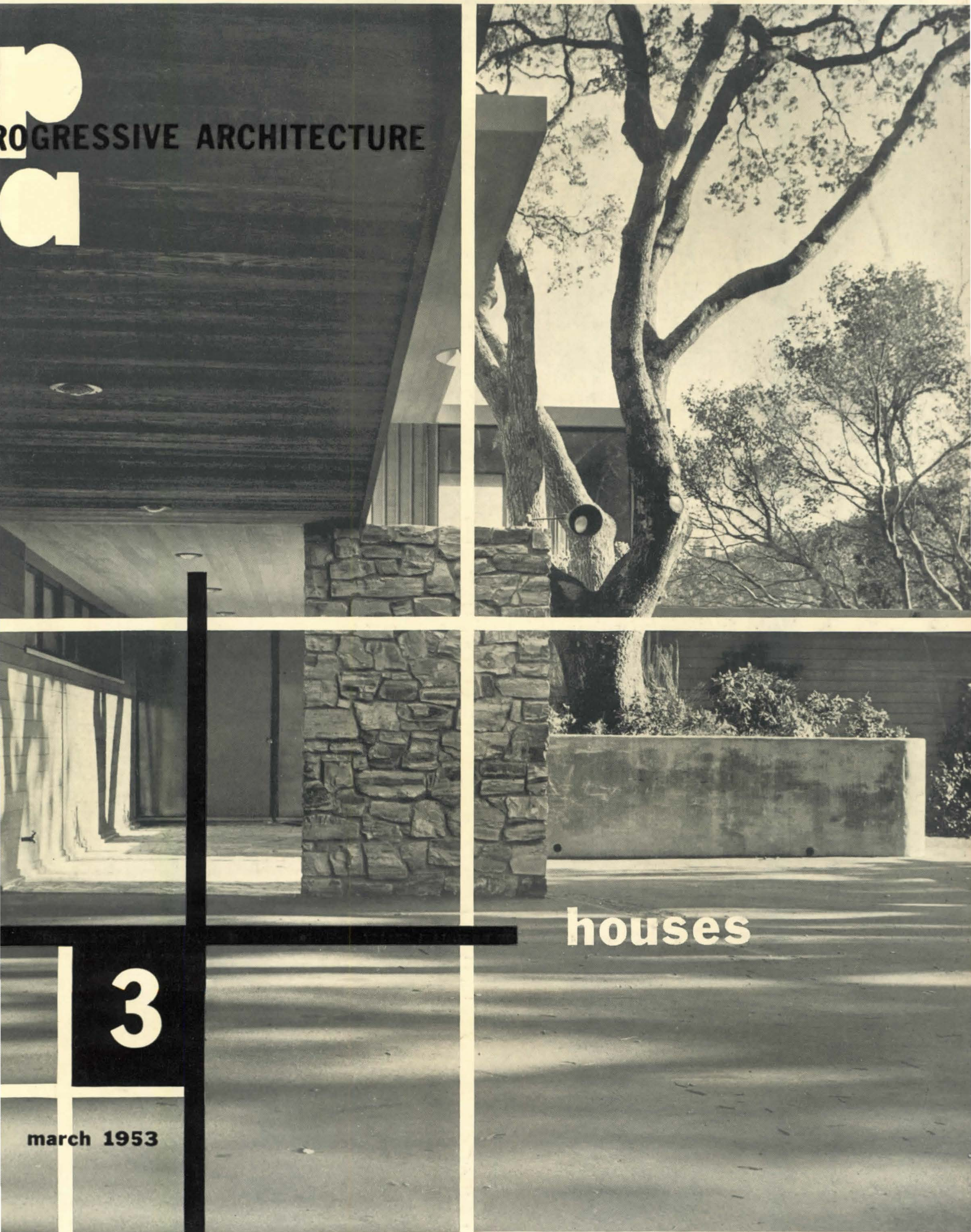
p
ROGRESSIVE ARCHITECTURE
a



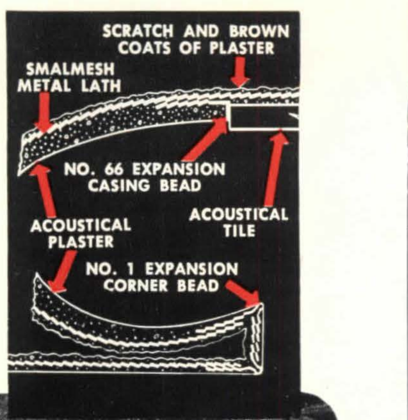
houses

3

march 1953

largest architectural circulation in the world

Handsome Misericordia Hospital lobby made permanently beautiful and firesafe with Milcor Metal Lath construction. Note details at right and construction photo below.



Misericordia Hospital, Milwaukee, Wis. • *Architects*: Brust & Brust • *General Contractor*: Ed Steigerwald & Sons • *Plastering Contractor*: Michael Iglinski, Jr

MILCOR* Casing Bead provides

clean, protective separation between plaster and other materials

IN this hospital lobby, Milcor Casing Bead has a double function: (1) It provides a sharp, permanent line of separation between the finished acoustical plaster and the acoustical ceiling tile, which is applied over a metal lath and plaster base; (2) During construction, it served as a screed, for a smooth, clean job at the point where the plaster adjoins the acoustical-tile ceiling.

This application of No. 66 Milcor Casing Bead is typical, wherever plaster abuts a material with a different co-efficient of expansion and contraction. It often eliminates the need for covering trim, batten strip or cove mould over the joint.

These advantages of Milcor Casing Bead, however, are in addition to its basic ones of providing the beauty and simplicity of flush door and window openings — with the permanence of steel.

A variety of Milcor Casing Bead is available — solid and expansion-wing types. For further details on all types, turn to the handy Milcor Manual in Sweet's. Or, if you want your own copy for convenient reference, write us for it — no obligation, of course.

*Reg. U. S. Pat. Off. M-117

INLAND STEEL PRODUCTS COMPANY

4109 WEST BURNHAM STREET • MILWAUKEE 1, WISCONSIN

BALTIMORE 5, MD.—5300 Pulaski Highway • BUFFALO 11, N. Y.—64 Rapin St. • CHICAGO 9, ILL—4301 S. Western Avenue Blvd. • CINCINNATI 25, OHIO—3240 Spring Grove Ave. • CLEVELAND 14, OHIO — 1541 E. 38th St. • DETROIT 2, MICH. — 690 Amsterdam Ave. • KANSAS CITY 41, MO. — P. O. Box 918 • LOS ANGELES 58, CALIF. — 4807 E. 49th St. • NEW YORK 17, N. Y. — 230 Park Ave. ST. LOUIS 10, MO. — 4215 Clayton Ave

Milcor No. 66 Expansion Casing Bead

Another popular Milcor Casing Bead— No. 4 creates interior beauty around this door opening. (1.) Note that only trim, narrow face is exposed. (2.) Expanded wing provides effective plaster reinforcement. (3.) Milcor No. 657 Applied Metal Base.

Metal Lath for Strength — Plaster for Beauty!

p
PROGRESSIVE ARCHITECTURE
a

March 1953

Impartial survey shows

ARCHITECTS PREFER CELOTEX INSULATING SHEATHING 2 TO 1

over the next leading brand

Does far more than ordinary sheathing–yet costs no more, applied!

Now stronger, more rigid than ever!

Celotex 25/32″ thick Insulating Sheathing is LAMINATED for extra structural strength, added rigidity, greater bracing power.

Applied, it costs no more—and usually LESS—than ordinary sheathing. Yet it gives you all these extra advantages and economies . . .

1. **Insulates and weatherproofs** as it builds, all at one cost! No building paper needed.

2. **No corner bracing needed** to meet F. H. A. requirements, with 4′ wide, 25/32″ thick Celotex Insulating Sheathing. Has approximately 30% greater bracing strength than ordinary sheathing.

3. **Goes up 30% faster.** Easier to cut and fit. Reduces waste up to 15%. Shingles can be applied direct, quickly and easily.

4. **Double-waterproofed.** Inside, by integral treatment that coats every fibre; outside by asphalt coating. Yet has over twice the vapor permeability required by government agencies!

5. **It is the only sheathing** made of tough, interlocking, long Louisiana cane fibres—and protected by the patented Ferox® Process from dry rot and termites.

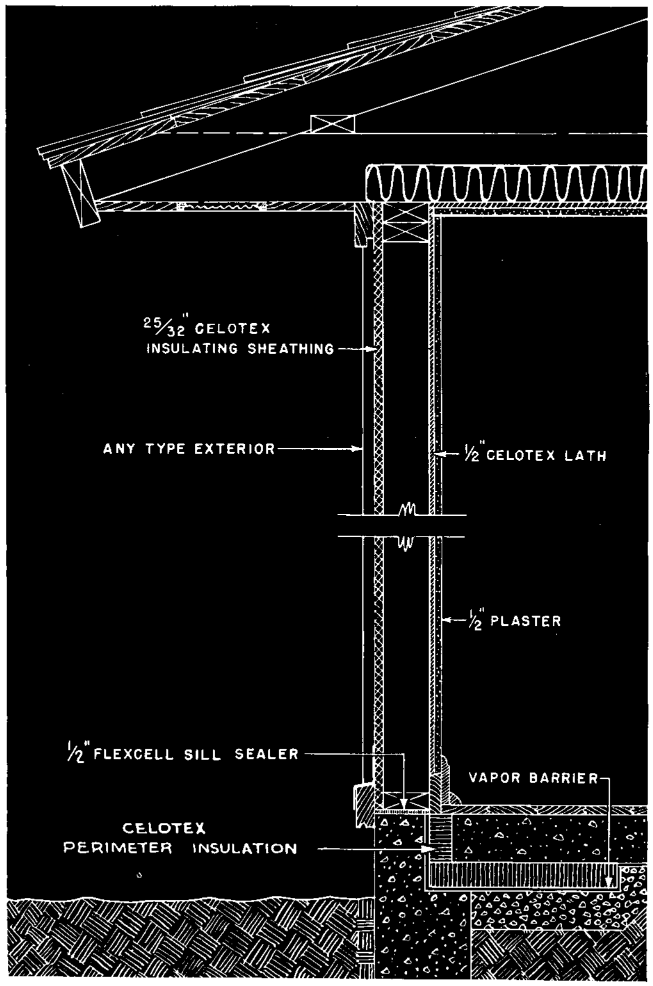
WRITE TODAY for full data on Celotex Double-Waterproofed Insulating Sheathing, and the Celotex Self-Insulating Wall described at right. The Celotex Corporation, Dept. PA-33, 120 S. LaSalle St., Chicago 3, Illinois.

Build Better... Specify Genuine

CELOTEX

REG. U. S. PAT OFF

BUILDING PRODUCTS



"U" value of this wall is 0.15 with wood siding and plastered interior

A better, stronger wall at lower cost— THE CELOTEX SELF-INSULATING WALL

Often called "the ideal wall," the Celotex Self-Insulating Wall is built with Celotex Insulating Sheathing on the outside, Celotex Insulating Lath on the inside. Costs less to erect than a conventional frame wall of comparable insulating efficiency.

Exceeds F. H. A. insulation requirements in about 90% of the areas in the country. Has greater structural strength and bracing power. Easier, quicker to build. Any type exterior finish can be speedily and economically applied to it.

THE CELOTEX CORPORATION
120 S. LA SALLE ST., CHICAGO 3, ILLINOIS

integration: epitome of perfection, fad, or obligation?

no style label

Dear Editor: Mrs. Moholy-Nagy's thought provoking article, "The Issue of Integration" (*February 1953* P/A), should give painters and sculptors something to ponder carefully whether or not they agree with her able rationalizations.

There is a sense of departing from the broad theme of Integration to the adoption of Integrated Architecture as a label for a style. The objective development of this viewpoint is more to be respected than disputed, although its implications leave the sculptor and painter high and dry.

The relative unemployment of the sculptor and painter is not just a sign of the times, chargeable to the increasing self-sufficiency of some architects in certain fields, the fickleness of changes in style, the indifference of the public to visual symbols, high costs, and so on. Faced squarely, it is rather the failure of the artist to assess his capacity and exploit the actual variety of his abilities, and to link them with the manifold opportunities for participation in his own society.

Life is short and learning comes slowly. This modern phenomenon of imperfect and inadequate integration of many artists with their own society is chargeable to the failure of many schools of the fine arts, in the recent past, to approach their obligation to their students with any understanding of the meaning, challenge, and opportunity for service inherent in the integrated viewpoint.

Reference is made to many art schools rather than all art schools, because there are a few whose dedication to wedding the humanities with a realistic selection of means of expression bids fair to aid the coming generation of artists to integrate not only as a matter of form but also as a way of life.

AUSTIN PURVES, President
National Society of Mural Painters
New York, N. Y.

encourage the artists

Dear Editor: I have read Sibyl Moholy-Nagy's "The Issue of Integration" with pleasure and profit. But I am still inclined to feel that sculpture and paintings do not appear in buildings simply because those who ultimately pay for the buildings are unwilling to pay for sculpture and painting.

I feel that there are many American artists living today whose work would fit very nicely into functional technological architecture. For, as Mrs. Moholy-Nagy admits, the same forces that have molded architecture have formed a number of modern painters and sculptors. The large textured spaces that architects so much admire nowadays have certainly much in common with the large canvases of Pollock, Baziotes, and others. I am not at all sure that should they be set in place in modern industrial buildings the public would grow weary of them. It seems to me too there are many sculptors beside Calder whose work would also fit—Lippold, David Smith, and Roszak come to mind.

The essence of the matter is that it is a bad thing for the country to discourage artists; it is a good thing to encourage them. There would be little art produced indeed if nothing were exhibited or bought except that which was expected to endure forever. If it is to be admitted that we must all share in the encouragement of American art, it is apparent that a certain responsibility for this encouragement must still rest with both the architect and his client.

ROBERT BEVERLY HALE
Associate-Curator of American Art
The Metropolitan Museum of Art

misleading and disarming

Dear Editor: Mrs. Moholy-Nagy's lucidly interesting article on the issue of integration is both misleading and disarming—misleading in that she gives the initial impression in the opening paragraphs indicating that the present-day attitude toward integration in the arts is just one of those fads — then disarming when she shows later on that it is exactly this which good modern architecture has been doing. The academaniac and the scholar often prone to categorize may see movements and periods rising and falling, then a new independent period emerging. Integration in the arts is not the mark or sacred cow (or herring) of any period, but the epitome and perfection of every great period of art and architecture.

HENRY L. KAMPHOEFNER
Raleigh, N. C.

the sense of beauty

Dear Editor: I have read the article, "The Issue of Integration," and have tried to analyze my own reactions to the thoughts presented.

I believe that one of the dominant factors of our generation is that we live in a shrinking world and that the shrinkage stresses are tremendous. Whatever is created by man has in it elements of the personalities involved in the creation. The blending of the functional requirements of a building and these personalities dominate the final result.

Personalities are in turn influenced by environment and upbringing. The artists and artisans living in small, homogeneous communities were governed by fixed concepts of man's purpose and destiny, and these concepts were common denominators in the makeup of their personalities. With the shrinking of the world, communities have become wheels within wheels insofar as the basic concepts of life are concerned. The result has been that any spiritual expression in architecture and allied arts is partly neutralized by the conflicting ideals struggling for acceptance.

It seems to me, therefore, that there remains the following two principal fac-

(Continued on page 10)

p/a views

(Continued from page 9)

tors: 1. Functional perfection; 2. Intrinsic beauty.

Since function and livability are direct and tangible problems, the expression of personalities are felt mostly in the creation of intrinsic beauty. Just as a painter must know intimately the technique of mixing paints to create the proper hues and nuances, so an architect and his team should know intimately what materials are available and use them harmoniously to create results that are pleasing to the eye and the mind.

Until this shrinking world has found its physical and spiritual balance, the best that can be hoped for, I believe, regarding integration of the arts in our day, is the keen awareness of materials and methods available, and the development not only by the architect, but by his whole team, of an instinctive sense of beauty and harmony. The greatest integrating force in this sense is the beauty around us, wherever it is found, far superior to anything that man can create.

FRED N. SEVERUD
New York, N. Y.

discussion to what end?

Dear Editor: The printing of the two articles, "The Heritage of Cezanne" and "The Heritage of the Bauhaus" seems to me particularly meritorious because they probe into our problems so much deeper than those superficial panel discussions which have kept our museums and conventions busy in recent years.

Yet, I hope that these attempts are just beginnings toward further efforts to develop much-needed professional meditation. To come to the truly deeper insights, however, would mean to develop the art of relaxation and devoted understanding.

This does not mean that I am incapable of enjoying a good journalistic melee. Indeed, Sibyl Moholy-Nagy and Robert Woods Kennedy have had a brilliant exchange of blows. When I consider their arguments, they are not very much apart in their basic intentions. But the words can be given so many contrasts and the prejudices can be so pronounced.

The trouble with those discussions usually is, and is in this case, that the authors have their way in presenting the facts slantingly.

Why Cezanne has to be singled out and isolated from the rich tradition of modern painting, and then be made responsible for everything good in modern art as a matter of heritage, is not made convincing. The argumentation does not show a comprehensive approach, and is bound to create unwarranted misunderstandings; particularly by the apodictic manner of presentation.

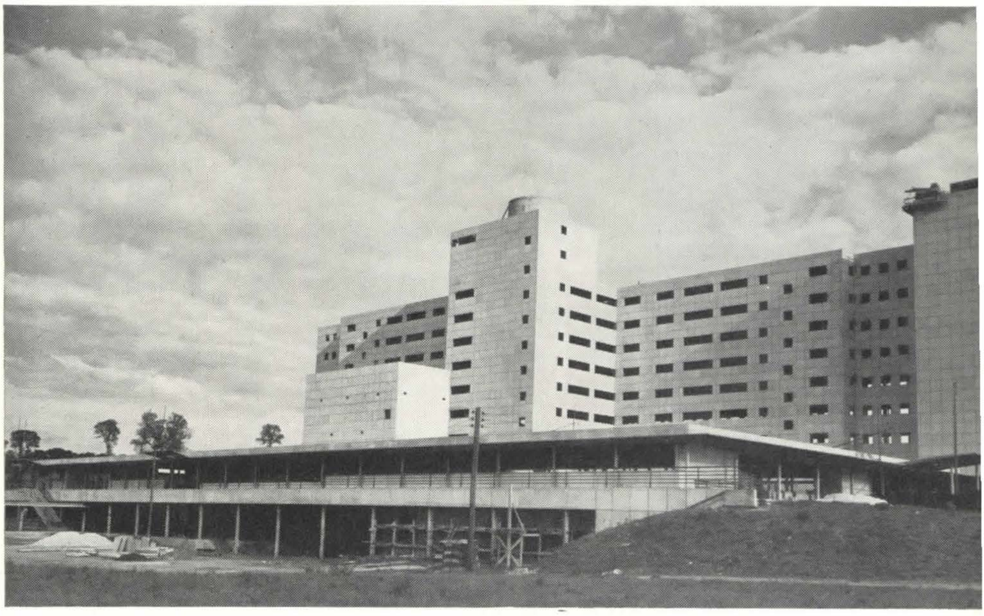
On the other hand, Kennedy's description of the Bauhaus and its activities is seen in a somewhat distorted perspective, for which probably the belated publicity by Bauhaus exponents in this country has to take a fair share of blame. I am still

(Continued on page 12)

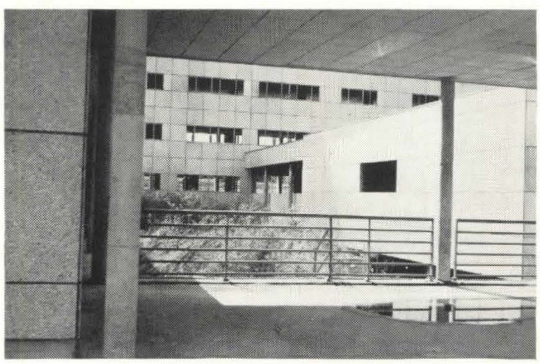
larger donation needed to complete memorial

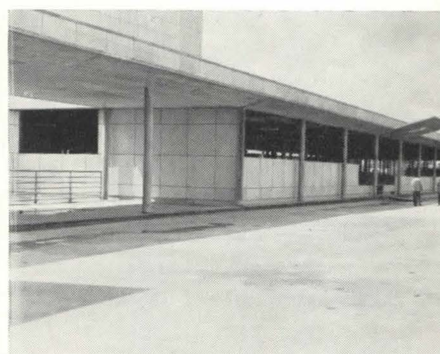
The Memorial Hospital at St. Lo, France, intended to be a tangible and useful expression of friendship between France and the United States, threatens to become, as St. Lo's Mayor expresses it, "another skeleton in the city of ruins." Rising construction costs, apparently unavoidable delays, and a rather sad loss of interest on the part of some of the original sponsors have resulted in a handsome shell. Pictured on these pages in its present condition, it promises to be one of the world's great hospitals, standing on the hill above the still-ravaged city of St. Lo with a few workmen poking around its ten floors of reinforced concrete structure. The building designed by Paul Nelson, Architect, with Roger Gilbert, Marcel Mersier and Charles Sebillotte as Associates, needs more fund-raising by more friends of the project before it can go further.

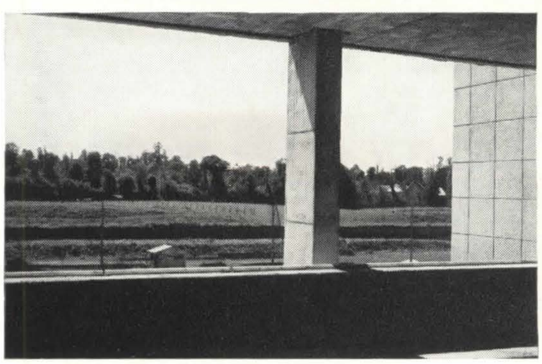
The story of St. Lo's hospital is an interesting one, which could have been (might still be, if a new wave of enthusiasm can be stimulated) a heart-warming example of living-memorial; it has become, at the moment, an embarrassment to some and a frustration to the community and to the hospital's designers. The city's almost total destruction during the war so impressed a group of Americans who saw it in 1945 (the Hon. William Phillips, the Hon. Robert Woods Bliss, Robert Pell, and others) that with then-General Eisenhower's consent and approbation they conceived a project to build the much-needed hospital as a memorial, replacing an inadequate one that had been destroyed. American Aid to France, Inc. (then American Relief for France) undertook fund raising and succeeded in collecting almost $150,000, and received, through the courtesy of Drew Pearson, almost 200 million francs from insurance money as a result of the Friendship Train fire in Paris. The financing of the hospital has been complicated; three French Ministries, under reconstruction laws, contribute funds, and the municipality must put up a certain sum (40% of



St. Lo's Memorial Hospital as seen from the northwest. Curved driveway is ramped above the service and personnel entrance on the north side; main entrances are along west side of projecting wing.







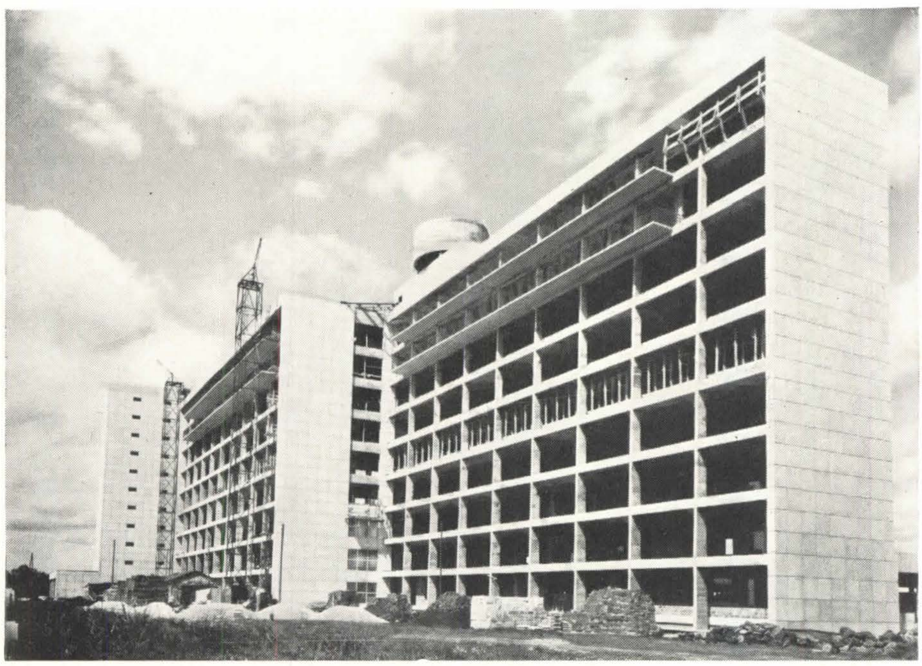
Views (top) *from the automobile ramp toward the hospital proper. Looking from a typical patients' room* (lower left), *glazing will be behind projecting structural fins. Series of courts* (lower right) *which separate visitors' entrance corridor from clinic and personnel areas.*

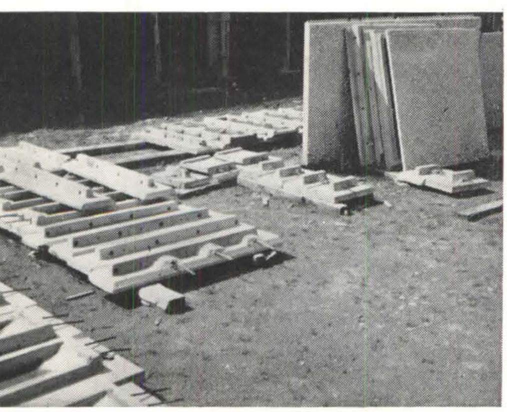
p/a progress preview

the total above the value of the original hospital that was destroyed). It is this share allotted to the municipality of St. Lo that American Aid to France has tried to raise. As the budget has been revised from time to time, figures have risen until now—for completion of construction, personnel lodging, furnishings and equipment—some $2,800,000 additional is needed as the municipality's share alone, to complete the project. Total construction cost is now estimated at about $5,700,000.

St. Lo Memorial Hospital incorporates all of the advances in hospital planning that the U.S. Public Health Service (whose architects worked closely with Nelson) has advocated, and at the same time it offers many innovations of its own. Paul Nelson's egg-shaped operating rooms (SELECTED

(Continued on page 20)





Southeast view (top), *nurses' wing in foreground. Southeast approach* (above) *to patients' wing; plan breaks at central core, dividing floors into two nursing units.*

Ribbed concrete wall panels (left), *cast on the site.*

architecture's design research laboratory

THE SINGLE-FAMILY HOUSE

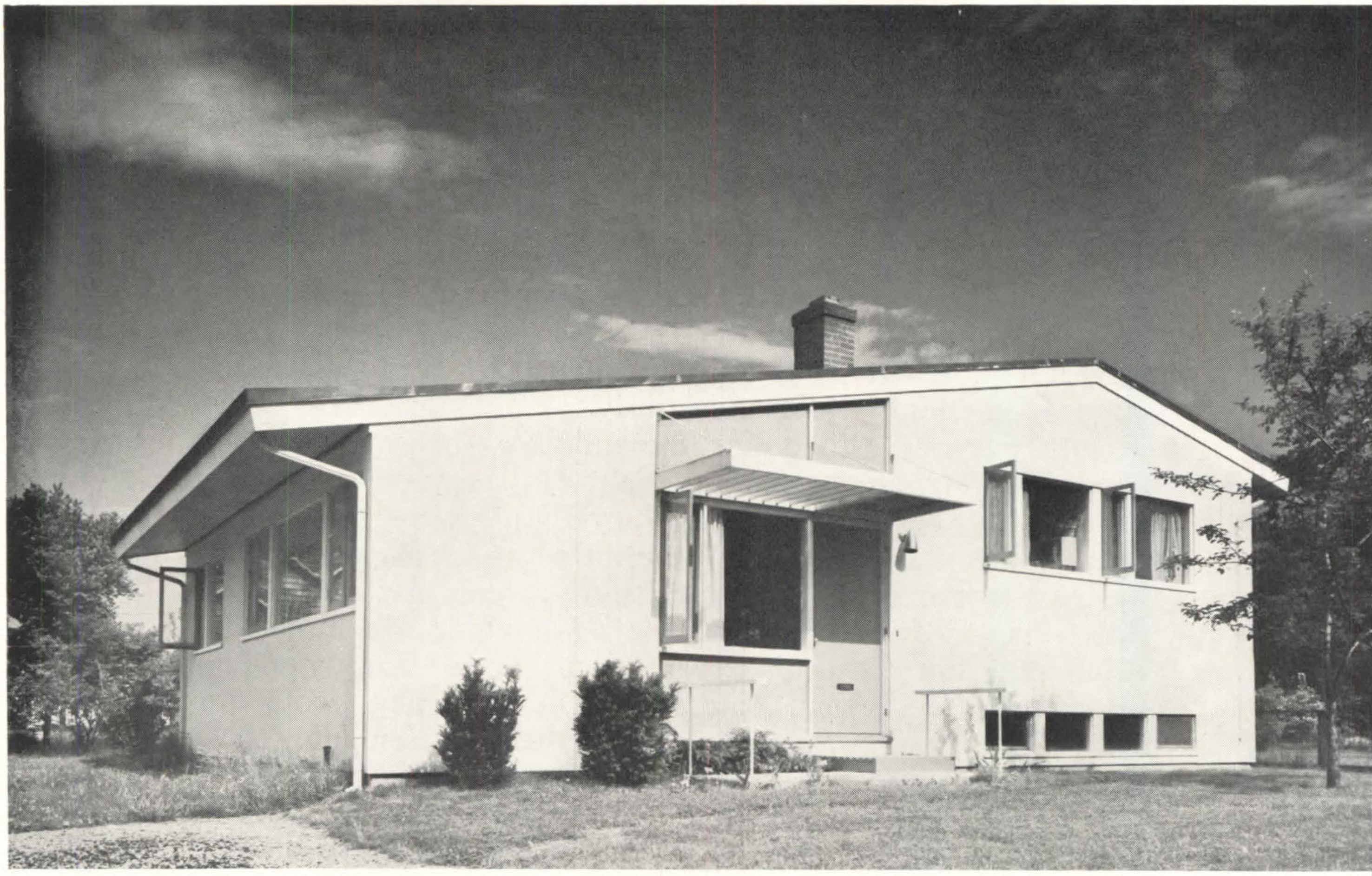
In architecture—as in sentimental songs—there's no place like home. To support this premise, we here explore the hypothesis that the custom-designed house, architecture's unique sport, is also the profession's ceaseless and universal testing-ground and research laboratory.

Several factors distinguish the private house from all other building types. In the first place, the client is just one family, or, in some cases, a single person. Compared to other types, the dollar expenditure—even for an elaborate residence—is small. The structure is lightweight and may be schemed of anything that will stand up. And houses are built everywhere under the sun—north, south, east, and west; by the sea, on remote mountains, in cities, and on the desert. By no means the least important distinction, the house is the one building type on which the client usually feels himself to be a knowledgeable authority.

Since a house is for just one "expert client" it is a highly specialized affair and may be downright whimsical, catering to the idiosyncrasies of the particular family involved. Some like to live in caves; others prefer goldfish bowls. Some like clutter, others live neatly. Many dote on television; some wouldn't have a set in the house. A few want extreme seclusion; others are happy only if there are mobs around. Standards mean little. Since the cash outlay is modest, and the structure light, things can be tried out in a house that would be economically disastrous in a multimillion-dollar office building. Since houses are built everywhere, they can and do vary infinitely, to make the most of differing climates and natural settings.

Thus, everything and anything is possible here, subject only to the client's willingness (or determination) to try the untried—and the architect's ingenuity. It is not surprising, therefore, that more new elements in plan, structure, and design find their first expression in the private house, than in any other building category. A few examples: long before office buildings or schools employed louvers as light- and air-control devices, they had been used in dozens of ways in the private house. Full walls of glass appeared in family living rooms years before their double-insulating-glazing counterparts found their way into big city buildings. And the contemporary steel frame and the curtain wall are surely no more than a technological maturing of the simple mill construction of early New England barns. Radiant-heating coils were first buried in the slab of someone's home, and the first use of the lift-slab method of construction produced a small house. And so on—and on and on.

Almost any carefully designed house will reveal fresh design facets—elements that, in translation, could well become vigorous new words in architecture's vocabulary. In the five houses selected as illustration for this study, the particular "laboratory tests" documented concern structural economy, esthetic dimension, remodeling, expandable space, and an experiment in structure.



structural economy

location	Rumford, Rhode Island
architects	The Architects Collaborative

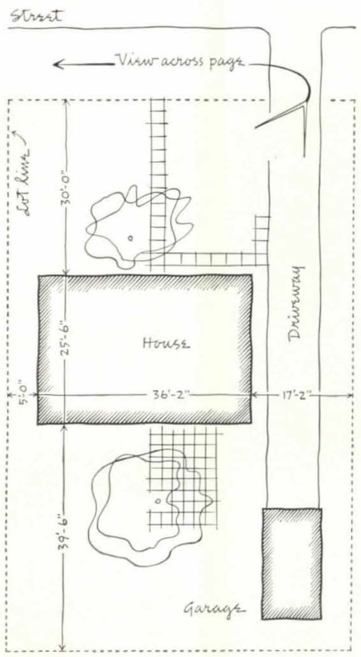
No aspect of design research is more important than the search for simpler, more economical ways of building. And this applies whether the problem is a small frame house (such as the one shown here) or some huge metropolitan structure. The study may involve the best ways of using new materials, or it may be concerned with a more efficient organization of the most time-honored. The house shown falls in the latter category.

The owner is in the lumber business and is interested in the possibility of closer co-operation between lumber yards and architects. His idea is that good contemporary design for houses might be merchandized through lumber yards that would carry all of the standard-length or precut lumber for the purchasers. Basic criteria were that construction be so simple that any local contractor could carry it out—an approach quite opposite to that of the large-scale operator who employs complicated devices which pay off through multiplication.

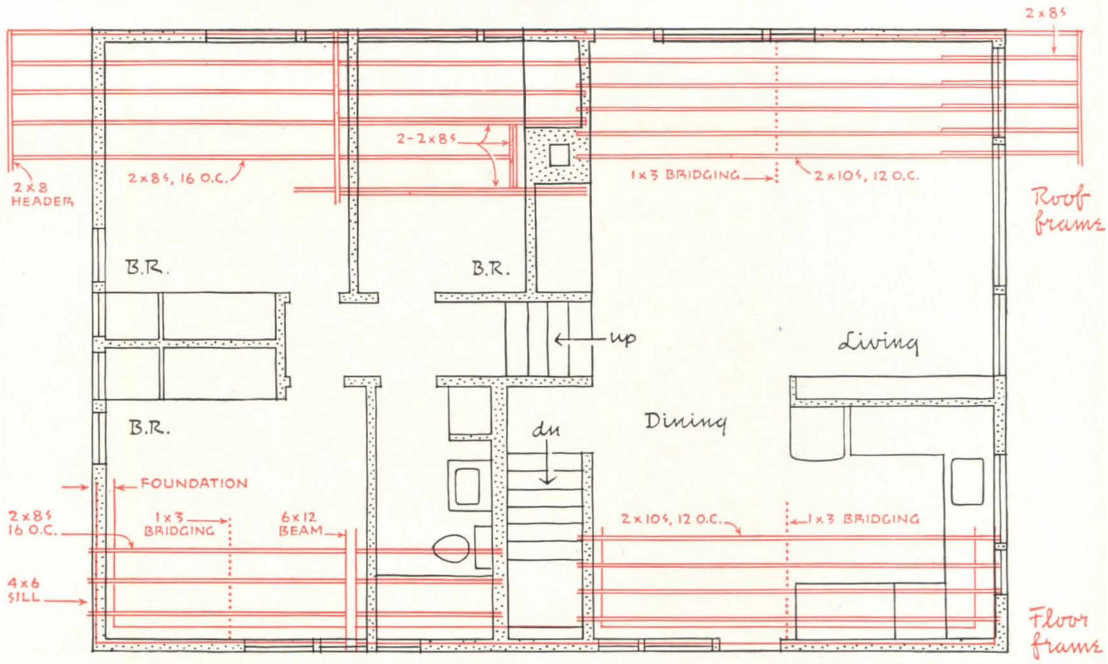
The house was designed for a 60-foot lot and room sizes were planned to meet FHA standards. In addition to three bedrooms and bath, the owner wished to provide some overflow space that might be used in a variety of ways—a playroom, workshop, or added bedroom-bath space.

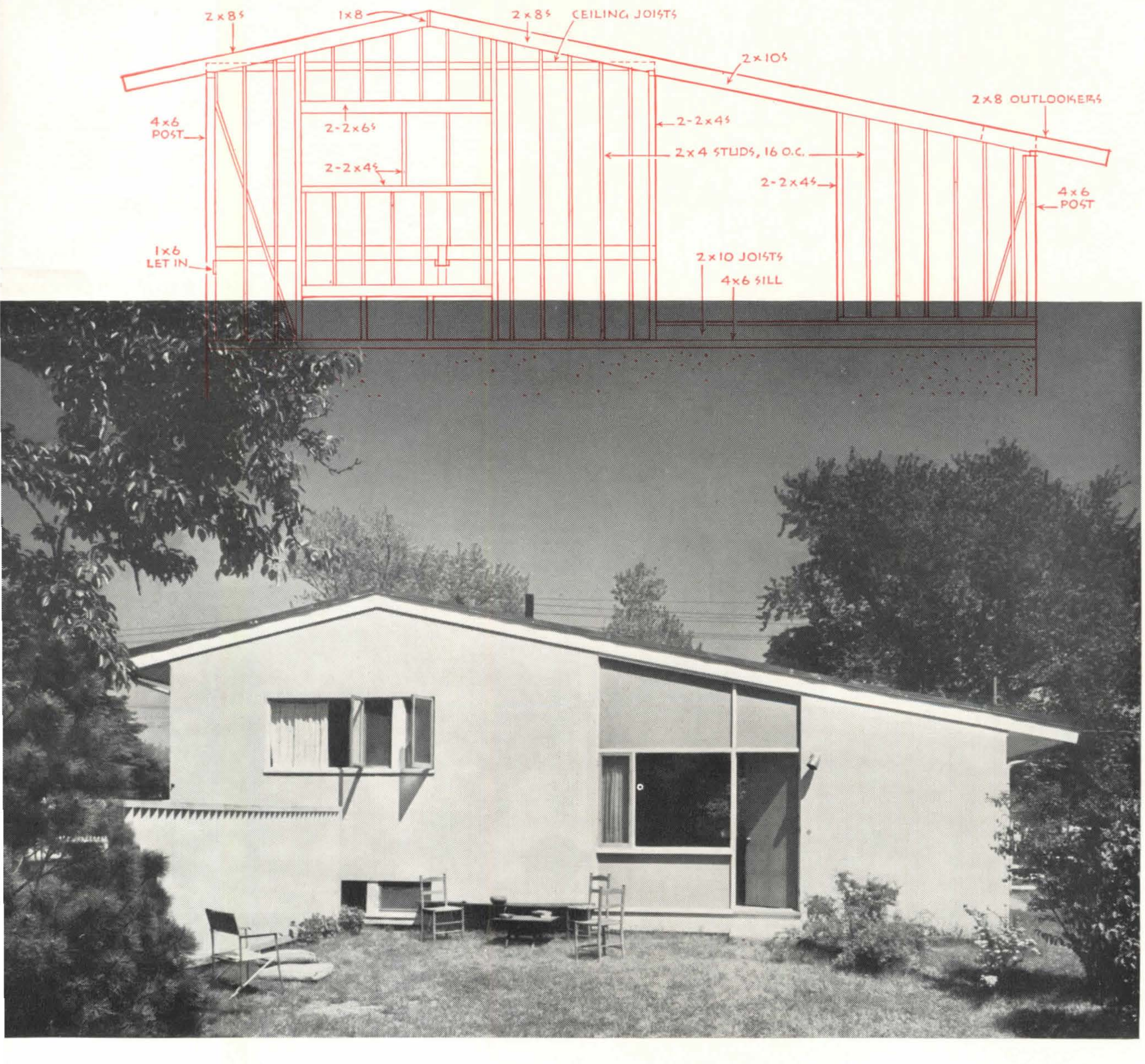
The result, using standard-length lumber and the simplest possible framing, is a split-level scheme. The half-level basement provides the required expansion space and gives privacy to the bedrooms, five steps above the main floor.

That this search for structural economy was successful is evidenced by the fact that cost, counting playroom at full area but not counting the 5-foot crawl space (where the heater is located) under the living room, came to $7 per square foot.


