus, a vent of given height and type of construction will be operating at its maximum venting capacity when the minimum diameter of vent is used which does not cause spillage at the draft hood.

By the same process, the equation shows that, for a vent of given dimensions and resistance, any increase in heat loss will cause a corresponding decrease in the value of Ta,



Typical gas-vent installation in two-story home showing use of double-wall, insulated vent pipe to assure proper venting of gas appliances.

(1) **Draft Hood Connector . . .** fits over the round or oval flue collar of the gas appliance and has quick-coupling outer end.

(2) **QC Round Pipe . . .** maintains strong draft and eliminates condensation. Available in many lengths and sizes.

(3) **QC 90° Round Elbow . . .** provides a smooth right angle change of direction for vent gas travel. Also used for take-off at bottom of vertical vents.

(4) **QC Round to Oval Tee . . .** shown here inside of wall . . . creates transition from round to oval vent pipe, as well as change of direction of vent gas travel.

(5) **Oval Pipe . . .** designed to be installed inside a 2"x4" stud wall with only minimum furring out required for combustible construction.

(6) **Oval to QC Round Adapter . . .** provides a transition from oval to round vent pipe and fittings.

(7) **QC Round Increaser . . .** creates a smooth concentric change in the cross sectional area of a round vent line.

(8) **QC Round Tee . . .** joins two vents into a common vent. Also used at bottom of vertical vents.

(9) **METALBESTOS Wallvent . . .** fits inside a 2"x4" stud wall to vent recessed wall heaters safely, and listed by Underwriters' Laboratories, Inc., for use within ⅜" of combustible construction. A packaged unit available in various lengths.

(10) **QC 45 Round Adjustable Elbow . . .** easily swiveled from 45 through any intermediate angle to a straight length.

(11) **QC Round Adjustable Length . . .** permits variable extension of QC round pipe from 3" to 17" without cutting or crimping.

(12) **Roof Flashing . . .** all-aluminum and adjustable for various roof pitches.

(13) **Storm Collar . . .** additional weather protection around vent pipe above roof flashing. Aluminum.

(14) **Belmont Top . . .** exerts highly efficient "ejector" action regardless of wind direction.

the average temperature of the vent gases. While this should be a self-evident fact, it apparently has not been given much weight if we are to judge by the kinds of vent pipe materials still in common use. No one questions the necessity of insulating steam lines or hot air ducts; few people seem to realize that gas vents must be insulated for the same reason. The explanation is that, until now, we did not understand the function of the vent gas temperature and did not fully appreciate the importance of conserving the heat content of the flue gases. What our equation proves is that the first and most important requirement in designing a vent for gas appliances is to use a material which will permit maximum conservation of flue gas heat, yet allow for the practical considerations of installation and total cost.

The effect of these findings on existing concepts and practices can be demonstrated by applying the equation to the conditions of one test arrangement under which gas appliances are tested by A.G.A.—a straight, vertical vent four feet in height and of the same diameter as the vent collar on the appliance. Since the four-foot vent presumably removed all the products of combustion, it is likely that a reduction in height to three feet will unbalance the equation and reduce the value of B. Since B is fixed by the rating of the appliance, the amount of its reduction in the equation will represent spillage. In order to avoid spillage without increasing the height or the insulation of the vent, we must increase the area. In this case, therefore, we find it necessary to provide a vent of greater diameter than that of the vent collar. On the other hand, if we increase the vent height above four feet, the value of Ta, the average temperature of the vent gases, will decrease.

Successive additions to the height will finally cause the temperature to reach the dew point and condensation will occur. If this final height must be maintained, the *only* way to bring the equation into balance is to reduce A, or the diameter of the vent. Thus, under certain conditions, it may be necessary to reduce the diameter of the vent to a size *smaller* than that of the vent collar. Practically all codes prohibit such a reduction in size, thereby making it impossible to install a proper vent under certain conditions.

Most codes require that a lateral run have an upward slope of ¼″ per foot, while laterals in attic spaces are required to slope upward at least 45°. Actually, there is no scientific basis for this requirement. The only effect a lateral has on the equation is the almost negligible increase in resistance caused by the sharper turns as compared to a sloping lateral. Actually, if the vent is run vertically a foot or more up from the appliance (to offset the inertia of gas flow) a perfectly horizontal vent will not affect vent operation.

Many codes require that when two vents are connected to a common vertical vent they must intersect at an angle of not greater than 45°. This is another restriction with no sound basis for its existence. Strangely enough, most codes permit the common practice of running a single wall, uninsulated pipe lateral from the appliance to an insulated vertical vent. This, of course, allows a substantial loss of heat before the gases reach the vertical run, reduces the value of Ta, and wastes a good portion of the "power" available to make the vent operate.

Probably one of the most harmful code restrictions, and one that is quite common, is that which requires use of a T at the bottom of the vertical vent where the connection is made to the lateral from the appliance. This involves, with the one to three elbows required, a considerable increase in resistance, causing a decrease in the right-hand side of the equation—and serious spillage at the draft hood might occur. Another restriction harmful to proper venting is the present trend of specifying the maximum Btu input (into the appliance) per square inch of vent area. This practice tends to force installers to use oversize vents, since the ratings are based on incorrect tables of capacities which generally overstate vent diameters, because of erroneous assumptions as to heat loss and average vent gas temperature.

Still another misconception about gas venting is the popular belief that the capacity per square inch of an oval pipe is drastically lower than that of a round pipe. This belief was fostered by an authoritative report, based on inconclusive experimental work, which stated that a round vent was found to have about 2½ times as much carrying power as an oval vent. Actually, the only difference is that an oval pipe will have a slightly higher heat loss due to its greater surface area and a slightly greater resistance due to the higher ratio of its perimeter to its area. These two differences make the vent capacity of oval pipe slightly less than that of round pipe—possibly 3% to 5%—but certainly not 60% less.

These examples of incorrect venting practices indicate the urgent need for prompt revision of many present code regulations and installing practices. How quickly this is done will depend largely on the ability of code authorities and industry groups to part with the deeply-rooted misconceptions inherited from the past. However long this may take, gas appliance users are now in a position to demand and obtain a soundly-engineered gas venting system which completely eliminates condensation and spillage —which continuously removes *all* the products of combustion. A vent pipe is available[3] which is designed specifically to vent gas appliances and which will continue to operate as a rigid, integral venting system for an indefinite period. It is now possible to determine *in advance* how a given vent installation will operate. It is also possible to specify correctly the exact manner in which the vent should be installed under given conditions.

It has become accepted practice for the heating contractor to design a proper heating system: to compute heat losses of windows, walls, and ceilings, calculate the required Btu for adequate heating, determine the correct duct size, and otherwise apply engineering methods to the problem of heating. The same design considerations with respect to gas venting are necessary if he is really to finish his job. Fortunately, complete tables based on the equation previously discussed are now being developed by the writer's company to simplify the design of a proper venting system and can be obtained without cost in the near future. In fact, for the vast majority of installations, these tables *will* provide complete capacity data without the need for elaborate calculations. This information together with a vent-installation handbook now available, and additional material to follow, constitutes a valuable contribution to the gas industry and the heating business which, once and for all, will place the venting of gas appliances on a sound scientific basis.

[3]*Metalbestos.*

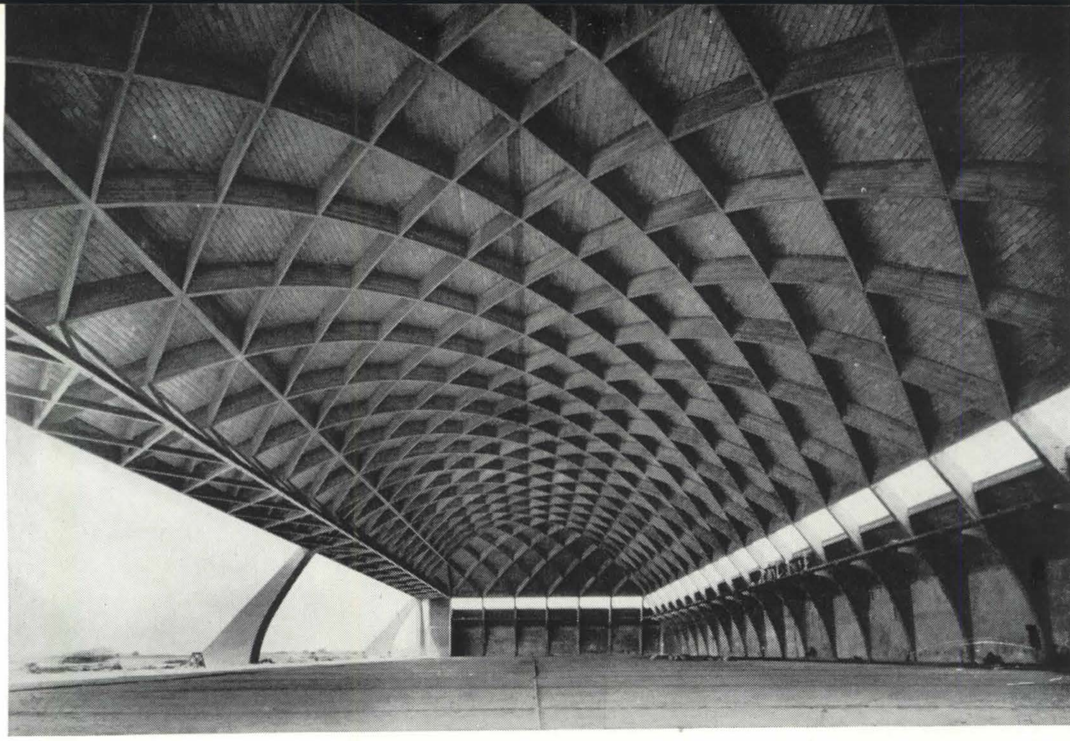


Figure 1—airplane hangar near Rome, Italy (1938).

geodetic and plastic expressions abroad

ITALY: Pier Luigi Nervi

by A. L. Huxtable

Pure engineering, in the hands of an artist, has created some of the architectural masterpieces of our age.

It is seldom, however, that the engineer's instinct for esthetic calculations is as sure as his knowledge of mathematical formulas. When this happens, as in the hangars and warehouses of Pier Luigi Nervi, structures of dramatic beauty result. Because Nervi's feeling for form equals his almost uncanny understanding of the complex structural possibilities of reinforced concrete, he has produced a series of buildings that are of equal importance to the science of engineering and to the art of architecture.

Nervi's engineering contribution has been the covering of great open spans with ingeniously ribbed, reticulated or corrugated systems of reinforced-concrete vaulting. New constructions have resulted in completely new building forms — curved monolithic shells, tent-like shapes, undulating roofs, and angled supports—all striking departures from the rectilinear principles that have been symbolic of construction since man's first efforts to build. From Paxton's Crystal Palace in Victorian London to Nervi's Exposition Hall a century later in modern Turin, engineers have pioneered the revolutionary constructions that have created the new architecture.

If the 19th Century was the Age of Iron, then the 20th Century is the Age of Steel and Reinforced Concrete—and Nervi one of its greatest prophets and pioneers. The last 20 years have produced important developments in reinforced concrete that indicate revolutionary architectural possibilities in the framing of space. Concrete construction has been growing lighter, due to improvement and standardization of the material and to developments in vibrating, precasting, and prestressing. New structural forms have shifted the emphasis from monumental masses to the space-enclosing shell. To Nervi's credit is his contribution to the development of ferro-concrete and the integrated use of a metal-armature skeleton with concrete, providing a greater strength and a greater range of structural possibilities than could be achieved by ordinary techniques.

The record of Nervi's achievements covers an important 20-year period. The first of his large projects was the community stadium of Florence, built in 1932. Shortly after this, in 1935, studies began for two airplane hangars outside Rome, the first erected in 1938, the second in 1943. These spectacular structures cover the same span, 328′ x 131′, but differ in design. The first (*Figure 1*) is a classic example of a lamella-type roof, in-filled with brick tiles covered with asbestos cement and supported by evenly spaced buttresses on three sides, with a single additional support in the center of the entrance span. The later hangar, using a roof of prefabricated lattice members with stiffening beams along the edge and only six buttresses supporting its span, is an audacious solution of a great visual and technical excitement.*

In 1947, a competition was held for a new exhibition hall to replace the bombed area of the Palazzo Esposizione in Turin (*Figure 3*). The requirements were speed, size, economy, and facility of erection. Since the problem could not be solved by existing techniques, Nervi won the com-

This article is based on a section of an exhibition, "Modern Italian Architecture and Design," prepared by the author for the International Program of the Department of Circulating Exhibitions of the Museum of Modern Art, New York.

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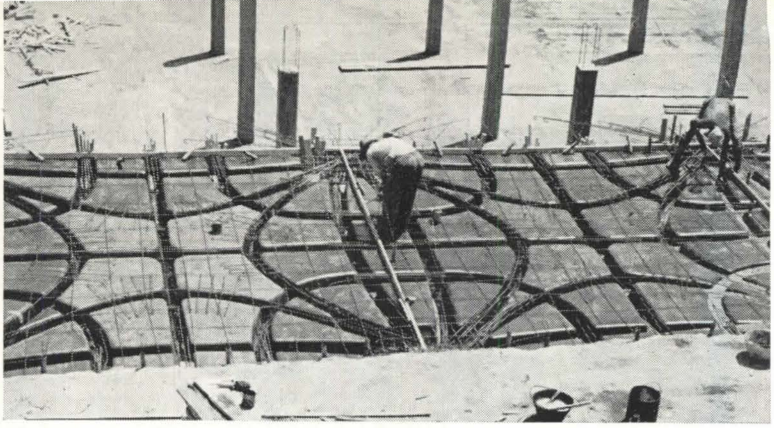


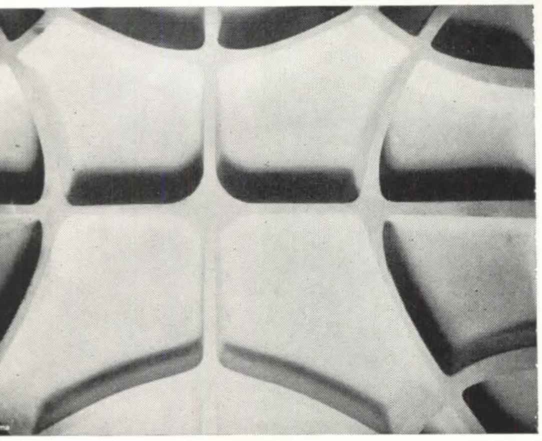


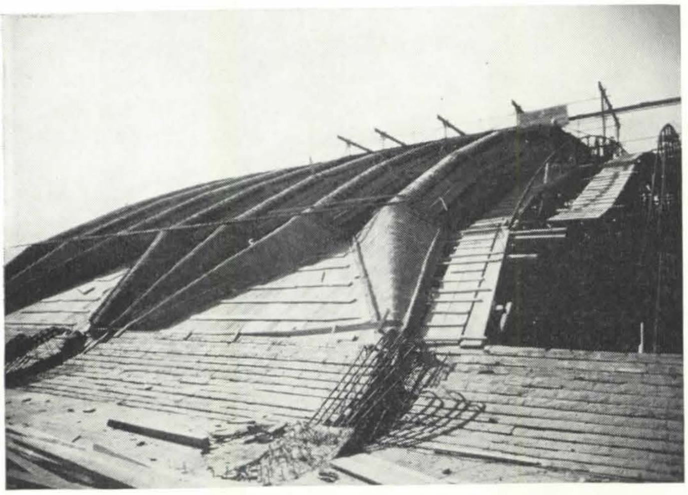
Figure 2—Lanificio Gatti factory, Rome, Italy (1951). Nervi has devised numerous roof systems of precast or poured-in-place, flat-ceiling slabs joined by intricate stiffening networks for distribution of stresses. Ceilings of the Lanificio Gatti factory were poured continuously in place with the forms (above right) *set on movable scaffolding. Removal of the scaffolding left a smooth upper surface at floor level and a reticulated ceiling surface underneath, with stiffeners collecting the load at column heads* (above and right).

