Concrete of good appearance and other desired qualities with POZZOLITH*

In the construction of this outstanding municipal auditorium and coliseum — as with many other important projects built since 1932 — Pozzolith proved a valuable aid in improving cohesiveness and plasticity, to enhance the appearance of exposed concrete.

Beauty and utility with architectural concrete is but one of the advantages obtained with Pozzolith... key to the control of:

1. water content ... makes possible lowest water content for a given workability.
2. entrained air ... provides optimum air content without sacrificing other desired qualities.
3. rate of hardening ... provides desired handling and finishing time under widely varying job conditions.

Any one of our more than 100 seasoned fieldmen will be glad to demonstrate the full benefits of Pozzolith for your project, and to advise of the availability of Pozzolith Ready Mixed Concrete through more than 1000 qualified producers.

*POZZOLITH... compounded from exclusive technical components including Master Builders time-tested cement-dispersing agent, modifies the kinetics of the portland cement hydration process thereby improving the quality of concrete and its control.
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Members of Audit Bureau of Circulations and Associated Business Publications. ARCHITECTURAL RECORD is indexed in Art Index, Industrial Arts Index and Engineering Index.

Every effort will be made to return material submitted for possible publication (if accompanied by stamped, addressed envelope), but the editors and the corporation will not be responsible for loss or damage.

Subscription prices: Published monthly except May 1957: when semimonthly. U. S., U. S. Possessions and Canada: $5.50 per year; other Western Hemisphere countries, Spain, to those who by title are architects and engineers, $9.00 per year. Single copy price except Mid-May 1957 issue $2.00; Mid-May 1957 issue $2.95. Beyond Western Hemisphere, excluding Spain, to those who by title are architects and engineers, $9.00 per year for 12 monthly issues not including Mid-May 1957 issue. Subscriptions from all others outside U. S., U. S. Possessions and Canada for 12 monthly issues, not including Mid-May issue, $24.00 per year. Change of address: subscribers are requested to furnish both old and new addresses, sending if possible stencil impression from magazine wrapper; allow four weeks for change.
THE STATE OF ARCHITECTURE in these United States as the American Institute of Architects holds its Centennial Celebration Convention in Washington this month can almost be reported around the two photographs at the bottom of this page — the one, a grotesque and earnest effort at architectural sensitivity by the agency of the United States Government most concerned with public building, in real danger of being built; the other, a triumph of architectural sensitivity to civic aspiration, having waited ten years for realization, alive again only as a Centennial project of the Institute’s St. Louis Chapter. These, plus one recent conference on urban design, at any rate, provide clues.

JACKSON PLACE, a site on the west side of Lafayette Park in Washington, D.C., just two blocks from the White House, has been designated as the site of a new Federal office building. In a genuine desire to allay the fears of those who foresaw the destruction of a fine old area, the General Services Administration last month released the sketch at left below showing how the site might be developed with balanced treatment, low façades and preservation of historic houses of true architectural values. The building at right in the sketch is Decatur House, an existing Georgian house which was the first to rise on Jackson Place (1819); the central building — described as “a building that would harmonize with the Decatur House without detracting from the architecture of that historic building” — would be the new Federal office building; at left is “a Georgian counterpart” of Decatur House which would be built “to balance Jackson Place, contribute to the preservation of its original character and add a needed annex to Blair and Blair-Lee Houses, the block’s remaining pair of historic houses, of outstanding design, which will remain standing on Pennsylvania Avenue.” Thus GSA, in response to what it recognizes as “an architectural challenge.”

St. Louis has let ten years go by since the high excitement of the national architectural competition sponsored by the Jefferson National Memorial Association; the $40,000 first prize design by Eero Saarinen and Associates (his father submitted a separate scheme, not premiated) still exists only in drawings (rendering at right below). But the great arch was in the news again last month, with the announcement by the St. Louis Chapter of the A.I.A., as their special observance of the Institute’s Centennial, that “as our contribution to our community’s future, we have decided to concentrate our efforts on helping to gain support for the Jefferson Memorial and to solve the problems that lie between it and its realization.” The problems, of course, include both financing and civic inertia; but the hope is that with a great celebration of St. Louis’ Bicentennial coming up in 1964, enough enthusiasm may be generated to overcome even these obstacles — at any rate the Chapter intends to try. “The central river-front area,” a Chapter statement said, “is the heart of our community. To go forward with its redevelopment now, with the magnificent Saarinen arch, would symbolize throughout the nation and the world the vitality of our metropolitan center on the greatest river in the world. It would inspire and challenge our planners and builders to comparable greatness.”

THOUGH THE TOPIC was assigned to Richard Neutra — “Biological Realism” (“we must find a way to measure and prove the cost in human energy of making a left turn”) — it was Charles Abrams who supplied the realism. Harvard’s Urban Design Conference heard from this old warhorse of housing that eager and well-meaning architects should stop the there-ought-to-be-a-law cry, when they talk about implementing ideals of design. There are already too many laws, he insisted; too many things are now possible, not too few. Somebody can do too much manipulation of our city patterns, and, he said fiercely, that somebody will not be you. Architects do not know how to organize their ideas and make them realizable. They don’t know how to be expedient, to play politics, to be devious. You ask us lawyers to help you, he continued, but you don’t reduce your wants to anything we can focus and put into a bill. It is always somebody else who gets the laws passed, the regulations drawn, or realizes whatever ambitions may be involved. If his remarks may have chilled the ardor of some of his listeners, others may have recognized a clear challenge to constructive action. It was certainly made clear, throughout the conference, that things are happening in urban scenes, that current years are finally seeing tangible results of somebody’s planning. As Abrams said, at the right time you can do almost anything.
Louis Skidmore, F.A.I.A., will receive the Gold Medal of the American Institute of Architects, the Institute's highest honor, at the Centennial Convention in Washington this month. The work of Skidmore, Owings and Merrill, the firm he (with Nathaniel A. Owings and John O. Merrill) founded 20 years ago, has come since the war to be known around the architectural world, and, for foreign architects, to typify perhaps more than any other the achievements of American technology. Less universally recognized is the greater significance of S-O-M's organization as a context for the encouragement of individual talent, bulwarked but not barricaded by the solid sense of the conference.
1. The Capitol, with the McMillan commission's suggestion for a new approach from the Mall; Benjamin Henry Latrobe, architect. 2. Washington Monument, shown with McKim's scheme for a base; Robert Mills, architect. 3. Lincoln Memorial; Henry Bacon, architect. 4. Front of the White House; James Hoban, architect. 5. The Octagon House, built for John Taylor, now headquarters of the American Institute of Architects; William Thornton, architect.

ARCHITECTURE AND GOVERNMENT: THE FITFUL EVOLUTION OF WASHINGTON

Washington, D.C., ever since it was first laid out by L'Enfant, has seemed to be one city, at least, in this country where the requirements of a noble and fitting architecture have been a matter of public concern. Inevitably, also, architecture and politics became curiously involved, with the politicians, starting with Washington, keeping a close eye on the architects, and the architects likewise keeping an eye on politicians.

From the beginning, however, government architecture has for the better part been kept out of any political grabbag—virtually all of Washington's important buildings resulted from design competitions.

**The White House**

The first of the city's official buildings was the White House, for which the cornerstone was laid October 13, 1792. James Hoban apparently won the competition handily. "It was a specimen," wrote Montgomery Schuyler in April 1803, "of British Georgian, with some important cis-atlantic modifications..." Cis-atlantic modifications were only the first of a long chain of modifications wrought on the White House, starting with the British fire in 1814. Through the 19th century, the several Presidents and their wives added stained glass screens, decorated the East Room in showboat style, and employed a Pullman Car interior designer to do over the Red Room. President McKinley's plans for renovation (see page 360) were fortunately defeated by the intercession of the American Institute of Architects, and when Theodore Roosevelt succeeded to McKinley's unfinished term, he selected Charles Follin McKim to do a thorough job of redesigning the White House interiors. McKim devoted much of his personal attention to this job, succeeding so well that the public rooms of the White House look much the same now as the pictures published at the time.

**The Capitol**

The Capitol, architecturally speaking, got off to a confused start. Like the White House, the design was the result of a competition. The first prize, of $500, went to Stephen Hallet, whose design, the jury felt, was not really acceptable; they asked him to revise it, and at the same time asked William Thornton to submit a design, subsequently awarded him a $500 first prize.

(Continued on page 360)
Here's a brand-new concept in acoustical ceiling design . . . rich, distinctive fissuring on a random, textured background. It's an economical wood fiber tile styled to match the luxurious beauty of costlier materials.

The exclusive textured design now available in Cushiontone offers architects and interior designers an opportunity to specify up-to-date, high-styled ceilings in homes, offices, and commercial areas at moderate cost.

This new material is made in both tongue-and-groove and butt edge joint. It's available in 12" x 12" and 12" x 24" size and 3/16" and 5/8" thicknesses. Like the popular full random styling, Cushiontone in the textured design can be installed by cementing, stapling, or mechanical suspension.

The new Cushiontone's flame-resistant finish classifies it as a "Class C" (slow burning) tile. This finish meets the requirements of Federal Specification SS-A-118b. Repainting, when necessary, can be done by either brush or spray gun without affecting the acoustical efficiency of the material.

For more information on this decorative new ceiling material, send for the free booklet, "Armstrong Cushiontone." Write Armstrong Cork Company, 4205 Rock Street, Lancaster, Pennsylvania.
FERMI COMPETITION WON
BY REGINALD C. KNIGHT

A 36-year-old American architect, Reginald C. Knight of Coral Gables, Fla., has been selected as the winner of the Enrico Fermi Memorial International Architectural Competition. His proposal - shown in photographs at right, with the text of the jury's comments on it - was chosen for the $5000 First Award from among 355 entries from 25 countries (176 from the U. S.) by an international jury (see below) which met in Chicago late in March. The competition, sponsored by the Chicago Junior Chamber of Commerce and the Chicago Joint Committee of Italian Americans, sought an appropriate structure as a key unit in the Institutional Center of Chicago's Fort Dearborn Project (AR, May 1954, page 170-171), to be a memorial to the late great physicist.

The jury report notes that study of the entries in relation to the site model convinced them that "a relatively open plaza achieved the best general solution to the problem" and that "for this particular type of memorial the primary requirement was a strong imaginative idea rather than detailed architectural plans." Although the jury "could not find any projects sufficiently distinguished to be given the Second and Third Awards," it distributed the prize money available as follows:

Three awards of $1000 each to Peter Roesch of Hamburg, Germany; John Harold Box, James Reece Pratt and Joanne Henderson Pratt of Dallas, jointly; Huson Jackson, Costantino Vinola, Vincent J. Solomita and Joseph Zaleski of Cambridge, Mass., jointly.

Four awards of $500 each to Eberhard Ludwig, Dusseldorf, Germany; Jan Lippert, Degenhard Sommer, Karlsruhe, Germany, and Dr. Eugene Lantzi, jointly; Louis J. Johnson and Arthur S. Takeuchi, of Chicago, jointly; and Igor Z. Sazevich, David H. Larson and Enrique Garcia-Reyes of San Francisco, jointly.

DISTINGUISHED JURY looks at model of Fort Dearborn Center with First Award entry set in place. At left: Architect Ludwig Mies van der Rohe, U. S.; Engineer Pier Luigi Nervi, Italy; Physicist Lancelot Law Whyte, England; Architect Gordon Bunshaft, U. S.; John O. Merrill, F.A.I.A., professional adviser for the competition, is at Mr. Bunshaft's left. Right: Architect Jose Luis Sert, U. S.

FIRST AWARD - "The Jury was enthusiastic and unanimous in selecting this project for the First Award, their reasons being: It provided an integrated solution of the problem in relation to the entire project, in the form of an open plaza appropriately used. Moreover, in this open plaza the designer has created the brilliant conception of using sound as a unifying principle for the entire project. The instrument employed for achieving this result is a system of vertical, tubular bells which are so placed in three rows as to form a satisfactory composition defining a space and relating it to the surrounding area. In the opinion of the Jury, this has produced the most beautiful and dignified Memorial to Enrico Fermi, the scientist, particularly appropriate since it achieves a unification of Art and Science. This submission leaves the allocated site entirely open at the pedestrian level, and plans auditorium and covered exhibition space at the traffic level. The auditorium is square in shape and the exhibition space is distributed around it. The basement provides for equipment, storage and services. The main feature of this project, for which it receives the First Award, is - paraphrasing the words of the winner - that the entire design is based upon the integration of space, structure and acoustics in one total concept which will have meaning not only within the confines of the Memorial site but over the entire area. Through the controlled medium of sound, architecture will be able to reach out and touch the lives of many more people than would be possible through vision alone. The upper pedestrian plaza, surfaced with translucent white material, will glow softly at night"
Today's smartest floors wear KENTILE

This is KENTILE® vinyl asbestos tile

So much easier to care for!
So much longer-wearing!
And grease-proof, too!

KENTILE FLOORS

available in Vinyl Asbestos, Solid Vinyl, Cushion-back Vinyl, Rubber, Cork and Asphalt tile...over 150 decorator colors.

SPECIFICATIONS

SIZES AND THICKNESSES:
| Marbleized | 9”x9” | 1/16” |
| Carnival   | 9”x9” | 1/16” |
| Corktone   | 9”x9” | 1/16”, |

COLORS:
| Marbleized | 19 |
| Carnival   | 16 |
| Corktone   | 3 |

INSTALLATION:
Kentile vinyl asbestos tile (KenFlex®) may be installed over any smooth interior surface, including concrete in contact with the earth.
SPANISH ARCHITECTS WIN
$25,000 REYNOLDS AWARD

The first winner of the richest annual architectural prize in history, the $25,000 R. S. Reynolds Memorial Award, is the firm of Cesar Ortiz-Echague, Manuel Barbero y Rafael de la Joya of Madrid. Their winning entry (shown in photos here) was the Visitors and Factory Lounge Center of the S.E.A.T. automobile plant in Barcelona, completed last July. It was among 86 entries from 19 countries submitted in the annual international architectural competition instituted this year by the Reynolds Metals Company, as a tribute to its late founder, to recognize "the most significant contribution to the use of aluminum, esthetically or structurally, in the building field." In the judging, a jury appointed by the American Institute of Architects, which administers the award, decided the award "should go to a project in which aluminum had been used for structural members as well as for the enclosing and finishing elements"; nine submissions from seven countries met these conditions. Members of the jury were: George Bain Cummings of Binghamton (chairman); Willem M. Dudok of Hilversum, the Netherlands; Ludwig Mies van der Rohe of Chicago; and Edgar I. Williams of New York. George S. Koyl, F.A.I.A. was professional adviser.
This very early use of aluminum spandrels helped insure taxpayers' investment in this school. Educational institutions are now one of the biggest users of aluminum building materials.

Still modern looking and attractive after more than twenty-five years, this structure makes fine use of large aluminum window frames and pilasters. The interior applications of aluminum in main lobby are outstanding.

More than 8,000 Alcoa Aluminum Spandrels are installed on the magnificent Radio City buildings in New York. The ball-burnished finish gave a slate-gray effect at the start, and has since toned down to a darker gray, blending harmoniously with the stonework.

Despite the warm, moist air in the gardens, the all-aluminum superstructure is in excellent condition. Here is one of the earliest structural applications of aluminum. No effort has been made to maintain the surface appearance, yet even in an atmosphere trying to most metals, no corrosion problem has been experienced.