Street
View across page
Lot line
30'-0"
House
25'-6"
5'-0"
36'-2"
17'-2"
Driveway
39'-6"
Garage

Plot Plan


2x8s
2-2x8s
2x8 HEADER
2x8s, 16 O.C.
1x3 BRIDGING
2x10s, 12 O.C.
Roof frame
B.R.
B.R.
up
Living
B.R.
dn
Dining
FOUNDATION
2x8s 16 O.C.
1x3 BRIDGING
6x12 BEAM
2x10s, 12 O.C.
1x3 BRIDGING
4x6 SILL
Floor frame


2x8s
1x8
2x8s
CEILING JOISTS
2x10s
2x8 OUTLOOKERS
4x6 POST
2-2x6s
2-2x4s
2-2x4s
2x4 STUDS, 16 O.C.
2-2x4s
4x6 POST
1x6 LET IN
2x10 JOISTS
4x6 SILL

A conscious wish on the part of both owner and architects was to provide a greater sense of spaciousness in the living-dining area than is usually found in speculative housing; other refinements include sliding closet doors and a built-in cabinet in the typical bedroom (left).
Photos: Richard Garrison

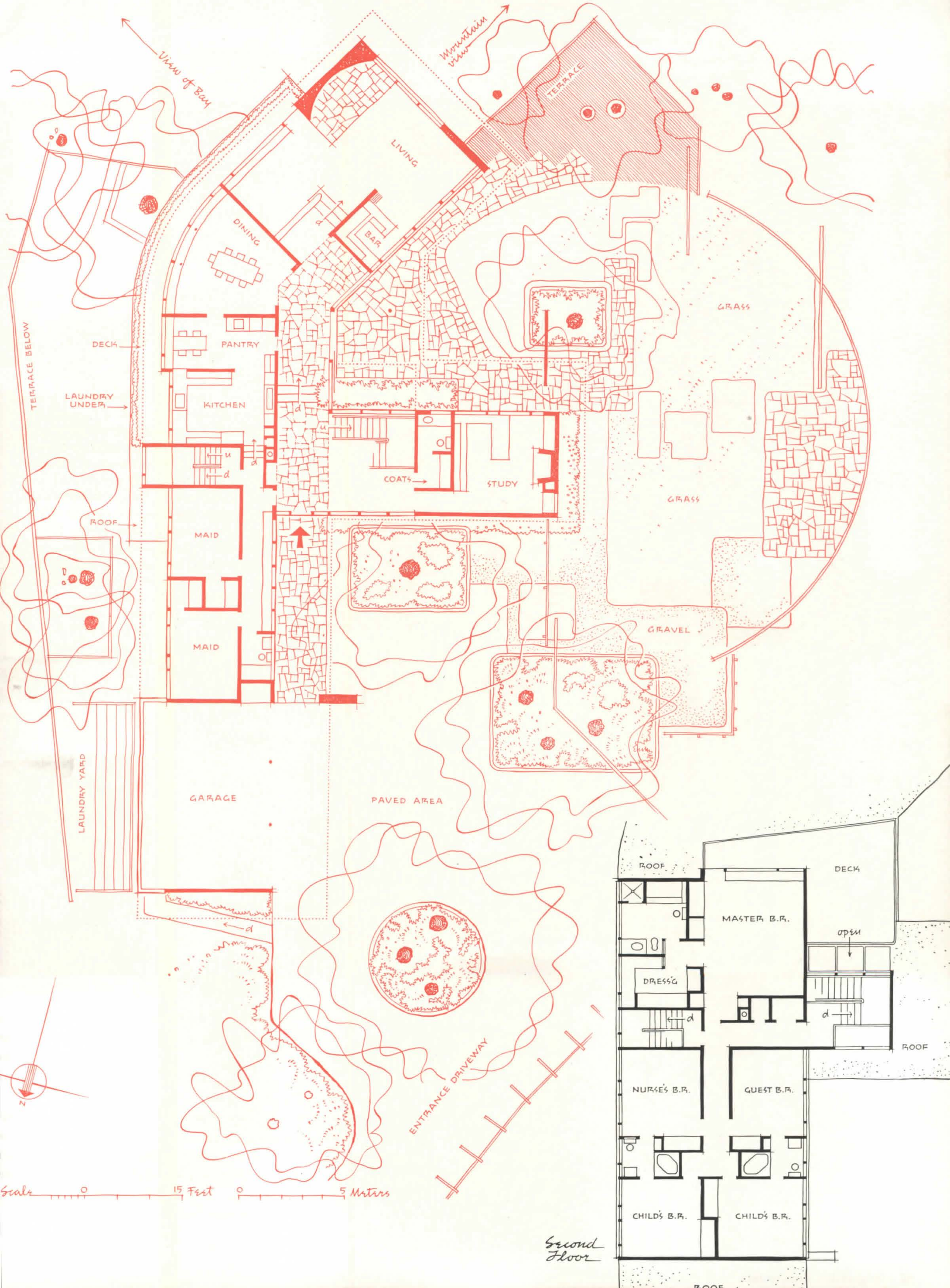
The living-dining space goes right through the house from front to back (below), *with a ceiling track provided that can close off the kitchen* (left) *from the living area. The house has 4" insulating batts in ceilings; 2" batts in walls; wood sash are operated with roto-gear operators. A forced warm-air system provides heating.*

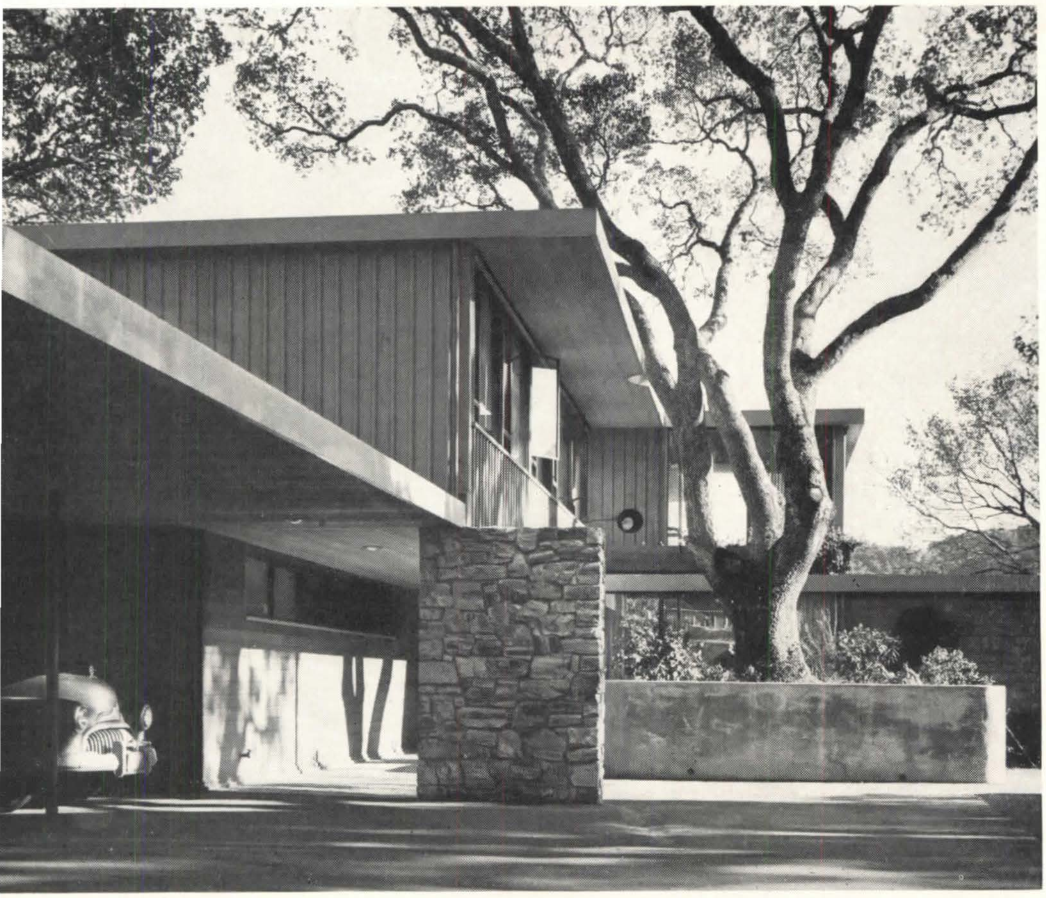
new esthetic dimensions

location	Marin County, California
architect	Henry Hill
landscape architects	Eckbo, Royston & Williams

The most subtle aspect of architectural design is the final fillip that is given to a building basically well planned, uses sensible materials sensibly, and is soundly constructed. Namely: the hard-to-define fillip of esthetic correlation or design inspiration—the ingredient that distinguishes architecture from engineering and makes of it an art. Since this factor rests in the realm of the spirit, standards are largely hypothetical, and expressions vary with the talent of each designer. Nonetheless, in spired examples—as with other desig factors, most frequently discovered in th *residential* field— can serve to kindle fres inspiration.

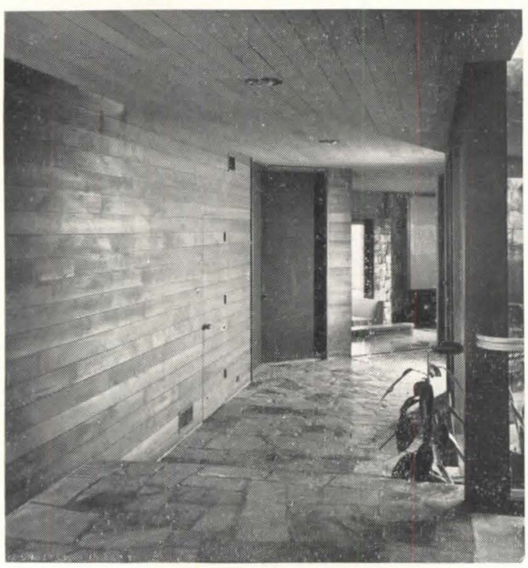
The house presented on these pages ap pears to us to possess esthetic qualities o extraordinary measure—in accommodatio to site; in plan organization; in fine de tailing; and in the eye-pleasing handlin of masses, textures, and contrasts.

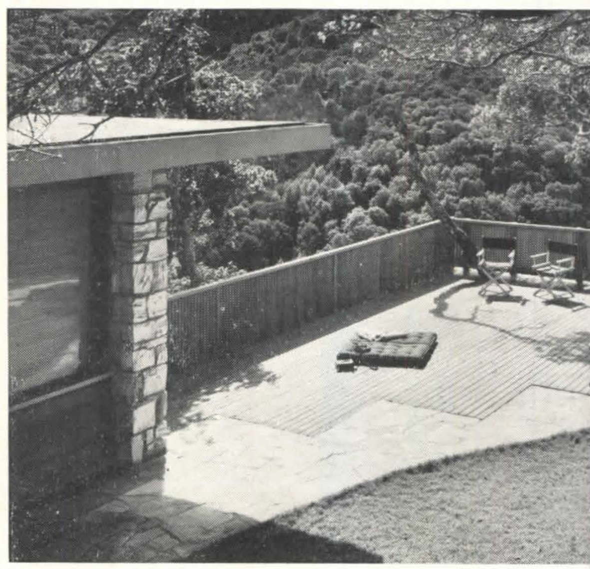

View of Bay
Mountain view
TERRACE
LIVING
DINING
BAR
GRASS
DECK
PANTRY
TERRACE BELOW
LAUNDRY UNDER
KITCHEN
COATS
STUDY
ROOF
MAID
MAID
GRAVEL
LAUNDRY YARD
GARAGE
PAVED AREA
ENTRANCE DRIVEWAY
N
Scale 0 15 Feet 0 5 Meters
ROOF
DECK
MASTER B.R.
OPEN
DRESS'G
ROOF
NURSE'S B.R.
GUEST B.R.
CHILD'S B.R.
CHILD'S B.R.
Second Floor
ROOF



The large, rectangular stone pier at the entrance (left) *was not necessary, structurally, as the second-floor overhang is supported on pipe columns, but Hill "wanted to introduce an accent—an announcement—of the entry." To emphasize its visual, rather than structural, importance, "it projects beyond, frankly becoming freestanding, with the second floor sitting on the edge. Entrance flagging, exterior wood wall, and ceiling treatment are continued into the house* (below, left), *while an outdoor sitting deck* (below, right) *projects from the hillside to embrace a few treetops.*

Photos: Morley Baer

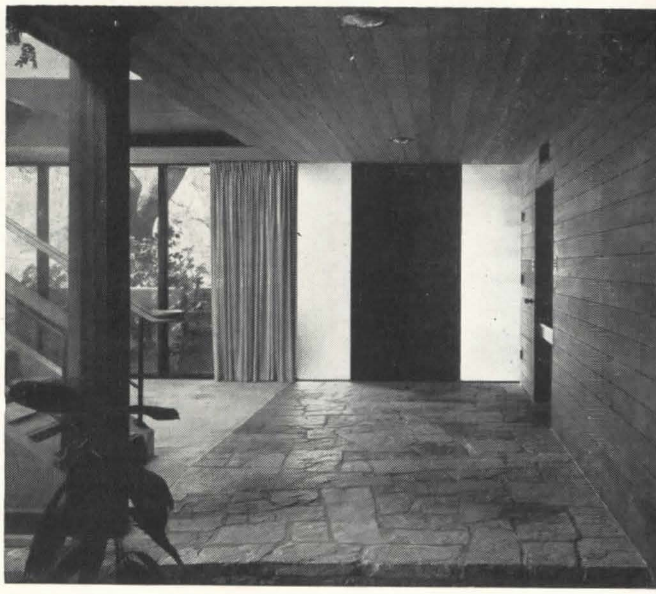




The plans *(previous page)* indicate the remarkable siting, with the house bent around to conform with the curve of the near-hilltop location. "You approach the knoll on a ridge ramp gently rising to the south," Hill states, "the sides dropping on both sides of the ramp. The crest of the knoll is crowned with magnificent oaks. But even when you reach the edge of the crown, you want to go on beyond, to see what will unfold on the further edge. This circular crown drops at 45 degrees in all directions, except for the ramp approach. I felt strongly that this same feeling of wanting to look over and beyond the edge should be kept in the architecture." Therefore, the house is "wrapped around the edge," preserving the top.

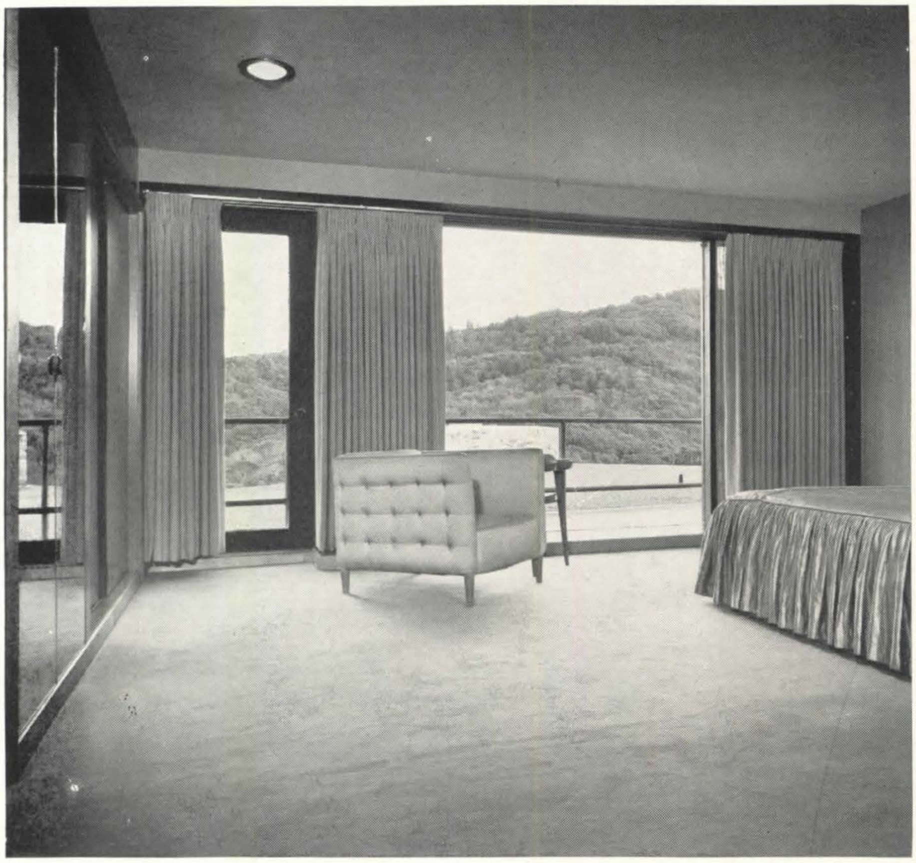
Exterior walls of the frame house are of redwood siding; while redwood, plaster, Philippine mahogany, primavera, stone, tile, and structural glass are all used inside. Operable sash are of steel. The owner reports that living in the house has been "very comfortable . . . Hill has an exceptional artistic ability, as well as a practical knowledge of design and construction."

The study ell and bent living-room wing protect an outdoor living area (left) with a mountain view to the southwest. To keep as much open area as possible on the dome-like site, grading and leveling of the top were involved; but, to keep this to a minimum, "we sliced off generally about 2½' for level areas—in spots, as much as 4½'—but we simply put big retaining walls around the oaks and leveled around them, preserving the natural levels at the base of the trees."

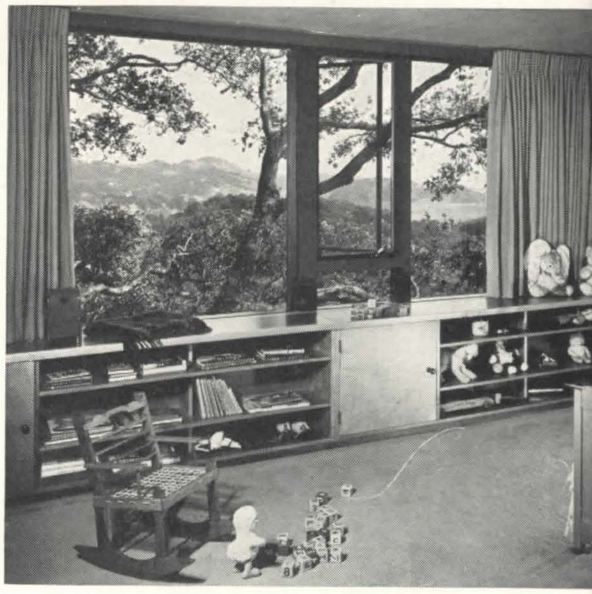


Entrance hall stone flagging, wall of horizontal redwood siding, and 8-ft pine ceiling continue the treatment used along the entry loggia outside. From here, the progression into the living room is down three steps in the hall passage and down three more into the high-ceilinged living room (ceiling level remaining the same throughout). Huge windows to the southeast and southwest dramatize views of San Francisco Bay, valley, and mountains.

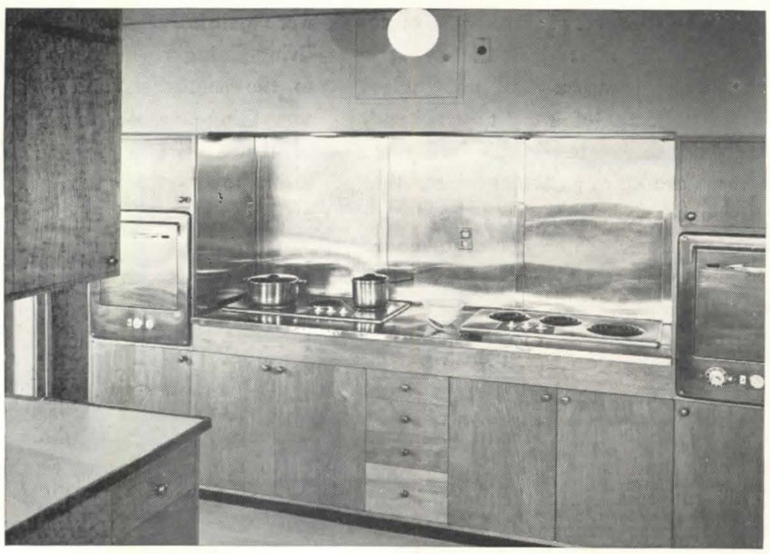
architecture's design research laboratory: new esthetic dimensions

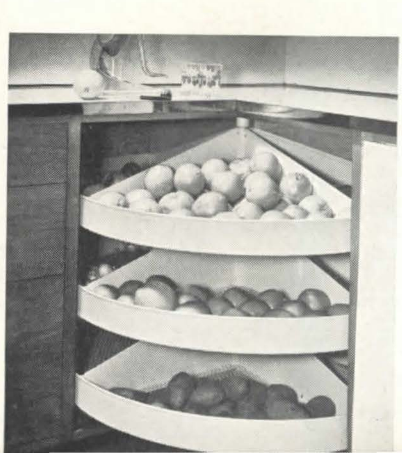


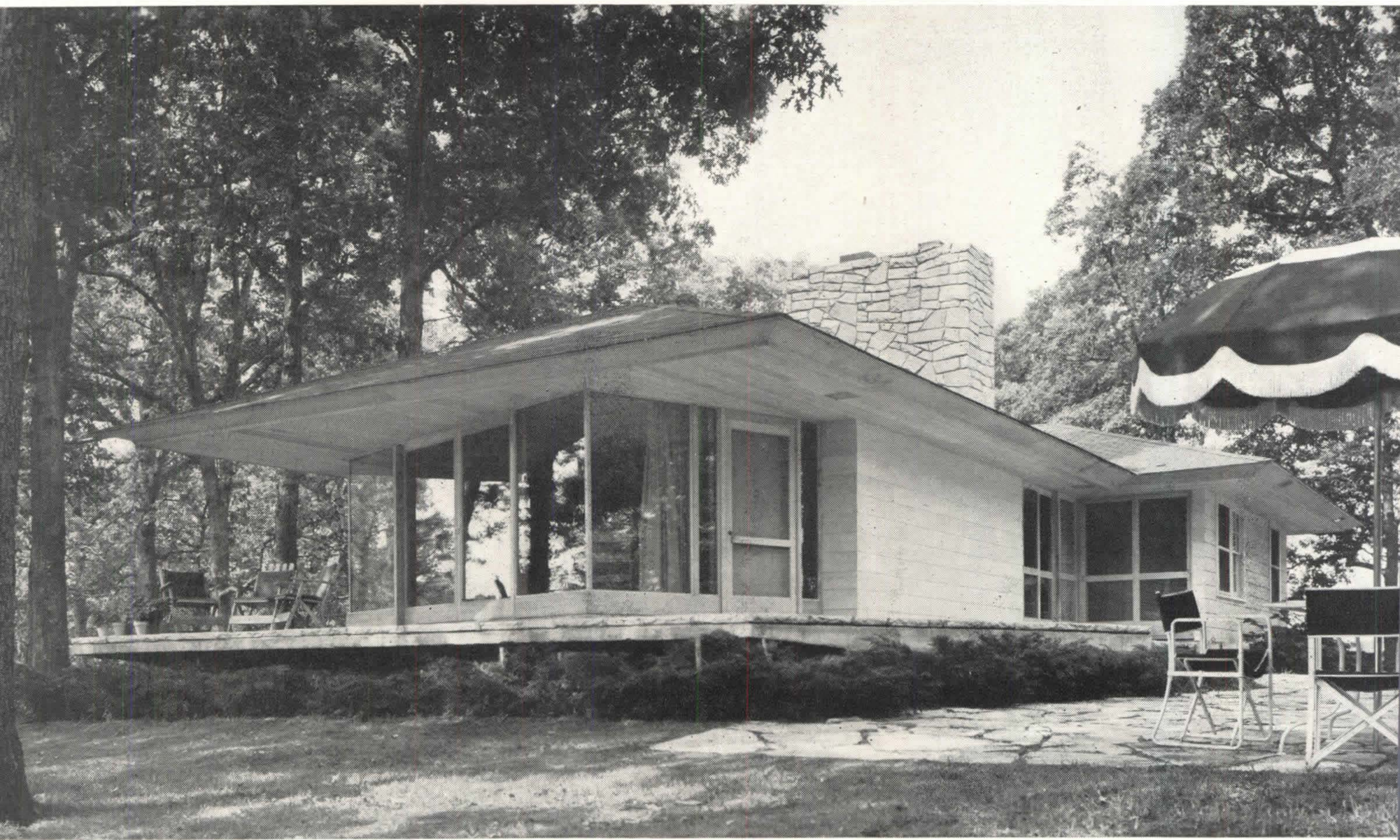
Design refinement is not restricted to the family living quarters; witness the elegance of the service staircase (acrosspage). *This stair goes down to a partial basement floor (not shown) where a workshop, heater room, and laundry are located. The owner's bedroom* (left), *with its mirrored, sliding closet doors, opens onto a private sunning deck.*



The view from one of the children's bedrooms (right) *hints at the magnificence of the site. The cabinetwork and cooking facilities in the kitchen* (below, left) *are both functional and beautiful. Even the usually forgotten difficult corner* (below, right) *has received the designer's painstaking attention.*







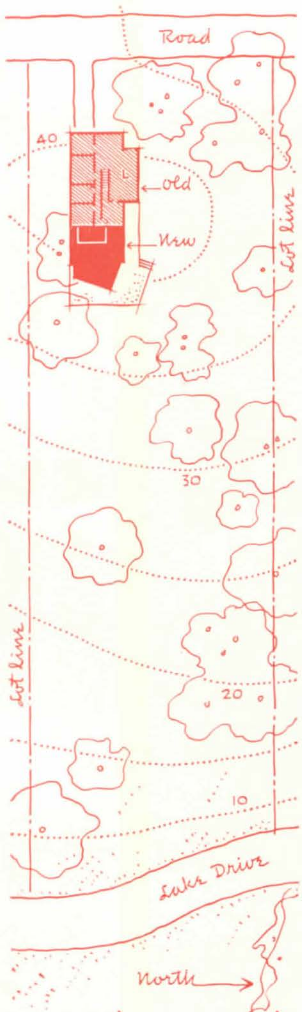
location	Barrington, Illinois
architect	Martin S. Kermacy

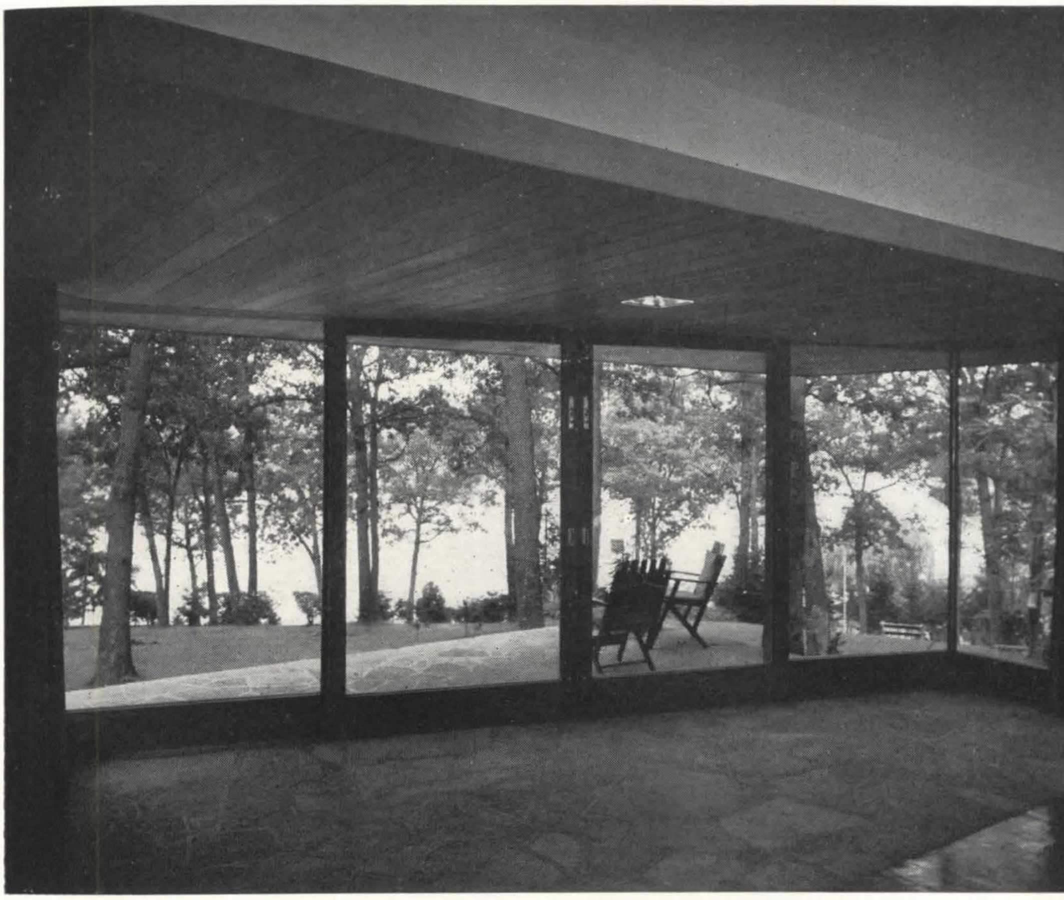
remodeling

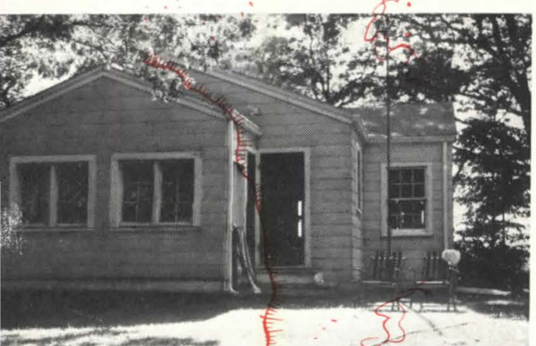
The renovation of old buildings is an activity known to every architect's office. Most often and most dramatically seen in houses and storefronts, it nonetheless occurs in buildings of every type. Standards become meaningless in this field, since most cases are unique. But the ideas that are developed are all grist for the design mill. The little reborn and enlarged house shown on these two pages is—we think all would agree—an improvement in every respect over the old.

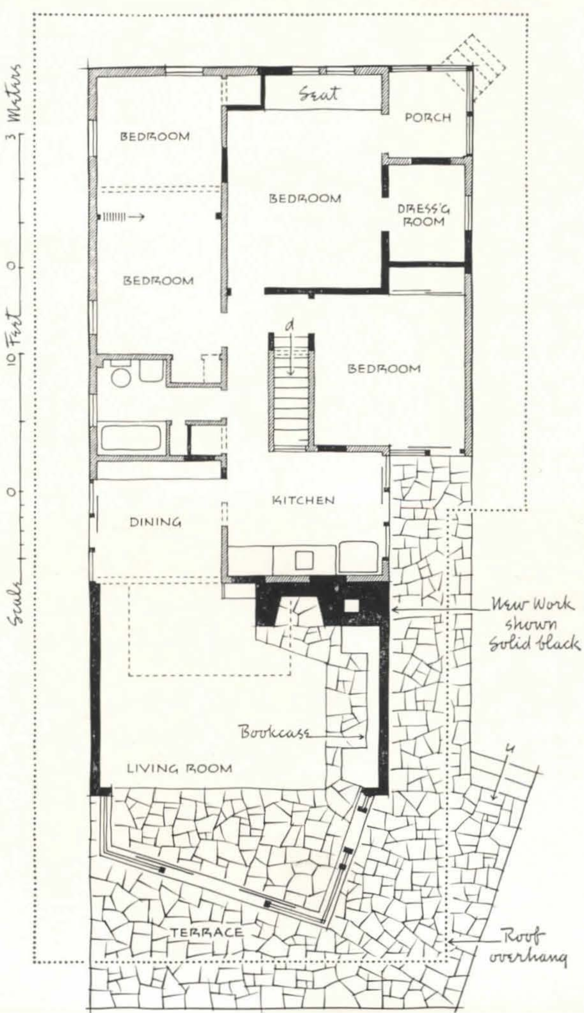
The owners decided to remodel an old cottage, on a handsome wooded site overlooking a lake to the east and southeast, for a year-round home. The original was not only too small, but the north-facing living room was wrong for sun, breeze, and view; bedrooms and storage space were painfully inadequate. The new big living-dining room exploits the lake view to the southeast, and the architect did everything possible "to emphasize the sense of thrust and projection from the hill crown toward the water." The angled glass wall was schemed "to establish a relationship with the water by approximately paralleling the shore line"; the cantilevered terrace floor was used "to augment the sense of lightness when viewed from the road below." The changed roof line intersects the line of the soffit overhang, thereby "bringing the whole structure closer to the ground and establishing visual relationship to the land."

Photos: Hedrich-Blessing Studio


Road
40
old
New
Lot line
30
20
10
Lot line
Lake Drive
North
Lake





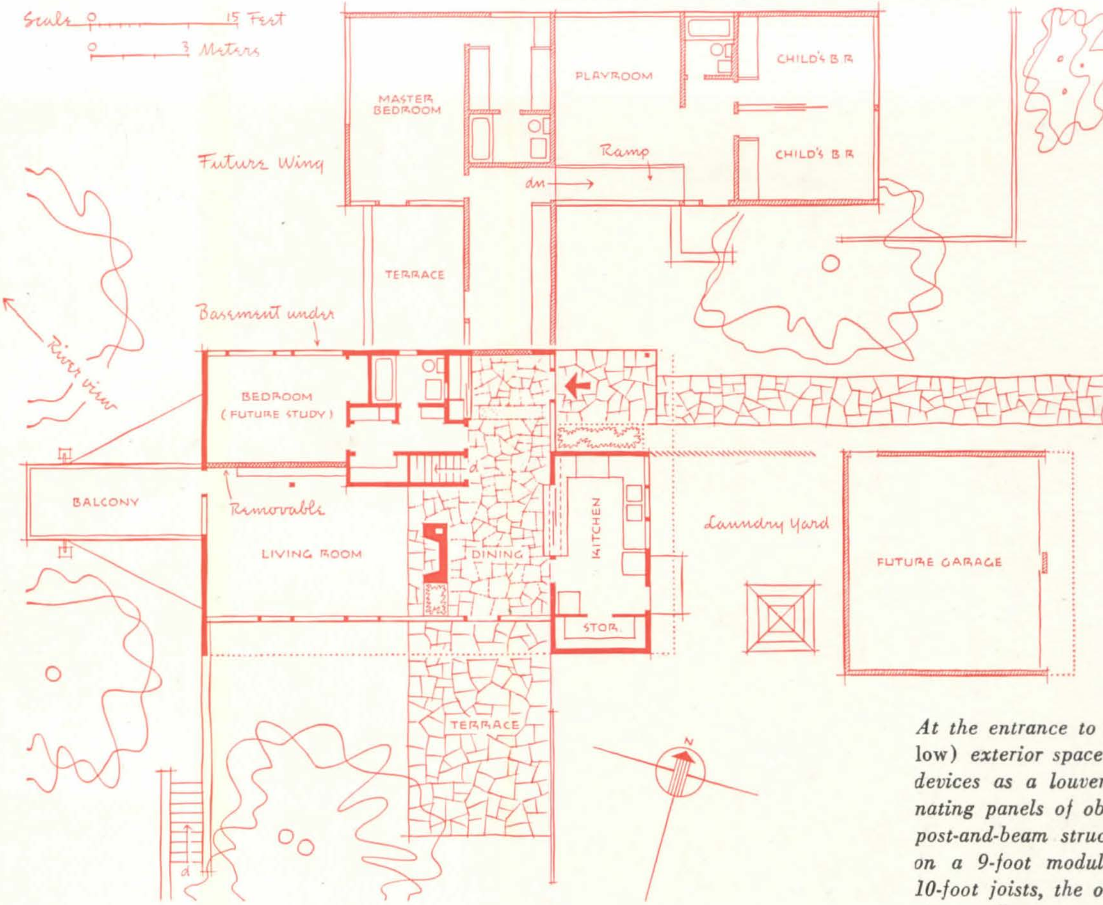

Seat
PORCH
BEDROOM
BEDROOM
DRESS'G ROOM
BEDROOM
BEDROOM
DINING
KITCHEN
Bookcase
LIVING ROOM
TERRACE
New Work shown Solid black
Roof overhang
Scale
10 Feet
3 Meters

expandable space

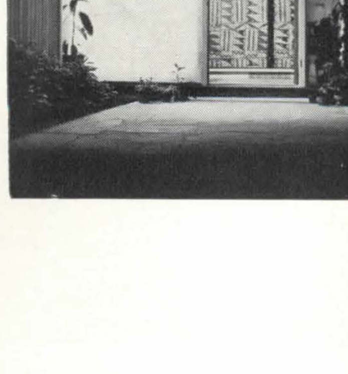
location	Lincoln, Massachusetts
architect	Hugh Stubbins, Jr.

Organization of space is a factor in every architectural problem. One current-day expression—that has almost become a cliche—is the open plan, a scheme that new methods of construction and concepts of planning made possible. Improvements in glass manufacture have produced numerous instances not only of better lighting but of almost total visual joining of indoors and out, and a design lightness not formerly possible.

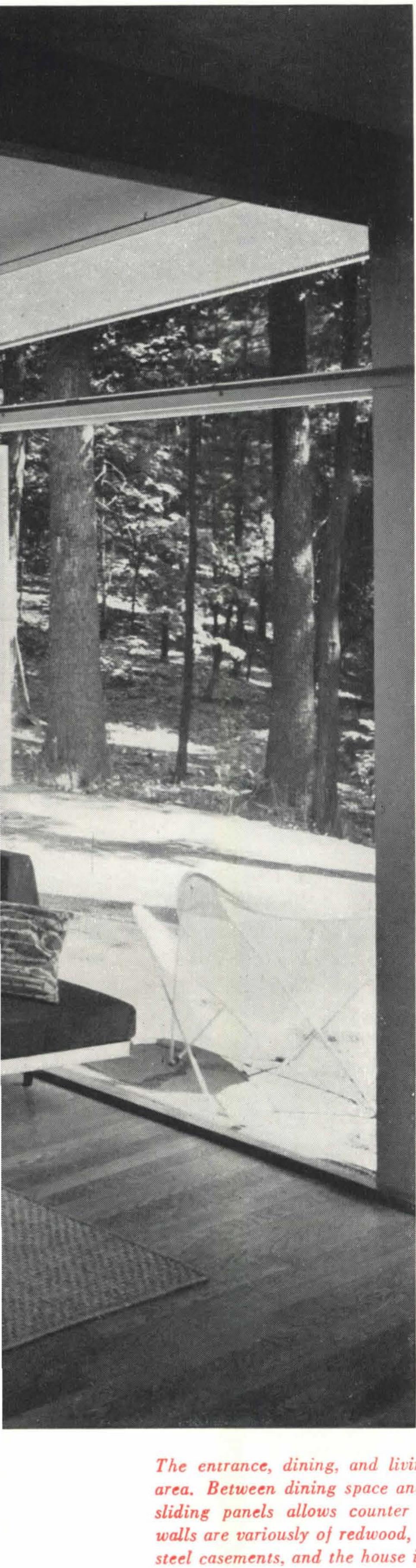
The little house shown here—planned from the start for eventual expansion to about twice its present size—is both a skillful design in itself and full of this ingredient of potential new horizons. The future expansion will require minimum changes in the original; and a partition between the present bedroom and living room is so installed within continuous floor and ceiling planes that it can readily be removed, should the owners find this desirable. The use of large areas of glass to join indoor and outdoor areas is obvious (see *Selected Detail*, page 145). Placement of the fireplace breast, with openings at either side, both protects the dining area and increases the sense of spaciousness; the slate flooring that extends from the entrance in through the dining area and includes the living-room hearth also assists in this desired visual end; and the upsweep of the butterfly roof, lifting the western (main view) walls of the room to dramatize the outlook, adds still more to apparent size. Not the least of these extension-of-space elements is the siting of the house on the crest of the hill, with a cantilevered balcony to dramatize the western river view.



At the entrance to the house (two photos below) *exterior space is defined by such various devices as a louvered wood fence and alternating panels of obscure and clear glass. The post-and-beam structural system was laid out on a 9-foot module, allowing direct use of 10-foot joists, the overlapping providing effective tie. Posts are 4 x 4's and beams, 4 x 14's.*
Photos: Richard Garrison



architecture's design research laboratory: expandable space



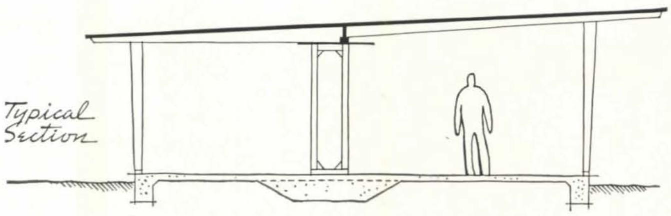
The entrance, dining, and living space is all one subtly defined area. Between dining space and kitchen, a pass-through unit with sliding panels allows counter eating for quick meals. Exterior walls are variously of redwood, plaster, and plywood. Windows are steel casements, and the house is heated by forced hot air; oil fuel.

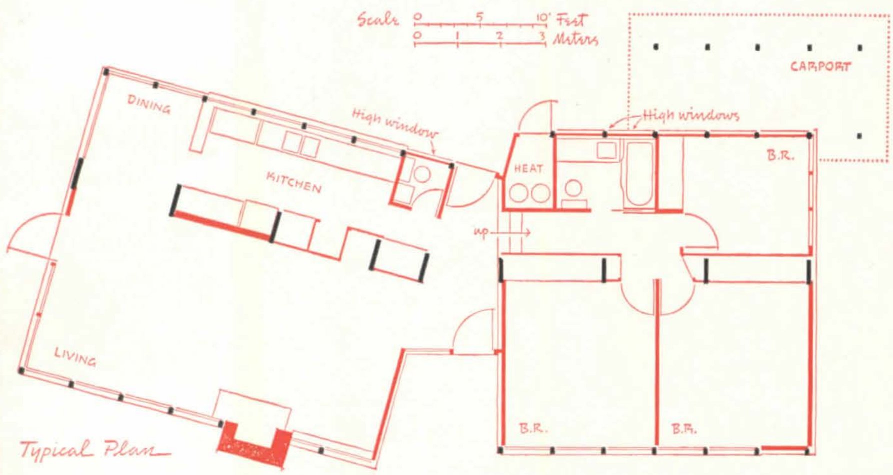
experiment in structure

location	Pasadena, California
architect	Leland L. Evison
engineers	Mackintosh & Mackintosh

The architectural world is forever looking for, discovering, and trying out new ways of putting buildings together. And, as with every other element of design, the private house usually serves as the testing ground. If the system is not wholly successful, no great damage is done; if it works, a chain-fission reaction sets in and before long, the basic principle is adopted and adapted to structures of every type, built of every known material. Witness the progression from a house of rammed earth to a structure of monolithic concrete; or from a simple wood frame with wood curtain wall to a welded-steel frame with curtain wall of glass.

In the house shown here, the system (*detailed in progress photographs on following pages*) was developed from the architect's conviction that structure and closure should be treated as separate problems. To effect this, he worked out a structural scheme that resists wind and quake, both laterally and longitudinally. Elements include a series of aligned, vertical, hollow-core structural frames (*black overlay on floor plan*) that occur well within the building envelope and are tied into the concrete floor slab by means of steel plates; and rafters, similarly spaced 4′ o.c., with supporting posts at their ends also tied to the slab by steel inserts. The roof diaphragm—4′ x 12′ asbestos-cement-surfaced structural-insulating panels placed parallel to the frames—carries all stresses toward the center of the building and down to the ground through diagonal steel straps and bracing that occur between the aligned vertical members within the house. The spaces between the structural supports may be treated in any way the designer chooses—for lighting, insulation, ventilation, etc.

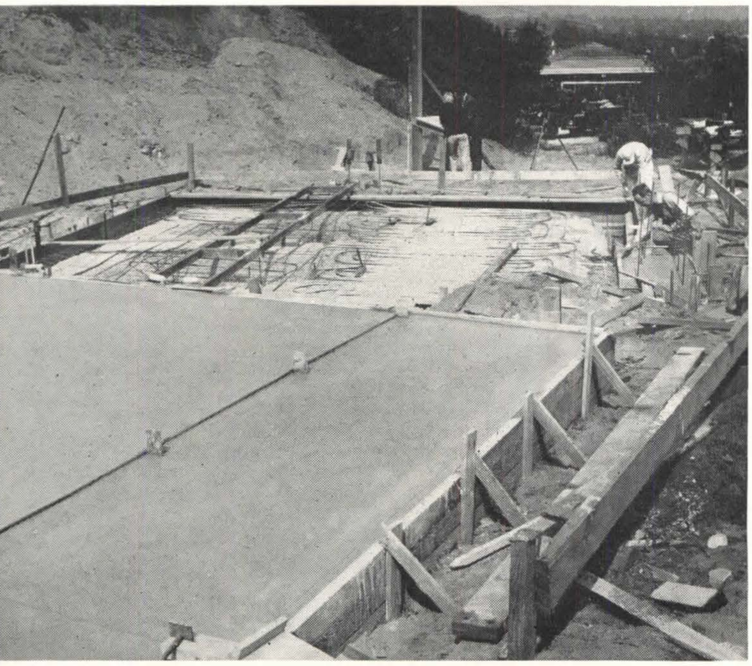




Interior wall surfaces are of striated plywood on stud frame; the cement floor is integrally colored. The house has a radiant-heating system in the floor slab. The black pattern on the floor plan indicates the vertical elements of the structural system.

