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Temple Isaiah has been designed by Kenneth N. Lind, Architect, Los Angeles, California, for a steadily growing congregation of that city that wanted to symbolize its progressive attitude in the architecture, also to provide for a busy social and education program as well as the center for worship.

The plan indicates the use of a central, second-floor lobby, approached by a covered ramp curving through the garden, to link the sanctuary, assembly room, and block of educational classrooms, library, and workrooms. Folding doors between the assembly room and sanctuary would permit throwing the areas together when needed. This would seat more than 1000 persons.

Traditional construction and architectural styles, were carefully weighed by the rabbi and congregation before it was agreed that these were unsuitable for the
A light, curving loggia (top) will lead through gardens up to the entrance of the Sanctuary (above), where the altar area will be dramatically lighted from the sides by hidden windows.

objectives of a contemporary congregation. The concrete structure is to be erected by the lift-slab method. Brandow & Johnston are the structural engineers. Interior and exterior treatment, as well as decorative elements, all will be chosen for best contemporary expression. It is estimated that the temple and furnishings will cost $280,000.

In the educational center, along the north side of the site, there will be classrooms for the Sunday religious school and the weekday Hebrew school. In addition, there will be dual-purpose classrooms for study of arts and sciences. These light, well ventilated rooms are to have best modern classroom and shop equipment.
Forecourt looking toward the great chancel window. Exterior walls of the frame structure are rough-sawn fir boards and battens. The inscribed boulder at the entrance (foreground) symbolizes the joint spirit in which the church was built. "We almost gave it up," the architect reports, "as being too heavy and costly a job . . . but the committee decided that if the old Egyptians could move obelisks, they ought to be able to move small boulders. So they went ahead on their own . . . That's the kind of swell committee we had to deal with."

Photos: Julius Shulman
In approaching the problem of designing a religious building, Belluschi comments that "the contemporary architect is confronted by the difficult problem of creating forms appropriate to a modern society without destroying the symbols that have given formal validity to the idea of 'church' in the past." While Belluschi refuses to build with tools of the past or imitate old forms, he believes in respecting and preserving "that feeling of emotional continuity which is the very essence of religion." In designing the Cottage Grove Church, "the aims and reasons expressed by the architects were shared by Pastor and congregation."

The lot, in the midst of a residential district, had beautiful trees on it, which have been preserved. The design aim was to produce an intimate and inviting atmosphere. Hence the landscaped forecourt, to provide a sort of transition area "to dispose the churchgoer inwardly, and to create a feeling of space and expectation... The materials used are humble ones, and the details very simple, chosen more to convey the idea of purpose than that of richness, and to prove that architecture is an intrinsic art and not an arbitrary dress to applied at the designer's whim."

D. Hugh Peniston, the Pastor, carries the posts of the bell standard himself, feels that "everything about the plan suggests a small friendly church where people know one another, and work together to God's will. It is not a small-sized model of a large city church... We have tried to be honest... expressing our faith in terms of our own day. Whatever else you may of the building, it is our own."

The entry porch (above) and side loggia provide covered passage into the church. The bell standard, with posts carved by the Pastor (above, right), is freestanding, in the courtyard just outside the Pastor's study. Panels on the church side of the narthex (right) may be opened to take care of overflow congregation. The Pastor's study may be reached directly from the side street (right of general view, acrosspage).
First Presbyterian Church

Interior walls are of plaster or spruce flooring. The church ceiling, that curves upward above the chancel, and the rear wall of the church are of grooved spruce, the grooving providing inexpensive acoustical correction. Flooring is asphalt tile. See Selected Detail of the pulpit page 68. Heating is handled by a radiant floor panel system.
The chapel (right, top) is open at all times for prayer and meditation. At the end of the parish hall (second photo in strip) is a stage. The church parlor (third photo) has a folding partition that creates two classrooms. At the southwest corner is the nursery classroom (bottom photo). Acoustical tile surfaces the ceilings. The architect asks that special credit be given to the contractors, Albert Vik & Son: “The workmanship throughout is superb... They were inspired in their work.”
JULIUS SHULMAN

FIRST PRESBYTERIAN CHURCH, Cottage Grove, Ore.

Pietro Belluschi, Architect
TEMPLE BETH ISRAEL

location | Lima, Ohio
architect | Percival Goodman
associate architects | Thomas D. McLaughlin and John J. Keil

March 1952
The planning problem was to provide a Sabbath temple with permanent seating for a congregation of 200, plus adjoining space related to the temple in such a way that the two areas could be thrown together to accommodate 500 or more on High Holy Days. During the remainder of the year, this expansion space would be used for social functions, lectures, assembly, theatricals, etc. In addition, four classrooms, a committee room, kitchen, office, coat room, and toilets were needed.

The flexible area is aligned along the south side of the building; entrance, offices, toilets, etc., are on the north. At the east end, about one-third of the open area constitutes the permanent temple; the portion alongside is normally used as a lobby, foyer, and the western end is a social hall equipped with a stage. A serving kitchen adjoins. Folding partitions make it possible to divide or join the major spaces as needed. A second floor on the north side of the building contains the four classrooms.
The stair landing (right) is suspended from the roof framing on turnbuckle steel tension rods. Throughout, interior finishes, as in the temple (below), are brick or red cedar; spotlights are recessed in the attached acoustic ceiling. Two sets of folding partitions (below, right) define the social hall (foreground), lounge, and temple. Cavity brick bearing walls were used since they provide in one operation bearing, insulation, and finish; open-web steel joists span the main hall, while wood-joist floor construction is used in the school area.

Photos: Hedrich-Blessing Studio

As a primary element in the Jewish service is reading, ample daylight is provided the temple by two large windows; artificial light comes from recessed spots, providing 20 foot candles at reading level. The heating system is radiant type—steel in the first floor; copper coil in the ling of the second floor.
Designed to serve the needs of both townpeople and students at the University of Arkansas (whose campus it adjoins), this project has two major parts—the church to seat 150, with choir loft above the narthex, and a recreation-fellowship wing.

Elements were consciously kept simple, and the church was designed to focus maximum attention on the altar. The frame is of steel-frame trusses, with columns embedded in the 12-inch sidewalls of clinker brick; window openings are glazed with pale gold, translucent lights. Exposed fir purlins extend the length of the roof and protrude through the rectangular brick wall at the west end. The 12-foot cross of wood, in front, is floodlighted at night.

The altar is of marble and limestone, altar rail, pulpit, lectern, and baptism font are aluminum. The Crucifix was sculpted by Harriet Reinhardt. The two-story wing uses bar joist and steel roof construction; pumice-block walls. A forced warm-air system heats the building.

"In its simplicity, it effectively sets the tone of and for worship," says Pastor Marcus Lang. "Its small, community feeling is all to its advantage, the very thing which I believe we should strive today."

Photos: Bob's Studio; Lionel Freedman
This structure, designed to house two congregations joined, is built on the site of one of the old churches. Since designing the building, the architectural firm has become two offices, with Ramey & Himes continuing their practice in Wichita, while Robert E. Buchner has established his own firm in Tulsa.

Photos: Julius Shulman
The joining of two congregations led to the decision to build a new church, and the architects were asked to produce a structure "to interpret the spirit of Christ and to enrich and perpetuate a Christian faith among us and our children."

Happily, no stylistic strings were attached, and the success of the design is indicated in the comment of The Clay Center Dispatch: "A building of this kind is a real asset to the community." The Pastor feels the building to be symbolic of a sincere and living Christian faith through the honest use of materials and modern construction."

In addition to facilities shown, there is a full basement, with parish hall, a classroom, kitchen, and service rooms; also (above the narthex) a choir loft and pipe organ. The natural lighting is designed to focus the eyes and minds of the congregation on the chancel and altar; strip-windows in side aisles are a greenish, glare-reducing translucent glass; the clerestory wing-panels direct light forward, and at left of the altar is a huge window panel that floods the area with light. The curtain behind the altar, with gold thread on a blue-green field, was specially woven for the church by Marianne Strengell. In plan, note the rear motor entrance, for use for small functions or in inclement weather.
The site of the former church, and the new building was built while the old one was still in use; hence, fortunate lawn setbacks from sidewalk lines. The slope allowed full above-grade windows for basement rooms.

The structural system consists of a combination of open-web steel-joist framing on the main floor, with the roof and high walls carried on laminated wood trusses. End walls are of brick masonry. As the architects explain, "this system gave us freedom to form the side walls—splayed window panels in the upper portion, etc.—with low side aisles which, by contrast, increase the apparent height of the nave."

Brick and wood were selected as major materials for their simplicity, beauty, and economy. The church is heated by a natural gas-fired, forced warm-air system, with separate zoning and control for the main floor and basement.
In this article, the author discusses five principles affecting the design of church-heating systems and applies them to two of the churches presented on the preceding pages. As he had only basic floor plans to consider, and was denied the benefit of consultation with the architect concerned, his analysis should be valued primarily as a method of applying these principles.

principles and violations of church heating

By Robert H. Emerick*

Two unusual but vital factors guide our approach to church-heating design.

First, all church monies are provided by voluntary, and sometimes uncertain, contributions from parishioners. This means that a lack of funds is a constant and well-established church ghost.

Second, the hours of heating, depending on the particular church considered, will range from two hours per week, for a single service, to almost continuous heating for a church that remains open between services for personal worship and meditation. This means that fast heating is desirable for a brief use of the facilities, while some form of partial or area heating should be provided for the open-door condition.

These factors create the first principle of church heating, which is: *provide economy in the design.*

The spending money of one church, for example, comes from 450 families; more than half of these families contribute less than $1 per week per family, and only three of them can be counted on for as much as $5 per week, or more. Also, these are weekly averages taken over a full year; many times, the income drops substantially as individual families meet sickness or other immediate obligations. This is a relatively large and affluent church; nevertheless, there simply is not enough sure money available to allow an elaborate heating system.

The second principle is a requirement so obvious that only its frequent violations require us to consider it in some detail. It is: *provide uniform heating, without drafts or hot spots.*

Usually the designer, if he is a professional, knows all about uniformity in heating. Unfortunately, he sometimes allows church authorities to convince him that short cuts must be taken to save money or space.

Figure 2 shows a heating system that was abandoned eventually, on orders from the church authorities, in favor of Figure 3. The latter arrangement clipped $6000 from a $14,000 installation: and also clipped heating satisfaction since the back of the church, where the air in the underfloor plenum was comparatively stagnant, remained much cooler than the altar end.

Figure 4 illustrates another way that violates heating uniformity. In this arrangement, the warm-air supply is being forced to go too far and remain warm too long. The employment of return-air grilles at regular intervals throughout the full length of the church, where the air in the underfloor plenum was comparatively stagnant, remained much cooler than the altar end.

In this church, the installation of a few radiant-glass, electric-heating panels at the chancel end would contribute substantially to better and more uniform heating. Although electric panels would create a hybrid system of heating, one should not hesitate to combine varied heat sources to achieve a harmonious effect.

Problems of draft can be difficult to solve when warm air, introduced into the
church, is the heating agent. To provide every pew with warm, still air requires skillful engineering, and is seldom wholly achieved. Figure 5 illustrates a method used by this writer with considerable success. The warm air is introduced into the aisles from registers so arranged in the end panels of the pews that air streams from opposite sides of the aisle collide and merge, losing their velocity in the collisions. This arrangement also eliminates large, unsightly grille openings.

The third principle of church heating is provide heat without noise.

Steam and water systems rarely offend in this way, although water hammer in an improperly designed steam system can be extremely irritating. To avoid this condition, the designer must provide generous pipe-line drainage; the presence of hammer is a proclamation of poor design, poor installation, or both. Of course, hammer can develop years after a system is installed, as the ultimate result of building settlement or system sag. In either case correction is neither difficult or expensive. For example, the one-pipe steam system illustrated in Figure 6 gave a great deal of annoyance to the church it served until loop drips were provided at the points shown. Thereafter, the heating was not only quiet but was also more efficient and the boiler was no longer forced. One-pipe systems are particularly susceptible to the development of water hammer as a result of building settlement; they are also particularly favored by many churches because of the comparatively low initial cost.

Noise in forced-air heating systems originates primarily in the fan, although oil burner sounds are not unknown. This fan noise often causes a church to reject unit heaters for a more expensive system, despite painful, financial stringency. If the unit heaters can be arranged with sound treated, short ducts, as shown in Figure 7, the problem is easier to solve. Units with the lowest practical decibel rating should be obtained—and one need not accept the manufacturer’s guarantee blindly. A commercial sound meter that reads directly in decibels enables one to check the claim. After the unit is installed, A.S.H.V.E. recommends a maximum allowable noise factor of 30 decibels in churches.

Sound lining for ducts should extend for a distance of at least 10 times the greatest diameter of the duct, beginning at the noise source, or heater. A minimum thickness of $\frac{3}{16}''$ is necessary, since the principle of sound absorption is to trap the vibration in multitudinous crevices and caves. In thinner material the caves are too shallow to be effective.

The transmission of noise can often
church heating

tively stopped by the insertion of a ric joint between the heater and the t. Its purpose is to interrupt the har-rious transfer of vibrations across a alto-metal joint.

elocity noises through ducts and les do not occur if the designer holds speeds to the following feet per minute- les: main ducts, 900; stacks, 500; les and registers, 500.

he fourth principle of church heating the heating system must not offend the bitecture.

n their efforts to observe this principle, re designers have stuffed heating plants in closets and under stairs, demanded the sage of air through ducts too small for volume required, set radiators behind risades which thoroughly imprison the , and finally, have provided chimneys of size where a senior structure was intial. Fortunately, by some careful sking, the designer usually can avoid of se and at the same time provide ade te heating.

hurch chimneys create special design blems. More important than our de- is, is the basic fact that a simple chimn will fail in its purpose if it lacks ght. Height provides the natural draft t pulls air into the fire for combustion. ight compels fumes and cinders to jour far above our heads before finding ir freedom. For architectural harmony, ght may be lessened if we substitute ft fans, but the amputation can be a ential neighborhood nuisance.

so far as heating equipment is con- nected, probably the least conflict with archi architecture occurs if we use some n of panel heating. This practice is ng viewed by designers with consid e favor, but caution is recommended, the service ritual involves much kneel -.individual worshipers may object here there to alternating a dozen times an ir between the desert warmth of the r and the comparative coolness of wind. The fact that radiant floors are afactory in many churches is no guaran teed that such floors will be satisfactory very church. Before adopting this plan, should evaluate operating experiences churches of the same denomination for ch we are designing.

uch can be done with baseboard radia-, particularly if no supplementary ting is needed. In 23 churches brought the attention of this writer from various is of the country, four indicated the f for heating assistance from another e. Extremely interesting is the unali shown in selecting the peak-period er: it was a unit heater in each case. aufacturers of baseboard equipment it do well to develop thoroughly docu-

mented data on their equipment perform ance in religious buildings, with particular reference to the basic requirements dis cussed in this article.