This building is considered to be the first true application of aluminum in curtain wall construction. There's no masonry surface at all above the first floor. All of the glass and metal panels are held in aluminum frames.

This majestic 16-story government building of Alcoa Architectural Blue-Finish Aluminum is highlighted with satin-finish natural aluminum windows and mullions. It is typical of the "new look" for architecture which is made possible through the use of aluminum in curtain wall construction.
ANYBODY LISTENING?

True function of everything we build must also include esthetic considerations — proportion, design and appearance. For the buildings and roads we erect are by themselves an expression of our culture. They are, whether we desire it or not, monuments by which future generations will judge us.

— Leon Chatelain, Jr. President
The American Institute of Architects

Last year Congress approved a multi-billion dollar highway improvement program which, when carried to fruition in the next 15 years, can work a profound change in this country’s landscape.

The significance for architects in this greatest public works program of all time will be determined by the extent of the interest they take in it; their opportunities will be affected during its progress by decisions governing location of city and near-city routes, width of rights-of-way, and building code changes that might be prompted by or influence redevelopment programs. These are decisions that will be made at the state level, and are being made today as the vast construction effort moves into its action phase.

Congress decreed that $27.4 billion in Federal money would be used for bearing 90 per cent of the cost of constructing the National System of Interstate and Defense Highways. Add to this an estimated $22.6 billion that Uncle Sam will pay out to the states in the same period for a 50 per cent share of the cost of laying other roads in the overall program — rural, secondary, and urban — and the full impact of the Federal government’s financial contributions emerges. If all goes as now planned, this ultimate figure, under the present law, will approximate $50 billion.

To support this largest single public works program expenditure, a taxing structure has been established which is feeding revenues into a trust fund over a specified 13-year period. The new Federal Highway Administrator, Bertram D. Tallamy, has estimated that with the final contracts let running beyond the termination of the financing program, it will take 15 or 16 years in all to construct the roads called for in the legislation.

Very obviously, major questions of city and regional planning are involved; and architects will want to be much

(Continued on page 354)

ARE ARCHITECTS LOOKING? This is the map of the National System of Interstate and Defense Highways. As a guide for development, the Bureau of Public Roads, the administering agency, has approved “Geometric Design Standards” adopted last year by the American Association of Highway Officials. Goals: safety, permanence, utility, flexibility

(More news on page 36)
Powers Recording controller regulates temperature of chilled water used for comfort air conditioning.

Below: Powers Recording controller regulates temperature of chilled water used for comfort air conditioning.

Below:

Williamsburg Inn was among the first of our country's outstanding hotels to provide guests with the comfort of modern year 'round air conditioning. Spacious guest chambers, suites and lounges have individual room thermostats which allow occupants to select the temperature desired. Primary air in ducts to each space is properly conditioned including dehumidification.

In 1907 Powers Pioneered in Hotel Air Conditioning Control in the Gold Room of Chicago's Congress Hotel. Superior performance of this control system was due to an exclusive Powers feature...gradual control of mixing dampers and valves.

Are You Planning a New Building or modernizing an old one? Ask your architect or engineer to include a Powers Quality system of temperature control. They have been time-proved dependable in thousands of prominent buildings since 1891.

(74)

POWER CONTROL helps guests enjoy modern air conditioned comfort in this famous hotel.
PLANT DESIGNED FOR AUTOMATIC CONTROL, PROTECTION AGAINST BLAST AND Fallout

An industrial plant which half buries its manufacturing facilities for protection against blast and puts its office building above them for quick access and control of highly automated processes has been designed for Canadian Pollard Bearings Company Ltd. by A. Bruce Etherington, Architect, of Oakville, Ont. The plant, to be built in stages as production requirements dictate, is already under way on a rural site two and a half miles west of the Toronto suburb of Oakville.

Glass-enclosed offices hung from the bottom of the office building will provide the visual control of production lines essential in highly automated operations. It is hoped in this plant to reduce manual labor by 50 per cent from existing plants in England by achieving a high degree of automation in the lathe, milling and tempering stages of manufacturing.

Security considerations were important because Pollard is a military supplier in wartime. Thus the decision to put the 200x200-ft manufacturing area partly below ground and surround it with concrete-stabilized earth retaining walls from three to 15 ft thick. Thus also a roof structure on the factory area which will permit installation of lead sheeting in multiple layers to a depth of 18 in., insulation estimated to provide sufficient protection from radioactive fallout on the roof until special roof sprays can wash such dust from the roof into specially planned cisterns. All of these precautions are regarded as making the factory safe against anything but a direct bomb hit.

Placement of the office building above the factory helped satisfy another of the owner's requirements—prominent visibility from the highway—and the sculptural shape of the building, a purely esthetic decision, seems likely to advertise it even more widely. Structure is reinforced concrete columns and plate slabs; curved end walls are constructed of reinforcing steel bent to contours, wired with metal lath and sprayed with gunnite to the required curvature.
Learn the **money-saving method** for better shower construction

The cross section sample being shown in the photograph above clearly and simply demonstrates why the Fiat PreCast method of shower floor construction is the answer to an age old building design problem. It takes but a few minutes to see how this one-piece floor has many, many advantages over old fashioned, built-on-the-job shower floor construction. It is immediately evident that this solid, monolithic unit does away forever with any problems of leakage. The cut-away view shows how the integral flange forms a watertight seal between the floor and shower wall material (whether tile, plaster, wallboard or structural glass). You can examine how the drain is cast permanently into the floor material and how the inclined floor and raised shoulders deflect water downwards toward the drain. You will appreciate the substantial savings of on-the-job labor and understand why the low installed cost of a PreCast Fiat Floor makes all other shower floor methods obsolete.

---

Bruce S. Bletz, V.P. of Irvin A. Bletz Organization, nationally known builders, takes 5 minutes to find out how Fiat Shower Floors make better showers possible at lower cost.
THE RECORD REPORTS: CONSTRUCTION COST INDEXES

Labor and Materials
U. S. average 1926–1929 = 100

Presented by Clyde Shute, manager, Statistical and Research Division, F. W. Dodge Corp., from data compiled by E. H. Boeckh & Assoc., Inc.

NEW YORK | ATLANTA

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Cost comparisons, as percentage differences for any particular type of construction, are possible between localities, or periods of time within the same city, by dividing the difference between the two index numbers by one of them; i.e.: index for city A = 110, index for city B = 95 (both indexes must be for the same type of construction).

Then: costs in A are approximately 16 per cent higher than in B.

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Conversely: costs in B are approximately 14 per cent lower than in A.

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Cost comparisons cannot be made between different types of construction because the index numbers for each type relate to a different U. S. average for 1926–29.

Material prices and wage rates used in the current indexes make no allowance for payments in excess of published list prices, thus indexes reflect minimum costs and not necessarily actual costs.
Completely Reversible... can be mounted on the top jamb for maximum headroom on out-swinging doors.

Installation is Quick, Easy... can be installed in less than half the time of other surface-type closers.

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beauty

Designed and styled to match today's architectural trends, Schlage door closers reflect the clean lines of modern interiors. For the first time, you can furnish your clients with the maintenance convenience and functional superiority of surface-type closers... and at the same time be assured that the appearance will complement the building design. As advanced in mechanical precision as it is in external design, the Schlage door closer provides complete control throughout the entire door swing by a full rack and pinion mechanism... teeth are pitched for greatest strength and are sufficient to permit $230^\circ$ shaft rotation. In both appearance and function, Schlage door closers meet the building requirements of contemporary architecture.

For complete information about Schlage's Modern Door Closers, write for Catalog #680-A-8.
ECONOMIC DEVELOPMENT OF THE TROPICS CREATES A NEW FRONTIER FOR ARCHITECTURAL EXPRESSION, ASPIRATIONS

As economic development uproots the ancient and primitive customs of the tropical zone, as latent resources of mind and matter are stirred with the swizzle stick of industrialization, as tribal towns and villages give way to the mass centralization of cities, as mud-and-thatch shacks are abandoned in search of a better means of shelter — then architecture will find a whole new frontier, a whole new source of inspiration, a whole new challenge to its artistic and functional aspirations.

There is much to be learned about this new frontier. There is much to be learned about the requirements, the potentialities and the psyche of this new stage for architectural pioneering if the challenge is to be met — not only met but transcended. What Le Corbusier, Jeanneret, Fry and Drew have done in Chandigarh can be nourished, multiplied (but not necessarily duplicated), and bettered throughout the width and breadth of the tropical zone; and that is a challenge mighty enough to inspire, and require, the most extensive and exhaustive research.

Two of these pioneers, Maxwell Fry and Jane Drew, have broached the total scope of this new frontier in their recently published book, *Tropical Architecture*. They have not stopped

(Continued on page 62)
MINORU YAMASAKI is one of a growing group of American architects whose work is clearly and consistently demonstrating a search for the means of achieving once again a whole architecture: an architecture rooted in the conviction that to afford man both a broad and penetrating experience of space is the ultimate concern of the architect. They seek an architecture satisfying to the man who acts and thinks and feels; which any man can enjoy at some level and some men can enjoy at many levels.

Acknowledging their debt to the rational work of our most influential pioneers they nevertheless have felt its limited sensual appeal and their own efforts have been drawn into that vacuum much as their predecessors had tried to fill the intellectual vacuum with which they had been confronted.

It is understandable that the lessons of history are being reexamined by these men. In the case of Minoru Yamasaki, India, Italy and Japan have furnished particular inspiration, of which he has written with great feeling in "Toward an Architecture for Enjoyment" (Architectural Record, August, 1955), quoted here in the margins.

In the works undertaken since his travels in those countries there are five buildings which mark especially the impressive distance he has climbed in the direction of achieving "an architecture for enjoyment." In each can be found the principal means employed in his search for a total synthesis of experience in structured space. Of particular interest are the ways in which he employs the ancient tools of silhouette, sunlight, surface and surprise.

**SILHOUETTE: through plastically developed profiles and penetrations**

The American Concrete Institute Building (above) and the Wayne University Conference Building (right) show ways in which from either inside or outside the edges of the building are seen meeting the sky in moving lines whose changes of direction develop from the basic structural organization, just as the peaked and hooded vault silhouettes of the earlier St. Louis Airport. Although these are admirable effects we were moved to ask the architect: Why is the roof structure so complicated in the small ACI building? "Normally, this structural system wouldn't be appropriate, but in view of the client's objectives, it seemed basic to show what can be done with concrete". . . With your interest in silhouette, why didn't you lead the roof valley water through a row of projecting spouts — like modern gargoyles? "As a matter of fact we do take the water down through scuppers just back of the fascia and drop it into a coarse gravel strip" . . . This kind of roof demands a very finished look. What are you applying to the concrete slab? "We're using a plastic because it's attractive, economical, and in addition has the same quality of continuity that the concrete has."
“Our architecture must ... learn new forms and new dimensions to give richness to our skyline ... bring back the pleasure and drama of silhouette against the sky”
**SUNLIGHT:** and the shadows generated by its intricate interruption

All these buildings have been designed to exist in the sun and their eaves and skylights and walls and screens (as on the Reynolds Metals Building, right center) have been calculated to admit and exclude or modulate the light in useful and stimulating ways. Granting the visual excitement of flooding the middle of the buildings with sky light we asked: *Won't these spaces get pretty hot?* "Well ... we faced that, of course. For Wayne (above and right, bottom) we had planned to use blue heat-absorbing glass as in the other three, but changed to clear glass — with client agreement — when we decided it would be more satisfying to have full sunlight and the strong patterns of frame and column shadows though it will be warmer for brief periods ... at night the whole thing reverses; shadows become light and daylight goes dark" ... For us there's strong disharmony in ACI (right, top) between the pattern of the garden wall and the lattice screen at the building's base. "We have changed that lattice (see p. 173) ... actually we're trying to express that it has no supporting function ... and we're trying to echo the diagonals of the roof too."
"We need buildings which can be flooded with the joy of bright sunlight in which the impulse is to dance"
SURFACE: richly responsive to demands of material, method and motive

Whether in metal, masonry or glass the patterns in these building surfaces are seldom arbitrary. Typical of the regard for both form and function is the screen for the Reynolds Building (above and p. 167). "It’s metal of course . . . gold anodized aluminum for Reynolds . . . short sections of tubing. But where it passes the upper part of each story we deepen the tubing sections . . . that way we cut down on direct light and glare where they’re most critical . . . of course many of these surfaces develop from the fact that in me the urge to touch buildings is strong . . . sometimes irresistible . . . I’ve often developed an arm 50 feet long so I could mentally reach and touch a building beyond a wall. When the desire to touch architecture is not there, something is wrong . . . perhaps it’s with me . . . but this is my only reservation about Corbu’s work" . . . Where are the plain surfaces — for relief? "In Wayne the end walls and floors are plain . . . some of the masonry patterns look stronger on paper than they will in space . . . but in ACI we thought of such a small building in terms of jewelry which need have no plain surfaces."
"The simple, strong forms of our architecture can gain richness in detail"

"The pleasure of shadow within shadow"

Top left, concrete grille, ACI Building; top right, sun screen, Wayne Conference Building; bottom left, floor pattern, ACI Building; middle right, perforated wall, Art School; bottom right, floor pattern, Wayne Conference Building
SURPRISE: the calculated sequence of unfolding visual experience

Surprise in any spatial sequence largely develops from unexpected change: going from light to dark to light again; from large to small to large; or high — low — high. To find daylight where it is not expected, a garden or a pool, is to find heightened pleasure. In these buildings, and particularly the Society of Arts and Crafts Building (above, right, and page 178) most of these means are employed — and most artfully. However it seemed fair to ask: All these buildings are essentially symmetrical. Doesn’t that limit your ability to surprise? “Yes ... a little. But in these instances order superseded surprise ... it seemed essential to keep the simple order which we felt was demanded and which the central axis provides ... actually the majority of our work today is not symmetrically arranged. Above all the architect has an obligation to try to create beauty; and order is a great part of this ... each building asks for its own kind of order. But other elements work to furnish surprise ... the skylights — especially in the Wayne and Reynolds buildings. You go from dark to sunlight and reach up to the sky ... you always walk toward daylight.”
"... buildings as relaxed, friendly and enjoyable places ... evidence those qualities ... which symbolize our democracy"
SYNTHESIS: space structured for experiences of enjoyment

Underlying the careful organization of silhouette, the handling of sunlight, the surfaces, and the provision for surprise is the primary sense of unity in the spaces of these buildings and in the pattern of structural elements through which it is achieved. The column plays a full role in this architecture; it is constructive and decorative. The Loudon Embassy proposal on these pages illustrates this approach to the total use of structural elements. But fascination with the decorative potential of structure can inhibit structural efficiency and we inquired about the close spacing of the columns. "Of course we liked the looks of the close spacing . . . we felt it recalled a kind of English verticality . . . we really did this because the spaces are so long in the other direction . . . 45 ft in the Embassy . . . the bays in Wayne are 40 by 10 . . . in Reynolds 25 by 15. In each case there was the matter too of the best module for the office partitions." . . . Is it a coincidence that the Embassy recalls the Doges Palace in Venice? "Not entirely . . . we wanted to combine the strength and English quality of Westminster Palace with the elegant laciness of the Doges."
"Enrichment must fit within the framework of our mechanized society"
SYNTHESIS