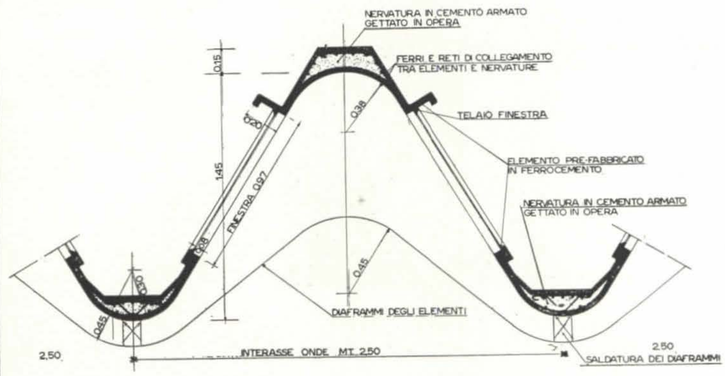
mission by the invention of a system of prefabricated units which would form a corrugated barrel-vault and which could be mounted and joined in a minimum of time. Each day, approximately 30 of these units were set in place on a tubular scaffolding; and as each quarter of the construction was completed the scaffolding was lowered, moved forward, and the process repeated. Precast stiffeners add a rhythmic emphasis to the undulating pattern of the ribs. The forces are gathered into groups of four converging ribs at the sides of the hall, transmitted to widely-spaced, sloping abutments, and then to concrete masses below ground. There are two lateral galleries and a rotunda 132′ in diameter at the far end, covered with a half dome. The ribs of this dome are used as stiffeners rather than for carrying stresses and form a decorative element indicative of some of the design freedom of the engineer.

There is, unfortunately, a too generally accepted division between scientist (engineer) and artist (architect), and too little realization of the enormous choice that is open to the engineer in his development and use of structural elements. In 1950, Nervi and his partner, Bartoli, added another salon to the Turin exposition building, this one approximately 213′ x 180′, and completed a handsome salt warehouse at Tortona, both utilizing lamella-type ceilings. Since 1950, he has been developing a series of flat-slab ceilings for factories and warehouses; notable among them the Lanificio Gatti factory of 1951 (*Figure 2*) and a tobacco factory in Bologna (1952). Reinforcing networks of intricate mathematical design stiffen and separate reinforced-concrete slabs, accepting and distributing weight and stresses to make possible large spans and simple monolithic enclosures.

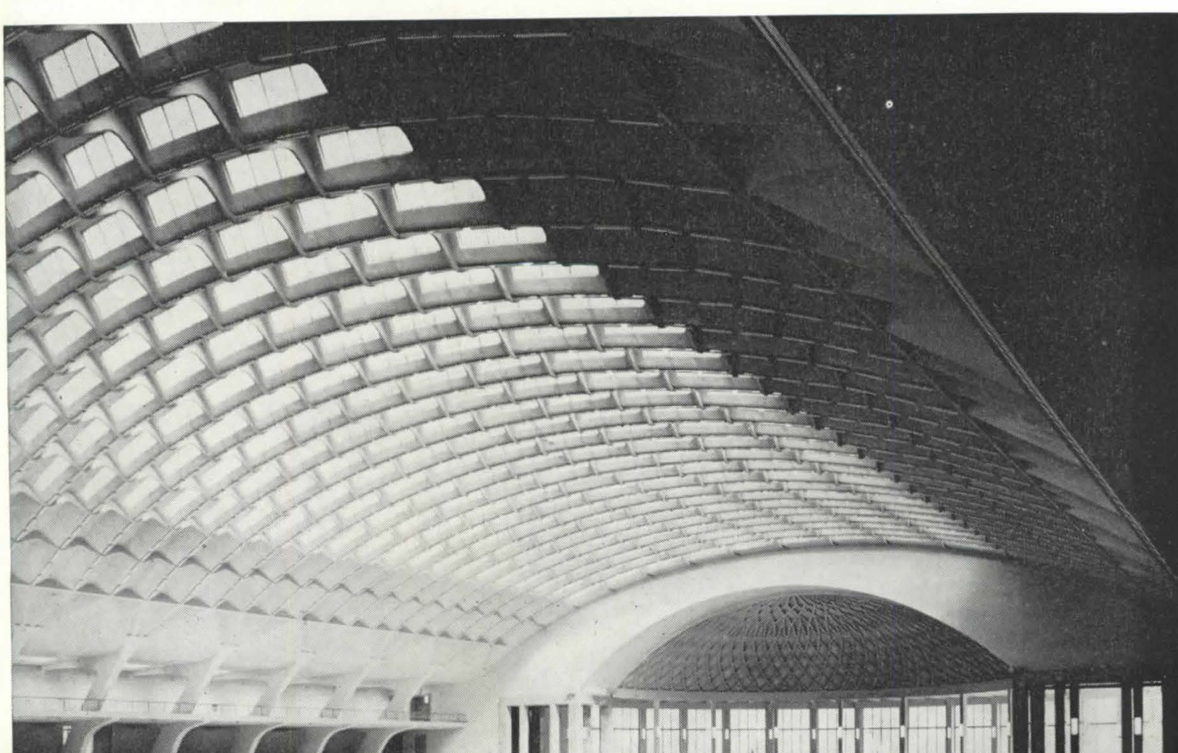
These factories, warehouses, and hangars are indisputably among the most stimulating buildings of our day and represent two noteworthy directions in contemporary work: a new concept of construction, and a new sense of space. The resultant fusion of structure and form may prove to be more significant for the architecture of the 20th Century than the much-discussed integration of the traditional arts.

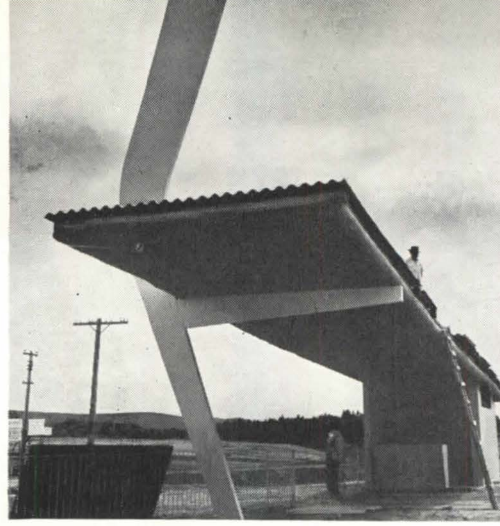
Figure 3—Exposition Palace, Turin, Italy (1947). Prefabricated units (right) *of the corrugated roof were consecutively mounted on a tubular scaffolding, fitted together, and joined with poured concrete. Exterior view of roof with elements in place* (below). *Section of element* (below right) *is width of one wave, 14½′ long and slightly more than 1½″ thick.*

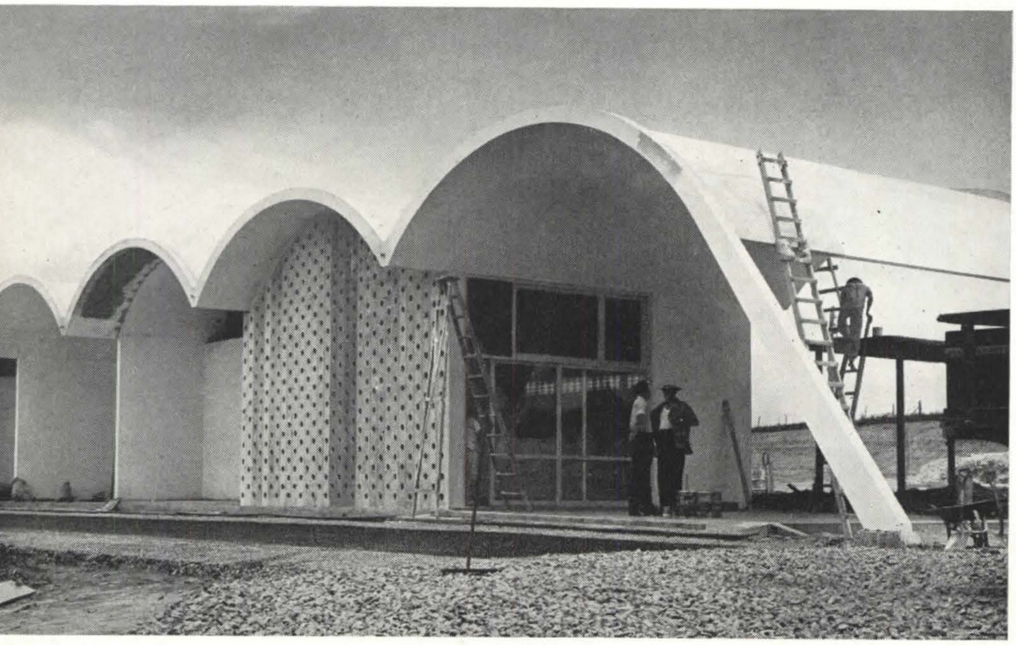




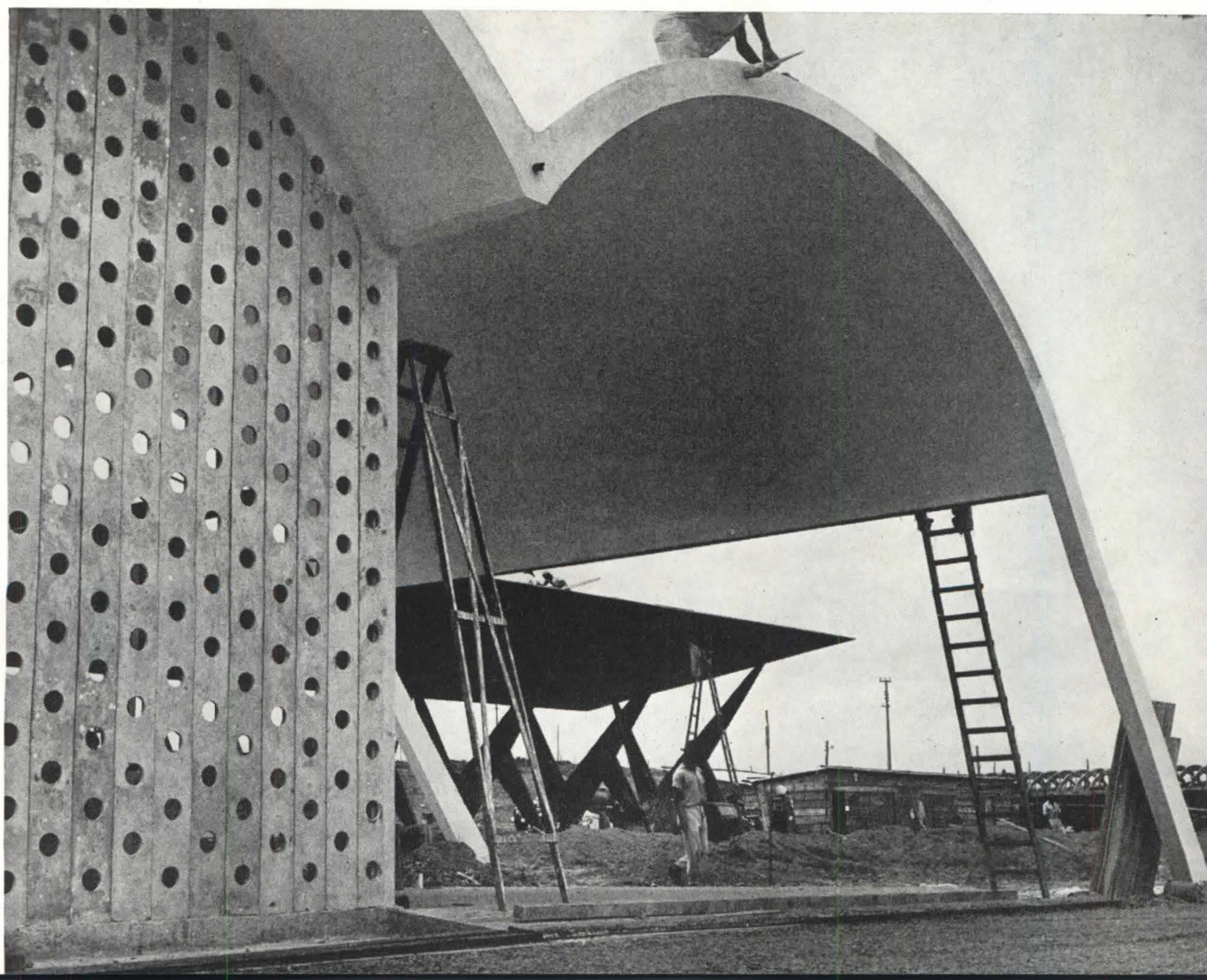
The abutments (left) *receive the full load of the 320′ span at an angle that makes possible a sharply cantilevered balcony. The finished hall* (below) *shows clearly the completed effect of the ingenious system of construction, and equally important, an architectural design of great esthetic success. The vast interior space is modeled and controlled by a structural shell that provokes an immediate sensuous and emotional response by its rhythmic patterns and dynamic curves, its coloristic effects of light and shade.*







Club dos 500, *São Paulo (an automobile service station). "Customer-attraction" pylon* (above); *details of repetitive barrel-vaults over administrative area* (left and below); *two views of service area* (acrosspage). *Elements of the plan are: (1) portico; (2) office; (3) rest rooms; (4) offices; (5) storage; (6) pumps; (7) lubrication pits.*