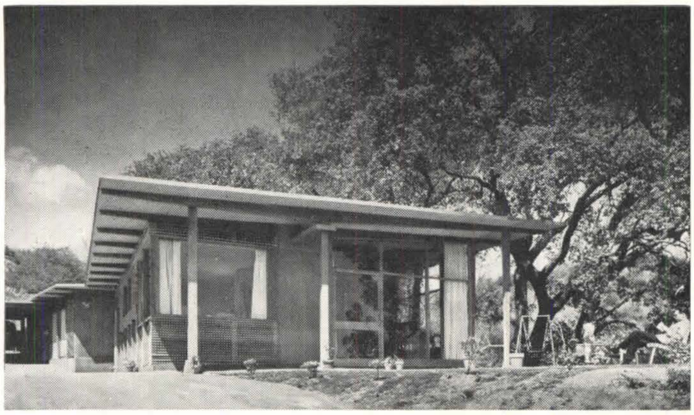
Photos: Julius Shulman

architecture's design research laboratory: experiment in structure

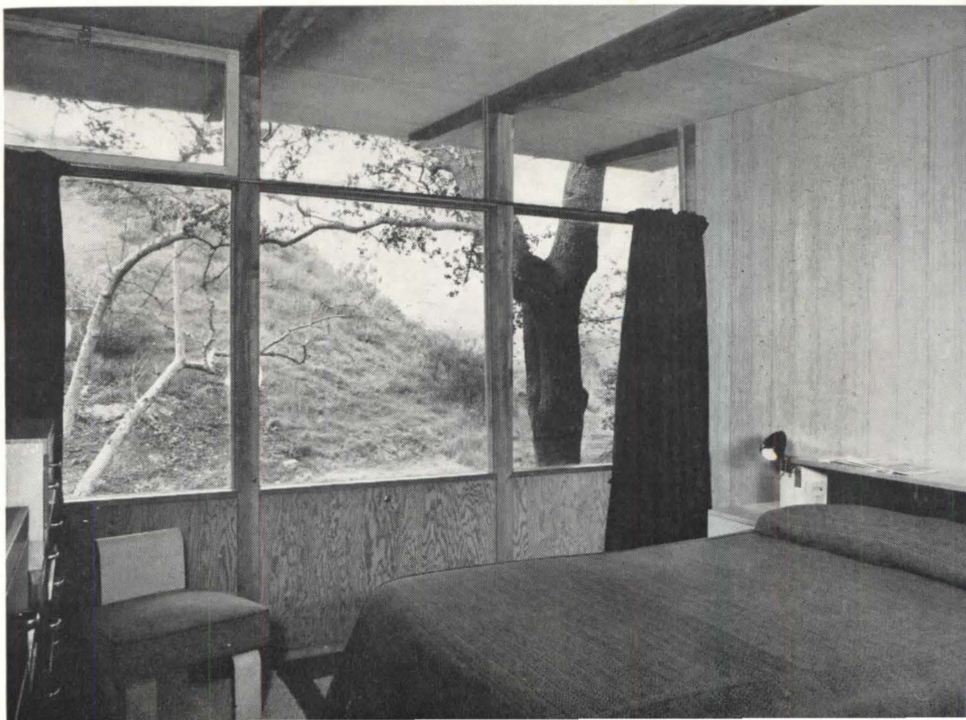


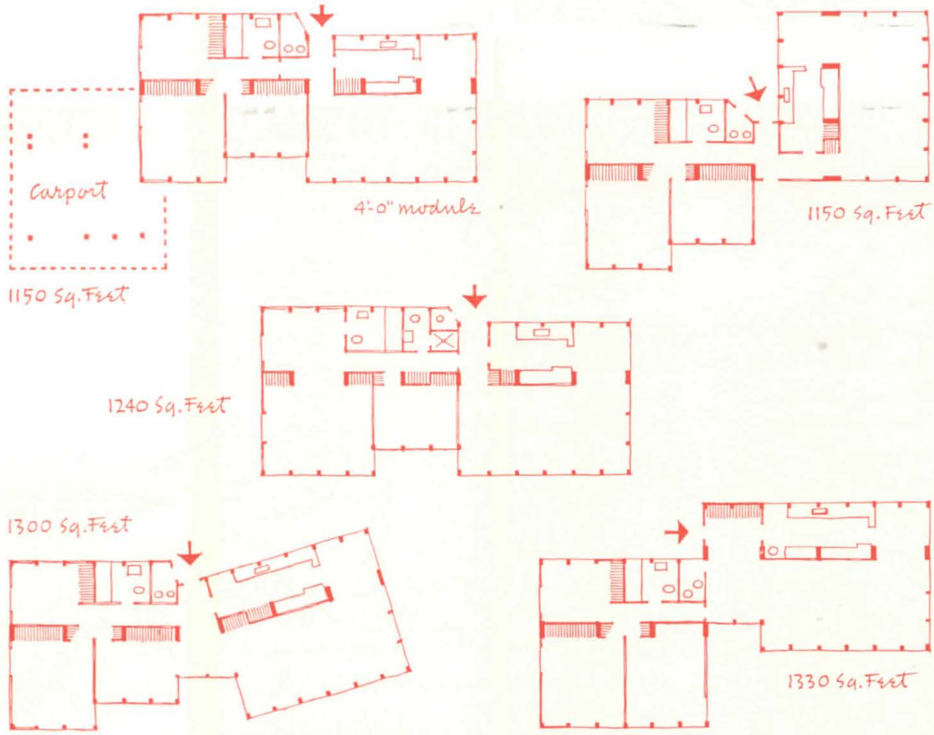
The floor slab is poured, with radiant-heating coils buried in it (above, left); *note aligned steel inserts to receive framing members. The steel-channel tie member and cross bracing* (above, right) *occur between the interior core frames.*

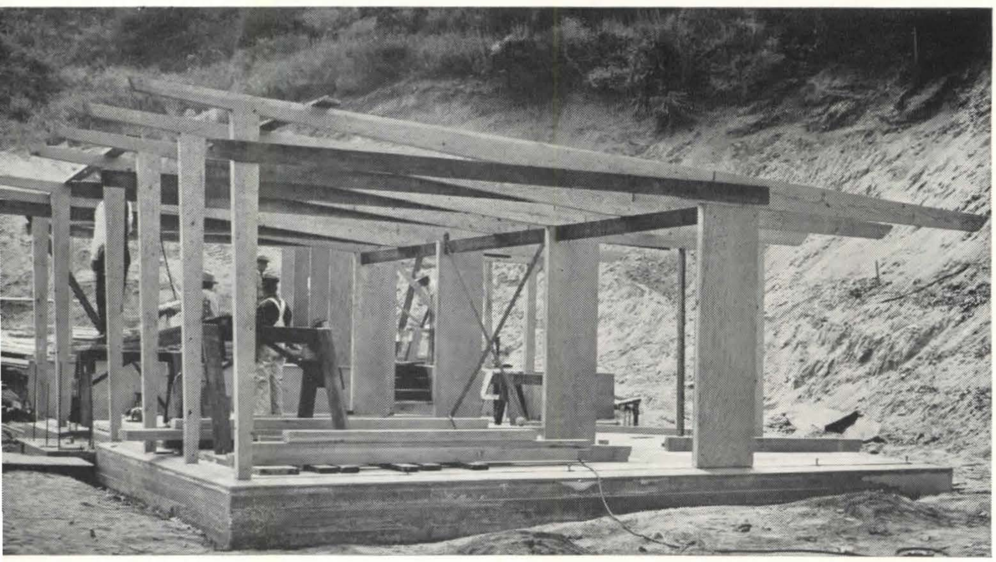
Structural photos: Frederick L. Richards



The pattern of the rafter frames, fixed glass, and louvered ventilation areas is clearly shown in the porch-end view of the completed house. The bedroom detail shows a combination of fixed glass, tilt-in wood sash, and in-opening plywood panels beneath that serve the ventilating louvers.







The independent structural frame (left) *permits any sort of enclosure within reason. On a sloping site, the system can simply be stepped down hill* (above)*, the roof break allowing introduction of a clerestory window. Roof edging is stainless steel.*

The structural photographs (of an earlier house) demonstrate the basic system, which is constantly undergoing refinement as each new house is *developed.* Salient points about the system, that the architect emphasizes, are that it produces " a house whose structural principle allows complete flexibility of plan; where no walls are structural or bracing elements; wherein all base, base shoe, window and door frames, casing and cornices are eliminated." Though tilt-in wood sash are occasionally used in restricted areas, light and ventilation in general derive from areas of fixed glass, with louvers and vent panels beneath them.

Commenting on his current thinking about the system, the architect says "we are carrying the modular post-and-beam idea to the limit." He is also trying materials other than the cement-surfaced structural insulating units for the roof diaphragm. But the basic principle is always the same. If this type of system were to be used on large groups of houses all built at once, he believes that sizable cost savings over standard construction would be realized. As the small sketch plans indicate, there are endless design possibilities within the discipline of the module.

"For at least one third of the citizenry of the United States, including the peoples of the insular possessions and mandates, the more urgent air-conditioning problem is that of maintaining comfort livability during hot weather, not cold."
W. R. Woolrich[1]

NEW DIRECTIONS IN THERMAL INSULATION,

by Groff Conklin

It has taken a remarkably long time for the science that has made America great to turn its attention to the problem so sharply identified by Dean Woolrich. Ever since the beginning of modern technology for thermal control inside structures it has been predominantly directed toward providing warmth rather than coolness.

There is good reason for this obvious emphasis. On our particular planet, in its particular location vis-à-vis the sun, it is not unusual for an unprotected man, in many parts of the world, to die from cold. But it is almost impossible for a man to die from the sun's heat only, anywhere on this earth. Even in the great deserts he usually dies of thirst before he dies from heat exposure.

Provision for warmth coupled with economic considerations, has made insulation of buildings against heat loss the overriding interest of architects, engineers, builders, and manufacturers concerned with the design and use of insulating materials. Until very recently, insulation could be classed as a paying investment only when it was used to reduce heat loss, for then it resulted in sizable savings in heating-plant costs, by making possible reduced furnace and duct or pipe sizes, and in much lower annual fuel costs. Insulation against heat gain, on the other hand, has, until recently, been generally neglected because it did not seem to offer any economic advantage. Even as late as the first half of 1950, when the Housing and Home Finance Agency made a survey of new single-family detached FHA-insured houses, only about two-thirds of the dwellings in the three hot-climate regions of the country used any roof or ceiling insulation, and fewer than seven percent used wall insulation. It is true that more than half of these homes were furnished with attic fans, but without insulation the fans could be only partially effective since they could not reduce heat entering the structure.

Today, when we seem to be entering the Air-Conditioning Age, insulation has at last become an important consideration in planning both dwellings and nonresidential buildings in hot climates. It is obviously an important comfort factor in such climates and is now sure to become accepted, with the advent of room or central air cooling. That such equipment is swiftly becoming essential in homes built in the South is evidenced by the statement of an anonymous eastern builder quoted by *The Wall Street Journal*:[2] "In two or three years no speculative house . . . will be built to sell for over $15,000 without air conditioning. And many in the $12,000 class will have it, too."

While this may well be true, it is also true that nonair-conditioned homes and nonresidential structures will continue to be built for a long time to come. Architects practicing in hot climates should know how to design for low heat gain, whether the buildings are to be air conditioned or not. One of the stumbling-blocks in the way of rational design for comfortable living in hot climates is that there are very few reliable standards that can be followed in all regions. For example, climatic conditions vary enormously from area to area, even though they may lie in very nearly the same latitude. A home designed for comfortable living in hot, dry El Paso, with less than nine in. of annual rain, will present quite a different problem from one in hot, wet Houston, with over 46 in. of annual rain. The two cities lie only two degrees of latitude apart and both have average July temperatures of around 82 F.

In the North, modern homes are designed for low heat loss. Such designs present relatively few complicated thermal problems for the architect or the engineer. The experts have insulating materials, vapor barriers, weatherstripping, double glazing, and various other devices at their disposal; they use them as they wish and as their clients can afford, with the result that the "tight" house has become the northern ideal. With the installation of summer or hot-climate air-conditioning units, such a house can under certain conditions be quite

[1] *Dean of Engineering, The University of Texas, Austin, Texas; quoted from September 1952* Heating, Piping and Air Conditioning, *page 119.*

[2] *September 11, 1952.*

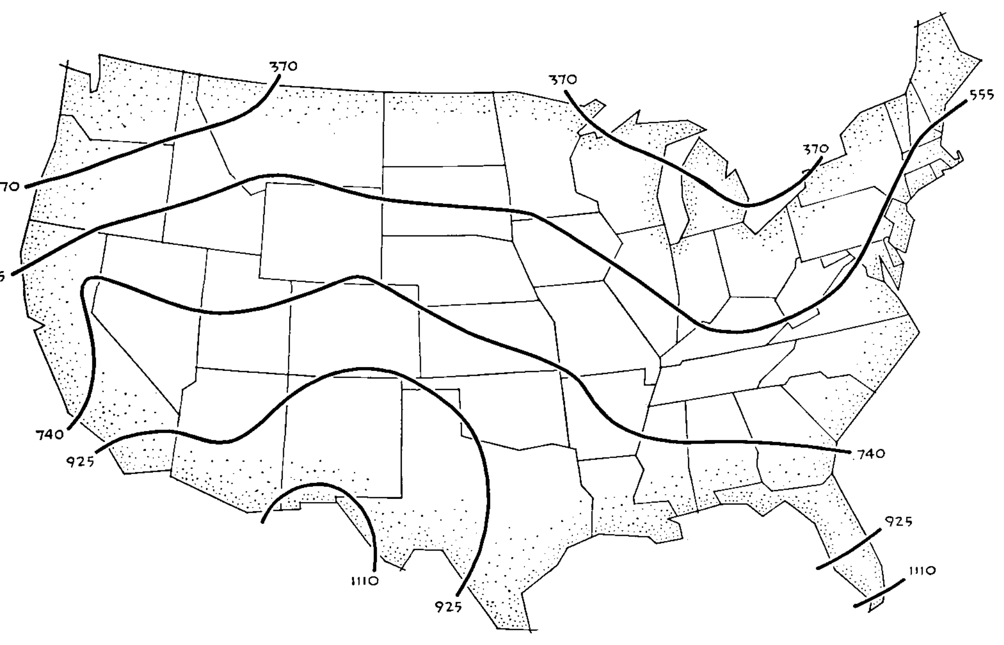


Figure 1—average daily solar radiation received at the ground during January in Btu per day. Maps (*left and across-page*) are by Sigmund Fritz and Torrence H. MacDonald, U. S. Weather Bureau (*Heating and Ventilating*, July 1949).

Part II:* *The Problem of Hot Climates*

a suitable environment—though one should be able to open it widely during cool evenings. However, for summer comfort without air conditioning, the tight house is a mistake. It is a heat trap of a sort, particularly insofar as it bars natural ventilation.

Incidentally, this characteristic of houses designed for low heat loss can be just as much a summer comfort defect in most of our northern states as it is in the "hot" regions of the South. This is due to a fact about the climate of the United States that Tyler Stewart Rogers, author of the excellent *Design of Insulated Buildings for Various Climates,* has described as follows: "My studies indicate that the summer heat problem is *almost uniformly severe* over the United States, whereas the winter heat problem varies mostly with the northern . . . or southwest areas."[3] In actual fact, July is just about as hot, in terms of average amount of daily sun heat received on a flat surface, in Chicago as in Fort Worth, in Newark, New Jersey as in Palm Beach, Florida! Data presented by Sigmund Fritz and Torrence H. MacDonald of the U. S. Weather Bureau,[4] show solar radiation distributions during January and July for continental United States (*Figures 1 and 2*).

However, designing for comfort and for the efficient operation of air-cooling equipment in regions where heat is the primary problem—those regions with short, mild winters and long, hot summers—requires very different and much more complex techniques than those commonly used in the North. Too often the northern-trained architect practicing in hot climates uses, in Dean Woolrich's words: ". . . heating and cooling standards that are keyed to the 40th parallel, as if the United States and all of its insular possessions and other military outposts were located on or in near proximity to that latitude . . . Some 50,000,000 citizens of this nation must journey northwards many hundreds of miles to experience the phenomena typical of such a latitude."[1]

what are "hot climates?"

Strange as this question may sound at first, it is of basic importance to the architect and builder. On November 18 and 19, 1952, the Building Research Advisory Board of the National Research Council held a "Correlation Conference on Housing and Building in Hot-Humid and Hot-Dry Climates" in Washington, D. C. In the very title of the Conference the most important difference in hot-climate types was emphasized.[5] The hot-dry climate is usually characterized by hot days and cool nights, as the sun's heat is quickly reradiated to the clear night sky. The hot-humid climate is defined by somewhat lower temperature extremes both day and night, since high humidity prevents full solar radiation during the day and also limits reradiation of daytime heat out to the sky at night. Mixtures of the two are found in some areas—hot-dry regions, for instance, with definite rainy seasons, as in Lake County, California, where average monthly precipitation varies from as low as 0.1 in. in July to as high as 20.5 in. in January.

One of the common characteristics of hot climates in southern United States, unlike the true tropics, is a short winter season during which some artificial heat is needed. The weather is rarely severe, but is cold enough to be very uncomfortable without heating. In many of these regions, homes are designed for hot-climate comfort rather than cold, and the necessary warmth is provided by inexpensive space heaters of one sort or another. Central heating in such climates, unless part of an all-year air-conditioning system, is generally an economic waste.

These are the most important variations in hot-climate conditions, and they are wide. Obviously, the problems confronting the architect who has to design for hot-climate comfort are many and varied, and among the most important is the problem of the actual nature of the climate he is

* *Part I of this series was published in May 1952 P/A.*
[3] *Private communication.*
[4] *"Average Solar Radiation in the United States," by Sigmund Fritz and Torrence H. MacDonald; July 1949* Heating and Ventilating.

[5] *The author would like to state that a good deal of the information in this report was derived from the papers and the discussions at the B.R.A.B. Conference. The proceedings of the two-day meeting, when published, will be an essential reference for any architect, builder, or engineer interested in hot-climate construction.*

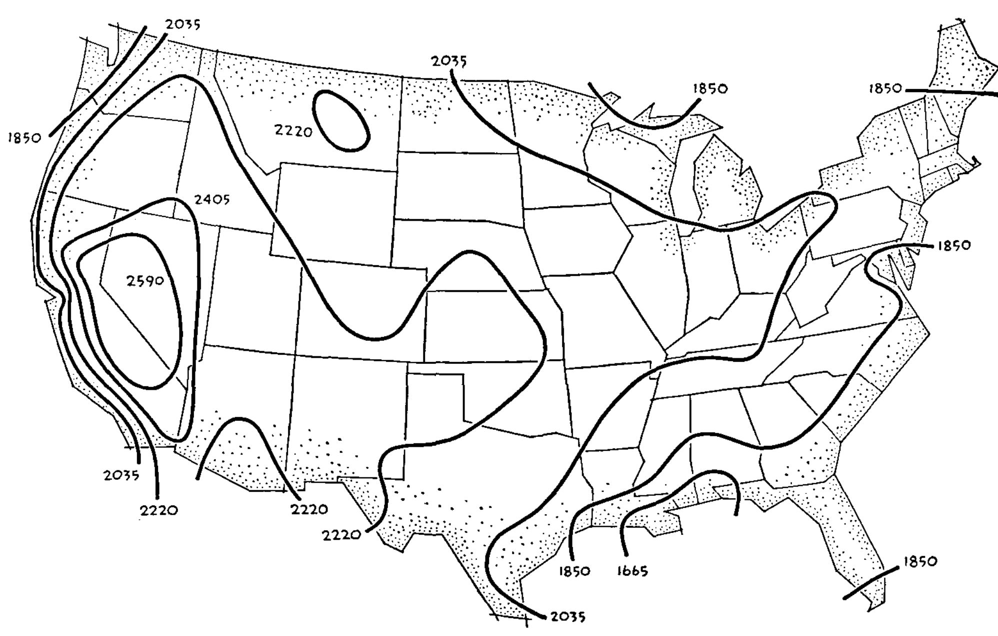


Figure 2—average daily solar radiation received at the ground during July, in Btu per day.

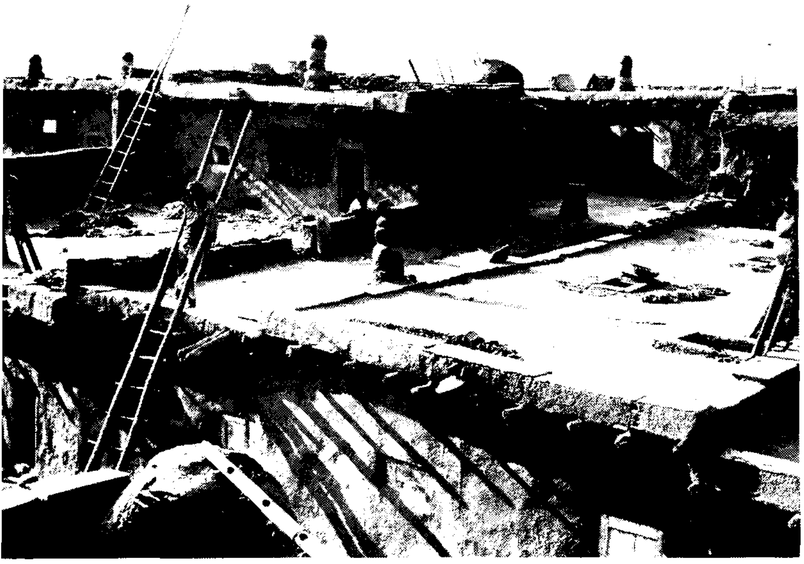


Figure 3—thick earth walls and roofs of Pueblo Indian houses in hot-dry New Mexico produced small openings and deep reveals; in addition, a longer time was required for sun heat to penetrate to the interior surfaces. *Photo: courtesy of Smithsonian Institution, Bettman Archive*

Figure 4—Winthrop Sargent, first governor of the Mississippi Territory, built his well-balconied, high-ceilinged, and large-windowed house (1810) in a dense growth of oak hung with Spanish moss, to help combat the hot-humid climate of Natchez. *Photo: by Ewing Galloway, N. Y.*

going to have to cope with in any particular situation.

essential climatic facts

In northern regions, where homes are designed for minimum heat loss, minimum-design temperatures are often the only climatic data used by architects. Of course, the really up-to-date ones also study angles of solar incidence, so that they can locate large windows to avoid sun always shining through them, but that is about all.

In the South, however, if buildings are to be rationally designed for hot-climate comfort, a wide variety of information about the local climate should be at the architect's disposal. A surprising amount of material is already available on broad regional lines, from such sources as "Regional Climate Analyses and Design Data," begun in the September 1949 *Bulletin* of the A.I.A., the publications of the U. S. Weather Bureau, the current *Guide* of the American Society of Heating and Ventilating Engineers, and the excellent 1941 yearbook of the U. S. Department of Agriculture, *Climate and Man.*

But these data are only general. More specific material will have to be unearthed by the architect or engineer from state and local governmental and nongovernmental sources. Detailed climatic data which would be extremely useful are often to be found after a little inquiry; the major types to be sought are the following:

(1) *Outdoor daytime dry-bulb temperature averages,* on a weekly or monthly basis, for the actual area in which the building is to be erected. The A.S.H.V.E. *Guide* gives design dry-bulb temperatures for nearly 300 cities and towns in the United States, but these temperatures are not necessarily adequate for towns or rural areas in the same general region as a city for which a figure is given. Temperatures can be markedly different over a distance of a few miles. Local dry-bulb temperature data should be obtained wherever possible. If the only information that can be obtained is the average temperature for the hottest month, together with maxima, many conclusions about home design can be based on that material alone.

(2) *Wet-bulb temperature averages* on the same basis, so that outdoor relative humidity can be estimated. The average relative humidity in a region will have considerable effect on the design of buildings in hot climates, as will be seen below. If the information cannot be obtained in detail, local opinions on humidity conditions will be of some value.

(3) *Day-and-night temperature averages,* if not for every period of the year, at least for periods of a week or so in each season. In hot-dry climates there will be a marked difference between day and night temperatures; in hot-humid climates there will be less of a difference.

(4) *Estimates* of the proportion of the year in which it is cold enough to require artificial heat, at least part-time. Local customs in this respect are usually reliable. In general, artificial heat is needed whenever the outdoor temperature falls much below 60 to 65 F for any extended period of time. Indoor relative humidity may effect this figure; the higher the humidity, the greater will be the need for artificial heat, at temperatures under 65 F.

(5) *Wind velocities and prevailing directions.* Whenever there is a prevailing breeze in hot climates, the architect should take every possible advantage of it by correct orientation of the building and by suitable openings in the walls. Average velocities and directions are here primarily important, particularly in hot-humid climates where any non-air-conditioned

house must be specifically designed to take advantage of the breeze if it is to be at all comfortable to live in. However, the likelihood of catastrophic winds during certain seasons of the year must be recognized, especially where hurricanes and destructive gales are not uncommon. Data on wind velocities and directions are not usually easy to compile on a microclimatic basis, and the architect often has to rely on rule-of-experience information from local inhabitants, particularly in small towns and rural areas.

(6) *Angles of solar incidence* at various times of the year. These are not difficult to obtain. Solar incidence angles, from sunrise to sunset for every season, and particularly for times of lowest and highest morning and evening altitude, are of major importance in establishing the dimensions of overhangs and other methods of protecting the interiors of the rooms from the sun's rays. A general fault of most modern homes in hot climates is that protection against the sun is inadequate on exposed sides. When the major climatic problem is one of solar heat, shielding from the sun's radiation at all times of the day and all seasons of the year is a major factor in comfort and also, of course, in the economical operation of air-cooling equipment.

(7) *The average number of cloudy or rainy days* in a year. This information, plotted against average temperatures and humidity data can often help the designer to arrive at pragmatically sound decisions on types and sizes of sun-control devices, and on other factors that depend on solar heat and glare.

(8) *Local data about the site* for the structure that will affect the microclimate of the dwelling itself. Types of information needed include: actual breeze directions on the site, if they can be determined: natural shade; site contours and their relation to prevailing winds: nearness of streams or lakes; position relative to nearby hills or valleys; type of soil, to judge its suitability for future shade plantings; and so on. Careful consideration of these factors will increase the interior comfort of the dwelling by permitting it to take fullest advantage of existing favorable climatic conditions and to suppress unfavorable ones.

These eight categories of information about climate are important in the planning of any home in hot climates, whether it is to be air conditioned or not. They will affect the orientation of the house on its site, the placement of openings in the walls, their size and shading, the selection of materials and construction techniques, and many other factors.

It is true that some of these factors will be used differently if the house is to be air conditioned—and this leads to certain difficulties. There are many engineers and architects in the South who believe that no dwelling should be designed and built anywhere in the United States today, including the South, that could not be economically air conditioned upon the addition of suitable equipment. This means that a number of design aspects will have to be worked out with a different future use in view and may thereby produce less effective immediate results. It seems somewhat extreme to recommend such a procedure, at least as long as (for example) in hot-dry climates relative comfort can be achieved by the suitable inclusion of insulation, large shaded openings, and adequate artificial ventilation in the design of the home.

designs for hot climates

At present it is not possible to present absolute standards for the design of buildings in hot-dry and hot-humid climates. Even if the architect is able to obtain every type of climatic data previously described, he will still be faced with the indisputable fact that there is a fairly wide difference of opinion among men who are experienced in building in hot climates about what types of materials, equipment, and building techniques are best. At the recent B.R.A.B. Conference, there seemed to be a noticeable division between those men who felt that the wisest practice would be to follow the local traditions for hot-climate building and those who supported new techniques. Followers of tradition said that their point of view was especially valuable in underdeveloped regions, where native materials and methods often made possible quite comfortable homes. Believers in modern methods agreed that some of the old traditions were sound but that others were antiquated and should be retired to pasture.

Actually, the only safe thing is to present

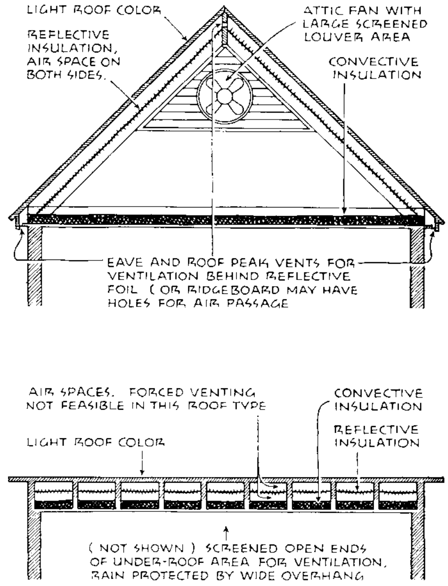


Figure 5

what seems to be the concensus, covering as much as possible the areas of agreement. The whole problem is too new, research-wise, for any positive and scientifically certain data to be obtainable on many of the most debatable points, and the following paragraphs are offered more as a compilation of the available architectural experience in these areas than as an exact statement of ascertained facts.

In *hot-dry climates*, traditional or native buildings are usually built with extremely thick masonry, stone, or earth walls and roofs. Small openings with deep reveals, and extensive exterior shade when the climate makes it possible, are characteristic of such homes (*Figure 3*). In addition, one finds in some parts of the world sheltered areas outside the structure, such as patios, courtyards, or areas enclosed by fence or arbor where, open to the sky, the family can sleep at night.

This living pattern is quite logical, for the walls and the roofs are thick enough to prevent the sun's energy from warming the interior of the building during the day. Some heat may penetrate, but it will be dissipated overnight through reradiation to the night sky and through natural ventilation; meanwhile the family is sleeping comfortably in the open patio. Indeed, the idea of sleeping outdoors with the body directly exposed to the night air (except for insect screening) is particularly sound in hot-dry climates, since one can become cooler faster in such regions by permitting body heat to radiate to the clear night sky than by many other ways more common with us.

Today, such thick-walled construction is usually too expensive to be practical and is no longer commonly used in this country. Architects from the Southwest like to tell of the northern builder who observed the comfortable temperatures maintained in the adobe structures of the desert Indians and who set about manufacturing standard eight-inch blocks out of adobe. Of course, he was miserably disappointed when his homes became unbearably hot toward the end of the day! He had ascribed to the material a quality which was entirely dependent on dimension. Concrete or stone has about as high a heat transmission coefficient as any nonmetallic substance—as high as 16 Btu, as compared with 0.27 Btu for mineral wool—but heat will take so long to penetrate a *very* thick layer (18 in. or more) that it will go back out during the cool nights, as well as being diminished by night ventilation. Thus, heat will not seriously affect the interior of the structure. With only eight in. of thickness, the time lag is wholly insufficient to keep the heat out.

Today adobe and other materials of a similar nature are being replaced by modern insulating materials and construction techniques, which permit only a small portion of the heat to enter the wall or roof exposed to the sun or the hot air. Similarly, since sleeping in the open is rarely feasible in most urban and suburban areas, either air conditioning or artificial ventilation with attic or bedroom exhaust fans, or both, take over the task of keeping the rooms and their occupants cool at night. It has been proposed that sections of the roofs over bedrooms in modern houses built in hot-dry climates be made retractable so that they could be pulled back at night, thus exposing the occupants to the cool night sky; but this is in itself a more costly construction, and, furthermore, has not as yet been tested for effectiveness.

With the thin wall and shallow window of the modern house, in hot-dry climates, must go special devices for providing shade or else an intelligent use of existing natural shade, since deep reveals are no longer present to keep out the solar energy.

In *hot-humid climates,* the most common characteristic of houses is their openness. They are designed to catch every vagrant breeze that passes: for comfort in humid climates (other than in air-conditioned homes) is most satisfactorily achieved by ventilation.

The well-balconied, high-ceilinged, large-windowed Natchez, Mississippi mansion (*Figure 4*), the loosely-woven structures of the natives in the wet tropics, the deep-veranda, post-and-lintel, fabric-walled homes of the Equatorial African planters, and the paper-thin walls of the dwellings in southern Japan: all are designed to admit breezes. The houses are so placed that whatever air there is in motion passes through the living quarters. Outdoor sleeping is rare and is not missed since night-sky radiation is a small factor in humid climates. One sleeps on the screened porches or verandas, instead.

Artificial ventilation, whether by native boys waving punkahs or by electric fans, is one of the few sure ways of obtaining a bit of comfort in a very hot-humid climate. The *slow-moving,* large wood-blade electric fan is the only type for this type of climate. However, an efficiently-operating air-conditioning unit will provide the really effective solution for those who must live in hot-humid climates. Insulation in roof and walls will reduce the amount of heat entering the building, thus making it more comfortable and also increasing the economy of operation of the air-cooling equipment.

building methods for hot climates

Modern technology has made possible considerable improvement in structures designed for hot climates, both dry and humid. Some of these methods were described in previous P/A articles by the author.[6] The important amendment to the data in the first article, which dealt with roof constructions for both winter and summer comfort and economy in the north temperate zone, is that in hot climates the problem of vapor condensation in the building's structural components above ground level rarely occurs. Vapor barriers generally are not required in such climates. L. V. Teesdale of the Forest Products Laboratory writes: "We have never heard of condensation collecting in walls, attics, or roofs . . . of houses that are cooled a few degrees below outside shade temperatures. The temperature differences are not great enough to cause condensation."[3] Teesdale also calls attention to the fact that condensation is common on concrete-slab floors *in northern climates* where winters are relatively severe. Such condensation is most unlikely to occur in warmer regions.

Moisture condensation or high vapor pressure *inside the house* in hot-humid climates is, of course, not uncommon; as anyone knows who has ever tried to get rid of summer mildew at the seashore or in climates similar to that found in and around Washington, D. C. However, this condensation cannot be prevented by vapor barriers. Dehumidifiers are highly effective but expensive; well-designed air conditioning

[6] *"Weather Conditioning of Roofs for Residences," November and December 1949 P/A; "Sun Control Methods," May and June 1950 P/A.*

Figure 6—spray system on roof of the Acme Ceramic Housing Project, Austin, Texas, is being tested by the University of Texas Bureau of Engineering Research. Spray heads are on 12 in. risers and each head sprinkles an area of about nine ft in diameter. Evaporation of water from the roof removes about 1060 Btu for each pound of water evaporated. *Photo: courtesy of R. A. Bacon, W. E. Long*

will also do the job. There is some reason to believe that in extremely humid hot climates, in buildings that are to be dehumidified or air conditioned, a vapor barrier in the *outer* sections of the building might assist in reducing condensation in the cooled interior, but there are as yet no reliable experimental data to support this supposition.

Roofs. The problem of keeping sun and air heat out of attics or roofs differs somewhat from the more ordinary one in northern climates, where the roof is designed to keep heat in during the winter. For one thing, it is more difficult and calls for sterner measures to reduce the amount of heat entering through the roof. One needs *more* insulation, not less, to improve summer comfort under a hot sun.

No single insulating material and no one construction technique will be wholly adequate in reducing downflow of heat to a bearable proportion in hot-climate regions. It should become a commonplace for architects in such climates to use normal reflectors of solar radiation, such as light-colored roof-surfacing materials and as much natural shade as the environment affords. In addition, a *combination* of devices and materials should be used in the roof and ceiling, so designed that they will keep a large part of both the radiant and the convective heat from passing down into the rooms below.

Teesdale has pointed out[3] that unventilated attics, even in such a far-north region as Madison, Wisconsin, can attain temperatures as high as 150 F in summertime when the outdoor normal temperature averages 90 F. "Tests show," he wrote, "that ventilation through louvered openings will lower the temperature 20 to 25 F. an a combination of vents under the roof overhang and louvers or other outlets is still more effective."

Natural ventilation alone, however, is hardly adequate as a method of eliminating overheated air and solar radiation from the top of the structure. All methods of eliminating the heat which do not require excessive operating and maintenance costs should be used to keep the dwelling free of the heat penetrating the roof. Teesdale continues: "These factors suggest the use of reflective insulation under the roof rafters to reduce the inflow of heat, ventilation through the attic space, and blanket or fill insulation between the attic and the rooms below." Particularly in hot-humid climates, care must be taken to use inorganic insulating materials, such as mineral wool, which are impervious to attacks by the biological enemies of the house—termites and other insects, rodents and other small animals, mildew and so-called "dry-rot."

In most hot climates, attic ventilation should be powered, since the prevailing breezes are not strong enough to keep the air in the attic from storing heat and permitting its transmission downward by convection. Power bills for exhaust fans are not excessive and the investment in artificial ventilation is likely to prove a sound one, provided the fan is installed with due understanding of the principles of air flow. For example, the air intakes for an attic exhaust fan should be located on the side of the house that has either a northern exposure or natural shade, and preferably both, since these elements tend to keep down the actual air temperature (*Figure* 5).

Water-cooled roofs, either spray or pool type, are often used in hot climates to reduce the amount of heat entering the building. Evaporative cooling from a water spray (*Figure 6*) is said to be much more efficient in a hot climate than is a pool, since the water in the pool does heat and eventually it transmits some of its stored heat down into the dwelling.

Water-cooling of roofs, however, is not always possible or desirable in hot climates. In hot-dry regions there is likely to be a shortage of water that will make the technique uneconomical, and in hot-humid areas it may prove of only minor value since all it does is to add to the natural humidity of the atmosphere. The water also encourages vegetable and fungus growths, particularly in the hot-humid regions and has been known to be a breeding-ground for mosquitoes.

Actually, the value of water cooling a roof if that roof has already been designed for the most efficient reduction of heat gain as described above is highly conjectural. Tests should be undertaken before use.

A not uncommon type of construction in hot climates outside the United States is the double roof. Perhaps the best-known example of this construction is the house that Admiral William F. Halsey occupied in the Solomon Islands during World War II. This type of native building is particularly useful in those parts of the world where there are moderately strong winds, but rarely gales, to provide natural air-cooling between the two layers.

The double roof has been adapted to modern materials elsewhere in the tropics (*Figure 7*). Here two thicknesses of concrete masonry separated by short piers form a double roof that must be quite efficient as a bar to radiant heat.

One additional point should be mentioned in connection with roof constructions in hot climates. If there are to be clerestories in flat or shed roofs to permit light to enter the central area of the structure, adequate overhangs to keep the sun from the windows should be provided and the roof of the clerestory should be as carefully insulated as the rest of the building.

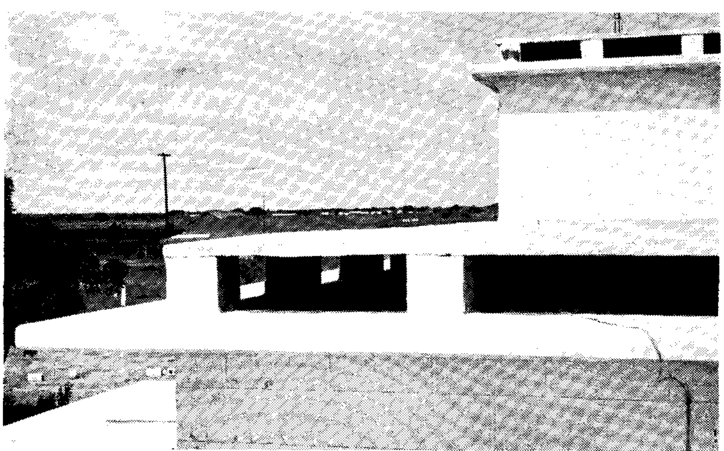
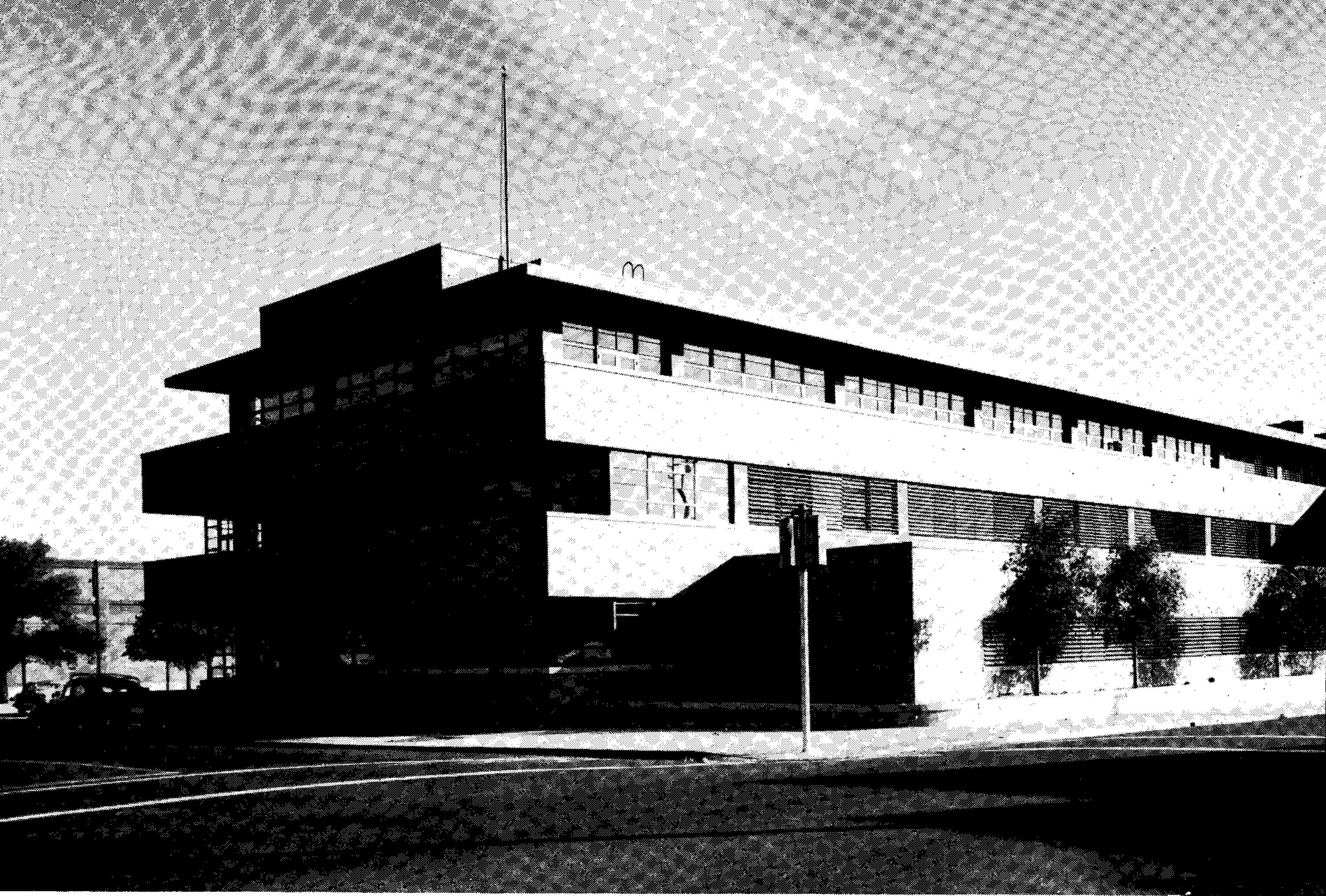


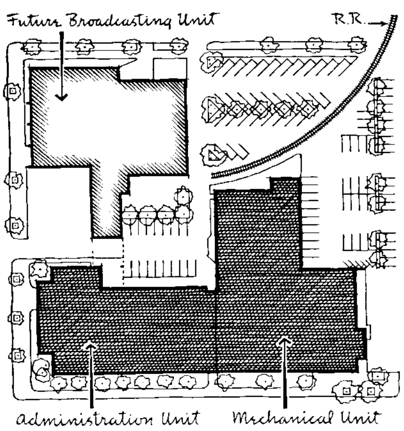
Figure 7—concrete double roof at Kano, Nigeria. Upper slab provides protection against solar radiation.

Photo: from paper by Bruce M. Holmes presented at B. R. A. B. Conference on "Housing and Building in Hot-Humid and Hot-Dry Climates," November 1952.

Part III will appear in April 1953 P/A.

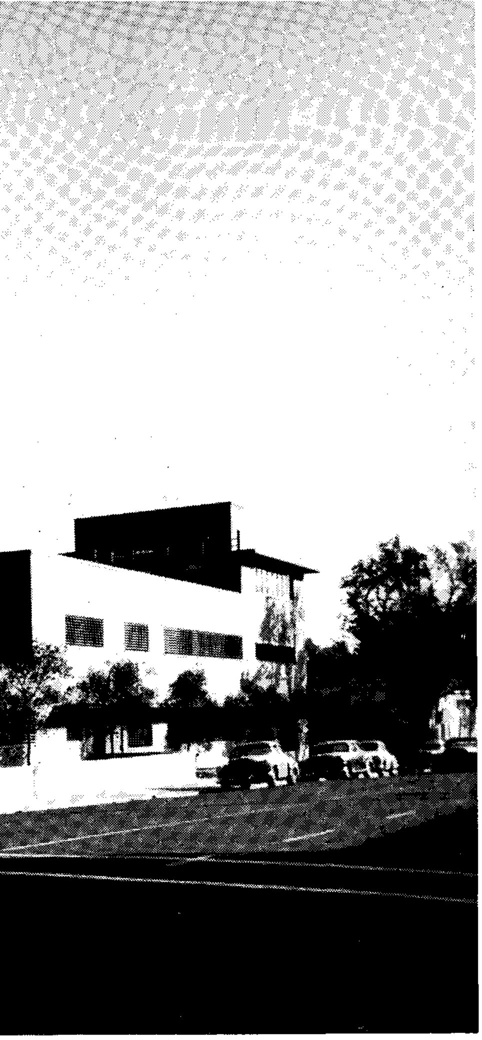


newspaper plant



Headquarters for McClatchy Newspapers (*The Sacramento Bee; The Modesto Bee; The Fresno Bee*), this full-block complex also houses the publishing plant and the *Bee* engraving department, which does outside commercial engraving as well as the newspaper's work. Future expansion will add offices for the McClatchy Broadcasting Company. In the words of Dunbar Beck, the associated designer, the problem was "to keep these various activities separated, but to maintain a good relationship to each other and to the employe services that are used in common." Highlights of the group: "More than 200,000 sq ft of working space . . . ceilings and floors that soak up sound and reduce fatigue . . . air conditioned throughout . . . wired music in all departments . . . new 8-unit press . . . railroad siding for direct expansion of any and all departments . . . additional floors may be added, wings extended . . . includes an entire floor for employe welfare . . . cafeteria, lounge, library, dispensary."