What role does color play in all this? “To us it’s enormously important. We think of colored surfaces in terms of how they receive daylight . . . how they contribute to the sequences of surprise . . . how they bring unity to the whole . . . and, of course, in terms of other specific functions certain surfaces may have . . . for example, in the Art School (above), light walls serve as the background for many brilliantly colored exhibits, and the dark red brick walls offer striking contrast. There is the same kind of contrast outside, with the white mullions played against the dark brick walls again . . . in Wayne (right) we tried for lightness and brightness with travertine end-walls, gray-green slate floors with some cream Mankato stone, white marble columns and corridor floors, also off-white and teakwood interior walls . . . the only strong color inside is the green marble bridge at the second floor level . . . the Reynolds building (overleaf) is gold and black and silver, with white floor and elevator shafts. The ceiling for the first floor is black with pinpoint lights; upstairs, the situation reverses, with dark floor and white ceiling.”
"... the joyousness of Renaissance architecture... the color of stone, the play of water... all contrived to make a wonderful and happy place..."
SYNTHESIS

You've said you weren't completely happy with the expression of the mullions for the ACI building (above). "Well . . . they are liable to look as though they're holding up the roof — I wish I had been able to leave them out". . . Where you run the columns above the roof in the Reynolds building (right) and the Embassy, why don't you mark their termination . . . they're no longer structural up there . . . couldn't they be more interestingly shaped? "I'm glad you asked that because you're right . . . actually, the concrete columns back of that screen will taper (through three decreasing sections) and become thin at the top — like needles" . . . Where the screen projects above the roofline, how will it look against the sky? "You won't see the sky in that perspective — you'll see the inside of the tubing" . . . Where do you go from here? "I've got a lot farther to go . . . in what direction . . . and how . . . I don't know . . . certainly since Lionel Pries first got me started on the right track at the University of Washington, these five buildings mark the most important phase in my own development" . . .
"The buildings of the future will bring more variety to our surroundings through diversity of forms against the sky, through the excitement of surprise . . . and the richness of ornament"

"I wondered if the signature of the architect, written boldly on buildings which are the effort of many, is not a kind of arrogance"
THE SHAPE OF AN ARCHITECTURE

by JOHN ELY BURCHARD

John Burchard, Dean of the School of Humanities and Social Studies, and Albert Bush-Brown, Assistant Professor of Architectural History, both at Massachusetts Institute of Technology, have been working more than a year on a social history of American Architecture commissioned by the A.I.A. The following, based on much of the content of the still incomplete manuscript, was delivered as a talk before the recent Centennial Meeting of the Minnesota Society of Architects. Now we are happy to publish it in the month of the Centennial Convention of the A.I.A.

— The Editors

What is Architecture? Certainly it does not include every building ever built. It can never really be far away from meeting the three famous old canons of Vitruvius. At least it must try to achieve firmness, commodity and delight. A failure to measure to the canons may mean bad architecture. But a building which ignores one or more of them or has no aspiration to be measured by them falls outside the scope of architectural history and criticism.

The covered wagon was never architecture, nor the sod house, nor the Chinese laundry in a Gold Rush town. The Corn Palace in Mitchell, South Dakota, is not architecture. Not very many log cabins were architecture, perhaps none, though as reconstructed some may seem to have been. We must not mix up nostalgic romance with architecture. It is one thing to play at reliving a past that never was, to trip on dainty high heels over the streets of a Williamsburg which in real life would have trapped the lipsers in gluey mud; it is permissible to attend an opera at Kota, which in real life would have trapped the lipsers in reality. The experiences have no relation to an historical thing to play at reliving a past that never was, to trip the house, nor the Chinese laundry in Gold pressed b

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tural development. The efforts have often been charming and there is nothing wrong about nostalgia and sentiment, but they are doomed by the course of American life and can be maintained only by artificial measures. To a sophisticated visitor from abroad, New York is more interesting than Boston, Los Angeles than San Francisco, and of course Chicago more interesting than all four of these ancient and delightful cities put together.

**Even After We Have Passed** the road-block of a vanishing regionalism we have to decide what we shall call American. We shall not be so foolish as to insist that the architect shall have been American-born. Shall we insist that architecture to be American must by some definition be indigenous? Are we for example to seek out for major attention only those building types which have seemed especially American in that they served needs which in America were premiated and in other countries perhaps given less attention — must we be restricted to American types like public schoolhouses, county courthouses, commercial skyscrapers, even detached dwelling houses reaching far down into the income groups? Are we going to insist that American architecture shall have been invented here, like the balloon frame; or brought to the peak here, like the skyscraper? All of these special restrictions seem to lead to an incomplete idea. The only ultimately satisfactory restriction seems to be that the buildings were built here.

In this sense the American Georgian of the time of Peter Harrison, though less polished than the corresponding Georgian of England, is quite as American as the Greek Revival mansion which had a finer development here than in Europe; and both are as American as the Prairie Style of Frank Lloyd Wright or the Chicago Style which may or may not have been invented in Chicago and revealed there in the second Leiter Building of Major Jenney. Jenney, Sullivan, Wright, are more native in their work than Latrobe, Harrison or Bulfinch, but we cannot say more American.

This kind of decision is bound to be repugnant to many people. Ever since Edward Johnson wrote his

“Wonder Working Providence,” there has been a stirring in the air of America that America was going to be different. This spirit still exists. It is complicated. It has something of the early Puritan view expressed by a New Englander a hundred years after the landing of the Pilgrims: “It’s more noble to be employed in serving and supplying the necessities of others, than merely in pleasing the fancy of any. The Plow-Man that raiseth Grain, is more serviceable to Mankind, than the Painter who draws only to please the Eye. The Carpenter who builds a good house to defend us from Wind and Weather, is more serviceable than the curious Carver, who employs his Art to please the Fancy.”* It has much of the view that the past is too much with other peoples. The voices of nationalism became more strident after the separation from England. There were cries that we must develop a national novel, a national poetry, a national dance, a national music, a national painting, a national architecture. This exhortation was more than mere chauvinism. It rested on the conviction that this boundless land, this country in which the door of opportunity was never closed, this place in which the future was always to be better than the present, this terrain with its great scale, its violent and majestic scenery and weather, must, if expression for it could but be found, produce arts which would be as different from the arts of Europe as the geography and the politics and the economic, social and technological attitudes seemed to be; that this would indeed come if only Americans would stop looking over their shoulders at Europe. However much it might be denied by the facts, the notion that the American was more inventive than the European has never died out. However often the ideas of our architecture have come from elsewhere, the desire that we shall make our own persists. It was one of the tenets of the transcendentalists from Emerson and Thoreau to Whitman and Sullivan and Wright. It was opposed by those who respected rather the genteel tradition, who argued that a frontier could not remain a frontier forever and who thought that for a start anyway America would achieve its civilization faster by noting what Europe had to offer, transferring what was appropriate to our own shores, modifying it as little as possible. Architects in the genteel tradition could be such different men as Hunt and McKim and Richardson. They could be prompted by such different aesthetic, moral and philosophical principles as those of Stanford White and Ralph Adams Cram. All of them in this definition made American architecture. Yet some seem more American than others. Richardson somehow we call more American than Hunt, McKim or Cram. Wright is more American than Pope. Why?

It is not for the simple reason that they were greater geniuses or because their forms were not repeated explicitly in Europe. If we could answer why, we would have some clue to what American architecture is. But

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* From an anonymous pamphlet of 1719 entitled *An Addition to the Melancholy Circumstances of the Province Considered*, cited by Oliver Larkin, *Life and Art in America*, Rinehart, N. Y. 1949.
we would not want the answer to force us to exclude
the work of Cram, Hunt, Walter, Upjohn, Costigan,
Shirerock, Thornton or Latrobe.

One does not usually speak of "French Architecture." There is, of course, a French spirit in architecture. One can clearly speak of French Gothic or French Renaissance or French Baroque. What this says is that the Gallic spirit took each of the forms and building types as they became important in Europe and on Gallic ground erected them in harmony with generally accepted principles and needs but with a peculiarly Gallic flavor. Sometimes the forms or the needs were found earliest in France, sometimes latest. Sometimes they were original there, as in the Norman or Burgundian Romanesque; sometimes they originated far away, as in the Renaissance forms. Some of them were doubtless more sympathetic to the French character and taste than others. Sometimes the style was carried to its apotheosis as in the great thirteenth century cathedrals of the Île de France; sometimes, though not often, the French version was the poorest. But no Frenchman would be silly enough to insist that French architecture should include only the Cathedral of Chartres and its nearby contemporaries. In the pantheon of French architecture you can find many deities. There have been several, if not so many, in the pantheon of American architecture.

American architecture had to begin with its own version of an evolving and vestigial though graceful style, the Georgian; had to try to accommodate, and on a frontier, to the intellectually sharp but aesthetically dull notions of the Enlightenment; had to indulge in its own variations of recall of work from Egypt, Greece, Rome, the Île de France, the universities of England and the Victorian experiments. Not much before 1890 could America begin to stretch its muscles to the tune of a new architectural ballet, a ballet with technological instruments, which might offer new opportunities and new problems for architecture; which if grappled with courageously might lead to the first great style since the sixteenth century. Here was perhaps the first chance for America or indeed the Western World to produce another architecture that by the test of time might expect to rank with the Greek or the Gothic in future history books.

But this opportunity was only beginning to be clear at the turn of the twentieth century. To study it is to study a style in development, to try to interpret something contemporary. To complicate the matter, the rest of the Western World was industrial, too; it had technology though it might approach it in a different way; all the inventions and all the power were not yet in America nor likely ever to be. So although America might be a greater force in the architecture that was to come than it had been in the architecture that was past, it would be unrealistic to think of this architecture as uniquely American; foolish to expect that all the best exemplars were certain to be produced in America; insane to protest against an "International Style." In all this it would be appropriate only to ask that the American version of the architecture of the technological century should be a first-class version.

Sometimes the American version would be better than that of other nations, sometimes worse; sometimes it would owe much of its basic philosophy to American invention. Such a version might have an American flavor but this would have to come naturally and not by self-conscious effort.

In shaping the building needs of the twentieth century and in providing the tools to meet those needs many forces were at work. Some were international and could be expected to affect building everywhere even if their development were more aggressive in one country than in another. Some were national and therefore likely to have mostly a local effect. The technological forces were likely to be international; some had obvious impact — the Bessemer process, the elevator, the internal combustion engine, the super highway. Some were less obvious and accepted in some places more than in others — the electric light bulb, the telephone, the typewriter, the loud speaker, the television tube. The political forces often showed up in many places, as the revolutions of 1848 did, but they were more likely to have a clearly national slant. Again, some were easy to relate to architectural developments — for example, the changing concept of America's political relations in foreign lands. Others were not at all easy to connect with palpable effects. If American relations with Japan
became more intense, for example, if young architects visited Japan, there would soon be visible evidence of the changing relation in the new buildings. But where for example was there a Populist Architecture or a Bull Moose architecture or even a radical architecture in the same sense that there was a radical novel, a radical novel which sought less to change the form of the novel than it did the form of society?

**America Passed Rapidly From The Status of a colony on the Atlantic Coast to that of a continental nation.** The main process took only about 75 years. The colony coincided with the architecture of Peter Harrison and the bland Georgian passed almost imperceptibly into the Classic Revivals of Latrobe, Strickland and Shryock. These civilized buildings got somehow over the Alleghenies and then followed the rivers towards the west, and it is amazing to see how many elegant and reposed exemplars of the Greek Revival are for example to be found in Ohio and Kentucky.

West of the Western Reserve the examples thinned out. The drive to the Pacific had a different kind of momentum, fewer people planned to stop on the way, the terrain became less and less inviting to permanent settlement. Even an important depot such as St. Joseph, the jumping-off place for the Far West, remained a frontier town and did not seek architectural stability until much later, perhaps much too much later. Even a permanent settlement like Salt Lake City was too busy expanding to do much consolidating; and here, where some efforts towards a refined architecture might have begun earlier, the Mormon temperament seemed to prefer beehives to the work of the "curious Carver." Thus when the Civil War finally broke upon the nation almost everything that could seriously be called American architecture could be found east of the Mississippi, most of it east of the Appalachians.

**The Great Acceleration of Technological change coincident with and no doubt promoted by the Civil War itself brought us new building materials, notably steel, which called for and received new architectural treatments.** The vast transportation networks that were opening up began to prepare the way for the elimination of indigenous necessities which had forced a reliance on local materials, though the final blows to regionalism were to be struck later, after electricity had made climatic control possible. The expansions made great fortunes and the men of these fortunes sought to demonstrate their success through building. The building was personal, not institutional. If the soap-maker of 1937 lived in an unidentified dwelling and praised his soap through the excitement of his urban office building, the railroad entrepreneur of the 80's made his personal palace his corporate advertisement. These personal palaces and the architects who made them would inevitably have to come into conflict with Chicago and its buildings of trade and the architects who made them. The story of this conflict has been told too many times already.

Through all this time the population was increasing enormously, becoming more homogeneous, its center of gravity moving steadily from Baltimore westward to Central Illinois. Economic circumstances were always leveling off as America moved in the direction of becoming one vast middle class. But long before all these effects had worked their full way, another set of technological stimuli appeared, more subtle, more far-reaching, harder to control. The internal combustion engine, the motor car, the concrete highway made it easier to escape the city and thus made civic design for a time seem less important. They also opened up America to every traveler as the railroads had never done, and this struck another blow at regionalism. The sunset strips that are the American versions of the Apian Way are but one of the most disagreeable byproducts of these potentially benign innovations. The automobile accelerated urban obsolescence and blight as the streetcar and subway could never have done. While the latter remained pinned to their tunnels, wires and elevated rails, the enterprises and residences which clustered near them could entertain some hopes of durability. But the bus line or the private motor vehicle could make a new route tomorrow, and each new highway not only made the old one obsolete but produced new backwaters and new main streams which in turn were doomed from the beginning to become backwaters in their turn. New cities which lacked the stabilizing force of well-developed public transportation were quite unprepared; like Los Angeles they were atomized. However charming, however exciting they might appear to a foreigner as a confirmation of what he believed America to be, they carried less of this conviction to an American. But even the old cities were eroded at their peripheries by the tide of motor cars and strangled at their centers by uncontrolled street parking, while the economics of public transit became shaky. Now great gullies were cut through the metropolis by men like Robert Moses that people might move rapidly through the city if not in it. The speed of movement found architectural design based firmly on the vision of the pedestrian, ill prepared to cope with eyes which passed at 50 or 60 miles an hour, still less well prepared for eyes that viewed it from an airplane even if such
a view was fleeting. No outstanding circulatory or aesthetic solution had by 1957 been achieved, despite the occasional and accidental beauty noted in an approach to an American city by air, especially at night. What a foresighted architect or client might have foreseen would be that the isolated building could have no meaning in the great city of tomorrow, that competition between isolated buildings could produce only self-cancellation or chaos. Even by 1957 there were few examples in America of successful larger groupings. The Detroit waterfront, the Golden Triangle of Pittsburgh, the South Side Housing of Chicago had somehow all seemed to miss the architectural boat while combinations like that of Rockefeller Center in New York were still few and far between. Of the incipient projects like that of the Boston and Albany yards in Boston or the Near North Side in Chicago, many seemed to have lost their stature between the first exciting proposals and what emerged from other and usually different architects' boards. If there were to be success with the cityscape it would have to be tomorrow—and if the tomorrow were to be too far away, there might be no tomorrow for the American city at all.