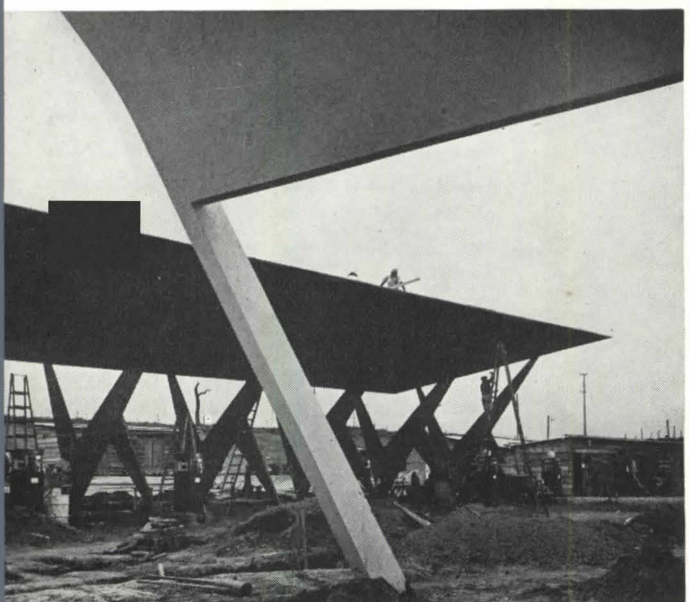
BRAZIL: Oscar Niemeyer

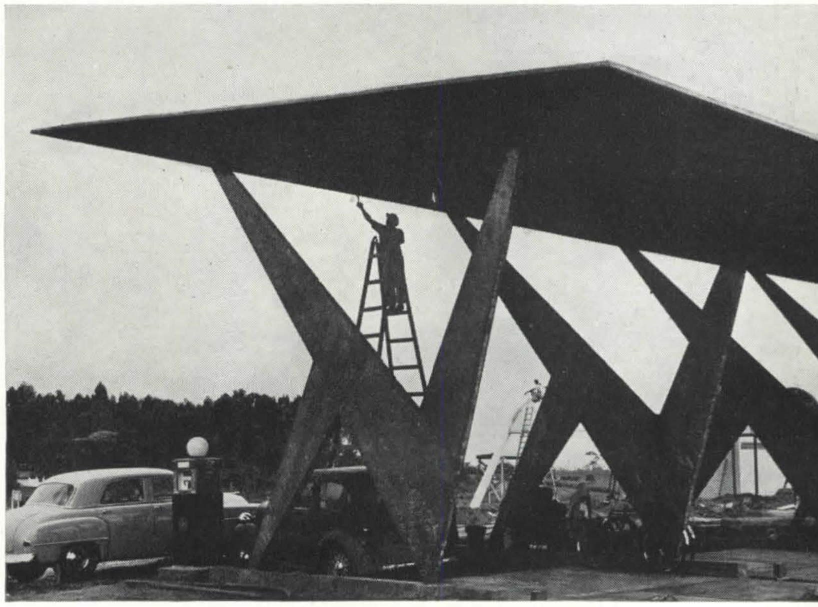
Niemeyer has written that architecture must express the spirit of the technical and social forces of a given epoch. While his own design complies with this dictum, it is also curiously influenced by the vestiges of colonial baroque as well as the climatic and physical aspects of his native Brazil. His abundant use of plastic structural expressions clearly displays his affinity for the baroque, while his work unquestionably embodies contemporary technology creatively applied to the solutions of spatial problems.

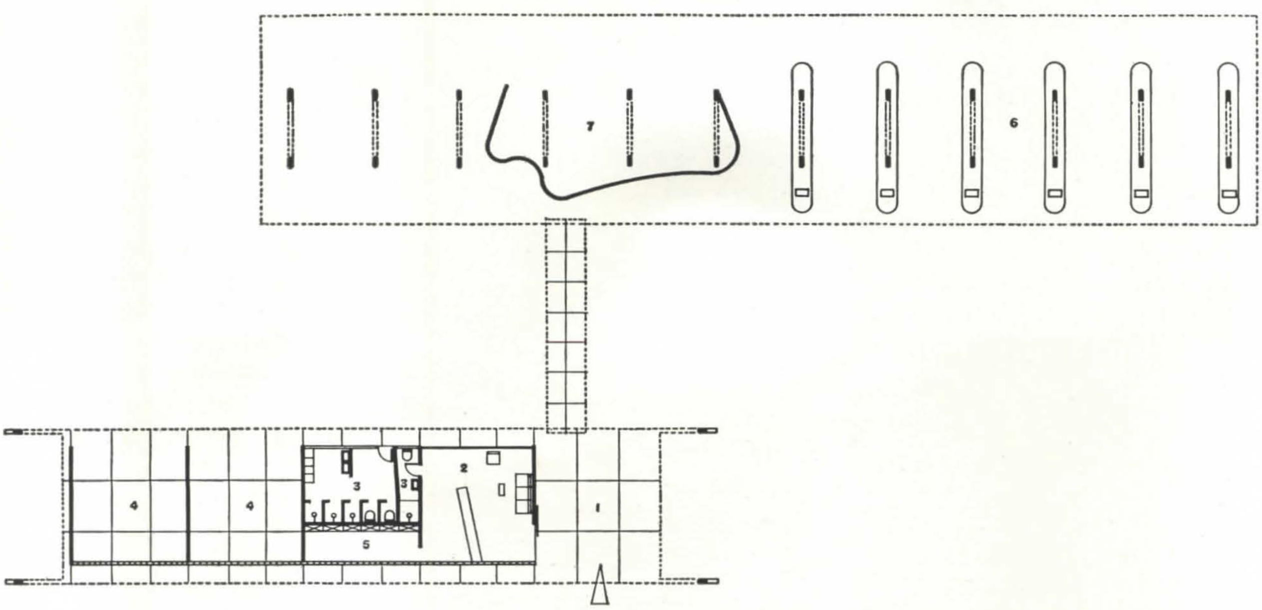
To document a few of these observations, this architect's *Club dos 500*, an automobile service station in São Paulo, is presented (*acrosspage and below*) together with two row houses at the Aeronautical Training Center, São Jose dos Campos (*overpage*).

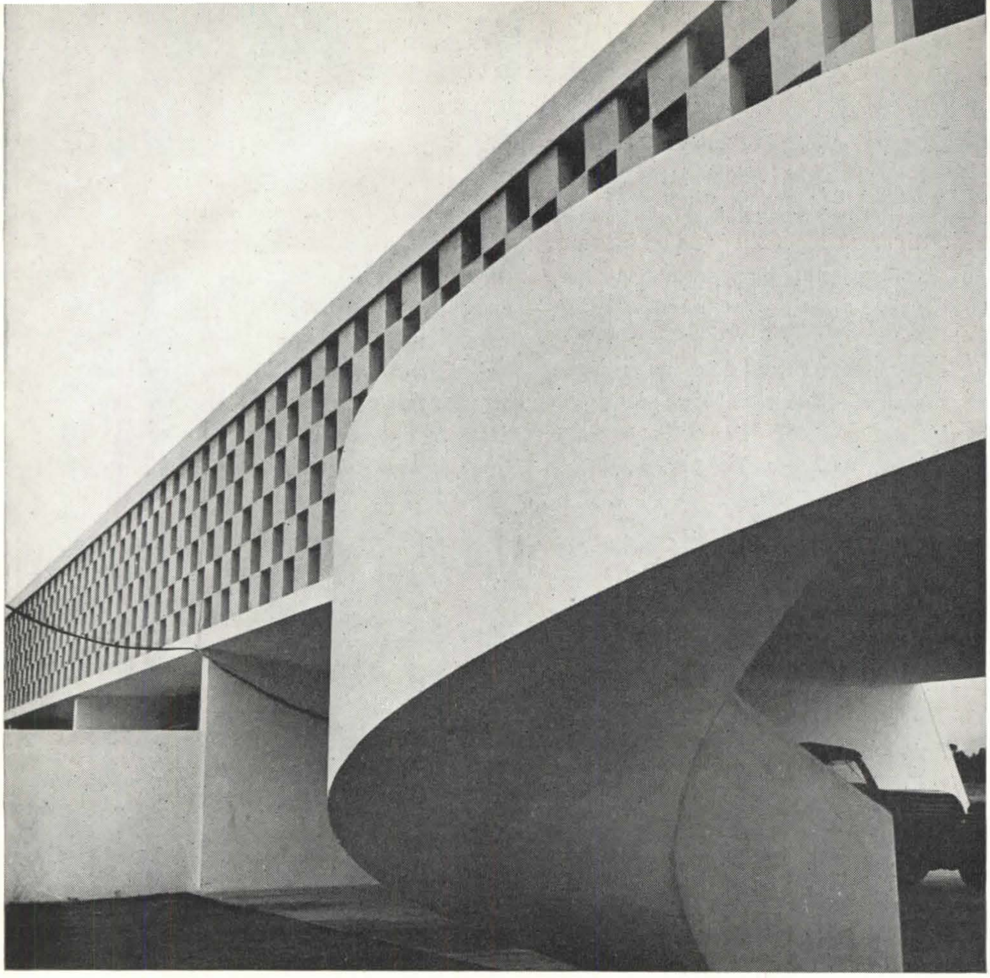
In the service station, note how the repetitive barrel-vaulting over the administrative areas clearly displays Niemeyer's love for the curved form and in execution how it compliments the geometric vigor of the vertical supports in the open service area. Also, note that the boomerang-like "customer-attraction" pylon (located in front of the station near the main road)

This brief but visually exciting examination of two reinforced-concrete structures in Brazil has been staff prepared.

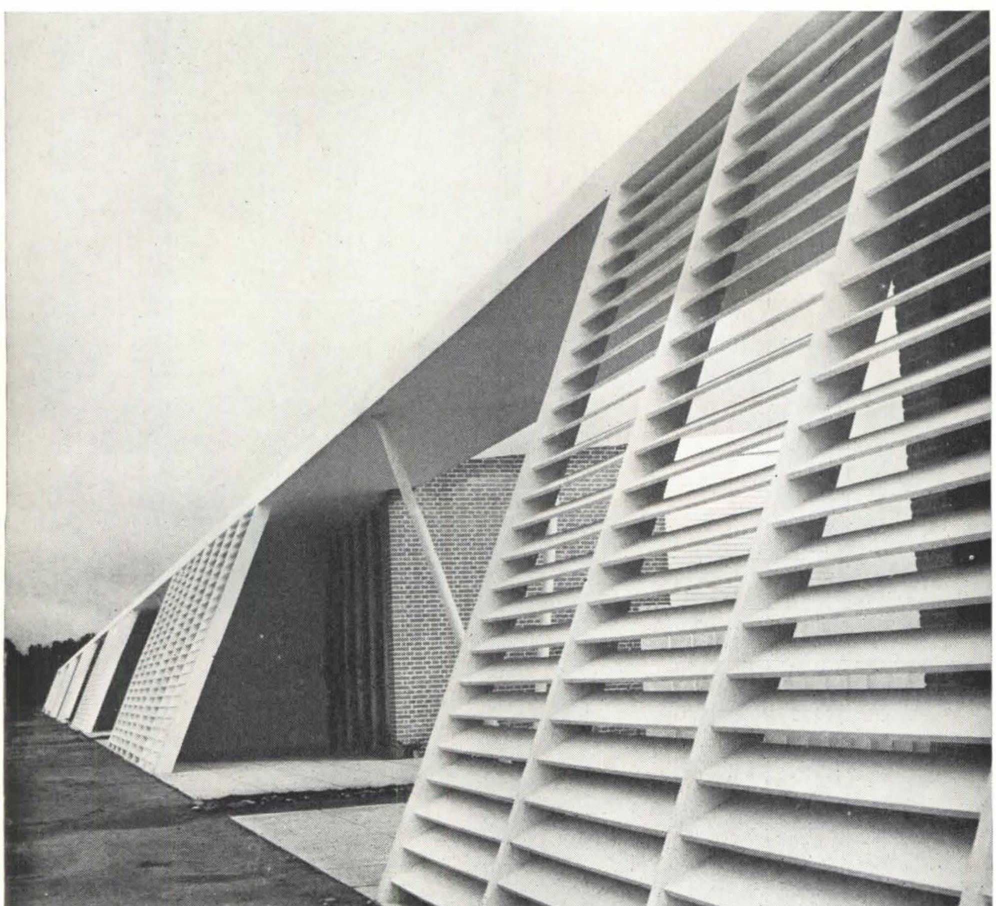








Differing methods of providing privacy and sun control are found in the north elevations of two row houses at the Aeronautical Training Center, São Jose dos Campos.



leans in defying contrast to its rigidly perpendicular counterpart that is so abundantly found in shopping centers, supermarkets, and other commercial developments in the northern hemisphere of America.

If one were not told where this station had been constructed, he could make a fairly accurate estimate of the climatology of its location by the appearance of the structure alone. Note the length of the overhang integrally formed by the extensions of the barrel-vaults; the general lack of doors and windows in the administrative units; the openings in the precast-concrete vertical panels along the front façade of the office area; the magnificent, shading concrete-roof panels over the service area.

Essentially the structural system is simple: barrel-vaults are supported at their springings by the concrete walls sepstating individual offices. Live loads and dead loads acting on the concrete panels over the pumps and lubrication pits are carried to earth by members whose design reflects the pattern and location of both existing and potential static forces.

Different row houses at the Aeronautical Training Center exhibit two of Niemeyer's methods of obtaining privacy and sun control for northern exposures. Checkered pattern of blocks affords protection for a second-floor exterior corridor (*left above*) while wood louvers in a frame pitched 70 degrees from horizontal protect two-story living rooms (*left below*). In the design of both buildings, load-bearing brick masonry and reinforced concrete were specified. See how the grid pattern of the sun control (*in upper photo*) is softened by the baroque character of the circular stairway.

the ARCHITECT and color photography

by Morris Lapidus

The use of color photography makes it possible for the architect to discuss in definitive detail many aspects of his projected building. Color combinations in offices, windows, store fronts, and showrooms, which until five or six years ago could only be suggested in black-and-white photographs, can now be shown clearly and accurately in natural color.

This is a handy tool for the architect, since color today plays an important role in building materials. Many building materials come pre-finished in color. The choice of a type of brick or wood often depends on the colors in which it is available. Color photography aids the architect in discussing such details with his client.

In line with this trend to color, a great many of the more progressive firms are now making slides of their products available to architects. The thinking behind this is that architects present their sketches in color, so why not photographs? Consequently, more and more architects are using color slides to show their work to clients. It may be that eventually the 35-mm color slide will become as much a part of the equipment of the modern architect as his blueprint.

How can the architect set about developing a file of 35-mm color slides of his more important buildings? The first step is to buy a 35-mm camera. This type of camera is easy to use, highly effective, and inexpensive. Its fast lens enables one to take pictures that are sharp and detailed. When buying film for it, the cost of processing and mounting is included, so that the cost per print is only about twelve cents.

As to showing color pictures to clients, there are four basic ways in which this can be done: (1) by means of projection, using a slide projector; (2) by enlarging the 35-mm slide to a color print; (3) by means of a hand viewer; and (4) by using a table viewer.

While the projection method is by far the most dramatic and effective, and can be used to great advantage, it poses problems because of the necessity of setting up projector and screen, moving furniture to get a clear throw of beam, and darkening the room. The projection method can only be used in the architect's own office, because of its space requirements.

As for color prints, the cost of enlarging them to such a size that the architect may point out the features of the building is exorbitant. Up to now, any except the very expensive prints lack true color and brilliance. The age-old theory of light, that reflected color is never as effective as projected color, renders this method undesirable.

