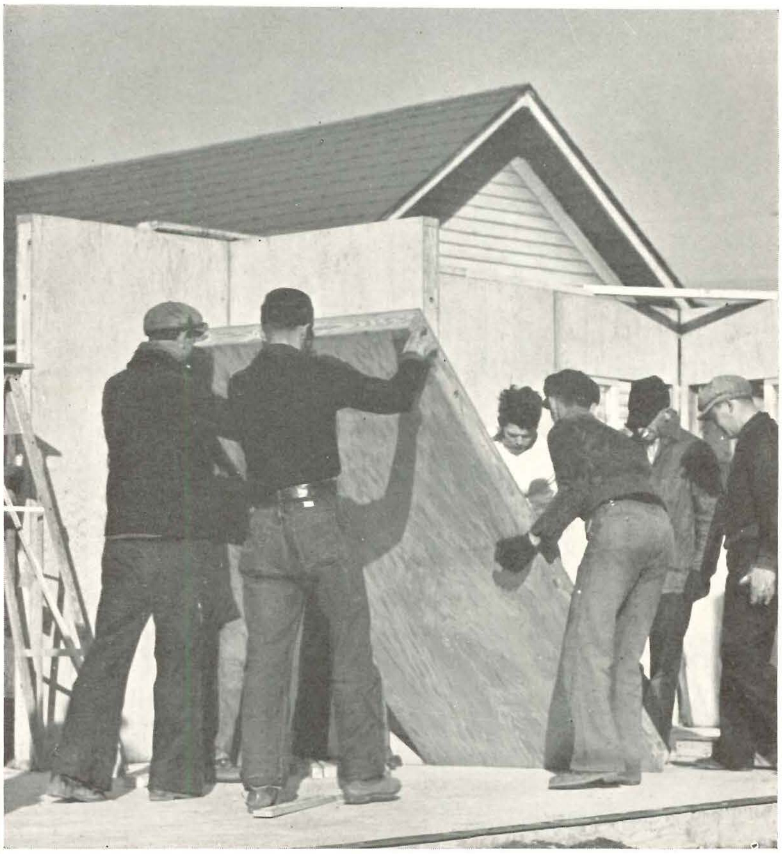
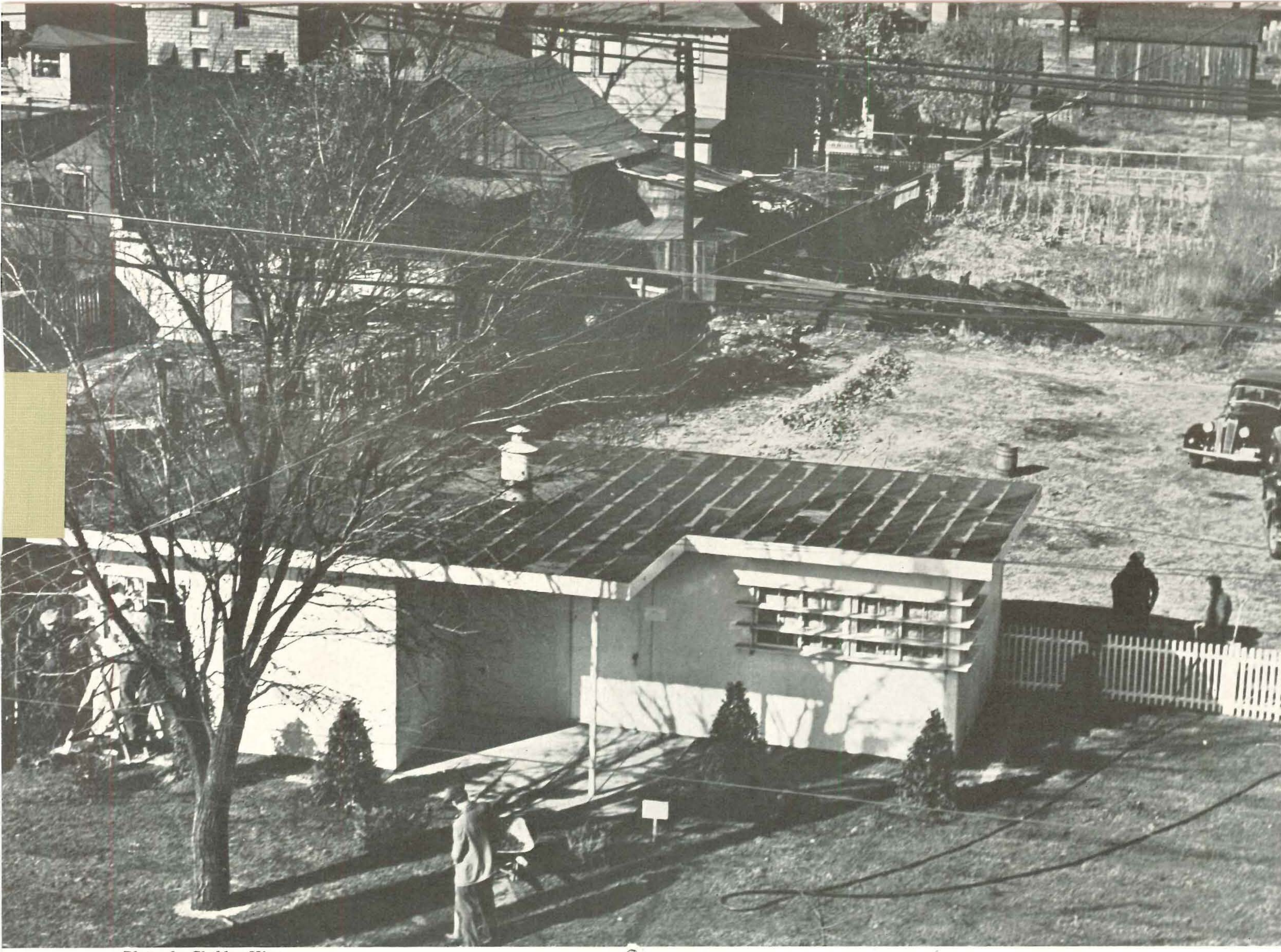
BUILDING NEWS



Sheldon Hine

Prefabricated panels being assembled at site... see pp. 38-40

ARCHITECTURAL RECORD



Photos by Sheldon Hine

FIFTY PLYWOOD-PANEL HOUSES BUILT AT RATE OF ONE A DAY

FEDERAL HOUSING ADMINISTRATION, Designers

AT THE RATE of a house each working day, the Federal Housing Administration has just completed fifty plywood houses at Fort Wayne, Indiana. Erection of each unit at the site took only 1 hour and 40 minutes. The houses have been built by WPA labor; overhead, material, and land costs were $900 per unit.* Units rent for $2.50 a week, sufficient to pay principal and interest of a $900-mortgage at 4½% interest over a period of 20 years.

The houses are built of plywood box-beam panels filled with mineral-wool insulation. Phenol-resin bonded sheets are nailed and glued to both sides of framing members. The strength of these panels is many times what is required for one-story residential structures.

*Labor cost is not included.

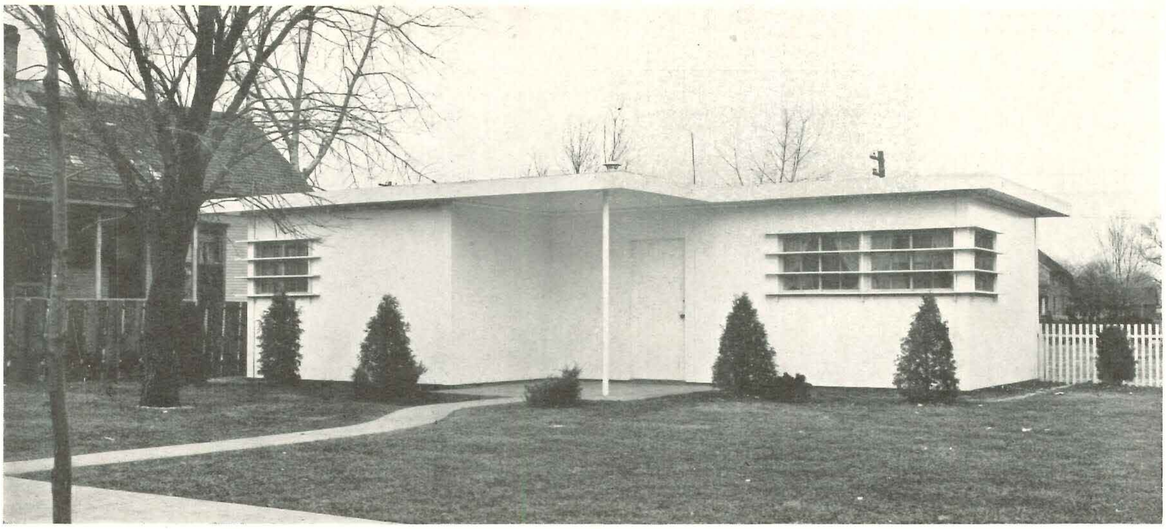
A factory was rented and equipped by the Housing Authority as part of its overhead cost. Plant equipment consisted of a cut-off table, a plywood saw, and various jig tables on which the different panels were assembled and fabricated. The factory was manned by WPA labor.

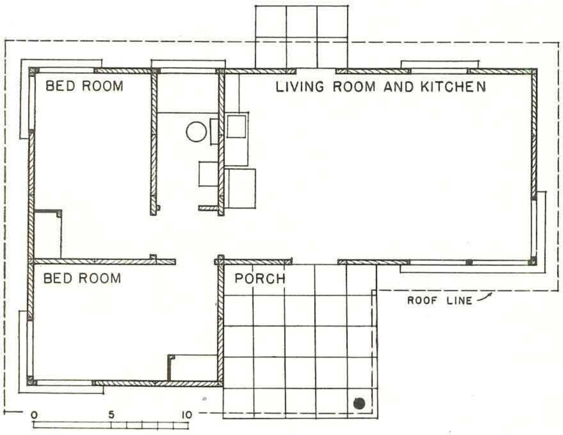
The construction system requires four types of panels: 1, for plain wall surfaces; 2, for doors; 3, for windows; 4, for roof. Wall panels are 4 x 8 ft. in size. Roof panels, filled with 4 in. of insulation, are 4 ft. wide and 16 and 24 ft. long. Each house is built of 22 plain, 8 window and 5 door panels, and six 24-ft. and three 16-ft. roof panels.

The floor, poured at the site, is a concrete mat reinforced with wire mesh and laid over a tamped gravel fill. Wall and partition panels are erected on the floor slab and are butted together with long steel rods. Roof panels are similarly bolted together laterally at 4-ft. intervals and secured with nuts and cast-iron washers at each end. Vertical rods, hooked to the slab and roof rods, tie the entire house firmly to the foundation.

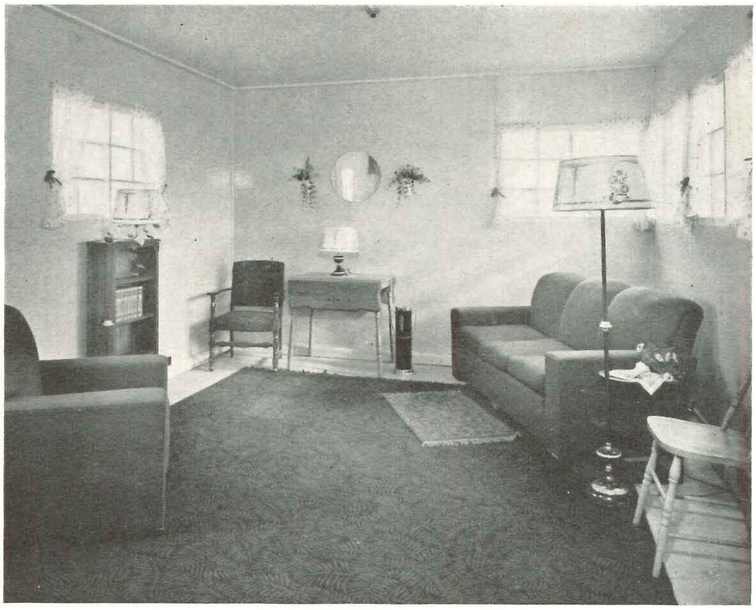
Roof panels are covered with 4-ply, 17-year specification, gravel-covered built-up roofing. Exterior and interior wall and ceiling surfaces are finished with three coats of paint.

A pot-type oil-burning space heater with a water coil is used for heating the house; the insulating quality of the construction makes this type of heating practical. Kitchen and bathroom plumbing are arranged back to back; all pipes are exposed for easy accessibility.

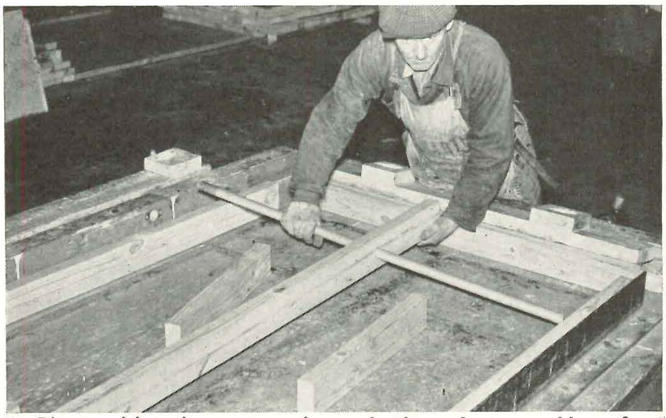




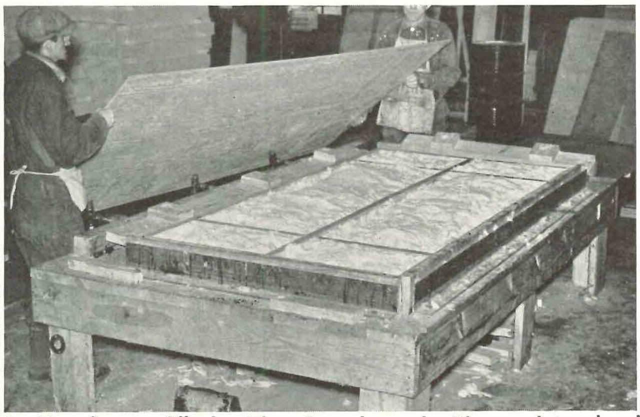
Floor plan



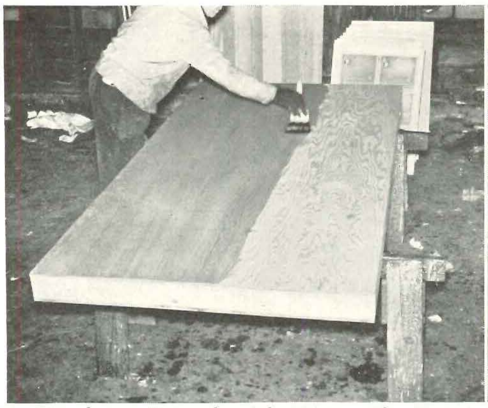
RIGHT, ABOVE: Combined living room, dining room, and kitchen is 12 x 20 ft. All rooms have cross ventilation. RIGHT, BELOW: Typical bedroom. Children's beds may be double-deckers to save space.