Elevators, steel, automobiles, electricity were all needed to make the skyscraper possible. But they did not make it inevitable or desirable. That required the vaulting and competitive ambitions of men. Here let us speak, though, of a more subtle technological influence implicit in the invention of the electric light bulb. The bulb ultimately made the city a 24-hour proposition. It changed the time sense of Americans and removed the limitations of a life lived from sunrise to sunset. It also stole away some of the compensations of such a life. It changed the time sense of Americans and the space sense and the color sense. It enlarged their fear of the dark. One way to destroy this fear was to destroy the night. When this happened the visual city became two cities, a city of day and a city of night. The architectural problem was of course not the same but it was seldom even recognized. Buildings continued to be designed for day. Most often the illumination tried to reproduce the sun, missing the shifting shadows implicit in the solar progress across the heavens, and this gave us the artificially floodlighted building, more like the ornament of a wedding cake than like architecture. At odds with this stood internal illumination which when allowed to show through in an otherwise dark street transferred the voids of a building to solids, and vice versa. Here a stairwell might become the main accent of a building at night while absent at day; here internal wall colors might lend accents to the building in the dark which were entirely missed in the light, an interior sculpture asserting dominance. Yet it appeared that most such effects were accidental. Again there were the colored signs which provided the blazing and beautifully vulgar stridency of Broadway and 45th Street or the serene and equally accidental repose of a frugally lighted Charles River in Boston.

But the potentials of all this light in dark, of color, even of the possibilities of moving light and moving color had not been exploited with any conscious vigor and had also not met many happy accidents. One could not say of many American buildings of 1957 as one might of the Manufacturers' Trust in New York that their architecture was even well aware of the electric light bulb, much less the neon tube.

With these technological pressures at work there was also the move away from isolationism and towards an understanding that, for good or ill, America had to be part of a larger scene. This move was by no means steadily forward, but the trend was clear. This development was almost certainly one of the most significant in American architectural history. She had become an exporter more than an importer of architecture. French students studied architecture in America, not the other way around as had so long been the case.

But one other trend could not be ignored, either, much as it was intuitively rejected. America was becoming more and more collective. Collectivism was not in America a matter merely of a socialistic distribution of economic goods, which was not approved in public by very many people. It meant rather the extent to which a group effort or decision was needed for any accomplishment. Every sign of America for the last 25 years had been that the group effort was steadily becoming more dominant. You might love it or you might hate it, but you could not deny it. You could speak against it and run campaigns against it and be elected on a platform which preached against it, but it went on just the same. The President of the United States was the chairman of a committee, in
That all this was nonsense, that great architecture must somehow effect this combination of all the visual arts, perhaps even mobile visual arts not yet considered appropriate for buildings or for architecture. Yet the road to such a collaboration seemed more tangled in 1957 than it might have when Latrobe substituted the tobacco leaf for the acanthus in the column capitals for the Hall of Representatives in the United States Capitol, or when McKim commissioned the murals for the Boston Public Library by Sargent, Abbey and the more durable Puvis de Chavannes, or when Magonigle and Goodhue worked so hard at the collaboration with Lee Lawrie on an architectonic sculpture such as was so evident on buildings like the Nebraska State Capitol at Lincoln. For as the sculptor or painter had advanced or retreated into personal idiosyncrasy so the architect had retreated or advanced into the state of being a cooperative social animal. You could make your own choice as to which was happier. As to what this might say of the future of American architecture, there could be no such choice. Breakers were ahead.

It is not impossible that what emerged from Chicago as the most important element of American architectural history was not the Transportation Building or the Meyer-Schlesenger store at all but the principle of coordination which began to be understood by Burnham then and more fully later as he moved on to be the planner of large cities, and was intuitively accepted anyway by such men as Adler when they conceived the Chicago Auditorium. These were the men who cast the shadow of things that had to come, Burnham and Adler, not Sullivan and Root, although Burnham and Adler too were incomplete men and their own designs were never gracious once their talented partnerships had been severed.

The taste-makers had been guilty too of a kind of indifference to matters of economy and even of use. It was common for librarians to say of architects like McKim that the architect was the librarian’s enemy, while forgetting that others said of them that the librarian was the reader’s enemy. Again it was the man like Adler who accepted a responsibility to the user of the building; and from his line came other and always larger coordinators, born in America usually, or like Adler and Kahn early comers, trained in America, unoffended by industrial America but not romantic about it either as some unindustrial Europeans of the twentieth century were to be, men in the American stream of Richard Shreve, Albert Kahn, Louis Skidmore.

The single building, the single site, the operation which could all be conceived by one man shrank away but not without pain, and not ever completely. But the momentum of the country was bound to demand more and larger projects and the alternative would be weak and diffused collaborations between many artist-architects controlled by well meaning but not very understanding clients, or the collection of more and more skills and some kind of effective combination, presumably in a mammoth firm whether of a transitory or a
permanent form. The decision would not be an easy one for it was no secret to America that the great coordinating firms had not often achieved great architecture. Kahn's factories which he did not regard as architecture had elegance; his libraries which he did regard as architecture were feeble or worse. Burnham made fine plans but few fine buildings after John Root died. Shreve's Empire State Building was a phenomenon of the steady and remarkably fast flow of materials from all points of the globe to the top of the highest edifice in the world, but though the edifice was the highest it was scarcely one of the finest. In this welter of big projects of the 30's and early 40's only the phantom figure of Raymond Hood seems to have shown a steady artistic progression from the tentative and backward-looking Gothic Chicago Tribune Tower through the ever simpler and more powerful massings of the McGraw-Hill and the Daily News buildings to the triumph of Rockefeller Center. Across this evolutionary road to coordinated architecture stood warning signs to say that more interesting, more imaginative, more varied, more beautiful and probably even more commodious suggestions were being made in some of the side alleys and that one should not walk off from the traveler the lanes where a Wright, a Mies or a Saarinen walked. Out of this was developing though a legend or a myth that the big coordinating office could never accomplish "great" architecture. But this had to be coupled with the warning to the architect who purposefully kept his office small and yet wanted to take on big work that he was kidding himself, that he could be spread too thin between the Gold Coast, Hong Kong, Fargo, North Dakota, and his home town of San Francisco or Boston or Chicago, and that when spread thin the advantages he might have held over the architect coordinator would have been dissipated.

Few if any of the brilliant and small offices were prepared in 1957 to accept minor roles and many of the talented were having perforce to become coordinators themselves. In entering these lists they often found themselves losing the gage not to the coordinators whom they had scolded but to big sales organizations with little aesthetic concern or conscience, the "Madison Avenue boys" of architecture. Meanwhile some of the large offices such as that of Skidmore were trying all the experiments they could to divide the tasks into parts of human scale, to let the individually talented man in their employ design a building that would have some of his character and not merely be the reflection of a Skidmore, Owings and Merrill style, wherever that style might have originated. Whether they were succeeding as well as this as they thought was a verdict that could not be rendered in 1957. It had to wait for more buildings. Whether the small office could survive while doing big building, whether the large office could encourage genius and innovation in its organization, whether both would lose the game to the advertising world with all that would signify, could not be foreseen in 1957. But it too would have a great deal to say about the future of American architecture in the second half of the twentieth century.

Whether Americans could forego the self-conscious seeking for a national architecture and achieve it by the simple process of making good architecture in their own place and for their own time; whether they could accommodate their cities and their architecture to the automobile and the airplane; whether they could learn to exploit the aesthetic potentials of the electric light; whether they could accomplish an "operatic" architecture which would at once and in a unified way use the talents of architect, painter, sculptor and even some newer kinds of artists and craftsmen; whether they could solve the problem of collectivism as it bore on the organization and the practice of architecture — these were questions which architects might think about as they went their way in the right way there might yet be an American architecture, or an American version of a world architecture, which could stand in the great halls of architectural history as a peer with the architecture of Athens or Byzantium or the heart of Europe; if they were not, the palm that seemed inevitably to be awaiting the architecture of the automatic age would be awarded elsewhere. To the question of which, an American watching the contemporary scene might express a tentative but hopeful, "Yes, it will be made in America."
Above, left to right: Transportation Building; Sheraton Hotel; Suburban Station, P.R.R.; No. 2 Penn Center. Below, Penn Center area in relation to established Philadelphia landmarks.

TRANSPORTATION BUILDING AND CONCOURSE

Penn Center has been in truth a joint undertaking requiring many talents: the businessman’s, the politician’s; the realtor’s, the building operator’s; the bureaucratic’s and the technician’s; the financier’s, the builder’s, the owner’s; the man-of-vision’s, the specialist’s and, key to all, the architect’s. To the Pennsylvania Railroad acting through its president, James M. Symes and other officers, goes credit for making the huge undertaking possible. The City Planning Commission has been involved, and so has the Advisory Board consisting of Architect George Howe (succeeded upon his death by Vincent Kling), Robert Dowling and Edmund Bacon (executive director, Philadelphia City Planning Commission). Eight Philadelphia banks, the Penn Mutual Life Insurance Co. and 25 lawyers participated in the 45 separate transactions required before McCloskey & Co., owner-builder, could erect the Transportation Building. One architect’s vision, design enthusiasm and continued devotion are evident at every stage of the Center’s history, though many architects contributed.
TRANSPORTATION BUILDING AND CONCOURSE, PENN CENTER
Penn Center is an idea, born in the decision of the Pennsylvania Railroad to remove its "Chinese Wall," which had for so long hindered mid-Philadelphia development, and the Broad St. Station. The underlying motive was economic. The decision offered many possibilities. There was at one time fear that the land thus freed might become a patchwork of small, speculatively developed parcels. This might have been a means to great immediate profit, but the railroad — quite frankly after prodding by many of those named on the preceding page; yet this second momentous decision was in truth the railroad's and so the credit is theirs — decided to make it an open, unified commercial development, to limit ground coverage to 50 per cent, and to construct the underground concourse as a shopping esplanade, open to the sky at frequent intervals, and connecting the above-ground buildings, Pennsylvania Suburban Station, two subways and eventually the Greyhound Bus Terminal and a parking garage. The first building, 2 Penn Center, was built for Uris Brothers who hardly believed the Concourse dream would come true and so declined at first to consider worthwhile the extra cost of full connection to it. The most recent, the Transportation Building (plans at right), ties Penn Center together and gives it reality.
TRANSPORTATION BUILDING, PENN CENTER

Early in 1950 the architect who was later to design the Transportation Building was invited to serve as consulting architect for Penn Center development by the Philadelphia City Planning Commission; his association with the entire Center since has been continuous. Although the buildings now rising in the Center do not conform exactly to concepts then initiated, the main theses (minimum ground coverage, pleasant pedestrian circulation, separate underground vehicular access, penetration of the ground plane by courtyards open to the lower concourse level) have been realized. Among the important services rendered by Kling were:

1) Preparation of a master plan for Penn Center.
2) Coordination of the re-routing of utilities in order to accommodate the underground pedestrian concourse (a new 60 in. sanitary sewer in the middle of the area, rehandling of the telephone lines, relocation of the city's major steam company line, the usual problems with water, electricity, and clearances for the Market Street Subway and underground track system of the Pennsylvania Railroad.
3) Coordination of the relationships with concurrent building projects.
4) Exploration of the financial and functional feasibility of the areas composing the four-block lower-level commercial concourse, and the complex coordination of accesses to street level and public transportation system.
5) Design of the concourse and planning of construction in such a manner that presently undetermined superstructures might rise in harmony with the master plan.
6) Assistance in the preparation of the cost-income studies for the Transportation Center itself (including a 1000-car parking garage, Greyhound bus terminal, commercial space and an 18-story office building served by underground truck loop). Studies of construction costs and rental income had to be concluded before a client, The Pennsylvania Tower Building Corporation, and the proprietary construction company could arrange financing with the various Philadelphia banks.
7) Preparation of plans and models in greater detail for specific tenants in the Transportation Center in order to assist in renting space.
8) Coordination and review of commercial areas designed by other architects for tenants in Transportation Center.
9) Detailing tenant changes, including division of space, interior finishes, furniture and decorating scheme.
10) Developing, with various city departments, the complex underground fueling and maintenance section for the Greyhound

Facing page: tree-planted court from Greyhound waiting room, Sheraton Hotel at rear, parking garage at left, Transportation Building lower at right. This page, top to bottom: typical large office, first floor elevator lobby, court, bus waiting room, bus loading concourse.
Bus Terminal, where for the first time buses can be fueled, repaired, washed and serviced in the same area with passenger loading facilities. This required an automatic-fire-fighting system as well as two 30,000-gallon gasoline tanks and a 10,000-gallon tank of oil buried below the floor.

11) Commissioning design of a 10 ft by 70 ft sculptured screen in the main lobby of the Transportation Building designed by Ellsworth Kelly.

12) Design and supervision of paving of reflecting pool, tree-wells, stairways and several courtyards which compose the esplanade and knit the entire Penn Center project together.

13) Design of all commercial signs throughout the Transportation Center Project. This was done with the approval of the Art Jury headed by Roy Larsen, Architect, which is charged with aesthetic control of structures planned for the Parkway area.

14) Service, with Robert Dowling (City Investment Trust Company, New York) and Edmund Bacon (Executive Director, City Planning Commission), on the Penn Center Advisory Committee, created to advise the Pennsylvania Railroad on projects proposed for Penn Center.

15) Design of the access stairways, ventilating system and physical structures that comprise the underground street system used by trucks in the east-west loop and by pedestrians below north-south streets.

16) Schooling of building maintenance personnel, engineering staff and real estate managerial staff in the operation of complex mechanical and electrical systems in the Transportation Center.

Amid today’s thin-skinned office towers, the Transportation Building’s solid limestone may seem old-fashioned. Many remarks have already been passed, probably with some justification; and this is an instance of design for acceptance by a large, diversified group, which always entails compromise. But consider: the Transportation Tower deliberately straddles the axis of the Center to permit vision through and thus create an openness exactly opposite to the character of the “Chinese Wall” which the Center replaces. In Philadelphia, curtain walls still require masonry backing; what should one think of the apparent thin skin of the Uris Building? The Transportation Building’s exposures to sun made heating and cooling costs heavy whereas pierced masonry walls lowered air conditioning costs; and against its conservative concentration on the juxtaposition of solid building masses — somehow in keeping with the multi-level, three-dimensional design of the whole Center — the gayety of the Sheraton almost verges on the gaudy. There may have been pressures on the architect, but he has managed to preserve his original theme.