As for the third alternative, hand viewers, these consist chiefly of a magnifying glass with means to hold the slide. This is as impractical as the projector, because only one person can view the slides at a time, consequently preventing the architect from bringing out intricate details and features of the building. This same difficulty applies to all hand viewers, including expensive ones.

For the purposes of the architect, the table viewer is the most effective way of demonstrating 35-mm color slides. There are several good viewers on the market which are specifically designed so that they can be viewed by five to six people at a time. In viewers, color film is projected to a self-contained translucent screen. This obviously is the most desirable way to show pictures, because lights need not be turned down in the room and the picture is large enough so that detail can be seen.

Best of all, by means of the viewer the architect can work with his pencil as a pointer, showing desirable features of his work. Especially recommended is a portable table viewer, which is light, compact, and folds up like a camera. This type of viewer is currently widely used by industrial firms in demonstrating their products.

The advantages of 35-mm color slides to the architect are almost too numerous to mention. When you present your drawings to a prospective client, for example, you can show not only the drawings but also color slides of the drawings, which will give the client a better illusion of the finished building.

As to slides of manufacturing materials, they cut down the burdensome samples of materials that the architect must sometimes carry with him.

In another connection, too, color slides are of considerable importance to the architect. It is a customary procedure to submit progressive shots of the building to the client in black-and-white photographs. By showing these in color, the effect will be better. For American architects who work abroad, the 35-mm slide is of great assistance in demonstrating large construction jobs that the architect has completed in the past.

More advantageous than anything else, though, is the economy that results when 35-mm film is used. Not only the essential equipment, but also the cost of the slides themselves is minute. Any good camera store will assist the architect in purchasing the right camera and equipment for his purposes. The architect employs color when he shows a presentation drawing to a client. He should employ this oldest and most adroit of visual aids in his photographs, too.

continuous-strip eave-to-eave insulation

At Lutheran Concordia Seminary, St. Louis, Missouri, a field house was recently completed at a relatively low cost with structural members in small sections forming an arch-type support for a corrugated-aluminum roof sheeting. Ultralite, a glass-fiber insulation material, was chosen over other insulating materials since it could be applied from the outside and thus save the expense of interior scaffolding. The Ultralite panels, faced with moisture-barrier and supplied in rolls 2′ wide, 2″ thick, and 186′ long, were rerolled on the job from each end to center, taken to the peak of the roof, and allowed to unroll down both sides.

Applied directly beneath the aluminum sheeting and compressed over the structural sheeting, the insulation strips were pulled tight with block-and-tackle and wooden clamps while roof sections were fastened to the steel purlins very simply by drive screws with neoprene washers. Architects were Lorenz & Wischmeyer, St. Louis, Missouri. Gustin-Bacon Manufacturing Co., Kansas City, Missouri.

completely operatorless elevatoring

Even the elevator starter, the last remnant of manual control for operatorless elevators, has been eliminated in Westinghouse's completely automatic elevator-control system now available for general sale. Called Automatic Traffic Pattern Control, it is the latest addition to the Westinghouse Selectomatic, the electronic supervisory system that makes elevators work as a team in heavy traffic buildings. This system has been especially designed for buildings where the demand for elevator service changes drastically at certain periods of the day. In the early morning

air and temperature control

Room Air Conditioners: ½-hp unit designed for room areas up to 300 sq ft under average conditions, ¾-hp unit for room areas up to 500 sq ft. Both models adjust automatically to room temperature changes; refrigerating mechanism controlled by thermostat which is adjustable to any one of 6 settings. Air is also dehumidified and filtered. Units designed for window installations but adaptable for through-wall or cabinet-type installations. General Electric Co., 310 W. Liberty St., Louisville 2, Ky.

Central Cooling Unit: new unit in 2- and 3-ton sizes, may be installed in new or existing forced warm-air heating system. Protection afforded by thermal overload device and high-low pressure control. Multiple feed expansion valve; receiver provided by generous supply of Freon 12 refrigerant. Condenser easily cleaned, can be connected either to city water system or to cooling tower. Iron Fireman Mfg. Co., Cleveland 11, Ohio.

Dehumidifier: portable plug-in model will extract more than 3 gal of water per day from up to 10,000 cu ft of room air; does not require special wiring, plumbing, or permanent installation. Unit, including reversible water container, finished in gray enamel and equipped with ⅛-hp motor that operates air circulation fan and refrigeration system charged with Freon 12. Hotpoint Co., 5600 W. Taylor St., Chicago 44, Ill.

Wall Diffuser: new perimeter-heating diffuser sprays warm air upward and to all sides at reasonably high velocity. Diffusion pattern starts at 45° from floor, extends over a 90° fan-shaped spread blanketing cold outer wall or window area. Smooth, one-piece standard face, electrostatically-applied metallic finish. Diffuser designed for ceiling, low, or high side wall installation. Two sizes: 10″ x 6″ and 12″ x 6″. The Lima Register Co., Lima, Ohio.

construction

Epiphen XR-823: new epoxide-resin adhesive is suitable for bonding nonporous surfaces. Resistant to boiling water, acids, alkalis, and most organic solvents, adhesive has shown good results in bonding metal, glass, natural or synthetic rubber, ceramic materials and wood, phenolic and glass-fiber laminates, either to themselves or in various combinations. Borden Co., Chemical Div., 350 Madison Ave., New York 17, N. Y.

Roof Drain: new drain, cast iron or bronze, has especially large and deep sump area which acts as temporary reservoir, eliminating swirling and splashing and allowing entrained air to escape before water enters drain pipe. Mushroom-type dome strainer, flush with roof level, increases free open area of straining surfaces up to 9:1. Gravel guard prevents clogging of primary drainage. J. A. Zurn Mfg. Co., Erie, Pa.

doors and windows

Toplite System: prefab panels of hollow-glass units set in insulated-aluminum grids are suitable for installation in schools, industrial, commercial, and other types of buildings. Weatherproof, glareless units give uniform light transmission, low solar heat transmission in summer months, and provide good insulation during cold weather. Panels weigh 16 lb per sq ft and are made in four sizes: 3′ x 3′, 4′ x 4′, 4′ x 5′, and 3′ x 6′. Developed in Daylight Laboratory at the University of Michigan. Kimble Glass Co., Ohio Bank Bldg., Toledo 1, Ohio.

Door Closer Selector: new perforated slide calculator determines correct size in each of manufacturer's concealed and exposed types of closers which will effectively handle a door with given width and location. Data for exterior doors appear on one side of calculator, data for interior doors on reverse side. Available without charge from manufacturer. LCN Closers, Inc., Princeton, Ill.

Dusklite: new shatterproof flat glass is composed of two layers of window glass laminated with inner layer of neutral gray vinyl plastic. Provides light control for ribbon windows and ventilator units used in conjunction with functional glass block installations in schools and other buildings. Visible light transmittance approximately 25%; solar heat transmittance approximately 50%. Standard 7/32″ thickness, sizes up to 15 sq ft. Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh, Pa.

Black-Light Unit: weatherproof black-light fixture for illumination of outdoor signs and billboards employs two self-filtering long-wave ultra-violet tubes with specially designed reflector. Fewer fixtures required per lineal foot of copy. Units available with two 150-w white flood-type bulbs; intermittent flasher may be installed in base if specified. Ultra-Violet Products, Inc., 145 Pasadena Ave., South Pasadena, Calif.

Ualco Awning Window: weather-tight aluminum awning window provides special

banks

A completely new attitude has invaded the banking business—that of being friendly. All of the fresh new color, the lighting, and the comfortable furnishings, show that bankers have had an awakening. What a relief to see the passing of the old teller's cages! Whether the thought came first—or progressive design has helped create this atmosphere—is not important. The fact that it exists is.

On the following pages are four banks entirely different in interior design, but throughout the section immediately obvious is one prevailing quality—no matter what the location or size—that of openness of design. Though they are of different character, each has avoided the clichés that have thwarted interior design in banks for years. Basically, of course, bankers have been ultraconservative and, in the past, there seemed to be an agreement to give bank interiors a pompous, impersonal atmosphere. Even now, it is possible to see banks of contemporary design filled with outmoded, stuffy furnishings. Fortunately, they are becoming fewer in number.

The largest of the banks selected this month is on a busy corner in Manhattan, a remodeled interior. Its size is not overwhelming, nor is it cold and impersonal. One's impression upon entering is that here is a successful, confidence-inspiring company. It is attractive, yet businesslike. The colors—black, white, and gray—are subdued and clear; the lighting is bright and cheerful, without its sources being evident; and the space division is uncluttered, orderly, and open. Another New York bank, in the UN Secretariat, is small in scale. It, too, has a clean, uncluttered look. Particularly eye-pleasing is the curved counter and straight-plane storage wall of flush wood veneer behind it. This creates an appearance of intimacy, combined with great dignity.

The third bank, the Desert Bank in California, is a small branch bank—completely in character with the surrounding territory, but with cool color as a relief from the bright sunlight out-of-doors. The other small bank, in Maine, is informal in a more sophisticated way. Made in a circular form to permit drive-in banking, it is completely unorthodox as banking design goes. The entire vault wall is done in a mural of many colors, depicting numerals and percentages in arithmetical procedures arranged in an attractive design.

banks

location	York National Bank, Old Orchard Beach, Maine
architect	Carl Koch & Associates
associate architect	Leon Lipshutz

luminous ceiling

wall mural

Planned to be a drive-in bank as well as over-the-counter, a circular scheme seemed the most logical solution. One teller may serve alone and handle both operations. The vault was considered the most important feature, so the amusing and effective (porcelain enamel) mural was planned for it, and all other surfaces were done in an inconspicuous manner. A neat yet refreshing and attractive result has been achieved.

Photos: Ezra Stoller

data

cabinetwork

Teller's Counter: designed by architect/ executed by J. G. Deering & Son, Biddeford, Me.

doors and windows

Door Hardware: Schlage Lock Co., 2201 Bayshore Blvd., San Francisco, Calif.

Window Glass: "Thermopane"/ Libby-Owens-Ford Glass Co., Room 1038-T, Nicholas Bldg., Toledo, Ohio

furniture and furnishings

Chairs: #6002/ Herman Miller Furniture Co., Zeeland, Michigan

Tables: #2116/ M. Singer & Co., 36 E. 19 St., New York, N. Y.

lighting

Downlights: #350/ Century Lighting Inc., 521 W. 43 St., New York, N. Y.

Luminous Ceiling: "Marlux ceiling"/ corrugated, translucent plastic/ Martin Electric Products, Inc., 346 Somerville Ave., Somerville 43, Mass.

mural

Vault Exterior: designed and executed in porcelain enameled steel, by Gyorgy Kepes

walls, ceiling, flooring

Walls: painted plaster

Ceiling: wood battens/ J. G. Deering & Son, Biddeford, Me.

Flooring: rubber tile/ Hood Rubber Co. Division of B. F. Goodrich Co., 99 Nichols Ave., Watertown, Mass.

banks

location	Desert Bank, Cathedral City, California
architects	Clark & Frey

crafts display

indoor plantings

cove lighting

check desk

bleached-walnut

The directors of this bank in a resort community wanted a friendly, informal atmosphere. The architects and interior designers have achieved this aim. There is a small lounge area, which encourages people to stop and chat with their friends, and a display of native crafts adds to the informality. Combined with sage green walls for eye rest from the desert glare, bleached casework with glass screens, and large glass windows, are indoor plantings to contribute to the over-all effect. Particularly attractive are the architect-designed check writing desks.

Photos: D. J. Higgins

data

cabinetwork

Tellers' Windows, Check Desks: custom design, Clark & Frey

Sliding-Door Hardware: Grant Pulley & Hardware Co., 31-95 Whitestone Parkway, Flushing, L. I., N. Y.

doors and windows

Doors: "Herculite" tempered-plate glass/ Pittsburgh Plate Glass Co., 2166-2 Grant Bldg., Pittsburgh 9, Pa.

Door Hardware: "Plymouth"/ dull chrome/ Schlage Lock Co., 2201 Bayshore Blvd., San Francisco, Calif.

Windows: (north side) ¼" plate glass/ (east side) ¼" AKLO, hammered heat-absorbing/ Blue Ridge Glass Corp., Kingsport, Tenn.

lighting

Fluorescent Cove and Incandescent Flush Fixtures: General Lighting Co., Inc., 1527 Charlotte St., New York, N. Y.

walls, ceiling, flooring

Walls: painted plaster, brick

Ceiling: "Acousti-Celotex"/ The Celotex Corp., 120 S. La Salle St., Chicago 3, Ill.

Flooring: terra-cotta-colored cement sculpture in wood

Vermont marble columns

data

cabinetwork

Counters: front-face and top in flush-face dark mahogany, deal plates of black Formica/ William Somerville, Inc., 166-172 E. 124 St., New York, N. Y.

Check Desks, Hand Rails: dark mahogany/ William Somerville, Inc.

furniture and furnishings

All Furniture: dark mahogany/ black leather used on upholstered pieces/ W. & J. Sloane, 575 Fifth Ave., New York, N. Y., and Smith & Watson, Inc., 20 E. 55 St., New York, N. Y.

Curtains: Fiberglas net/ Thortel Fireproof Fabrics, Inc., 101 Park Ave., New York, N. Y.

lighting

Circular Downlights: Rambusch Decorating Co., 40 W. 13 St., New York, N. Y.

Flush Recessed Strip Lighting: Modern Metal Mfg. Co., 217 Grand St., New York, N. Y.

sculpture

Relief Sculpture: cherry wood/ subject matter—original function of company, supplying water to Manhattan/ executed by Sidney Waugh

walls, ceiling, flooring

Walls: plaster/ painted

Ceiling: Sabinite acoustical plaster/ United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.

Flooring: terrazzo/ V. Foscato, Inc., 22-02 40th Ave., Long Island City, N. Y.

location	Bank of the Manhattan Company, 535 Fifth Ave., New York, New York
architects	Walker & Poor

In this alteration job, with drastic revisions to all spaces, the architects aimed for a design so simple and bold that it would seem like an unlabored solution, with careful incorporation of lighting and air-conditioning as integral elements of design. Aiding in this successful execution are soft pale-gray walls, black-and-white floor, and free-standing columns of white Vermont marble. Dark mahogany furthers the look of elegant simplicity.

Photos: Gottscho-Schleisner

terrazzo floor

banks

Executed in limited space, to handle only banking needs of UN personnel, this is dignified and intimate, yet functional within a compact area. The curved counter area creates a wide space for work desks at one end of the room, and is an attractive form in an otherwise severely rectangular space. Deep-green leather upholstery, carpet, and walls, and golden wood tones produce a sympathetic scheme.

Photos: Gottscho-Schleisner

curved counter

data

cabinetwork

Counter: front face and top, flush-surface butternut/ John Langenbacher Co., Inc., 550 Barry St., Bronx 59, N. Y.

Check desk: butternut/ John Langenbacher Co., Inc.

furniture and furnishings

All furniture: walnut/ upholstery, dark-green leather/ Macey-Fowler, Inc., 305 E. 63 St., New York, N. Y.