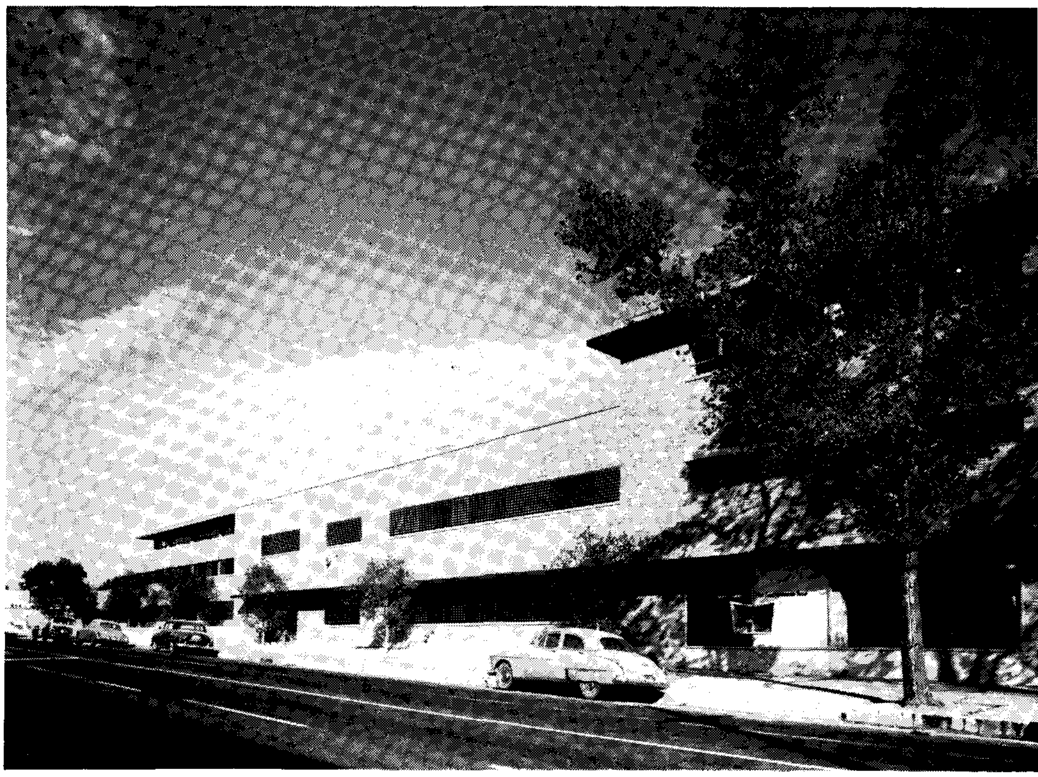
The present group comprises an administrative unit, including offices of the *Bee* engraving department (*left of photo above*), and a mechanical unit, housing the editorial rooms, pressroom, composing room, mailing room, and delivery and shipping docks (background). Basic requirements for an optimum newspaper site, in the opinion of Lockwood-Greene, Inc., architects-engineers who are specialists in newspaper-plant design, include "efficient receipt of newsprint; a good center for truck distribution of the finished product—newspapers; a convenient location, for the staff to get to work; and convenience to the business areas of the city, where advertising is secured." How well this plant meets these needs is apparent from a study of the floor plans (page 104).

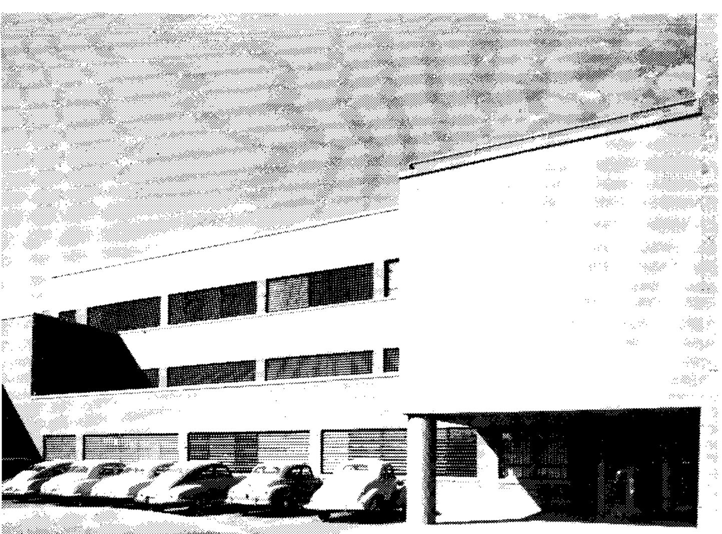


owners	McClatchy Newspapers
location	Sacramento, California
architects-engineers	Lockwood Greene Engineers, Inc.
designer	Dunbar Beck, representing the owner
special assistant	Denis C. Elliot
production layout consultant	Hal P. Skemp
landscape architect	Douglas Baylis
general contractors	Lawrence Construction Co. (office building) H. W. Robertson, Inc. (mechanical building)

On the west front (right) *a side entrance leads directly to the central employe elevator lobby. The adjustable louvers outside window areas are also used on the south and east* (below) *sides of the building. A steel-framed, fireproof structure, with foundations, floors, and roofs of concrete, the plant is also built to resist earthquake stresses (construction and equipment outline, page 104). A full discussion of the ventilation and air-conditioning begins on page 107. The building has a sprinkler system, a watchman's clock system, and fire-alarm boxes connected with the city's alarm network.*

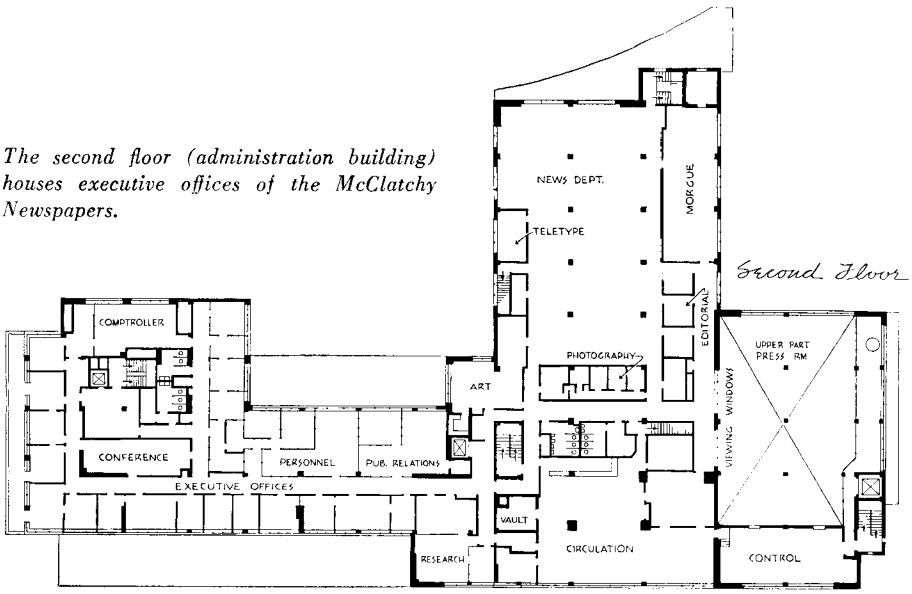
Photos: Roger Sturtevant



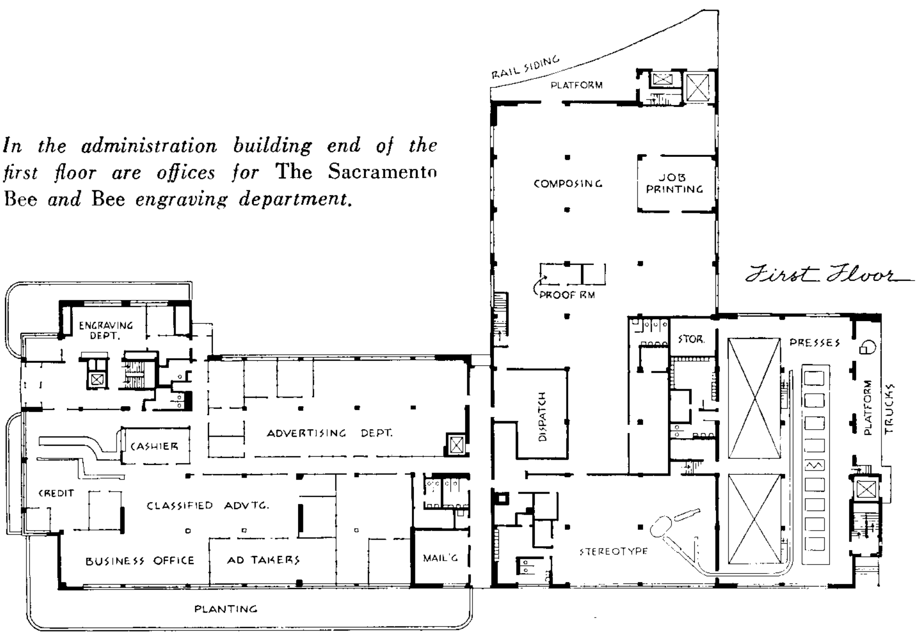


newspaper plant

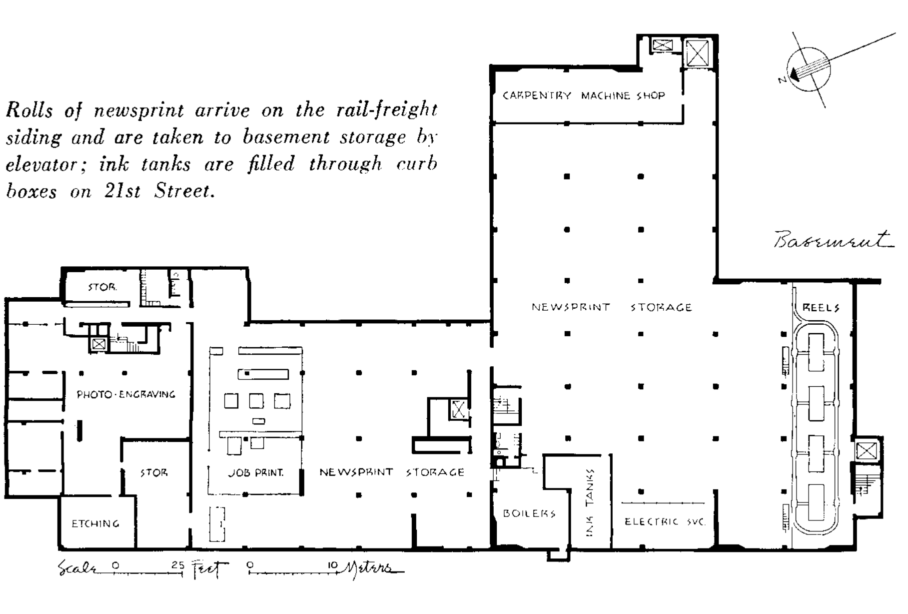
The second floor (administration building) houses executive offices of the McClatchy Newspapers.



In the administration building end of the first floor are offices for The Sacramento Bee *and* Bee *engraving department.*



Rolls of newsprint arrive on the rail-freight siding and are taken to basement storage by elevator; ink tanks are filled through curb boxes on 21st Street.



Construction

Foundation, frame, floors, roof: reinforced-concrete foundation and floors: reinforcing steel—Bethlehem Steel Company; structural-steel frame—Bethlehem Steel Company; concrete, concrete block, and brick walls. **Wall surfacing:** exterior: concrete and brick; interior: plaster. **Floor surfacing:** linoleum, industrial floor covering—Pabco Products, Inc. **Ceiling surfacing:** acoustical tile—Owens-Corning Fiberglas Corporation. **Roof surfacing:** built-up roofing (Mechanical Building)—Johns-Manville Corporation; built-up roofing (Office Building)—Koppers Company, Inc. **Waterproofing and dampproofing:** protective coating—A. C. Horn Company, Inc. **Insulation:** acoustical tile, thermal roof insulation—Owens-Corning Fiberglas Corporation. **Partitions:** interior: plastered cement block; steel and glass—E. F. Hauserman Company; steel toilet partitions—The Mills Company; **Windows:** steel sash (Mechanical Building)—Truscon Steel Company; steel sash (Office Building)—Detroit Steel Products Company; observation: chrome-trimmed plate glass—Cain Glass Company. **Doors:** interior: kalamein and hollow metal—Superior Fireproof Door & Sash Company, Inc.; aluminum entrance doors—Kawneer Company. **Hardware:** brass and bronze lock sets, bronze-finished door closers, brass hinges.

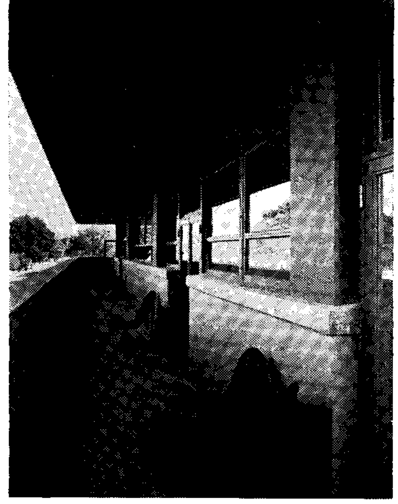
Equipment

Kitchen and cafeteria: stainless-steel units—Dohrmann Hotel Supply Company. **Office equipment:** executive chairs—Emeco Corporation; posture chairs—DoMore Chair Company; safe cabinets—Remington Rand Inc.; side chairs—Maso Steel Products Company; steel desks and tables—Globe-Wernicke Company; typewriter stands—Cramer Posture Chair Company. **Intercommunication and public address systems:** McClatchy Broadcasting Company. **Elevators:** electric—Montgomery Elevator Company and Otis Elevator Company; oildraulic freight—Rotary Lift Company. **Lighting fixtures:** executive offices: incandescent units with special fixtures; manufacturing and hospital ward areas: fluorescent units; office area: slimline units; lobby area: fluorescent cove lighting. **Electric distribution:** panelboards, multibreaker—Lexington Electric Products Company, Inc. **Plumbing and sanitation:** water closets, lavatories, toilet seats—Crane Company; water heater: copper-lined hot-water storage tank; heating elements in boilers—McDonough Steel Company, circulating pumps—Chicago Pump Company; flush valves—Sloan Valve Company; circular and semi-circular industrial wash fountains—Bradley Washfountain Company; cast-iron underground pipe, copper hot- and cold-water pipes; sprinklers—Grinnell Company, Inc. and W. D. Allen Manufacturing Company; shower controls—Crane Company; water-supply system: city water for drinking and kitchen uses, two wells provide cooling water for air-conditioning and manufacturing operations. **Heating:** low-pressure steam with condensate return—The Nash Engineering Company; boilers: Pacific Steel Boiler, Div. United States Radiator Corporation; fuel: gas or oil; burner—S. T. Johnson Company; convectors—The Trane Company; exhaust fans—American Blower Corporation, Div. American Radiator & Standard Sanitary Corporation. **Air conditioning:** warm- and cold-air systems, Freon refrigerant, compressors—Carrier Corporation; diffusors—Anemostat Corporation of America; blowers, cooling coils—American Blower Corporation, Div. American Radiator & Standard Sanitary Corporation; filters—American Air Filter Company, Inc.; controls—Johnson Service Company.

Along the west wall of the first floor of the administration building is the classified-ad department (below), *where operators receive orders by phone.*

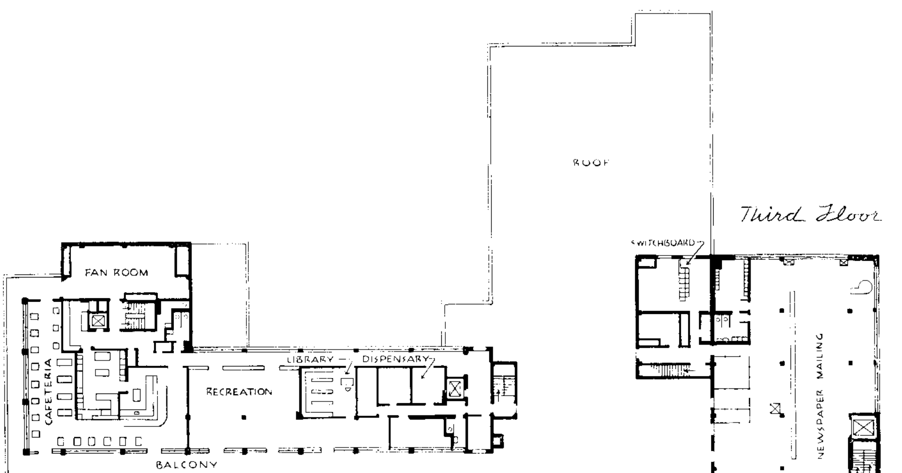
Bordering executives' offices on the second floor is a cantilevered balcony (top, right).

A complete dispensary is included as an employe service; in the corridor that serves this department (right, below) *the doors are of obscure tempered-plate glass.*



In the newsroom, on the second floor of the mechanical wing (left, top), *the ceiling is acoustically treated. The room is lighted by slimline lamps in surface-mounted fixtures with eggcrate diffusers. An underfloor duct system in all office areas makes possible telephone or electrical connection at almost any point.*

The pressroom (left, below) *occupies the entire rear end of the first floor; an off-street truck dock adjoins.*



Employe services occupy the top floor of the administration building—a cafeteria, recreation room, library, and dispensary. The top level of the mechanical building contains the mailing room; printed papers come up to this room on a power-driven conveyor to be bundled, labeled, and taken by conveyor and spiral chute down to the 70-ft truck dock at ground level.

NEW SUBSCRIPTION ORDER

Please enter my NEW subscription to PROGRESSIVE ARCHITECTURE at the *professional* rate for one year $4.

☐ Check here for THREE years *professional* rate $8.

NOTE: Professional rate available only to architects, designers, draftsmen, engineers and architectural students. To *all others* one year $10.

Name.. Professional Job Title..............................

Address ....

City .... Zone .... State ....

Company.. Type of Business..............................

OVERSEAS RATES: Latin America and Philippine Republic — 1 year $10; 2 years $16; three years $20. All other overseas — 1 year $15; 2 years $25; three years $30. Canada same as U.S.

MA

NEW SUBSCRIPTION ORDER

Please enter my NEW subscription to PROGRESSIVE ARCHITECTURE at the *professional* rate for one year $4.

☐ Check here for THREE years *professional* rate $8.

NOTE: Professional rate available only to architects, designers, draftsmen, engineers and architectural students. To *all others* one year $10.

Name.. Professional Job Title..............................

Address ....

City .... Zone .... State ....

Company.. Type of Business..............................

OVERSEAS RATES: Latin America and Philippine Republic — 1 year $10; 2 years $16; three years $20. All other overseas — 1 year $15; 2 years $25; three years $30. Canada same as U.S.

MA

Postage
Will be Paid
by
Addressee

No
Postage Stamp
Necessary
If Mailed in the
United States

BUSINESS REPLY CARD

First Class Permit No. 1538, Sec. 34.9, P. L. & R., New York, N. Y.

PROGRESSIVE ARCHITECTURE

REINHOLD PUBLISHING CORP.

330 WEST 42ND STREET

NEW YORK 36, N. Y.

Postage
Will be Paid
by
Addressee

No
Postage Stamp
Necessary
If Mailed in the
United States

BUSINESS REPLY CARD

First Class Permit No. 1538, Sec. 34.9, P. L. & R., New York, N. Y.

PROGRESSIVE ARCHITECTURE

REINHOLD PUBLISHING CORP.

330 WEST 42ND STREET

NEW YORK 36, N. Y.

newspaper plant air conditioning and ventilating

by Tyler G. Hicks*

Newspaper plants require air conditioning as it is the only effective means of solving certain operating problems arising from the materials and processes of printing. Local ventilation with humidification of room air is another means of simplifying some production and comfort problems. But neither ventilation nor air conditioning alone is satisfactory—the modern newspaper plant combines the two to secure a carefully controlled atmosphere within the building.

paper characteristics

Newspapers are printed from rolls of paper by a process called *web-fed* or *web printing.* The paper is hygroscopic; its properties vary with the quantity of moisture it holds.

Paper rolls that lose moisture from their ends have "short" or "tight" edges. Cracks develop at paper edges and web breaks on the press may be frequent. This means press shutdowns may occur more often, cutting output. High-speed presses are expensive machines and any condition that reduces their production causes a direct loss on the initial investment for the press.

Static electricity and ink misting are two other newspaper problems caused by low-humidity, "dry" atmospheres in the pressroom. News inks are thin—they dry mostly by absorption. A change in pressroom temperature or the wrong temperature can affect ink viscosity, slowing production.

stereotype, engraving

Here we run into processes giving off large quantities of heat, others that require high relative humidities, room-air exhausting, special filtration to recover valuable materials, hood services of several types, and close control of atmospheric conditions. All are essential for economical, rapid, and safe production of modern newspapers.

Examples of stereotype-room problems include the large internal heat gains from lead melting and molding machines, mat formers, and scorchers. Heat, smoke, and foundry-like odors must be localized. Room temperature must be maintained higher than in the rest of the plant because personnel perspiration rate is high. Drafts are objectionable; they may endanger health.

Besides these problems of heat and smoke, a high-humidity atmosphere is needed for conditioning stereotype-plate mats in storage.

The usual engraving department includes operations such as etching, drying, photography, and photo printing and developing. Controlled humidity, exhaust, and air filtration in the right combinations are usually satisfactory.

composing and pressrooms

Linotype operators must be able to concentrate on their operations without disturbances of drafts or uneven room temperatures. Fully-conditioned spaces carefully designed for the job are the only answer.

Recommended temperature and humidity conditions for pressrooms, stockrooms, and storerooms are listed (*Table I*). Five percent variation of relative humidity in the pressroom is allowable if production is to be satisfactory at all times. This and the 5-F allowable temperature variation result from paper characteristics.

The best humidity for roll storage is 50%; the best temperature is from 73 to 80 F. The job shop, a part of most modern newspaper plants, requires conditions fixed by the type of work done. (*Table I gives specifications for a typical plant.*)

editorial, circulation

In general these departments need only usual comfort conditions, summer and winter. Areas where work may resemble that in a typical office structure are editorial, circulation, recreation, cafeteria, library, and medical. These are common to many newspaper structures.

Areas needing other than straight air conditioning are kitchen, conference rooms, museum, first-aid treating, and cooking school. Where large changes in occupancy are expected, recreation rooms and cafeteria are made more comfortable by more than just air conditioning. Direct exhaust systems may supplement air conditioning and remove objectionable smoke and odors.

the sacramento bee

Application of the general principles that have been outlined will vary from one newspaper plant to another, depending on location, architectural treatment, press types, job-shop size, and many other factors. *The Sacramento Bee* is an example of advanced design because it combines modern interior and exterior treatment with year-round air conditioning.

All departments in both the administration and mechanical buildings are conditioned throughout, under complete automatic control. Hoods and mechanical exhausts are used in all places where newspaper equipment generates heat or fumes. Locker rooms and service areas have similar exhausts.

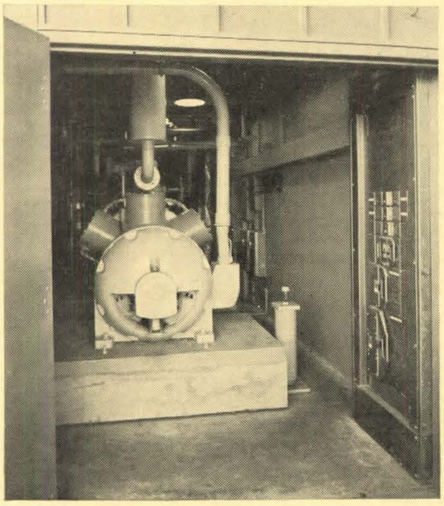
Table I: Temperatures and Humidities for Printing Plants*

Process	Temp F	R.H. %
Pressroom:		
Newspaper and other web printing	75-80	50-55
Multicolor offset lithography	75-80	46-48
Other sheet-fed printing	75-80	45-50
Stockroom:		
Roll storage	73-80	50
Multicolor offset lithography	73-80	5-8% above pressroom[a]
Other paper storage	70-80	[b]
Binding, cutting, drying, folding, and gluing	70-80	45-50

a 5 to 8% above pressroom
b same as pressroom
Notes: Air from pressroom and storage rooms should not be recirculated through office areas. Provide hoods for gas dryers (solvent recovery recommended for all except job shops). Exhaust system with dust collectors incorporated is required for type- and plate-cleaning areas. Check use of gasoline and other solvents.
* Abstracted from A.S.H.V.E. Guide, 1952, p. 942

* *Associate Editor,* Power

Figure 1—one of two refrigeration compressors used for building cooling at the Bee.



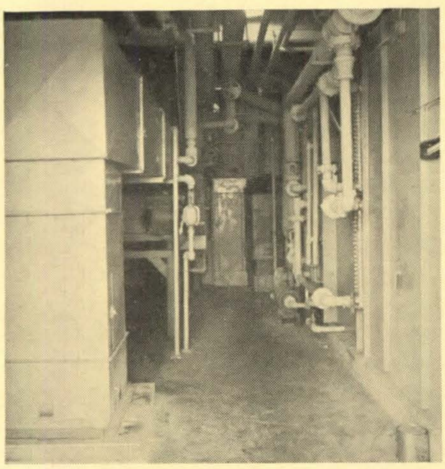
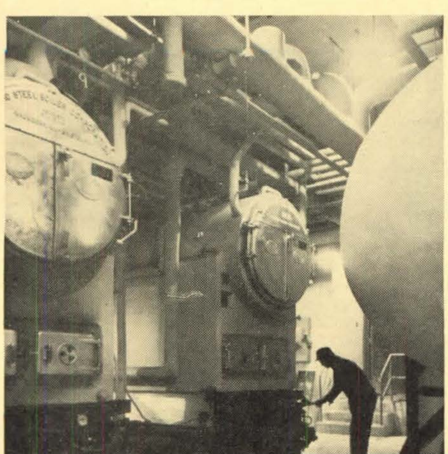


Figure 2—fan room in mechanical building contains newsroom air-conditioning system (right) *and composing room system* (left).

Figure 3—two low-pressure heating boilers supply steam and hot water; burn natural gas or oil.



The extent of the air-conditioning installation will be realized when one sees that the entire basement (except for photo-engraving department and job shop at north end, reel room for press, ink room, boiler room, and electric service room) is available for newsprint.

system design details

Sun load can have a major effect on refrigerating-system loads during the summer. To reduce sun load and system operating cost, all *Bee* windows exposed to the sun have adjustable louvers. These allow blocking of the rays as the sun travels from east to west, preventing large fluctuations in heat load. Roof decks are well insulated for the same reason.

All outdoor air introduced into the building is filtered. Every cubic foot of air circulated inside the building is filtered about eight times per hour for dust and pollen removal. Most air is further cleansed and conditioned by passage through water sprays.

Room air is supplied through slotted openings in the top of continuous cabinets located under the windows. This blankets exterior walls with cool air in summer, warm air in winter.

The air-conditioning systems using refrigeration require no reheating in summer. This reduces operating costs to the lowest possible figure for a fully air-conditioned building. Instead of a reheater, hot and cold plenums are fitted at supply-fan discharge. The cold plenum is kept at a low enough temperature to satisfy any one of the various zone-supply ducts. The hot plenum handles recirculated room air in summer. In winter the air in the plenum is heated only enough to offset building heat losses. Each zone duct connects to both hot and cold plenums. A pair of dampers automatically admits the correct percentage of hot and cold air to the zone duct, according to the demand of the zone thermostat in the conditioned space.

The system of this design is most flexible because as many different temperature conditions can be obtained as there are zones. The three double-duct systems installed in the building replace 33 individual systems which would otherwise be needed. The results are equally satisfactory.

Relative humidity throughout the building is automatically reduced in summer and increased in winter to provide maximum human comfort. Winter humidification is automatically maintained at comfort condition by means of recirculated water sprayed over the cooling-coil surface over which air is drawn. Humidistats control all phases of this process.

At least two fans are used in each air-conditioning system. One is the usual supply-air fan, the other a recirculated-air fan. The latter can automatically vent large volumes of air when the systems run with 100% outdoor air. They are automatically controlled so that when the outdoor-air temperature is suitable for cooling, the refrigerating plant is shut down and a mixture of outdoor and room air is used for cooling. Therefore, if there should be a breakdown in the refrigerating units, it is possible to run all air systems on natural ventilation and mechanically exhaust all air introduced into the building. This is extremely important, should an interruption in refrigeration service occur in summer. Also, it is common practice to seal and lock the windows in fully air-conditioned buildings to reduce dust infiltration. Having air available during refrigeration failure eliminates the need for opening building windows.

cooling, refrigeration

During plant design, extensive studies were made in an attempt to apply the principle of the heat pump to the building heating and cooling systems. But the heat pump did not prove economical in any respect for a building of the *Bee's* character. Its application was discarded after a careful comparison of costs and operating results with well water and refrigeration systems (*Figure 1*).

Water from two deep wells is used for cooling in several of the air-conditioning systems handling large volumes of outdoor air. The water is then reused in the condensers serving the refrigeration systems. Heat abstracted from the air and refrigerant is added to the well water during each step and the warm water is wasted.

Systems utilizing well water for summer cooling are arranged so that well water can preheat outdoor air introduced into the building in winter. A substantial heating-fuel economy is realized for systems handling large volumes of outdoor air, when compared with the cost of gas or oil fuel.

Well water is also used for cooling and setting molten-lead newspaper plates in the stereotype department. The system includes a large well-water storage tank with circulating pumps, piping, and automatic controls which maintain the cooling water at the desired temperature for the best results in setting the lead plates.

building heating

The heating plant consists of two low-pressure steam boilers (*Figure 3*) fired by natural gas with standby facilities so that heavy oil may be burned at a few moments notice whenever gas service is curtailed by the local utility company in severe weather. Domestic water is pumped through heating coils immersed in the boiler water, then stored in tank reservoirs, ready for use. The system is automatically controlled.

pressroom

This is cooled in summer and heated or cooled in winter by a central-station air-conditioning system handling 100% outdoor air and using well water for cooling. All outdoor air is used so that the room is purged of ink and oil mist and paper lint from presses. Recirculation of air from this room would introduce costly and troublesome maintenance problems from ink, oil, and paper.

Outlets discharge reel-room supply air at the floor. Low-velocity pan outlets (*Figure 4*) supply air below press catwalks in the pressroom. Low-velocity low-level air distribution secures the maximum cooling effect from the supply air. Since heat generated by a press comes from friction throughout the length and height of the press structure, the heat rises unhampered to the room ceiling. Here it is exhausted directly by roof ventilators arranged for easy cleaning. Direct removal at a high point in the room prevents most of the heat from affecting room temperature at operating-floor level.

Conventional mixing-type air outlets were not used because they would interfere with the warm air current over the press. About one-third of the additional cooling effect obtained by pan outlets would be nullified by conventional outlets. Temperature reductions of 5 to 7 F have been observed in pressrooms cooled by pan outlets and ceiling exhaust. Also, it is possible to make a substantial reduction in system air capacity below usual designs. This cuts operating costs.

The supply-air fan has a two-speed motor to allow a 50% reduction in air capacity for winter operation. This also reduces air movement to a minimum during the winter, improving personnel comfort.

Summer cooling is done by two banks of well-water coils. One bank is in a sprayed-coil section for winter humidification. The choice of well water was based on the fact that it gives a good economic balance between costs and room temperature conditions where space needs larger volumes of outdoor air to replace air exhausted and where there are high internal heat gains. Well water is reused in the refrigeration system before being wasted.

stereotype room

The supply-air system is the same as for the pressroom. Specially constructed hoods with direct mechanical exhaust relieve heat from lead melting and molding machines, mat formers, and scorchers. As a result, the total exhaust quantity is high and exceeds the amount of air supplied to the room. This produces a negative air pressure in the room and heat, smoke, and foundry odors are localized.

Stereotype mats are stored in a separate enclosure automatically maintained at high relative humidity for mat conditioning.

Hoods for stereotype pots are No. 10 gage steel plate to withstand rugged use and to prevent buckling from heat given off by lead. The hood encloses the entire pot and has self-closing doors to prevent spilling or splashing of lead during loading. Dross is skimmed off the top of the liquid lead through other doors. The operator adjusts the quantity of exhaust air to suit working conditions.

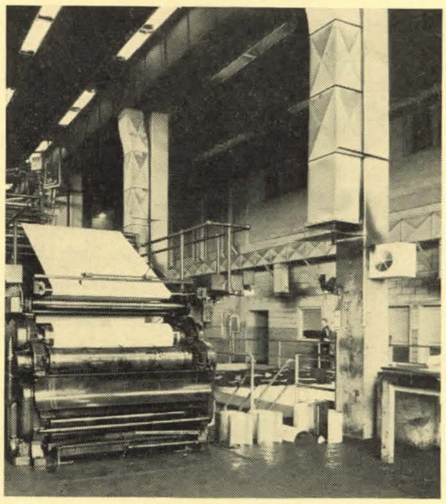
Personnel perspiration is unavoidable in this room because equipment has high radiant-heat loss. Room temperature 5 to 10 F higher than usual is needed for the best comfort conditions. Careful placement and design of air supply ducts will eliminate drafts.

composing room

A double-duct system provides full air conditioning. Interior space as well as each wall exposure is separately zoned. Heat gains from closely spaced linotype machines and high-intensity lights are large. For best results heat-load computations should be made for each bay and the required air volume for the bay established. Then uniform temperature throughout the area will be obtained. Supply-air outlets chosen (*Figure 5*) must be suitable for good air mixing and temperature equalization without drafts.

About 50% of the total air supplied this room is outdoor air. This is needed to partly offset direct exhaust from some equipment and for diluting oil mist, lead fumes, and smoke haze coming from linotype machines. Good zone control is needed because the heat gain from linotype machines varies from 25% to 100% of full rated motor and heating-element capacity, depending on speed. No fixed humidity is

Figure 4—low-velocity pan outlets in pressroom are at bottom of drops from large ducts.



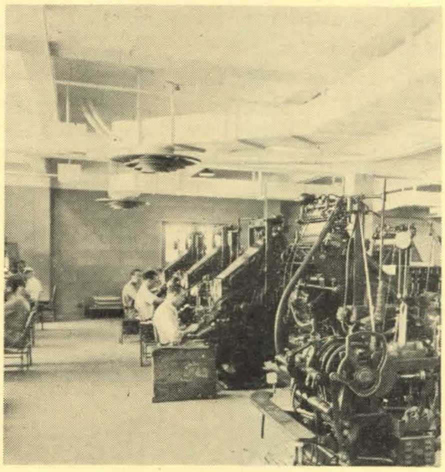


Figure 5—overhead outlets supply air to composing room containing linotype machines.

Figure 6—advertising makeup also requires controlled air conditions for comfort and efficiency.

needed for any operations in this department. Automatic controls maintain standard comfort conditions in winter.

engraving department

A central-station air-conditioning system handles 100% outdoor air for the makeup of direct exhaust. Full air conditioning was selected because the department has no exterior exposure. If this were not so, something less than full air conditioning would probably be satisfactory. Usually, people confined indoors need lower temperature conditions for the same sensation of comfort felt by people working near windows.

A single duct supplies the entire area, the temperature for different rooms being regulated by gradual-acting dampers in branch ducts. Dampers are automatically controlled by room thermostats.

Etching-department operations require several types of direct exhaust and hoods. Zinc and copper etching machines have enclosed stoneware tubs containing acid and a wooden circulating fan, with air slots and an exhaust outlet. Stainless-steel ductwork under suction is connected to the exhaust outlet and has the means to vary the quantity of direct exhaust from the machine. Ductwork must be soldered and the condensation collected and drained.

Table-high enclosures for manual dusting of engravings are called powder boxes. Velocity across the enclosure opening must be high enough to contain powder within the enclosure but not so high that the powder is drawn into ductwork. Plenum space having a fine cotton-bag filter is built at the top of the powder box and connected to the direct exhaust system. The bag has a shaking device to keep it in good condition.

Conventional hoods connected to direct exhaust are used for gas stoves and dryers. Acid is stored on a prepared section of the floor against a wall. A stainless-steel duct on the wall behind the acid carboys exhausts air through high-velocity slotted openings in the duct, quickly removing fumes.

Photographic dark rooms have a direct exhaust above sinks and a conditioned air supply less than exhaust volume. This maintains a slight negative pressure in the room. Camera rooms using cameras and arc lights have high internal heat gains while the arcs are in use. A direct exhaust register on the camera center line and midway in the arc's travel removes heat from the room.

Conditions in printing rooms are somewhat similar to those in camera rooms. Room temperature and humidity must be held as nearly constant as possible when sensitized paper is being handled. This prevents stretching or shrinkage during printing or while the paper is in storage.

other rooms

A central-station air-conditioning system using well water serves the mail room. Ceiling outlets of the air-mixing type evenly located in the room distribute air uniformly throughout the room. No special problems are encountered.

Grid-type secondary resistors are used for press speed control. Located in a separate room, the resistors are in fan-cooled cubicles hooded and vented directly outdoors. Replacement air enters through louvers in the exterior wall. Louvers have air filters to keep electrical equipment free of dust. Outdoor air is not heated in winter because equipment in the room does not need constant attendance.

statistics

The main air supply and exhaust quantities are summarized (*Table II*). Also listed are important items of equipment used for heating, refrigeration, air washing, and cooling-water supply.

The mechanical design of a building of the *Bee's* type requires far more study than the average office building or similar structure. Heat loads for a variety of processes under different operating conditions must be determined. Careful air supply and exhaust balances must be worked out for each room to insure the best comfort conditions. Not only is engineering skill needed for the system design but good judgment must be used in evaluating heat-load data. Long experience coupled with engineering skill are the best tools for approaching the design of plants such as the *Bee*.

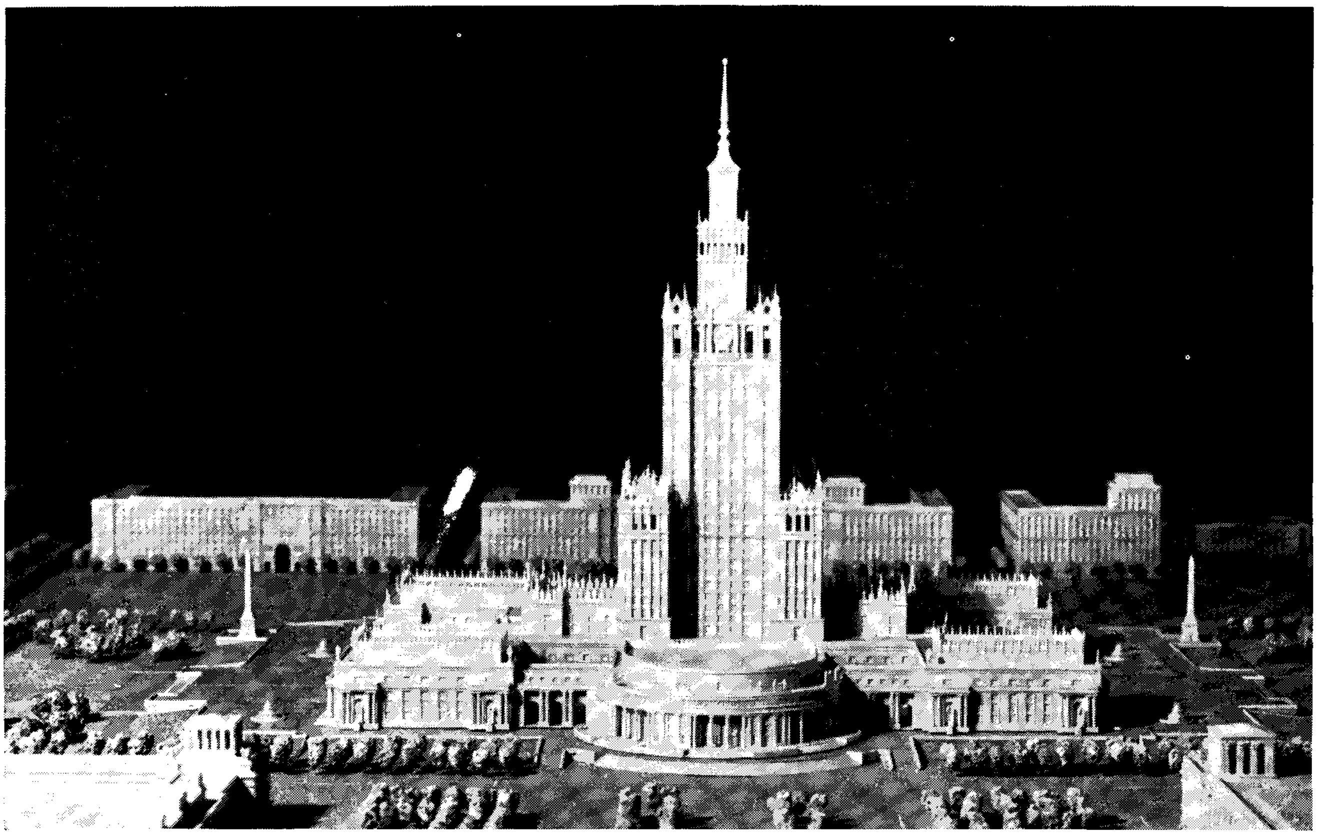
Table II: Sacramento Bee Air-Conditioning System Design Details

Area	Total air supplied	Direct mechanical exhaust	Outdoor air supplied
Press	30,600	32,000	30,600
Stereotype	9,000	9,000	9,000
Composing	18,000	4,500	4,500 min
Engraving	6,000	6,300	6,000
Mail	13,000	—	2,600 min
Press control	14,000	14,000	14,000
Kitchen	—	2,500	—
Locker rooms, etc.	—	15,400	—
Newsroom, Circulation	15,000	—	2,500 min
General Offices	50,000	—	10,000 min
Totals	155,600	83,700	79,200

Heating equipment:
- Boilers (2) 8,500 sq ft edr, 15 psi, natural-gas or oil-fired connected to two-pipe system
- Condensate pumps, duplex, operating on gravity return
- Direct radiation, at all entrance doors from street, shipping doors, and stair towers

Refrigerating equipment:
- Compressors (2) direct-expansion with step-type unloading controls, total capacity 300 tons
- Air washers, sprayed-cooling sections for seven systems; total capacity 135,600 cfm

Well pumps:
- Deep-well turbine-type (2) 200 gpm and 500 gpm, to furnish water for air cooling, refrigeration condensers, and stereotype-plate cooling



Soviet-designed Palace of Culture, "a gift of the Soviet Union to the People of Poland," which is now under construction as the focal point of reconstructed Warsaw.

"New Classicism" in the U.S.S.R. *

A large part of the world today is under the influence of the Soviet Union, in the arts as well as in a social and economic sense. What is the Soviet attitude toward architecture? What is the argument for designs such as the one illustrated on this page? Last August, at an international architectural conference in Poland, the writer participated in an interview with Alexandre Vlassov, Chief Architect of Moscow. Another Russian architect—Grigori Zacharow—added a few comments of his own; Helena Syrkus, Warsaw architect, acted as interpreter. Vlassov's remarks are a criticism of contemporary architectural trends in the western countries as well as an explanation of present-day Soviet architecture. They are presented without comment, in the belief that the reader may want to arrive at his own conclusions.

Vlassov began by explaining that the Soviet Union had had its experience with what he called "so-called modern" and "Constructivist" architecture. "So-called Left architecture and Constructivism were rather well developed at one time in the Soviet Union", he said. "There was much work of that type built—even complete cities. Le Corbusier built, in 1927, the Central Cooperatives Building (the Palace of Centrosoyous). It stands today as a "museum" piece of so-called modern architecture. Although it was executed carefully with a light Armenian stone it stands now with papers in the windows to keep the cold out, and costs five times as much to heat as a normal building." Vlassov went on to say that Le Corbusier's building did not recognize the climate or the other needs of a building in Moscow. Zacharov interrupted to say that Vlassov himself, in his younger days, was a designer in the manner of Gropius or Le Corbusier—a modernist—with the difference that "he worked on the earth, while others tried to build cities in the air (perhaps hung from dirigibles)."