Greyhound Bus Terminal: top bus sign indicates character of signs throughout Penn Center, all designed by Kling’s office; waiting room from office building lobby; bus passenger concourse; loading docks
Imaginatively conceived and skillfully executed, this small weekend cabin expresses its function with a directness not often achieved. Its roofline, openness and simplicity of plan are all reminiscent of the familiar camp tent—deliberately so, no doubt, since the design goal was an easily maintained base for hunting, fishing and hiking trips. Everything possible was done to minimize housework: floor area was cut to the bone, materials and colors were selected for durability and quick cleaning, and a special "clean-up room" was built adjacent to terrace and swimming area.
Site is in Kittitas Valley, a flat grazing land, hot and dry in summer and cold (20 to 30 degrees below zero) in winter. A mountain stream nearby was diverted and dammed to create a pond large enough for swimming; stepping stones connect house with island and the narrow creek beyond it.
THE THIRY "CABIN" is actually three separate structures: a tiny 16- by 24-ft main house consisting of a central living-kitchen area with adjacent shower and dressing alcove and a balcony bedroom for the parents; a much smaller bunk-house for the two sons; and a pumphouse which contains, in addition to the water tank, a work bench and storage space for tools and foods. The main house is so placed on the site that it is open to the breeze on the sunny side and closed in on the shady side; it overlooks a fine view of fields and distant snow-capped mountains.
Small dimensions of main house are extended visually by all-glass wall on view side and actually by flush terrace which more than doubles living area. Partitioning is limited to the essentials: enclosures for shower and toilet, and a dressing room which is only partly enclosed.
The emphasis on minimum housework has one interesting sidelight: there are no closets in the house “to hold dirt, spiders or bugs, or to get musty when the house is vacant,” as the architect puts it; the family dresses at home. Flooring is easily washed ceramic tile in yellowish color which is slow to show dirt; cabinets are all wall-hung to simplify sweeping. Walls are wood or tile, ceilings are wood. The boys’ cabin has a plastic roof (it is in shadow until after eight o’clock in the morning).
Construction is wood frame on concrete slab; exterior walls are wood and fieldstone, roofing is asbestos shingles. Kitchen is fully equipped, even to an electric dishwasher. Heating is electric radiant.
ONE HUNDRED YEARS OF SIGNIFICANT BUILDING

12. IN SUMMARY

by EDGAR KAUFMANN

WHEN THE AMERICAN INSTITUTE OF ARCHITECTS was founded one hundred years ago, what significant buildings were in construction? Three examples can be cited. At Broadway and Broome Street in New York City rises the Haughwout Building (Figure 1) built in 1857 by J. P. Gaynor, using standardized elements from the American Iron Works. It has long been recognized as a classic of its kind and an early instance of the use of passenger elevators. Its daring, practical structure is clearly expressed in forms borrowed from the Venetian Renaissance, yet its function, structure, and forms are knit into an impressive unity. The Haughwout lifted a novel, modular building technique to brilliant accomplishment. Just as rational and eloquent is the Hamilton Hoppin house (Figure 2) at Newport, by Richard Upjohn, a founder of the A.I.A. Its wood forms speak for themselves; its influence on American home design can be seen in much work of subsequent decades, as Vincent Scully demonstrated. Even so late as the 'nineties a family resemblance can be traced between the Hoppin house and Frank Lloyd Wright's Harlan house (the very building that caused the break between Wright and Sullivan). The year 1857 also produced, in contrast to these progressive works, the last, most monumental and dreamlike of all classicizing Southern mansions, Belle Grove (Figure 3), built in stucco by Henry Howard at White Castle, Louisiana.

These three buildings stand at the beginning of American professional architecture, promising an inheritance of artistic talent, nostalgia, inventiveness, and common sense. Here at the start are indicated two great areas of activity — homes and business buildings — that have come to include much of our best architecture; here are the two structural materials we have developed most fully, metal and wood; and here is the building germ that promises to dominate the next hundred years — prefabricated standardized architectural components. Neither the present nor the future of American architecture can be well understood without appreciating these roots in the past.

In this sense the panel's choices, published over the last eleven months in Architectural Record, highlight disturbingly spotty aspects of our understanding of the past. If the original buildings that have given form to
our world are not to vanish, all of them, into legend — as many too many have already — the architectural profession will need to alert the rest of the community and many of its own members to the values of these structures, values that have enabled our country’s worldwide acceptance as a center of cultural achievement. The Record, searching for fifty buildings, asked fifty panel members to name “about twenty buildings in existence today.” Now that the results have been published, this panel member for one believes a century of American architecture is inadequately outlined in fifty examples. The editor has generously allotted these closing pages to some amplification and certain general remarks. For example, are those buildings we have torn down ipse facto of minor interest? Is Richardson’s Marshall Field Wholesale Store, 1887–1930 (Figure 4), insignificant? Indeed, what building has exerted more influence on our architecture, what one can we look at with more certainty that ours is not only a vital architecture but one that has achieved its perfections along the way? Is Wright’s Larkin Building, 1904–1950 (Figure 5), that compendium of well-documented “firsts,” to be forgot now, when only a generation since it was one of the chief works of modern architecture anywhere in the world? Destroyed by fire, not by the hand of man, isn’t Maybeck’s Hearst Hall at Berkeley, 1900–1922 (Figure 6), more curiously prophetic than his extant buildings? And if Sullivan is to be praised for the architecture of Carson, Pirie, Scott’s store (Figure 7), that end is properly served by showing its original top, a termination as beautiful and inventive as any other part of this uniquely integrated, sensitive design. If American architecture is to have a living tradition, we must not only study the past, we must cherish it openly. But we must acknowledge that the publication of buildings gone and done for, and of buildings in their pristine state, will stir students and leave city fathers utterly uninterested. The task of preserving what is still extant has been eased notably by the publication of this series of articles: in city after city the local press has drawn attention to the acclaim some familiar landmark has won in the Architectural Record poll, weaving the building more securely into the fabric of local pride — the only protection available against cupidity and decay. What extant buildings of the past hundred years, then, may be distinguished as significant architectural accomplishments, beyond those already published in the series?

H. H. Richardson was one of the first Americans to receive the flattery of imitation in Europe, even as he was one of the first American students at the Beaux-Arts. Richardson is represented in the panel’s choices by Trinity Church, a prominently located but less than creative work, and by the Allegheny County Buildings, where his best efforts, in the courtyard, are rarely photographed. But Richardson gave us both the Stoughton house in Cambridge, 1882 (Figure 8), which H.-R. Hitchcock understandably
has called "perhaps, the best suburban wooden house in America," and
Sever Hall at Harvard, 1878 (Figure 9), which the same biographer has
called "an almost unique masterpiece of the incredibly difficult art of build-
ing in harmony with fine work of the past and yet creating a new style for
a new day" — a problem tackled recently by several younger U. S. architects.
Sever Hall is also one of the rare American buildings where brick is archi-
tecturally mastered.

From Richardson it is natural to turn to Sullivan, for the Field Building
is often given as the stylistic parent of Adler and Sullivan’s much-imitated
Auditorium Building, 1887 (Figure 10), Chicago’s bid to outdo the Metropo-
litan Opera in New York. But inspection of both illustrations will convince
a candid eye that here a younger architect has adopted the scheme of an
earlier building with the same relationship maintained as between, say, a
sonnet by Milton and one by Meredith: the common scheme yields basically
different results for each man. And indeed it was not until late in his career,
long after worldly success had left him, that Sullivan produced those now
unappreciated masterpieces that really challenge Richardson’s greatness,
like the National Farmers’ Bank of 1907 at Owatonna, Minnesota (Figure
11), currently being remodelled inside by H. H. Harris.

Chicago after the Fire had more to its credit than buildings by Richardson
and Sullivan; it resumed the general search for proper structure and form
of business buildings on narrow, downtown lots which had been begun a
generation earlier in Philadelphia and New York, as Winston Weisman of
Pennsylvania State University has shown. If the frames of modern building
are eloquently displayed in those Sullivan designs that give him fame today
(Architectural Record, June, 1956), a curtain wall largely of glass, hanging
free of the building’s vertical supports, was displayed with parallel virtuo-
osity on Burnham and Root’s Reliance Building, 1890, 1895 (Figure 12), a real
victory of Chicago construction and ingenuity, pointing to much done
since and still today.

In the Midwest also, the Richardsonian excursion into a native form of
domestic architecture was to find its best successors after the turn of the
century. But earlier, back East in 1887, only two years after their Villard
houses (Architectural Record, October, 1956), McKim, Mead and White
were working on the Low residence (Figure 13) at Bristol, Rhode Island,
where Richardson’s direction was maintained and given new form. By 1900
Frank Lloyd Wright was erecting his classic Hickox house (Figure 14),
as perfect in its way as the now more famous Willitts (Architectural
Record, October, 1956). It stands at the beginning of Wright’s marvelously
fertile and masterly out-pouring of modest, individual homes leading to
the Goetsch-Winckler house (Figure 15) of 1939 at Okemos, Michigan. I
cannot help feeling that these small homes have contributed as much or
more to our way of life as the spectacular and beautiful architecture of
Taliesin West or Fallingwater.

And in the Northwest has not this American domestic architectural
tradition flowered again, as in the enduringly satisfactory forms of the
Watzek house (Figure 16) designed by John Yeon in 1937 at Portland,
Oregon?

A blend of this domestic tradition with forms of space and structure
not native but readily assimilable is found in the East in our own times;
witness the friendliness of Marcel Breuer’s Chamberlain cottage (Figure 17),
Wayland, Massachusetts, 1940, and Eliot Noyes’ calm, symmetrical home
(Figure 18) which he designed in 1956 for his family in New Canaan, Con-
necticut.

Mass housing has rarely received as much architectural attention in the
United States as individual homes, yet during the last war at least two
big projects of real value were carried out — Breuer and Gropius collabor-
ated on Aluminum City (Figure 19) at New Kensington, Pennsylvania,
1942, while in the next year Neutra’s Channel Heights (Figure 20), L. E.
Wilson consulting, went up at San Pedro, California, near Los Angeles.

What promises to be a significant feature of office-building design ap-
ppears in published photographs of the model of a work scheduled for com-
pletion in 1957, the Inland Steel Building (Figure 21) in Chicago by Skid-
more, Owings and Merrill. The appearance of columns as louvers on the
exterior of a glass facade is the only intrinsic modification of such building
yet seen that gives scale and movement to a city street. I find it hard to
understand that only three schools were called significant, especially after
the most recent efforts in this field. And finally, in a list of American churches
of the last hundred years should there not be a place for Wright’s quiet,
moving meeting house (Figure 22) for the Unitarians at Madison, Wisconsin,
1951, its rafters ingeniously joined in warped planes?

Here, then, are a score out of the hundreds of examples of good archi-
tecture, not chosen for the fifty of this series. Few of these added designs
will arouse much opposition, I dare say, and most were listed by some panel
members in the original naming. Were they omitted because little known
or little remembered — it doesn’t matter. They were not omitted from
American architecture. Together with the fifty chosen by acclaim they trace
an outline of the wonderfully varied accomplishments of American architects
in the last hundred years; it is no record to be ignored, and it augurs well
for the future. If only the evidence can be preserved!

Newport County; 3. Wayne Andrews; 4, 12. Chicago Architectural Publishing Company;
17, 18, 22. © Ezra Stoller; 21. Hedrich-Blessing

208 ARCHITECTURAL RECORD MAY 1957
A LIBRARY IN A SMALL TOWN'S CIVIC CENTER
The reading room is one large open space, 50 by 70 ft, divided by movable bookcases into reading areas for adults, teenagers, children. An unusual framing system provides height at outer walls (where balcony may be added later), and daylight at center; the roof is supported by four diagonally laid, laminated wood beams deeper at each supporting column than at center column where they join. No acoustical material was used, despite openness of room; so far, none has been needed, due to character of room.
In the small library two factors — in addition to the primary ones of sheltering books and making possible their use — especially influence the design: easy supervision and flexibility of space use. The high-ceilinged, continuous space in the reading room of this library in Mount Vernon, Wash., admirably meets these needs, but, in the kind of environment which it creates, it answers other less tangible requirements. It is informal and yet dignified, inviting and still conducive to the essential quiet and reposeful atmosphere of a library.

The library is the first completed building in the new civic center on the fringe of the town’s main business section, accessible to shoppers who combine shopping expeditions with library visits. Since the library’s circulation has more than tripled in the 18 months of the building’s use, there is an obvious two way advantage — to the businesses of this area and to the library — in such a location. When fully developed, the civic center will provide an open, almost park-like setting for all of its buildings, with the library as the dominant element of the group. Peter Hostmark, Structural Engineer; Norman L. Omodt, Mechanical Engineer.
hood of $16,000, motor hotels in the last few years have shown costs per room anywhere from $6,000 to $18,000. In size they range from 40 to 366 units, the largest being the $5-million Marriott Motor Hotel near the Pentagon in Washington.

Almost without exception, these motor hotels have complete hotel service, and their average room rates are in the $8 to $10 general range. There are those who predict an ever-growing number of this type of highway hotels.

According to a recent study by C. Vernon Kane, partner of Horwath & Horwath, hotel accountants and consultants, the modern motor hotel is more expensive to operate than the oldtime "motel." The cost per unit of operation is usually in the neighborhood of $1500, and payroll per unit between $600 and $750. Housekeeping expense, exclusive of payroll, is about the same as in other hotels of the same size, but administrative expenses are usually higher than most investors anticipate. Their operating profit before fixed charges varies from about $1000 to $2100 per unit, but probably none would earn more than $7-900 had they not food and beverage income. The resort-type motor hotels usually show the highest profits, but usually they cost more to build, and sometimes get as much as one quarter of their net profit from food and bar operations. A first class resort motor hotel, operating the year round, accountants say, must gross at least $3000 per unit in room sales — or about a $12-14 annual average daily rate at 65-70 per cent occupancy.

Already there are strong indications — and several examples — of decentralizing group and function business which heretofore was monopolized by downtown hotels. Many of the newer motor hotels are making a strong bid for group business with function and convention facilities. To be sure, it's only the beginning and may never reach the proportions of large city operations. But more and more established motor hotels are plan-

The Sheraton chain is venturing into the highway hotel field with two projects: 8, a 300-room for Portland, Ore., and 9, a 200-room hotel for Binghamton, N. Y., Samuel Glasser, architect. The Pick Hotels Corporation is moving into the field with two models: 10, The Edge-O'-Town Motel, Rockford, Ill., E. P. Lewin, architect; and 11, Holiday Inn Hotel, Chattanooga, Tenn., William Bond, architect. 12. The “world’s largest” motel is going up near the Pentagon Building, Marriott’s Motor Hotel, by Hol Shoppes, Inc., Joseph Morgan, architect. 13. Chicago’s famous Drake Hotel is building the Drake North, a $2,000,000 highway hotel in the northwest suburban area of Chicago, Walton and Walton, architects. 14. One of the Jack Tar chain, this one in Orange, Texas, Coleman & Rolfe, architects.

**TODAY’S TRENDS IN HOTEL DESIGN**

ning function room additions. And as more downtown hotels and hotel chains gain a foothold in the highway field they will, no doubt, introduce features which will force the older hotels into the competitive race.

The two- and three-story motor hotel is no longer an isolated case. Those who pour millions into their projects are convinced they have the ideal solution by going vertically as well as horizontally in construction. Others try to compromise with a split level, from the parking level up and down. It’s a good solution where the terrain lends itself. The guest has his car outside his room, whether he lives on the lower or upper floor.

It’s safe to say that highway hotels will get larger and more luxurious. With money getting harder to borrow, money will probably come from real estate syndicates. The sale leaseback method is already attracting investment money to the motor hotel field. Some motor hotel operators with older properties are trying to ward off new competition by upgrading or enlarging their establishments.

Existing downtown hotels continue to add garage and parking facilities and create drive-in entrances wherever possible. Group facilities are also enlarged wherever there is some waste space to recover.