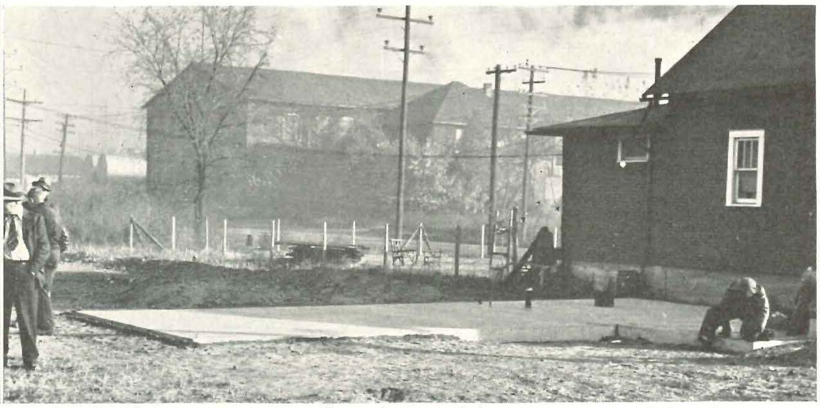
1. Plywood box-beam panels are built at factory. Use of cardboard tubes will facilitate insertion of tie rods. . . .



2. Panels are filled with mineral wool. Plywood is glued and nailed to both sides of framing members. . . .



3. Panels are sized with Tung oil. Painting is done after house is assembled. . . .

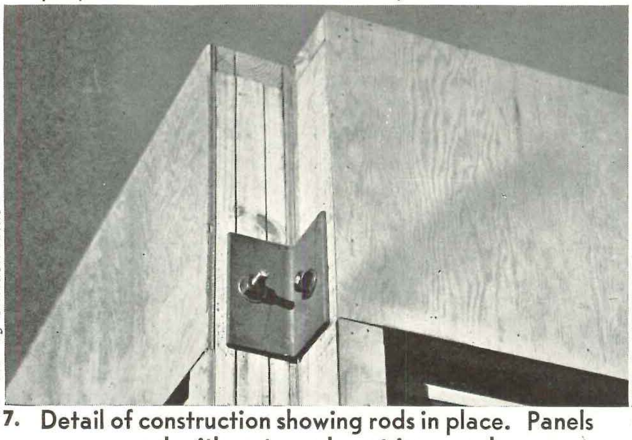


4. At the site, concrete foundation slabs are prepared for the assembly. Here workmen apply asphalt cement and tarpaper. . . .

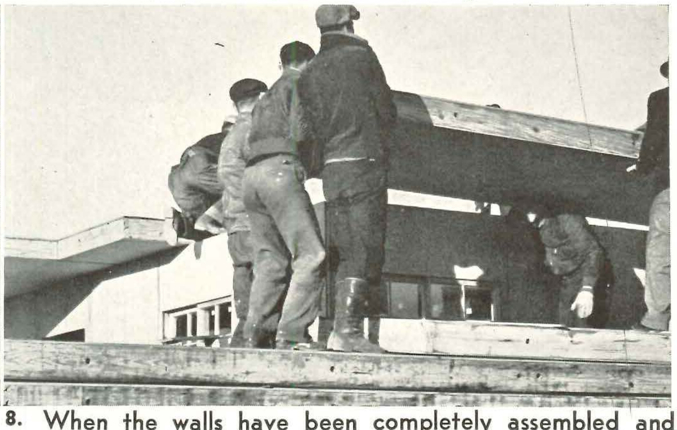
5. Here the white-lead seal is being applied in preparation for the next wall panel. . . .

6. Panels are tied together with steel rods and bolted at corners; walls are drawn into rigid units. . . .

Photos by Sheldon Hine



7. Detail of construction showing rods in place. Panels are secured with nuts and cast-iron washers. . . .

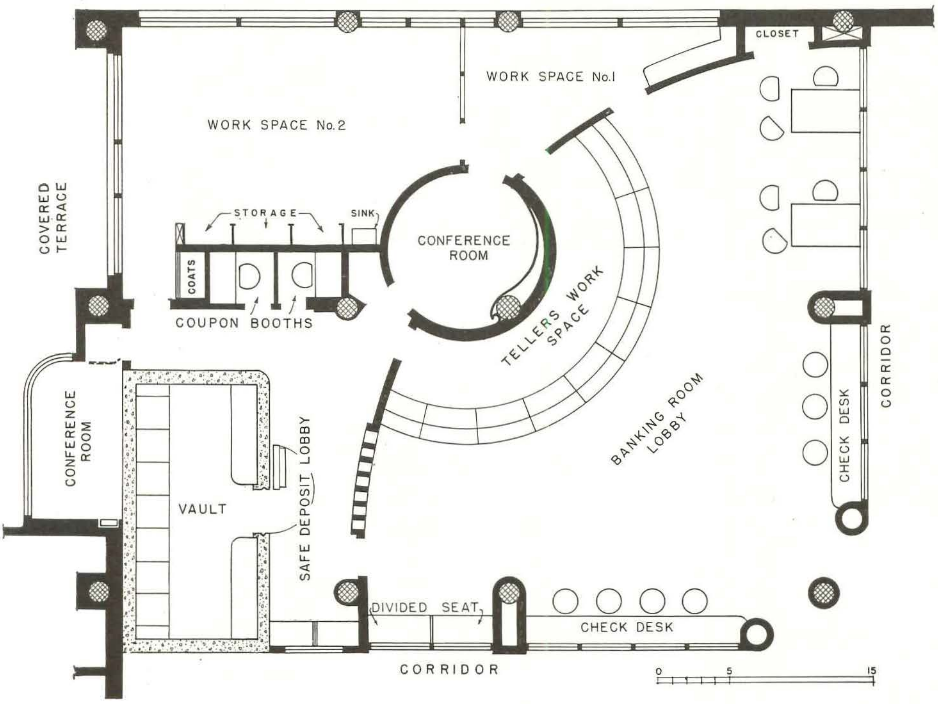


8. When the walls have been completely assembled and bolted together, the roof panels are placed in position.

Dick Whittington

MODERNIZED BANK OVERCOMES RESTRICTIONS OF EXISTING STRUCTURE

STILES O. CLEMENTS, Architect



Floor plan

THE DESIGN of this modernized bank opening from the street-floor lobby of the Ambassador Hotel in Los Angeles is a logical outcome of the problems inherent in the site. The existing columns and low ceiling, as well as the relative smallness of area available, have put limits on the design possibilities.

The new floor plan eliminates all free-standing pillars in the public lobby, yet permits the lobby to occupy approximately half the entire floor area. The various departments radiate from the manager's office, a small circular room near the center of the bank. The tellers' counter in the bank lobby conforms to the semicircular wall of the manager's office behind it.

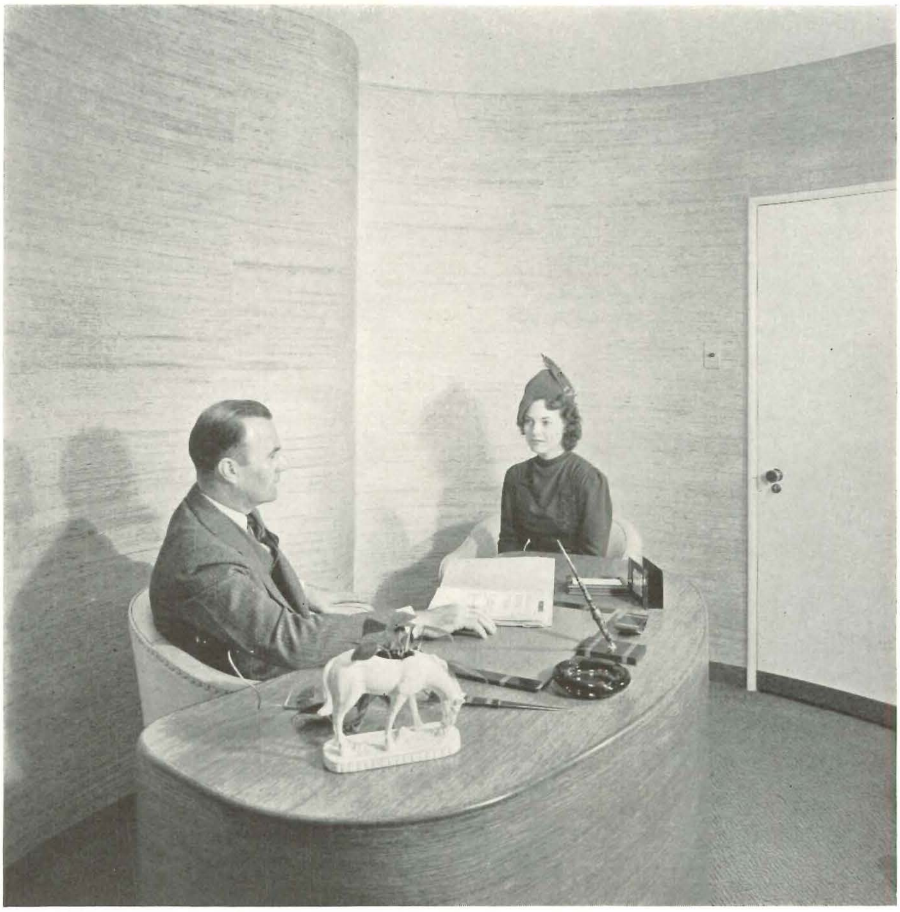
Concealed lighting is supplemented by countersunk lights above desks and tellers' counter. The ceiling is sound-absorbent, the floor carpeted.

All interiors are finished in white oak veneer, in some instances molded over special cores. Furniture was made especially for the job.

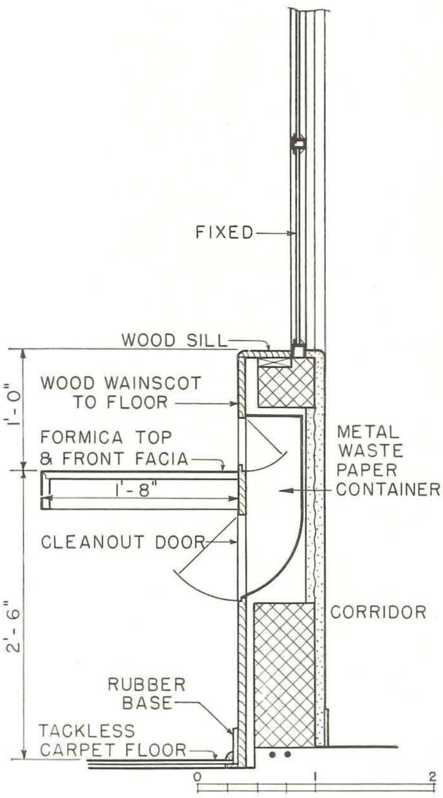
Photos by Dick Whittington

A semicircular false ceiling over the tellers' counter is intended to give an illusion of greater height to the room.

There are no grilles or partitions at the tellers' counter; counter follows the wall of the office behind it.