"Now," continued Vlassov, "Soviet architecture is designed to the needs and desires of the people, while the so-called modernists produced buildings that no one liked or understood but themselves." He went on, "In the Soviet Union the people have the deciding word, and our country is a union of many nationalities. In order to understand why Soviet architecture has developed in quite different lines one must understand fully the whole development of the Soviet Union and the Soviet state. The main thing, which is the difference between past and present, is that the whole nation of people have the deciding role. The Constructivist work done in the early years was not accepted by the Soviet people. The simplified architecture—bands of windows, concrete forms—was not dear to anyone but the architect himself."

Architecture in the West, Vlassov be-

(Continued on page 182)

* *An interview with Moscow's Chief Architect by Thomas H. Creighton*

location	Phoenix, Arizona
associated architects	Ralph Haver and Fred Guirey
structural engineers	Stephens & Hamlyn
mechanical engineers	M. M. Lowry
color consultant	Mary Louise McLeod
general contractor	Kitchell-Phillips, Inc.

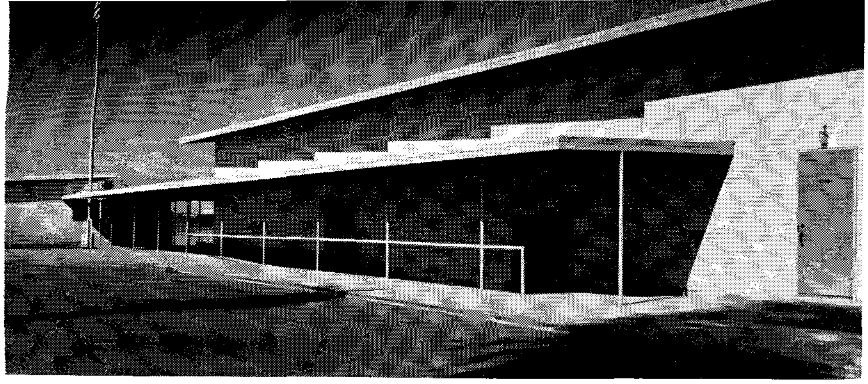
school auditorium

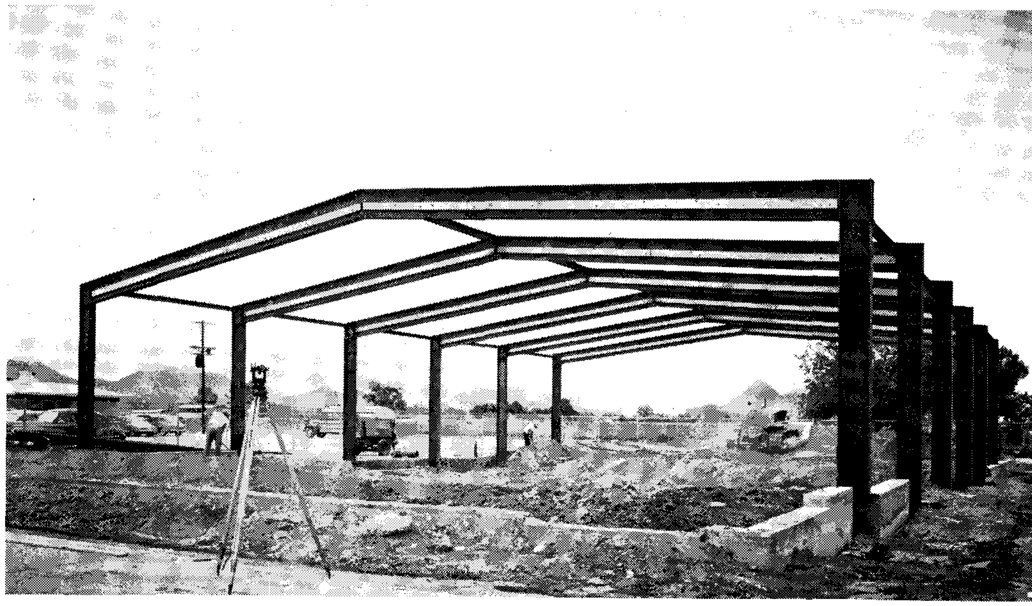
Latest addition to a 1000-pupil elementary school (*August 1951* P/A), this auditorium has a continental type seating arrangement that accommodates 500. The theory behind selection of the continuous seating without center aisle was that each teacher could escort the pupils directly to their seats, from the sides. In actual operation, the architect reports that this very real advantage is somewhat counterbalanced by the fact that teachers lack control over the children in the center seats. Other plan requirements were a music room, book-storage room, and room for the school custodian.

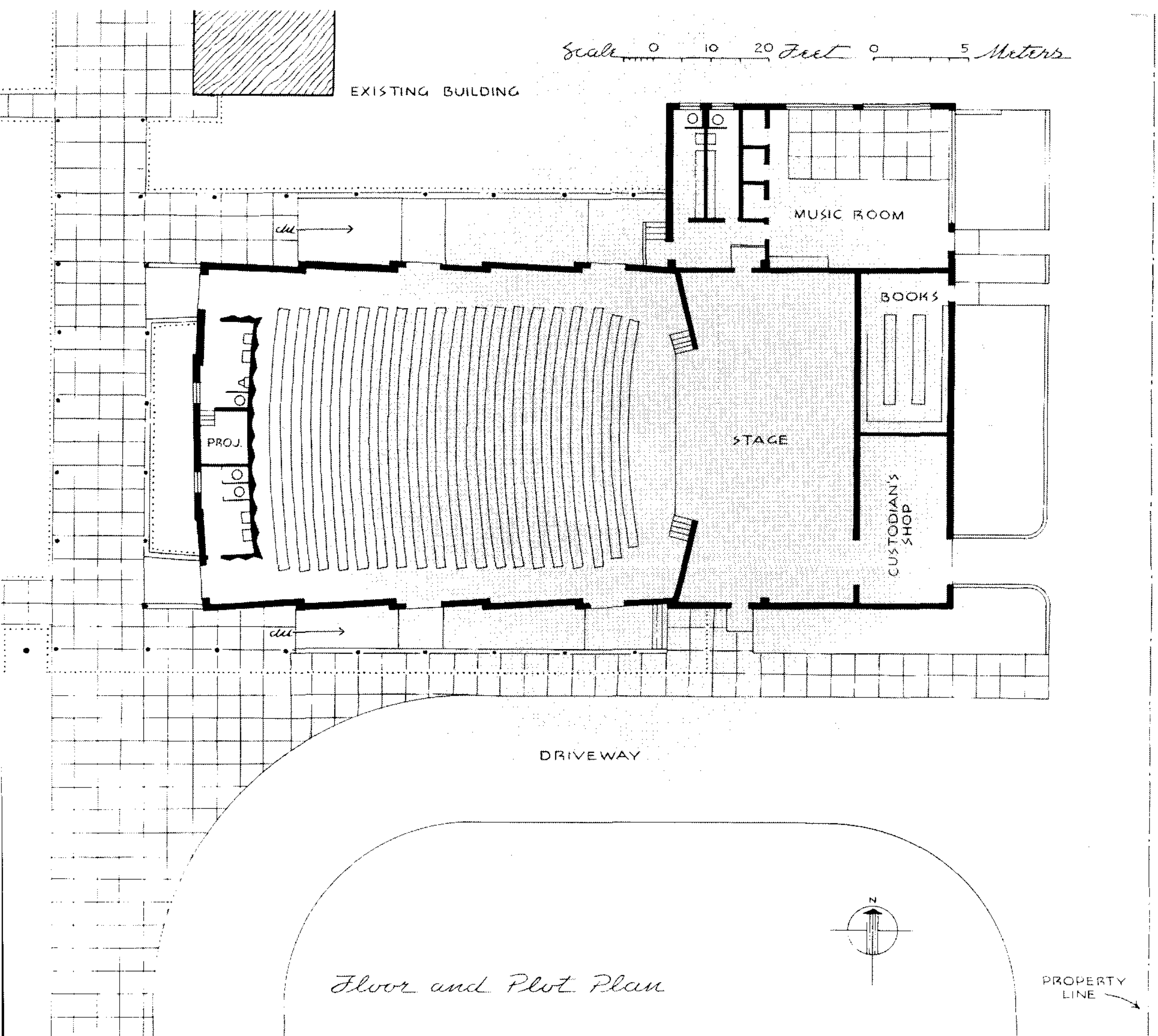
The stagger in the side walls assists sound control. The metal-lath-and-plaster ceiling (4″ wool-type insulation above) is also staggered and not only conceals the roof framing but also helps sound dispersal. Side walls (lightweight concrete block, plastered) are semi-absorptive, while the rear wall is specially treated—perforated wood-base panels over a $1\frac{1}{2}$″ blanket of glass fiber—to kill reverberations and provide correct reverberation time.

Structurally, the auditorium consists of a series of rigid steel-bents with wood-joist purlins spanning the 16-foot bays between. The floor is colored concrete, sealed and waxed, except for aisles, which are finished with cork. In music room, flooring is asphalt tile, except on band platform (plywood-topped tables of graduated heights).

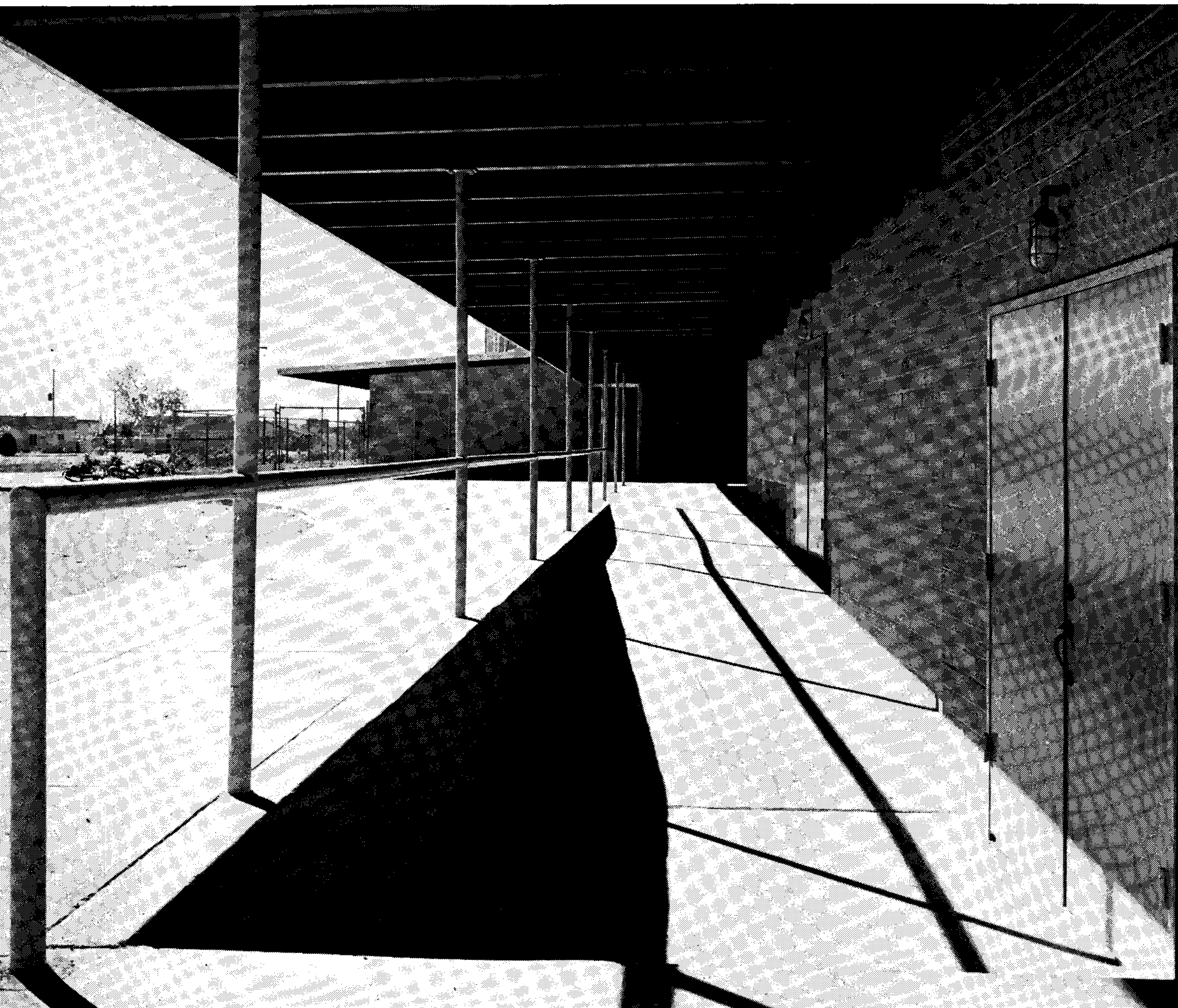
Heating is handled by gas-fired, air-blower units that give "flash heat" as needed; cooling is by means of evaporative coolers. The house lights are on a rheostat, with added lights above the front seats that are turned on when the room is used for classes that require reading. Stage lighting consists of three rows of border lights, on rheostat, with spots to the front, and outlets on the proscenium and stage walls for additional spots as needed. Footlights were not considered necessary.





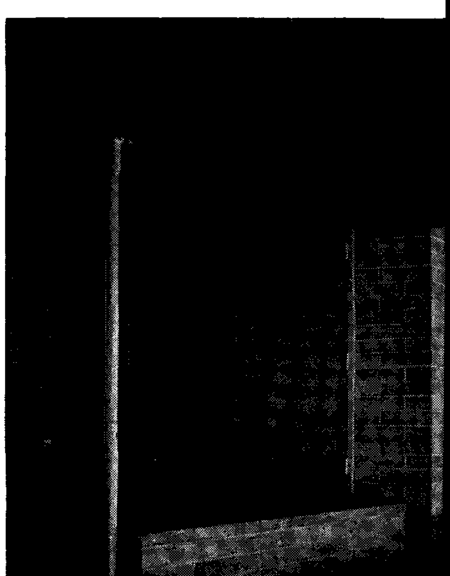


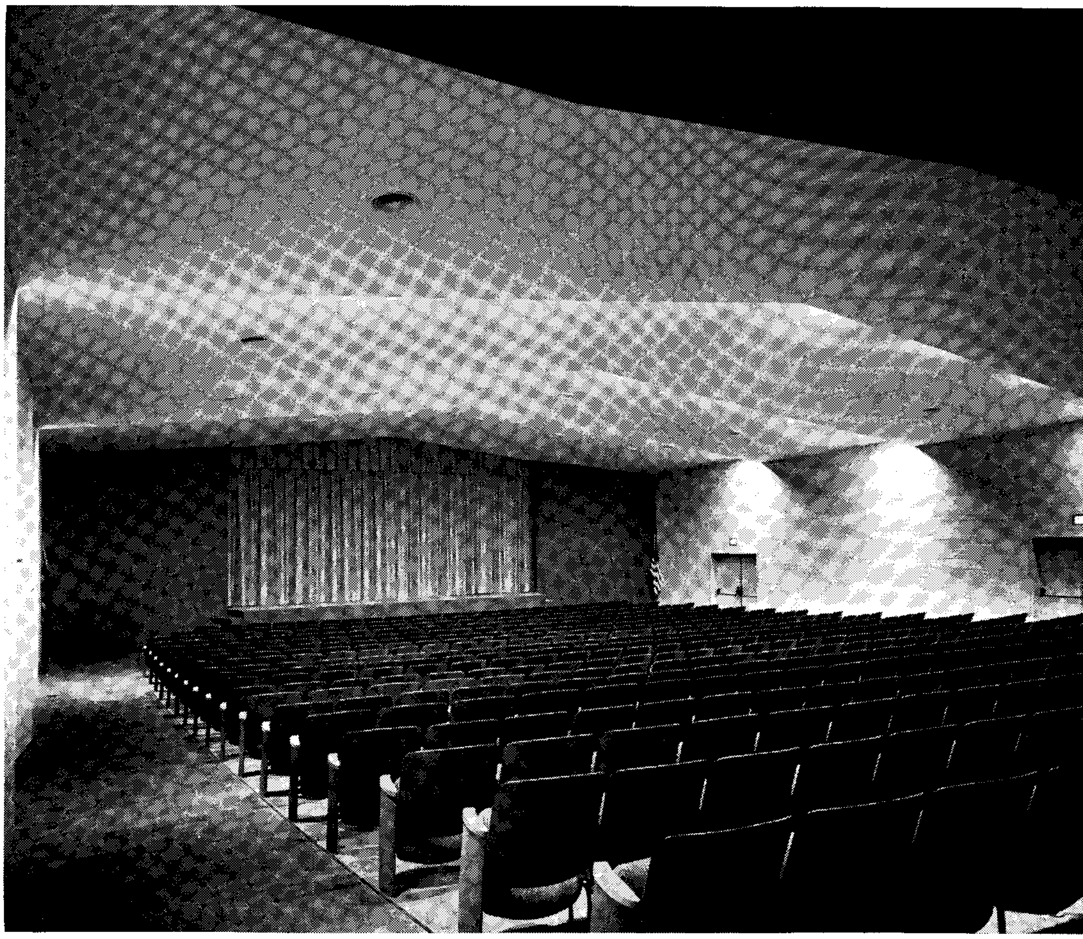
Scale 0 10 20 Feet 0 5 Meters
EXISTING BUILDING
MUSIC ROOM
BOOKS
PROJ.
STAGE
CUSTODIAN'S SHOP
DRIVEWAY
N
Floor and Plot Plan
PROPERTY LINE

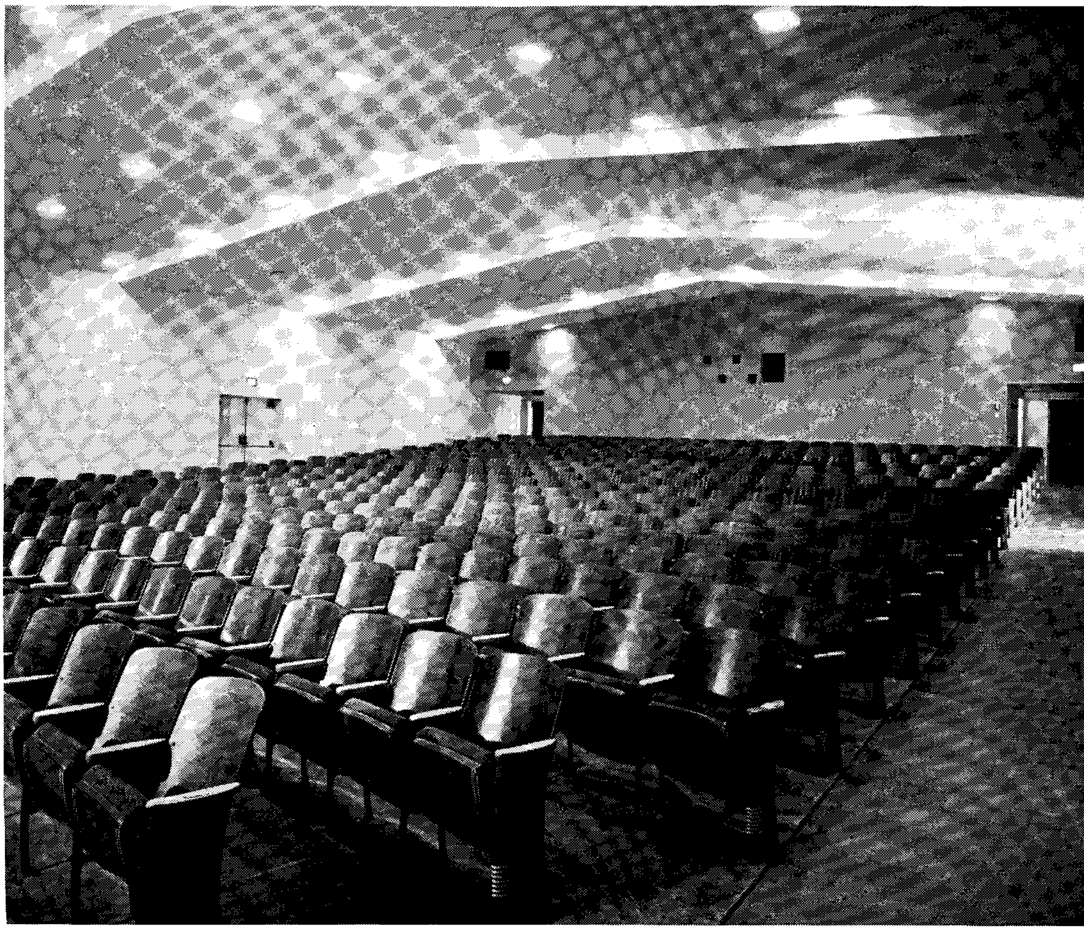


Covered ramp and platform walks on either side of the building provide direct access at several points. The one on the north (above) *is terminated by the music-room wing. View of the south walk* (right) *shows one of the two entrances that occur at the front of the building* (left of photo).

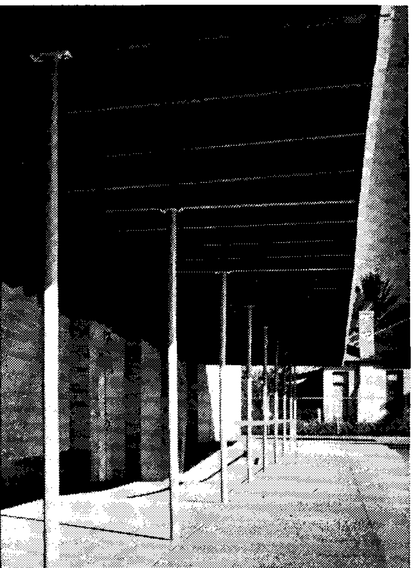
Photos: Stuart Weiner







Both the walls and the ceiling of the auditorium have broken sections, which, with the semi-absorptive surfaces and glass-fiber-blanketed rear wall, provide acoustic correction. Side walls and ceiling are light gray; the front wall is dark green; and the rear wall is rose. Figuring covered area at one half, the cost of the building came to $9.50 per sq ft.



The Architect and Public Relations: 6

by Asher B. Etkes and Raymond Dodd

After you've launched your publicity program, keeping it alive may present some problems.

If you're an architect with a continuous output—houses for example—to talk and write about, there's no great difficulty. But what about the designer in the industrial field? He may spend upwards of a year planning a single project, spend another seeing it materialize from blueprint to reality.

It's understandable that there may be lengthy periods between newsworthy projects, but that's no reason to put a publicity program in mothballs. You can't afford to. Even with sustained publicity, it is tough enough to get people to remember you and your work. To forget you is easy.

Fortunately, there are other subjects available to keep the publicity ball rolling. Just remember that your status is that of a recognized authority on matters architectural and that your comments or opinions bear weight—provided you pick the right subject and contribute something of real interest.

Take surveys, for instance. Scarcely a week rolls by without the results of one being announced. They are reported in newspapers, magazines; maybe even an original report may cross your own desk. Examine them closely. If the survey findings are related to your immediate activities, golden opportunity may lurk between the lines.

A variety of persons and organizations sponsor surveys for a variety of reasons, but the end results indicate trends. And trends are news.

As a case in point, let's appraise a survey of householders. Perhaps the research indicates what these people do, have or desire; it offers some estimate of what ideas or products are growing in popularity—or declining. If you can establish a bridge between such a survey and your current work, you may have grist for a news release.

As an example: One survey points up the fact that home air conditioning is booming in public favor, that people without it now want it tomorrow. Drafting this material for your own use is obvious if you design homes; it also might fit your needs if you have specified air conditioning for the factory, store, or office now on your drawing board.

Here's how such research material might be tied into a news release from your office:

"The rising public demand for air conditioning, indicated in the recent nationwide survey by *X Magazine*, was anticipated in the designing of the new 12-story Wonder Building, scheduled to be erected at 13th and Market Streets.

"This was revealed today by the architect, John Smith, who reported that the entire structure will be air conditioned year 'round to assure perfect weather in all seasons for the personnel of seven major firms slated to occupy the building next May.

"Mr. Smith added that the decision to air condition the new modern structure was made a year ago, after a limited survey produced opinion results closely paralleling those of the *X Magazine* research." . . . And so forth.

This technique of "riding" a recognized trend is fully justified only if your individual publicity hitch-hiker offers legitimate news. It's apparent that the announcement of an air-conditioning installation, even throughout a 12-story building is fairly commonplace. Spicing it with a few facts from an authentic survey makes it decidedly more palatable to both editor and reader.

Be dead certain you use the right spice. Surveys on radiant heating, the swift increase of electrical appliance, or on population shifts may serve you well, if they dovetail neatly with your work at hand. Don't use a survey result, however, as a thin veil to disguise a mediocre fact; your motives may show through the transparency. If your radiant installation is novel, your equipment planning unusual, or a population growth has influenced your design, your excuse for utilizing a survey news peg may be valid. If it isn't, wait for one that is.

Here's another possibility: If your field or community is touched directly by a survey's findings, a critique of the material might prove either interesting or important. Generally, this type of opinionated news is unsuitable for the news columns of your local paper but not for the editorial page. So perhaps that's where it belongs—in the "letters to the editor" section.

Never underestimate such letters. They're read carefully and regularly by a vast number of people. And they permit an expression of personal opinion not countenanced anywhere else in print. Just be careful of your facts, make certain that your comments are valid. There's always some reader ready to pounce on a mistake and announce it to the world in a return letter.

Use these techniques sparingly—a warning applying to most of your publicity activities. Too much is definitely worse than too little. The tag, "publicity hound," is a hard one to shake off, once bestowed by any editor or staff.

Let's re-examine the project long abuilding. There's no reason to hold a tight checkrein on publicity until its final completion date. Look around. What about newsworthy design or arrangement problems solved in the drawing-board stage; how about ingenious engineering tricks invoked to hurdle the "impossible;" what about clever construction wrinkles evolved to speed construction or save money? And don't forget the people connected with your project, or your office; a good human interest angle makes news.

Publication outlets for these stories—or photographs—depend on the character of the facts. Fairly sensational engineering or construction procedure involving a welter of technicalities would be greeted eagerly by the trade magazines but draw a blank with newspaper editors. How to determine which goes where might prove a dilemma for the individual who rubs elbows daily with lintels and logarithms.

There are no set rules. However, it's safe to assume that a new cement-mix proportion would meet with flagging interest from newspaper readers, no matter how strong a foundation wall it produced. But if one of the new ingredients happened to be something incredible—household cornstarch for instance—your story might land on page one. It all boils down to offering a newspaper editor something understandable that will excite, astound, amuse, or inform his readers—and your story stands a better chance of hitting print.

Another important publicity potential for the architect is the convention—school, industrial, or special trade.

True, it's unethical to set up a booth to tout your talents but it's not if you join hands with a manufacturer or supplier who has one. Materials of all varieties go into the structures you design, but if one product is outstanding in use or application the maker will welcome your co-operation. A display of your work utilizing his product to good advantage lends authenticity to his exhibit.

Lend a few ideas, as well as your best drawings and photographs, to boost the eye appeal of your joint effort. Your profit in this type of publicity is not the printed word but an opportunity to get your name and design before important audiences—and possible clients.

On the subject of photographs, keep in mind that a poor one is no bargain; a good one is never expensive if it shows your project to full advantage. Art requirements of publishing today are at an all-time high level, so choose your lensman carefully.

With luck, you might unearth a newspaper photographer willing to earn extra pin money. If so, use him for general "news" shots of construction or of people; but think twice about assigning him to photograph your best work for a major publicity effort. Not that he isn't a good photographer, but top architectural photography requires unusual know-how in both composition and technique. It's tricky.

Don't pick a photographer solely on the strength of striking portraiture or exciting candid shots—no matter how excellent. Decide on a man whose samples reveal his ability to make buildings or industrial production lines look glamorous. His fee may dent your budget but fine photographs can pay high publicity dividends. Of course, you may find a genius behind a passport camera. But don't bank on it.

Keep from being stingy when ordering prints. You should have a couple of extra sets in your files; there's always the chance that other publications may want them—sometimes in a hurry. And never economize with small prints. A few dollars extra for king-size enlargements is money well spent. Your work will look more impressive to everyone, including art editors.

Also, be smart and don't request your photos returned. It may prove a nuisance to an editor and remember, having your pictures in a publication's files may net future dividends. Good photos never die.

Therefore, rubber-stamp your name and address on the reverse side of each photo you release. Write, with extra soft pencil please, the identity of the subject, its location, and other pertinent data. There's a good reason; pasted-on credits frequently dry out and part company with photographs filed for long periods. And a few years hence, if your photo is plucked from the files to illustrate another story, you'll get no credit if all identification has vanished.

This may seem like primary advice but on the subject of credit, avoid a stamp with a legend like "please credit John Smith, Architect" or some similar command. Such credit instructions are photographers' prerogatives (most insist on them and editors respect such credits), but a terse demand from you may appear downright presumptuous.

Get full permission before releasing a photograph for publication—particularly that of the client. It's rare that you run into objections but disregarding this matter of courtesy might prove embarrassing—and troublesome—if the publicity you're planning runs counter to client policy. He may be planning some publicity on his own.

Most professional photographers will obtain legal releases from each individual identifiable in their photos, as a matter of course. Make certain that they do. Persons photographed without their permission may sue if their pictures are used for advertising or publicity purposes. By comparison, a dollar fee for a release is dirt cheap.

Make a deal with your photographer when planning widespread distribution. Invariably he'll scale down rates for quantity production. But even if such reduced prices still swamp your budget, you might investigate the copy-negative technique. This entails photographing an original print (top photographers rarely release negatives), then using the copy negative to make fast contact prints for twenty-five cents or less per print, depending on quantity desired. There's one drawback, however; quality generally suffers. Use of the method rests with the type of subject matter and where you release such copies.

What data to include in a picture caption is dictated by the type of photographic release—whether a picture is to go out single, as part of a series, or to illustrate a story.

Brevity is the essence of most captions but in the case of the individual photo release—one standing on its own feet—present all pertinent facts. Try to keep your data to a reasonable length and don't strain to be literary. The editor is more concerned with information than with style and will probably re-write your caption anyway.

In releasing a picture series or photo story, include a "master" or detailed caption to guide the editor both in appraising your story and preparing it for publication. For the pictures themselves, simple identification is sufficient—as it is with photos sent along to illustrate major feature stories.

Here are a few elementary but important tips. In preparing picture captions, and story copy too, type your name, address, and phone number in the upper left corner. This announces the publicity source immediately and makes it easy for an editor seeking more data to reach you quickly. Plenty of good copy has perished because editors have failed to make contact.

If the news is to be released when received, type "For Immediate Release" in the upper right corner. On the other hand, if your publicity is going out ahead of an actual meeting or public announcement, the instruction should read something like "Release A.M. March 15." And setting the release date ahead has advantages. The item can be set in type during slack time in the composing room and not get pushed aside for major news stories during the hectic scramble before deadline.

There's even an approved method of attaching captions to photos. Run your cement along the upper edge of the caption, lap it under the bottom of the photo as both lie face up. That way the caption folds over the photo neatly, is easy to zip off. Important? It is to the art editor. A caption slapped all over the back of a photo going to the engraver has to be copied, if it won't come loose. And this can cause a lot of irritation when there's a deadline.

Publicity and public relations employ myriad techniques for creating and disseminating news, for understanding and dealing with the public and publications. To set down every possible method is a thankless task, because every new project may provoke a fresh set of conditions requiring a different operational procedure. The term, experience is the best teacher, may be a cliché but it's certainly apt where publicity is concerned.

FLUORESCENT LIGHTING:

By Domina Eberle Spencer*

The architect accepts without question the customary 60-cycle operation of lighting circuits, as nearly all of our electric energy is generated at 50 or 60 cycles per second. The architect takes the available frequency and expects the engineer to manage the details of distributing the standard frequency to all electrical devices used in his buildings. The purpose of this paper is to question the acceptance of the standard 60 cycles per second in the lighting of buildings with fluorescent lamps.

At the turn of the century, when a-c generating stations were becoming well established, there were two principal applications: motors and incandescent lamps. The only reason why a frequency as high as 60 was chosen was to eliminate flicker in Edison's incandescent lamps. Today, however, higher frequencies are widely used: airplane equipment is ordinarily designed for 600 cycles per second to reduce weight; standard frequencies for induction heating of metals are 1000, 3000, and 10,000 cycles per second.

A study of the properties of fluorescent lamps shows that they are entirely unsuited for the 60-cycle operation. To perform at their best, fluorescent lamps should be operated at a frequency at least *50* times as high. In this paper circuits for these higher frequencies will be described and costs analyzed; it will be shown that many advantages result from operating fluorescent lamps at their most suitable frequency. In addition, economic savings result and the weight of metal required for the auxiliary equipment can be markedly reduced.

The architect should seriously consider the possibility of changing to a higher frequency whenever he is planning fluorescent lighting for a large building, or for an installation in a d-c district, or for a project with an independent generating station.

the best frequency

The choice of the best frequency for fluorescent lighting installations is based on the consideration of a number of factors. The most important of these is the volt-ampere characteristic of the lamps.

Incandescent Lamps

The characteristics of an incandescent lamp depend on the temperature of its filament.[1] As the temperature varies during a cycle of the applied voltage, the resistance of the lamp also varies and the volt-ampere curve has the shape shown (*Figure 1-A*). If the frequency is low, there is time for the filament to cool appreciably during a half-cycle and the loop is pronounced. As the frequency is increased, the temperature of the filament becomes nearly constant. Dynamic thermal equilibrium is established and the volt-ampere characteristic becomes essentially linear. These conditions are satisfactorily approximated for an incandescent lamp at 60 hertz[2] (*Figure 1-B*). At this frequency, the temperature of the incandescent filament is nearly constant, dynamic thermal equilibrium is established, and flicker is not perceptible.

Fluorescent Lamps

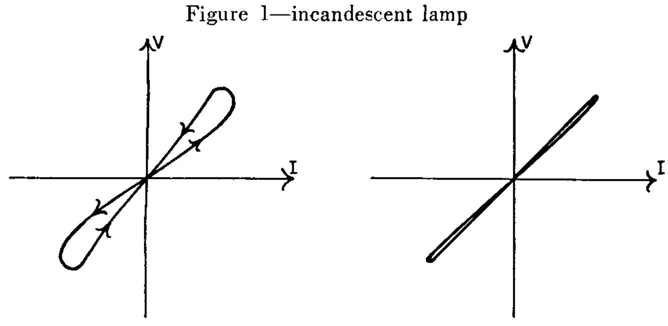
The characteristics of a fluorescent lamp depend on the state of ionization of the vapor within the tube.[1] Deionization of the vapor in a fluorescent lamp is very rapid compared to the cooling of an incandescent filament. At 60 hertz, the volt-ampere characteristic of a fluorescent lamp is a complicated affair (*Figure 2-A*). To establish dynamic equilibrium for the state of ionization in the fluorescent tube, we must increase the frequency until there is not time for deionization during a half-cycle of the applied voltage. At such frequencies, the volt-ampere characteristic of the fluorescent lamp becomes linear. For the fluorescent lamp, this occurs not at 60 hertz but at approximately 3000 (*Figure 2-B*). Therefore, fluorescent lamps will operate at their best only if the frequency is raised above the standard by a factor of at least 50.

* Associate Professor of Mathematics, University of Connecticut, Storrs, Connecticut

[1] *V. J. Francis*, Fundamentals of Discharge Tube Circuits, *John Wiley and Sons, New York, N. Y., (1948)*

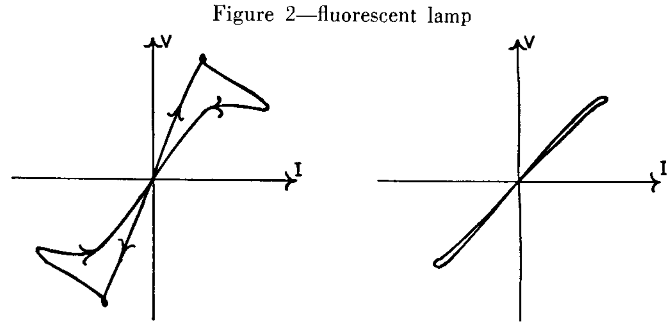
[2] *The "hertz" is the meter-kilogram second unit of frequency. 1 hertz = 1 cycle per second*

Figure 1—incandescent lamp



(A) 25 HERTZ (B) 60 HERTZ

Figure 2—fluorescent lamp



(A) 60 HERTZ (B) 3000 HERTZ

What Frequency Is Most Suitable?

More Lumens Per Watt

As dynamic equilibrium is approximated, the amount of light radiated (lumen) for each watt input is increased (*Figure 3 and Table I show the type of change that results*). The higher the frequency, the more light we obtain for the same power input. The increase continues up to about 10.000 hertz. The data[3] of Campbell, Schultz, and Kershaw (*Table I*) indicate that increases of as much as 13% occur at 10,000 hertz. Data[4] taken with a different circuit gave a somewhat greater increase of 15% for 40-w T-17 lamps operated at 3000 hertz.

Long Lamp Life

The life of a fluorescent lamp is cut short as a result of ion bombardment of the filament during starting and during steady state operation. If dynamic equilibrium is attained and quick starting is provided, the life of the fluorescent lamp will be increased. Accelerated life tests[4] made on 40-w T-17 lamps at 3000 hertz showed an increase of 12% in lamp life as compared to 60-cycle operation on G.E. 89G400 ballasts. It is felt that the 12% increase obtained with the first life tests is on the conservative side. Results in a test installation in the U. S. Agriculture Department seem to indicate that the life at high frequencies is practically indefinite.

Radio-Frequency Interference

Will a fluorescent lighting system operated at 3000 hertz interfere with radio reception? The answer is no. Radio-frequency interference sometimes encountered with fluorescent lamps has nothing to do with the frequency at which the lamps are operated (so long as they are not operated in the broadcast band). It depends, rather, on the wave form.[5] If a linear volt-ampere characteristic is obtained (*Figure 2-B*), the voltage and current waves are pure since waves and radio-frequency interference is completely eliminated. With a poor wave form (*Figure 2-A*), the spectrum is rich in high-frequency overtones which may produce radio-frequency interference.

Flicker

Above 63 hertz, Hecht and Shlaer[6] have shown that the eye perceives no flicker. Thus, any increase in the frequency at which fluorescent lamps are operated will completely eliminate flicker.

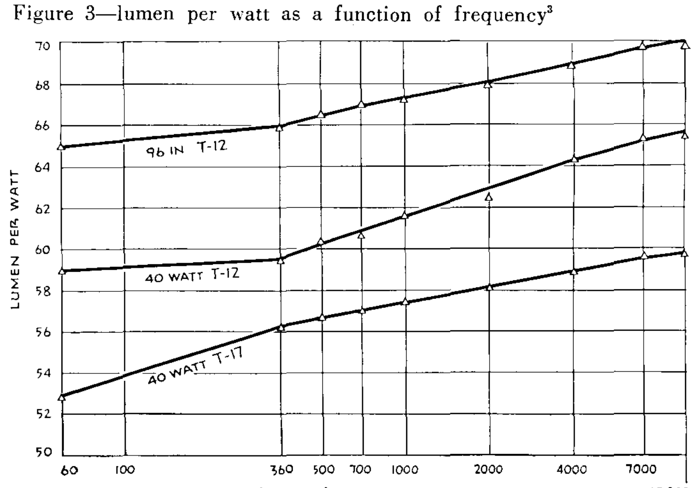
Stroboscopic Effect

Stroboscopic effect is an entirely different thing. A light source operated at such a high frequency that no flicker can be detected may thoroughly confuse our observation of moving bodies. Rotating machinery may appear to stand still when it is moving, to go forwards when it is actually going backwards, or to rotate at an entirely deceptive speed. Difficulty with stroboscopic effect is not experienced for 60-cycle incandescent lamps, which flicker[7] less than 12%. With fluorescent lamps, on the other hand, stroboscopic effect may be very troublesome. Slow-decay phosphors are now being used which reduce[7] the 60-cycle flicker from 100% to between 27% and 58%. This may still cause trouble at 60 hertz but is negligible at the lowest frequency that has been considered[8] for "high-frequency" operation of fluorescent lamps (360 hertz).

Table I

Lumen Output of Fluorescent Lamps as a Function of Frequency (At rated power input)[3] Lumens per watt expressed as percentage of 60-hertz values			
Frequency (hertz)	40-watt T-12	40-watt T-17	96-in. T-12
60	100%	100%	100%
360	101%	107%	102%
1000	104%	109%	103%
3000	108%	110%	106%
10,000	111%	113%	108%

Figure 3—lumen per watt as a function of frequency[3]



[3] *Adapted from Figure 1 in J. H. Campbell, H. E. Schultz, and D. D. Kershaw, "Characteristics and Applications of High-Frequency Fluorescent Lighting," Paper #16, National Technical Conference of the Illuminating Engineering Society, Sept. 8-12, 1952, Chicago, Ill.*
[4] *Measurements made in collaboration with R. A. Coradeschi who has recently joined the staff of Bell Telephone Laboratories, New York, N. Y.*
[5] *J. Warren Culp: "Noise in Gaseous Discharge Lamps,"* Illuminating Engineering, *Vol. XLVII, 1952, pp. 37-46*

[6] *S. Hecht and S. Shlaer, "Intermittent Stimulation by Light," V: "The Relation Between Intensity and Critical Frequency for Different Parts of the Spectrum,"* Journal of General Physiology, *Vol. XIX, 1936, p. 965*

[7] *Arthur A. Eastman and John H. Campbell, "Stroboscopic and Flicker Effects From Fluorescent Lamps,"* Illuminating Engineering, *Vol. XLVII, 1952, p. 27*
[8] *J. H. Campbell, "High Frequency Operation of Fluorescent Lamps,"* Illuminating Engineering, *Vol. XLIII, 1948, p. 125; J. H. Campbell and B. D. Bedford, "Fluorescent Lamp Operation at Frequencies Above 60 Cycles,"* Proc. Nat. Electronics Conference, *Vol. III, 1947, p. 307; Kuo-Shu Chao, "Investigation of Fluorescent Lamps at Frequencies Above 60 Cycles," S. M. Thesis, Electrical Engineering, M.I.T., 1949; John A. Losh, "Fluctuations in Color and Helios of a Fluorescent Lamp," S. B. Thesis, General Engineering, M.I.T., January, 1950*

Acoustic Considerations

The hum from 60-cycle ballasts is produced by vibration of magnetic-core laminations. The sound is radiated at a frequency of 120 hertz.

High-frequency circuits contain a smaller number of noisy inductors than 60-cycle circuits. Nevertheless, it is desirable to make sure that any sound radiated from the auxiliary equipment will cause as little annoyance as possible. According to Knudsen and Harris,[9] minimum masking effect will occur if the frequency is near the top of the audible spectrum. The frequency range for ordinary speech is between 100 and 7000 hertz, while the ear is most sensitive in the vicinity of 3000 hertz. A 60-cycle circuit gives noise at 120 hertz and is particularly effective in masking the entire range of frequencies used in speech. If a 1500-cycle circuit is employed, the ear will be extremely sensitive to even a small amount of the 3000-cycle noise. But if the frequency of the generator is 3000 hertz, the noise occurs at 7000 hertz, near the top of the audible region. Such noise produces little masking effect and the ear is relatively insensitive to the noise itself. On an acoustic basis, 3000 hertz can be considered as the minimum acceptable frequency. Higher frequencies will be entirely inaudible to human occupants.

[9] *V. O. Knudsen and C. M. Harris,* Acoustical Designing in Architecture, *John Wiley and Sons, New York, N. Y. (1950)*

Weight of Auxiliary

On the basis of engineering design of the necessary capacitors and reactors, the highest possible frequency is best. The size of the auxiliary decreases rapidly as the frequency is increased. The higher the frequency, the smaller and lighter the auxiliary equipment.