The fifth principle of church heating is: design for simplicity.

The sexton of a church is a busy man. Occasionally he is equipped with a flair for mechanics and an interest in machinery; more often, however, the less he must do with a heating system, the better he likes it. In consequence, the average system is asked to run year after year, providing comfort to every exacting pew-occupant in the church, and without any mechanical considerations whatever.

Since this treatment is the rule rather than the exception, we certainly should not install a control system that will be made inoperative, perhaps during the first season, by the vibration of passing traffic. It is far more likely to be excised than repaired.

Nor should we seek the utmost operating economy with a multiplicity of dampers, bypasses, or regulating valves, for they are quite sure to assume fixed positions eventually, and the heat, as directed by the sexton, will be either off or on. In short, a simple, sturdy arrangement is what we want for long and probably neglected service.

Suppose we discuss the application of these principles to the Temple Beth Israel (plan on page 70).

A firm decision will not be offered, since decisions always emerge from studies too extensive for our present space and time, but the reasoning that leads to the adoption of one system or another will provide a signpost of method.

First—economy. Since unit heaters cost least if gas fired, we study the plan to spot suitable locations. There are none of these in the sanctuary and but two possibilities in the social hall, both dependent on the availability of wall space above the chair storage rooms. Dressing rooms and all the other small offices, classrooms, and kitchens are still to be heated. The verdict is not favorable.

Our next thought is to use a forced circ ulation warm-air system, with basement ducts and baseboard registers. A disadvantage is observed in the need for large ducts—can their bulk be tolerated in the basement? We can use registers in the pew ends, discharging toward the decorat ive windows, thereby achieving a kind of perimeter heating. If there is no basement under the temple, the application of air becomes more complicated, but obviously this arrangement merits our more exhaustive study.

The combination of radiant floors in the sanctuary, using forced hot water, and con vectors in the other rooms, offers another approach. But the writer doubts if a heated floor would be satisfactory in the social hall during dances, the warmth underfoot tending to produce foot fatigue earlier than other forms of heating.

Next, consider the second principle, the importance of uniformity in heating. The design of this structure is such that uniformity is not difficult to obtain. Except for the choir space, it is notably free from offsets, alcoves, and cubby holes. In consequence, forced warm air, a radiant floor, or the judicious locating of convectors will meet our needs on this score.

The question of noise, the third principle, is answered largely by the location of the heater room. Noise weakens as it travels (called attenuation in duct sys tems) and its journey from the heater room to the sanctuary outlets is a long one. For the registers at the ends of short runs, the use of a fabric interrupter joint and, perhaps, the insertion of acoustical material inside the duct, should assure comfort to all ears. If we use steam or hot water instead of air, the noise problem is simplified to the provision of a properly designed system.

Considering architectural harmony, the fourth principle, we need have no visible ducts in either the sanctuary or the social hall, and the registers, as we have already observed, will be in unobtrusive positions.

If we go to a radiant floor in the sanctuary, the problem does not exist. The adoption of convectors, however, will suggest the need for recessed construction or, if this is not practical, a fitting-in of their physical bulk. Fortunately, the seating in the sanctuary is arranged with side aisles adjacent to the outside walls; when the pews extend into contact with outside walls, comfort in these extreme seats is most difficult to provide. This writer would consider the employment of baseboards along these outside walls, with the possible addition of cabinet convectors backed up against the last row of pews and discharging toward the foyer. By such a design, we observe the bold precept of making important what must be seen.

Our fifth principle, the need for sim plicity, must be viewed in the light of operating practices. The entire building, with the exception of the rabbi's study, probably will not be used during the daytime hours more than one or two days a week. The sanctuary will be used for serv ices Friday nights and Saturdays, but the social hall and other rooms are likely to house activities during most of the nonreligious evenings.

Obviously, some kind of sectionalized or zone operation is indicated. For the warm air system, this would involve a two-speed fan and motor-operated dampers; for
steam, either motor-operated or solenoid-operated sectionalizing valves; and, for circulating hot water, a separate circulating pump for each zone. In the opinion of this writer, the last would be the simplest for this particular case, since all the circulators could be concentrated in the heater room; dampers and steam valves, however, might be expected to take stations elsewhere in the system in order to best employ duct and piping facilities.

In any event, some form of supplementary heat appears to be justified for the rabbi's study, considering the isolation of both its physical location and its hours of use. Operating the main plant for such a comparatively tiny load is disproportionate and wasteful. A gas-steam radiator, a radiant-glass panel heater, or some similar unit should be satisfactory.

The view of the problem, as we now have it, suggests that either forced warm air or some arrangement of circulating hot water could best be adapted to this particular case. However, as we noted previously, the data and considerations examined are incomplete, and a firm decision must be deferred pending a detailed study.

An extremely interesting arrangement is illustrated by Pietro Belluschi's design for the First Presbyterian Church (page 65).

Relative to our principles of church heating, the central location of the heater room is a strong assist to economy, since the heat-conveying channels, whatever they are, are both shortened and reduced in individual sizes.

From the standpoint of noise, the heating plant is subject to some suspicion because nothing but a partition separates the heater room from the church. This writer would be inclined to specify sound-absorbing material for all walls and the ceiling of that room, regardless of the type of heater selected.

Uniform heating in this church is not difficult to achieve, for the reasons pointed out in the Temple Beth Israel design. In fact, the presence of enclosing and heated structure on three sides makes uniform heating almost easier to obtain than not to obtain. Exactly how we would heat this church cannot be determined from the plan alone, as we need information concerning heights and materials, but the distribution problem is not complex.

Unit heaters probably could be used, at a saving, for the parish hall. The walls on each side of the proscenium offer possible grille positions, with the heaters set behind them. At the other end of the hall, the kitchen and storage walls also might provide grille areas. The arrangement could be similar to that shown in Figure 1.

From the standpoint of economy, these unit heaters should be separately fired, using gas-fuel and thermostatic control. Nothing would be saved by extending steam or hot water lines from the central heater.

The reduced need for heat-emitting equipment in the church simplifies the problems of architectural harmony in proportion. The cost of a radiant floor seems unjustified in view of the warm walls on three sides, and we cannot decide from a plan alone if warm-air ducts are feasible. These eliminations bring us to the considerations of steam and hot water, the former seemingly impractical since the heater room is not below the floor level of the church, and condensate drainage would involve underfloor trenches, a receiving sump, and pump. Therefore, hot water circulated by pumps appears at this moment to be the best solution of the problem. The arrangement of this church suggests that hot water equipment could be concealed boldly positioned, as the architect might desire. Actually, the beauty of utility everywhere illustrated by the human form and designers might ponder this fact with profit.

The principle of simplicity, as of economy, is assisted by the central location of the plant. Even if we were to use warm air ducts—perhaps locating them in a suitable ceiling, although the existence of such a ceiling is merely speculative—all zone dampers might be contained in the heater room. A similar concentration of controls for either steam or hot water is equally practical and indicated, each being actuated by a thermostat in the area served.

These discussions should emphasize that the principles of church heating are not complex in either idea or application. In fact, we can summarize each in a single word:

- Economy
- Uniformity
- Simplicity
- Silence
- Beauty

Violations result when we are guilty of superficial or wishful thinking.
House: Atlanta, Georgia

Moscowitz, Willner & Millkey, Architects
Designed for the family of one of the architects—Herbert C. Millkey, his wife, and their three children—this house is located on a beautifully wooded, 7-acre site about three and a half miles from downtown Atlanta. Apart from the rooms needed, and the wish to build the house as inexpensively as possible, a major requirement was a separate living area, both indoors and out, for the children. Hence, the house is placed on the site in such a way that all adult living rooms are on grade with the southern living terrace, and an above-grade partial lower floor, with direct outside access, is provided for children's play.

The house, completed in late 1950, cost less than $7 a square foot to build. The structural system consists of a building frame independent of all interior partitions and with all millwork eliminated.

Typical mill construction is used—4 x 6 yellow pine posts spaced 5½ feet on center, with roof beams on the same spacing covered with 2-inch t & g exposed sheathing. Above this is insulation board and a built-up roof. Fixed glass is framed directly into the posts; and a wall material used for the solid areas—insulating fiberboard between layers of asbestos cement—is also framed into the 4 x 6's. The living-dining area has a brick floor, while cork flooring occurs in other areas.
The south front of the house (across page and at right) is bordered by a living terrace paved with lightweight 18" x 36" precast concrete tiles; at the west end is a covered porch (page 83). Exterior panels of the asbestos-cement-surfaced fiberboard are painted red, green, and blue.

The approach side of the house (below). In the background is the east wall of the bedroom wing, that has the children's play room and guest room on a lower level. Photos: Richard Garrison
Waxed brick of the living-room floor is brown in tone; wall surfaces are either birch plywood or asbestos-cement panels painted Swedish red, while the exposed pine framing is pickled and waxed. Immediately above are two views of the kitchen, with its dining space opening out to the terrace.
The master bedroom (below) has a door out to the southwest living porch. As elsewhere, framing is exposed. The flooring is cork.

Throughout, there is a continuous electric base mould allowing lamp attachment at 3-foot intervals. Heating is handled by a forced warm-air system, from overhead ductwork that may be used for a future air-conditioning installation.
design procedure for a solar house
By George S. Sharon

The dream of having a home fully heated by the sun has at last become a reality. Several houses in the Boston area now contain collectors (each composed of a black-painted metal plate, an air space, and two panes of glass) which successfully gather solar energy and efficiently store it in either water or chemical ready for release when needed for house heating.

regional feasibility
Before the design of a solar house can be considered, it is necessary to know whether it can be achieved by its regional location. (Figure 1, based on the available solar radiation and degree days, indicates the various regional suitabilities for solar heating.)

architectural considerations
In a solar design, an architect is faced with definite restrictions imposed by the heating system. Because it is necessary to receive the maximum available solar energy, south orientation of the collector is mandatory. High ceilings, over-use of glass, large exterior wall perimeters, and many exterior wall openings are sources of excessive heat loss and should be avoided. Glass areas should have drapes or screens which can be drawn during the evening and inclement weather, and structural areas should be well insulated.

A lampblack collector plate has the highest absorptivity of the known pigments. Because black is not appropriate for a home, a better color scheme is desirable to reduce the somberness created by the large collector surface. Medium green (trim color) may be used as a satisfactory substitute.

In order to prevent the collector from being cracked by overheating during the summer months, an overhang, awning, screen, shade, or a whitewashing of the glass may be considered as an adequate safeguard.

collector placement
The basic positions of the collector are on the roof and on the ground. Either of these positions may be used with a level or sloped site. A design for a level site may be considered as a universal solution, since no special land contours are required, at the same time, it is easily adaptable to a sloped site.

roof placement
One scheme for a level site has been the placement of the collector on the roof and the treatment of the collector and living area as one complete structural development (Figure 2). In such a solution, the length of the house is governed by the length of the collector. A collector requiring an area of 720 sq. ft. and a 10 height has to be 72' long; as a result, there is a loss of usable volume. The design, however, has advantages of large, unobstructed, heat gain through a dominant south orientation, good insulation given to the ceiling and collector, and simple construction. Using the elongated plan, whose façade incorporates the heat collector, other design forms are possible (Figure 3). Human scale and collector subordination may be achieved in the elongated plan by splitting the collector (Figure 4). In the vicinity of New York City, a 5'-high collector casts a maximum horizontal shadow of 17.7'; thus the split collector is architecturally feasible (in scheme "A" of Figure 4, the exposed backside of the collector creates a heat-loss problem. Schemes "B" and "C" reduce heat loss through the backside by incorporating attic, but have the disadvantages of being structurally and esthetically more complex.)

The roof itself offers a large area for solar collection. A roof pitched 45° has a favorable solar tilt and sheds snow well (Figure 5). This scheme offers a compact plan, small exterior wall perimeter, and good insulation to the ceiling and collector. The steep roof, however, may be esthetically questionable.

ground placement
The placement of the collector on the ground results in many compromises. Although south orientation is mandatory for the collector and desirable for the living areas, it is difficult to satisfy both conditions simultaneously. By orienting the living areas other than south, the south wall itself may become the

Figure 1—feasibility zones for solar house heating. Heat requirements can be supplied in zone A—by solar radiation collection devices without expensive engineering; B—by solar radiation collection devices and careful engineering design; C—full heat requirements cannot be supplied by even the most elaborate solar heating system.

Figure 2: Dr. P. A. Siple, "Space Heating with Solar Energy", Heating and Ventilating, Sept., 1950, pp. 88-90.
collector and thereby permit construction economy and ultimate lower heat loss. Researchers at M.I.T. have suggested placing the collector on the south wall and puncturing it with windows for the living areas (Figure 6). By abandoning a dominant southern exposure for the living areas, other schemes are conceivable (Figures 7 and 8).

The basic premise of forsaking a southern exposure is a questionable compromise. By elevating a structure, a favorable orientation may be given to both the collector and the living areas (Figure 9). The large heat loss through the backside of the collector, however, is a serious disadvantage of this scheme.

split collector placement

The basic collector positions may be combined to give a split placement of the collector on the roof and on the ground (Figure 10). Such an arrangement compliments human scale and gives dominance to the living area; however, it has the disadvantage of the extra cost involved in splitting the collector.