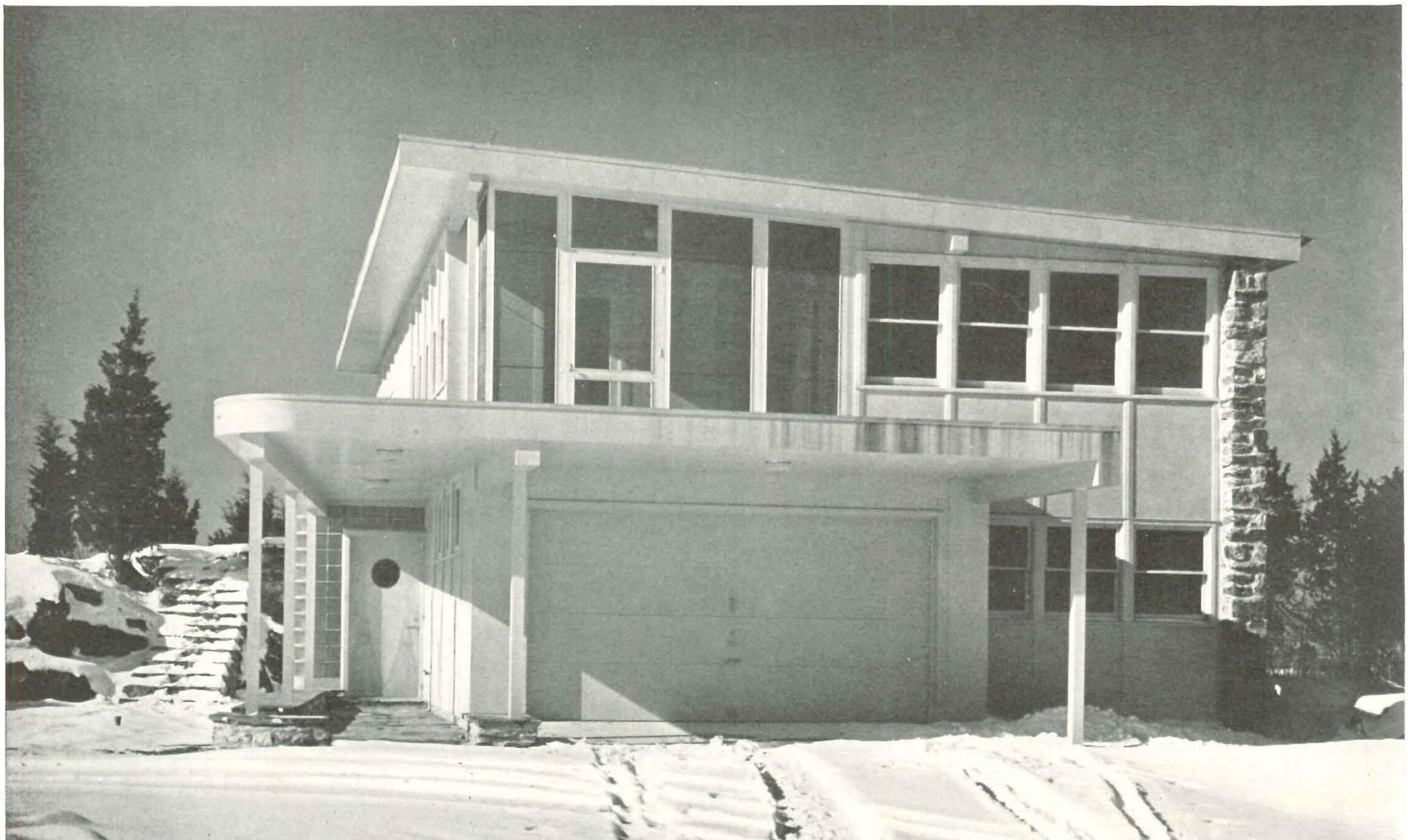


Manager's office: there is a column inside the curved wall at left.



Writing desks along the walls have built-in check and deposit-slip compartments, calendars, waste-disposal chutes, and ash receivers.

View from south. The room above the covered walk is a nursery, with ready access from sleeping porch and master bedroom.



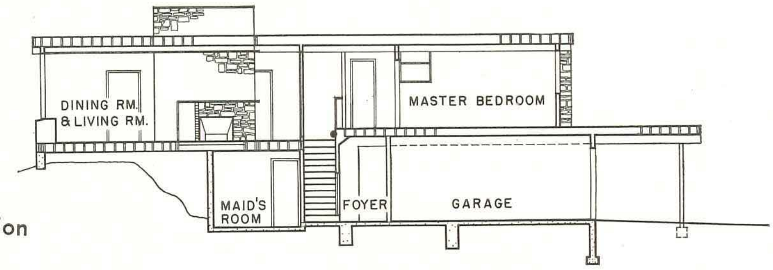
Photos by Saint-Thomas

Except garage, all areas on east side are bedrooms. Stone wall on the north is designed to withstand strong prevailing winds.

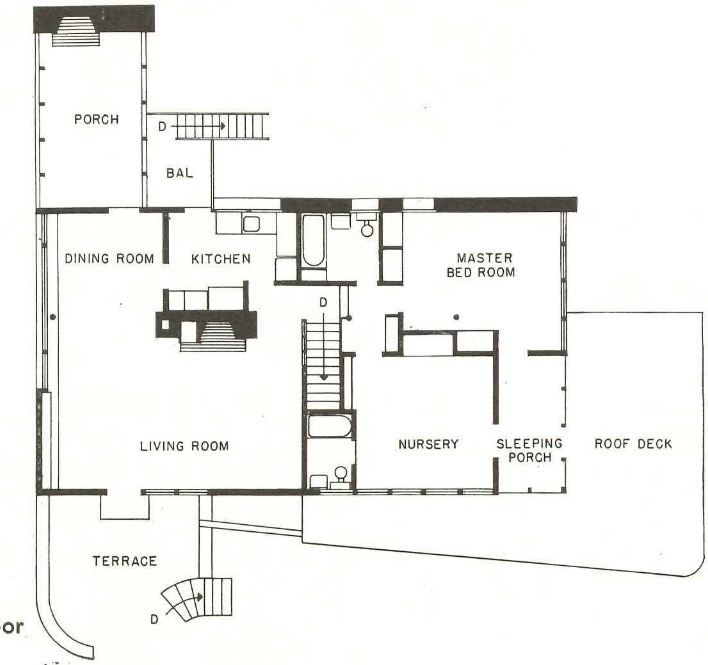
PLYWOOD AND FIELDSTONE WALLS ARE USED IN SAME HOUSE

WILLIAM FRIEDMAN and HILDE REISS

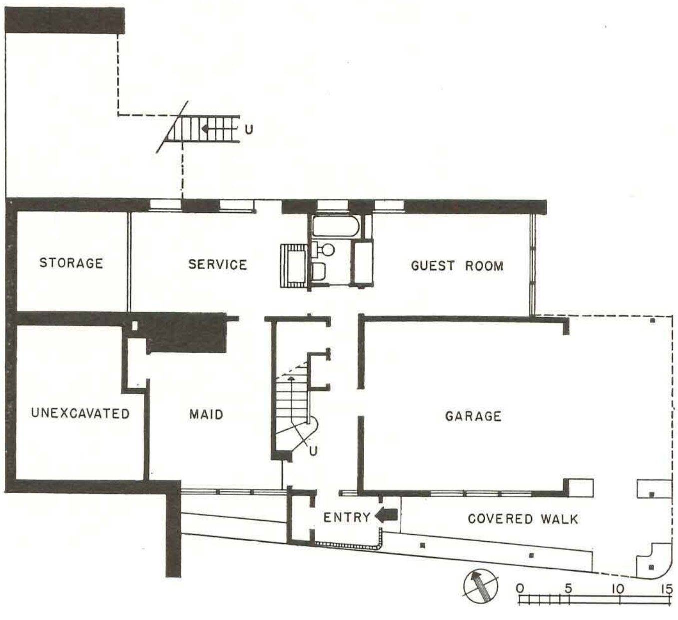
Designers



Section



Second floor



First floor

THE SITE of this house is a rocky ledge on a 43-acre estate in Pleasantville, New York. The house had to be sheltered from prevailing northeast winds. At the same time, advantage was to be taken of a superb view of the Hudson Valley about 6 miles away to the west. The north wall was built of 16-in. fieldstone as a screen against the wind. All other walls are 5-ply, resin-glued Harbor plywood, the use of which has permitted a lightness of structure and a width of span which takes adequate advantage of the view. The site is about one third of a mile from the main road.

The planning problem has been one of providing space for husband, wife and baby, occasional guests, and a maid's room large enough to accommodate a couple. The main living quarters have been placed on the top floor in an apartment-like arrangement which simplifies housekeeping and reduces stair climbing. The layout gives complete privacy to guest room and maid's room. The dining porch, screened from floor to ceiling on the view side, has an outdoor fireplace. The house is air-conditioned.

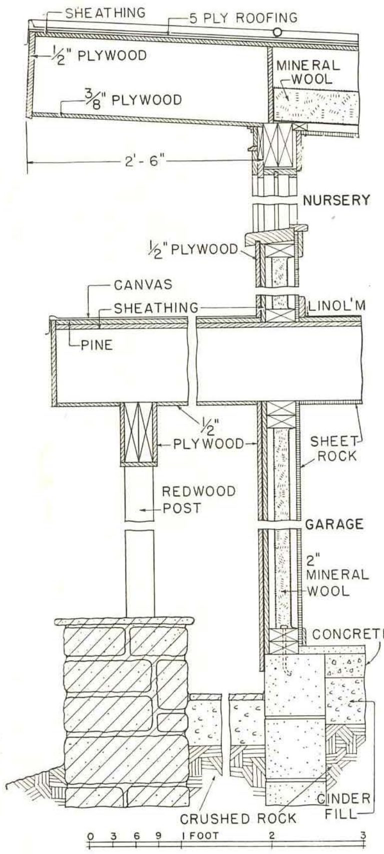
Floor and roof joists span from the north stone wall across a central line of girders supported on Lally columns. All interior walls are either plywood or wallboard. Ceilings are not hung; they follow the pitch of the roof.

Plywood panels are 42 in. wide and the design is based on a 42-in. module.

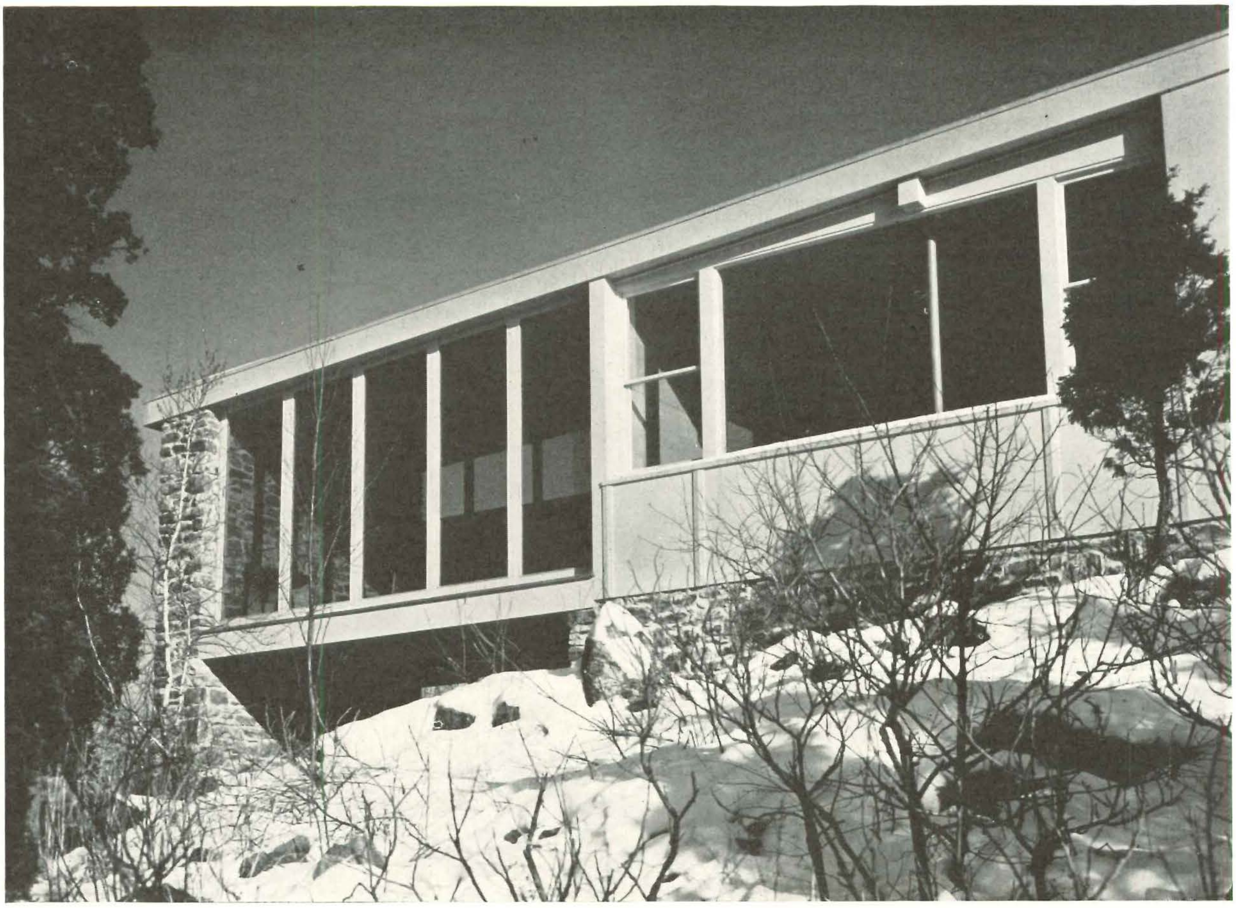
Cost of the house, including oversized mechanical equipment for possible additions, was $18,000—approximately 51c. per cu. ft.

HOUSE IN PLEASANTVILLE, N. Y.