There are definitely new trends in the hotel eating facilities. It is no secret that Americans prefer to eat in restaurants rather than hotels. And food operations in many hotels are not profitable. But it cannot be blamed entirely on customer refusal to patronize hotel dining rooms. In many existing hotels, food preparation and service areas are poorly laid out and oriented. It takes too many employees to prepare and serve the meals speedily and economically under today’s high labor wages.

In the older hotels the kitchens are not on the same floor with the eating facilities. Some still have two and three separate kitchens. Even the newer ones with one oversized central kitchen now go in for specialty food rooms with a specialized limited menu in each
room. This allows the guest the choice of a number of different eating places at various prices.

This has several other advantages; the eating places are tailor-made for a variety of people with different tastes, different money and different times to spend it.

A typical example is the Hotel New Yorker in New York City. It had four public restaurants occupying 20,000 square feet of space. The kitchen and bakery alone occupied 31,000 square feet. With $3 3/4 million food and beverage volume, it was making a departmental profit of about 10 per cent, before light, heat, power, rent depreciation, insurance, and taxes. On a comparative restaurant basis, the hotel had been losing because it couldn't cover those expenses with 10 per cent.

To remedy this situation, first a survey was made to determine the income per square foot and turnover per seat. (Both were entirely out of line with commercial restaurants. Income was too low, and the turnover too slow.)

The character and design of one of the four eating places were completely changed. A 2700 square foot dining room was changed to an eating and drinking restaurant equally conducive to breakfast, lunch, cocktail, dinner and supper business. The restaurant was to stay open from 7 o'clock in the morning until 3 o'clock the next morning. The cost of the change-over, including equipment and decor, was about $175,000. Immediately, the annual income increased 90 per cent, to $1 million.

In another dining facility at the same hotel, the income doubled from $500,000 to $1 million when it was converted. Then, a 5400 square-foot formal dining room was closed and diverted to banquet business. Within six months, the income was up 60 per cent.

While creating commercial rental areas is still in vogue, here and there low income producing shops are being turned into cocktail lounges or eating facilities. In one case a shop area which brought in $9000 rent a year now nets $60,000 in a newly created cocktail-cafe lounge in the same area.

With exception of the luxury hotels in Miami Beach and Las Vegas, and some of the better motor hotels on the highways, guestrooms in the new commercial hotels are considerably smaller than what was formerly considered a required minimum. In the 455-room Hartford Statler, the single rooms are only 96 square feet; doubles are 138 sq ft; small twins 150 sq ft; large twins 191 sq ft; parlors 410 sq ft; sample rooms from 140 to 313 sq ft.

In the newer Dallas Statler Hilton they are only slightly larger, but in the newest hotel, the Philadelphia Sheraton, guestrooms are again smaller. There seems to be no guest resistance to small hotel rooms, provided the furniture is not over-scaled. Air conditioning and television, on the other hand, are something every traveler expects in a new hotel.

Most recently-built hotels have an equal number of studio-type and conventional bedrooms with alternating connecting doors. Room clerks, however, say they could do with fewer studio-type rooms. The demand for conventional beds is increasing. A 40-60 ratio, with the larger portion of rooms having conventional beds, might be a safer bet.

It's usually best to survey a locality for hotel room requirements. In certain cities, there is still a great demand for single rooms, while in others twin-bedded rooms throughout the house are more economical. Some recent surveys have shown an increasing demand for double beds in certain areas. Furniture can be changed to suit the demand, but permanent construction cannot. To make the smaller rooms large enough for a double bed, if needed, would seem a good solution.

The new hotel lobby is just large enough to handle the traffic. A minimum of seats discourages lobby sitters. The public writing room so popular in the 20's and 30's is a thing of the past.

Elevator control is important. With more operatorless elevators being used in hotels, the front office staff or bell captains should have an unobstructed view of the elevators.
TODAY'S TRENDS IN HOTEL DESIGN

After World War II the open front desk with everything built into the counter, made its first appearance. Guests could lean over the counter to see whether the house was full or empty. Room clerks and assistant managers had no way of discussing anything without being overheard by the guest. While the old conventional hotel desk, where clerks spent most of their time concealed behind brass fronts was bad, the completely open desk is not much better. The ideal solution is a compromise between the two, where room clerks and assistant managers can step out of guest's hearing. The pivoting room rack in all of the new Statler hotels is one way to do it.

Function rooms are receiving more design attention than in former years. Group business constitutes a major portion of the food and room income in city hotels. Flexibility and accessibility are major factors. Assembly areas which can be closed off and used separately should be included. Hotels in large cities and state capitals usually require larger function space because of a greater number of conventions. Storage space for banquet tables and chairs should be included. Some of the larger hotels have also located a public bar or cocktail lounge on the function room floor.

If sample rooms are specified, it will be wise to proceed with caution. Demand for sample rooms blows hot and cold. In most hotels sample rooms are used for small conferences. The newer hotels design them with that double purpose in mind. At the Philadelphia Sheraton a partition between two regular guest rooms has been eliminated, but bathroom plumbing connections in bathrooms are left intact. If it proves the hotel does not need as many sample rooms, the partition can be put back and bathroom fixtures installed for regular guest room use.

Almost without exception, hotels have insufficient storage space. Employee feeding facilities and adequate locker space are receiving more attention today than formerly. Usually it's best to have only one employee entrance and exit, preferably in connection with the delivery entrance, where the timekeeper can watch the traffic.

While 30 years ago the architect could make a guest-room or guestroom floor corridor any width, today he'll be picked up quickly by the alert hotel man if the floor measurements for wall-to-wall carpeting are not in multiples of the standard 9-in. carpet width.

The hotelman may also have definite ideas about bathrooms. He wants more shelf space for shaving and make-up kits, and larger mirrors with better bathroom lights. In the luxury type hotels, he demands larger bathrooms, possibly with two basins in twin rooms. And a glass shower door rather than curtains. (He doesn't have to buy them outright, but can write them off over a period of years and then own them.) In some of the newer motor hotels even the toilet is separately enclosed. Where costs must be trimmed, partial tiling in bathrooms might be a solution. Several hotels have switched to moisture-proof wall covering above the tiles. Some luxury hotels use both fluorescent and incandescent lighting in bathrooms.

Hotelmen stress preventive maintenance features in guestrooms. A great variety of color schemes is no longer necessary. Two or three color schemes are more economical to maintain than eight or twelve. A guest occupies only one room at a time and no hotel guest has ever refused accommodations because a hotel room wasn't in his favorite color.

Radio, hotelmen have learned, isn't entirely out of style. Many who have replaced radio with television get increasing demands for radios. Latest trend is to have a radio-clock combination, either built into the night stand or on top of the dresser-desk combination. But there are distinct disadvantages in this latest trend. If the house current is interrupted it delays the clock and makes guests miss trains and appointments. Also, in certain steel structures poor radio reception may make the investment wasteful. The better solution would be...
a centrally-controlled clock, and a radio-television combination working off a master antenna.

Some of the newer hotels anchor new-type picture hooks permanently in the wall between two rooms where furniture is placed back to back in connecting rooms. Sooner or later a colorful, pictorial map of the area, and perhaps another of the immediate vicinity, pointing out places of interest, might replace the old picture print.

Savings in electrical wiring can also be achieved if furniture placement is shown in the plans. Some hotelmen prefer outlets just slightly below desk top height rather than at baseboard level. It saves on cords, prevents tripping. Lamps to be placed against mirrors need only half shades. The mirror reflects the other half.

Ceiling lights for over-all illumination have long been discarded. The new trend is to make the closet light serve as foyer illumination by undercutting the wall on the closet so the closet light will shine out into the foyer.

Fewer desk or dresser drawers are another trend. Functional baggage racks take their place. Slanted fronts on drawers, with undercut fingertip grooves at the bottom make hardware unnecessary. Laminated plastics for furniture tops and fronts are standard today.

If preliminary surveys show the hotel will have a good portion of businessmen patronage, it's advisable to provide some rooms with larger-than-average hotel desk surfaces. Most recently-built hotels have a goodly number of executive suites. But it's more important to have more regular rooms with greater desk areas, even if it's accomplished with a raised drop-leaf.

Whatever the survey shows as to proportion of business men and vacation travellers, it is safe to predict for the future some interesting changes in clientele trends, as the downtown hotels go out for the highway business, and the motor hotels move ever closer to downtown to reach for the business man business.

More and more, motels are becoming part of other developments: 15. hotel with office building with architects bureau of building products, the DuPont Plaza Center, Miami, Frank H. Shufflin, John Edwin Peterson, architects. 16. a prototype design for Howard Johnson's southern restaurant-motels, this one for Portsmouth, Va., Rufus Nims, architect, with Carl Koch Associates; and 17, a similar prototype for northern areas, this one for Wilmington, Del., Carl Koch and Associates, architects, with Rufus Nims. 18. One of the important motels crowding into downtown territory, 1200 Beacon Street, Boston, Sturgis Associates, architects. 19. Many hotels are adding drive-in entrances, this one the Adams Hotel, Tucson, Ariz. 20. San Francisco seems a city where motels get downtown easily, this Holiday Lodge, by Herzwik & Knowles, architects. 21. A representative Miami Beach Motel, this one the Pan American, Carlos Scheppl, designer. 
NILE HILTON APPROACHES PLAN IDEAL

Hilton Hotels International, the branch of the Hilton empire that operates foreign hotels, also takes a hand in planning them for best and most profitable operation; if not in fact the client they are at least the client's American representative in dealing with architects. Curt Strand, vice-president in charge of construction, assisted by Emmanuel Gran, head of the architectural unit, is the focus of the functional know-how here; he has been known to work a hotel scheme up to twice its original earning capacity. Comments about the plans of this hotel and the next two shown are typical of the concerns of hotel design for profitable operation. This hotel, planned as a luxury operation catering largely to American tourists, represents a particularly satisfactory planning effort, and an especially good example of the desiderata of this operation.

- Kitchen is "best of all."
- Ideal service arrangements from central kitchen to various dining areas — a matter of many man-hours — and to service elevators, for room service, and delivery to roof kitchen.
- Ballroom and private dining room divisible by folding partitions. Each section accessible via service corridor.
- Cocktail bar near dining rooms. Bar (not on these plans) near street.
- Coffee shop in prominent location with respect of lobby and street frontage.
- Especially good for this particular operation is plenty of rentable area for shops.
- In a city where outdoor living is an age-old custom, intensive development of the site is plainly indicated. This scheme develops its income potentials, with shops, refreshment spots, roof gardens.
- Good handling of double entrance problem. Good front office control. Executive offices well related to operations.
- Like plan of guest room ("This is what you sell"). Like especially curtained dressing area. Bathroom is good — has lavatory shelf, also bidet. Balcony five feet wide, full room width, is usable.

Nile Hilton, Cairo, Egypt; Misr Hotels Co.; Welton Becket and Associates, Architects and Engineers.
SIX- STORY ADDITION TO GARDEN TYPE HOTEL

It seems characteristic of the times that as the small, intimate, horizontal office building over first floor, will rise from a depressed cocktail lounge, individual rooms, eleven to the floor, will be commodious, to cater to...
PRECAST SHELLS ROOF A SUPERMARKET
Here is a new approach to precasting — that is, taking real advantage of the structural and architectural potentialities. Twelve circular translational shells with a 24-ft span in each direction were cast at ground level and then hoisted by two small cranes. Costs were low, visual interest high.


An unusual combination of architectural concept, engineering design and construction technique has produced a structure which may set a new trend in the use of precast concrete. While precasting has gained greatly in volume in the last few years, generally only a few of the advantages have been exploited — such as reducing formwork and providing closer quality control. Most precast concrete structures have been quite conventional, differing little in shape from steel framing.

The roof structure shown here stems from a much more imaginative approach by relying on the shape of a thin shell to get an efficient structural component, while retaining the other advantages of precast concrete.

The architect envisioned a series of shells of such size as could be precast at ground level and lifted to roof height by a small crane. With this as a premise, a little figuring showed that a shell covering a 24-ft bay could be handled without trouble. This spacing caused no problem in terms of layout for shelving, food cases and other equipment.

There’s no doubt that with a 24-ft column spacing there are a number of standard structural roof systems that could have given a minimum depth at low cost, but in this case the architect has also managed to achieve a high degree of structural interest while keeping the cost down to a respectable $13.25 per sq ft, including air conditioning.

Once this idea had been decided upon, it was thin shell designer Mario Salvadori who suggested that an appropriate shape for repeated use in the roof would be a circular translational shell. The resulting solution was 12 shells each covering a 24-ft square bay.

Geometrically the shell is formed by
The shell ribs are tipped back to leave space for plastic skylights. The ribs do not come clear down to the columns but merge into short stubs. Both are architectural features to emphasize the structural "separateness" of the shells. Space between shells at columns is filled with sufficient concrete to cover the steel tie rod fittings; rods then take rib thrusts translating a circular arch 24 ft in span and 3 ft 3 in. in rise over an identical circular arch at right angles to it. (A translational shell is geometrically different from a spherical dome cut on four sides. The membrane stresses in it are quite different too.)

Although the first thin shell built in Europe in 1910 was actually a translational shell of this type, circular translational shells have only become popular again in recent times. (Salvadori has designed four of them in Italy made out of tile and concrete, the largest of which is 61 by 93 ft.)

The translational shells in New Canaan are the first of their kind to be cast integrally with their boundary arches on the ground, and then to be raised in place by means of a crane. (Actually two cranes were required at $150 apiece per day. With only one crane, there would have been a tendency for the shell to "drift" during lifting, possibly upsetting it.)

The repetitious use of individual forms on the ground together with a shell reinforced with only 0.37 psf of steel, makes this type of construction especially economical.

In addition to the 2- by 2-in. welded wire reinforcement, the shell is reinforced at the corner in order to prevent cracks due to tension in the diagonal direction.

Number 4 bars on 6 in. centers constitute shell reinforcement between the boundary arches and the shell. The thrust of the arches is resisted by means of 1 1/4-in. tie rods welded to specially designed jaws set in the top of the columns.

The circular arches are 6-in. wide and vary from 1 ft at top to 1 1/2 ft at haunches. The arches lie in a plane inclined towards the center of the shell so as to offer four bands of light around the shell, and to emphasize that from a statical viewpoint each shell is an independent element and gets no support from the adjacent shells.

The forms built on the ground were constructed of thin ribs 19 in. apart, on top of which were laid insulation
Shell being guided into position atop columns. Note temporary tie rod above, permanent tie rod below (with turnbuckle). Tie rods across interior shells are required because of the possibility of unbalanced load conditions; otherwise thrusts from shells would cancel.

Permanent 1½-in. tie rods were welded to special fittings set in the columns. The jaws are ½-in. plate welded to a “box” section formed by two 6- by 6- by ½-in. angles.

blocks of cement coated fibers, 2½-in. thick, approximately 16-in. square.

The contractor originally built two forms which were deemed adequate for the schedule, but unforeseen delays caused him to build two more. Since casting was done in freezing weather, the form was protected by a movable temporary shelter.

The concrete was poured directly over the insulation in a thickness of 1½ in. while the insulation blocks created a grid of ribs 3-in. wide and 3-in. deep. (Because of the shell’s curvature it was impossible for the insulation blocks to butt on the edges.) The ribs themselves are not necessary for structural strength, and could have been a lightweight insulating concrete.