A slope site has the advantage of providing good orientation for the collector and living areas; it also permits a collector to be separated from a continuous façade and offers good insulation for its backside. (In Figure 11, scheme "A" has the disadvantage of having its collector plate located away from the home which it is to heat; therefore a high heat loss in transmission can be expected.)

solar collector design

Having determined a feasible solar house design, the designer must compute the collector size. In the following paragraphs, the calculations required for a collector for a solar house located in the vicinity of New York City (Figure 12) will be discussed and solved.

critical months

The collector area is governed by the most critical months of the heating season. A factor rating the severity of the heating month may be expressed by:

\[ M_c = \frac{\text{Degree days per month}}{\text{Monthly total of average solar radiation}} \]

Because December, January, and February are the most critical heating months for the New York City vicinity (Table 1), they will determine the collector size.

collector tilt

The collector tilt and shape is governed by architectural feasibility. Because the maximum solar radiation is delivered from 11:00 am-2:00 pm, the optimum tilt should be based on the corresponding hourly solar angles. The average solar angle, therefore, is 29° resulting in an optimum tilt of 61° (Table 2).
incident solar energy
The energy delivered to a collector may be expressed by (Equation 1):
\[
\frac{q_A}{A} = (H_s - H_d) \left( \frac{\cos \Theta T / \cos \Theta Z}{\cos \Theta T' / \cos \Theta Z'} \right) \frac{\cos \Theta T / \cos \Theta Z}{\cos \Theta T' / \cos \Theta Z'}
\]
where:
\[
q_A/A = \text{Rate of heat delivered to 1 sq. ft. of collector plate: Btu/hr/ft}^2.
\]
\[
H_s = \text{Total direct solar radiation on a horizontal surface: Btu/hr/ft}^2.
\]
\[
H_d = \text{Diffuse radiation on a horizontal surface: Btu/hr/ft}^2.
\]
\[
\Theta T(\Theta T') = \text{Angle between direct (diffuse) solar beam and normal to the tilted collector surface: Degrees.}
\]
\[
\Theta Z(\Theta Z') = \text{Angle between direct (diffuse) solar beam and normal to a horizontal surface: Degrees.}
\]
\[
\tau(\tau') = \text{Over-all transmittance, for direct (diffuse) sunlight, of a system of glass plates, allowing for absorption and reflection.}
\]
\[
\alpha(\alpha') = \text{Absorptivity of surface of collector for direct (diffuse) solar radiation.}
\]

solar radiation: Hs and Hd
Values of direct and indirect solar radiation are obtainable from regional weather stations (Table 3).
solar angles: Cos \Theta T/Cos \Theta Z and Cos \Theta T'/Cos \Theta Z'
The maximum solar energy strikes a collector when Cos \Theta T/Cos \Theta Z approaches infinity. Having established the collector orientation, the values of Cos \Theta T and \Theta Z can be found by descriptive geometry (Table 4). The values of Cos \Theta T'/Cos \Theta Z' may be assumed to be 1.
solar transmission: \(\tau\)
The factors influencing solar transmission through a series of glass plates are the number and type of plates, thickness, and angle of incidence. Two water-white plates (each .117" thick double-strength glass and separated by an air space) at a 33° angle of incidence will transmit 82% of the incident energy (Figure 13).
solar absorptivity
The factors influencing solar absorptivity are the angle of incidence and color of the collector plate. At a 33° angle of incidence, a medium green collector absorbs 96% of the energy absorbed by lamplack resulting in the absorption of 91.2% of the incident energy (Figure 14).

usable solar energy
\[
q_A/A \text{ represents the solar energy impinging upon a collector. In order to determine the quantity of energy actually utilized for storage, plate dirtiness, transmission losses, and "warming up" of the collector must be considered. The total collectable energy may be expressed by (Equation 2):}
\]
\[
Q_u/A = F[q_A/A(1 - D) - q_L/A - q_a/A] - Q_H/A
\]
where:
\[
F = \text{Ratio of useful heat collection for the method of heat transmission.}
\]
\[
q_A/A = \text{Rate of heat delivered to 1 sq. ft. of collector plate: Btu/hr/ft}^2.
\]
\[
D = \text{Fractional reduction in transmittance of glass plate system due to surface dirt.}
\]
\[
q_L/A = \text{Rate of total heat loss through 1 sq. ft. of the top of the collector: Btu/hr/ft}^2.
\]
\[
q_a/A = \text{Rate of total heat loss through 1 sq. ft. of the bottom of the collector: Btu/hr/ft}^2.
\]
\[
Q_H/A = \text{Loss, per collection period, due to heat capacity of the collector: Btu/hr/ft}^2.
\]
lateral resistance: \(F\)
The value of \(Q_u/A\) involves the assumption that the collector plate is at a uniform temperature "T," whereas, a collector design having tubes soldered to the backside of the collector has only an average value of "T" along the contact lines of the plate and pipes through which the fluid flows; it is higher between the pipes. It may be shown that the ratio "F" of useful-heat collection from the latter system to one having a uniform plate temperature is given by.

Figure 14—Absorptivity of a blackened surface for artificial sunlight transmitted through glass (left).

Figure 15—Over-all heat transfer coefficient for use in calculation of heat losses from flat-plate collectors (below). Tilt from horizontal, 30°; collector surface emissivity, 0.95; wind coefficient, 4.07, 10 mph.

Table 4: Hourly values of Cos θT and Cos θZ for Jan. in N. Y. C.

Table 5: Avg. direct radiation, btu/hr*ft², delivered to 61° collector tilt during 4:05 hours.

Table 6: Avg. HD, but/hr*ft², delivered to 61° collector tilt during avg. Jan. day in N. Y. C. (below).

Table 1: Severity of heating months for N. Y. C.

Table 2: Avg. solar altitudes of most critical angles for N. Y. C. (above).

Table 3: Avg. direct and diffuse radiation, btu/hr*ft², for Jan. in N. Y. C. (below).
<table>
<thead>
<tr>
<th>Period</th>
<th>Morning</th>
<th>Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>U</td>
<td>.57</td>
<td>.57</td>
</tr>
<tr>
<td>$\Delta T$</td>
<td>69°</td>
<td>65°</td>
</tr>
<tr>
<td>QL/A</td>
<td>39.3</td>
<td>37.1</td>
</tr>
<tr>
<td>Avg. inward heat loss QL/A-QL/B: Btu/hr</td>
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<tr>
<td>Total collector heat loss QL/A-QL/B: Btu/hr</td>
<td>40.3</td>
<td>38.1</td>
</tr>
</tbody>
</table>

Table 7: Outward and inward collector heat losses.

<table>
<thead>
<tr>
<th>Year</th>
<th>December</th>
<th>January</th>
<th>February</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Dark Partly cloudy Above average</td>
<td>Dark Partly cloudy Above average</td>
<td>Dark Partly cloudy Above average</td>
</tr>
<tr>
<td>1941</td>
<td>11441120</td>
<td>224121</td>
<td>332131</td>
</tr>
<tr>
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<td>25</td>
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<tr>
<td>Avg.</td>
<td>11441120</td>
<td>224121</td>
<td>332131</td>
</tr>
</tbody>
</table>

Table 8: Max. consecutive number of days.

Figure 16—chemical performance in terms of collector efficiency.

Figure 17—elements of a solar-heating system and the three phases of operation (below).
the cleanliness: 1 - D

where:

- W = U/kM
- U = Over-all loss coefficient, plate to upper air (Figure 16).
- D = Minimum distance between parallel pipes measured along collector plate: Ft.
- T = Thickness of collector plate: Ft.

A 24-gage copper collector with ¾" copper tubes 6° o.c. has an "F" of .975.

\[ F = \frac{2}{3} \left( \frac{c^2 - 1}{c^2 + 1} \right) \]

\[ q_L/A = U(T-Ta) \]

\[ q_B/A = \text{Rate of total heat loss through 1 sq. ft. of the bottom of the collector: Btu/hr/ft}^2. \]

Tests indicate that the glass plates and bottom insulation contribute 52% and 28% respectively of the total heat capacity, and the copper absorbing surface and tubes account for but 20%. Solving Equation 6, is found that QH/A = .335 Btu/hr/ft²/°F.

useful energy: \( \text{QH/A} \)

During an average day in January, in the vicinity of New York City, a collector tilted 61° (having two water-white plates each .117" thick, a 24-gage copper plate painted medium green with ¾" copper tubes soldered to the backside 6° o.c., insulated with 1" air space, aluminum foil, 4" rockwool, and 1" fiber board) collects 30.9 Btu/hr/ft² and 287 Btu/day. The resulting collector efficiency is 32.3%.

collector size

The collector area may be expressed by (Equation 8):

\[ \text{Ac} = \frac{H_L}{S_a} \]

where:

- Ac = Collector area required: Sq. ft.
- H_L = Net average heat load: Btu/day.
- S_a = Solar energy gathered on a unit area during the most critical heating month: Btu/hr/ft².

heat balance

The heat loss of a solar house cannot be computed as a conventional heat loss problem. Because the solar energy gained for house heating is based on an average monthly value of solar radiation, it is necessary to base the temperature difference on the average outside temperature and not on the regional winter design temperature. The heat balance equation may, therefore, be expressed by (Equation 9):

\[ H_T = S_m \]

where:

- H_T = Total average daily heat load during the most critical month.
- S_m = Average daily solar heat collected during the most critical month.

Based on an average outside temperature of 33°F, the heat loss of the solar house is 373,000 Btu/hr. Although the glass area on the south façade loses considerable heat during the evening and inclement weather, it admits a large quantity of heat during an average day which results as an aid to house heating. The total energy gained through 170 sq. ft. of south-facing window is 128,000 Btu/day, resulting in a net heat loss of 245,000 Btu/day. The collector area, therefore, is 850 sq. ft.

chemical storage

In the design of the collector, the plate temperature was assumed to be 100°F. Glauber's salt was chosen because of its efficiency (Figure 16). The amount of chemical storage is dependent upon the heat capacity of the salt, heat loss of the house, and the maximum number of days that the house is to be heated solely by chemical storage. For eight consecutive sunless days (Table 8) and a 65% efficiency due to heat loss and chemical sluggishness in changing state, chemical storage should be provided for 11 days. During this 11-day period, no heat assistance is considered gained through the south façade. The total heat loss is 4,100,000 Btu; therefore 21 tons of Glauber's salt occupying 434 cu. ft. are required.

solar-heating system

Basically there are three phases of operation for a solar-heating system. Phase I consists of solar-energy storage and house heating; Phase II consists of solar-energy storage, but no house heating; and Phase III consists of house heating with stored energy, but no solar collection (Figure 17).
Ceramic sculptures by Viktor Schreckengost, of Cleveland Institute of Art, adorning the 60-foot sandstone heating stack of the new $500,000 Bird Building in Cleveland, Ohio, Zoological Park, won first architectural ceramic citation in the 16th Ceramic National sponsored by Syracuse Museum of Fine Arts. J. Byers Hays, of Conrad, Hays, Simpson & Ruth, architects for this highly specialized and modern structure, terms the dominant decorative motive "a sort of contemporary totem pole." The sculptures, representing (bottom to top) the evolution of bird life from the earliest Archaeopteryx to the American eagle, symbolizing living species, were meticulously studied for scientific accuracy. Twenty-four smaller plaques, depicting North American birds now extinct, are inserted in the masonry walls to further decorate the interior and exterior of this building, first unit of the rehabilitation program of the 70-years-old zoological park. Photos: Robert C. Hoffner
offices for six associates

On this and the next pages is shown the office building of a remarkable professional organization known as Six Associates, Incorporated, Architects and Engineers. Not the least remarkable fact about the firm is that, in spite of its name, there are just five principals in the firm. When the name was adopted, evidently there was a consulting engineer who might have been the sixth, but he had "other fish to fry."

Briefly, the group of principals consists of three architects, one architect-engineer, and one engineer, all of whom had successful practices of their own when they decided to pool resources and thus be able to handle commissions of a variety and scope that no one of them could entertain alone.

President of the group is Erle G. Stillwell, F.A.I.A., who had conducted his own architectural practice for 26 years. There are two vice presidents—Henry Irven Gaines, architect, A.I.A., and Anthony Lord, architect-engineer, A.I.A. Gaines had 17 years in private practice before joining the group, and Lord, who is past president of the North Carolina Chapter, A.I.A., had been in partnership or independent practice over a period of 13 years. S. C. Minich, Jr., engineer, A.S.H.V.E., who formerly had a private engineering practice in Kingsport, Tennessee, serves as secretary of Six Associates; while the organization's treasurer is Stewart Rogers, architect, A.I.A., who for 9 years conducted his own private architectural practice.

The origin of the association was a matter of expediency. For the design of two slum-clearance projects, the Asheville Housing Authority wanted participation of several local men, rather than giving the work to any one office. To meet this demand, four architects decided to join forces. Because of war restrictions, the projects were not built, but the design work was carried through jointly: expenses and income were equally shared. Meantime, each participant continued his private practice.

Since war demands—as with defense needs today—meant that most of the plum jobs were going to large, fully equipped firms, the group decided in 1942 to set up a formal organization and, after adding another architect and a consulting engineer, they became Six Associates, Inc.

A brochure was prepared describing the constitution of the organization, the work each member had done, letters from clients, etc. This was distributed widely with emphasis on the offices of the Art Corps of Engineers and the Navy Bureau of Yards and Docks. As a result of this and other efforts, "a contract for architect-engineering services for construction of Army general hospital was promptly cured." Income and expenses were equally shared by the (five) members who gave full time to war work—mainly for the Army.

Eventually, the participants began opening their individual offices. But Six Associates was continued to handle large-scale commissions, such as industrial work for the State of North Carolina, school work, and other big projects. In the interim period, an hourly wage system was established by the associates and, after amounts earned by each were paid, the remainder was equally divided.

However, this dual type of practice in some group, some individual—proved unsatisfactory, and the associates finally agreed to pool all offices, all work, and all efforts. This was also the time they decided to build the group office building shown here.

Today, the office force, including principals, totals 45 persons; 7 architects; architectural draftsmen; 2 structural engineers; 2 structural draftsmen; 3 mechanical engineers; 3 mechanical draftsmen; 6 civil engineers; 2 electrical engineers; 3 job engineers; 1 landscape architect; a site planner; 3 in the reproduction department; and 5 secretarial workers.

The end result has been that dollar volume of work, as well as number of jobs, has steadily increased and is far greater than the joint efforts of the separate firms previously. With its own mechanical, electrical, civil, and structural engineering
SIX ASSOCIATES
IN ARCHITECTS AND ENGINEERS
HENRY IRVING GAINES
ANTHONY LORD
CLINTON MINNICH JR
 STEWART ROGERS
 ERLE G STILLWELL

location Asheville, North Carolina
architects and engineers Six Associates, Inc.
offices for six associates

Opening off the reception room (right, top) is the south-facing secretarial room (center). The engineering department (bottom) occupies the south third of the drafting-room wing.

The building is 4 miles from the center of the city, on a principal highway. Plenty of parking space; clean air; no smoke; excellent view. Combination of load-bearing walls, steel frame, and wood floor and roof construction. Photos: F. S. Lincoln
the firm is well set up to handle the large-scale work that it increasingly obtains. However, it continues to do considerable private residential work—as a feeder and fill-in for the drafting room, as well as a goodwill factor in the business.

Things sometimes become overloaded in the drafting room, but the firm feels that "much of this could be overcome by better scheduling." The principals do not act rigidly as department heads. In general, the man with whom a job originates takes charge of the project from start to finish. But, on larger work, frequently two or more principals may be engaged, and they now have one giant commission on which all are actively working. "No doubt a conventional setup with department heads in charge of particular sections and others who looked after client contacts etc. would be more efficient, but our setup has worked and we look forward to improving it as time goes on."