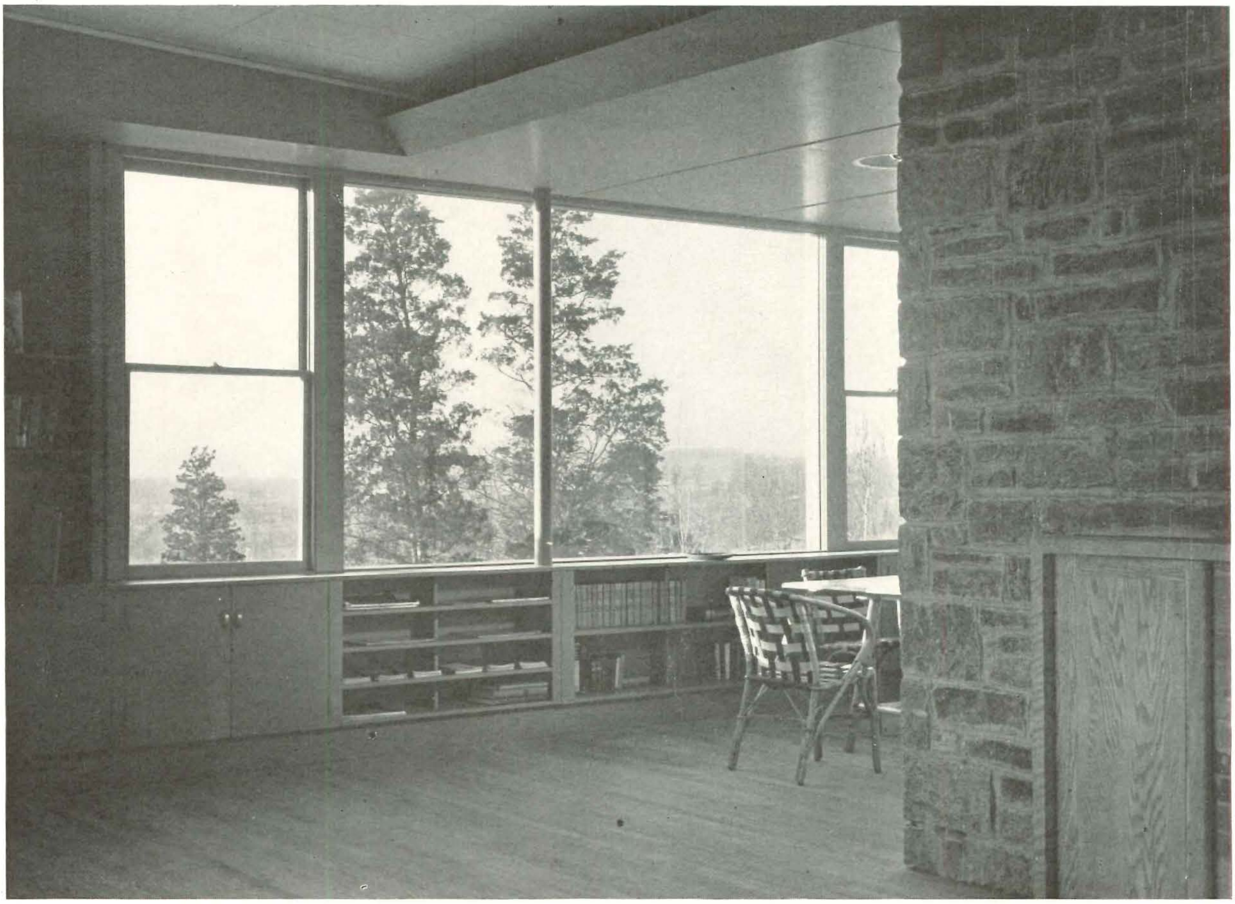
Photos by Saint-Thomas



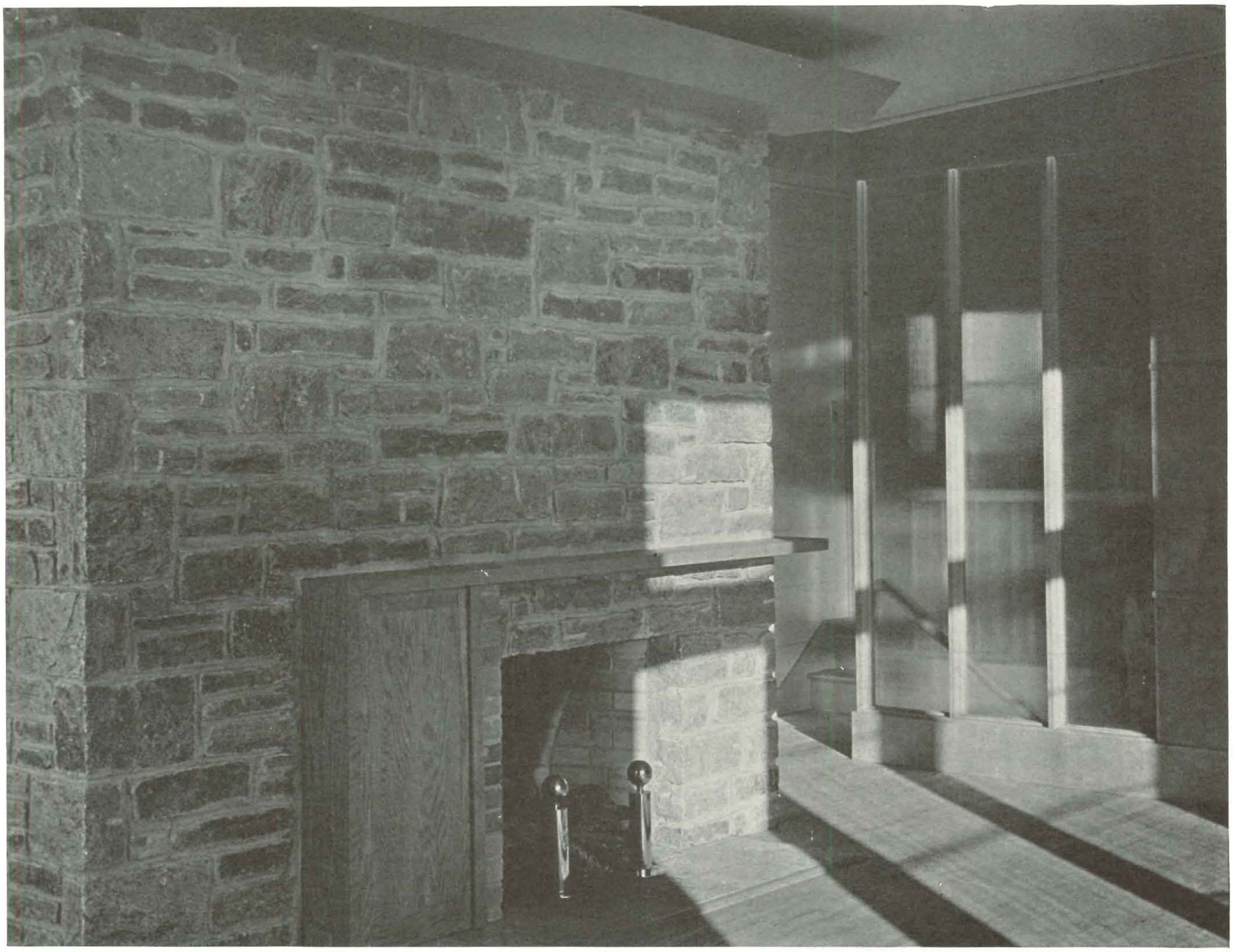
All walls but that on the north are built of 2 x 4 in. studs covered with sheathing and faced with ½-in. thick, 5-ply, hot-pressed, resin-glued waterproof plywood. Joints are covered with wood batten strips laid in mastic. Wall insulation consists of 2-in. mineral-wool batts.

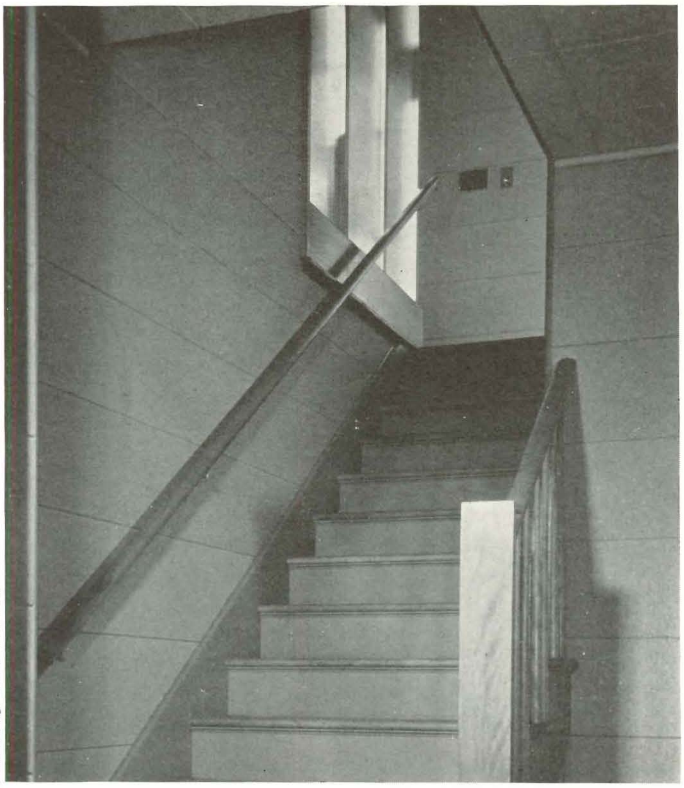


View from west. Living-and-dining room at right with access to porch at left. There is no cellar below grade.



Interior of living-and-dining room. This room commands a view of the Hudson River Valley six miles away.





Photos by Saint-Thomas

ABOVE: Open fireplace in living-and-dining room. This room is immediately accessible from stairway; part of one wall consists of glass panes to admit daylight to stair-hall. LEFT: Stairway to upper floor.

MIRROR USED IN PROPOSED DESIGN OF FOUR-WALL COURTS

GAVIN HADDEN, Engineer

IN DESIGNING four-wall courts for games like squash racquets, squash tennis, racquets, four-wall handball, etc., one great restriction has been the difficulty of providing for more than a handful of spectators at any one contest. With the field of action at the bottom of a "well" formed by the four playing walls, there is a steep angle of view downward from above one of the walls. The back wall of the court is the lowest of the four, and space for spectators' seats or standing room has usually been located above it; but even with tiers of seats rising as steeply as practicable, always part of the play has been hidden from those seated or standing anywhere behind the first or second rows.

A new scheme for the design of four-wall courts by which the spectators are placed above and behind the *front* wall, and by which all of the playing surface can be seen, is now projected. Spectators are seated on gradually rising tiers instead of a steeply stepped floor; their lines of sight are reflected from a large mirror located in part above the rear of the court, in space not required for play.

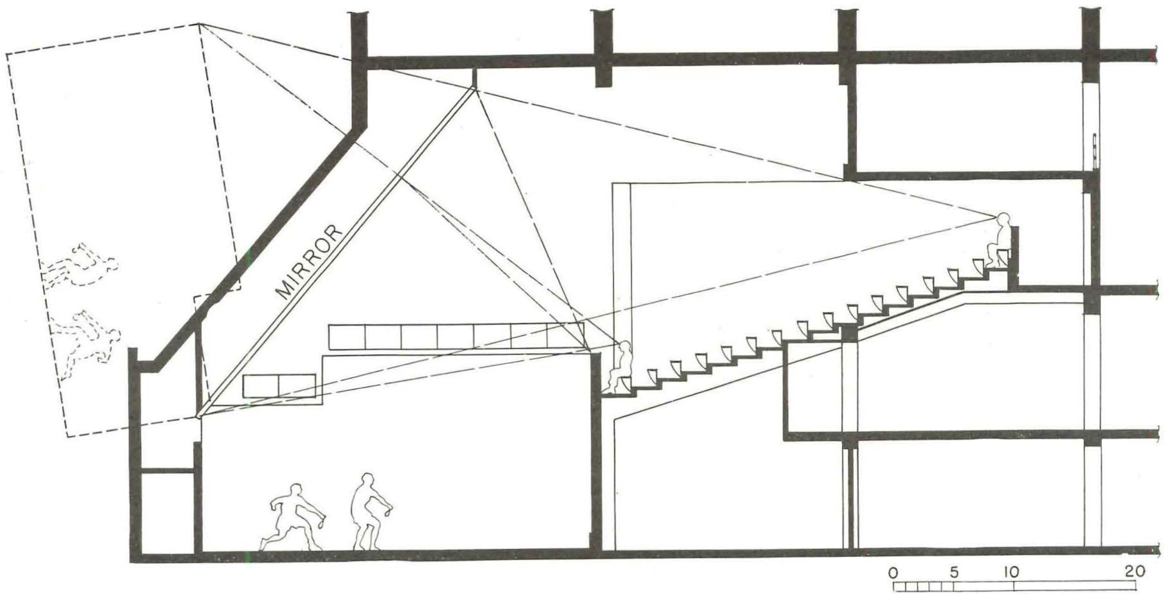
The number of possible arrangements of the mirror with respect to court and spectators is limited only by the slope of the mirror and its height above the floor. With regard to the mirror's slope, there are two limiting positions: one just permitting the front-row spectators to obtain a view, foreshortened to a single line, of the back wall, and the other just permitting the last-row spectators to obtain a similar view of the front wall.

The section diagram shows sixteen treads or steps, which would extend the full width of the standard squash court and accommodate at a singles match about 200 seated spectators, all provided with a view of the entire court; or, if the chairs or benches are removed, more than 400 standees can be accommodated, all similarly provided with a view of the entire court. In addition, one row of seated spectators could be accommodated in the usual manner, with a direct view from above the back wall, through the opening between the top of the wall and the bottom edge of the mirror. The height and angle of the mirror can be altered to provide for additional rows of spectators above and behind the back wall; but these spectators would not be able to see the entire court—just as they are unable to do so at existing courts today.

Among the problems to be solved are those involving the structural support and accurate adjustment of the great mirror; provision for heating the mirror to prevent condensation and clouding of the face; the method of artificial lighting, etc.

Because of the mirror, indirect lighting of the ordinary type is not possible; but the high ceiling and the large side openings between the mirror and the top of the side walls make possible the use of sidelighting from a considerable height above the floor. Such lighting can be arranged to avoid glare in the eyes of players or spectators.

A possible objection to the scheme arises from the fact that the spectator sees only a reflected view, in which all locations seem reversed. For example, a right-handed player will appear to be left-handed, and vice versa. The designer maintains, however, that the completeness of the view would compensate more than adequately for its somewhat artificial character.



Section diagram

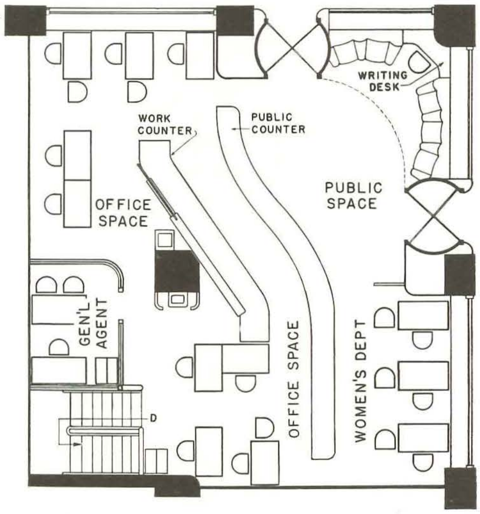
View of public counter. Front face of counter and frame behind it are oak, of natural finish and lacquered.