While the underside of the shell will remain untouched, the outside will be painted with three coats of acrylic plastic paint which will weatherproof the roof, but will not be affected by shell movement. The skylight created by the incline of the boundary arches will be covered by strips of white corrugated reinforced plastic material, nailed through rubber gaskets to special wooden inserts in the shell.

The shells weigh 13½ tons and were lifted by means of a special frame which grabbed ¼-in. bent rods cast into each corner of the shell.

The lifting schedule was two shells per day, but the contractor feels that on another job this could be increased to three.

Temporary tie rods were attached to the boundary arches during the lifting operations to provide stiffness, and were removed by burning them off once the shells were in place.

Drainage is accomplished through pipes set in center of interior columns and through scuppers at the fluting of exterior columns. Flashing was placed in the corner of the shells around the pipe insert.

This type of design can be easily adapted to shells 30 to 40 ft on a side, the only limitations on the dimensions of the shell being the cost and availability of crane service.
How the shell acts, and the nature of its stresses

In designing a thin shell, the engineer aims at having a shape and means of support such that most stresses in the shell are membrane stresses—direct tensions, compressions and shears in the plane of the membrane. It is desirable to avoid bending stresses as much as possible because this both complicates the analysis and increases the amount of reinforcement needed.

One might think that a membrane is practically self-supporting, that it can almost exist free in space with a minimum of support at the edges.

This is not so because at the edge of the membrane (or shell) there are forces that must be resisted so that the membrane will be in equilibrium. The ideal solution is a very thin, deep rib (a diaphragm) infinitely rigid in the vertical plane, but with no resistance in the horizontal plane.

Under this condition, forces parallel to the rib will be resisted by the shearing
Exterior shells have a cast-in-place "awning," provided with a reglet for window installation. Concrete blocks are set on end for a vertical wall pattern (difference in color is caused by variation in block moisture). Columns have a fluting to provide additional interest.

Opening between shells gives a strong sense that shells are independent units. Corrugated, white reinforced plastic is attached through gaskets to wooden insert in the shell.

strength of the rib. Forces normal to the rib will tend to displace the rib. Since it is actually impossible for the rib to be entirely free to move, bending forces (called boundary disturbances) are set up at the edge of the membrane, penetrating some distance into it depending on the shell thickness and the rib.

In the case of the translational shell shown in this article, arches tied to the shell are the elements which take the shear forces of the shell. These forces cause thrusts in the arches which are resisted at the ends by tie rods.

In the circular translational shell, the computed shear forces at the corner of the shell are infinite. In practice this does not happen, because the ribs have a certain lateral rigidity. But they are high enough to require special diagonal reinforcement at the corner.

At the junction of the rib to the shell transverse shears are developed which produce bending stresses in the shell.

For most of the shell, 2- by 2-in. welded wire reinforcement can be used to take the direct stresses, but rods are used next to the ribs to take the bending stresses. These bending stresses vanish rapidly away from the rib due to the curvature of the shell and its small thickness.
CURTAIN WALLS, COLOR ADD GLAMOUR TO GLASS BLOCK

Two recent developments — the use of glass block as a curtain wall material, and a new color-finished block — promise to give the Cinderella of the glass industry a leading role in building design.

Until recently, glass block has been relegated to playing a practical and utilitarian — but not very glamorous — supporting part. And, while architects have recognized and used its unique properties as a building material since glass block arrived on the American scene over twenty years ago, a survey conducted for the Pittsburgh Corning Corporation showed that many of them had tired of it. This may have been due, at least in part, to miscasting. Although glass block is both glass and masonry, it has inevitably been used most often for its most obvious advantages — those of a sort of "super-glass" which provides controlled natural lighting without glare, insulates against heat gain or loss accompanying large window areas, and eliminates expensive sash. Its potential use in walls (as masonry) rather than in window spaces (as glass) has been largely neglected.

Now, such pioneer projects as Milwau­kee's seven-year-old Layton School of Art, designed by John B. Waldheim Associates, have proved the practicality of glass block as a wall material, and the technique has gained increasing acceptance, spearheading what may prove to be a revolution in the glass block industry. What are the advantages of a glass block curtain wall? Add to its light-transmit­ting properties, its insulating value (glass block has a u-factor equivalent to that of an eight-inch masonry wall), its cor­rosion-resistance and easy maintenance, another factor — economy. Because one trade installs the entire wall, a glass block curtain wall can be erected at a lower cost than most conventional curtain walls. And once up, it is a finished wall inside and out.

To add impetus to the curtain wall technique, Pittsburgh Corning Corporation has developed a method of giving glass blocks a fired-on translucent ceramic finish which makes it possible for the architect to use color on the exterior of a building without sacrificing any of the inherent qualities of the glass block wall. The colors — turquoise, green, yellow and coral — have a median light transmission range of about 20 per cent, which allows the entry of diffused natural light while cutting down glare and heat gain. To produce the permanent finish, the blocks are sprayed with a water based ceramic enamel and sent through a long continuous lehr, where they are preheated, fired for 10 minutes at 1040 degrees F., and annealed for about 1 1/2 hours.

The new colored blocks, which are expected to find their greatest application in combination with PC Sun­trol and standard functional blocks, come in the eight inch square size, Pittsburgh Corning Corp., One Gateway Center, Pittsburgh 12, Pa.

A new ceramic-finished block available in four colors promises to add impetus to the use of glass block in curtain walls such as that designed by architects Harrison and Abramovitz for the Corning Glass Works shown above.
Two marked trends have emerged from efforts to combat rising material and labor costs for structure, and, along with this, critical manpower shortages in certain trades: (1) the continuing search to lighten construction, and (2) the attempt to take greater advantage of mechanization.

Fitting neatly into this picture is sprayed fiber fireproofing for direct application to cellular steel flooring. The beams can be either direct-sprayed with fiber, or enclosed first in a metal lath cage and sprayed with fiber or lightweight plaster. The fibers are asbestos or asbestos combined with manufactured mineral fibers. A fiber spray can also consist of asbestos combined with vermiculite.

The significant development here is the first large scale application of direct spray fireproofing in a big building.

This current example of extensive usage of sprayed fiber fireproofing is in the Baltimore Commercial Credit Building designed by Harrison & Abramovitz. Eleven of the 18 floors, each with approximately 9900 sq ft, are fireproofed in this manner. The other seven floors have gypsum plaster with vermiculite or perlite aggregate. Beams of the top 11 floors have perlite plaster on metal lath. The fiber on the cellular steel flooring is tamped to a thickness of 5/8 in. below the lower cell, providing a three-hour fire rating approved by Underwriters' Laboratories. The steel beams, plastered with a 1-in. coat of perlite plaster, provide a 4-hr rating. The plastering contractor was John H. Hampshire, Inc. of Baltimore, Md.

The sprayed fiber process, itself, is not new, the spray having been pretty well developed by manufacturers, and the construction assemblies tested by standard fire rating authorities. There is some news in the fact that machinery is being further improved to speed up the rate of application, which is now typically 1500 sq ft per day. Some equipment is said to be capable of handling 5500 sq ft per day. With hand plastering the rate is usually 300 to 400 sq ft per day, per man.

This is not difficult to appreciate when one considers the other claims that costs can be cut from 10 to 33 per cent and weight up to 80 per cent as compared with suspended fireproofing treatment, including the metal lath, hangars, channels, etc.

Manpower can be reduced since in the spraying operation only two men are required for each machine, and another man moves the rolling scaffolding.

With proper operation and equipment, the application of spray fiber can be both free of dust and splattering residue. Since sprayed fiber coatings also give sufficient sound reduction, it is possible that additional acoustical material may not be needed.

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**DIRECT-SPRAY FIREPROOFING CUTS WEIGHT AND COSTS**

_Sprayed fiber was blown on 100,000 sq ft of cellular steel flooring, giving 3-hr rating, in the Baltimore Commercial Credit Building_
ON-GRADE FLOOR SLABS FOR RESIDENCES-1

BASIC DESIGN CONSIDERATIONS

The physical characteristics of the site and the nature of the soil are the controlling factors. The type of soil, its load-bearing and capillary characteristics must be known in order to have an efficient and effective slab-on-ground design. Surface drainage in every direction is essential, and, if necessary, a positive underground drainage system must be provided. Proper elevation of the slab above the finished grade is critical. Many moisture problems will not occur if elevation of the slab and drainage are properly handled. A moisture condition may cause a failure of the flooring surface material, and increase thermal problems.

Moisture control involves controlling the water transfer by capillarity and by vapor phase migration. The capillary rise of water can be broken by using a layer of granular base material under the slab. A vapor barrier separating the slab from the ground will limit vapor transmission and may also serve as a water stop. Under certain conditions, it is desirable to use either one or the other of these slab protections; at other times, both are needed. Likewise, there are sites where neither would be required. The important thing is to know what is required in order to overcome any moisture difficulties that may exist for the specific site.

The major thermal consideration is to provide comfort. A less important consideration is to achieve some economy from heat loss through the slab. Two essentials are required: first, a suitable insulation material, correctly placed around the perimeter of the slab, and second, a properly designed heating system.

SITE PREPARATION AND GRADING

Fills Outside Foundation

(1) Grading fill should be clean soil, from which all roots or foreign material have been removed. Grading fill should be mechanically compacted in not more than 4-in. layers.

(2) Backfill used against the outside of foundation walls or grade beams should be thoroughly compacted by tamping.

Site Grading and Drainage

(1) Finish grades should slope downward away from structures having slab-on-ground construction, a minimum of 12 in. for a distance of 25 ft in all directions (4 per cent slope). Where property lines, retaining walls, etc., limit the distance from the structure to less than 25 ft, no less than 4 per cent slope should be provided.

(2) Wherever less than a 4 per cent slope is used adjacent to the structure, such as for a terrace, a positive means of drainage should be provided.

(3) In side-hill locations, the site should be so graded that surface water will be diverted around the structure. In addition, a positive system of underground drainage may be required for certain conditions.

Height of Floor Above Finish Grade

(1) For an unheated slab or where heating coils are embedded in the slab, the finish grade at the outside wall should be not less than 6 in. below the top of the concrete slab.

(2) Where there are air ducts used in or under the slab, the finish grade at the outside wall should be not less than 2 in. below the bottom of ductwork adjacent to the foundation wall.

SLAB BED

Soil Capillarity

The underside of a concrete slab should not be in contact with liquid water. Capillary water rises through soil from the water-level or water-table to various heights depending on the type of soil. (See sketch.) A base material of limited capillarity of sufficient thickness will break the capillary rise of water. Effective drainage will prevent the base from being a reservoir of water.

Limits of Capillary Rise

(1) The capillary rise of liquid water in a material used in a slab bed should not exceed 2 in. under a recognized test for capillarity for the material to be considered of limited capillarity:

Material of Limited Capillarity

Gravel or crushed rock, ¾ in. and larger in size or other material which will qualify by recognized test. The permanence of limited capillarity is necessary in such a test.

Capillary Material

Clay, silt, sands, bank-run gravel, or other solids unless shown to be otherwise by a recognized test for capillarity. This classification applies to both undisturbed soil and foundation fill.

Foundation Fill

(1) Areas within foundation walls should have vegetation, topsoil, roots or foreign materials removed. The desired height should be established with clean foundation fill.

(2) Foundation fill and backfill should be thoroughly compacted in not more than 4 in. layers to assure uniform support for the slab. Compaction should be obtained by either mechanical means or by tamping.

Base

(1) A base for a concrete slab-on-ground required when by design conditions must be at least 4 in. in thickness.

(2) To qualify as a base of limited capillarity, the material should be a selected and clean material, ¾ in. or larger in size, or other material as described above.

(3) The base should be thoroughly compacted by rolling or tamping to assure uniform support for the slab.

Waterproof Membrane

A building site having either hydrostatic pressure in the soil or a liquid water condition, less than 6 in. below the natural surface of the ground, should not be used for a house incorporating slab-on-ground construction. With such condition a waterproof membrane under the slab would be required.

Vapor Barrier

(1) The permeance of vapor barriers should not exceed 0.20 perms when tested by the ASTM methods.

(2) Vapor barrier joints should be lapped a minimum of 6 in. Sealing is not required.

(3) Vapor barriers should be capable of withstanding handling and construction traffic without puncture or displacement.

(4) Vapor varriers should be required under design conditions 1 and 2, as shown in Table 1.

Separator

(1) When a vapor barrier is used it also serves as a structural separator between the concrete and the slab bed.

(2) A separator should withstand handling or construction traffic, but qualities of durability or low permeance are not required.

(3) A separator should be used under the following conditions:

(a) When a slump test of a concrete mix is more than 4 in. by standard test.

(b) When water heating coils or warm-air ducts are embedded in the slab.

Adapted from "A Study of Slab-on-Ground Construction of Residences," conducted by the Building Research Advisory Board for FHA

TIME-SAVER STANDARDS

ARCHITECTURAL ENGINEERING

ARCHITECTURAL RECORD  MAY 1957  253
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ON-GRADE FLOOR SLABS FOR RESIDENCES

SLAB ON GROUND DESIGN CONDITIONS RELATIVE TO MOISTURE

Design No. 1 (shown above)
Design No. 2 (both base and fill capillary)
Design No. 3 (no vapor barrier)
Design No. 4 (no vapor barrier, base capillary)

<table>
<thead>
<tr>
<th>Construction Item</th>
<th>Design No. 1</th>
<th>Design No. 2</th>
<th>Design No. 3</th>
<th>Design No. 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vapor Barrier</td>
<td>Provide</td>
<td>Provide</td>
<td>No vapor</td>
<td>No vapor</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>barrier,</td>
<td>barrier,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Separator as</td>
<td>Separator as</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>noted 1</td>
<td>noted 1</td>
</tr>
<tr>
<td>Base of Limited</td>
<td>Provide 2</td>
<td>None</td>
<td>Provide 2</td>
<td>None</td>
</tr>
<tr>
<td>Capillarity Material</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fill or Base</td>
<td>Capillary</td>
<td>Capillary</td>
<td>Capillary</td>
<td>Capillary</td>
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<td>Group A</td>
<td>Group A only</td>
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<td></td>
<td></td>
<td>Group B only</td>
<td>as noted 3</td>
<td>as noted 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 Provide as listed under the subhead, "Separator" sheet 1.
2 A duct or plenum system should have a 4 in. base material of limited capillarity under the entire system.
3 To determine if Group B flooring may be used with Design No. 2:
   (a) Determine type of soil.
   (b) From table for capillary rise of water in various soils, determine figure which applies to this soil.
   (c) If the water table for the site is at a distance below the ground surface greater than this figure, Group B floors may be used.
4 To determine if Group A flooring may be used with Design No. 4:
   (a) and (b) same as in Note 3.
   (c) If the water-table for the site is at a distance below the ground surface greater than this figure, Group A flooring may be used.

INSULATION

Properties

(1) Insulation should be required to be non-capillary, not permanently harmed by wetting, or harmed by contact with wet concrete mix, and not subject to damage by termites or fungi.

(2) Insulation must have a compressive strength equal to or more than that required to pass the following tests:
   (a) Preload insulation to a loading of 50 lb per sq ft. Measure the thickness of the insulation under this preload.
   (b) Add an additional loading of 40 lb per sq ft for live load equivalent.
   (c) Measure the thickness of the insulation under the second loading. The compression of the insulation under the second loading must not be more than 6 per cent of the thickness measured after the preload specified under (a).