As with any organization, some members like to be busier than others, and this problem is currently being met by a sliding scale of payment. The first thousand hours worked in a year are at a minimum rate; the second thousand, at a higher rate, and the third, still higher.

As to a workable size for such an organization, "the group should probably be no larger than five and perhaps smaller. It is not easy to find five architects and engineers who can get along together."

A few questions suggested for any who might contemplate establishing a similar type of group practice:

"Do the prospective participants all subscribe in general to the same underlying principles of architectural design?"

"Are the talents of the members such that they supplement one another?"

"Are the engineer members imaginative men who can offer fresh approaches?"

Mr. Rogers' private office (above) and (at left) the architectural drafting room. Throughout, various floor, wall and ceiling finishes, lighting units, etc., were used to serve as a sort of materials and equipment exhibit. An intercommunication system assists office efficiency.

The heating system is forced circulation hot water, operating in two zones—one for the drafting room; one for the office area. The system is oil fired and has automatic control with outside pilot. Ceilings are acoustically treated.
For his own offices, the architect wanted an efficient, attractive building that could be built at minimum cost. That he achieved his goal is evidenced by the plan and photographs, and by the surprising fact that this tidy structure, completed in the fall of 1950, cost only $8 per sq. ft.

Specific requirements included a drafting room with space for 14 boards; three private offices; a conference room; reception-office space; and ample storage and utility work area.

The site is a small lot bounded by three streets, in an outlying residential section that is gradually becoming commercial. The architect is most proud of "the full use of land and an open plan, with privacy for offices." Also, he points out, within the compact scheme good orientation has been provided for all spaces and there is direct access to all rooms.

A particularly resourceful plan element is the use of garden walls to provide complete privacy outside full windowed areas while maintaining the openness and elegance that the glass wall allows.
Seen from a side street (acrosspage), the tall mass at the left is the drafting room. The entrance for draftsmen occurs just at left of the end of the serpentine wall.

At the front of the building (above), the tall brick wall at right encloses the garden outside the conference room.

Inside the serpentine wall (below). The window wall of the reception room is made up of alternating fixed and operable sash; door to the drafting room in background. The exterior side walk consists of concrete squares with surface aggregate washed and exposed, separated by strips of the same red brick used in the walls of the building.

Photos: Lionel Freedman
Structurally, the building is a combination of wood frame with steel pipe columns and brick bearing walls. Footings and foundation walls are concrete, as are also the floors, which are surfaced with either terrazzo or asphalt tile. Exterior walls combine three materials—red brick, stucco, and yellow-painted plywood. Soffits and steel residential sash are gray; the fascia is white, and doors are natural-finish oak.

Interior walls in the office area are of plywood, burlap-surfaced building board, brick, or plaster. The south wall of the drafting room is covered with prefinished oak flooring, while the two side walls are of lightweight concrete block, providing “good acoustical and thermal conditions.” The roof framing for the 28-foot span of the drafting room is the lightest possible steel-bar-joists and steel decking; elsewhere, roofs are wood framed. The building is heated from a combined floor-and-ceiling radiant system, using steel piping and served by a gas-fired boiler.
The architects are husband and wife, and their former home-office arrangement has consisted of a generous living space and minimum office area. Since both were busy practitioners, however, they found that they spent most of their time in the cramped space and used the large living area very little.
the design of the new building, they ded to reverse the emphasis and provide large, flexible office area and just a small independent apartment that they could use themselves or rent. By keeping the two areas on separate floors, it would be possible (if ever desirable) to convert the present office floor into a second-bedroom apartment.

The solution is a four-level building, with garage, storage, and utility space on the ground level; office floor, one flight up; the apartment above that; and a roof recreation room and garden at the top. Since prevailing daytime breezes derive from the northeast, the drafting room and main apartment rooms are located along the east wall, with reception space, service rooms, bathrooms, etc., on the west. The latter are protected from excessive sun and heat by precast, fixed, vertical louvers of lightweight, insulating concrete.

The structure is reinforced concrete throughout, with concrete block filler walls, either left exposed or finished with stucco. Flooring is black terrazzo, and ceilings are of acoustic tile.
offices and home

The architects' private office (bottom) on the working floor of the building and (below) the living room of the apartment. Both of these rooms face the favored east exposure to gain both good light and the desirable north-east breezes. Windows are specially designed jalousies and clear glass units. The roof garden (right) has a pavilion at the south end, that may also be used as an out-of-the-sun loggia.
A new, already-occupied 60,000 sq. ft. multi-arch factory warehouse was completed at the Nash-Kelvinator Corporation plant in less than 45 working days with a 16-man crew (construction photos above). The plant is four bays wide at one end; the overall lengths of bays vary at the opposite end in accordance with plot limitations. The four-bay width extends 440', a three-bay width also extends 440', and a two-bay width stretches 480'. Insulation and interior finish, not required for warehousing, can be installed quickly and inexpensively whenever the building may be desired for manufacturing purposes.

Quonset Long-Spans are now available for prompt shipment. As the cost of any Quonset is determined by many factors such as size, number of door and window openings, freight charges, and local labor rates, it is impossible for the manufacturer to quote exact prices; however, estimates on any specific building requirement may be obtained without obligation.
laminated glass roof

Solex, a green-tinted plate glass which absorbs the sun’s heat, reduces eyestrain, and keeps fading and bleaching of show-window displays at a minimum, is the newest product offered by the flat glass industry and it is expected eventually to replace the conventional colorless glass used in public buildings, trains, buses, and even homes.

The material may be bent, laminated, or tempered for use in practically every known type of flat-glass application. Recently, it was incorporated into a new method of glazing for skylight, terrace, and other canopy enclosures. Conceived by Dr. J. Hervey Sherts, product development director of the Pittsburgh Plate Glass Company, the Flexseal laminated glass roof illustrated on this page employs plate glass, Solex glass (a room glazed with Solex alone is 10 to 20 degrees cooler than a room with windows of ordinary glass), and double layers of neutral vinyl plastic which reduces glare from the direct rays of the sun. The roof is assembled in individual sections but becomes a self-sealing, continuous unit by the overlapping and sealing of the vinyl plastic layers.

In addition to being absolutely leakproof, the Flexseal glazing method is said to overcome a number of other outstanding objections to regular glass roof installations. Simple to install, it cuts transmission of the sun’s infrared and red rays by 95 percent, reducing the room temperature under glass by as much as 30 degrees. Since the assembly is mounted on the building top, cleaning problems are considerably reduced.


air and temperature control

High-Capacity Power Ventilator: especially designed for rapid, localized removal of air contaminated with smoke, fumes, and dust. Construction of unit is of prime galvanize sheets but is also available in aluminum, stainless steel, Monel, other metals. Powered by axial flow fan directly connected to motor; is available in 7 sizes, with motors from 1/3 to 5 h.p.; capacities range from 5000 to 75,550 cfm. Burt Mfg. Co., Dept PA, 927 S. High St., Akron, Ohio.

Basement Forced-Warm-Air Furnace: oil- and gas-fired furnaces, with output of 93,000 Btu/hr. Exceptionally small unit—only 20” wide, 46” long, 45” high—is factory assembled, ready for installation, and equipped with full-size blower and three-pass heat exchanger. Switch device permits supply of cool, circulating air during summer months. Delta Heating Corp., Trenton 8, N.J.

Motorstokor Crossfeed Stoker: commercial and light industrial, automatic, hard coal burner constructed with all moving parts outside of boiler away from high temperature zone. Feed-rate adjustments made from outside of unit without disturbing fire; burner can be mounted on either side of boiler, in single or double installations, and may be equipped for either bin or hopper feeding. Approved by Anthracite Institute, is available in capacities of either 200 or 300 lbs. of coal per hour. Hershey Machine & Foundry Co., Motorstokor Div., Manheim, Pa.

Multi-Zone Air Conditioners: heating or cooling is provided by these units as required by zones, each zone operating independently of others. Individual control accomplished by separate, built-in face and bypass dampers for each zone and by parallel arrangement of heating and cooling coils, rather than in series as normally used. Multiple service access panels, moisture-sealed insulation. In sizes up to 19,800 cfm. Kennard Corp., 1819 S. Hanley Rd., St. Louis 17, Mo.

Double-Flow Aquatower: water-cooling tower, all steel or wood with asbestos cement board casing, for use wherever intermediate cold water capacities are required. Low height (only 7¼ for 150-ton unit) detracts little or nothing from appearance of building. Patented “double-flow” fan arrangement cools more gallons per minute than towers of any other design. All parts—piping, nailless redwood filling, basin fixtures, fan and motor, distribution basin—are readily accessible. In 7 standard sizes, starting with 50-ton unit, Marley Co., 222 W. Gregory Blvd., Kansas City 5, Mo.

Pressuretrrol: low-pressure steam control, now introduced on mass volume basis, can be applied to almost any domestic steam job. Convenient conduit outlets; concealed tamper-proof device prevents abusive adjustment of setting. Minneapolis-Honeywell Regulator Co., 2753 Fourth Ave., S., Minneapolis 8, Minn.

Morell Tube Vent: new type of wall-vent tube, made of nonrusting alloy, is equipped with domed cap that sheds water, locks flush against wall siding, and is almost invisible; for use in preventing lifting, peeling, and blistering of paint. Tiny sloped dome provides assurance of circulating air and also reduces condensation in inner walls. Morell Crossing Tube Vent Co., Inc., 1041 Carlyon Ave., Cleveland 12, Ohio.

Convector Grilles: custom-made to any size, for lower wall installation in marble, tile, or other surfaces. Ruggedly constructed with extra-wide louvers for air deflection, but spaced closely to prevent gum wrapping of waste paper, etc., from being dropped between blades. Grilles are available with damper and knob control. Titus Mfg. Co., Waterloo, Iowa.

doors and windows

ABCO Weatherstripping: plastic weatherstripping with extruded rubber insert, exclusively for tempered Herculite glass doors to eliminate drafts and dust and increase efficiency of air-conditioning system. Constructed so that it can be easily slipped on and off. Abbott Glass Co., 160 E. 120 New York 35, N.Y.

Fenestration for Industrial Rolling Doors: narrow, transparent panes of heavy-duty...
Skylights which require no putty have been designed with aluminum moldings that hold any thickness of glass and provide a completely watertight frame. Its simplified construction (cross-section below) not only offers a greater expanse of uninterrupted light area than found in other types of skylights, but also makes installation easy and has proved to be as economical as conventional skylights.

Corrosion-resistant aluminum alloy is used in the mountings and its high tensile strength, according to tests performed by the Materials Testing Laboratory of the University of California, will withstand a midspan weight up to 1700 pounds without causing deflection sufficient to crack the glass panels. Glazing caps, equipped with self-tapping aluminum screws and felt isolation strips, hold the glass under uniform tension to allow for expansion under solar heat, thus eliminating any danger of glass cracking.

The Technical Committee of the Pacific Coast Building Officials Conference have approved the skylights for use with glass panels 24" x 144", or 3456 sq. in. in size, as compared with the maximum panel of 720 sq. in. approved for standard galvanized skylights.

An average installation can be made by a two-man crew at the rate of 300 to 500 sq. ft. of skylight per day; a job involving a small series of small skylights would, however, require more time. Large speed screwdrivers and adjustable wrenches are the only tools needed. The aluminum bars and mountings are now being shipped to all sections of the country and contractors have already reported on the low installation costs incurred. O'Keeffe's, Inc., 55 11th St., San Francisco 3, Calif.

Skylight Fixtures: Four-sectional, overhead garage door Pittsburgh Corning Corp., 307 Fourth Ave., Erie, Pa.


Cementitious Sky Lights: Insulite Co., 500 Baker Ave., St. Louis, Mo.

Building Blocks: Holophane, 3747 Bulver Ave., St. Louis, Mo.

Skyless Skylights

- Skylights which require no putty have been designed with aluminum moldings that hold any thickness of glass and provide a completely watertight frame. Its simplified construction (cross-section below) not only offers a greater expanse of uninterrupted light area than found in other types of skylights, but also makes installation easy and has proved to be as economical as conventional skylights.

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air and temperature control

1-152. Radiant Panel Heating with Steel Pipe, 48-p. booklet. Discussion of heating method employing large, warm radiating panels. Outline of system's development and operating principles, advantages, example of design and application for moderate-size home, diagrams, photos. Also, section on snow melting and ice removal. American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.


1-156. Portable Window Fans (615), 4-p. folder describing line of window fan units, furnished with safety grille guards, designed for installation in casement windows; may be lifted easily from window support and carried wherever desired. Sizes, installation photos, advantages. Lau Blower Co., 2007 Home Ave., Dayton, Ohio.

1-157. Warm-Air Perimeter Heating (No. 4), 30-p. booklet, including 6 worksheets, providing detailed information for design and installation of warm-air perimeter heating systems for basementless structures. Sections include site selections and preparation; performance characteristics; classifications of systems; warm air outlets and returns; concrete slab construction; installation details; and crawl space construction. Diagrams, contents table.

National Warm Air Heating and Air Conditioning Assn., 145 Public Sq., Cleveland 14, Ohio. ($1 per copy; please pay directly to National Warm Air Heating and Air Conditioning Assn.)

1-158. Thrush Flow Control (FCE-1251), 40-p. booklet on hot-water heating equipment. Contents include: boiler details and wiring diagrams; engineering data for design of one- and two-pipe systems; greenhouse and brooder-house heating; unit heater engineering data; domestic water installations; radiant heating engineering; snow melting applications; pipe size tables; other engineering data. Also, catalog section illustrated with flow control equipment. H. A. Thrush & Co., Peru, Ind.

Two catalogs, one on blower-type unit heaters for factories and warehouses; applications, capacity and performance data, dimensions, diagrams; other catalog contains full line of air-conditioning, heating, ventilating, and heat-transfer equipment; construction, cutaways, photos of products and parts, capacities, sizes, dimensions. Crane Co., La Crosse, Wis.: 1-159. Torridor Unit Heaters (DS-327A) 1-160. Tran Products (PB-290)


1-162. Warm-Air Perimeter Heating (No. 4), 30-p. booklet, including 6 worksheets, providing detailed information for design and installation of warm-air perimeter heating systems for basementless structures. Sections include site selections and preparation; performance characteristics; classifications of systems; warm air outlets and returns; concrete slab construction; installation details; and crawl space construction. Diagrams, contents table.

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National Warm Air Heating and Air Conditioning Assn., 145 Public Sq., Cleveland 14, Ohio. ($1 per copy; please pay directly to National Warm Air Heating and Air Conditioning Assn.)