Photos by Hedrich-Blessing

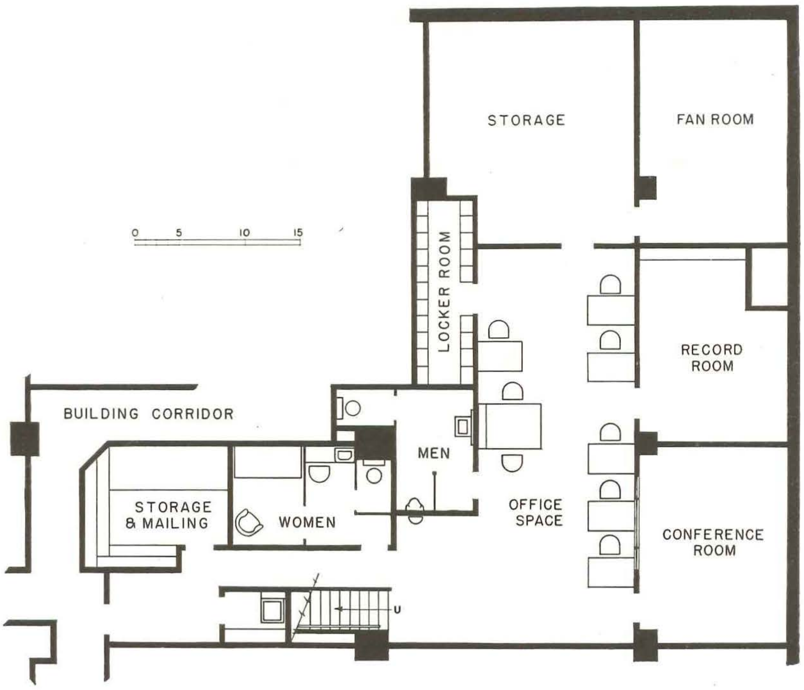
Venetian blinds are metal. Sides of settee are gun metal with Formica tops for arm rests; ash trays are set in flush.

AREAS OF TICKET OFFICE ARTICULATED ACCORDING TO FUNCTION

W. T. WELLMAN, Architect
H. C. WILLIAMS, Designer



Street-floor plan

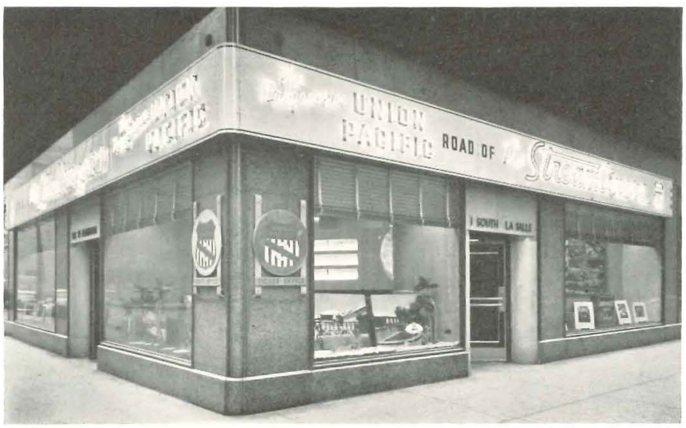


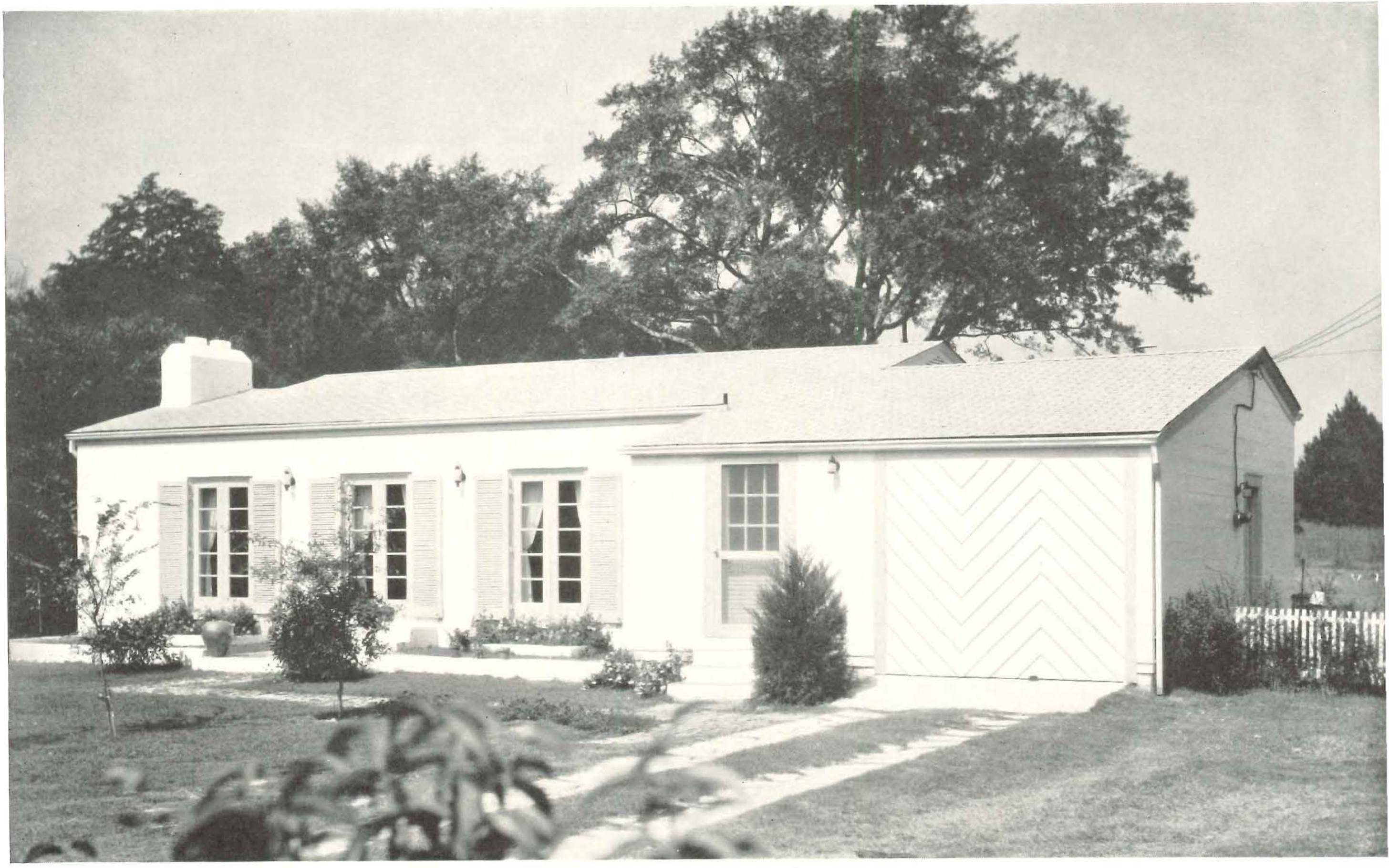
Basement plan

THE NEW Union Pacific ticket office in Chicago is characterized by a functional articulation of areas—of waiting area, public area, and working spaces; at the same time each area is immediately accessible from other spaces. Waiting space is located in a corner of the office, away from the flow of traffic. Public space at the counter is adjacent to revolving doors at either side, leading to the street. Work spaces at street level are sufficiently isolated, yet not inaccessible to patrons. At the basement level are equipment, storage and record rooms, lavatories, and general office space.

Floor surfaces and most desk tops are of rubber. The wood veneer around revolving doors and soffit of the public space is flexwood applied to plaster. Acoustone with butt joints has been used on the first-floor ceiling. The walls are cream beige and the ceiling ivory. Desk tops are dark brown. Rubber floors are light beige, mottled with brown and red. Furniture, front face of public counter, and the frame above the work counter are of American quarter sawed oak, of natural finish and lacquered. Photomurals are dark sepia.

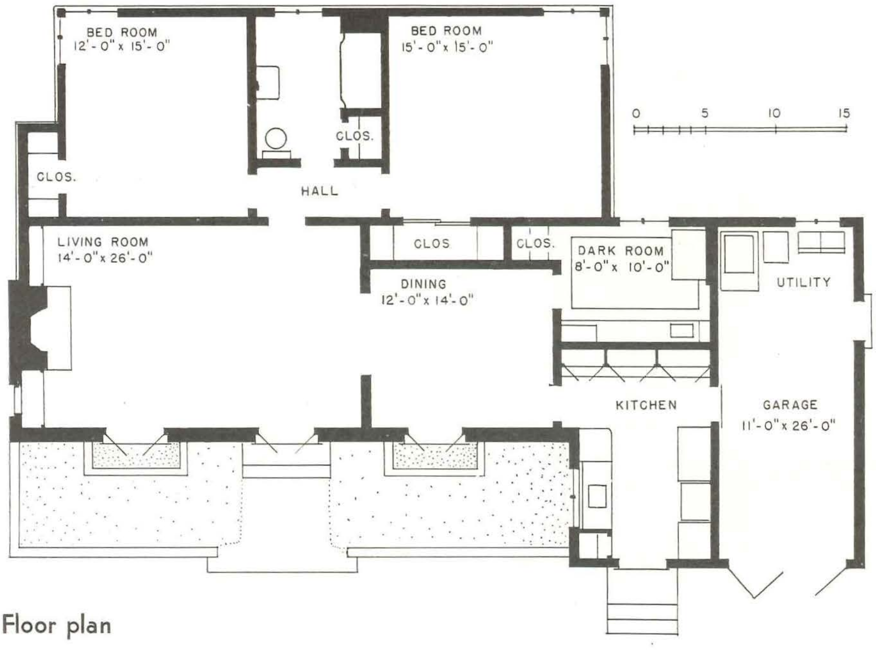
All lighting is indirect. The 7-ft. glass map behind the public counter is illuminated by edge- and floodlighting. The entire project is air-conditioned.





AUBURN, ALA.: 5-ROOM HOUSE BOASTS COMPACT PLANNING

SIDNEY W. LITTLE, Architect



Floor plan

SLIGHTLY NORTH of its Florida origin, this owner-designed house for Prof. and Mrs. Sidney W. Little boasts a compact and well-organized plan. Basement has been eliminated by placing gas-fired hot air furnace and hot water heater in rear end of garage. An interesting feature of the house is the combined dark room and office (see facing page).

The house is wood framed, with brick veneer and ship-lap siding: roof is of aluminum coated composition shingles. Both roof and walls are insulated with rock wool bats. Floors are oak, except for linoleum in bath and kitchen. All walls are plastered. Total cost, exclusive of land, landscaping, was $6,600.