Transmission

The only factor that tends to limit the use of high frequencies is the distance to which an uncompensated transmission line can be extended without encountering large fluctuations in the line voltage when the load is changed. This distance is generally taken as a quarter wavelength. Thus for 60 hertz we can anticipate possible trouble at about 778 miles, for 1000 hertz at 47 miles, for 3000 hertz at 16 miles, and for 10,000 hertz at 5 miles. As the buildings or plants likely to be considered for high-frequency systems in the near future are not likely to be 5 miles across, we need anticipate no immediate difficulty on this score. If public generating plants at high frequency were to be constructed, these voltage fluctuations would be eliminated by using compensated transmission lines.

The Frequency to Choose

All of the characteristics of the lamp indicate that a frequency of at least 3000 hertz should be used. Acoustical and weight considerations indicate that even higher frequencies would be advantageous. Transmission-line characteristics, on the other hand, give some advantage to lower frequencies. Thus, we can conclude that *the lowest frequency suitable for operating fluorescent lamps is 3000 hertz.*

The possibility of choosing 6000 or 10,000 hertz should not be entirely discarded. Frequencies higher than 10,000 hertz need not be considered for fluorescent lighting because: (1) the improvement in fluorescent lamp characteristics beyond 10,000 hertz is negligible; (2) motor-generators for frequencies beyond 10,000 hertz are not available.

circuits

The simplest circuit suitable for high-frequency operation will be described here. Circuits are discussed in greater detail in another paper.[10] In most cases encountered by the architect today, power must be obtained from 60-cycle lines. A motor-generator set is used to obtain the desired

[10] *D. E. Spencer, "Frequency and Fluorescent Lamps," to be published*

Table II—Design Data for Group Operation Circuit

	Type of lamp		
	40-watt T-12	40-watt T-17	96-in. T-12
Rated lamp current (amp)	0.430	0.425	0.425
Rated lamp voltage	99	103	190
Equivalent lamp resistance (ohm)	230	242	447
Recommended minimum starting voltage	385	385	625
C (microfarad) at 3000 hertz	0.0611	0.0607	0.0379
L (henry) at 3000 hertz	1.972×10^{-3}	2.00×10^{-3}	5.84×10^{-3}

Operating 25 40-w lamps, or 14 96-in. lamps from a single switch

Figure 4—A, B, C to Z represent groups of lamps each controlled by a single switch and connected as shown in Figure 5.

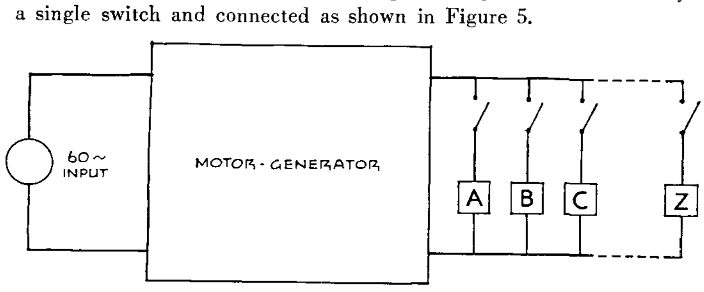
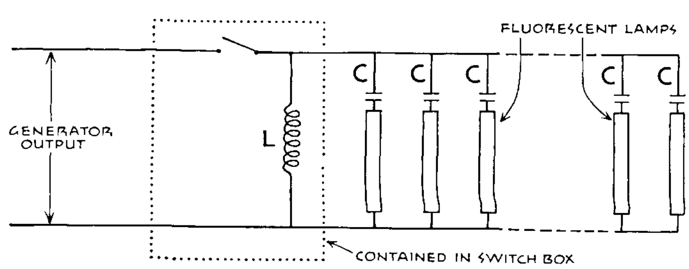


Figure 5—group operation circuit



frequency (*Figure* 4), and the Group Operation Principle is employed. The auxiliary equipment is not designed as a one- or two-lamp ballast, as generally used today, but is arranged for the entire group controlled by a single wall switch. Much of the auxiliary can then be enclosed in an acoustically-treated wall switchbox.

In d-c districts, fluorescent lamp operation is not, in any case, economical without a motor-generator set. The frequency of the motor-generator required should not be 60 but 3000 or perhaps 10,000 hertz. If a large factory or office building is to be supplied by its own generating system, the generator should be built for a frequency suitable for fluorescent lamps.

The simplest group-operation system that has been tested[11] is shown (*Figure 5*). The line voltage is sufficient to start the lamps. The capacitors limit the current to rated value, while the inductor L provides unity power factor at each switch. Design data for three types of fluorescent lamps is shown (*Table II*). A small capacitor of roughly 0.05 microfarad is required in series with each lamp, while a few millihenries inductance concealed in the switchbox provides power factor correction for a large group of lamps.

If there is objection to using as high a line voltage as is required to start the lamps, low-line voltage can be obtained by using a more complicated set of coils in the switchbox and larger capacitors in series with each lamp. Such a circuit is described in detail in another paper.[10]

cost

The architect who wishes to employ high-frequency lighting in a proposed building must, of course, convince his client that this is not a wild scheme to waste money. He must demonstrate, if possible, that the new system is not only advantageous in the respects previously mentioned but also that it provides an economic saving.

To show that this can be done, let us consider the design of an actual building. The 40-w T-12 lamp is the most economical[11] and will be used in this design. Costs of a similar system using the 96-in. T-12 lamp are only a few percent higher; but costs of a similar system using the "low-brightness" T-17 lamp are approximately 50% more. Thus, on an economic basis, the use of T-17 lamps is never justified. It is always more economical to use the 40-w T-12 or the 96-in. T-12 lamp with a quality lighting fixture.

An office building is to be lighted by a 3000-hertz system using the output from a 200-kva three-phase motor-generator installed in the basement. Wall outlets for motors, computing machines, fans, and electric typewriters are to be on an independent 60-cycle circuit.

The power delivered to each lamp is 39 w, the power to the inductor L per lamp is 1.25 w, giving a total of 40.25 w per lamp. The 200-kva generator can therefore supply power to operate 4970 lamps. Losses in the motor-generator may be taken at 19%. Therefore, the power taken from the 60-cycle line at rated load is 238 kw. The lumen output of each lamp is 2540 lumen, and the total lumens for the entire building is 1.264×10^7 lumen.

Take the cost of luminaire (without ballast) at $6.86 per lamp and the combined cost of capacitor and inductor (per lamp) as 95¢. Thus, the luminaires cost $7.81 per lamp, or a total of $38,800 for the high-frequency system. Assuming a cost of $25 per kva for the motor-generator, its initial cost is $5000. Or the *total initial investment exclusive of lamps is $43,800.*

If lamp life is assumed to be increased 12% above normal value, lamps will last 2800 hours. Assuming normal discounts, lamps are purchased at 92¢ apiece. If lamps are burned 2500 hours per year, *annual lamp replacement will cost $4090.* At 1.5¢ per kwh *energy costs each year are $8910.*

If the fixed charges per year are 10% of the investment, the annual cost will be:

Fixed charges	$4380
Lamp replacement	4090
Energy	8910
Total annual lighting cost with 3000-hertz system	$17,380

At 60 hertz the cost of the same luminaires with standard G.E. instant-start ballasts is $10.00 per lamp. But the output of the lamps is only 2350 lumen, so 5380 lamps must be used to provide the same quantity of light. The *initial investment in luminaires and ballasts is $53,800.*

At a lamp life of 2500 hours, *annual lamp replacements will cost $4950.* Power required per lamp is 39 w for the lamp and 11 w for the ballast or a total of 50 w per lamp. The *total power for the 60-cycle system is 269 kw. Annual energy cost is $10,460.*

If fixed charges are again taken as 10% of the investment, the annual cost will be:

Fixed charges	$5380
Lamp replacement	4950
Energy	10,460
Total annual lighting cost with 60-hertz system	$20,790

Thus, the architect's client may expect to save $3410 each year by installing the high-frequency system, a saving of 16% of the annual cost of the 60-hertz system.

A comparison of the weight of the auxiliary required is also of interest. The weight of the 3000-cycle auxiliary (including the motor-generator set at 2.28 lb per lamp) is 2.41 lb per lamp or a total of 12,000 lb for the building. On the other hand, a standard 60-cycle instant-start ballast weighs 4.13 lb per lamp, and the total weight required for the entire building is 22,200 lb. The weight of metals required for the new system is only 54% of that ordinarily used.

The client is justified in choosing the high-frequency system for his new office building. He likes the trim appearance of the luminaires which look as though they contain no ballasts. He is glad to be rid of stroboscopic effect, ballast hum, and radio-interference. He recognizes that longer life means less money spent on lamp replacement and less work for his janitors. He has just been reading a summary of the President's Materials Policy Report[12] and has a warm patriotic glow as he realizes that he can save over 6 tons of steel and copper by choosing the new lighting system. And finally, when he sees that he can save over $30,000 in 10 years, three-fourths of his initial investment, he is completely sold. Ground will be broken in the spring. A revolutionary idea in fluorescent lighting is about to leave the laboratory and drawing board and become accepted practice.

[11] *Tests made in collaboration with Prof. Jamison R. Harrison of Boston College, Chestnut Hill, Boston, Mass., and R. A. Coradeschi.*

[12] Resources for Freedom, A Report to the President by the President's Materials Policy Commission, *United States Government Printing Office, Washington, D. C. (June 1952)*

selective radiopaging

With the unprecedented expansion of modern technological society, the problem of keeping in touch with key personnel in large buildings or industrial installations has become increasingly complicated. Royalcall Radiopaging System, developed by Al Gross, electrical engineer, and Harry Royal, President of Royal Communication Systems, Inc., from the original idea of Charles F. Neergaard, hospital consultant, fulfills all the requirements of a really effective paging system with the ability to signal a particular individual, out of perhaps hundreds, with relative privacy and with no accidental duplicate signal reaching any other receiving set in the vicinity. It is now available to architects, designers, and engineers throughout the country for general use.

The new system has overcome the limitations of existing paging systems. Costly two-way communications in the form of the wartime walkie-talkie do not limit the signal to a single receiver, while the automatic radio signal system, which constantly broadcasts a series of code numbers to all receivers on its wavelength, cannot provide for the instant receipt of urgent messages. Audible wired paging systems can be heard by anyone in the area, including hospital patients who should not be disturbed. Audible annunciator systems using bells or buzzers are limited in the possible number of coded numbers which can be transmitted. Unless the recipient of the message is in sight of an annunciator board and can see if his number is on display, visual paging is not effective.

In contrast, the Royalcall system individualizes radio signals so that only one receiver out of many on a given wavelength will receive the signal and it reaches the person being paged whether he is consciously listening for it or not. Furthermore, the signal when it is transmitted does not startle the receiver or disturb the people he is with. Once the signal is received, the recipient goes to the nearest telephone and calls the central switchboard for his message. The basic elements of the system are the transmitting unit with a 100- or 1000-channel-keyboard sending desk, a sending aerial strategically located to broadcast its signal most efficiently, and the receiver which is small (fitting into the breast pocket of a business suit), light, and compact. A third item being developed and practical for large installations is a special notification rack which will hold receivers when not in use. When a receiver is removed from the rack, a number or name will light up on an annunciator board in the telephone operator's room announcing that the person assigned that particular receiver is ready to receive signals. Installation of the system will require a minimum of special wiring. Transmitters will operate in the 10-megacycle strip known as the Citizen's Band which is free of commercial broadcasting interference and in which broadcasting by nonlicensed radio operators is allowed by the Federal Communications Commission.

The standard unit offered will operate

air and temperature control

Kno-Draft Type HPR-K Air Diffuser: high-pressure air diffuser capable of handling wide volume variations in different zones, provides flexible distribution system and saving in space and ductwork. Long runs of diffusers serving large areas can be supplied by conduits of uniform size without customary reduction for each take-off. Consists of perforated cylindrical damper, sound absorption chamber, standard circular diffuser; available in neck sizes 4″ to 10″ and capacities of 70 to 525 cfm. Connor Engineering Corp., Shelter Rock Lane, Danbury, Conn.

Year-Round Air Conditioning Equipment: new line of residential year-round air conditioning units; over 190 models in wide range of heating and cooling capacities. Self-contained packaged units with factory-sealed refrigeration system based on newly developed hermetic compressor. Designed for use with General Electric's Air-Wall system of heating and cooling as well as for conventional cooling and heating distribution systems. General Electric Co., 5 Lawrence St., Bloomfield, N. J.

construction

Shakertown Glumac Unit: new sidewall material consisting of cedar shingle outercourse electronically bonded to waterproofed, impregnated insulation backerboard. Necessity of sawing, cutting, planing, and fitting individual shingles is eliminated. Each unit measures 18″ by 46½″, available in nine colors. The Perma Products Co., 5455 Broadway, Cleveland 27, Ohio.

Rilco Type 75: tied arch for low-cost clear span buildings can be used with wood, asphalt or asbestos shingles, or metal roof covering. Arch is formed in two segments with straight section on either side of ridge connection. Light-weight, laminated Douglas fir arches and ties precut and drilled, shipped unassembled with necessary hardware. Spans range from 24′ to 40′ with center heights ranging from 4′-2½″ to 8′-9½″. Rilco Laminated Products, Inc., First National Bank Bldg., St. Paul 1, Minn.

doors and windows

Fleetlite Window Unit: complete, double-hung window unit with new extruded aluminum sill. Koroseal lip along bottom edge of storm sash and sill; pile Mohair weatherstripping on vertical surfaces of sill contacting inside edge of sash; three vertical steps inside of screen, storm sash, and interior sash are protective features. Fleet of America, Inc., 458 Dun Bldg., Buffalo 2, N. Y.

Alumi-Door: all-aluminum overhead garage door with Monocoque facing, a type of crimp given sheet aluminum which presses out horizontal strips at a slight upward angle. Capable of withstanding heavy concussion without denting, door is also resistant to vertical or horizontal distortion. Painted or unpainted, it may be washed down with a hose without danger of rust or warpage. Sizes 8′x7′, 9′x7′, 16′x7′, available with either track or jamb hardware. Stevens-Thuet Co., 2165 Cowles St., Long Beach, Calif.

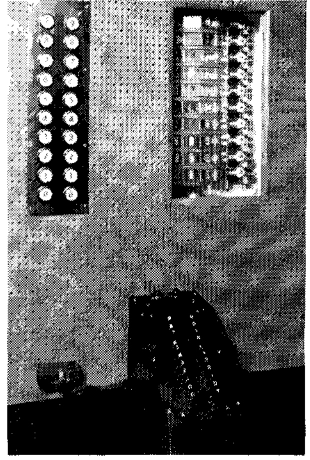
electrical equipment, lighting

Gratelite: new type of plastic louver diffuser for fluorescent fixtures and tubes, providing lower apparent brightness because of "in shadow" lattice-like pattern. Diffusion results from ⅜″ cubical facets which give 45° x 45° lengthwise and crosswise lamp shielding. Furnished in sizes up to 4 ft long to fit fixtures of specified Guth design. The Edwin F. Guth Co., 2615 Washington Blvd., St. Louis 3, Mo.

Chalkboard Dean: lighting unit designed to give maximum illumination from top to bottom of chalkboards without glare. Light from a row of fluorescent lamps is distributed over the board by means of a parabolic trough reflector placed along the top of the board extending out from the wall. The size of the reflector causes the bare lamp candlepower to be amplified by about five times in the direction of the axis of the parabola. Solar Light Mfg. Co., 1357 S. Jefferson St., Chicago 7, Ill.

SDP Luminaire: new luminaire for heavy industrial use provides upward component, which distributes 23% of the light toward the ceiling, by slots located over the lamps on each side of the reflector. Two slimline lamps of 38, 58, or 75-watts each are used. Back to back lamp spacing is provided. Slide action hangers and a longitudinal shield to provide 27° shielding are available. Westinghouse Electric Corp., First National Bank Bldg., Pittsburgh 30, Pa.

Component parts of Royalcall transmitter (right)*: 100-channel keyboard* (bottom), *annunciator panel* (upper left) *which can be used in the same fashion as the boxed keyboard, and frequency selector* (upper right).



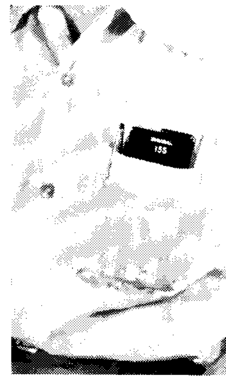
on 50 watts and will have an effective broadcasting radius of four miles. This unit will be able to handle up to 1000 receivers; it will be able to broadcast differently-keyed signals through a series of oscillating crystals. It is estimated that as many as 40 of these 50-w transmitters could be operated within the same area.

Tests have shown that the penetrating but extremely short broadcast signal has literally no effects whatsoever on nearby or distant radios, television sets, or other communication devices. On the other hand, it was also proved that X-ray machines, diathermy machines, arc-welding machines, electric motors, and all other modern electrical devices are incapable of interrupting or distorting the Royalcall signal, or of reducing its selectivity.

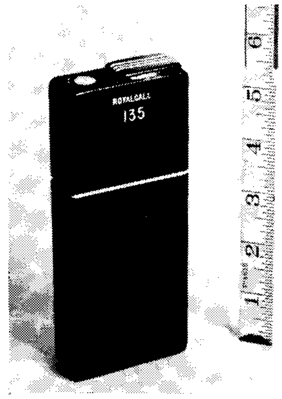
The effectiveness of the transmitter's penetrability was proved during the first test of the prototype in Cleveland last year. Here the broadcasting unit was a low-power 5-w portable. The signal was broadcast to the receiver on a constant-tone basis so that the continued effectiveness of the broadcast could be checked. The person carrying the receiver walked throughout the multistory hospital building and it was found that the signal did not die out even when the person went into a completely lead-lined X-ray therapy room and closed the door.

The new paging system will have a wide variety of uses. Letting a particular individual know, instantaneously and without his volition, that he is wanted is often an urgent necessity, whether he be a physician in a modern skyscraper hospital or a buyer in Chicago's Merchandise Mart, a general in the Pentagon Building, or a key scientist in an atomic energy installation encompassing many square miles of territory.

Inquiries about the system may be addressed to Harry Royal, President, Royal Communication Systems, Inc., 11462 Euclid Avenue, Cleveland, Ohio; or to Standard Electric Time Company, Springfield, Massachusetts.



Receiving unit (right and below) *weighs 12 ounces: aerial is enclosed.*



finishers and protectors

Mason-Dri: rubber based weatherproof masonry paint protects against the destructive elements of lime, alkali, and moisture present in masonry. Any type of masonry surface is also kept free from stains, streaks, and mildew. Available in several colors. Sapolin Paints, Inc., 229 E 42 St., New York, N. Y.

insulation (thermal acoustic)

Channel-Seal Roof Insulation: cane fiberboard roof insulation material with special bevel on all four edges of deck-side. When units are applied, a network of triangular channels is formed between roof deck and insulation which equalizes air pressure between roofing and deck and protects against localized pressure build-up with consequent blistering or separation of felt and insulation. Asphalt-coated, comes in laminated panels 24" x 48" in thicknesses of 1", 1½", and 2". Celotex Corp., 120 S. La Salle St., Chicago 3, Ill.

Durant Anchor: new type of insulated anchor for use in underground insulated pipe systems conveying hot or cold liquids or gases which eliminates contact between anchor plate and pipe. Plate is insulated from the pipeline both thermally and electrically by a noncompressible block of Transite sheet material. Design and material serve to minimize heat loss at anchorage points and prevent pipeline corrosion due to electrolytic action. Durant Insulated Pipe Co., Warren Way & Bay Rd., Palo Alto, Calif.

sanitation, water supply, drainage

American-Standard Disposer: food waste disposal unit which can be connected to drain of any standard sink with a 3½" to 4" opening. Three-way handle of the safety top control acts as drain, seal, and operating control as well as protective device when unit is running. Force of shredding blades grinds all types of food waste into fine pulp. American Radiator & Standard Sanitary Corp., Bessemer Bldg., Pittsburgh 30, Pa.

Submersible Cellar Drainer: new type of submersible sump pump without protruding floats or rods; complete unit can be installed in sump pit with no extended pump shaft above floor level. Motor and operating switch enclosed in stainless steel housing allows pump to be completely submerged without damage to the motor if electric power should fail. Operating range set at factory; no float adjustment necessary. Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

specialized equipment

Tele-Jac: permanent television antenna anchor; provides a direct through the roof lead-in to the television set which gives better reception and eliminates exposed guy wires and lead-ins on the roof and outside walls of the house. Installation of the anchor takes less than 30 minutes in buildings under construction. Froelich-Reeder-Froelich, 1350 N. Highland Ave., Hollywood 28, Calif.

Swimming Pool Construction Package: new "packaged" engineering and equipment system with new filter plant and self-skimming pool overflow developed for residential swimming pools. Instead of conventional filter assembly requiring from 8 to 10 valves, plant has one dial-type valve which controls filtration, backwashing, and overflow. Filter assembly includes integrally-mounted motor and self-priming pump, automatic air relief valve, and Latex-coated disc underdrain. Plans, specifications, labor and material estimating forms, and equipment installation data provided. Landon, Inc., 5920 Sepulveda Blvd., Van Nuys, Calif.

surfacing materials

Eze-Hang Wallpaper Adhesive: new adhesive for wallpaper application which is applied directly to the wall instead of to the wallpaper. Ready-mixed to the right consistency and applied with a standard paint roller, the adhesive works equally well with any pretrimmed wallpaper or wall-covering and will adhere to almost any surface: enamel, canvas, wood, masonite paint, or other wallpaper; acts as bond and neutralizer even for new plaster. With its use, wallpaper is easily removed when it is completely saturated with water rubbed on with sponge. Commercial Packaging Corp., 724 Hoffman St., Hammond, Ind.

Lamidall: new plastic laminate panel ⅛" thick, for use on both walls and counter tops. Plastic surface, resistant to heat, moisture, stains, and ordinary abuse, bonded to tempered Presdwood. Panel available in wood grains and colored patterns with matched mouldings. Woodall Industries, Inc., 3500 Oakton St., Skokie, Ill.

p/a manufacturers' literature

★ *Editors' Note: Items starred are particularly noteworthy, due to immediate and widespread interest in their contents, to the conciseness and clarity with which information is presented, to announcement of a new, important product, or to some other factor which makes them especially valuable.*

air and temperature control

1-1. Base-Ray Radiant Baseboards (915), 6-p. folder describing cast-iron radiant-heating baseboards; inverted and projecting corner plates and extensions 7" high, 2" thick. Floor to ceiling temperature differential 2° to 3°. Heating and decorative advantages, piping arrangements, other types of heating equipment; photos, drawings. Burnham Corp., 2 Main St., Irvington, N. Y.

1-2. Dunham Engineering Data Manual (26-95), 28-p. booklet providing engineering data for those who specify, sell, and install heating systems and equipment. Sections cover steam data, water properties, piping data, weights and measures, pipe and fitting dimensions, heating terminology, and miscellaneous facts such as temperature conversion formulas, decimal equivalents, electrical unit equivalents, weights of sheet steel. C. A. Dunham Co., 400 W. Madison St., Chicago 6, Ill.

1-3. The Kewanee-Iron Fireman Boiler-Burner Unit (2314), 14-p. catalog in color giving detailed description and data on line of new units for high or low pressure heating, power or process steam. 8.2 sq ft of heating surface per boiler horsepower. Cutaway of unit with description of parts; ratings, data, dimensions. Information on other units: oil burners, forced-draft gas burner models, and combination oil and gas burners. Kewanee-Ross Corp., Kewanee, Ill.

1-4. The Trageser Copper Core Automatic Gas Water Heater, 8-p. folder. Detailed information on water heater with copper storage tank including specifications and cutaway drawing. Nonsludging base, insulated with wall of extra thick Fiberglas, Grayson Unitrol, ribbon burner, draft diverter. Trageser Copper Works, Inc., 5000 Grand Ave., Maspeth 78, N. Y.

construction

Two bulletins describing perforated hardboard and over 60 hanging fixtures which are interchangeable and self-locking without nails, screws, or tools. Illustrations of use as a complete wall treatment or separate sections in homes, offices, factories, display rooms, and stores. List of sizes and finishes, wall installation details, drawings of metal fixtures and accessories with prices and specifications. B. B. Butler Mfg. Co., Inc., 3148 Randolph St., Bellwood, Ill.:

2-1. Peg-Board, A.I.A. 35-H-5

2-2. What Is Peg-Board Equipment

2-3. Architectural Porcelain Enamel, A.I.A. 15-H-2, 12-p. booklet giving facts about porcelain enamel and laminated wall panels with architectural porcelain facing. Typical details, available shapes, coping details of porcelain enamel panel. Photos of new and remodeled buildings on which enamel has been applied and typical applications on wood and masonry construction. Davidson Enamel Products, Inc., Dept. H-53, 1100 E. Kibbey St., Lima, Ohio.

2-4. Flintkote Building Materials (BK-216), 12-p. catalog containing general information and detailed specifications on asphalt shingles, asbestos-cement sidings and shingles, insulating wool, built-up and roll roofing materials. Color illustrations of typical roofing and siding products. Flintkote Co., 30 Rockefeller Plaza, New York 20, N. Y.

2-5. Tilt-Up Construction (S3), 32-p. booklet describing a special form of precast concrete construction. History of development, advantages, design information, sequence of operation, construction details, tilting operation, insulation details, special uses. Fully illustrated with photos and drawings. Portland Cement Assn., 33 W. Grand Ave., Chicago, Ill.

2-6. Pretensioned-Prestressed Concrete Bridge Members, 12-p. bulletin by M. W. Loving, Consulting Engineer. Description of manufacture and erection of pretensioned-prestressed concrete bridge members requiring only about 25% of steel necessary for reinforced concrete bridge members of conventional design. 35 finished and progress photos with detailed captions. Concrete Products Co. of America, 1505 Race St., Philadelphia 2, Pa.

2-7. Round Columns of Concrete, A.I.A. 4-D, 4-p. leaflet on the advantages and uses of a laminated fiber form for the construction of concrete columns, piers, underpinning support, piles, weep holes, storm sewers, etc. Available in 19 standard inside diameters, from 3" to 24", lengths up to 24 ft. Suggested stripping methods, concrete cap details. Sonoco Products Co., Construction Products Div., Mystic, Conn.

2-8. Suggested Details of Waylite Masonry Wall Construction. 16-p. brochure containing 64 drawings illustrating various construction details for masonry units, prepared in accordance with modular coordination of design. Photos of masonry interior and exterior finishes. The Waylite Co., P. O. Box 30, Bethlehem, Pa.

doors and windows

3-1. Amarlite Aluminum Entrances, A.I.A. 16-E, 20-p. catalog of complete building entrances of aluminum; standard and semi-standard entrances, extruded shapes. Description of doors, frames, and operating conditions, standard hardware and equipment, specifications of various models. Photos, detail drawings. American Art Metals Co., 433 Bishop St., N. W. Atlanta, Ga.

Two booklets covering line of louvered windows and doors conditioned to both northern and southern climates, including new heavy extruded aluminum-framed unit. Table of standard window sizes, materials, construction, operation, weatherstripping, finish, erection and calking, and glass and glazing details. Drawings, photos. The Casement Hardware Co., 612 N. Michigan Ave., Chicago 11, Ill.:

3-2. Approved Jalousies, A.I.A. 35-P-3 (1003)

3-3. Extruded Aluminum Framed Jalousies (1011)

Four two-color booklets showing features of varied line of architectural metal products. Installation photos, cutaway drawings, details, specifications. Store front booklet revised to include all new moldings. Dept. NB, The Kawneer Co., Niles, Mich.:

3-4. 1953 Awnings, A.I.A. 35-P-2 (53051)

3-5. 1953 Store Fronts, A.I.A. 26-D (53011)

3-6. 1953 Zourite, A.I.A. 23-F (53031)

3-7. 1953 Entrances, A.I.A. 16-A (53021)

3-8. VMP Steel Doors and Frames, A.I.A. 16-A, 8-p. brochure giving information on line of steel doors and frames, single swing and double acting doors, sliding door and frame units, fire doors, and all types of engineered doors. Specifications with drawings, photos. Virginia Metal Products Corp., 1112 First National Bank Bldg., Pittsburgh, Pa.

electrical equipment, lighting

4-1. A Comprehensive Factual Definition of Art Metal Incandescent Lighting, A.I.A. 31-F-2 (153), 60-p. booklet describing in detail 47 incandescent lighting products for commercial use. Lighting design information, product illustrations, performance statistics, lighting calculations, mechanical construction with cross section drawings, installation methods, application suggestions, general engineering information. The Art Metal Co., 1814 E. 40 St., Cleveland 3, Ohio.

Two catalogs on commercial lighting equipment. First deals with units for use in stores, display rooms, show windows, restaurants, museums and other types of public buildings. Optical units, downlights, louvered indirect lights, reflector lamp units, fluorescent units, spotlights among products described and illustrated. Second booklet discusses television lighting and features base lights, spotlights, borderlights, follow spots, beamlights, switchboards, control equipment, accessories, lamps. Recommended lighting complements for television studios of various floor sizes and grid heights. Century Lighting, Inc., 521 W. 43 St., New York 36, N. Y.

4-2. Architectural Lighting (2)

4-3. Television Lighting (4)

4-4. Lighting Churches, A.I.A. 31-F, 20-p. brochure on church illumination giving information on lantern design and lighting, down lighting, and adjustable wall fixtures. Special sections on pulpit and sanctuary lighting. Illustrations of typical church lighting fixtures. Rambusch Decorating Co., 40 W. 13 St., New York 11, N. Y.

finishers and protectors

5-1. Vermiculite Plaster Protection for Wood Construction, 2-p. bulletin summarizing fire ratings for wood-joist floors and wood-stud partitions protected with vermiculite plaster on gypsum lath and metal lath and comparable fire resistance obtainable with sand plaster in each instance. Cutaway, chart. Vermiculite Institute, 208 S. La Salle St., Chicago 4, Ill.

insulation (thermal, acoustic)

6-1. Loxit Acoustical Systems, A.I.A. 39, (A.C.), 4-p. bulletin describing regular, surface-applied, and combination acoustical suspension systems. Mechanical advantages, typical specifications, information on acoustical wall trim. Cutaways and drawings, Loxit Systems, Inc., 1217 W. Washington Blvd., Chicago 7, Ill.

★ **6-2. Fiberglas Roof Insulation Preferred,** 16-p. folder containing more than 40 photos of outstanding installations of fiber glass roof insulation in industrial plants, schools, stores and shopping centers, hospitals and public buildings. 350 more outstanding jobs listed with names of architects, general contractors, and roofing contractors. Data on thermal conductance and application specifications included. Owens-Corning Fiberglas Corp., Nicholas Bldg., Toledo 1, Ohio.

sanitation, water supply, plumbing

7-1. Briggs Beautyware Plumbing Fixtures, A.I.A. 29-H (i), 24-p. condensed catalog listing porcelain enameled formed steel and vitreous china plumbing fixtures and chromium brass fittings, including bathtubs, lavatories, water closets, sinks, and cabinets. Features of complete line, color chart, description of each model with photos. Briggs Mfg. Co., 3001 Miller Ave., Detroit 11, Mich.

specialized equipment

Two 8-p. bulletins describing folded horn corner enclosures with complementary loudspeaker systems; Klipsch licensed; mahogany and blonde finishes. Recommended coaxial drivers, component specifications, response, impedance, efficiency, and distortion data. 12″ and 15″ full range and separate 2-way loudspeaker systems. Photos, charts. Electro-Voice, Inc., Buchanan, Mich.:

8-1. The Aristocrat (189)

8-2. The Regency (185)

8-3. Metal Toilet Compartments, A.I.A. 35-H-6 (530), 12-p. catalog of ceiling-hung or floor-supported, flush or panel type, metal toilet compartments, hospital cubicles, dressing compartments, and showers. Specifications, installation data, drawings of each type. Color chart; standard and variable installation recommendations. Fiat Metal Mfg. Co., 21-33 Borden Ave., Long Island City 1, N. Y.

8-4. Fountain and Food Service Equipment (1052), 36-p. brochure covering line of soda fountain, cold food, hot food, refrigerated short order, dishwashing, storage, and utility units, equipment stands, refrigerated display cases, fast food service equipment. Specifications, drawings, photos, price list. Stanley Knight Corp., 3430 N. Pulaski Rd., Chicago 41, Ill.

8-5. Display Equipment (52-G), 74-p. catalog of metal merchandising equipment including pricing and signing material, binning hardware, over-counter units, window and counter display stands, floor racks, perforated panels. Photos of each piece of equipment, index. Reflector-Hardware Corp., Western Ave. & 22 Place, Chicago 8, Ill.

surfacing materials

9-1. Architect's Portfolio, A.I.A. 23-B, 23-C, 23-D, folder containing pamphlets on asphalt, rubber, and cork tile. Sizes, thicknesses, colors, finishes of each, fully illustrated. Recommended and nonrecommended uses; architects' specifications, maintenance advice; information on the use of resilient flooring over radiant heating. Separate folders on advantages of flooring materials in schools and hospitals and special greaseproof tiling for heavy-duty industrial flooring. Kentile, Inc., 58 2 Ave., Brooklyn 15, N. Y.

9-2. Northern Hard Maple, Beech, and Birch Flooring, A.I.A. 19-E-9 (902-AF), 20-p. architects' edition of brochure giving general characteristics, grading rules, standard specifications, finishing data, and supplementary material on maple, beech, and birch flooring. Direct photographic color reproductions of maple flooring panels, charts, cutaways, installation photos. Maple Flooring Manufacturers Assn., 35 E. Wacker Dr., Chicago 1, Ill.

★ **9-3. Genuine Clay Tile,** A.I.A. 23-A (K-400), 22-p. brochure describing present status of thin setting bed technique of installing clay tile as shown in a nation-wide survey of the experience of representative members in building industry. Development, possible advantages and disadvantages of technique, detailed specifications for three basic types of thin setting installations, U. S. Dept. of Commerce Commercial Standard for water-resistant organic adhesive for clay tile installations. Tile Council of America, 10 E. 40 St., New York 16, N. Y.

(To obtain literature, coupon must be used by 5/1/53.)

(We request students to send their inquiries directly to the manufacturers.)

PROGRESSIVE ARCHITECTURE, 330 West 42nd Street, New York 36, N. Y.

I should like a copy of each piece of Manufacturers' Literature circled below.

1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4
2-5	2-6	2-7	2-8	3-1	3-2	3-3	3-4
3-5	3-6	3-7	3-8	4-1	4-2	4-3	4-4
5-1	6-1	6-2	7-1	8-1	8-2	8-3	8-4
8-5	9-1	9-2	9-3				

Name

Position

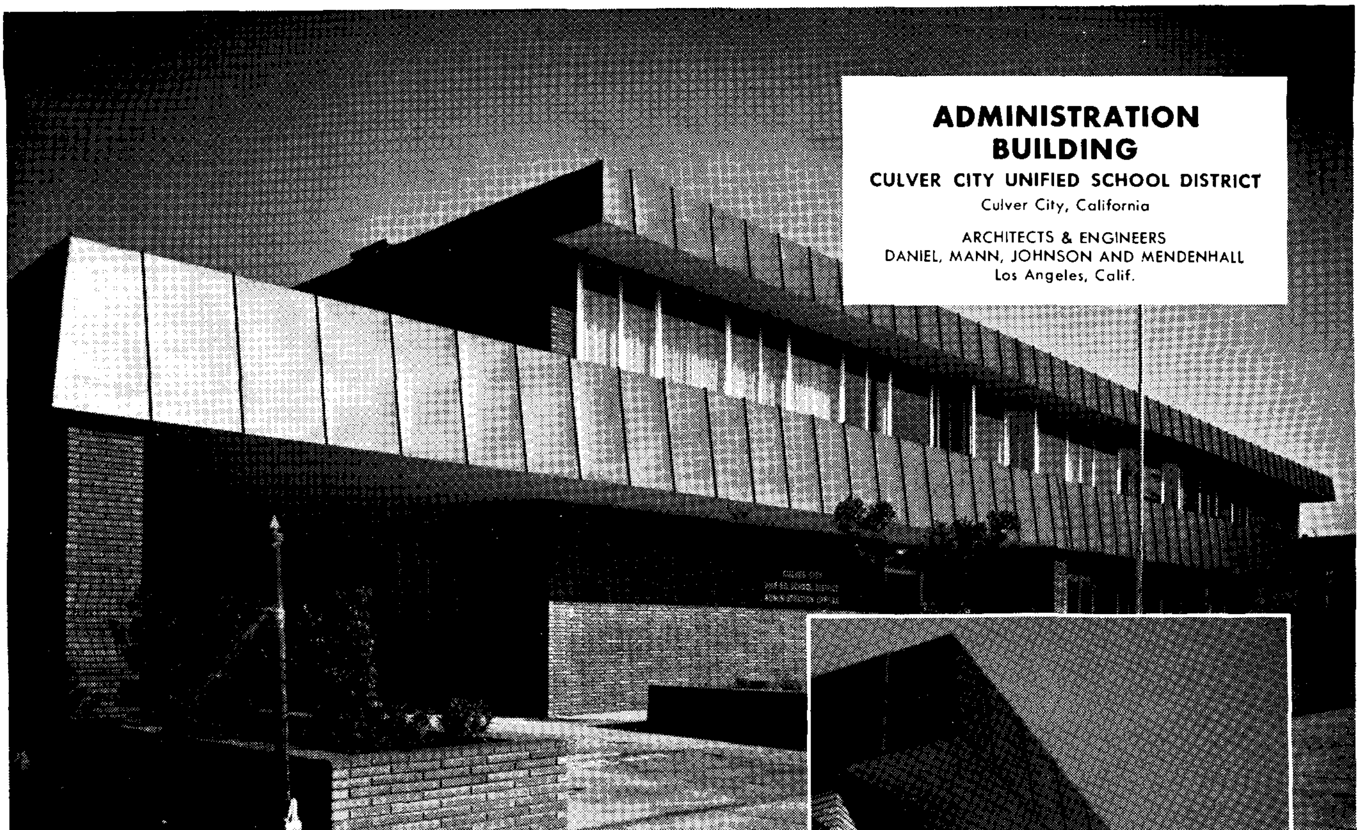
Firm

Mailing Address ☐ *Home* ☐ *Business*

City *State*

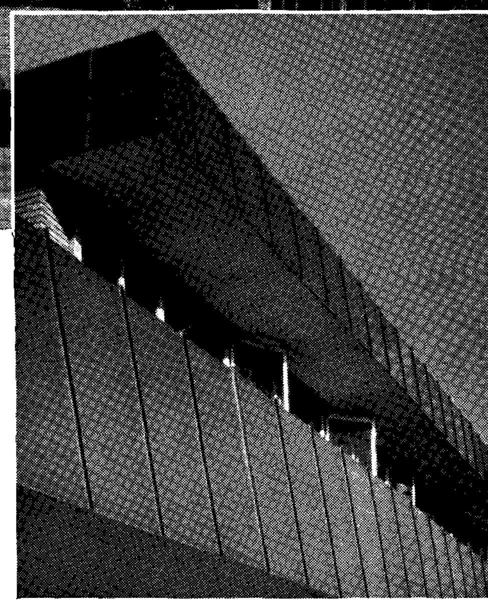
please print

3/53



ADMINISTRATION BUILDING
CULVER CITY UNIFIED SCHOOL DISTRICT
Culver City, California

ARCHITECTS & ENGINEERS
DANIEL, MANN, JOHNSON AND MENDENHALL
Los Angeles, Calif.



ANOTHER CASE OF
Copper
WHERE IT COUNTS

FROM THE DESIGN AS WELL AS FROM THE UTILITARIAN STANDPOINT

Revere Copper plays a dual role in this building which won an award from the Southern California Chapter of A. I. A. in their annual competition. It has been used in the facias in combination with the brick walls to create an unusual and striking effect. In fact the flexibility in design of Revere Copper is practically limitless. At the same time its non-rusting and enduring qualities place maintenance costs at the vanishing point.

Those are the reasons architects and builders prefer to use this "ageless" metal whenever they can. And sheet metal contractors are glad when it is specified because it is so readily worked and soldered.

In addition to the 2,000 sq. ft. of 16 oz. Revere Sheet Copper being used for the facias, the roof flashing also was made of 16 oz. Revere Sheet Copper, the entire building taking some 2,500 lbs. The Main Cornice Works, Inc., Los Angeles, Calif., were the subcontractors who did the installing, while Brunzell Construction Company, Culver City, Calif. were the general contractors.

Now, with restrictions eased, and quantities permissible without allotments greatly increased, there isn't any reason why your next job can't have the many benefits of Revere Copper. See the Revere Distributor nearest you about Revere Sheet, Strip or Roll Copper for flashing. Particularly ask him about the money-saving advantages of Revere Keystone Thru-Wall Flashing.* And, if you have technical problems, he will put you in touch with Revere's Technical Advisory Service.

*Patented

REVERE
COPPER AND BRASS INCORPORATED
Founded by Paul Revere in 1801
230 Park Avenue, New York 17, N. Y.

• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y.— Sales Offices in Principal Cities, Distributors Everywhere

SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

spec small talk

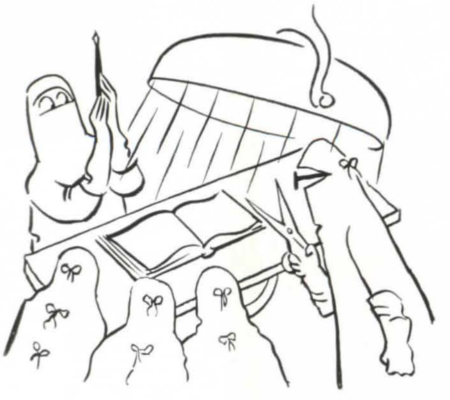
by Ben John Small

scope gripe

A specification writer I know is a rabid "anti-scope" man. He sees no justification for a scope of the work. It is his contention that despite the fact that most scopes make no claims for all inclusiveness (i.e. "including, but not limited to, the following, —") it encourages service as a bidder's check-list of required work. During the pressure of a bidding period, estimators are apt to ignore the all inclusiveness warning, use the scope as an actual work list and merely skim read the detailed specification clauses. His experience indicates that scopes are more often misleading than useful. What do you think?

hucksterectomy

If I were an advertising man concerned with the problem of attracting the attention of those who specify I should think my approach would include a re-reading of P/A's research report "How Building Products Get Into Buildings" as well as the technical literature criteria prepared by the American Institute of Architects. For advertising in architectural magazines I would design the ad to attract the professional reader exclusively and not attempt to use one watered down for nonprofessional palatability. If the ad contained a building product drawing I would indicate continuous construction as well—such construction, however, would be reviewed by an architect or engineer and not "an artist's conception of." To most specifiers I think well presented technical data in an ad has more specs-appeal than devices used commonly in promoting over the counter consumer goods. An ad man would undoubtedly disagree with this thesis and say that the professional man succumbs, with a little technical data bait, to the same eye-catching devices designed for the average consumer. I don't think so. I maintain that if the ad teaches something, we remember, and if we remember we are more apt to specify. As a broad generality, most of us will specify brand names in proportion to informational services rendered by product manufacturers. An informative ad should want to say "tear me out and save me today, I stand ready to serve you tomorrow."