Net Curtains: J. H. Thorp & Co., Inc., 250 Park Ave., New York, N. Y.

lighting

Recessed Downlights: louvered/ flush with ceiling/ Century Lighting Inc., 521 W. 43 St., New York, N. Y.

walls, ceiling, flooring

Walls: plaster

Storage Wall: butternut/ flush-surface sliding doors/ John Langenbacher Co., Inc.

Ceiling: Sabinite acoustical plaster/ United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.

Flooring: rubber tile/ black-and-gold/ The B. F. Goodrich Co., 448 S. Main St., Akron, Ohio

rubber-tile flooring

location	Chemical Bank & Trust Co., UN Secretariat, New York, New York
architects	Walker & Poor

behind-counter storage wall

so over last week-end I panelled his office in English Oak

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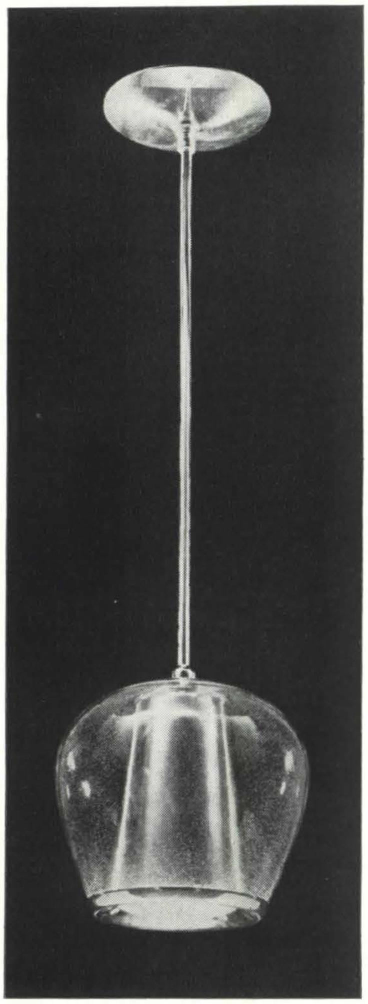
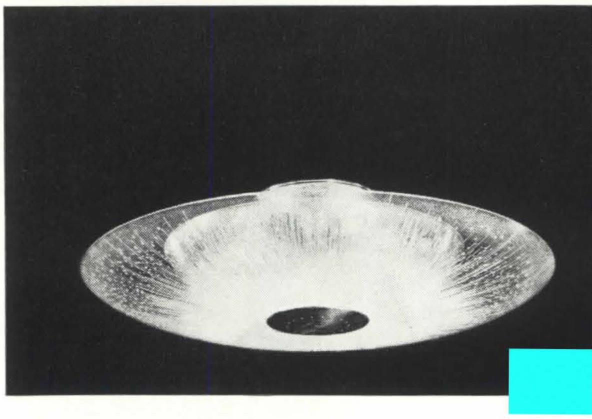
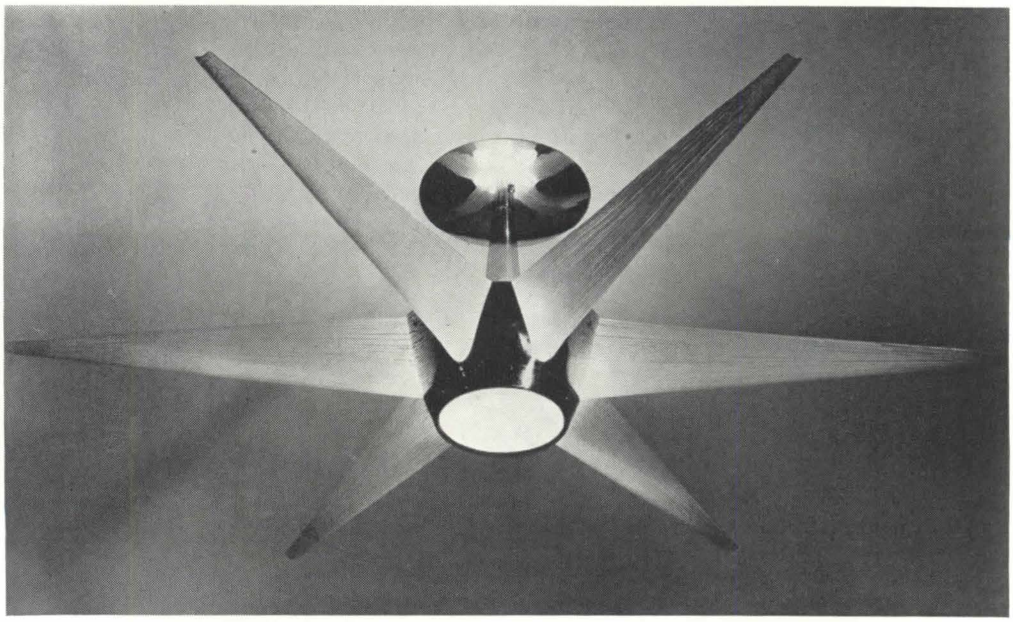
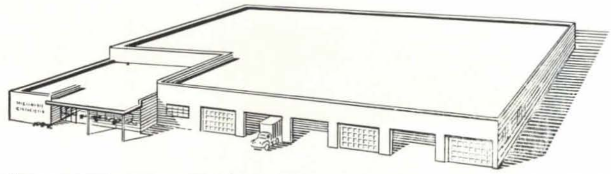




Lighting Fixtures: "Claremont" group/ combination of microscopic glass beads fused by hand on glass plate and polished brass/ glass is both translucent and refractive/ designed by Carl Moser/ #4221 downlight, 31-5/8" long/ **retail:** \$32.75; #4224 bowl, 21-1/2" wide, 14-1/2" long/ **retail:** \$44; #4227 indirect, 21-3/8" wide, 6-1/2" long/ **retail:** \$37.50; #4238 Star/ available larger size for commercial installations/ 29" wide, 12-1/2" long/ **retail:** \$66/ **Lightolier, Inc., 11 E. 36 St., New York, N. Y.**



Richmond Groceries Warehouse, Philadelphia, Pa.
Architect & Engineer: The Ballinger Co., Philadelphia.
General Contractor: George K. Heebner, Inc., Philadelphia.
Roof Deck Contractor: J. B. Eurell Co., Lansdowne, Pa.



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says CLEMENT J. STEFANOWICZ, *President, Richmond Groceries, Philadelphia, Pa.*

"We recommend Kaylo Roof Deck to other companies," says Mr. Stefanowicz, "because of our satisfactory experience with it in our modern warehouse." Mr. Stefanowicz likes the cool, pleasant conditions provided by Kaylo Insulating Roof Deck throughout the hot summer months . . . absolutely no spoilage of grocery products . . . greater employee efficiency.

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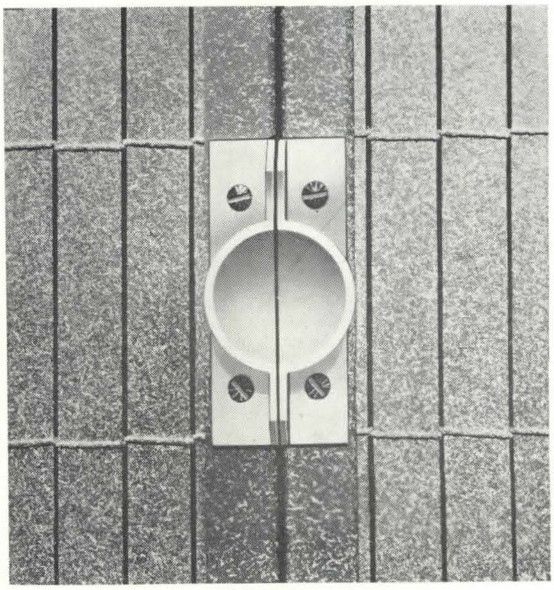
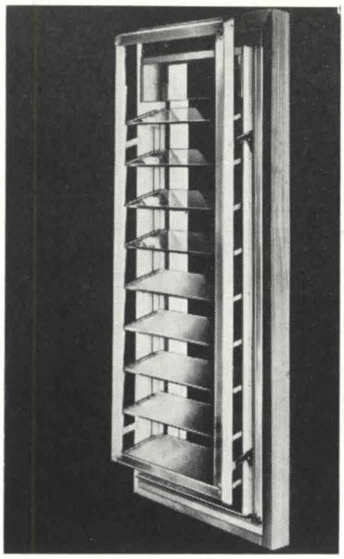
Fabric Wall Covering: "Stylon"/ hand-printed/ designed for use in homes/ may be scrubbed without damage, will not fade in sunlight/ priced within range of hand-printed wallpapers/ **retail:** $7.95 and $8.95 a single roll/ **Wall Trends Inc., 509 Madison Ave., New York 22, N. Y.**

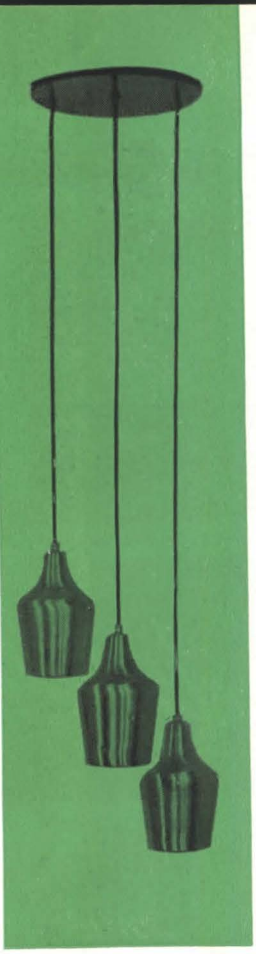


Folding Door: "Ra-Tox"/ basswood strips woven with seine twine/ available in new Cocoa Brown color/ stipple finish available in green-on-ivory and white-on-gray/ hardware designed by Walter Dorwin Teague Associates/ handle of molded phenolic plastic in light neutral gray/ for single and double doors/ **The Hough Shade Corporation, Janesville, Wis.**

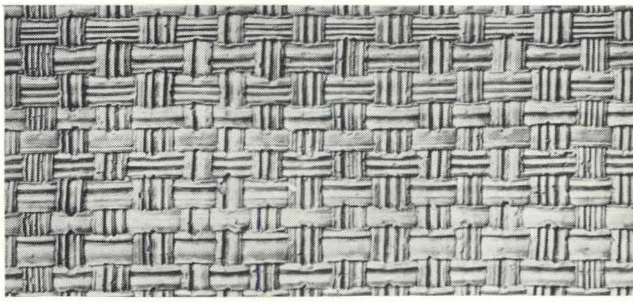


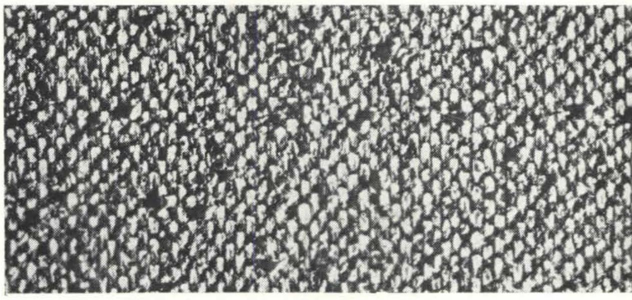
Louvered Window: "Seal-Vent"/ designed for Northern climate, lifetime vinyl-plastic weather-stripping developed by B. F. Goodrich Co./ provides a tighter closing than most casement windows/ .093 Alcoa Aluminum extrusion/ inside screens mounted flush/ has storm sash attachments/ **American Aluminum Products, Inc., Miami, Fla.**

Electric Ranges: "Spacemaker 24" and "Spacemaker 36"/ automatic pushbutton ranges/ narrow widths permit addition of storage units and counter top without loss of efficiency or cooking space/ Calrod ovens have extra width/ oven timer sets for desired time cooking is to end and length of time to cook/ **retail:** $229.95 and $254.95/ **General Electric, Major Appliance Division, 310 W. Liberty St., Louisville 2, Ky.**



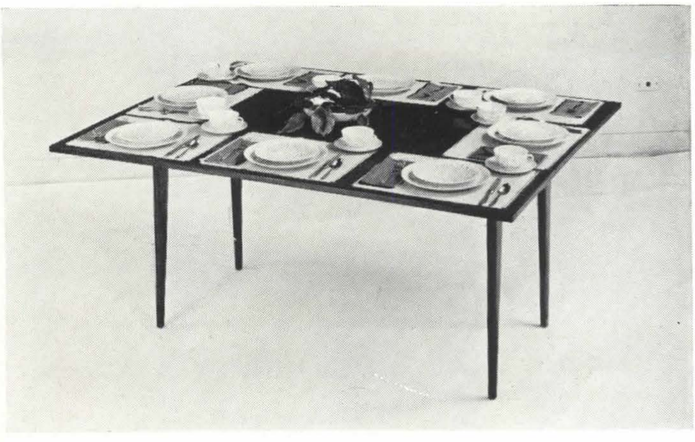
Ceiling Chandelier: #322/ lamp housings, brushed-aluminum/ canopy and cord, flat black/ triangularly spaced, hung at 6" height differentials/ over-all length, 30"/ designed by Harry Gitlin/ **retail:** $57/ **Ledlin Lighting, Inc., 431 W. Broadway, New York 12, N. Y.**





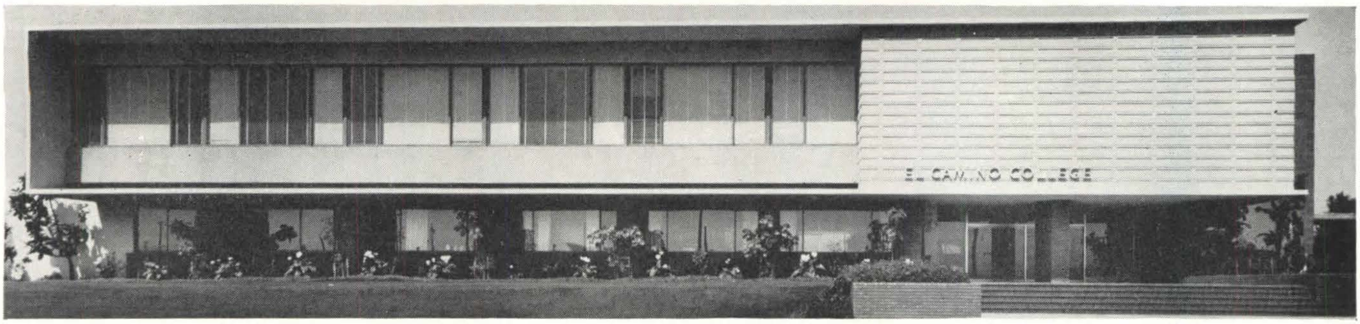
Textured Vinyl Fabrics: "Vicrtex V. E. F." (vinyl electronically fused)/ 3-dimension textures, Norfolk Briartweed, Wood Weave, and Irish Basket/ will not chip, scratch, peel, or crack; can be folded, pleated, or shaped; stain, soil, and flame-resistant/ need no backing or lining/ available in 28 fadeproof colors/ may be used for wall covering or upholstering/ 56" wide/ **retail:** $6.00 a yd./ **L. E. Carpenter & Co., Inc., Empire State Bldg., New York 1, N. Y.**