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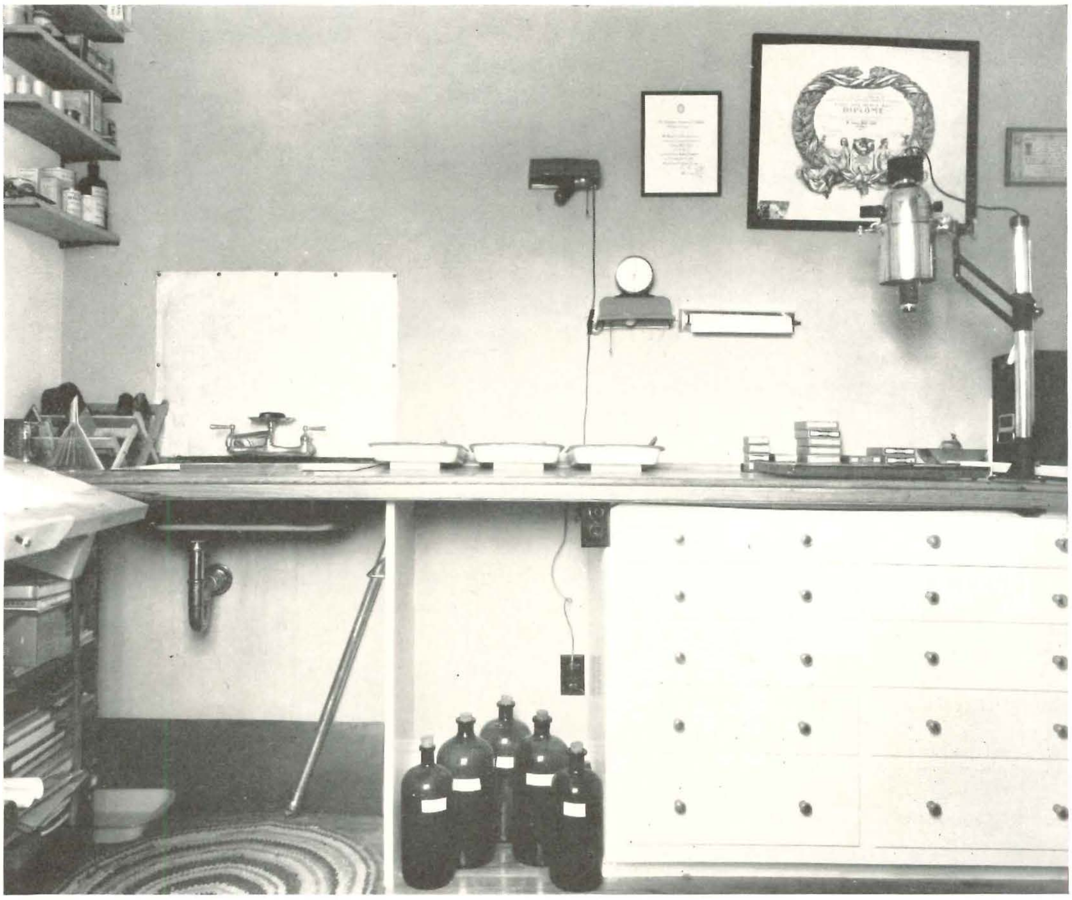
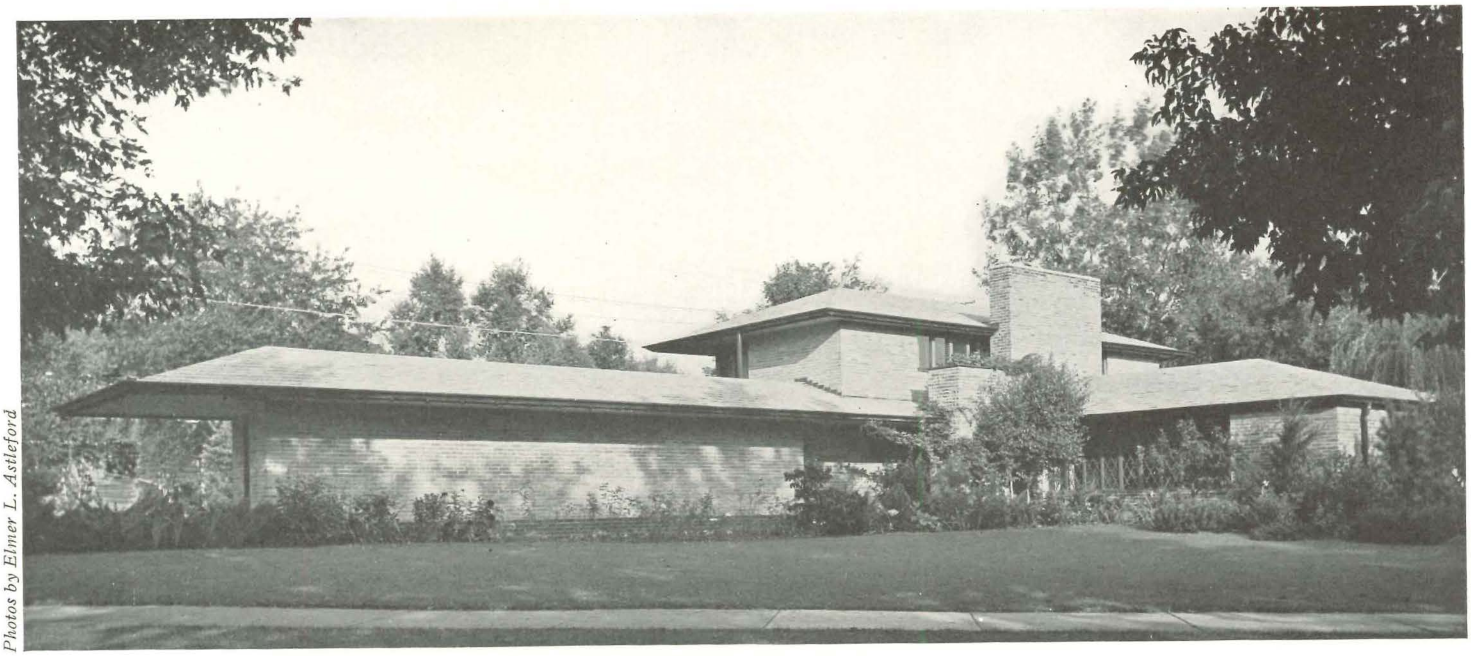
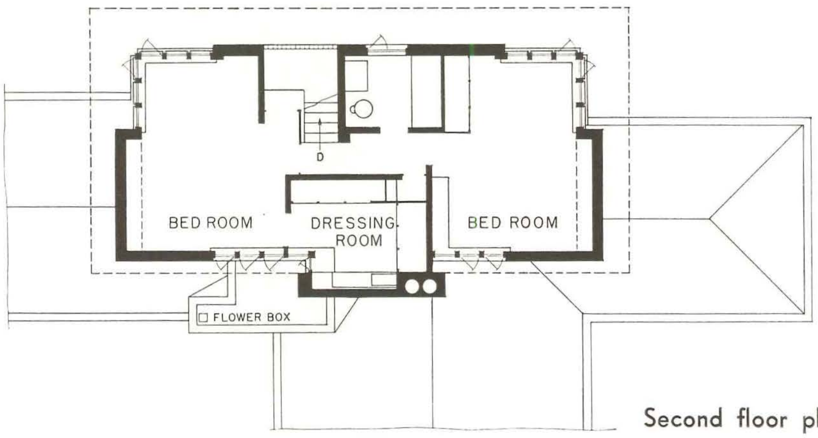


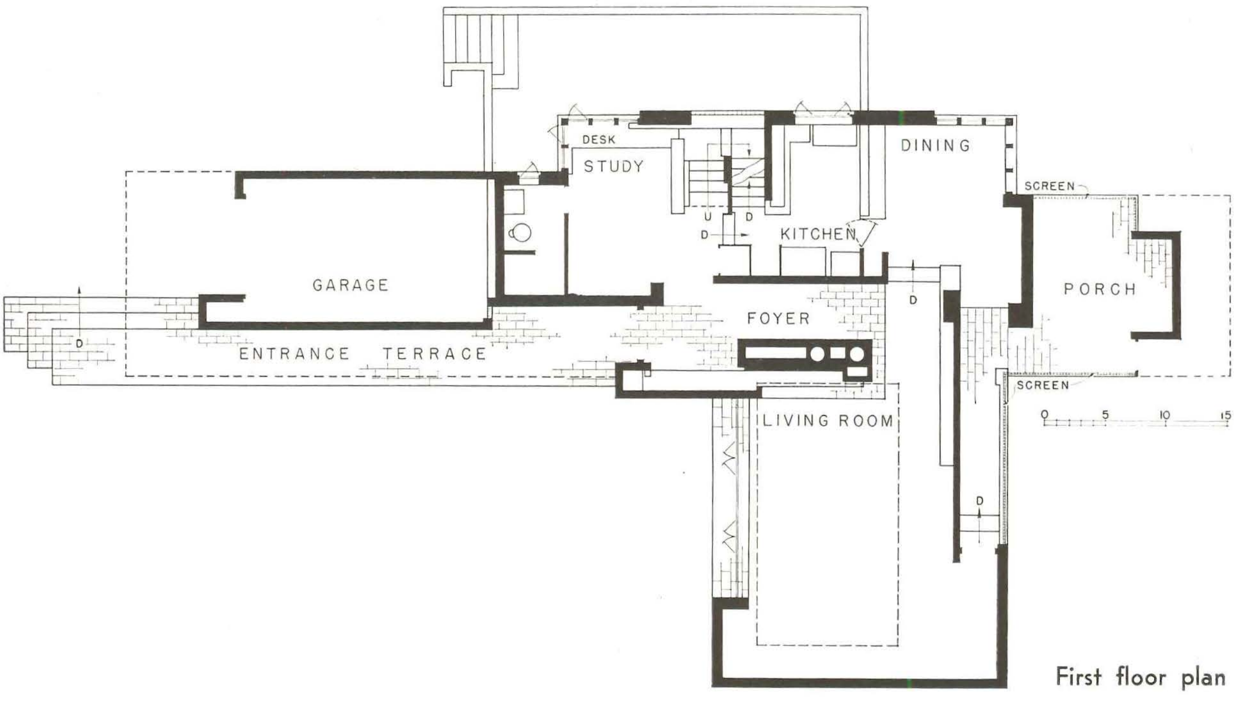
1. One of the bedrooms. Floor: oak with white wool rugs. Walls: red and silver woodwork. Trim: oyster white. Furniture (designed by the architect): white and chromium. 2. Darkroom is equipped for developing, enlarging, and printing, as well as drafting and study.



View from street



Second floor plan



First floor plan

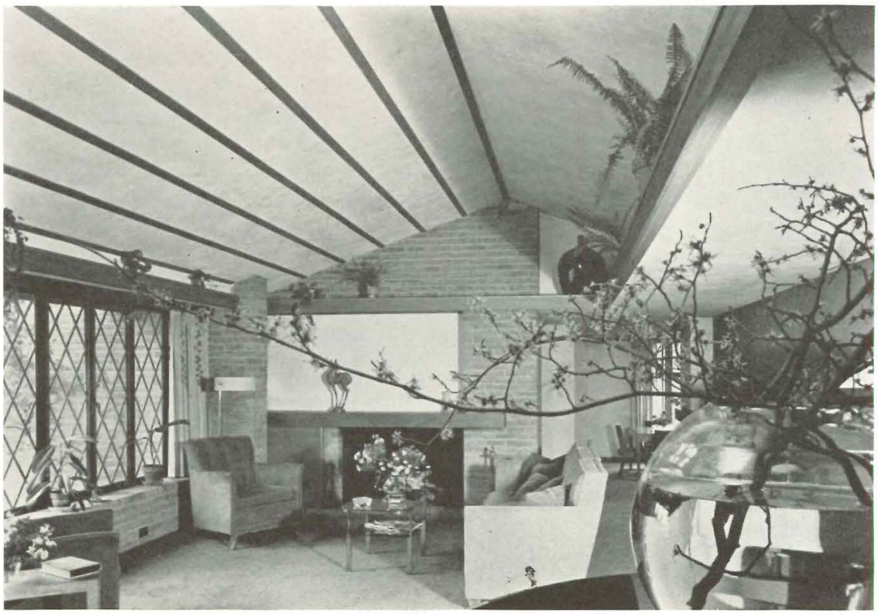
MIDLAND, MICH.: 1—SERVANT SMALL HOUSE FOR FAMILY OF 2

ALDEN B. DOW, Architect

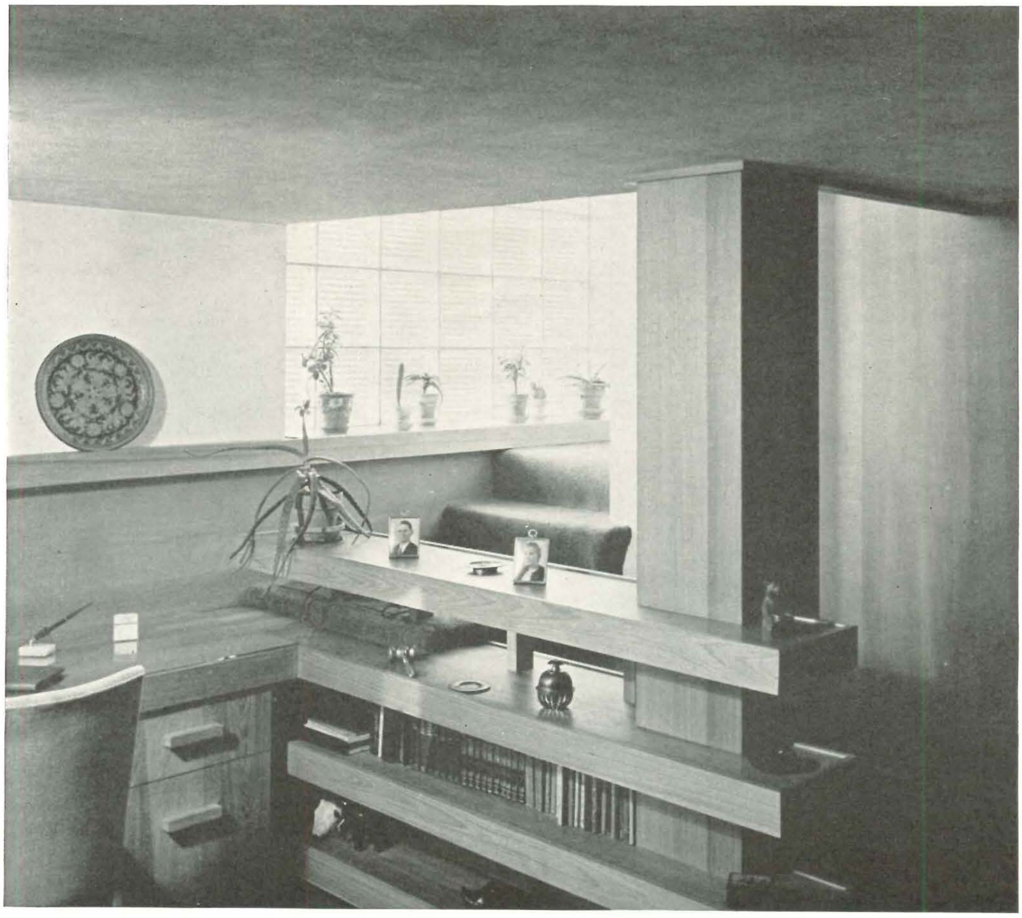
ORGANIZATION OF the various plan elements of the O. C. Diehl house in Midland, Michigan, was largely determined by a triangular plot whose base lay along the street. Use of an L-shaped plan, placed as close to the street as possible, enabled the architect to get privacy for the living areas while keeping both main and service entrances near the street. The interior of the plot was thus kept intact, protected from the street by the mass of the house. No first floor windows face the street—the living room windows look down, not across it—and there are only two minor window groups on the second floor on this front.

In spite of its external appearance, the Diehl house is compact. It pivots around the brick-paved foyer, with circulation simplified by "free" planning. A one-servant kitchen has quick access to front and service doors, dining, and living areas. The two bedrooms, bath, and dressing room on the second floor provide maximum facilities in a relatively small area.

Construction of the house follows Mr. Dow's characteristic approach — large unbroken wall surfaces, low-pitched roofs with wide overhangs, massed windows, and massive chimneys. Foundations are concrete block. Walls are of pink common brick—hollow where load bearing, veneered elsewhere. The roof is wood-framed, shingled in white asbestos. All exterior metal work is copper, woodwork unpainted cypress. All roofs and veneered walls are insulated. The forced-air heating system is gas-fired.



The living room (right) shows Mr. Dow's characteristic use of color, texture, and pattern. Floors are carpeted in green; plastered surfaces are natural color; exposed brickwork is common pink; all cabinet work and trim is in red cypress. Upholstery is in neutral shades.