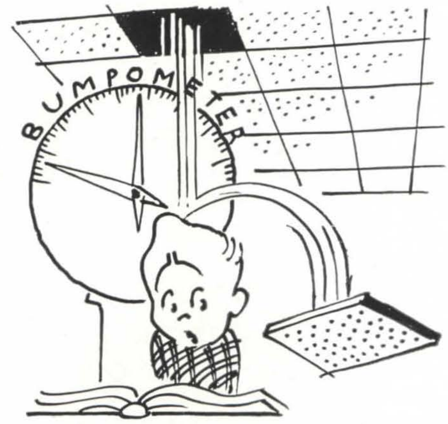


reference specifications

Reference specifications, when employed properly, serve as an excellent device for producing good specifications. Conversely, when employed improperly, you may find yourself squeezed between Scylla and Charybdis. For example, let us review "Aluminum Windows Specifications" issued by the Aluminum Window Manufacturers Association. Like similar reference specifications, in addition to contributing to the specification's slenderizing process, its usage maintains an au courant quality in the specifications in that the General Conditions require the latest edition thereof. However, the specification writer must not use reference specifications without a prior careful reading. In the A.W.M.A. specifications mentioned above, erection, glass, glazing, clips, glazing compound, glazing, caulking compound, caulking, grouting and cleaning after erection are required to be done by others. If this point is missed, there may be trouble. If you include the A.W.M.A. specifications by reference without specifying modifications to suit the project, there may be trouble. The A.W.M.A. document specifies "where called for" and "when specified"—be certain you do. See that sizes indicated on the drawings are co-ordinated with those in the A.W.M.A. specifications. If non-stock sizes are required, specify this as one of the A.W.M.A. specifications modifications. Caveat Emptor!

sound and fury

I am having acoustical tile installation troubles. Every so often I hear about acoustic tiles which have been cemented in place falling either singly or in patches. I have seen several such balding examples in schools and hospitals. In checking with some manufacturers and their authorized applicators I was the recipient of indignant denials to the effect that such things do not happen these days. If, they contend, tiles should fall the cause is probably traceable to improper adhesives (water soluble type) and anyway how much of a bump on the noggin can a tile cause? With respect to the adhesive, I do not know about your specifications, but mine require the adhesive to be that as recommended by the manufacturer of the acoustic tiles. Maybe



the general contractor indulges in a bit of cost shaving on this important item and slips in a low-price ersatz goo. Hereafter, I am going to ask the general contractor to certify that the adhesive offered for approval is the one recommended by the acoustical tile manufacturer for securing the tiles under the specific conditions of the project. (I must send a note to our field superintendent to check this, comes installation time.) I also plan to broaden our specifications by specifying noise reduction coefficients like this ".65 to .75" instead of ".65" or any other specific NRC on the grounds that from an acoustical engineering viewpoint there is no need for average installations to demand any precise NRC rating since such ratings represent resultant averages anyway. In a recent classroom design we plan to cement acoustic tiles on the wall 4′6″ down from the ceiling and extend the tiles on the ceiling for a distance of no more than 2′0″ from the walls. Our acoustic engineer says this design is proper for the classroom (he maintains we over-acousticize anyway) and now I sleep soundly in the knowledge that should any tile fall the chances of its striking a child are reduced greatly. Just the same, I have warned my children to keep out of the side aisles and keep an eye on the ceiling. I expect an urgent note from the teacher momentarily.

specialist

I was invited to join a select group of architects who toured the recently completed home of an obviously successful engineer. When someone asked him who designed an elaborately equipped closet I am certain I heard him reply, "closeteer." Pardon, whilst I run off and do some "scheduleering." I am vice-president in charge of preparing schedules for use in our specifications. As we departed an envious architect mumbled something about this sewage disposal plant engineer becoming affluent from effluent.

Schillings Drive-In Restaurant, Covington, Ky., Backus Bros, Formica Fixtures

HAVE LUNCH ON ME!

That's the unspoken Formica invitation that is accepted millions of times each day in eating establishments all over the country. There are more meals being eaten daily from Formica surfaces than any other material you could name.

The reasons Formica has been standard material in eating and drinking places for so many years go far beyond its obvious color and beauty.

Formica's super smooth surface wipes clean meal after meal, year after year with only a damp cloth.

Because it can't rot or crack it is sanitary and vermin-proof. It is armour coated against normal abrasion and scratching. It stoutly resists alcohol, boiling water, mild acids and alkalies.

The acceptance of the name Formica is a perpetual temptation to those who would have you substitute less proven materials of similar appearance.

When you specify and insist on genuine Formica you assure yourself the protection of 41 years of "know how" and integrity.

For additional information on Formica see Sweets $\frac{13a.}{FO}$ or write

FORMICA

4633 SPRING GROVE AVE., CINCINNATI 32, OHIO

Beauty Bonded

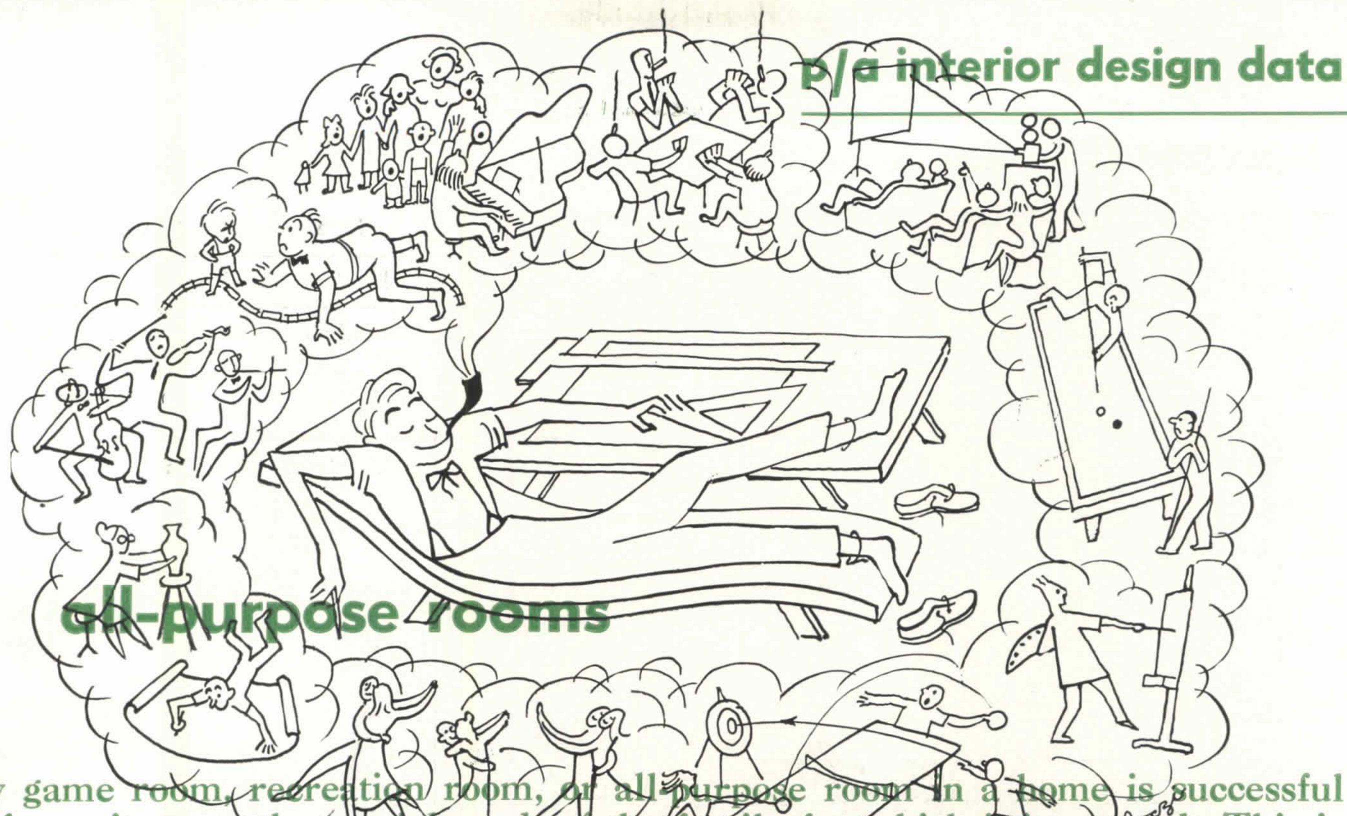
FORMICA

Reg. U. S. Pat. Off.

Pays in Performance

Guaranteed by Good Housekeeping — Replacement or refund of money if not as advertised therein

In Canada Arnold Banfield & Co. Ltd., Oakville, Ontario



all-purpose rooms

Any game room, recreation room, or all-purpose room in a home is successful insofar as it meets the special needs of the family for which it is created. This is usually the one room in the house where owners let their imagination run rampant and express all of the little idiosyncrasies they enjoy in themselves. Displays of hobbies or collections fit easily into such a room. The rest of the house may be almost conventional—at best, subtle in its design. But the recreation room rightly is a completely personal conception, because this is the relaxing, letting-down-the-hair, entertainment room—the most informal of all rooms. Ease and comfort are great considerations. Serviceability, in many phases, plays an important part. Ample storage space, fabrics and tabletops that will withstand wear, cabinetwork and furnishings that especially accommodate the family's wants must be considered.

True, these factors should be carefully studied in all the rooms in the house, but because of the very special uses of recreation rooms (which will vary in each home), much more thought and planning are required.

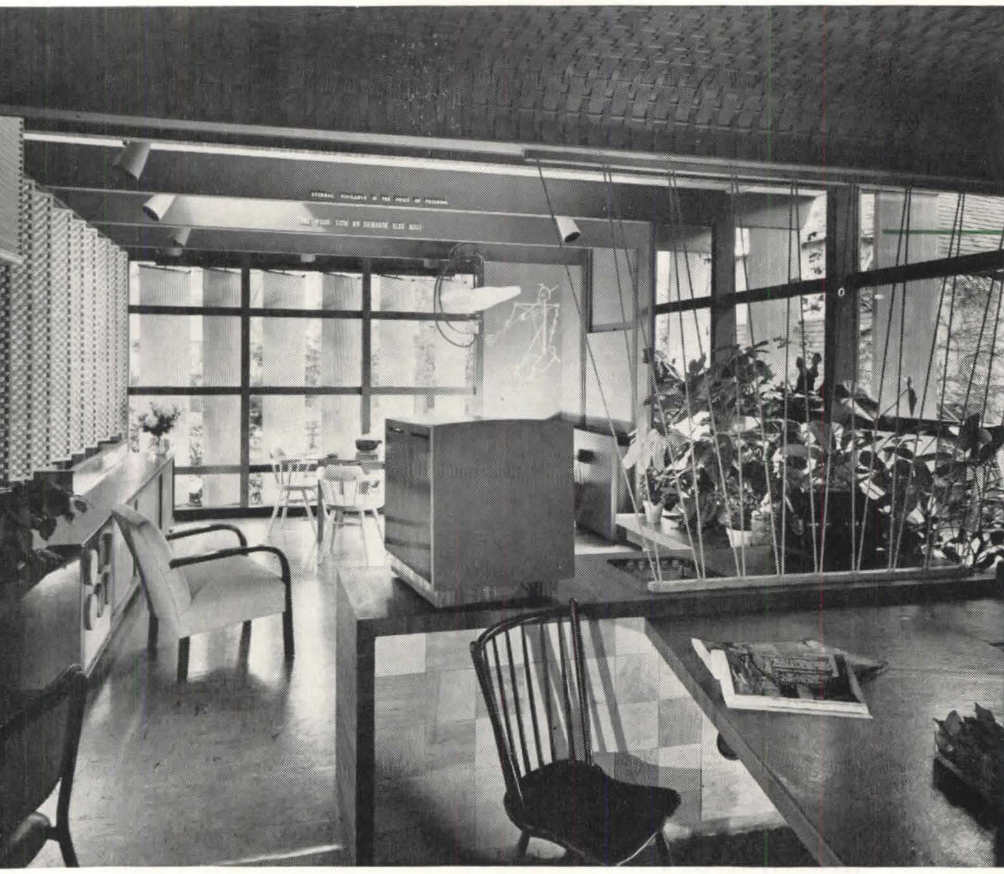
Here is usually the most cheerful room of all. Brighter color and unusual design may show importantly. Thus, it may be the most challenging and fascinating to create. Sometimes, as in the Breard house (discussed in the following section), the serviceability is of a different nature. The room is not separated from the rest of the house but is an important extension, so that the living room and dining room may be expanded as necessary. Naturally, it must have the same character and feeling of the adjacent rooms. Even in this instance, more variety in textures of wall finishes and more informal materials were used.

The Grant reception room, also presented in the following section, is different in its conception. A very high ceiling, with draperies and glass walls from ceiling to floor, creates a great feeling of space in a generously ample area. Hemp squares on the floor and bamboo blinds on the windows, with durable, wearable fabrics and tabletops, transform the character to informal elegance. Lastly, we show a studio, planned to be used for a special activity (weaving), but also doubling as an extra guest room.

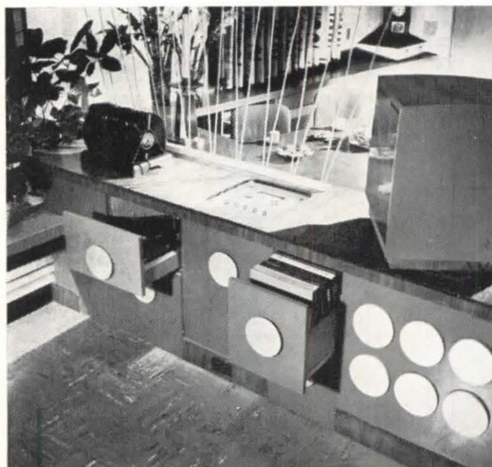
In summary, colorfulness, informality, serviceability, spaciousness, and originality of design, may all be successfully used in all-purpose rooms.

all-purpose rooms

type	recreation room
location	Pelham, New York
architect	Vernon Sears



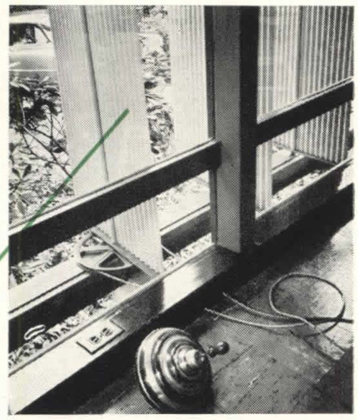
striated-plywood louvers



asphalt tile

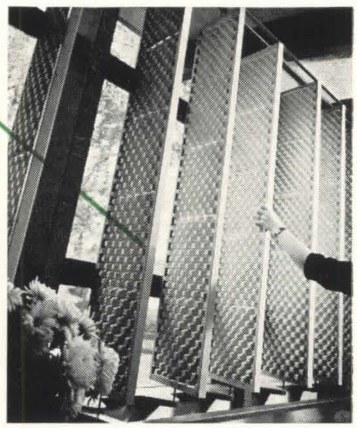
For a family of five that spends much time in entertaining and play, this architect-owned recreation room is a wonderful study in a variety of textures, window treatments, wall finishes, and cabinetwork. The room itself inspires activity and fun—encourages enjoyment. Aside from the entertaining approach, ease of maintenance was considered. The vertical louvers, varied and fascinating in design, take the place of draperies. There is no carpet on the tile floor—square dancing can start the minute it is suggested, and muddy or wet foot tracks can't hurt it. Furniture has been restricted, to avoid rearranging and moving with every activity.

Color is red, yellow, and dark green—with larger areas in gray and wood tones. All told, the room is exactly what a recreation room should be: right for the family, serviceable, attractively colored, and exciting in design. *Photos: Ezra Stoller: Pictorial Services, Inc.*



corrugated louvers

eggcrate louvers



striated-plywood ceiling

data

cabinetwork

Music Cabinet: smooth-faced plywood/ painted front, walnut-plywood top, plywood inlaid blocks, "Blocweld" on back/ baffles: monk's cloth in embroidery hoops/ drawer pulls: plywood/ U.S. Plywood Corp., 55 W. 44 St., New York, N.Y./ designed by Vernon Sears/ music installation by Keller Disk and Dial Service, Westport, Conn.

Counter and Cabinets: dark green "Kalistron"/ U.S. Plywood Corp./ cabinet doors, corrugated-metal covered with "Kalistron"/ designed by Vernon Sears/ executed by Thomas Della Badia, New Rochelle, N.Y./ installed by Sargent & Carmody, Inc., 575 E. Varick St., Mt. Vernon, N.Y.

equipment

Exhaust Fan: Hunter Fan & Ventilating Co., Memphis, Tenn.

furnishings

Captain's Chairs: #N20/ designed by George Nakashima/ Knoll Associates, Inc., 575 Madison Ave., New York, N. Y.

Glass-top Table: dark green "Kalistron"-covered legs/ custom-built.

lighting

Spotlights: #1606/ ceiling mounted fixture with universal swivel joint/ General Lighting Co., 1527 Charlotte St., Bronx 60, N. Y.

Hanging Fixture: designed by Edmund R. Huegel, Rambusch Decorating Co., 40 W. 13 St., New York, N.Y.

walls, ceiling, flooring

Walls: "Blocweld" plywood squares/ "Weldtex" striated-plywood strips/ painted plywood/ U.S. Plywood Corp.

Window Treatment: windows: "Thermopane"/ Libbey-Owens-Ford Glass Co., Nicholas Bldg., Toledo, Ohio.

Vertical Louvers: cardboard eggcrating material painted and inserted in wooden frames/ corrugated-metal covered with "Kalistron," U.S. Plywood/ stationary louvers: striated plywood "Weldtex," U. S. Plywood Corp.

Ceiling: "Weldtex"/ U.S. Plywood Corp.

Flooring: gray asphalt tile.

all-purpose rooms

type	studio
location	Lafayette, California
architects	Confer & Ostwald

data

doors and windows

Doors: "Pennslab"/ 1⅜" select white birch/ Pacific Mfg. Co., Santa Clara, Calif.

Hardware: Ply dull chrome/ The Schlage Lock Co., 2201 Bayshore Blvd., San Francisco, Calif.

Windows: Transoms: 3/16" "A" glass/ Libbey-Owens-Ford, Nicholas Bldg., Toledo, Ohio/ matchstick-bamboo blinds, painted dark green.

walls, ceiling, flooring

Walls: double, dark and light-red brick, with 2" air space/ natural finish/ plaster, painted white.

Ceiling: 1" x 8" redwood boards between 3" x 6" D. F. beams and mullions, painted light gray.

Flooring: 4" structural concrete slab membrane with integral coloring, green/ 2" radiant heating slab.

This studio has been cleverly planned to suit the needs of the family. It is separated from the main house by a screened dining loggia. To be used for weaving, mainly, it may serve as an extra guest room, since a small bath has been included.

The large sloping window catches north light and windows on the south allow the sunlight reflected by a garden pool to mirror on the ceiling.

The concrete floor was finished with a dark green wax in interesting contrast to the rough-textured brick walls. The beams and mullions are painted light gray, but color in the room is dependent on the natural brick and redwood.

Photos: Kurt E. Ostwald

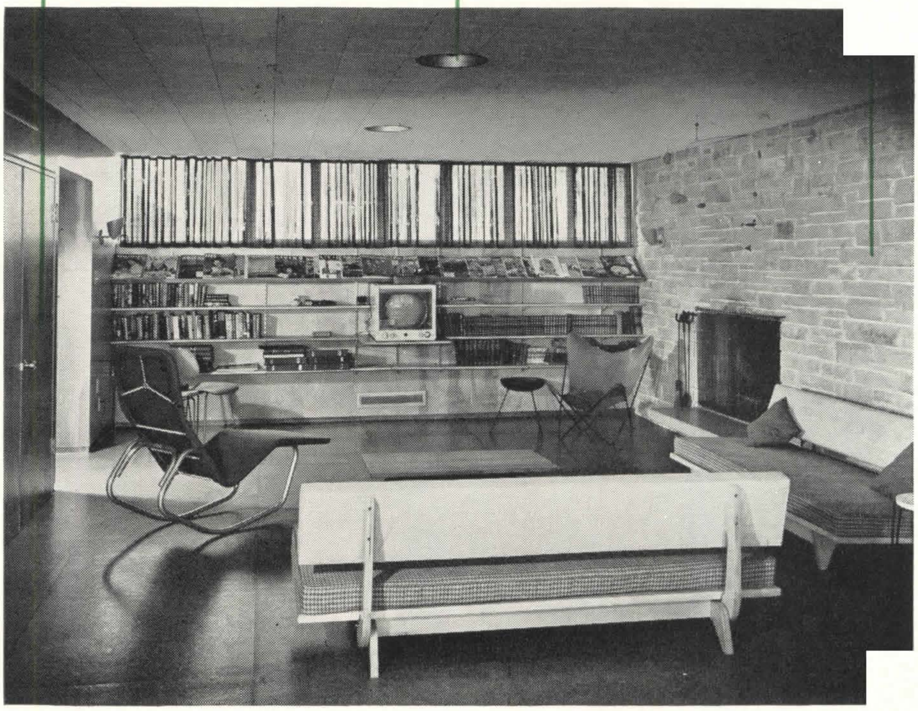
type	playroom
location	Dallas, Texas
architects	Fehr & Granger

recessed-dome luminaires

focal lights

birch-plywood south wall

stone north wall



data

cabinet work

Shelves, Cabinets: custom-built/ shelves on adjustable shelf standards and brackets/ Knape & Vogt Mfg. Co., Richmond at Voght, Grand Rapids, Mich.

doors and windows

Doors: flush, hollow core/ aluminum sliding doors: custom-built/ hardware: "Sateen"/ satin-chrome finish/ Schlage Lock Co., 2201 Bayshore Blvd., San Francisco, Calif.

Windows: aluminum casements/ 1/4" polished-plate and Pennvernon glass/ Pittsburgh Plate Glass Co., 632 Duquesne Way, Pittsburgh, Pa.

equipment

Air Conditioning: year-round/ Worthington Pump & Machinery Co., Harrison, N. J.

furnishings and fabrics

Chair: #72U/ upholstered in #K530/ designed by Eero Saarinen/ Knoll Associates, Inc., 575 Madison Ave., New York, N. Y.

Leather Sling Chair: #1982/ black legs/ Hardoy designed/ Knoll Associates.

Stacking Stool: #75/ birch top, black legs/ designed by Florence Knoll/ Knoll Associates.

Daybed: #700/ upholstered seat #K534/ back, plasticized Pandanus/ designed by Richard Stein/ Knoll Associates.

Table: #302/ natural-birch top, black lacquer legs/ designed by Hans Bellman/ Knoll Associates.

Low Coffee Table: hand-rubbed birch/ custom-built.

Chair: DCM/ birch seat and back/ chrome legs/ designed by Charles Eames/ Herman Miller Furniture Co., Zeeland, Mich.

lighting

Recessed-Dome Luminaires: #63262/ Kurt Versen Co., Englewood, N. J.

Focal Lights: #9162, "Versa"/ Kurt Versen.

Floor Lamp: #59022/ eggshell finish/ Kurt Versen.

walls, ceiling, flooring

Walls: birch-plywood, natural finish.

Ceiling: Fiberglas tile/ membrane faced/ off-white color/ 12" x 12"/ Nicholas Bldg., Owens-Corning Fiberglas Corp., Toledo, Ohio.

Flooring: Vinyl-cork tile/ 36" x 36"/ Dodge Cork Co., Inc., Lancaster, Pa.

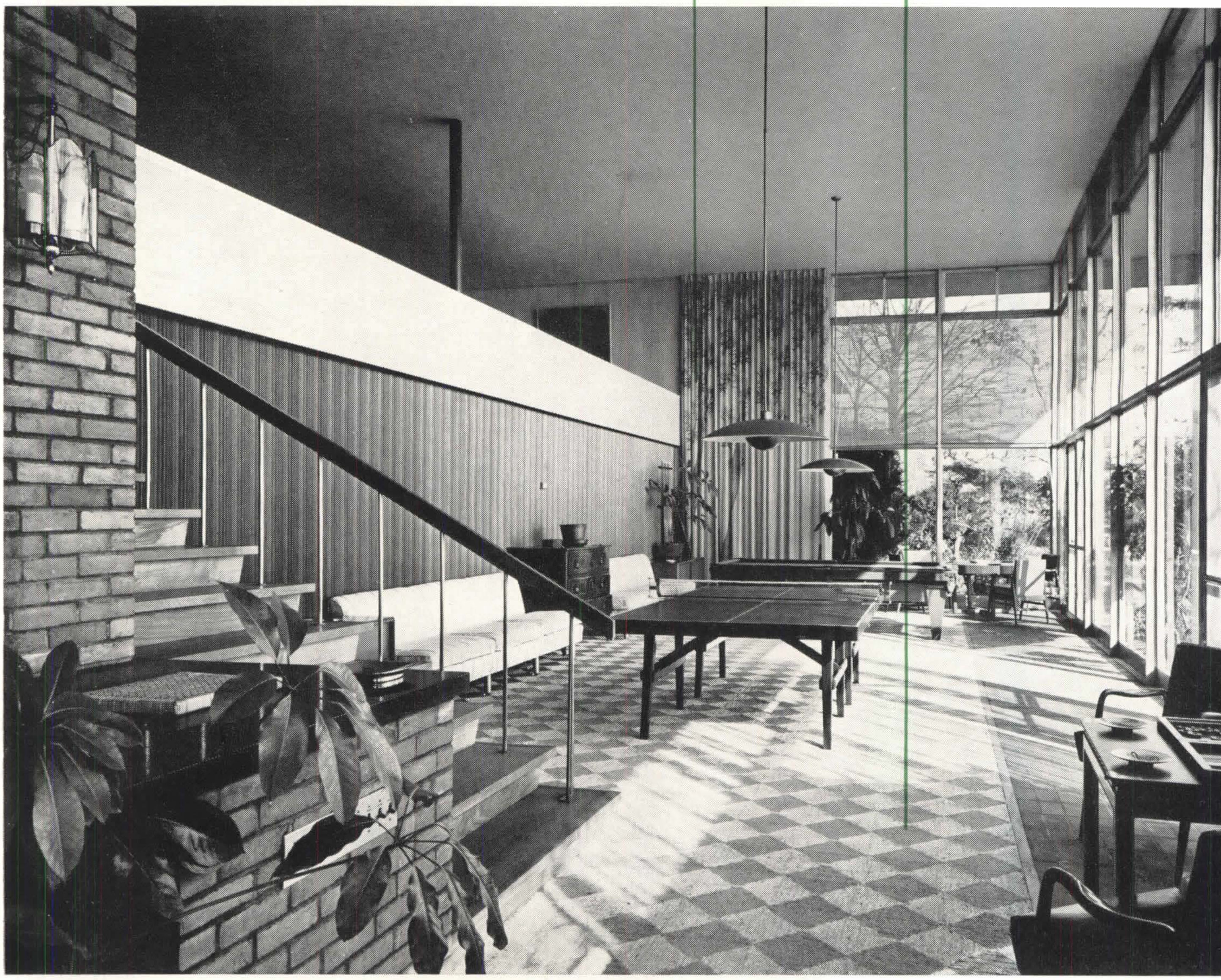
sliding-glass east wall

Planned to accommodate a family of six—including three boys and a girl—for playing, entertaining, and relaxing informally, this recreation room is beautifully related to the rest of the house. Living and dining rooms may become a part of the area, when necessary, and the room is so related to the kitchen that children may be watched and food service is convenient. However, if desirable to separate activities, the area may be closed off completely. The north wall is stone and has a fireplace; the east wall is of sliding glass, leading onto a screened-in porch; the south wall is of birch plywood and contains storage closets for games and tables; and the west wall, also of birch plywood, has adjustable shelves for magazines, books and television. Materials were selected for warmth and friendliness and ease of upkeep. The room has filled all of the requirements of the family, and has become a gathering place of the neighborhood.

Photos: Gottscho-Schleisner

all-purpose rooms

type	recreation area
location	W. T. Grant Home, Greenwich, Connecticut
architect	Edward D. Stone
associate architects	Karl J. Holzinger, Roy S. Johnson
interior designer	Dan Cooper



Spacious, and inviting, this recreation area provides many forms of relaxation. Tables for games, comfortable seating, and quiet decoration invite seekers of ease and comfort. Three complete walls are windows looking out onto beautiful landscaped grounds. The glare of sunlight is cut by the bamboo blinds. Especially effective are the long draperies with leaf pattern falling from the top, which make a pleasant transition from indoors to outdoors. Materials are extremely serviceable—yet cheerful and attractive—planned to take the wear-and-tear of informal living.

Photos: Lionel Freedman

data

doors and windows

Doors: aluminum frame, glazed.

Windows: Aluminum frame/ glass: Thermopane/ blinds: outside-bark split bamboo.

equipment

Heating: radiant heating in entire ceiling and outer edge of floor slabs.

furnishings and fabrics

Open Armchair: #1199 "The Alton"/ birch frame/ rubberized-hair upholstery/ Dan Cooper, Inc., 30 Rockefeller Plaza, New York, N. Y.

Round Game Table: #1257/ walnut, Kalistron top/ side pockets for chips and drinks/ 48" diameter/ Dan Cooper, Inc.

Bridge Table: #1256/ walnut, Kalistron top/ 30" square/ Dan Cooper, Inc.

Free-form Cocktail Table: #1247/ sucupira wood/ Dan Cooper, Inc.

Settee: #1250/ 9'-3" long/ anodized-aluminum legs/ Dan Cooper, Inc.

Curtain Fabric: Menlo cloth, yellow ground, red-and-brown print/ special print/ Dan Cooper, Inc.

lighting

Dome Lights: Gotham Lighting Corp., 37-01 31 St., Long Island City, N. Y.

walls, ceiling, flooring

Walls: windows on three sides/ fourth wall, dark-gray graphite lacquer.

Ceiling: sand-finished cement plaster.

Flooring: brick floor, wood block on edge/ hemp squares, Manilla abbacca.

sure, you can be sure! FLEXWOOD installations are guaranteed!

Many a Flexwood installation made years ago is just as beautiful today — and will stay beautiful as long as the building lasts — with no need for redecorating or special care. That's just one advantage of this flexible wood panelling that you can wrap around columns or curved walls — or even on concave fluting. With Flexwood you can use wood panelling and still meet all fire code requirements. And installations are covered by a written guarantee. Over 25,000,000 feet have been installed. Learn *all* of Flexwood's great advantages. Write now for a full color Case History Book and a sample.

FLEXWOOD

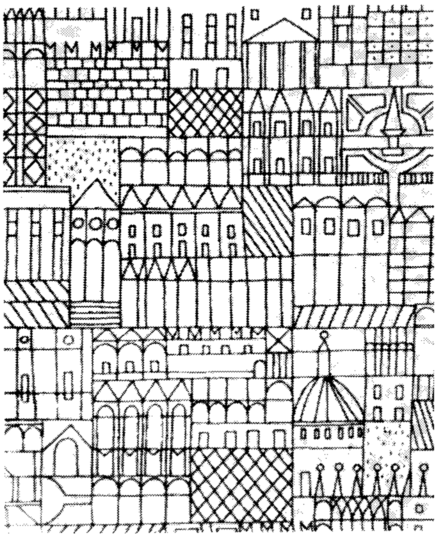
Choice wood in flexible sheets

Reg. U. S. Pat. Off.

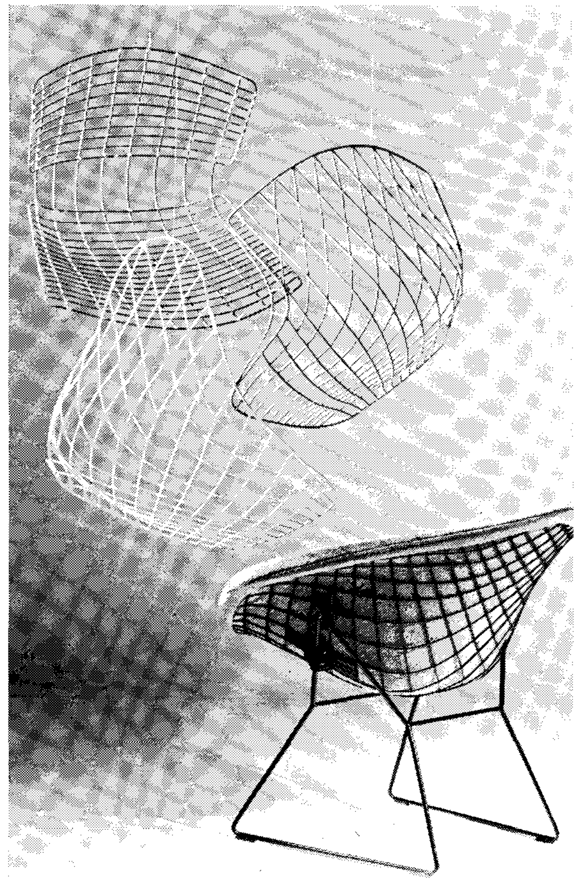
a few famous FLEXWOOD installations

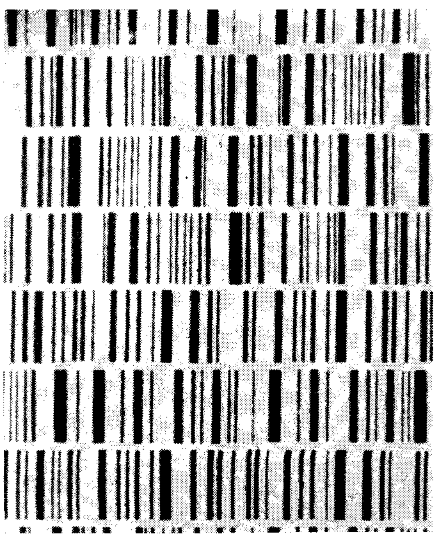
Company	Year Installed	Company	Year Installed
Aluminum Co. of America, Detroit, Mich.	1935	International Business Mach. Co., Washington, D. C.	1942
N. W. Ayer Co., Phila., Pa.	1946	Eli Lilly Co., Indianapolis, Ind.	1934
Bethlehem Steel Co., Bethlehem, Pa.	1943	McDonnel Aircraft Corp., St. Louis, Mo.	1949
Wm. H. Block Co., Indianapolis, Ind.	1936	Pittsburgh Post Gazette, Pittsburgh, Pa.	1937
General Motors, Chevrolet Motor Div., Detroit, Mich	1935	Temple U., Phila., Pa. (Dean's Office)	1944
D'Arcy Adv. Co., St. Louis, Mo.	1948	Toledo Public Library, Toledo, O.	1935
Ethyl Corp., Detroit, Mich.	1935	University Club, San Fran., Cal.	1937
J. L. Hudson Co., Detroit, Mich.	1935	Zurich Accident & Liability Ins. Co., Chicago, Ill.	1935
Illinois Bell Tel. Co., Chicago, Ill.	1938		

United States Plywood Corporation Dept. FW-38
55 West 44th Street, N. Y. 36, N. Y.
In Canada: Paul Collet & Co., Ltd., Montreal

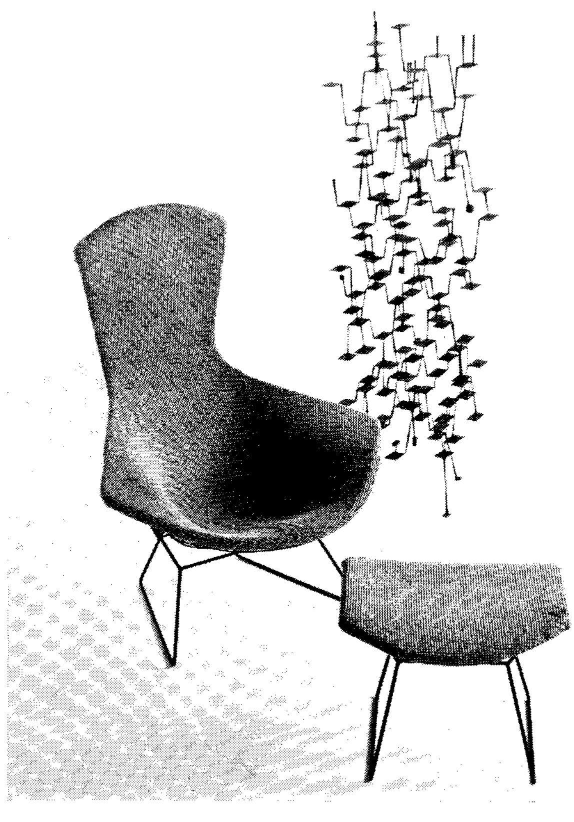


Hand-printed Wallpapers: #311 "retro-spective"/ all-over line pattern, suggestive of various types of architecture; #941 "alphabet"/ jumble of letters of the alphabet and ten numerals/ designed for children's rooms or where bright accent is needed.

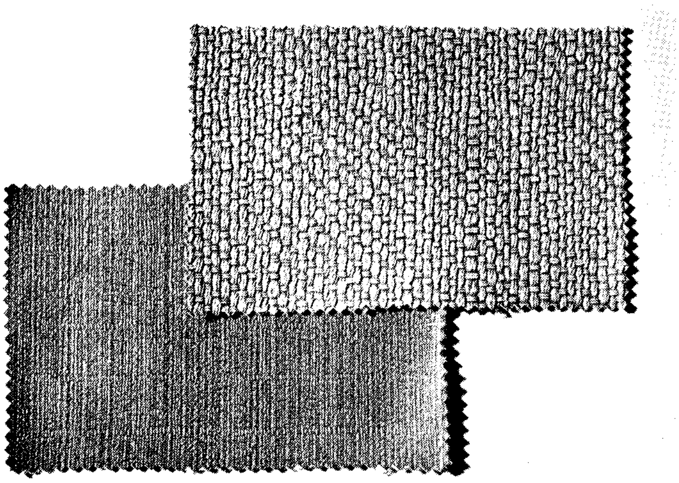




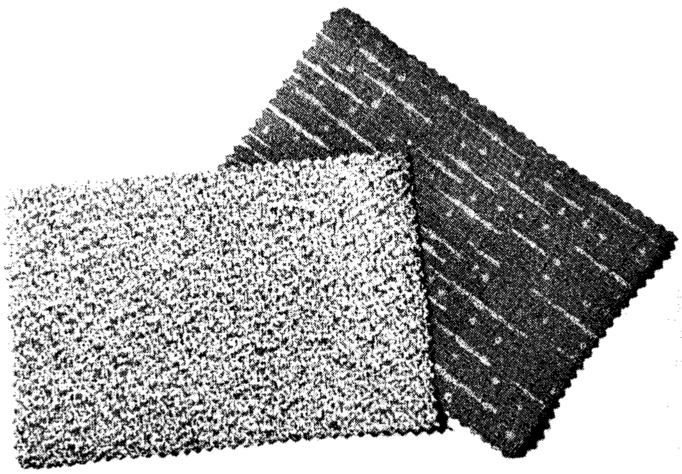
#774 "lines"/ horizontal [illegible] of variegated vertical [illegible] printed [illegible] five different colors [illegible] Herman Miller Furniture Co., Zeeland, Mich.



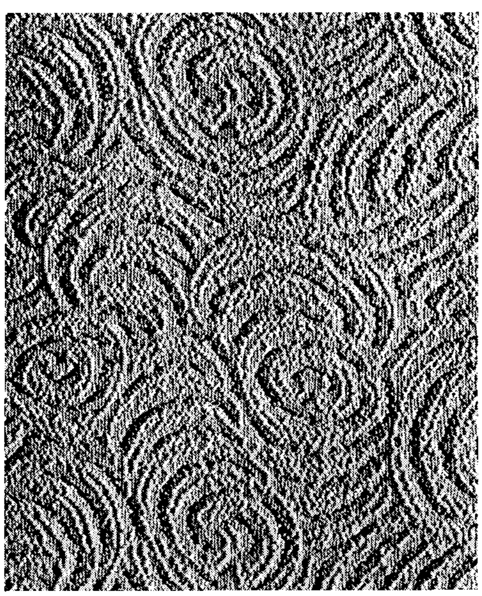
[illegible] 22, N. Y.



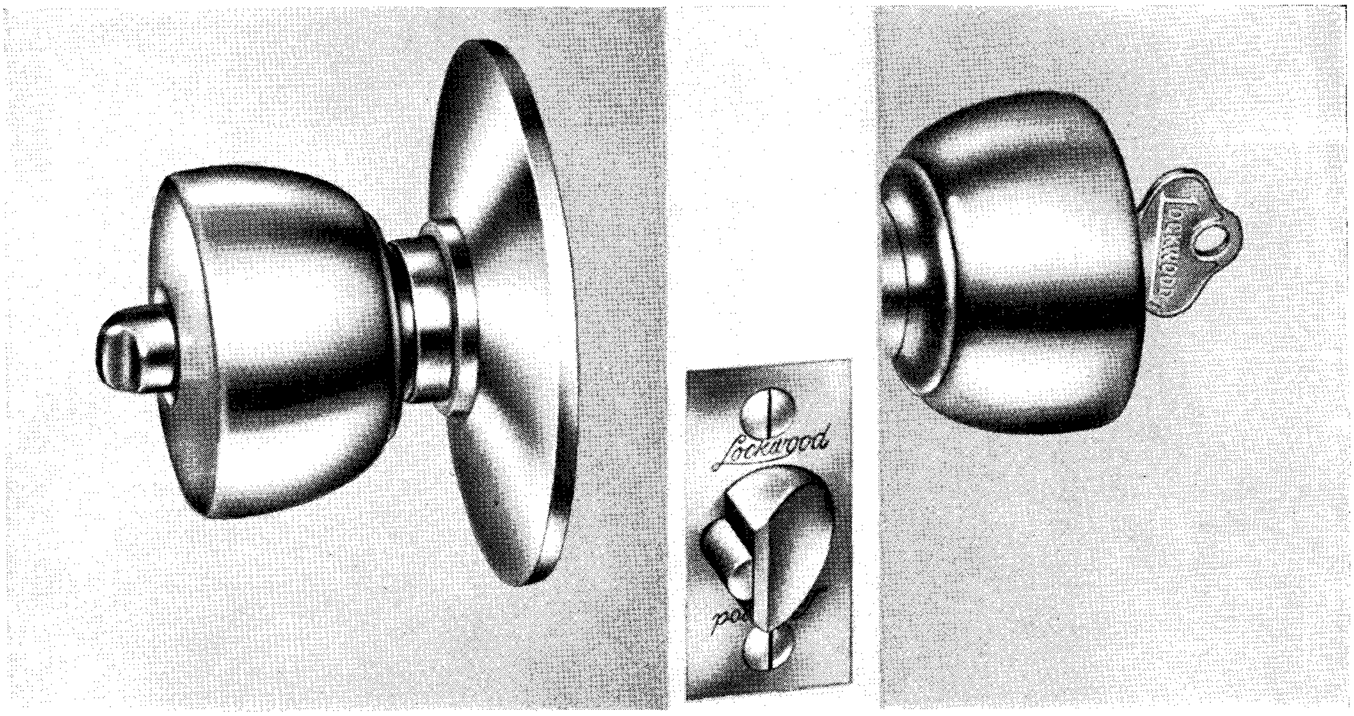
Elastic Naugahyde Upholstery: [illegible] Coated Fabrics Division, United States Rubber Co., Mishawaka, Ind.



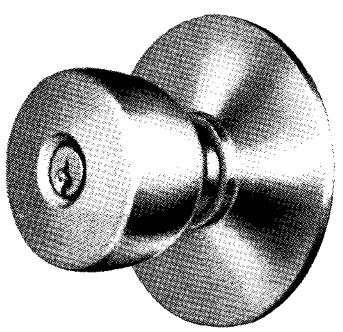
Textured Wilton Carpet: [illegible] retail [illegible] Bigelow-Sanford Carpet Co., Inc., 140 Madison Ave., New York 16, N.Y.



Hanging Bookshelf Unit: [illegible] retail [illegible] retail [illegible] retail [illegible] George [illegible] Madison Ave., New York, N.Y.



Engineered to do justice to your finest buildings



HATTEN DESIGN

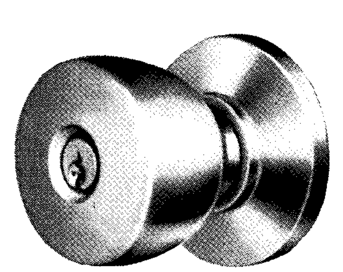
LOCKWOOD HEAVY DUTY KEY 'N KNOB LOCKS are engineered for endurance... in classic simplicity of appearance . . . in precision machining of internal mechanisms. All parts, many of them brass forgings, are unusually rugged, ensuring smooth, trouble-free operation year after year.

THREE DISTINGUISHED STYLES

Hatten Urn-shaped knobs offer a pleasing variation of the traditional elliptical profile. Large rose suggests luxury and provides extra protection for door finish. Heavy cast brass, bronze or aluminum.