Console and Card Table: double top/ available in walnut or birch/ card table expands to 64"; console, 24" x 60", opens to 48" x 60"/ designed by Harold Bartos/ **retail:** console, $259; card, $229/ **Lehigh Furniture Corp., 16 E. 53 St., New York 22, N. Y.**



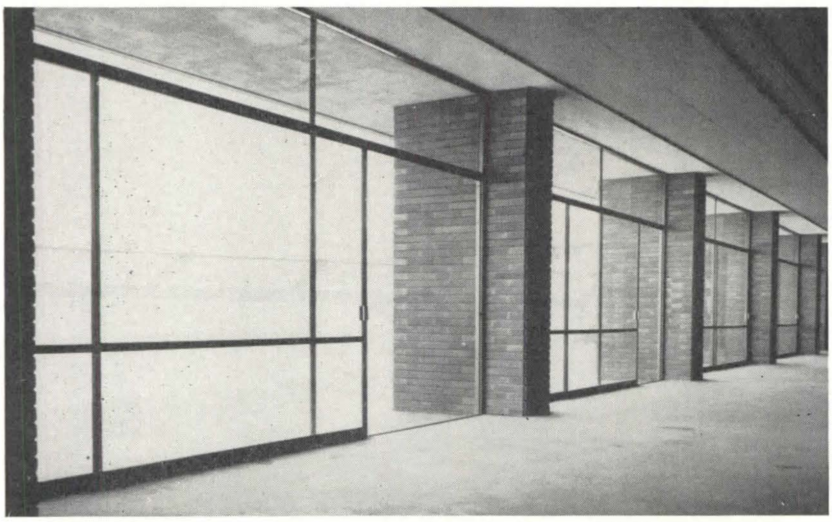
arcada details

no. 3 of a series



PHOTOS - J. DALE HEALY

sliding glass doors by Arcadia



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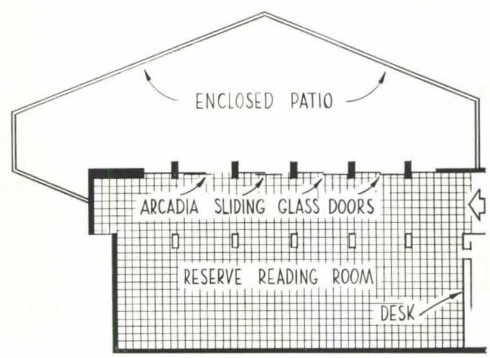
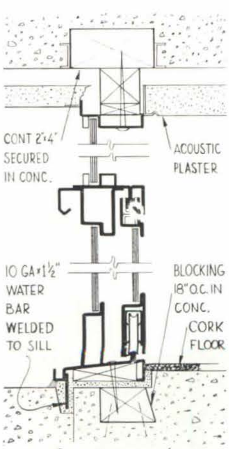
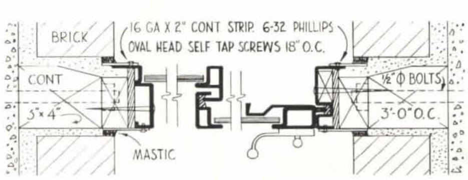




Section A



Section B

Large expanses of steel-framed Arcadia sliding glass units provide background of restful environment for modern learning at El Camino Jr. College. Arcadia units, used as entire wall of library reading room and across facade of administration building, reflect an established trend in contemporary school design. Ask Arcadia to help solve your school design problems.

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arcadia SLIDING GLASS DOORS

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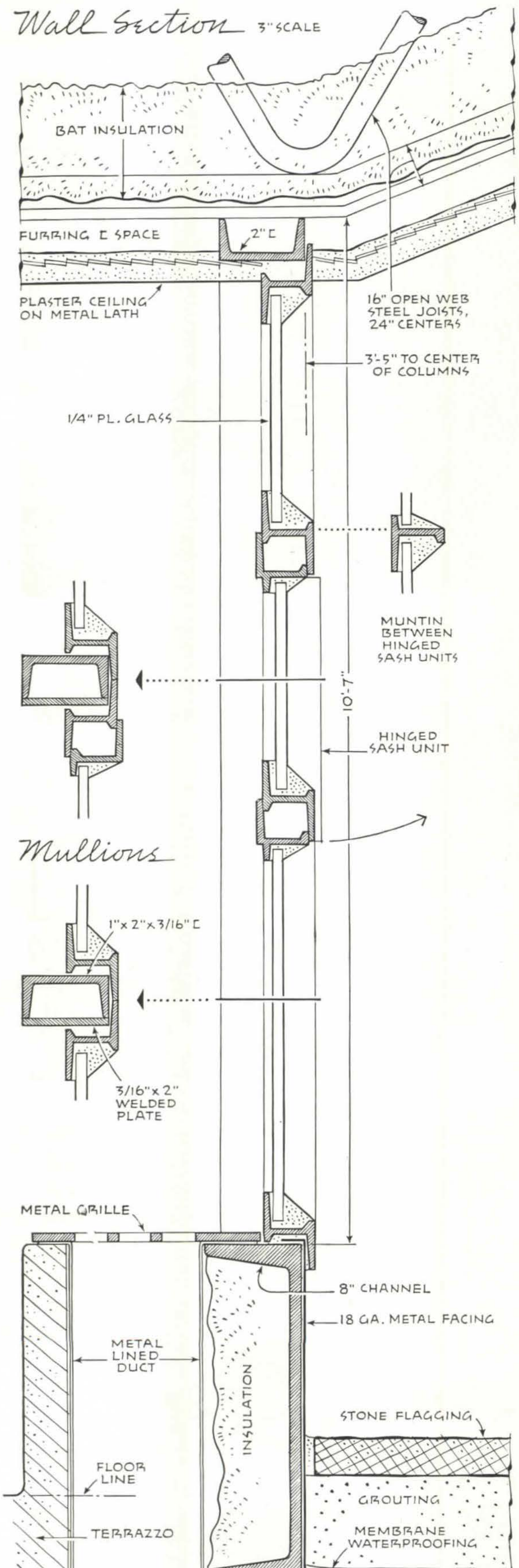
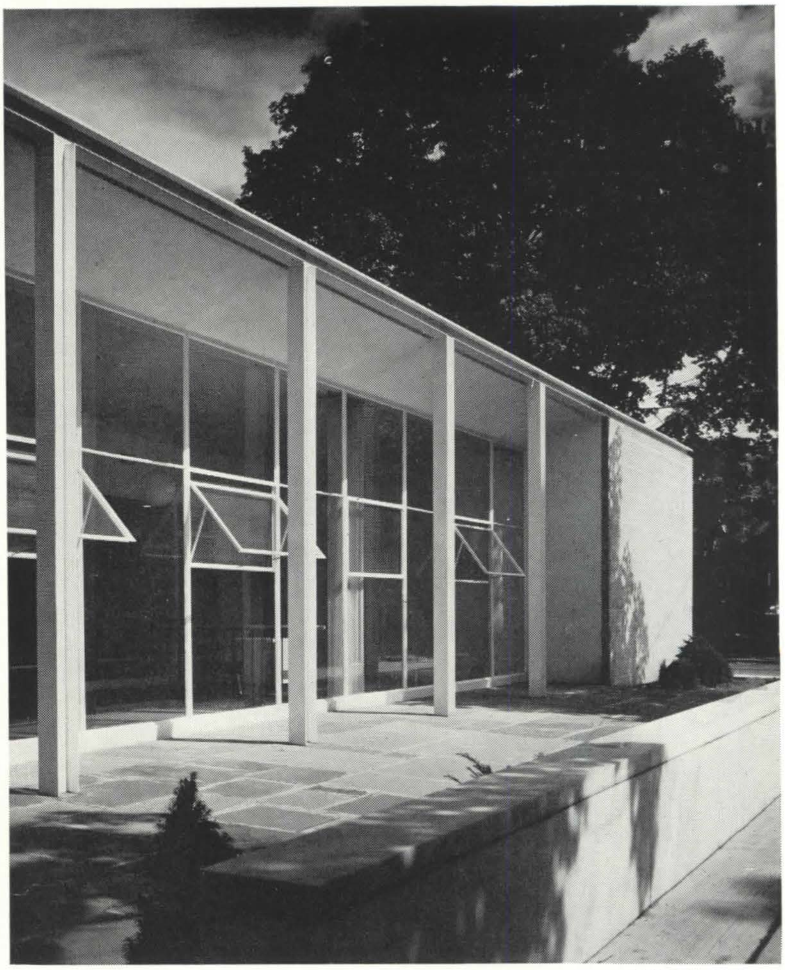
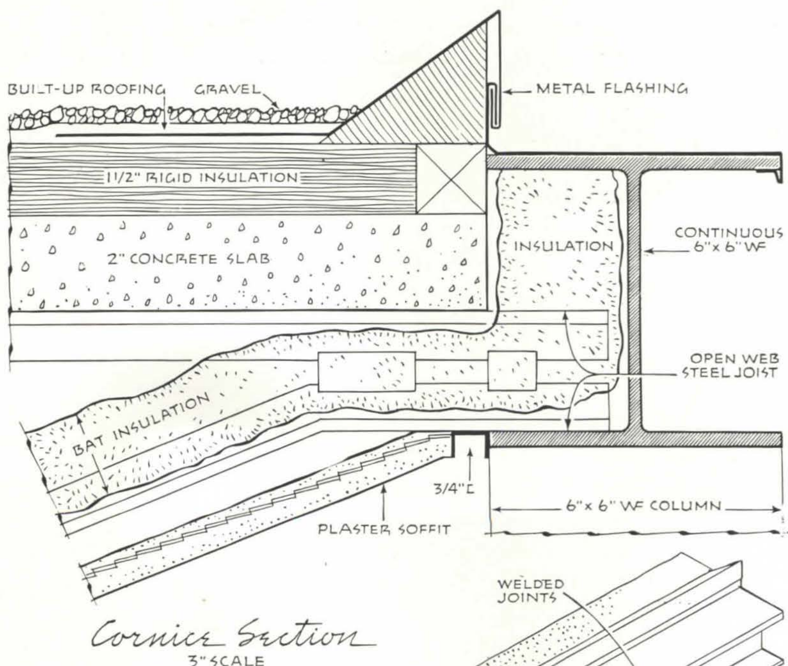
Lawndale, Calif.
Marsh, Smith & Powell, Architects.

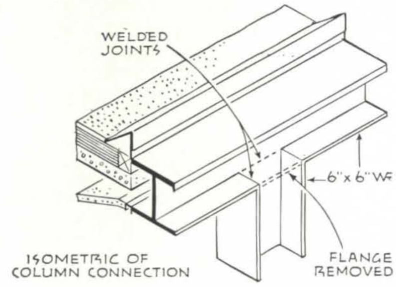
bank: loggia window wall





HEDRICH-BLESSING

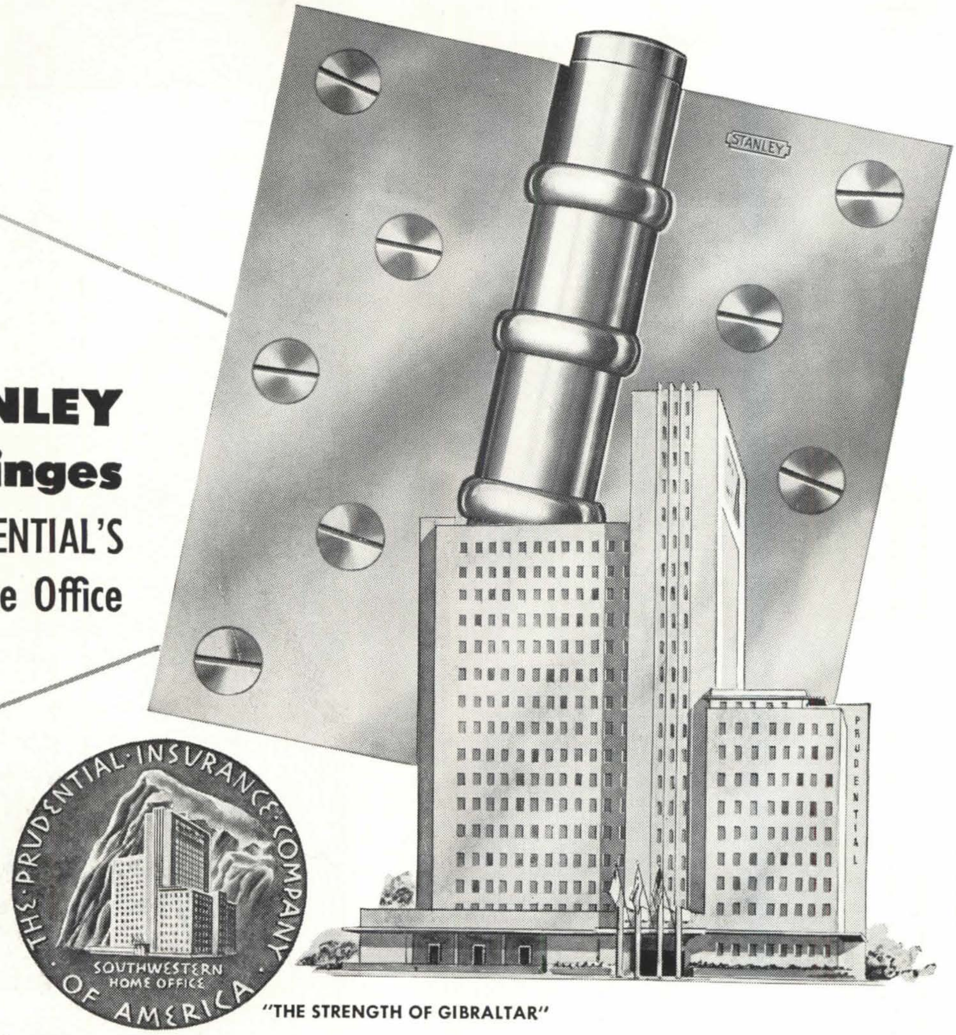




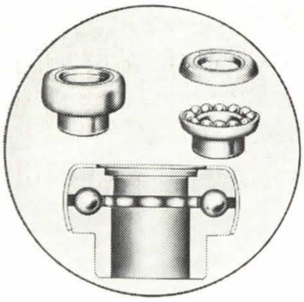
OTTAWA SAVINGS AND LOAN ASSN., Holland, Mich.

Harry Weese, John Van der Meulen, and Bruce Adams, Architects

STANLEY
BB118 Hinges
serve The PRUDENTIAL'S Southwestern Home Office



"THE STRENGTH OF GIBRALTAR"



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The exclusive Full-Jeweled Bearing in Stanley Hinges eliminates lateral as well as vertical wear.

Hardware Consultants know it as the Stanley BB118 (Full-Jeweled* Ball Bearing Butt Hinge). Architects and builders have come to know it as "the hinge that won't wear out".