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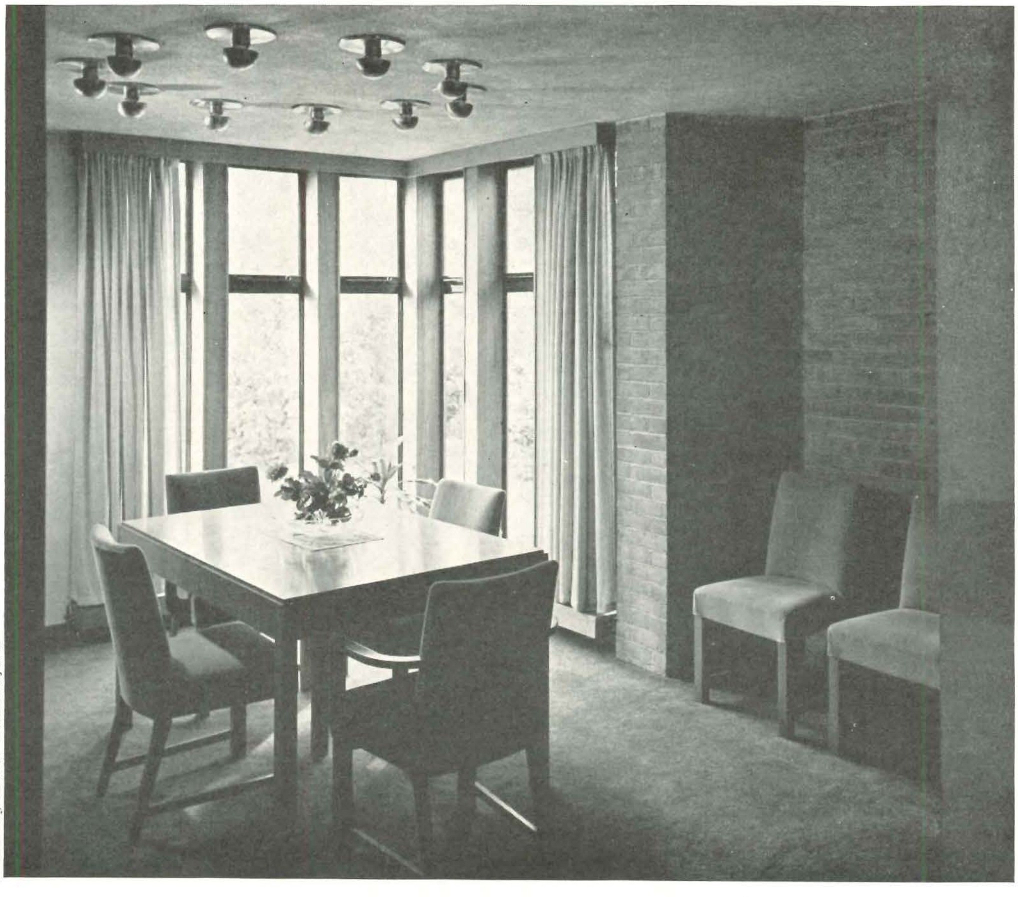
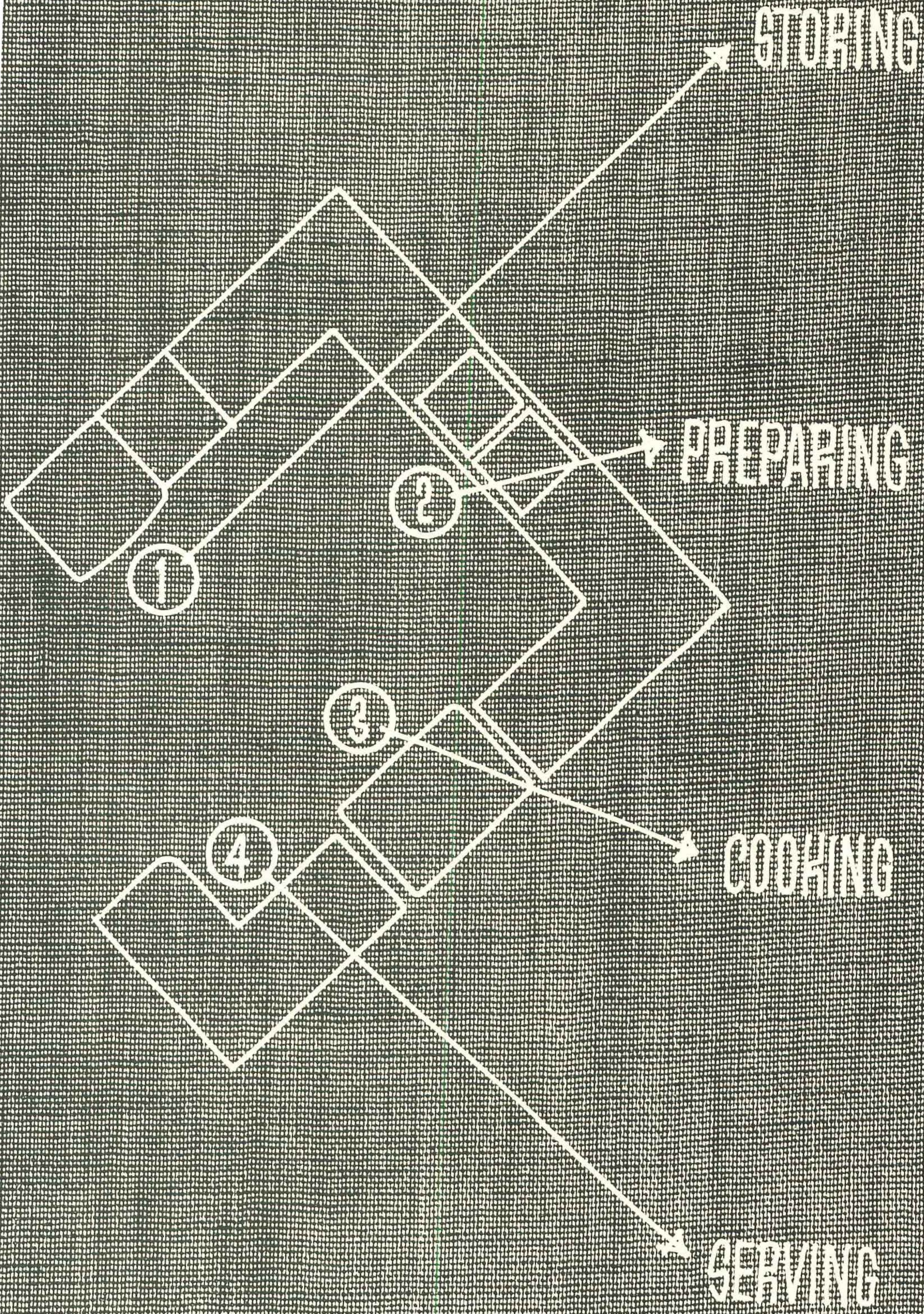


Photos by Elmer L. Astleford

1. Study and stairway. Here, as throughout the house, there is a wide and ingenious use of built-in equipment—most of which is an integral part of the house. 2. Wall surfaces in the dining room are pink brick, natural plaster, and cypress veneer.



YOUT AND DRAWINGS BY TORBEN MULLER

Upper photo courtesy Leonard Refrig. Co., center photos by Ewing Galloway, lower by Phillip Gendreau

NEW COOKING UNITS

Photos by Hedrich-Blessing Studio

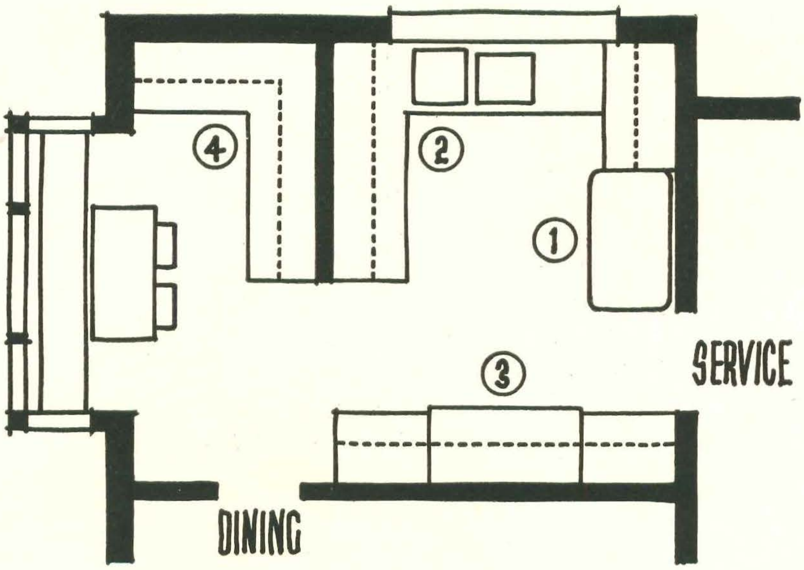
UNIT FOR FAMILY OF FIVE

WHITE & WEBER, Architects

IN DESIGNING this kitchen the four essential elements—storage (1), preparation (2), cooking (3), and service (4)—were carefully observed; the resulting layout achieves both convenience of operation and an effect of spaciousness. Actual food preparation takes place in the kitchen proper; ample counters permit easy serving, and an opening in the wall adjoining the breakfast alcove shortens this process. Walls and cabinets of kitchen are white, ceilings pale yellow. In the breakfast room walls are covered with wallpaper in which yellow and red are the predominating colors. The floor, in both rooms, is pale green marbleized linoleum with a 1-in. stripe of pale yellow and a border of plain gray green. Counter tops also are gray green linoleum; raised edges are stainless steel. Sink bowl is of stainless steel. In addition to general lighting, the sink is illuminated by a recessed fluorescent fixture, and the range by a tubular lamp.

Materials and equipment

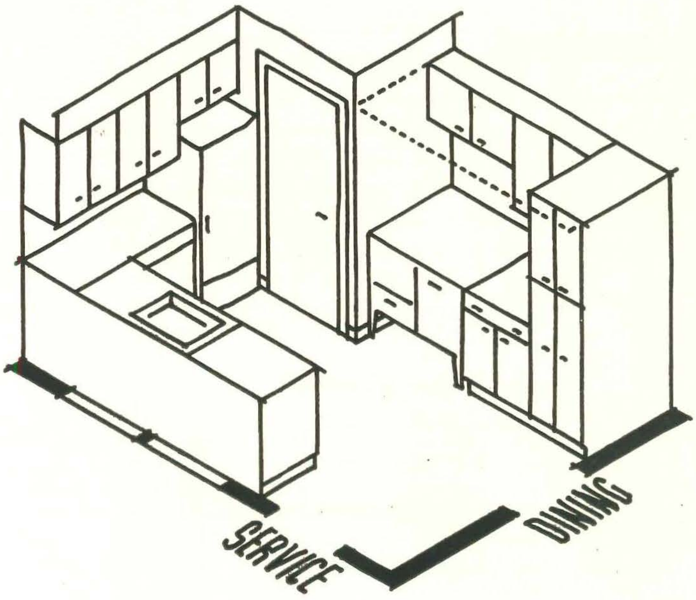
Floors: linoleum, Congoleum-Nairn Inc. Wall paper: Salubra, Frederick Blank and Co., Inc. Kitchen cabinets: Whitehead Metal Products Co., Inc. Garbage disposal: Disposall, General Electric Co. Refrigerator: 12.6 cu. ft. capacity, General Electric Co. Range: Hotpoint, Edison General Electric Appliance, Inc. Fan: Pryne and Co., Inc.



Saint-Thomas

UNIT FOR FAMILY OF THREE

WILLIAM FRIEDMAN & HILDE REISS, Designers



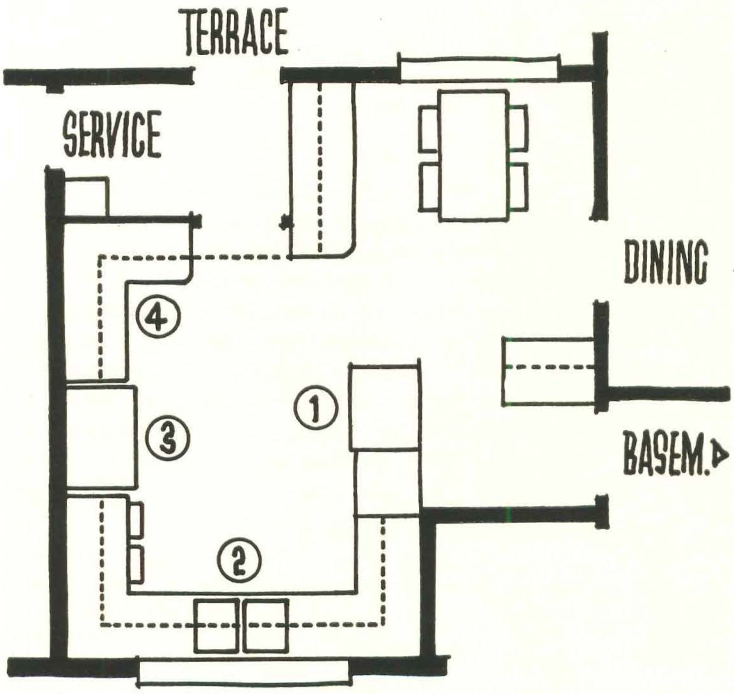
THE COMPACT arrangement of this kitchen provides convenience of preparation and of serving, since refrigerator, sink, and stove are in easy access to each other, and each has adjacent counter space. The unused corner between service and dining room doors is large enough to accommodate a small movable table for the maid's use. Kitchen walls are yellow; ceiling and metal cabinets are white; floor and counter tops are covered with blue jaspé linoleum. General lighting is from a centrally located fixture; over the range is a flush ceiling unit.

Materials and equipment

Floor: linoleum, Armstrong Cork Products Co. Walls: resin glued plywood, Harbor Plywood Corp. Kitchen cabinets: Janes & Kirtland, Inc. Sink: Homemaker, Crane Co. Refrigerator: General Electric Co. Range: electric, Universal Hartland. Counter tops: linoleum, Armstrong Cork Products Corp. Lighting: Lightolier Co.