Hartley The same urn-shaped knob is here combined with a smaller forged rose of somewhat flatter profile that suggests ruggedness and quality in minimum size. Heavy cast brass, bronze or aluminum.

Holbrooke Classic simplicity in the traditional pattern. Designed to give the smooth, enduring performance of the Hartley and Hatten designs at lower cost. Knobs and roses of wrought brass, bronze or aluminum.



HARTLEY DESIGN

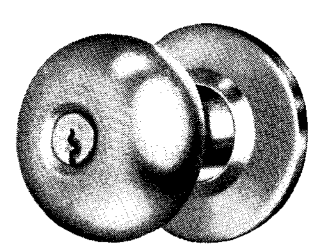
ALL THREE DESIGNS OFFER YOU THESE LOCKWOOD FEATURES

- Full range of functions
- Quick, foolproof installation
- Simple reversal of hand
- Easy removal of cylinder
- Long-throw, anti-friction bolt if desired
- Secure master-keying

see our CATALOG in SWEET'S FILE ARCHITECTURAL

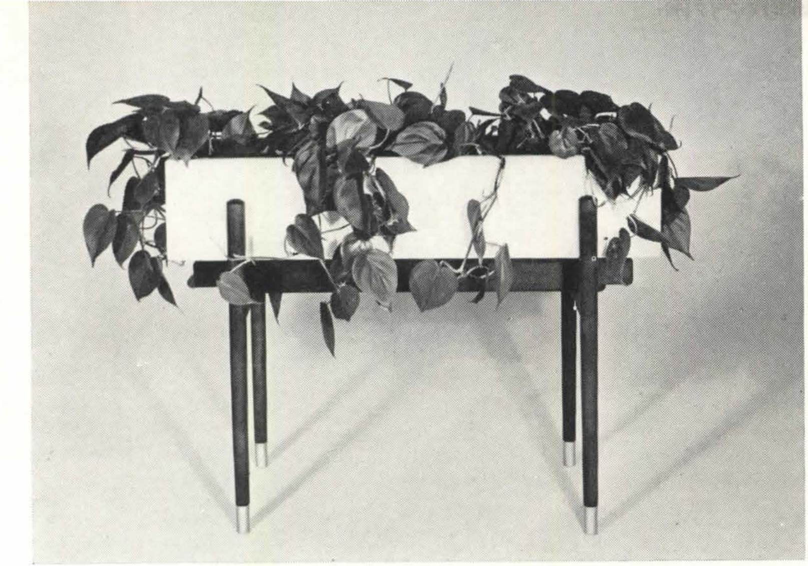
Lockwood

LOCKWOOD HARDWARE MANUFACTURING COMPANY
Fitchburg, Massachusetts

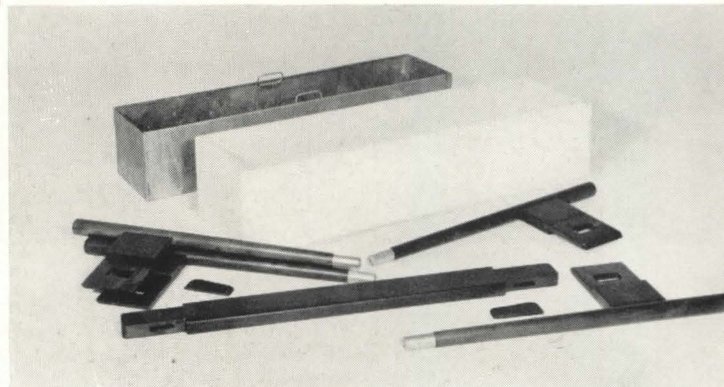


HOLBROOKE DESIGN

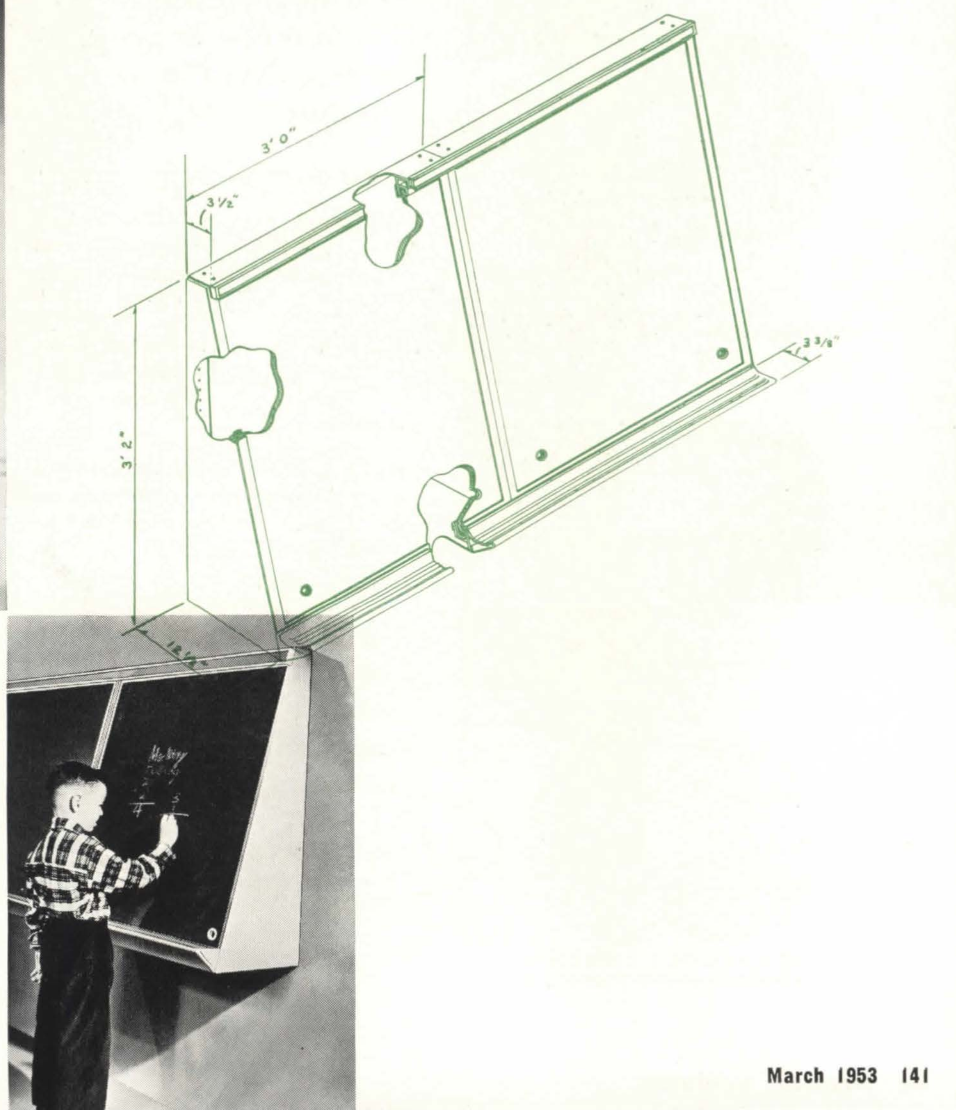
p/a interior design products



Knock-down Planter: all pieces pack in liner for compact shipment/ walnut members and legs/ white-enamelled box with copper insert/ **retail:** $33/ **George Tanier, 521 Madison Ave., New York, N. Y.**



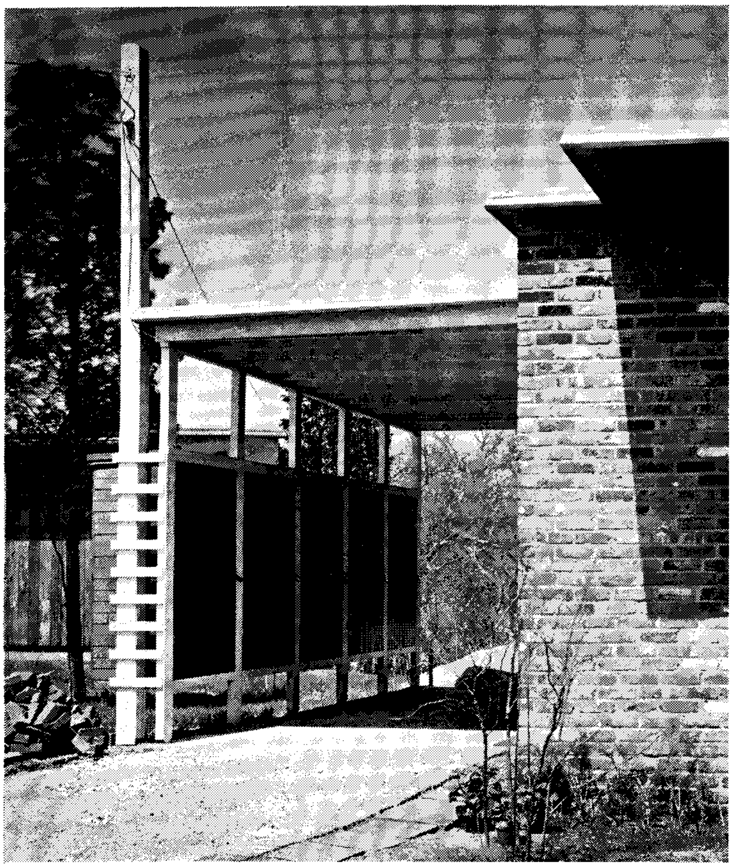
Wooden Armchair: #132/ frame of Danish beech, available in six finishes Florentine, walnut, Umbrian, Breton, mahogany, Cordovan/ spring-seat construction/ four brass balls permit inclination of back to follow position of sitter/ requires $1\frac{1}{2}$ yds. of fabric/ designed by Count Bernadotte/ **retail:** $67.50 in muslin/ **John Stuart Inc., Fourth Ave. at 32 St., New York 16, N. Y.**



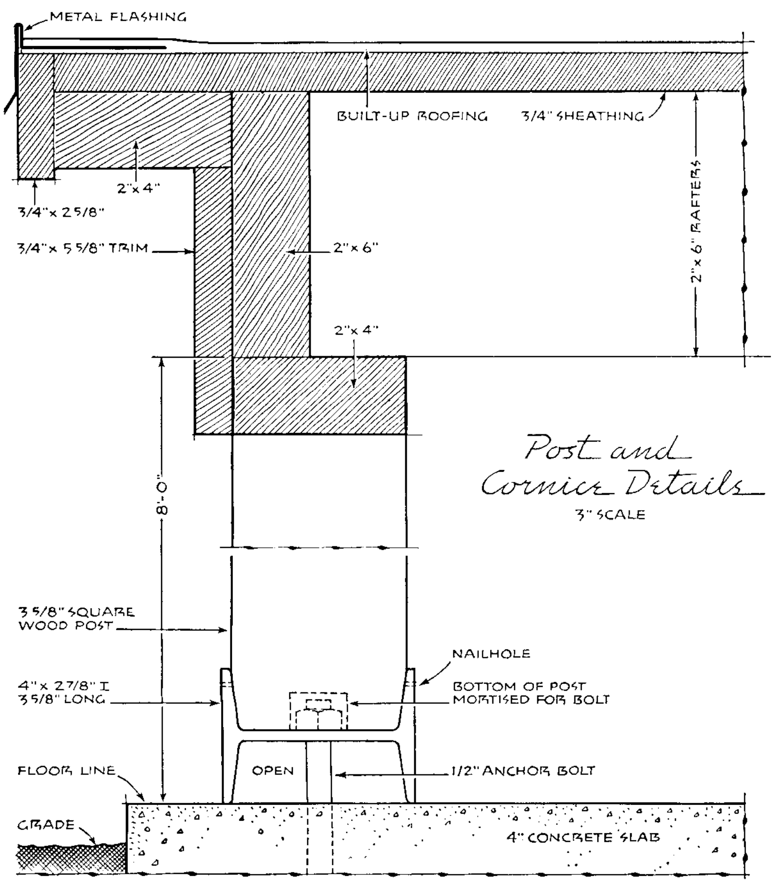
Chalk- and tack-board: "Vers-A-Tilt"/ tilted surface eliminates glare from natural or artificial light/ reduces writing fatigue/ chalk-board reverses to become a tack-board/ each unit 3 ft. long, 3 ft. 2 in. high, projection from wall, $2\frac{1}{2}$ in. at top, $12\frac{1}{2}$ in. at base/ installed by four fastenings/ chalk trough and display rail available in any length to accommodate multiple units/ unit may be shifted up or down ten inches, in multiples of one inch/ **Claridge Equipment Co., 4608 W. 20 St., Chicago 50, Ill.**


MODERN DOOR CONTROL
BY LCN
CLOSERS CONCEALED IN DOORS
HOTEL MUEHLEBACH,
KANSAS CITY, MISSOURI
LCN CATALOG 12-A ON REQUEST OR SEE SWEET'S
LCN CLOSERS, INC., PRINCETON, ILLINOIS
Neville, Sharp & Simon, Architects

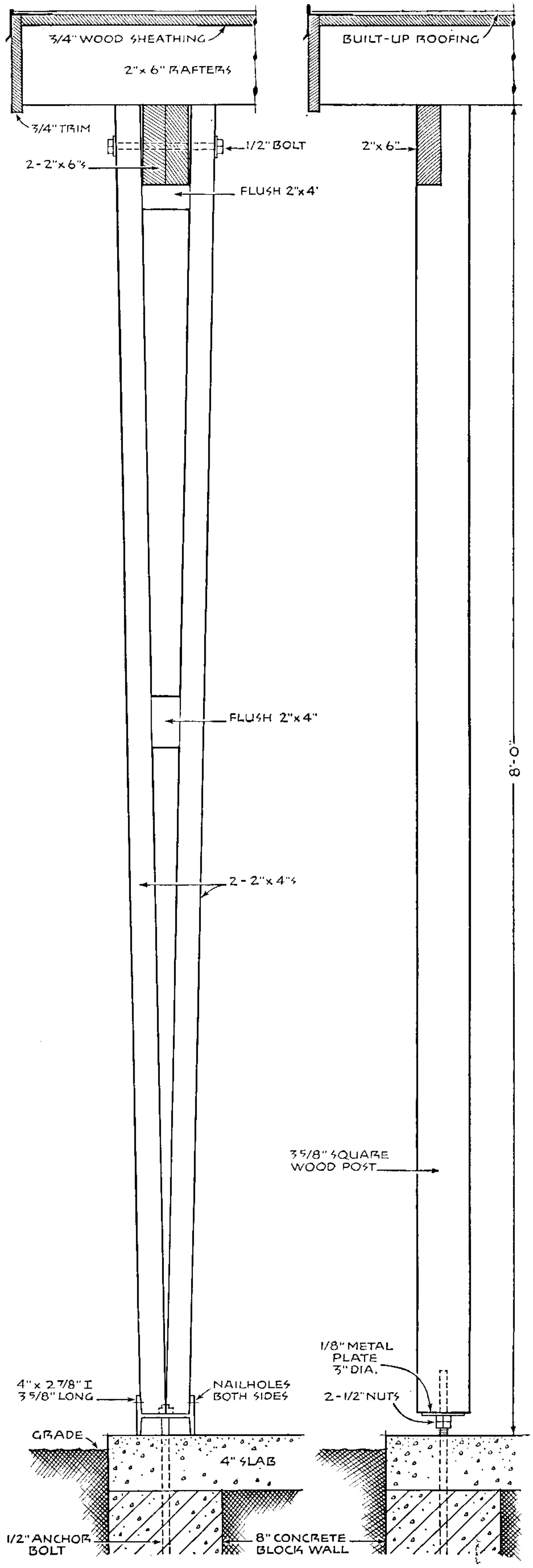
house: roof supports with variations



F. M. DEMAREST



Post and Cornice Details
3" SCALE

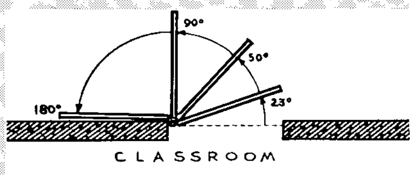


Suggested Variations 1" SCALE

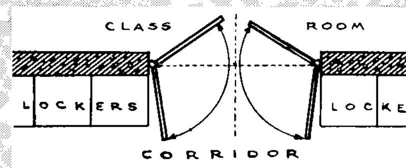
KLINE HOUSE, Massapequa, N.Y.

J. P. Trouchaud, Architect

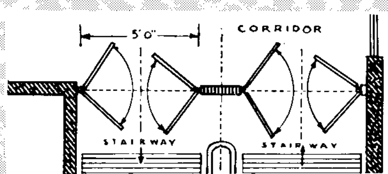
practical ideas for
SCHOOL DOOR control...



❶ RIXSON UNI-CHECK with 4 points of hold-open. A 180° hold-open built into the Uni-check plus 3 additional hold-open points in the RIXSON No. 37 Holder . . . allows teacher to set door where desired. A slight push releases hold-open. The ideal classroom door control.

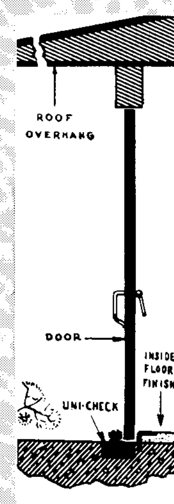


❷ RIXSON DUO-CHECK operating Double Classroom Doors swinging both ways. With half the wall thickness and locker depth adding up to 23", these doors when open 90° will extend only 5" into the corridor. Small 2'4" doors on Duo-checks panic proof for small children.



❸ RIXSON No. 30 Double Acting Closers operating doors leading into stair well. This arrangement allows a free traffic flow. Small 2'6" doors easy for small children to open.

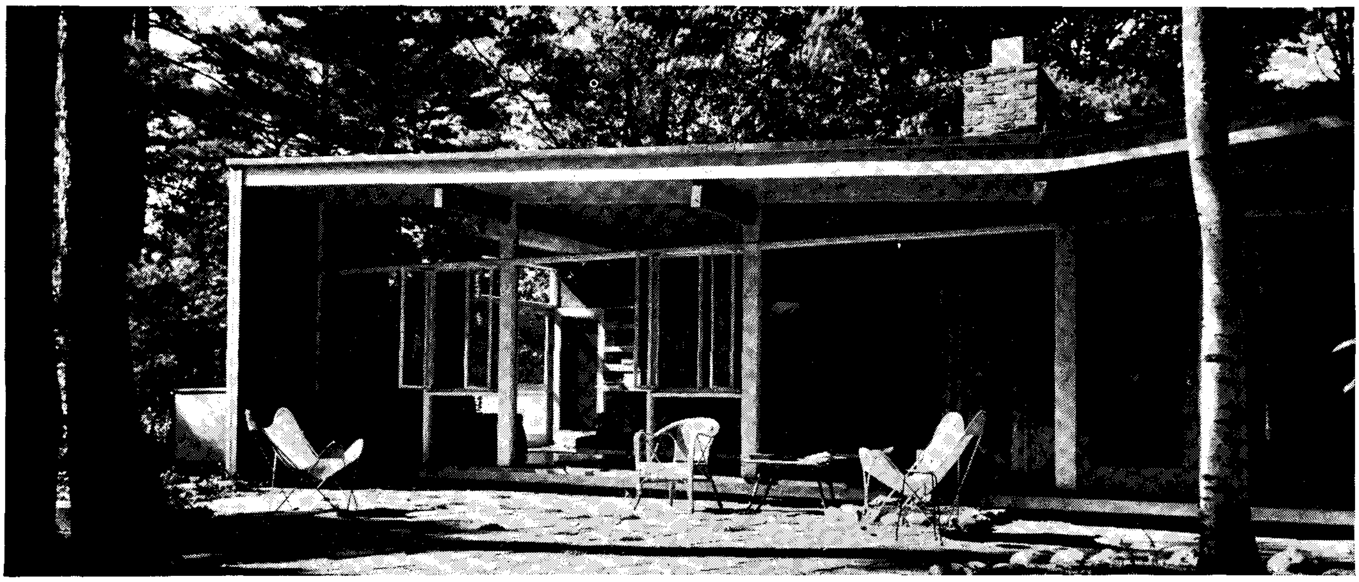
❹ RIXSON UNI-CHECK operating classroom door leading out of doors. Classroom floor is elevated two inches to prevent driving rain from entering. Uni-check is imbedded into lower level. This treatment is suitable only in warm non-freezing climates.



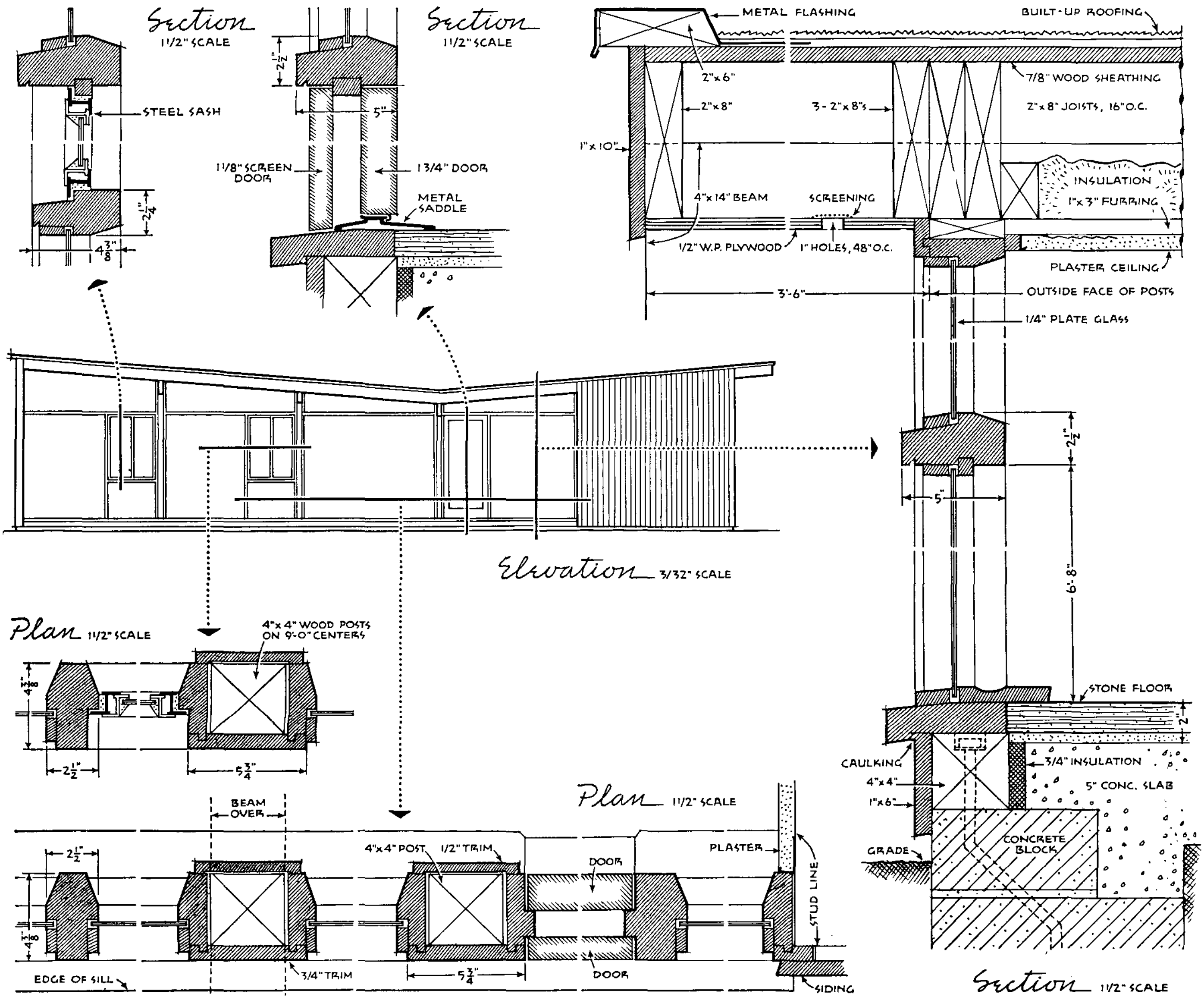
RIXSON heavy duty closers (single and double acting) have controlled the action of school entrance doors for over 40 years; lighter double and single acting RIXSON concealed, floor type closers are being used in different applications for school classroom doors, office doors, toilet room doors as well as doors leading off the corridor into stair wells. Shown above are four interesting applications . . . further details available.

THE OSCAR C. RIXSON CO.
4450 w. carroll ave. chicago 24, ill.

house: glass wall

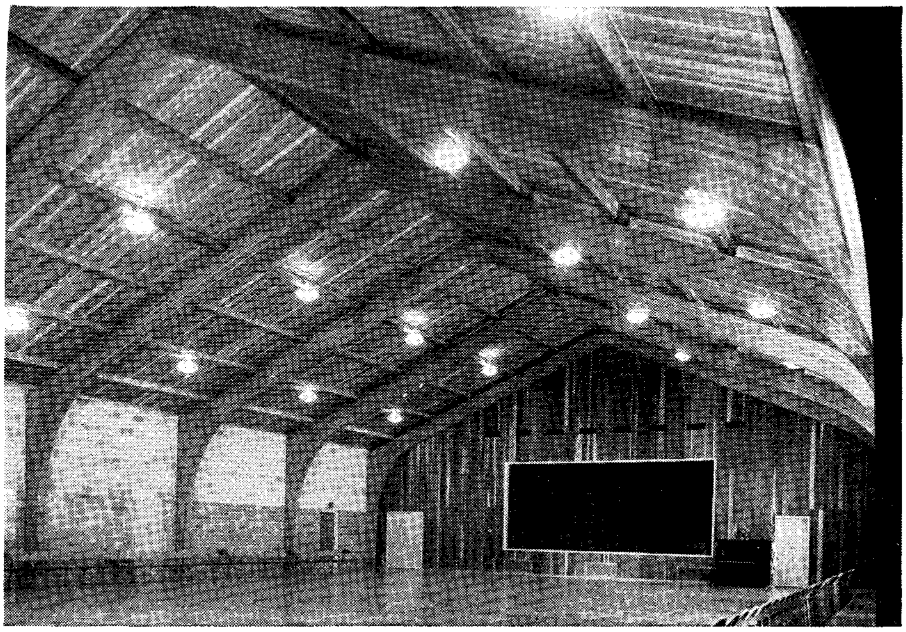


RICHARD GARRISON

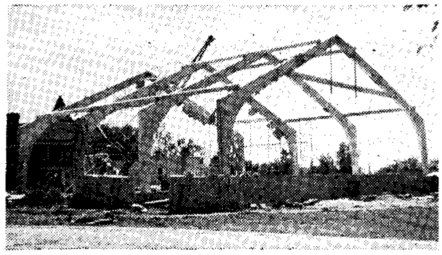


MORGAN HOUSE, Lincoln, Mass.

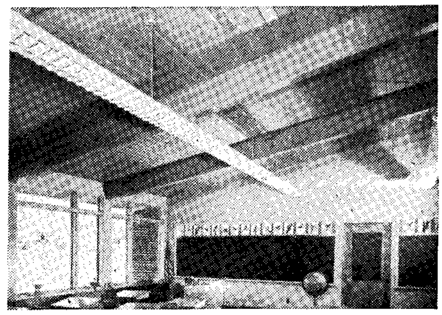
Hugh Stubbins, Jr., Architect



Because Rilco arches are factory cut and drilled for connection hardware, they can be erected quickly by the regular contractor crew, saving time and labor.



Elementary school gymnasium at Gladstone, Minnesota, designed by architects Ingemannn and Bergstedt, St. Paul.



A classroom in the Goodhue County School, at Vasa, Minnesota, designed by architects Max and Gerald Buetow, St. Paul.

LAMINATED STRUCTURAL MEMBERS

Engineered by Rilco

The luxury of wood is remarkably inexpensive with Rilco construction because erection costs are low. And the wide variety of basic shapes—plus special ones made to your specifications—permit many interesting designs for public or commercial buildings where clear span construction is desired.

These Rilco structural members are built up from selected, kiln-dried Douglas Fir laminations, bonded with the best structural glues. Each is designed for its particular job by Rilco's own engineering department.

Wood, contrary to popular belief, is a fire-resistant material. Being of relatively large cross section, laminated members are slow to burn. They do not quickly lose their strength under high temperatures and thus have definite advantages over other structural members. They are available to meet specific appearance requirements, such as architectural, industrial or structural finishes.

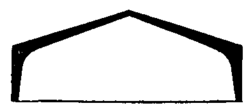
For architectural finish, they are surfaced, sanded, coated with wood sealer and wrapped to protect their smooth surface while in transit.

If you are planning a school or other large building, investigate the advantages of Rilco members—the dramatic beauty of fine wood, the strength and permanence of glued-laminated construction, and the greatly reduced labor costs. Rilco has a complete engineering staff and field representatives to give technical assistance on each job. And expanded production facilities assure prompt delivery. Write for our free catalog or, if you prefer, we'll be glad to have our experienced field representative call to discuss your requirements.

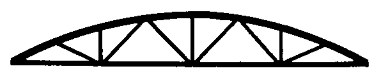
BASIC SHAPES OF RILCO GLUED-LAMINATED STRUCTURAL MEMBERS

Type 74 Radial Arches

Type D Boomerang Tangent Arches



Rilco Flat or Pitched Beams



Rilcord "62" Bowstring Truss

Type 70 Tied Arch

RILCO

Laminated **PRODUCTS, INC.**

"WORKS WONDERS WITH WOOD"

Rilco Laminated Products, Inc.
2517 First National Bank Bldg., St. Paul 1, Minn.

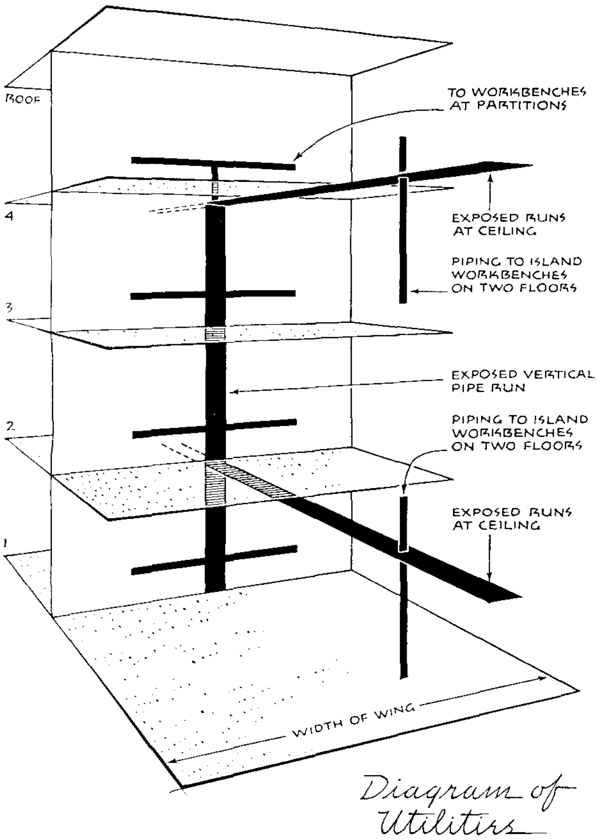
Please send me your new Commercial Catalog, containing basic design data and information on glued-laminated wood arches, trusses, and beams.

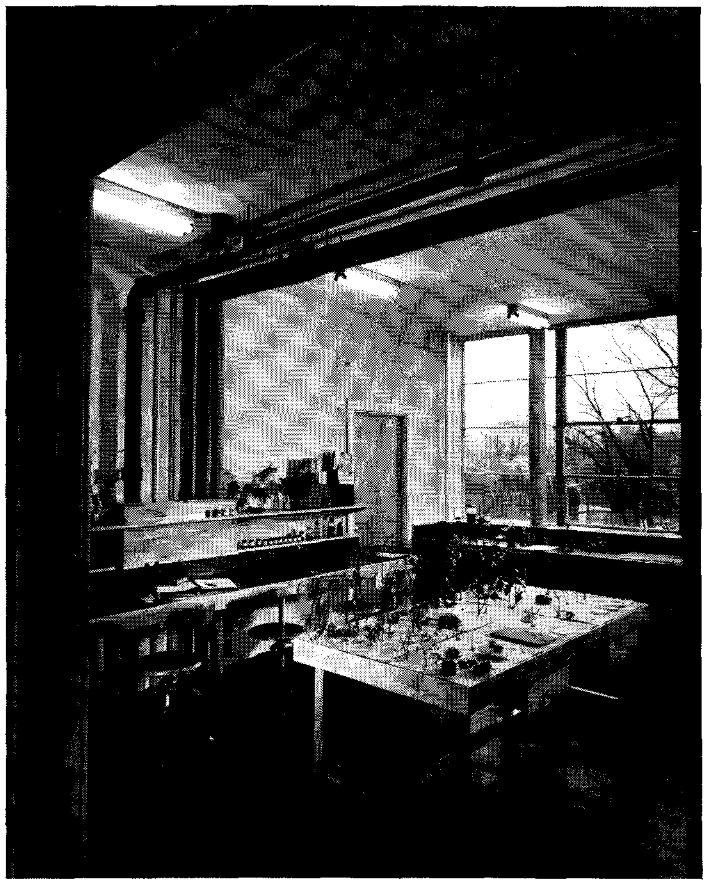
*Name*______________________________

*Address*____________________________

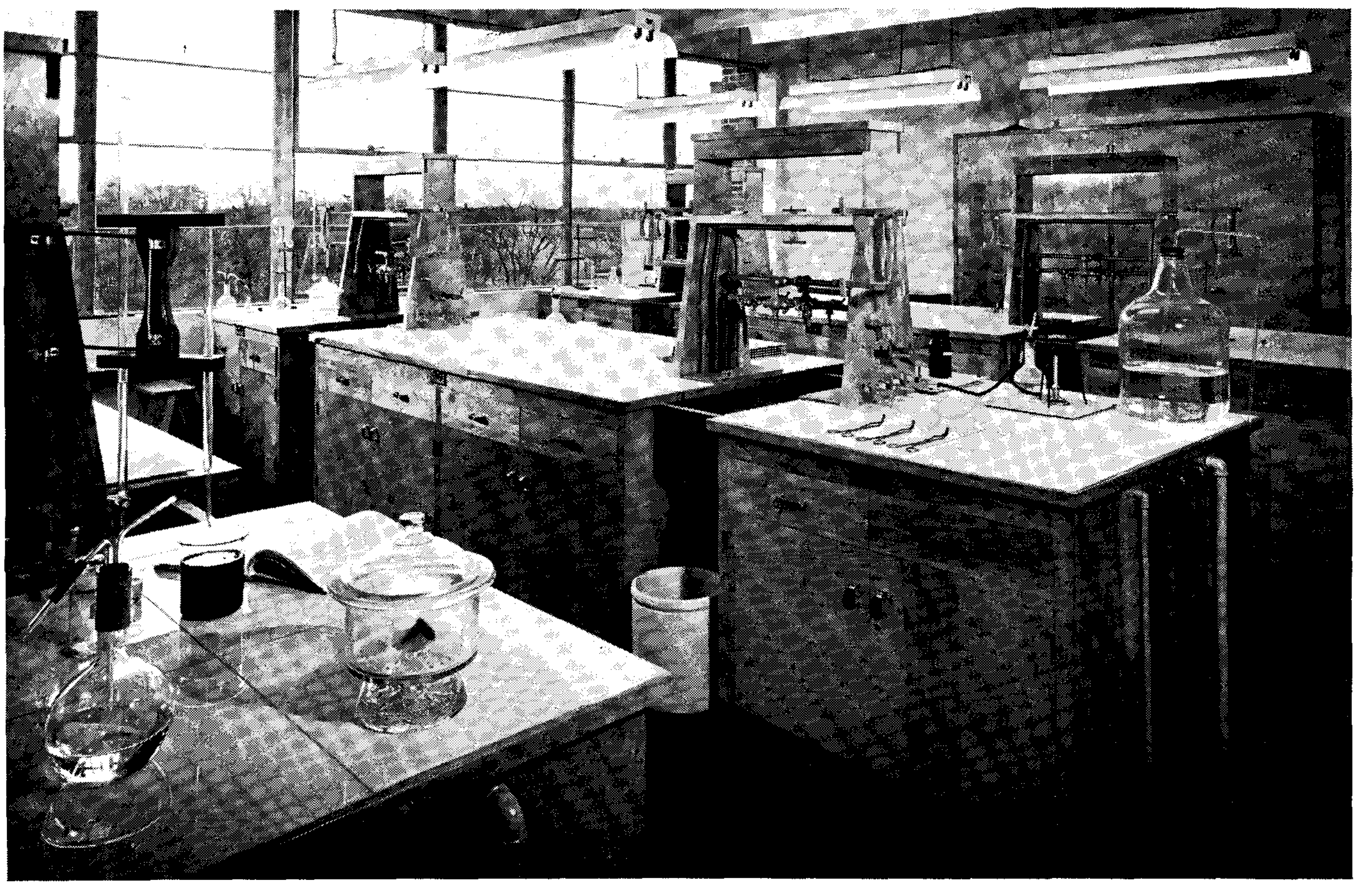
*City*____________________ *State*____________

science building: laboratory





EZRA STOLLER PHOTOS



WHEATON COLLEGE, Norton, Mass.
Caleb Hornbostel and Richard Bennett, Architects

Stairways are always safe
when the architect specifies Alundum® Aggregate.
Here is permanent safety, attractive appearance, durability
and economy. The surface is always non-slip,
wet or dry, and cannot wear smooth.

NORTON COMPANY
WORCESTER 6,
MASSACHUSETTS

NORTON FLOORS

TERRAZZO AGGREGATE • CEMENT FLOOR AGGREGATE
CERAMIC MOSAIC TILE • STAIR AND FLOOR TILE

Complete Norton Floors Catalog in your Sweet's

NORTON® *Making better products to make other products better* by Bernard Tomson

it's the law

This month's column is a continuation of the topic begun in February. Both columns supplement Tomson's Architectural and Engineering Law *(Reinhold, 1951).*

Last month's column emphasized the necessity for enforcing existing licensing laws and amendments to those laws which may be adopted. It also suggested the outline of a procedure which could be followed in New York by the profession in aid of the state authority set up to enforce the law. The column further discussed the law involved in this outlined procedure and discussed, among other things, the Court's definition of "gross negligence," "incompetency," "misconduct," and "dishonest practice."

The following cases illustrate the problem in California and Wisconsin. In considering these decisions, careful note should be taken of the summary of the Board's findings and the weight given these findings by the Court.

●

In *Coffman* v. *California State Board of Architectural Examiners, Northern California*, 19 P. 2d 1002 (1933), the Court, after reviewing the complaint, as filed, and the findings of the Board[1] found that the Board's order, temporarily suspending the architect for dishonest practice, was unsupported by the findings. The Court stated at page 1004:

"The act does not attempt to define what constitutes dishonest practice, for the very good reason, perhaps, that such dishonest practice assumes such a wide range and variety of acts and misconduct that a definition could not embrace its many forms, but for that reason the acts complained of should be found with such definiteness and certainty that the vice of the acts complained of might be apparent to all. We fail to find such definiteness and certainty in the present proceeding."

Section 101.31 (10) of the Wisconsin statute provides for the revocation of the certificate of registration of any registrant who is found guilty of . . . "(b) any gross negligence, incompetency or misconduct in the practice of architecture or of professional engineering as a registered architect or as a registered engineer."

Applying the statute in *Saunders* v. *Johnson* (1943), 243 Wis. 96, 9 N.W. 2d 630, the following summarized findings were found to warrant revocation of a certificate of registration, at page 634:

"'From the testimony in connection with Count No. 1 (Cates) the negligence and incompetence of Mr. Kuehnel is evident from the nature of the mistakes in the plans, the failure of the basement walls, the delay in the construction of the building, the failure to secure a building permit and the misplacement of the building in reference to the lot line. Further, his actions in connection with the securing of the owner's endorsement of payment on certificates after he had knowledge of the misplacement of the building is evidence of misconduct. The owners were kept in ignorance of the true state of affairs. In connection with Count No. 3 (Jensen) the negligence and incompetence of Mr. Kuehnel is again evident from the nature of the mistakes in the plans, the planning of an impractical and dangerous stairs which could not be safely installed, the improper construction of floor joists under bathroom and the lack of foundation for pantry walls.'"

I strongly recommend that enforcement activities be reviewed by each state society with the end in view of increasing the governmental appropriation for enforcement. Architects in each state should determine how their societies can actively participate in enforcement. Further, this should be a major subject of discussion at regional meetings so that action can be taken in a number of states at a time.

What was it that Benjamin Franklin said about hanging together?

[1] *"Substitutions were made in practically every phase of work on the house. The work was so slighted throughout as to cheapen the building materially. There is a question as to the actual safety of the structure.*

'The house vibrates in the wind, and the floors shake under ordinary tread. A substitution of wooden underpinnings was made in place of concrete foundation, as specified.

'The exterior woodwork and interior trim are Oregon pine, instead of redwood.

'This is warping and shrinking badly.

'2x6 floor joists were substituted for 2x8.

'With sufficient underpinning, floor girders were smaller than specified.

'Ceiling rafters are 2x4 instead of 2x6, with long spans, and are insufficient to support the ceiling. Roof rafters are light 2x4 size and surface 35" center, instead of 24 as specified.

'The sheathings under the shingles are 1x4—4½" space. This is very light.

'Local gravel was used instead of crushed rock, as specified.

'Gutters and downspouts are insufficient, and drains were not provided as specified.

'Stucco is in very bad condition, and is not weatherproof, due to the fact that it was not surfaced with two coats of Government whitewash as specified.

'The owner charges that no architectural supervision was given by Mr. Coffman, who has accepted his fee as supervising architect.

'Mr. Coffman did not give the owner a certificate of acceptance of the work of A. J. Fisher, who was legally the contractor.

'Mr. Coffman acted as contractor, throughout the erection of the building.'

As to these specifications the board made the following findings:

'(1) It is true that substitutions were made in various phases of the work on the house, which materially cheapen the building.

'(2) It is true that there is in places considerable deflection, but there is no question as to the actual safety of the structure, although there is vibration of a portion of the floors under ordinary tread.

'(3) It is true that certain substitutions were made in the underpinning of the house.

'(4) It is true that the exterior woodwork and interior trim were changed from redwood to Oregon pine. It is not tue that it is warping badly, but certain natural shrinkage is taking place.

'(5) It is true that 2"x6" floor joists were substituted for 2"x8" but with the knowledge of the complainant. However, the spans are greater than an alleged agreed limit.

'(6) It is true that the floor girders are smaller than those specified.

'(7) It is true that the ceiling 'rafters' (joists) are 2"x4" instead of 2"x6", but are at present sufficient to support the ceiling since additional trusses were found necessary and installed after acceptance of the building.

'(8) It is true that the roof rafters are 2"x4" spaced approximately at 32" centers, but the change was made with the owner's knowledge and consent.

'(9) It is true that the sheathing under the shingles and its spacing is standard for this class of work.

'(10) It is true that the river gravel was used in the concrete but this was allowed as an alternate by the specifications.

'(11) It is true that gutters and down-spouts as shown on the drawings, were omitted, but with the owner's knowledge.

'(12) It is not true that the stucco is in bad condition and it can be considered as waterproof as that specified. The surface has been given two coats of California stucco brush coat, in lieu of Government whitewash as specified.

'(13) It is not true that Mr. Coffman did not give supervising architectural service to the building. Mr. Coffman did act as architect throughout the erection of the building.

'(14) It is true that the building was accepted and the acceptance recorded.

'(15) It is not true that Mr. Coffman acted as contractor for the building but it is true that a contract was executed and carried out between the complainant and A. J. Fisher, as contractor.'

Upon these findings the board rendered the following judgment:

'1. That the defendant caused to be drawn under his direction and permitted to be signed a contract which was subject to certain prior verbal agreements which would cheapen the building below the standard set forth by the contract documents—and to the disadvantage and without the knowledge of some of the interested parties. In so doing, the defendant was derelict in his duty as an architect and he is guilty of the charge of dishonest practice."