Location

(1) The slab perimeter must be insulated in its entirety.

(2) If the highest known water-table of a site is 2 ft. or more below outside grade, perimeter insulation may be placed in either a vertical or horizontal position. If the highest known water-table is 4 ft or more below the outside grade, it is generally recommended that perimeter insulation be placed in a vertical position.

(3) If the highest known water-table is less than 2 ft below the outside grade, perimeter insulation must be placed in a horizontal or L-shaped position. An exception should be made if a special drainage system is provided to prevent moisture from reaching the insulation.

Thermal Resistances

It is recommended that the method of establishing thermal resistances for the selection of insulation be determined by using the outdoor design temperatures for the region.

Summer Cooling

(1) The frequent or continuous use of embedded coils for the purpose of cooling the house in summer is not recommended with slabs-on-ground as they are presently designed.

(2) For unheated slabs where summer air conditioning is contemplated, see perimeter insulation recommendation, Table 2.

Comfort

The achieving of comfort should not be dependent upon the provision of carpeting by the home owner. Therefore, the thermal conductivity, density, and specific heat of the flooring surface material or uncovered concrete floor surface should be taken into account in any consideration of comfort.

Adapted from "A Study of Slab-on-Ground Construction of Residences," conducted by the Building Research Advisory Board for FHA.
the men behind the Kewanee boiler...

and the man before it!

Thirteen sizes of the Kewanee M-800 Series meet requirements up to 651 h.p. for high pressure, 21,851,000 Btu for low pressure. Other Kewanee Boilers from 74,000 Btu to 651 h.p.

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Kewanee Boilers are advertised regularly in national publications.
Note: If foundation wall is more than 8 in. above finish grade, vertical insulation should be increased a like amount.

Note: Either A or B for design temperatures below 30 F.

Note: Use for design temp. of 30 F and above. Additional 6 in. if air conditioning is contemplated.

**TABLE 2**

<table>
<thead>
<tr>
<th>OUTSIDE DESIGN TEMP.</th>
<th>INSULATION CONDUCTIVITY</th>
<th>INDIRECTLY HEATED</th>
<th>PANEL HEATED</th>
<th>WARM-AIR PERIMETER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Nominal) Btu Inch (hr)(sq ft)(F)</td>
<td>VERTICAL 18-in. or L-Type 24-in. length of Insulation</td>
<td>VERTICAL 18-in. or L-Type 24-in. length of Insulation</td>
<td>VERTICAL 18-in. or L-Type 12-in. vertical 12-in. horizontal length of Insulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Insulation thickness, in.</td>
<td>Insulation thickness, in.</td>
<td>Insulation thickness, in.</td>
</tr>
<tr>
<td>-30</td>
<td>0.2</td>
<td>1 1/2</td>
<td>1</td>
<td>1 1/2</td>
</tr>
<tr>
<td>-30</td>
<td>0.3</td>
<td>2</td>
<td>1 1/2</td>
<td>2</td>
</tr>
<tr>
<td>-30</td>
<td>0.4</td>
<td>2 1/2</td>
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<td>-20</td>
<td>0.3</td>
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</tr>
<tr>
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<td>0.4</td>
<td>2</td>
<td>1 1/2</td>
<td>1 1/2</td>
</tr>
<tr>
<td>-10</td>
<td>0.2</td>
<td>1</td>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>-10</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>0</td>
<td>0.3</td>
<td>VERTICAL 12-in. or L-Type 18-in.</td>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>0</td>
<td>0.4</td>
<td>VERTICAL 12-in. or L-Type 18-in.</td>
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<td>1</td>
</tr>
<tr>
<td>10</td>
<td>0.3</td>
<td>VERTICAL 12-in. or L-Type 18-in.</td>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>10</td>
<td>0.4</td>
<td>VERTICAL 12-in. or L-Type 18-in.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>0.3</td>
<td>VERTICAL 12-in. or L-Type 18-in.</td>
<td>3/4</td>
<td>3/4</td>
</tr>
<tr>
<td>20</td>
<td>0.4</td>
<td>VERTICAL 12-in. or L-Type 18-in.</td>
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<td>1</td>
</tr>
<tr>
<td>30</td>
<td>0.4</td>
<td>1-in. thick VERTICAL 6-in.</td>
<td>1-in. thick VERTICAL 6-in.</td>
<td>1-in. thick VERTICAL 12-in.</td>
</tr>
</tbody>
</table>

1. Length measured from bottom of slab, and is in addition to edge insulation which is equal to thickness of slab.
2. Length measured from top of slab.
3. For Summer Air Conditioning, where design temperature exceeds 30F (See Fig. C).

Note: Ducts encased in concrete unless of crush-resistant, non-corrosive non-absorbent materials.

Adapted from "A Study of Slab-on-Ground Construction of Residences," conducted by the Building Research Advisory Board for FHA.
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<table>
<thead>
<tr>
<th>Where</th>
<th>What</th>
<th>Specifier</th>
<th>Installer</th>
<th>Allenco Fieldman</th>
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<td>Los Angeles, Cal.</td>
<td>Ramo-Weilddridge Corp.</td>
<td>Albert C. Martin &amp; Assoc.</td>
<td>Rockwood Sprinkler Co.</td>
<td>Lang Pratt</td>
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<td>Glendale, Ariz.</td>
<td>Salt River Power Co.</td>
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<td>Bechtel Corp.</td>
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<td>Boron, Calif.</td>
<td>Pacific Coast Borax Company</td>
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<td>Southwestern Engr. Company</td>
<td>Lang Pratt</td>
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<td>Wilmington, Cal.</td>
<td>Vegetable Oil Products</td>
<td></td>
<td>Engineering Dept.</td>
<td>Lang Pratt</td>
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<td>Albert C. Martin &amp; Assoc.</td>
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<td>Themselves</td>
<td>Don Davisson</td>
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<td>Tulsa, Okla.</td>
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<td>H. Lyman Cauvel</td>
<td>W. F. Glenn Plumbing Company</td>
<td>Floyd Merryman</td>
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<td>Riverdale, Ill.</td>
<td>Acme Steel Company</td>
<td>Schmidt, Garden &amp; Erikson</td>
<td>La Salle Construction Company</td>
<td>M. Jepsen</td>
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<td>Indianapolis, Ind.</td>
<td>General Motors Corp.</td>
<td>Argonaut Realty Div., Gen. Motors Corp.</td>
<td>Daniel J. Keating Company</td>
<td>George Fee</td>
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<tr>
<td>Athens, Texas</td>
<td>Olive Myers Plant</td>
<td>Giffels &amp; Vallet, Inc., Arch. — C. Cleasman, Engineer</td>
<td>Wm. H. LaDew</td>
<td>Hugh Cunningham</td>
</tr>
<tr>
<td>Dallas, Texas</td>
<td>Goodyear Rubber Plant</td>
<td>Harold A. Berry, Arch. and Engr.</td>
<td>Wm. H. LaDew</td>
<td>Hugh Cunningham</td>
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<td>Middletown, Conn.</td>
<td>Canal Project, United Aircraft Corp.</td>
<td>Chas. T. Main, Inc.</td>
<td>Fred Raff, Inc.</td>
<td>Harold Jope</td>
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<tr>
<td>Wethersfield, Conn.</td>
<td>State of Connecticut, Highway Office Bldg. &amp; Garage</td>
<td>Hubbard, Lawless &amp; Blakeley</td>
<td>Buckingham-Routh</td>
<td>Harold Jope</td>
</tr>
</tbody>
</table>

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By combining type 302 stainless steel mansard panels with translucent plastic panels of the same design, the A. M. Castle Company was able to clothe its new Chicago warehouse in stainless steel at a cost comparable to that of other curtain wall materials. From the exterior, the warehouse presents a colorful appearance with its bands of green plastic and stainless steel marching in orderly rows above an orange brick wall. And, as an extra bonus, the plastic panels used in walls and skylights allow natural illumination of the building interior even on overcast days. A 2B finish was chosen for the stainless panels to cut specular glare and blend with the other materials.

The unbacked 22 gage stainless mansard panels used for the warehouse itself were fastened directly to girts or purlins with self-tapping screws. Stainless bolts and neoprene washers were used for side lap fastening. The translucent mansard panels were installed in essentially the same way, except that rubber grommets were used to compensate for the differences in expansion and contraction between the plastic and steel.

For the two-story office wing of the warehouse the stainless steel panels

*(Continued on page 266)*
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ARCHITECTURAL RECORD  MAY 1957  265
were backed with 1½ inches of glass fiber insulation and a back-up sheet of 18 gage galvanized steel, giving a U-factor of 0.17. After the back-up sheets had been fastened to the girts, subgirts consisting of 3½ x 1 ½ in. steel bars were welded to the standing seams in front of the sheets, and the insulation placed between them. The stainless steel face panel was then placed over the insulation and fastened to the subgirts with self-tapping screws.

A third type of metal panel with a face sheet of mica and asphalt protected steel was used instead of brick for the lower portion of the west wall of the warehouse. This wall, which is considered expendable, will be dismantled and reassembled elsewhere when it becomes necessary to add to the warehouse space.

At present, the structure provides nearly ten acres of floor area for A. M. Castle's steel warehousing and distributing operations. Total width is 512 ft; total length is 700 ft. Steel columns spanned by trusses divide the space into five lengthwise bays, of which four are 100 ft wide, and one — the center bay — 110 ft wide to accommodate longer steel sections.

Each bay has a pitched roof of 20 gage galvanized corrugated steel decking over which bagasse and either an asphalt membrane or tar and gravel have been spread for insulation. Skylights supplement the light from the side panels.

Architect for the project was John Cromelin, F.A.I.A.; structural engineer was Fred Marshall. All panels — plastic, stainless steel and protected metal — were supplied by the Plasteel Products Corporation of Washington, Pa.

**CONSTRUCTION DETAILS**

for LCN Overhead Concealed Door Closer Shown on Opposite Page

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3. Hydraulic back-check prevents door’s being thrown open violently to damage walls, furniture, door, hinges, etc. Door may open 130°, jamb permitting
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MODERN DOOR CONTROL BY LCN - CLOSERS CONCEALED IN HEAD FRAME

KRESGE AUDITORIUM, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASSACHUSETTS

LCN CLOSERS, INC., PRINCETON, ILLINOIS

Construction Details on Opposite Page
Jim Crotzer is a photographer whose list of clients reads like a “Who’s Who” of the art and design world. Here he highlights the ageless richness and strikingly decorative character of Macassar Ebony veneer, by Stem, in this self-portrait. “Ebony, veneered to a panel in this way, radiates a peaceful kind of strength and a timeless charm that makes it an ideal background for elegance.” When he calls for Macassar Ebony, the architect, like the photographer, borrows for today and tomorrow one of the riches of the ages—a treasure that came by caravan with spices and silks from the East—and yet remains a stalwart pillar for the boldest contemporary design. Through the catalytic artistry of the architect, rare wood paneling and graceful living strike up a happy match. Wherever a background of fine wood is used, its noble presence is felt by all, welding substance and a spirit into exciting unity. When rare woods from the forests of the world are used, there is a spirited graciousness—a strength and beauty that dwell in every ripple of its meticulously finished grain. And yet, beautiful wood is the essence of peace; it brings serenity to a room in a way that is all its own. Now, Stem brings you, through the magic of modern factory methods, all the nobility, splendor and lifetime permanence of the finest veneer that tradition knows. And you can afford to be generous with this wood, for the cost is low.

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New York — Chicago — Dallas — Los Angeles
As people judge a car by the “feel” of its doors... So is a building often judged by its sliding glass doors.

To an ever-increasing degree in home and commercial building, the quality of the sliding glass doors symbolizes the quality of the entire structure. For this reason, more and more architects and builders are selecting Miller quality sliding glass doors. Visually, a beautiful focal point; structurally, there’s durability and quality in every detail. For single and/or dual glazing.

Below: Miller’s engineered method of using silicone-treated double seal wool pile provides maximum weather protection in all climates.

TECHNICAL ROUNDDUP

IMPROVED HOTEL SERVICE CHARTED FOR 1958

Although incoming and room-to-room calls will continue to be routed through the switchboard, installation of a dial telephone system in New York’s Waldorf-Astoria Hotel is expected to greatly improve service by eliminating the outgoing load. Guests will be able to place both local and long-distance calls directly, as well as to dial all the hotel service departments. The exact number of calls made from each room will be recorded on an automatic registering system located in the cashier’s office, and long distance charges will be tele-typed to the hotel by the telephone company operators. Developed jointly by the Waldorf management and the New York Telephone Company, the system is scheduled for completion early in 1958.

Farther south, a Miami Beach inventor is also turning his attention to electronic gadgets calculated to improve hotel service in 1958. Among the devices created by Eli M. Lurie, president of the American Communications Corp. of New York and the American Antennae Corp., is a wake-up system that will make the morning call more pleasant for guests, and less burdensome for telephone operators. As Mr. Lurie sees it, the jangle of the telephone bell will be replaced. At the specified time, room lights will automatically be switched on, followed by musical chimes and a weather forecast rendered in a pleasant (feminine) voice. Only if the guest fails to respond by pressing a bedside switch within five minutes will his sleep be broken by a personal call.

Outside Heating System Melts Ice

An unusual de-icing system buried in the half-acre plaza at the site of New York’s Seagram Building will melt ice and snow at the rate of one inch per hour and even keep the walks dry in the rain. By heating almost the entire plaza, including the stairways leading into the park from the street, it will allow the granite floor to sustain a lustrous sheen all year long. Prepared under the supervision of mechanical engineering consultants Jaros, Baum and Bolles, the snow melting device will utilize a network of 21,300 feet of galvanized pipe conduit containing a light, quick-heating oil that will transfer heat to the pipes, keeping the ground warmed to any desired temperature.

(Member Roundup on page 274)
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THE STANDARD ELECTRIC TIME CO.
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TECHNICAL ROUNDUP

STORE LICKS GLARE, HEAT WITH LOUVER-PANELED FRONT

The pleasant openness of a broad glass store front loses much of its charm for owners of supermarkets and grocery stores who must contemplate the spoiled perishables, melted candy and souring costs of air conditioning and refrigeration which often result from solar heat introduced through that inviting expanse of glass. Equally undesirable is the accompanying glare which makes it difficult for customers to see signs and displays — and each other.

In the Penn Fruit Company's Brandywine Supermarket, Wilmington, Del., the glare-heat problem was made particularly acute by a 100 ft frontage on the west. Realizing that an all-glass front would direct the afternoon sun onto check-out counters, displays of perishables, and baked-goods and freezer cabinets at the front of the store, architect Angelo R. Aquaro of Penn Fruit enclosed the semi-circular facade above the window wall with daylight-control louver panels formed from Plexiglas acrylic plastic. The 6 by 8 ft panels consist of a series of molded horizontal saw-toothed corrugations, their upper surfaces angled to intercept sunlight and coated with a translucent ivory paint that admits light but blocks heat and glare. The transparent lower part of the saw-tooth allows customers outside the store to see through the louvered facade from some approach angles. The clear area also admits light reflected from the ground, providing additional natural illumination. According to the architect, the plastic louver panels, as designed and installed by the Amplex Manufacturing Company of Philadelphia, Pa., were competitive in cost with a plate glass and metal louver system also considered for the installation.