3-138. Architectural Terra Cotta, folder describing facing material of cotta and illustrated with photos of ty interior and exterior applications in mer­ cial and industrial buildings. Type facing, advantages. Northwestern Terra C Corp., 1750 Wrightwood Ave., Chicago Ill.


doors and windows


1-153. Venetian Blinds, 20-p. booklet describing lightweight, all-steel venetian blind electro-galvanized, iridized, and zinc­mate-treated for maximum corrosion resistance; permanent plastic finish prevents peeling, chipping, or cracking. Types, construction performance details, size requirements installation and other data, in Eastern Machine Products Co., 1601 como, Baltimore 30, Md.

1-154. Gate City Wood Awning Windows, AIA 164. Portfolio containing catalog and 3 installation detail sheet wood awning windows, toxic-treated for resistance to rot, fungi, and termites. Specifications for complete unit, including hardware; schedule of sizes and types. City Sash & Door Co., P.O. Box 901, Lauderdale, Fla.


8. Industrial Pivot Steel Windows, 16-E, 4-p. folder giving types and sizes invoted, heavy-duty steel windows utilizing double contact weathering. Types, sizes, size details, specifications. Steeclraft Co., Rossmoyne, Ohio.

7. Electrical equipment, lighting
4. Meter Socket Selector (B-5284), booklet. How to determine proper me­ocket, once user knows type of service used and wire size to be used. Data on it-closing provision, terminals, service in­ects, ordering, and determination of number; additional information in­es reference wiring diagrams, dimensions, auxiliary parts. Westinghouse Electric Co., Box 2999, Pittsburgh, Pa.

specialized equipment
19-217. Steel Kitchens, Lavennes, ALA 35C-12. Portfolio comprising 12-p. booklet on various models of de luxe and standard cabinet sinks, either with single or double bowls; and 4-p. folder describing bath and powder room fixture consisting of vanity-lavatory unit with Formica top; drawers and storage space incorporated in all-steel cabinet. Photos, illustrations. Toledo Desk & Fixture Co., Maumee, Ohio.


surfacing materials

19-221. Textolite Monotop (CDL-45)

Catalog presenting complete assortment of Douglas fir plywood panels and allied produc­ts such as doors, chalkboard, etc.; recently new products included, are rigidized, tex­tured metal-plywood panels; porcelain-enam­eled steel bonded to plywood; termite-resis­tant plywood; fire-resistant, subdividing par­tition panels. Uses, sizes, photos, technical data, index. Booklet illustrating architectural applications of wood veneer wall covering which may be applied to either flat or curved surfaces. Solutions to architectural prob­lems demonstrated with actual installations. U. S. Plywood Corp., 55 W. 44 St., New York 18, N.Y.: 19-223. The Weldwood Catalog, AIA 19-F
19-224. Flexwood

(Personal Color Suggestions, 6-55. Interior Color Suggestions, 6-55. Interior Color Suggestions, each of which contains 2- and 3-color color charts, a cabinet, containing of vanity-lavatory panel, either with single or double bowl; drawers and storage space incorporated in all-steel cabinet. Photos, illustrations. Toledo Desk & Fixture Co., Maumee, Ohio.)

Progresive Architecture, 330 West 42nd Street, New York 18, N.Y.

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

1-152 | 1-153 | 1-154 | 1-155 | 1-156 | 1-157 | 1-158 | 1-159
1-160 | 1-161 | 3-136 | 3-137 | 3-138 | 3-139 | 4-152 | 4-153
4-154 | 4-155 | 4-156 | 4-157 | 4-158 | 5-104 | 6-55 | 9-69
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school classrooms  by Henry Wright*

School buildings, like factories, are among the most disciplined forms of architecture we have produced. In the well designed classroom, little is left to chance. Illumination is adequate and all pervading. Color schemes conform to specified contrast limits. Furniture and equipment must meet well defined functional requirements. Materials are scrutinized from the varying points of view of ease of maintenance, sound absorption, sound insulation, and light reflectance. Performance is evaluated with the aid of objective instruments and, at another level, through statistical studies which attempt to determine the effects of the resulting environment on pupil health and achievement records.

Those who fear the stultifying influence of such an approach—and there are many who do—may take heart from the result. Far from stifling architectural imagination, the engineers with their light and sound meters have had a stimulating effect on school design similar to that noted, a decade or two ago, in the case of the factory. Only the more rabid romanticists would deny that today’s schoolrooms are pleasanter, more attractive, more effective places for learning than the schoolrooms of 10 or 20 years back; while only the most prejudiced observer would fail to recognize that this change has been a result, to a considerable extent, of the demand for better seeing and hearing conditions, with the “better” defined in precise physical terms.

Fortunately, this is not the only way in which school architecture excels. Among recently completed structures, it is a good deal easier to find 1 ponderous public buildings, 20 retentious offices, 50 flamboyant shops or a hundred rococo restaurants than one really objectionable school. Modern school buildings tend to be good or dull—but not bad. And schools of really excellent design, like those shown here, differ from work in other fields in somewhat the same way that our better children’s books—exhibiting the same clarity of purpose, simplicity of means, and colorful, light-hearted treatment—differ from those published for adults. It may be merely a coincidence that the ultimate critics are in both cases the same. It is nice to think, however, that having accepted the criteria of the foot lambert and the decibel, we are also beginning to accept the candid vision of the child as a standard to which design should conform.

Thus, in approaching the problem of the school classroom, the interior designer must start from a more-than-usual respect for functional requirements, expressed in specific, measurable terms; and move towards a more arresting, more meaningful expression of the educational process, aimed at the child’s level of perception. Despite efforts to make it warmer looking, more inviting, the present-day schoolroom often presents a rather aseptic atmosphere, induced in part by a (probably unnecessary) uniformity of illumination, and in part by a tendency to settle for tan and beige, pale green and maple, to make certain of avoiding high brightness contrasts.

It is not necessarily a bad thing that the only surface in a modern classroom likely to have reflectance of less than 40 percent (and thus to provide a spot of highly-visible color) is the surface of the children’s clothing; but it may suggest that other areas might, for sufficient reason, sometimes also depart from the reflectance rule. So, too, the practice of lighting every bit of horizontal surface to the level required for “close visual tasks” might be improved by adding still more light in certain areas (or on certain occasions) for the deliberate purpose of creating dramatic foci of attention, or modeling solid objects. This is the type of “plus” that better interior design can offer the well designed school building—a natural next step in a process already under way.

*technical and promotional consultant, New York, recently concentrating on schools.
Bilateral lighting is achieved in this typical classroom at Barrington Countryside within a simple structural scheme. The roof is supported by the concrete-block cross walls, and the east and west walls are glazed from sill to ceiling. Low cabinets separate classroom from corridor, thus borrowing light from the west and creating a pleasant sensation of openness. Where necessary (in the less dignified lower grades, we presume) the space between top of cabinet and ceiling is also glazed.

Artificial illumination is provided by concentric ring fixtures, notable both for adequate, well diffused lighting and as a poor harbor for rubber bands. The desks and chairs are single-pedestal units. Height of seat and top is adjustable to suit individual comfort. Restful colors, mild in contrast, are used. Light green is the background for the green chalkboard and light gray is used for the other concrete-block wall. Asphalt tile is also gray and the acoustical-tile ceiling is white.

Room Photos: Hedrich-Blessin
Data

Desk and Chair: #38 Adjustable single-pedestal unit/ closed or open chair back/ top pivots in and away from chair/ height of seat and top adjustable/ lifting-lid book box/ built-in pencil tray/ offset movable pedestal with rubber shoe/ natural finish wood/ metal parts in "Arabian sand" baked enamel/ General School Equipment Co. (formerly, Bargen-Built Industries Inc.) 44 South 12 St., Minneapolis 3, Minn.

Cabinetwork: architect designed/ fabricated on site.


Map and Display Rail: satin-finish aluminum/ movable hooks/ "see-green" or tan cork insert/ stock lengths: 9, 10, 12 ft/ E. W. A. Rowles.

Concentric-Ring Fixture: #3-S 523 "Draco"/ 24" stem/ 300-500 silver-bowl wattage/ satin-aluminum hanger and baked-eggshell-enamel rings/ list $16.00 approx./ Kurt Versen, Englewood, N. J.

Walls: concrete block painted


School furniture is usually sold in contract lots. List prices are therefore not usually available.
The inverted roof in this Seaside School classroom makes possible high windows which provide sufficient daylight even on dark days. Sky glare, a serious problem in this foggy territory, is controlled by louvers under the overhang. Flexibility was a requirement for these classrooms and, therefore, cross walls are non-bearing, to allow for relocation when necessary. The paved area under the overhang is used as an outdoor classroom in suitable weather. Colors are gay, but light, and contrast is held to a minimum. Walls and columns are yellow; cabinets, yellow-green; ceiling, natural fiber color; and floor, gray with red inserts.

Room Photo: Julius Schulman

gray asphalt tile

wood-and-metal posture chair
data

Chair: "Rheem Standard Chair"/solid hardwood saddle-shaped seat/form-curved back rails/ruber-cushioned glides/natural wood finish/beige baked-enamel metal/eight seat heights from 11" to 18"/Rheem Manufacturing Co., 4361 Firestone Blvd., South Gate, Calif.

Cabinetwork: architect designed

Concentric-Ring Fixture: RK-1000-S "Rocket"/aluminum hanger/rings finished in satin white/750-1000-1500 silver-bowl wattage/list $33.30/Smoot-Holman Co., Inglewood, Calif.

Walls: plaster, painted pastel colors


Floor Covering: asphalt tile/Kentile Inc., 58 Second Ave., Brooklyn, N. Y.


Door Hardware: Sargent & Co., New Haven, Conn.


School furniture is usually sold in contract lots. List prices are therefore not usually available.
The kindergarten at Waite Park School functions as a self-sufficient unit, with closets and toilet as part of this special wing. Built-in cabinets are thoughtfully designed to provide neat and easy storage for a variety of play equipment. The chairs glide easily over the rubber-tile floor, left substantially free for groupings to suit various activities. The children can sit and take their rest periods on the floor which is radiantly heated. High clerestory windows on one side, and large windows oriented towards the view on the other, provide bilateral lighting as in the section shown on opposite page, which is typical of most of the classrooms in the school. The kindergarten in a separate wing is a variation of the typical section. The exposed brick is painted “Swedish pink” under the clerestories and other walls are yellow. The curtain is also yellow; the floor, white with black striations; and the acoustic tile, natural fiber color.

Room Photos: Photography In...
<table>
<thead>
<tr>
<th>type</th>
<th>kindergarten—Waite Park School</th>
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</thead>
<tbody>
<tr>
<td>location</td>
<td>Minneapolis, Minnesota</td>
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<tr>
<td>architects</td>
<td>Magney, Tusler &amp; Setter</td>
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<tr>
<td>associated</td>
<td>Perkins &amp; Will</td>
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**data**

Chair: S 915 "all-purpose chair"/tubular-steel frame with baked-enamel finish in "school brown" or "cocoa"/rubber cushioned glides/birch saddle-seat/birch bentwood back/available in eight seat heights from 11" to 18"/Heywood-Wakefield, School Furniture Division, Menominee, Mich.  

Table: Board of Education shops.  
Cabintets: architect designed/fabricated by Lake Street Sash & Door Co., Minneapolis and the Minneapolis Board of Education.  
Blackboard: W. E. Neal Slate Co., 1121 Dartmouth Ave., S.E., Minneapolis 14, Minn.  
Cabinet Hardware: Colonial Bronze Co., Torrington, Conn.  
Walls: #344/series #2800/Alton Panel Brick/radiant texture/painted rose or yellow/Alton Brick Co., Alton, Ill.  
Paint: Pratt & Lambert Inc., 79 Tonawanda Street, Buffalo 7, N.Y.  
Ceiling: "Acousti-Celotex"/The Celotex Corp., 120 S. La Salle St., Chicago, Ill.  
Floor Covering: Hood rubber tile #511/white-black/B. F. Goodrich, Watertown 72, Mass.  
Heating: supplied by radiant floor panels and wall convectors.  

brick painted pastel color
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School furniture is usually sold in contract lots. List prices are therefore not usually available.

Porcelain-enamel chalkboard: will not scratch, chip, crack, break, buckle, or warp, according to its developers, the Bettinger Corp. and U. S. Plywood/papers and notices can be attached to surface by magnets/porcelain-on-steel bonded to exterior-grade plywood with metal backing sheet/permanent installation or portable unit/material also available for desk tops/width: 36", 42", and 48"/length: as required/8' x 10'/most economical size/color: "chlorophyll green"/other colors to order where quantity permits/price for raw paneling: $1.50 per sq. ft./price installed: approx.$2.30 to $3.00 per sq. ft./mfr: the Bettinger Corp., Waltham, Mass./dist: U. S. Plywood Corp., 55 West 44 St., New York, N. Y.


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Tubular desk and chair: STW/natural finish or "school brown" solid hard wood/beige, taupe, or brown baked-enamel frame/STWL has solid wood lift-lid with book box under/STPL has plywood lift-lid book box/STP has plywood top and shelf/9 sizes/The Norcor Mfg. Co., Green Bay, Wis.

Lifting-lid desk: 18" x 24" top/adjustable height from 19" to 25" or 21" to 29"/also available in fixed height from 19" to 31"/other models have fixed tops or split-slat tops/natural wood finish/beige baked-enamel metal/chair: saddle seat/8 heights from 11" to 18"/Rheem Mfg. Co., 4361 Firestone Blvd., South Gate, Calif.
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Thonet chair: the classic bentwood model designed 100 years ago is available in kindergarten and grade school sizes. K 18/2—S 4 / light or dark maple / veneer seat / Thonet Industries Inc., 1 Park Ave., New York 16, N. Y.

Tablet arm chair: right or left hand model / 17" or 18" seat height / natural finish wood / beige baked-enamel metal / Rheem Mfg. Co., 4361 Firestone Blvd., South Gate, Calif.

"The skyliner": #500 / seat heights 13", 15" or 17" / open book compartment or enclosed side pocket / natural finish hardwood / baked-enamel frame in beige, taupe, coral, sage green, or ocean blue / The Griggs Equipment Co., Belton, Tex.

Classroom chair: #939 special / adapted from original desk chair by Ray Komai / molded walnut plywood / post in black, brown, or gray baked-enamel / can have pivoting mechanism / available with or without tablet-arm and book shelf / J G Furniture Co., Inc., 102 Kane St., Brooklyn, N. Y.
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RACK BUILT OF 4 3/4" X 3/4" X 1/8" L. WELDED

BRONZE BLUSHING, 1/2" DIA. SHEAVE SHAFT.