In buildings designed with an eye to the future, you'll find Stanley Full-Jeweled Hinges. Such a building is the new Southwestern Home Office of The Prudential Insurance Company of America in Houston, Texas. Equipped with the most modern facilities throughout, its doors swing *quietly* . . . easily . . . trouble-free — for the life of the building — on Stanley Full-Jeweled Ball Bearing Butt Hinges.

Like the building, these Stanley Hinges combine beauty and efficiency. And like The Prudential, they have the strength to overcome the stresses and strains of the passing of time.

In the buildings you are planning, specify Stanley BB118 Hinges for heavy doors, exterior doors and doors receiving high frequency service.

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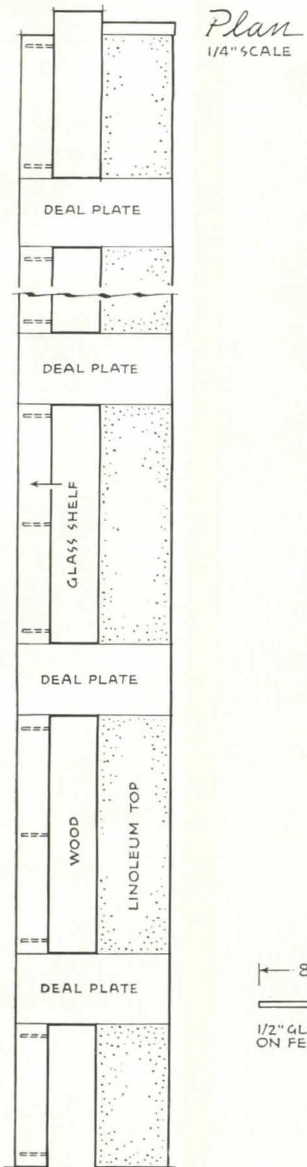
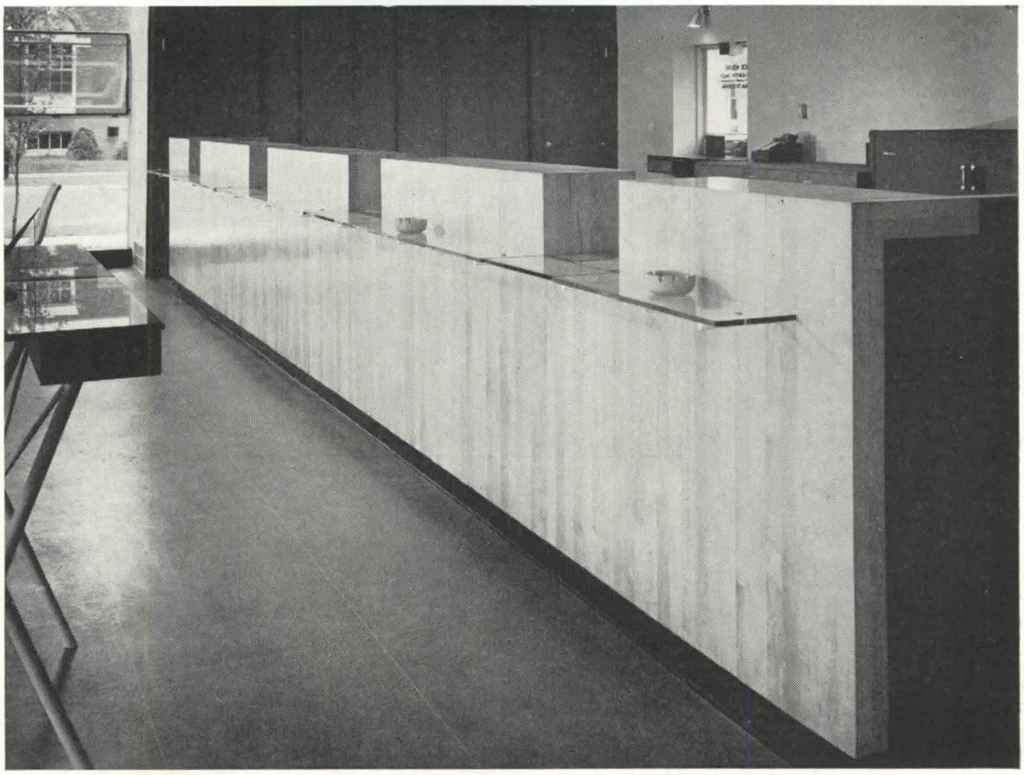
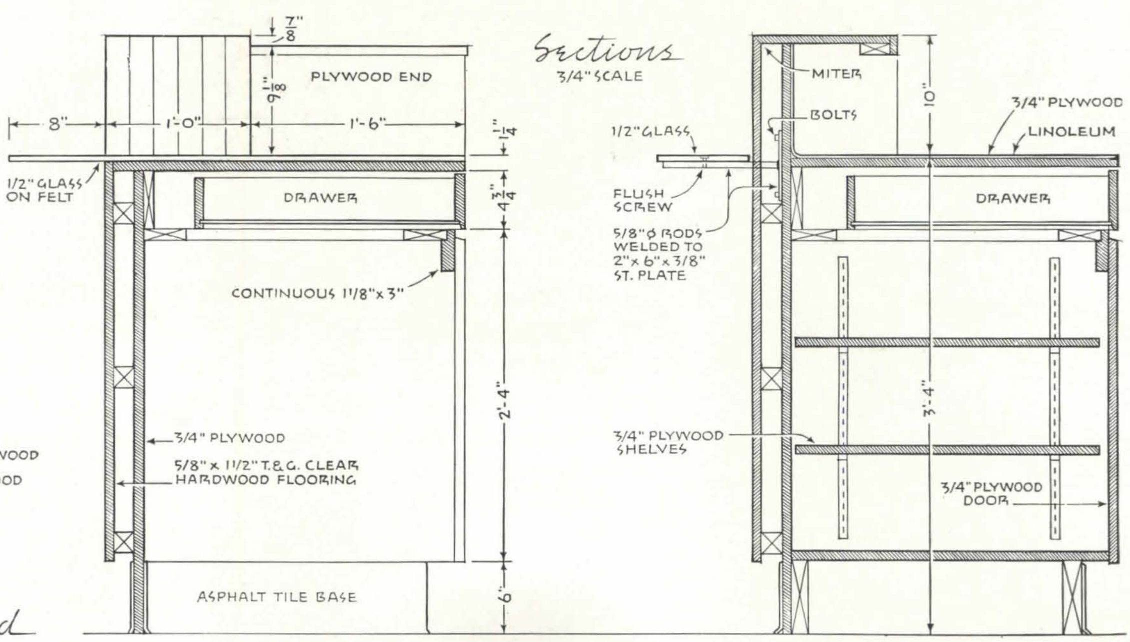
The Most Famous Doors in the World Swing on Stanley Hinges

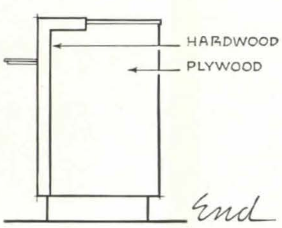
bank: teller's counter

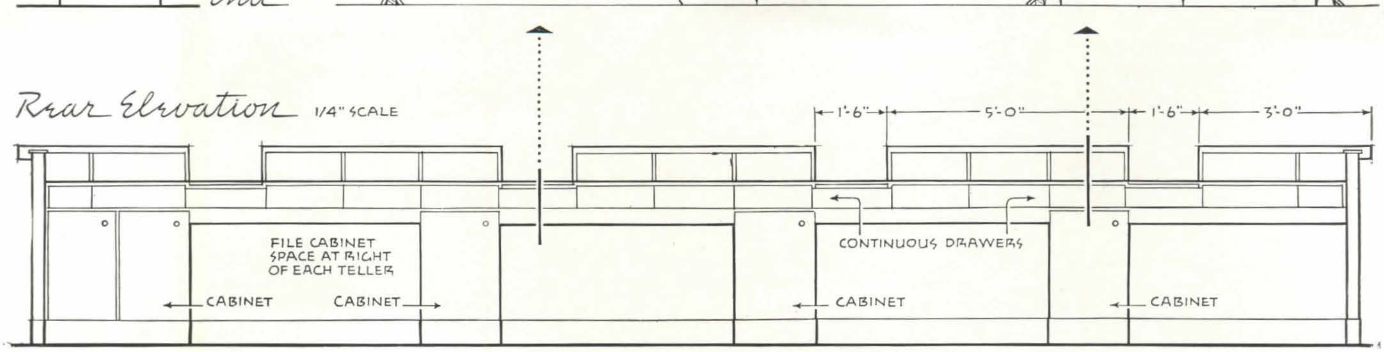




HEDRICH - BLESSING







OTTAWA SAVINGS AND LOAN ASSN., Holland, Mich.

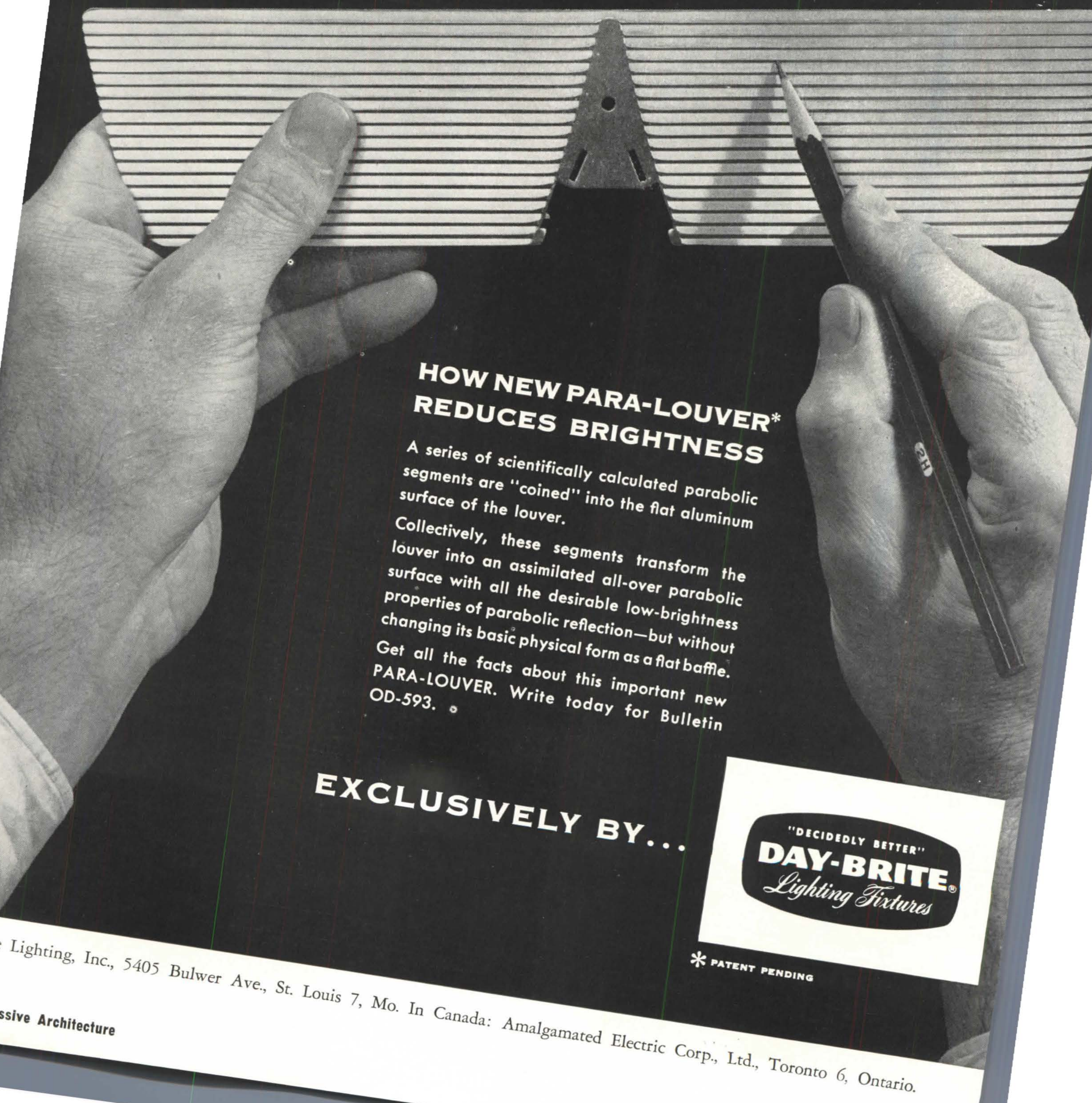
Harry Weese, John Van der Meulen, and Bruce Adams, Architects

NEW!

Now, for the first time in louvered fixtures, low-brightness comfort is possible from all viewing angles—cross-wise and end-on.

Day-Brite engineers, in keeping with a Day-Brite habit of being first in the field with new ideas for improved comfort in lighting, have developed a remarkable new low-brightness louver.

Called the PARA-LOUVER, this new discovery reduced brightness as much as 50% without sacrificing efficiency. PARA-LOUVERS are available now for use with Day-Brite Alzak aluminum parabolic troffers.



HOW NEW PARA-LOUVER* REDUCES BRIGHTNESS

A series of scientifically calculated parabolic segments are "coined" into the flat aluminum surface of the louver.

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Get all the facts about this important new PARA-LOUVER. Write today for Bulletin OD-593.