HOLE FOR OILING

CONTINUOUS 4 5/8" X 1 1/2" HILL

1/2" BOLT

CONTINUOUS WOOD BASE, REMOVABLE

SLIDING WALL FRAMES

1/4" SCALE

CONTINUOUS T CHANNEL FROM TOP OF WALL TO 9" INTO GROUND, ART BELOW GRADES IMBEDDED IN CONCRETE

5/4" X 6" T.E.C. VERTICAL BOARD

2" X 4" STUDS, 27" O.C.

5/8" PLYWOOD

3/4" DIAGONAL SHEATHING

PAPER

WEATHERSTRIPPING

2" X 10"

2" X 10"

1-1/2"

4-2"

2" X 4" STUDS, 27" O.C.

SLIDING WALL

SLIDING WALL

SPACE FOR 2" X 4" DIAGONAL BRACING AND 2" SOUND DEADENING BLANKET

1/8" TRIM

WINDOW

RIGGS RESIDENCE, Ithaca, N. Y.

Wells & Canfield, Architects

March 1952

PHOTOS BY RICHARD A. MAURER
The New

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Above: M-117 Tri-Panel Exterior Door; Below: M-1073 Tri-Panel Interior Door

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Above: Tri-Panel Exterior Door M-117 in Morgan M-14 Entrance

1/2

1-1/4" Thickness

Heavy 1-1/4" Hip Raised

Panels—2 sides

M-1073 DOOR

1-1/2" Thickness with 3/4" Hip Raised

Panels—2 sides
SELECTED DETAIL

OFFICE BUILDING, Baton Rouge, La.

1rop Douglass, Architect; Carson & Lundin, Associate Architects

March 1952
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March 1952 133
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appeal of modern design


people who want to dislike modern architecture, if they do, they are certain to change ir views. No one has ever described with re­­a­r­ity and conviction the true character and intention of the present movement in architecture, so far as this relates to the indivi­­ual house, and the text is illustrated such a way that it is hard to believe it any person could resist the appeal of the architecture in this, its most human phase. The book illustrates and describes 85 houses, which he confronts. And, what is sometimes usual in books on houses, the difficulties of the program, the site, space organization, environmental influence, construction and materials, and appearance—are with several pages text introducing each chapter. Additional text appears as introduction to subheads, thin the chapters.

The book is singularly free from dogmatic pronouncements and propaganda. The different problems which surround the architect of a house are set forth, one after the other, and from the architect's method of approach and lution is made clear, together with difficulties he confronts. And, what is sometimes usual in books on houses, the difficulties of the client are given a sympathetic considera­­tion.

Among the many books on the modern use, The American House Today is outstanding and should have a wide and ap­­reciative audience. JOSEPH HUDNUT

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AGGREGATES

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(Continued on page 136)
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REVIEWS

(Continued from page 135)

convenience of any reader who wishes to pursue further technical knowledge of the subject into a "department of further explanation..."

E. influential book

Acquisition for Avery Architectural Library Columbia University, of a first-edition copy of the earliest architectural book written and published in the United States—Asher Benjamin "The Country Builder's Assistant" (1797)—has been announced by PROF. JAMES G. VA DERPOOL, Avery Librarian. Commenting on the importance of such early American books, "cannot be overemphasized in the study of native architecture," Professor Van Derpool adds that Avery Library has in its possession no virtually every rare architectural book published since 1485.

for the layman

How to Build Walls, Walks, Patio Floors. Lan Publishing Co., Menlo Park, Calif. 96 pp. illus. $1.50

The latest in the series of how-to-do-it books on outdoor living by the publishers of Sunset Magazine, tells the layman how to make walls, patio flooring, and steps out of such materials as concrete, stone, brick, adobe, tile, redwood rounds, etc.; how to mix mortar with concrete; cut brick, dress stone, saw tile; how to estimate materials needed for a project; how to build a wall so that it won't topple over and to lay paving so that it won't appear in the mud; how to build steps that are comfortable to ascend. To follow these clear, step-by-step directions calls for only modest understanding of masonry. A few of the processes may demand a higher degree of craftsmanship or special and expensive equipment; although these are best entrusted to a professional, full information is given about them to judge the professional's work or devise specifications. Excellent construction drawings and photographs.

E.

gold medal winner

Annual Gold Medal of the Society of Architectural Historians has been awarded to ANTHONY GARVAN for his Architecture and Town Planning in Colonial Connecticut (Yale University Press, 1951). Cited as "the outstanding contribution to architectural history by an American author in 1951," the book is also praised for its general interest as well as specific reference value.

(Continued on page 13..."
For permanent strength and beauty, mortar must be durable — must be able to withstand the alternate freezing and thawing to which it is subjected many times each winter.

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REVIEWS

(Continued from page 136)

the new shopping centers

Geoffrey Baker and Bruno Funaro. Reinhold Publishing Corp., 330 W. 42 St., New York, N.Y. 228 pp., illus., $12

This work, in starting with “why, how and where,” among other pertinent information makes the clear distinction (and one often forgotten in discussing shopping centers) between the neighborhood center, the community center, and finally the new concept of the regional center that revolutionizing so-called “shopping goods” distribution.

The book is evidently the result of a very considerable amount traveling, interviewing, correspondence, and collecting of important data. It reports authentically on the actual types of stores in a given center, their ground coverage and operating problems. It is an important document because there has been so much partial reporting on this complex subject. It clearly states the problems of economic marketing analysis, the basic reasons for the radical shifts of retail distribution, and change in transportation habits, all of which explains some of the inconsistencies of any published works on the relationship of stores, population and transportation factors. Incidentally, it proves also the usefulness and worth of such institutions as the McKim Fellowship at Columbia University.

This book has a wealth of good advice scattered throughout, a number of authentic and useful tables, sources of information, and mention of many small but important details to be watched, for example, garbage collections, the design of show windows, the proper use of signs, and a good section on the design of the parking and parking requirements for shopping centers.

Among the many tables are typical Bureau of Labor Statistics expenditures by income groups, percentages of sales for rent for various kinds of stores, the rental charges by some five large developers, relation of costs of parking—self vs. attendant (as varied by land and structural costs)—, freight dock requirements as well as the rather complete list of store types with dimensions and ground coverage.

While types of centers are clearly defined and sound principles of basic economic studies, design and even operations are outlined and sensible warnings are sounded, the reader is left pretty much to find himself many of the deficiencies, shortcomings, and mistakes that we made, especially in a number of the larger centers illustrated. Considering the well-stated principles that are involved, this is not too difficult for the reader to do, and to have published in more detail the shortcomings of all the centers would have added considerably to the lineage.

The national chains, primarily food and variety, have through the real estate approach evolved methods of locating the retail outlets in neighborhood and community centers. But the new regional center requires a broader, more comprehensive method, which is well explained in the chapter on market analysis.

There is an interesting story of Cameron Village Center in Raleigh, North Carolina, the lopsided growth of the city and the intelligent use of the acreage of an old family estate for a planned residential area and a community center. Incidentally, this process of utilizing large, estates and built-up areas has failed in a number of cases through inability to re-zone. This was true in the case of the Severance estate.
However, as in the case of Raleigh, it has been successful and in others, as for example, the Park Central Plaza in Phoenix, now being planned by Welton Becket.

There are a number of statements made in the text that this reviewer take some slight exception to, none of them too important, but strikingly controversial:

Example, I do not think that the majority of people move to the suburbs to escape taxes or dwelling costs in general, as, in our expanded current inflationary economy, new housing costs and rents are rising at a greater rate than other costs. I can agree they are going to suburbs to get away from the overcrowding, the dirt, and the pollution and, I would like to add, the poisoned air and excessive use of masonry and hard surfaces that exists in the central city. This rings up the point; "when there is a certain amount of landscaping in a center, it produces the feeling of relaxation." This is true, of course, but I think it also reflects and is compatible with this seeking greater amount of green and that blending of the rural and urban world move to the suburbs to find.

There is a certain amount of landscaping in a center, it produces the feeling of relaxation. This is true, of course, but I think it also reflects and is compatible with this seeking greater amount of green and that blending of the rural and urban world move to the suburbs to find.

Regarding to so-called parking ratios, namely structural area and parking, there is still much missing information. The attempt to determine a ratio on complicated formulas of average sales, costs, etc. entails too many missing information. It can be better based on the average gained in the actual operation of larger regional centers. The average of 1.7 persons per car pertains to certain automobile use person per car in regional centers is well over 2. Also, the average gross sale of center per customer can increase materially when a center is well-planned to concentrate the pedestrian traffic between stores very easy, people to buy certainly in an average of over two stores and possibly over three. In this manner, the average gross sale for the center material increase the parking requirement.

Perhaps not enough emphasis has been placed on the great potential in the turnover of parking space between convenience-goods and shopping-goods centers and the considerable difference in ship of parking space to dollars and cents or unit sales activity per foot of structural area. This reviewer still thinks the best is to relate the number of parking spaces required to the total square footage of building, including basement and service areas. You have only to establish a standard for the number of square feet per car including access roads, magazine areas, and some minor parking. This comes out, in my experience, in the very large center less than 400 square feet per car. This sort of arrangement and necessary (to handle December peaks) ratio is not out of line cally on low-cost land which is the only kind of land to use large regional center, assuming that the tenants are, in the main, of established stores and use the typical amount of regional credit of ratios of two to one might be perfectly all right for the hood center with a high parking turnover. But, in a regional with high productivity, the ratio of parking area at 400 square per car, which is not too much, for the total gross square footage is nearly 7 to 1 and probably parking spaces should be in space per 60 gross square feet of structure. Also, the

(Continued on page 140)
 amount of parking ratio required is certainly, in the regional center, an indication of the productivity. The productivity of the stores depends, of course, first upon the management of the stores and second, on the management of the center. For example, Shopper's World, Framingham, with a plot of a little under 70 acres, with a total gross building area (when opened October 4th) of a little over 350,000 square feet, 6000 parking spaces have proved insufficient a number of times prior to the December peak.

In other words, in this case, it is doubtful if the formula of 60 square gross feet of building per car space will provide enough car spaces to handle the peak and, from the standpoint of ground coverage in mostly two-story buildings, the ratio is only about 5.3 percent of the total plot area. However, the productivity of the structural area in this center is probably higher than at any other one opened to date. It is also a basic fact in the retail distribution field that high productivity means a greater return for the developer, a larger profit for the merchant, and a relatively higher income for the personnel, all of which has a tendency to basically lower the cost of distributing these kinds of goods.

One other factor is important today and that has to do with property management which, among other things, takes the responsibility for obtaining the complete cooperation of all the tenants. This materially helps so-called accumulative pull. Probably one of the best examples of this is in the Farmers Market in Los Angeles where they have a tenants' organization with an active executive committee. They hold banquets every month or so and publish an house organ for the benefit of the tenants.

This reviewer takes exception to the statement that amateur observation is as good as the proper charting of traffic by highway officials and trained traffic engineers. The Public Road Administration has developed excellent procedures to determine, through origin and destination surveys, and highway usage in general, both current and potential traffic. The important thing is to be able to superimpose the traffic generator that is the center itself or travel already existing on the highways that will serve the center and traffic which might exist in the future.

Also, it is often better to get an option on property or to make an agreement to purchase subject to possible re-zoning, rather than purchase the land outright. The high and medium income group families, especially in single family zones or so-called dormitory towns, never want the best of shopping centers in their areas. They mostly have their food delivered in any event and they all own one or more cars. They even resist, with all the political pressures possible, even a small traffic generator being placed in their area.

(Continued on page 140)
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Type 430 is more readily available than is the 18-8 grade.
This reviewer is convinced that the higher-priced site regional center is not as good as further-out inexpensive acreage. Five to ten minutes more driving time, when there is an ample and balanced presentation of goods and a not-too-inconvenient parking space always available, does not detract one bit from the pulling power of the center. Framingham has proved this without question. Higher-priced land for this purpose might be defined as anything over $4000 to $6000 per acre. It is always higher priced because there is a built-up area in the immediate vicinity, desirable for the neighborhood center but not necessary for the regional center designed for the automobile. There is one other factor in the neighborhood or community center where there is a considerable amount of so-called walk-in trade. It is possible to have important branches of downtown stores largely supported by the immediate population if it is of high density in Parkchester or Fresh Meadows, New York, and can even be applied to some extent in Stonestown in San Francisco.

In very large parking areas of 4000 or more cars, it has been found that curbs, especially interlocking curbs, are a considerable and unnecessary expense. Also, most people who have dealt with these large areas now agree that 90-degree parking is far better than less angle parking which requires one-way lanes which, confusing the customers, too often result in bottlenecks, inconvenience, and annoyance. If the width of the parking sections are made 65 feet and the parking stall is nine feet wide (not too narrow for self-parking with modern cars), no one has difficulty turning a parking. Also, the lengths of the parking sections are vitally important. If they are too long, bottlenecks can develop. That is the reason parking sections running at right angles to the building or the pedestrian approach to the structures are the best solution for large centers.

The section on the design of show windows has some very useful hints but it might be called an over-simplification of a very complex subject. A great many architects in shopping centers play with so-called spatial environment and arrive at undoubtedly pleasing space relationships. However, they too often forget that reflecting high brightness and, especially, open sky so prevalent in one-story centers pretty well nullify the important merchandise display in the daytime. This is evidenced by careful examination of many of the photographic illustrations. Most show windows without the desirable overhang are actually lighted as far as the merchandise immediately adjacent to the glass is concerned. However, as mentioned, overhangs and covered ways are very desirable in outlying shopping centers to promote shopping in inclement weather and make it generally more enjoyable in any kind of weather. However, this does not mean that the pulling power in the outlying areas, present new problems.

(Continued from page 140)
Plant men like National Electric 4 x 4 WIREWA for protecting wiring—wiring that may be rerouted, changed, tapped, or spliced frequently. National Electric WIREWA provides steel protection, plus accessibility, unequalled by any other type of wiring raceway, for housing of electrical wiring systems up to 600 volts.

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For full information, write R. & W. Wiley, Inc., Dearborn at Bridge Street, Buffalo 7, N.Y. or see Sweet’s Architectural Catalog. Member Fleur-O-Lier Mfgs. Ass’n.

REVIEW

(Continued from page 142)

far as the geometrical disposition of the glass is concerned.

Overhangs with down-lighting have the advantage at night of visually reducing the barrier between the sidewalk and the store interior, whether it be an open front or an enclosed display window. The open front, however, seems to be the best solution for the large regional center when high pedestrian traffic on the walkways has been achieved. It adds materially to the almost carnival air that these centers produce. It is the complete antithesis of the empty sidewalks of the great majority of strip developments.