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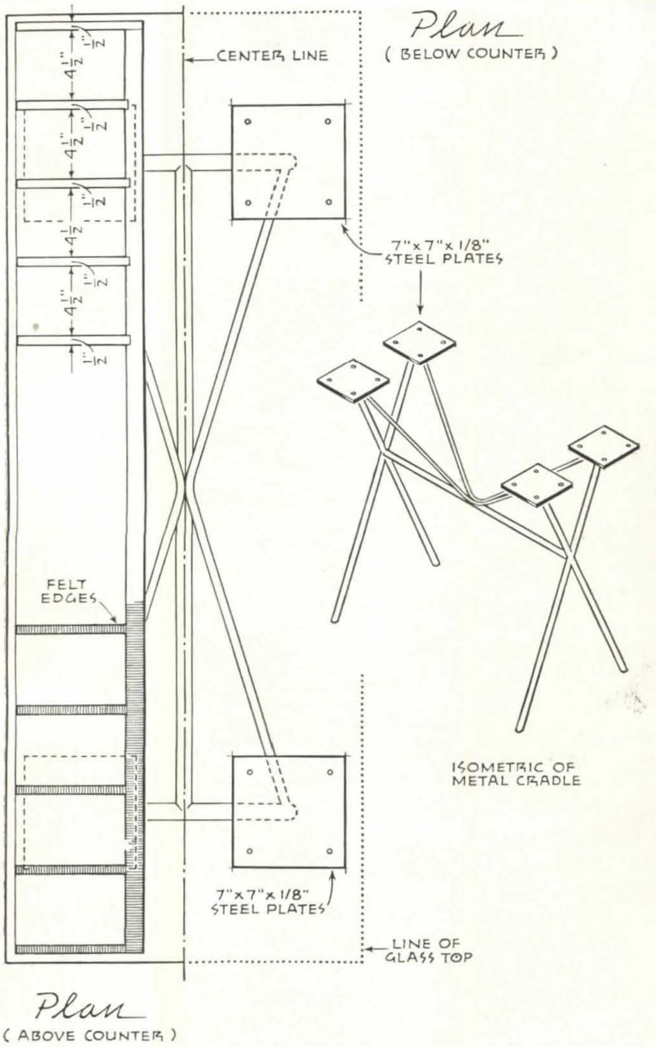
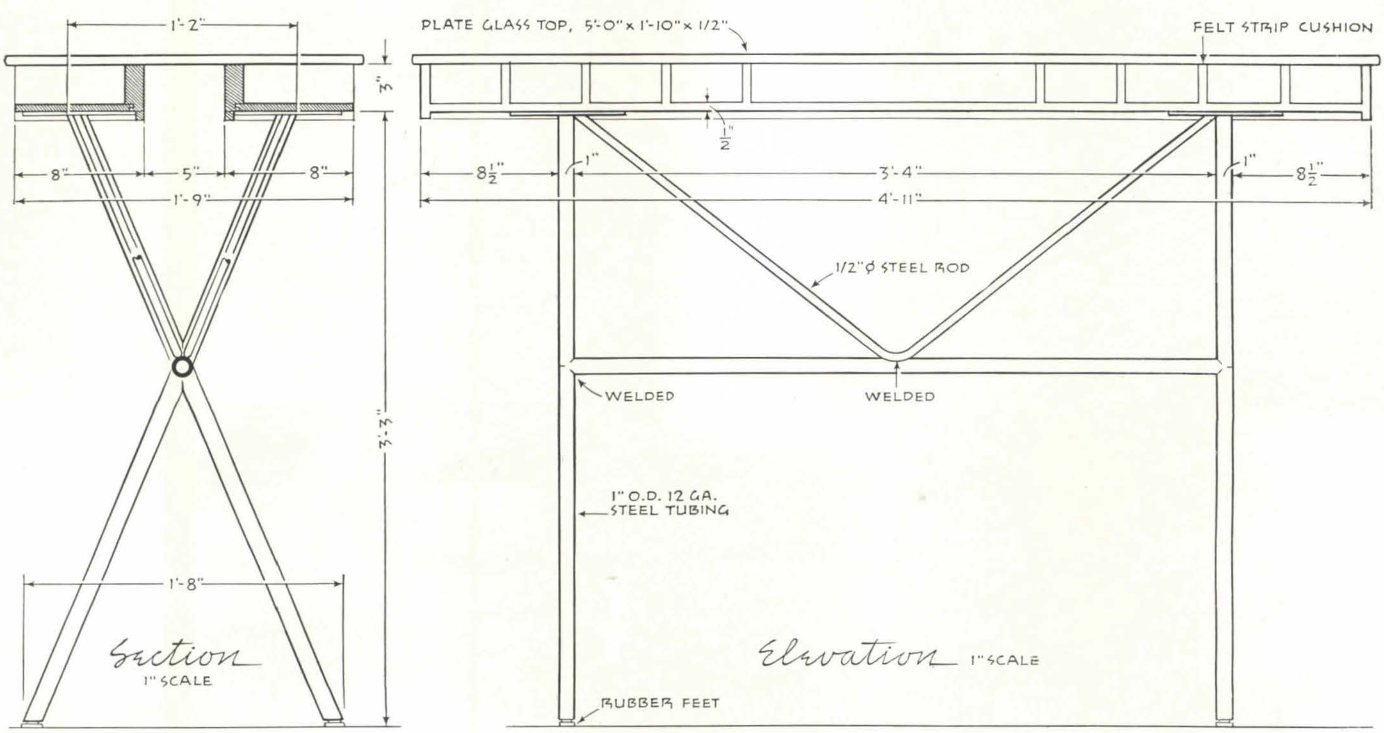
bank: customers' desk



HEDRICH - BLESSING



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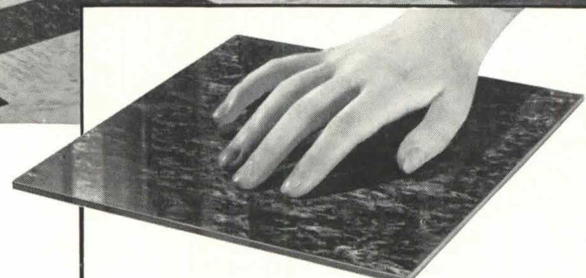
You can specify B. F. Goodrich Rubber Floor Tile with complete confidence . . . it's backed by the famous research of B. F. Goodrich . . . First in Rubber . . . there is no higher recommendation.

Write today for complete information or see Sweet's Catalog. Write *Dept. P6, B. F. Goodrich Co., Flooring Division, Watertown 72, Mass.*



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It will tell you the secret of *"Super-Density"*. This feature of B. F. Goodrich Rubber Floor Tile provides a smooth, non-porous surface. Dirt just doesn't have a chance to collect on this compact, yet naturally resilient floor tile. It's easier to clean and keep clean.

. . . in a floor with a surface like this. Cleaning is difficult, ineffective, costly.

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This month we continue reporting the case summaries and other matters of interest supplemental to Tomson's *Architectural and Engineering Law* (Reinhold 1950), begun on this page in our last issue.

AGREEMENTS WITH OWNERS

The employment relation between architect or engineer and owner is entered into by a voluntary agreement between the parties; its creation and existence is governed by the general principles of contract law.

California. *Crane v. City of Ukiah et al.*, 110 Cal. App. 2nd 640, 243 P2nd. 582 (1952). The plaintiff general contractor agreed to construct a reservoir for the city within a fixed period of time and the individual defendant and the city entered into a contract whereby he was employed as consulting engineer to provide all necessary engineering services in connnection with the construction of the reservoir. The general contractor, subsequently in consideration for an extension of time permit, agreed that the city should have the right to charge him for all or any part of the engineering and other charges accruing during the period of extension. The Court held that the defendant engineer was not such a third party beneficiary so as to entitle him to enforce an agreement between the city and plaintiff. The plaintiff therefore was permitted to recover from the city the amount of engineering charges deducted from the sum due plaintiff under the contract.

New York. *Brown et al. v. Mount Vernon Housing*, 279 App. Div. 794, 109 N. Y. S. 2nd 392 (1952). The Appellate Division found that the housing authority could not be held liable for services rendered by the plaintiff where the resolutions of the authority specifically conditioned employment of architects upon approval of State Division of Housing, and such approval had not been obtained. Plaintiff architect agreed to submit to the defendant the preliminary plans for construction of dwelling units upon sites selected by the housing authority, and the services of plaintiff were accepted by defendant who refused to prepare formal contracts for submission to the State Division of Housing.

RELATIONSHIP TO OWNER

A trust relationship exists between owner and architect or engineer. In undertaking to render professional services, the architect or engineer represents that he has and will exercise reasonable care and skill without negligence.

South Carolina. *Hill v. Polar Pantries*, 219 S.C. 263, 64 S.E.2d. 885, 25 A.L.R.2d. 1080 (1951). In a suit for damages alleged to have been caused by a corporate defendant in furnishing unsuitable and defective plans and specifications for the installation of a frozen-food locker plant and in their failure to supervise properly the work, the court held that there was an implied warranty of the sufficiency of the plans and specifications for the contemplated purpose. The court reaffirmed the rule that where a person holds himself out as specially qualified to perform work of a particular character, there is an implied warranty that the work which he undertakes shall be of proper workmanship and reasonable fitness for its intended use.

Massachusetts. *Simpson Brox. Corp. v. Merrimac Chemical Co.*, 248 Mass. 346, 142 N.E. 922 (1924). The approval of plans by the owner for an underground concrete tank for the storage of fuel oil, did not, as a matter of law, mean an unqualified acceptance and sanction of the plan in all its details, nor was it held to excuse the contractor, who had drawn the plans, from the exercise of ordinary and reasonable care in designing the structure and formulating his plans.

LIABILITY FOR NEGLIGENCE OR FRAUD

An architect or engineer is liable to the owner for damages resulting from his negligence in performing architectural or engineering services. He is also liable for any fraud practiced on the owner.

California. *Raisch v. Sanitary Dist. No. 1 of Main County*, 240 P. 2nd 48 (1952). Plaintiffs brought an action to obtain an adjudication that an assessment of benefits for construction of a sewer system was invalid because of the interest of the engineer employed by the sanitary district in the contract and in the property within the district.

The Court, although finding that the engineer accepted employment to subdivide property of the property owners within the district while employed by the district, determined that his action did not invalidate the assessment of benefits in the absence of an allegation by the plaintiffs of any specific misconduct by the engineer or of any discrimination in making assessments.

It was further found that the engineer was not a public officer and that he had no interest in what happened other than in performance of his duties so that the assessments were not void on the ground of the engineer's interest in the contracts as a quasi public officer. Finally it was determined that the engineer was not a party to the contract even though he was required by statute to sign the contract between the district and the contractor.

Missouri. *Dysart-Cook Mule Co. v. Reed & Hechenlively*, 114 Mo. App. 296, 89 S. W. 591 (1905). Plaintiff employer was found to have been put to a greater expense in the construction of a mule barn than would have been necessary if the architect had drafted the plans according to agreed specifications. The plaintiff was entitled to recover of the defendants the amount of such expense.

Louisiana. *Barraque v. Neff*, 202 La. 360, 11 So.2d. 697 (1942). Defendant architect was held liable for defective work when he substituted stucco for brick veneer in constructing the plaintiff's house and which necessitated the plaintiff reconstructing the walls, which had in the meantime become defective due to cracks and leaks. Plaintiff was granted recovery for the cost of repainting due to cracks and leaks and for the brick veneering.

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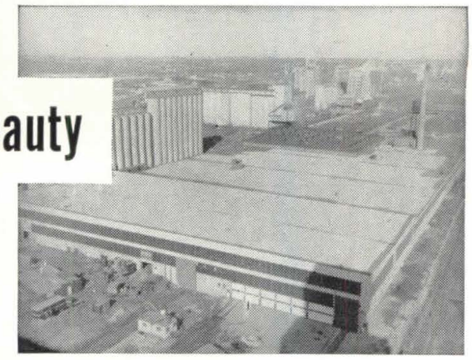
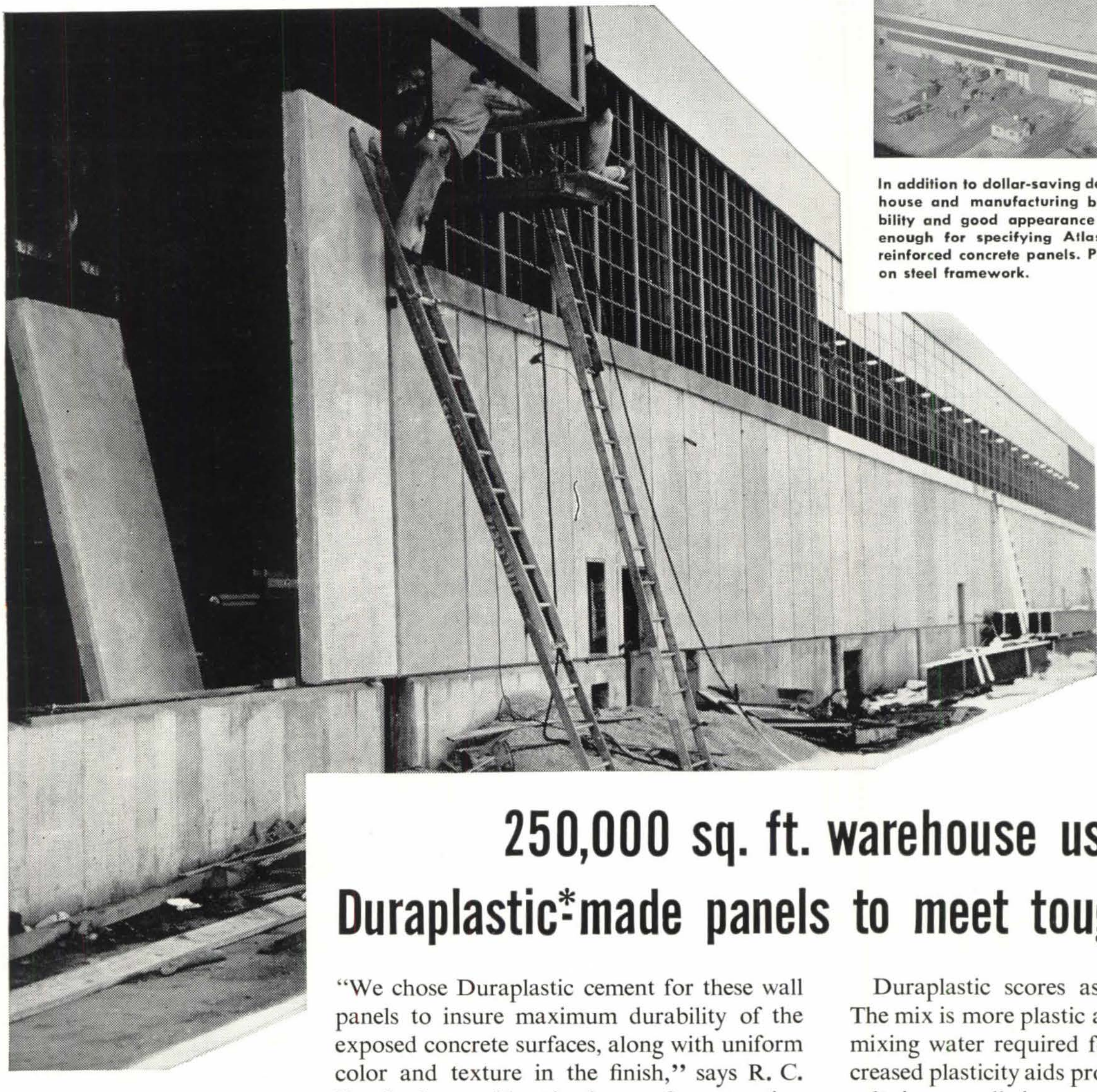


In addition to dollar-saving design for this huge new warehouse and manufacturing building in Milwaukee, durability and good appearance were also required. Reason enough for specifying Atlas Duraplastic cement in the reinforced concrete panels. Panels were job-cast and hung on steel framework.



*Designed by
V. K. Boynton,
Consulting Engineer
Milwaukee*

250,000 sq. ft. warehouse uses Duraplastic*-made panels to meet tough "specs"

"We chose Duraplastic cement for these wall panels to insure maximum durability of the exposed concrete surfaces, along with uniform color and texture in the finish," says R. C. Knoll, vice president in charge of construction for Inland Steel Products Company. And the builder backs him up:

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Duraplastic scores as well in appearance. The mix is more plastic and cohesive, with less mixing water required for a given slump. Increased plasticity aids proper placement and results in generally improved surface appearance.

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OFFICES: *Albany, Birmingham, Boston, Chicago, Dayton, Kansas City, Minneapolis, New York, Philadelphia, Pittsburgh, St. Louis, Waco.*

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