You see very few supermarkets on the important shopping streets in the downtown areas of large cities, which have always been and will be the very successful regional centers. The very large city downtown stores on the Fifth and Woodward Avenues, the State Streets and even in cities of 500,000 will always cater more conveniently to the transient who so often uses public transportation.

KENNETH C. WELCH

paint diagnosis

Paint Film Defects—Their Causes and Cure, Manfred Hess, Reinhold Publishing Corp., 33 W. 42 St., New York 18, N.Y. 544 pp. illus. $12

The true value of a reference book cannot be appraised except by respected use. When tested in this manner, the work of Manfred Hess qualifies as a generally dependable source of practical advice to the several groups of people who may be interested in diagnosing a paint failure. Considerably more than a layman's knowledge of paint technology will be required before a reader can feel confident that his own case of trouble with a paint job can be cured by the prescribed remedy.

The thoroughness of the German mind is reflected both by the orderly arrangement and by the complete index of the subject matter. In actual practice, a beginner in the study of paint technology may be confused by too much cross-reference material. After some experience, the careful reader will be rewarded by thoughtfully sifting all cross references in his search for an answer to a specific problem.

While most of the many illustrations are truly informative, a few paint defects such as "blushing" of lacquers or "lifting" of...
There is one type of window that has never stood still in offering important improvements and advantages to you and your clients. It is Curtis Silentite—the window that is constantly being studied and tested to improve still further its ease of operation, weather-tightness and other features that provide increased value. At the right are some reasons why:

Silentite wood casements can cut total heating cost in the home as much as 16%. Silentite casements are supplied with insulating glass and screens. Operation is exceptionally easy—the adjuster provides 15 times greater opening pressure than the lever type. No inside projecting hardware—no hardware visible outside when sash is closed. Several sash styles are available. These are one-light casements.

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Curtis Silentite casement adjuster.
REVIEWS

(Continued from page 144)

paint coatings are not photogenic subjects. Some use of color photography would be welcome in a later edition of the book.

The author’s limited uses of simple sketches are well handled.

The encyclopedic nature of this book commends it for reference by the home owner, the architect and builder, and by the industrial user of paint. This reviewer believes the author has proper respect for the complex nature of paint selection and paint service. He hopes the author would agree that this book should not be closed to any earnest student, but that the book’s teachings should encourage a layman to seek the advice of an experienced paint laboratory.

PAUL R. CROLL

ingenious pioneers

The Rise of the Skyscraper. Carl W. Condit. University of Chicago Press, 5750 Ellis Ave., Chicago 37, Ill. 255 pp., illus., 108 photographs. $5

Condit has put together the kind of book which American architects, united by chauvinism if by nothing else, will surely applaud. He has chronicled that phase of our architectural history which, far from being the pleasantly irrelevant dream of antiquarians, still reverberates in our frantic streets. His book is a valuable documentation of the ideas, aspirations, and achievements of the gifted architects (all but one of them came from other cities) who created, from 1871 until the turn of the century, the Chicago, or commercial, style building.

On the night of October 8, 1871, a small blaze in a barn on De Koven street overpowered a fire department already exhausted by the previous day’s battle. Before burning itself out in Lincoln Park, Chicago’s Great Fire destroyed $192,000,000 worth of property and rendered 100,000 people homeless. By 1871 over 10,000 permits for reconstruction had been issued. Rebuilding, added to the fantastic commercial growth of the city, provided architects with opportunities as extensive as the problem involved were formidable.

In the fight for light, space, and air, load-bearing masonry walls were a trying handicap; the masonry walls of the 16-story Monadnock building, tallest of its kind, were 72 thick at the base—a dimension which makes openings resemble tunnels more than windows. The great invention, of course, was the multi-story metal frame. Theoretically, it reduced the function of the wall to that of a mere curtailed against the elements, supporting only its Fireproof hollow-tile walls and reliable elevators, along with steam heating and hot and cold running water, made these towers both safe and practical. Today, the U. N. Secretariat at Lever House, in New York, and the recent gatherings glass and steel towers by Mies van der Röhe in Chicago, demonstrate what power forms this rationalization of structure can yield.

But because the decisive aesthetic, the all-important abstract concept of space with its (Continued on page 1...
Mr. M. J. Lahr, Omaha, Neb., specified Knapp Metal Base for the new Rorick Apartments in Omaha, Neb., because he knows that he can count on Knapp to meet his most exacting requirements.

Knapp's standard of quality is always the highest . . . for more than fifty years, they have taken pride in their ability to produce precision metal trim products that meet the most exacting specifications. Knapp Metal Base is the recognized standard for schools, hospitals, public and institutional buildings. No matter how large or how small, each job is handled with the utmost care and efficiency.

Knapp No. 219 Metal Base was used throughout this installation. Its permanence, chip and crack resistance make this type of base an essential item for modern apartment construction.
appropriate vocabulary of plastic forms, has come back to us from Europe, Americans often lose sight of the long native history such buildings have.

"The style is a monument to the advance of Chicago in commerce and commercial greatness," the authors of Industrial Chicago wrote as the price of the world's bread came under local control, "and to the prevailing penchant for casting out art where it interferes with the useful." But a businesslike statement of technique is not enough, and art, in fact, though cast out came back. There were others besides the great team of Adler and Sullivan and Frank Lloyd Wright who sought to create plastic form through a controlling esthetic idea.

And yet, the less Chicago's architects did to their metal cages, the better they were. Holabird & Roche's McClurg Building and Burnham & Root's Reliance Building are two such unadorned statements, valuable today not merely because they foreshadow 20th Century thought but because they achieve, in their own right, the Doric strength and directness of great building. In both structures, horizontal and vertical divisions of the cage were maintained on the façade as a relatively neutral grid describing the equilibrium characteristic of the technique itself. What is missing, perhaps, the justness of proportion and the harmony and detail that transforms a building into architecture. Excellent as it is, for example, the Reliance Building, with its projecting bay windows, only hovers on this side of clarity: mass is blurred rather than enhanced by it projecting bays.

The multistory metal cage is a skeleton with a unique, rather inorganic, advantage: unlike other skeletons it can be made to grow by the repetition of identical parts. Within certain limits, nothing hinders an upward extension of the skeleton frame (as was done to Sullivan building in the Gage group) and it is easier to stretch a building out along the street like the extension of the Carson Pirie Scott store. But the formal problems of this additive architecture, in which mass is cumulative and rhythm tends to be inflexible, were only partially defined and seldom solved by Chicago architects and engineers.

Condit has assembled, obviously with devotion, much obscure and fascinating material including photographs of buildings that are no longer standing. But his critical insights are not always satisfactory, and even the most appalling defects of Chicago's buildings do not diminish his otherwise admirable enthusiasm. It is too kind to an architect to suggest that his building be studied at nightfall, when merciful shadows conceal its gross stone folly. The author cites so many arbitrary divisions of a façade into base, shaft, and capital, and much insensitive detail, that it seems excess to discover in Chicago's buildings a complete architectural maturity.

(Continued from page 146)
A Statement by Anaconda on the Copper Situation

Many users of copper have vital decisions to make...usually in connection with the present defense-induced shortages of copper and aluminum. This statement is an effort to remove the smoke screen surrounding the copper picture...to wipe away the confusion caused by too much talk supported by too few facts.

Substitution poses problems — Industry has been urged to substitute aluminum and other materials for copper. In some instances this may be logical and practicable. In many others it is difficult, if not impossible. But — before making any long-term decisions that may cost a great deal of money in engineering, new plant facilities or rescheduling of production operations — one should know the facts about the future of copper.

New Anaconda projects — The first major increase in copper production will come from Anaconda when the Greater Butte Project and the new Sulphide Plant at Chuquicamata, Chile, begin operations this spring. By 1953, these two projects should raise present levels of copper production by about 95,000 tons yearly.

Toward the close of 1953, Anaconda’s new Yerington project in Nevada is expected to start producing at an annual rate of 30,000 tons. By then, Anaconda will be adding to the present yearly copper supply at the rate of about 125,000 tons.

Other new projects — During 1954-55 still other new projects in the U. S. and friendly foreign countries will further augment the increasing copper supply. All told, it is estimated that by 1955, not less than 450,000 tons of copper could be produced annually — over and above present production levels.

Accordingly, in 1955-56, domestic production plus imports could bring the U. S. copper supply to 1,800,000 tons yearly. This would represent an increase of about 20% over present levels. Based on historical comparisons, and barring a large-scale shooting war, this amount of copper could support a Federal Reserve Board Index of Industrial Production of 270, an increase of 24% over the present, and 45% above the first half of 1950.

These are the ‘things to come’ in copper. On the basis of the facts there is no necessity for considering long-range substitution of other materials for the red metal.
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REVIEWS

(Continued from page 148)

Chicago's great contribution to 20th Century architecture was made by ingenious men concerned with techniques and immediate practical goals. If they failed to establish a concept of space which would give direction and formal abstract value to those techniques, they did create a peculiarly American architecture—

ARTHUR DREXEL

amateur photographers

Williamsburg Pictures. Walter H. Miller. The Dietz Press, Inc., Richmond, Va. 118 pp., illus 3

The amateur photographer should find this camera tour through Williamsburg, Virginia of considerable interest and help, since it was compiled expressly to assist him in locating and capturing the most desirable sites in the photogenic city. Technical annotations accompany each picture and provide data in the matters of film, season, time of day, filter and exposure. The end-sheets in the book are guide maps for the city, with each of the sites and buildings marked and numbered according to the itinerary in the book.

Book of graphs

Short Cuts in Concrete and Steel Design. Fred C. Whitney, Fred C. Whitney, 16502 Wa Ave., Detroit 35, Mich. 1951. 82 pp., $3.50

This book of graphs will be useful to structural designers who habitually use handbook help wherever possible. It is about evenly distributed between graphs devoted to reinforced concrete and to structural steel design.

Sets of graphs for reinforced concrete, based on 2500f and 3000f strengths, include curves for design of floor and stair slabs, compression reinforced beams and columns with bending, plus stirrup charts and bar area tables. They have been adapted for both the 19 and 1951 A.C.I. codes.

Charts of moment and shear factors for continuous beams of two, three, and four spans and various conditions of loading, and a graph of concentrated load factors for solving Three Moment equations are presented. There are five pages of curves of moments and shears in single span beams, a variety of loading and end fixity conditions.

The structural steel section includes tables of lintels for masonry walls, curves of rivet

(Continued on page 1)
for choosing **kno·draft** adjustable air diffusers

Office space and manufacturing areas in this new asbestos dryer felt plant posed separate problems in air conditioning. In the manufacturing section, the vital factor in diffusion was the *even distribution* of the thoroughly conditioned air. Kno-Draft *Adjustable* Air Diffusers got the call because of their demonstrated efficiency in similar critical installations.

In offices and other employee quarters, beauty as well as efficiency had to be considered. Here again, Kno-Draft *Adjustable* Air Diffusers were selected. In addition to their unobtrusive harmony with any surroundings—from severely plain work areas to panelled directors' rooms—they assure the comfort of *draftless* air distribution.

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REVIEWS

(Continued from page 150)

brackets, and a set of curves for the design of crane columns. There are many additional graphs of less universal interest, some of which are adaptations of material in other handbooks.

The book is wire-bound to lie flat. Legibility is good, but on several plates the lettering is crowded and lines fuzzy. Most designers will think of more charts which might have been included to good advantage.

DONALD G. RADOW

designing for industry

Industrial Buildings. Compiled by Kenneth Reid, A.I.A., F. W. Dodge Corp., 119 W. St., New York, N. Y. 542 pp., illus $9

Informative material on industrial buildings that were published in the Architectural Record during the years 1940 to 1949 has been assembled into a handy, compact presentation of photographs, text, and drawings for use in the drafting room. There are also articles by foremost architects discussing related technological matters of lighting, heating and ventilation, plumbing, plant layout, etc., which are applicable to all factory buildings. Not the least valuable inclusion in the book are the Records Time-Saver Standards Sheets which appeared in that magazine during that decade. E.

products for hospitals


The Hospital Purchasing File—this is the 2nd edition—continues to be the standard source of hospital product information. It provides complete classified lists of products, equipment, services, and the names and addresses of known manufacturers, suppliers, and service organizations. Roughly about 800 pages of catalog data have been contributed by 350 firms. Complimentary copies of the file are sent routinely to the architect and other controlling personnel on every new hospital project announced during the one year's life of the volume.
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"On your first appearance before the (Supreme) Court, do not waste your time, or ours, telling us so. We are likely to discover for ourselves that you are a novice but will think none the less of you for it." Justice Robert H. Jackson, Cornell Law Quarterly.

In these Dark Ages, I've been wondering, can the architect and planner afford to be a man? I'm not sure at the moment what the role of man is in a scowling society. Whatever it may be, it isn't a sinecure. But only in rare instances in history has it been such.

When I talk of the architect's being a man I am not so much interested in the wealth of his knowledge, the breadth of his experience, the catholicity of his tastes, or the evidence of his learning as I am interested in two other attributes, one a faith in and affection for fellow man, and the other the zeal for a just cause.

What is wrong with us these days is that we have no burning torch, no banner bearing strange device, no white plume to keep unsullied in the thick of battle, in fact damned little interest in anything that should get our sand up. We cuss our government, our clients, at in general our competitors, but we do not see to be fired any more with the mountain-topping zeal that is the stuff of which pyramids and cathedrals and cities and TVA's are made.

A cause means a belief in something which the believer is so real, so vital, so true, so compelling that the 24 hours of the day are too short and the limits of life itself are a pulsing frustration. Belief in one's self may be a cause, once there is proof that one's self is worth making into a cause. That proof can stem not from an internal egoism but from the only reliable source, that of an irresistible urge to accomplish what must be done.

The choices of what must be done are immutable choices of each individual, whether outside compulsion and interference may make difficult of accomplishment, but they still remain the deep-down, inviolate rights of every man. In a world of conflicting emotions, tensions, a threatening terror which no man can escape, the importance of making the right choice belief in one's self and a cause becomes much more difficult.

Too many of us today are seeking that nonexistent cloud, "security", on which we can find a solid spot to rest our bones. There is no security in this world made for us by others. What we make for ourselves and our family is a point in time. I have had young men come to me right out of college looking for a job offering "security". These men are cowards who want offered on a silver platter ($5000 the first year and an annual raise) what no man can offer and what no man can achieve, in a padded cell.

The pattern is further deteriorating. It is not only a question of security; it is also a question of cynicism. "Nothing can be done that is w
If you know Briggs Beautyware plumbing fixtures, you undoubtedly know about the years of pioneering development work—the intensive program of product improvement—responsible for the tremendous popularity of these fast-selling, top-quality fixtures.

Now Briggs gives you new beauty—extra smartness—added eye appeal—sure to increase this popularity still further. Many of the Briggs porcelain enameled, formed steel lavatories and each of the tubs have been completely redesigned—restyled throughout! Several entirely new lavatories have been added. This dramatic new line is ready now to take its place with the superb Briggs vitreous china water closets, lavatories and urinals—to make doubly certain that Briggs Beautyware keeps out in front as the most brilliant, most desirable line on the market.

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"You may have to stand outside!"

Remember Aesop's fable of the camel and his master—how the kind master allowed the shivering beast to put into the tent first his head, next his shoulders, then his forelegs!

And then the camel said, "Master, I think I ought to come wholly inside," and crowded in. Immediately he said, "There is hardly room for us both, so I think it would be better for you to stand outside so I can turn around and lie down." And without further ado, the camel kicked the man out and took the entire tent.

Men have heard this story for 2,500 years—repeatedly have seen how it illustrates what happens when one man or group of men gain power over others. Men saw it happen in Italy and Germany when Mussolini and Hitler took over. Men saw it happen in Russia.

Even here in America a similar trend is evident. Powerful influences overlook no opportunity, through political manipulation, central controls and bureaucratic regulations, to intrude more and more in our private lives. The situation demands continual, alert watchfulness by all citizens who believe in individual liberty and freedom, to prevent this camel of big government from creeping further into the tent. Before we realize it, "we, the people," the master, may find ourselves "standing outside." In America it is government, which is the servant of the people.

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(Continued from page 154)

doing. Nobody wants my kind of work. Nobody is liberal enough, intelligent enough, to make it worth my time. In such a period of conservative taste and choice, nothing which I would do would be understood or treated right. It is up to others to recognize my ability and do much point in trying to do things until they do.” Or—and this is as bad, “Hello! What’s use? I may as well give in to make a living. I'll conform.”

The interpretation of a period by the people living in it is always difficult. No one can sure just where in the cycles of human activity he has been fortunate enough to be born. Interlocking and overlapping cycles for the movement of man in time separate into few which are the direct or indirect influence on each of us in the role chosen for each of us and by each of us to be played in our lives. As comprehensive architects and builders of the physical environment of our own society we should have a constant, fundamental interest in that cycle. This is the cycle that can be identified by the word “form”, rotation, beginning at the bottom of the cycle, goes clockwise—form, conform, defend and back to reform again. There is no alter these seasonal changes. In Angus Davids’s life of Edward Lear, he quotes from a critic in the London Times on the subject of Pre-Raphaelite painting. The date is 1851—101 years ago. Believe it or not, the Times is speaking of William Hunt, the Rosettis, Watts, Burne-Jones, in the rest of the Brotherhood and not of the recent and not-absorbed modern. I quote the critic:

“The public may fairly require that such offensive jests should not continue to be expounded as specimens of the waywardness of artists whose minds have relapsed into the infantile professions.”

And so it is with all the arts—applied or otherwise. Architecture and planning are continue moving round and round.

I’ve been interested in recent months in what seems to be interesting—really interesting—the "dear reader". In the design fields, I hear that there is a new element in large-scale developments of shopping centers in which a bit of an atractive spark is appearing—the first large-scale thinking evidenced by any body of architects in some time. I am, however, continually shocked by the fact that architects seem to have lost the verve and driving force of years ago and appear to be afraid of designing large-scale housing developments. I join enthusiastically with Lewis Mumford in attacking...
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March 1952
out of school

(Continued from page 158)

the incredible stupidity of the multi-family garden and high-rise rental monstrosities to which the American architects' and site planners' names are being attached. Apparently these buildings have no meaning to the designers. The fact that the total enterprise may consist of greater agglomerations of people and bricks than architects and planners have ever created before seems unimportant. On the contrary, this is perhaps the most important architecture of our day—or rather, it could be.

Not long ago, at a meeting of well known architects, I was shocked to hear them agree that housing projects could be too large for one architect to design. Shades of Bernini, Shades of Mansart and Le Notre! What mistake we have become that we spend our time on the permuted minutiae of thousands of little designs for little single houses (and fill our magazines with the results)! All this while thousands of people are jammed into the thousands of unstudied pigeon-holes in those great, glutinous, horizontal and vertical masses known as developments, projects, or what have you, and by whatever means. I'm getting sore again. If one half the time were spent today on the design of buildings as much as 1500 to 20 times as important as one little box, the vie nature, size of projects, and number of people involved would help put architecture and planning back where it belongs in society.

But what an admission of defeat! We are eunuchs! Or is it that our education in little things—that gadgeteering which walks as architecture—has blinded us to the virile undertakings which modern life demands? The architect says, "It is not my fault, there aren't enough site planners and city planners." What is a site planner? Why isn't an architect capable of grouping his own buildings? Why can't he have them to the land and in the places they belong? Is he lazy? Probably. Is he unimaginative? In all likelihood. Is he badly trained? It is obvious. Does he lack guts? That's getting more and more obvious too.

Why leave the guts to the few grand men? Theoretically manhood begins to wa after 60. But there are still four or five fighters around who are showing up everybody else. They aren't afraid of the lawyers, materials salesman, the engineer, public opinion, A.I.A. traditions, the future. They are makers of both tradition and the future. They are the men for a profession which is afraid to fight for itself, afraid to be virile, afraid to fight for itself, afraid to be petty security as a status in society, would go down the drain.

Being a man in society means more than fighting for one's own rights. It means more than thinking and creating big—important as is. It means having that cause in which you believe—you yourself—not the cause of all grand old men or any one's else. They are their own which can never be yours. You
Venetians made with LEVOLOR Orange Line (De Luxe) metal heads and bottom bars were installed throughout the modern Sterling-Winthrop Research Institute, Rensselaer, N. Y. W. Stewart Thompsohn, Architect; Grove, Shepherd, Wilson & Kruege, Inc., General Contractors.

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out of school

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fight alongside another man or in the great company of men whom you admire and for whom you have the affection which great purpose engenders. But in any true democracy you fight as a man for what you personally believe and no one else can fight that battle for you.

Today there is one cause which is every man's responsibility and which requires the teamwork of men. That is the job of developing means and fighting for the life of our society. The architect and planner has a peculiar and unique role in national and world defense. There are responsibilities of his inventive genius, his possible public leadership, and his reputed standards of performance which, if he is a man among men, he will apply to the preservation and creation of the environment which democracy under stress of defense badly needs. Despite petty differences in belief and approach to our problems of living and working, this cause should be sufficient to bring out every iota of manhood in what I am sure, is an adolescent and not a senescent profession.

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This month's discussion is related in subject to Part IV, "The Decision or Certificate of the Architect or Engineer," of Tomson's recent book, Architectural & Engineering Law (Reinhold).

It is the rule rather than the exception for a speculative builder to sell his house from a "model." The purchaser makes a down-payment and usually makes periodic payments during the course of construction, which are not always matched by a correlative amount of performance on the part of the builder. What happens when the builder decides not to carry out part of the bargain, and abandons the work? This may take the form of an obvious abandonment, or it may take the more subtle form of a slow-down. What can the buyer do? Of course, in the parlance of the courts, get specific performance of his contract? That is, can the court direct the defendant to complete the building in accordance with the plans and specifications within a reasonable time? The answer is, unfortunately, "probably not." It is unfortunate that people purchasing a home under these circumstances do not understand the importance of investigating the reliability of a speculative builder. Not to do so is to make a speculation on the part of the buyer, as well as the seller.

A recent New York case illustrated one court's attitude toward the problem of specific performance of construction contracts. The plaintiffs were purchasers of real property on which the defendant was to erect a dwelling. The building constructed failed in many respects to comply with the plans and specifications as required by the contract between the parties. The plaintiffs paid $1800 down on contract provided the builder finished the building in accordance with the plans. The relief sought by the plaintiffs was a judgment directing the defendant to remedy all defects and complete the building. The court refused to grant relief, relying upon the "general" rule on account of the great difficulty and, often, impossibility attending a judicial supervision and execution of performance, caused by the erection or repair of buildings and conduct of operations requiring time, skill, knowledge, and personal supervision not be specifically enforced. (*Stern v. Free Acres, Inc.*).

The plaintiffs in the above case, although foiled in their attempt to obtain specific performance of the construction contract, not without any legal remedy. The law allows a purchaser three distinct legal remedies:

(Continued on page...)

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(1) The purchaser is permitted to reject title and recover a judgment for his down-payment, with interest, and in furtherance of this, he is entitled to a purchaser’s lien upon the real property for that amount.

(2) The purchaser may complete the building and bring action against the builder for the expense incurred.

(3) The purchaser may prove the difference in value between the building, as constructed, and as the plans provided, and obtain a corresponding abatement in the sales price.

The three remedies available to the purchaser, although compensating him to some degree for the builder’s failure to complete the project, do not afford complete relief. A purchase of real property always has been considered by the Courts as something special. It was for this reason that equity courts early developed the doctrine of specific performance of contracts for the purchase of real property on the theory that a money judgment alone would not adequately compensate for a breach of a contract to sell real property.

An exception to the rule that contracts for the purchase of real property may be specifically enforced exists, however, in the ruling found in the Stern v. Freeport Acres, Inc. case, which has been stated by the Courts as follows:

“There is a class of special and exceptional contracts in which courts of equity refuse to exercise jurisdiction by way of specific performance. These are contracts having such terms and provisions that the court could not carry into effect its decree without some personal supervision and oversight over the work to be done, extending over a considerable period of time, such as agreements to repair or build, to construct works, to build or carry on railways, mines and the like.” (Wharton v. Stoughtonburgh, 35 N.J. Eq. 266.)

The United States Supreme Court has also expressed itself in the following language:

“It must be liable to perpetual calls in the future for like enforcement of the contract, and it assumes, in this way, an endless duty, inappropriate to the functions of the Court, which is as ill-calculated to do this as it is to supervise and enforce a contract for building a house or building a railroad, both of which have in this country been declared to be outside of its proper functions, and not within its powers of specific performance.” (Texas & R.R. Co. v. Marshall, 136 U.S. 393.)

The policy of completely rejecting the purchaser’s plea for specific performance and rejecting him to the law court for an action for money only, in many instances works a hardship upon the purchaser and in reality affords him inadequate relief. The alternative of allowing an abatement of the purchase price means that the purchaser becomes a reluctant builder—something he did not contemplate or desire when he signed the original contract. The other legal alternatives, i.e. the completion of the dwelling by the purchaser and his action to damages, or the rejection of title and an action for return of the purchase price, leave the purchaser with a money judgment which may be uncollectible because of the builder’s insolvency.

For these reasons, therefore, some courts do permit specific performance of building contracts. Where the work to be performed by the defendant was for the benefit of land sold, conveyed, or leased by him to the plaintiff, these courts have found stronger equities in favor of specific performance of the contract. In Zey v. Avenue Realty Co., 108 N.J. Eq. 46:

the defendant had sold a lot to the plaintiff but with a stipulation to construct a street and sidewalks in front of the lot within a year. To judge permitted evidence to be present whereby the character of the sidewalks could be fixed. The following should be noted in the opinion granting specific performance:

"In cases involving building and construction contracts, the court usually weighs, on the one side, the difficulties of enforcing and supervising the execution of a decree, and on the other side of the balance, the importance of specific performance to complainant and the inadequacy of an action for damages. If the difficult attendant upon enforcement are not impressed and the actual performance of the contract seems of much moment to complainants, courts are in the habit of granting equitable relief. The court may decree specific performance of a contract for construction work on land of the defendant when the difficulty enforcing and supervising the execution of a decree is not great and the work is essential to the use of complainant's adjoining land. If the damages are not an adequate remedy. But contract is specifically enforced unless it is certain in all its parts. The decree shall be so exact that a defendant may not be doubt with respect to his duty under the decree. He should not be left to guess what is required of him by the court. The importance performance to complainants and the inadequacy of damages are apparent. I cannot assume complainants have sufficient funds to prove Orchard Street, and even if they are able to do so, an adequate remedy is not then indicated. Whether, after spending time and money for this improvement, complainants can recover from defendant for the expense, doubtful; there is no evidence concerning
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financial standing of defendant. . . . A breach of contract which deprives one of the use of his land is a breach which cannot be adequately compensated by a judgment for damages."

The decision also serves as a guide to the owner or architect considering a contractor or builder. The owner particularly should understand that the lowest bid does not necessarily mean the lowest cost. He should understand how inadequate is an action for damages if the contractor does not properly perform. He should understand how important it is for the contract to be “certain in all its parts” so that neither the owner nor the contractor “should be left to guess what is required of him.” He should know whether contractors considered by him “have sufficient funds”, whether “they are able to perform, whether if the contractor unjustifiably breaches his contract the owner can recover his damages—whether the contractor is good for a judgment. He should keep in mind that “a breach of contract which deprives one of the use of his land is a breach which cannot be adequately compensated by a judgment for damages.”

Not until he understands all this should he choose his contractor.

NOTICES

five win scholarships

Five youthful New York students have won $500 scholarships for study at The Institute of Design and Construction, Brooklyn, directed by Vito P. Battisto. The grants from a fund established by the director in memory of his parents, Vincenzo and Sabino Battista, go to WILLIAM A. ANDERSON and JOHN McNIEL both Delehanty Institute students; RICHAORTIZ, Alexander Hamilton vocational high school; FRANCIS W. OTTAVIO, National Technical Institute; and PETER MCPARTLAND, the office of Bro. C. J. B. Baumann, O. F. M., architect.

for engineering study

American Institute of Steel Construction announces that, for the third year, ten scholarships of $1000 each will be awarded to high school seniors desiring careers in civil engineering. The grants may be used at any of 125 accredited colleges offering a degree in civil engineering. Applicants must be nominated by steel fabricating companies and obtain names of such companies by writing A.I.S.C., 101 Park Avenue, New York 17, N. Applications will be accepted until April 7. The jury of awards, a committee of prominent engineering educators, will make their selections in July.

traveling scholarship

The New York Chapter, A.I.A., announces LE BRUN TRAVELING SCHOLARSHIP for 19 The prize is $2800 for at least six months travel in Europe. The subject of competition is “A Small Town Library” and programs are now available. (Rendu April 30, 1952).

Requests for nomination forms are being received by Chairman, Le Brun Committee, New York Chapter, A.I.A., 115 E. St., New York 16, N.Y.
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