UNIT FOR FAMILY OF THREE

MICHAEL GOODMAN, Architect



THE DISPOSITION of elements in this kitchen hinged not only on their internal convenience but on their relationship to three dining spaces: breakfast alcove, dining room, and terrace. The terrace, by its orientation and sheltered location, serves virtually as another room; the climate of this locality is such that the terrace is in year-round use. A service entry affords privacy to the entire cooking unit. Good natural light is obtained by an extensive use of glass. Walls are canvas Sanitas, painted off-white. Floors are blue linoleum with red coved border. Counters are 2 ft. wide, and are made of white pine. Cabinets, 1 ft. 2 in. deep, are also white. The drain board is light cream tile with red nosing.

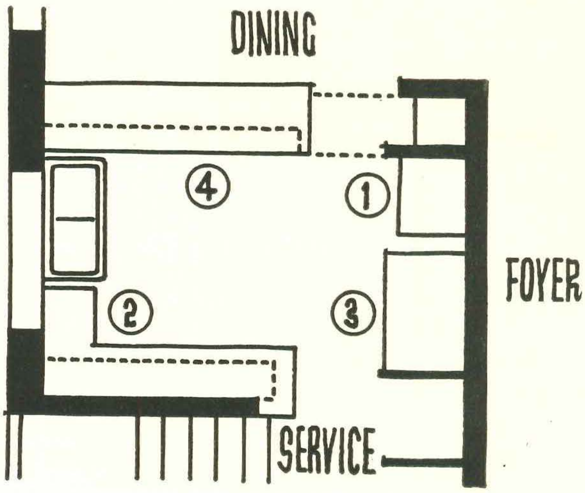
Materials and equipment

Floors: Marbelle linoleum, Armstrong Cork Products Co. Walls: Sanitas, Standard Coated Products Corp. Paint: Fuller-glow, Fuller Paint Co. Sink: Standard Sanitary Corp. Drainboard: American Encaustic Tile Co. Refrigerator: General Electric Co. Range: General Electric Co. Windows: sash, Detroit Steel; ribbed glass panel on entry, Libby-Owens-Ford. Blinds: National Venetian Blind Co. Lighting: General Electric Co.

Wright

UNIT FOR FAMILY OF TWO

ALDEN B. DOW, Architect



Exposed surfaces in this Midwest kitchen are all wood—a treatment not so frequently used today. All cupboards are of cypress veneer, with maple trim. Chrome hardware highlights the otherwise plain surfaces. The floor is mottled gray linoleum with black border. Wide counters provide ample workspace; interroom service is facilitated by having cupboard doors which open into dining room as well as kitchen. The photograph above shows the cupboard unit from kitchen side; on opposite page is a view from dining room.

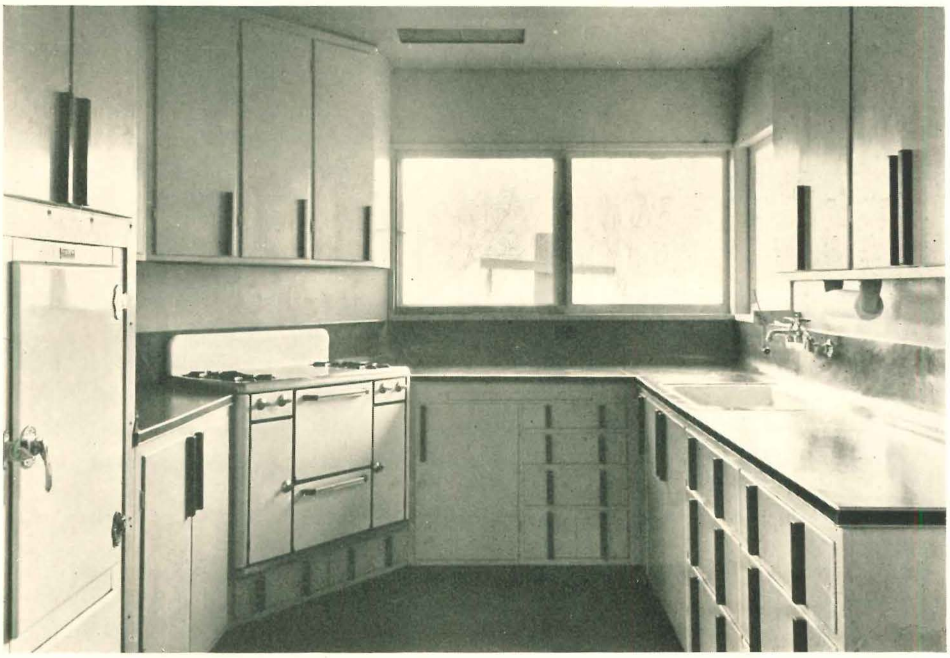
Equipment

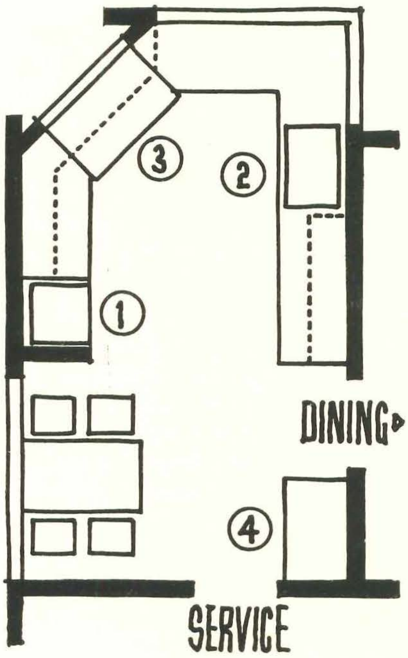
Sink: Dalcross, by Kohler.

Cupboard, showing doors open on dining room side. This arrangement makes for easy storage of dishes after use, and easy access for setting the table. In addition, the opening beneath the shelves speeds up serving.

UNIT FOR FAMILY OF FOUR

GEORGE PATTON SIMONDS
Architect





ALL EQUIPMENT in this cooking unit is built-in, including the refrigerator (1) and range (3). The refrigerator unit is ventilated by holes through the floor; in addition, warm air is discharged through the outside. Asbestos sheets at both sides and beneath the range provide insulation against its heat. Cabinet work is wood, mill made to the architect's specifications. Walls are plywood, painted yellow-orange. The floor is terra cotta. Drainboard is red-orange linoleum with metal-bound edges.

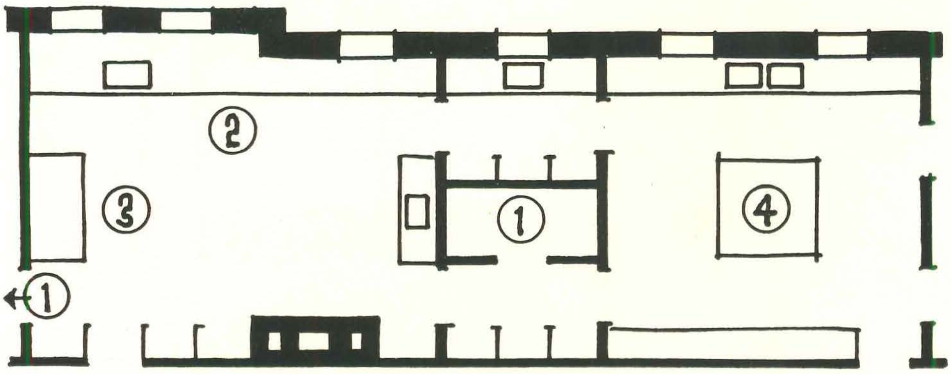
Materials and equipment

Floor: Standard terra cotta. Walls: ¼" Douglas Fir Plywood. Paint: National Lead Co. Refrigerator: Dayton. Range: Tappan. Sink: Kohler. Drainboard: linoleum, Congoleum-Nairn Inc.

UNIT FOR LARGE-SCALE ENTERTAINING

VICTORINE & SAMUEL HOMSEY, Architects

Robert Damora



NORMALLY USED by a family of five, this kitchen is planned and equipped for extensive entertaining. Its organization, therefore, is more complex than in the other kitchens presented in this section. Adjoining the area devoted to food preparation is a cold storage room. Between kitchen (2, 3) and serving pantry (4), is a scullery. Walls and ceiling are white plaster. Floors throughout are brown jaspé linoleum laid in 3-ft. squares. Cupboards are of wood with non-warping plywood doors. Garbage is disposed of by means of an incinator located in the kitchen.

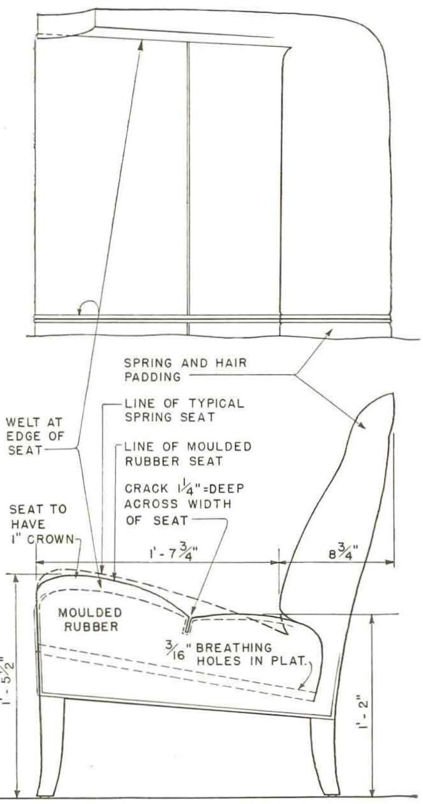
Materials and equipment

Floors: linoleum, Armstrong Cork Products Co. Incinerator walls: Carrara white glass tile, Pittsburgh Plate Glass Co. Paint: enamel, E. I. DuPont de Nemours & Co. Kitchen cabinets: wood; plywood doors from Crooks Co. Range, sinks, tables: DuParquet, Huot and Moneuse. Lighting: flush, with Holophane lenses, Holophane Co. Fan: exhaust type, American Blower Co. Annunciating equipment and call bells: Edwards Co. Hardware: special, Adolf Soeffing & Co.; standard, Russwin Manufacturing Co.

Hedrich-Blessing

The side chair above may be used as the center section of a sofa. The foam rubber molded seat is identical in all sections.

Architects Use Industrial Products in Designing Home Seating

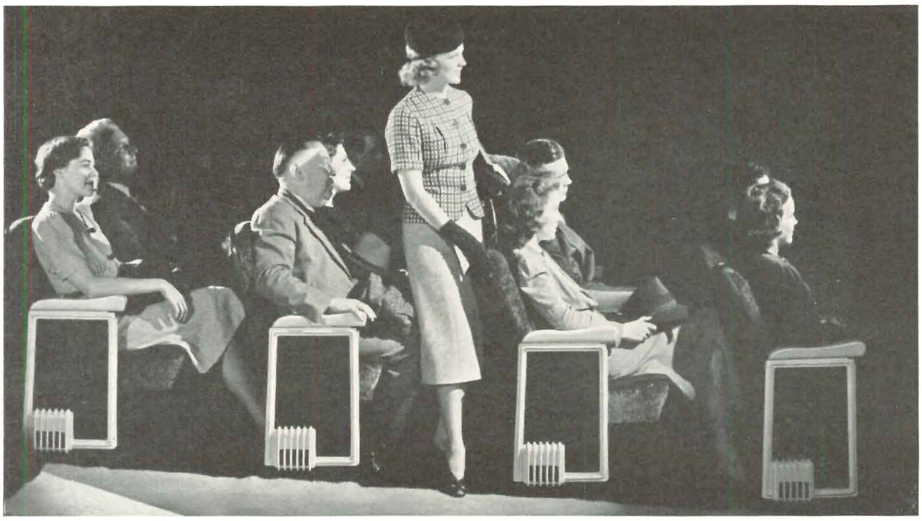


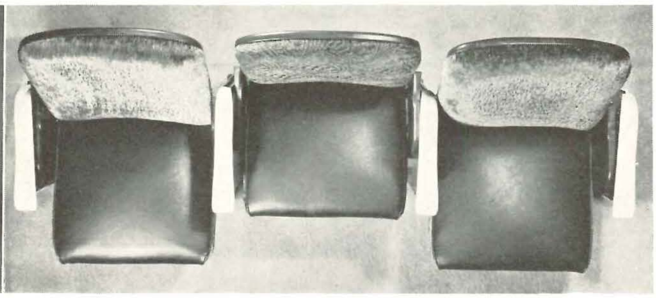
Designed for relaxation and comfort.

BORROWING both material and design principle from the aeronautic and motor car industries, Holabird and Root, prominent Chicago architects have designed this new seat for home use: it is now in production by E. Weiner & Co., also of Chicago. The back part of the seat is low and horizontal, separated from the front part by a crack 1¼ in. deep running across the width of seat; thus the front and back parts of seat act as separate units, there being more "give" to the seat with the crack than without it. The front part has a pronounced convex profile which supports the thigh. It also forces one to sit back in the chair in proper posture. The front of the seat is cut back under, on an angle, to allow for the calf of the leg when getting up out of the chair. The lower back is bulged out to support the small of the back, while the upper back is hollowed for the shoulders.

Foam rubber or latex, a product first applied industrially, has been used in the cushions. In producing the cushions, foam rubber or latex is poured into a metal mould, into which have been inserted a series of metal cylinders, allowing about one inch of rubber at the bottom—the top of the finished seat—and at the sides. The space between the cylinders is about ¾ in. The honeycomb air spaces thus formed are the trick which makes this type of rubber seat preferable to the rubberized hair or solid "crepe" rubber seats. In actual use the honeycomb rubber seat is placed over a wood platform which is perforated with a 3/16 in. hole under each air space. The hole allows the column of air (4 in. to 5 in. by 2 in. to 2½ in. dia.) to be expelled gradually as one settles down into the seat, so that one does not "hit bottom" suddenly as in spring seats.

Rubber seating was first used in buses, later by the railroads for day-couch seats and backs, then for lounge car seats, and finally for Pullman mattresses. The form fitting seats and backs now widely used on railroad day-coaches were developed from the original research and designs of Holabird and Root. According to the designers, "vibrations are absorbed much more by rubber than by spring construction." The rubber seats are from four to six inches thick, depending upon density of the rubber and comfort desired.





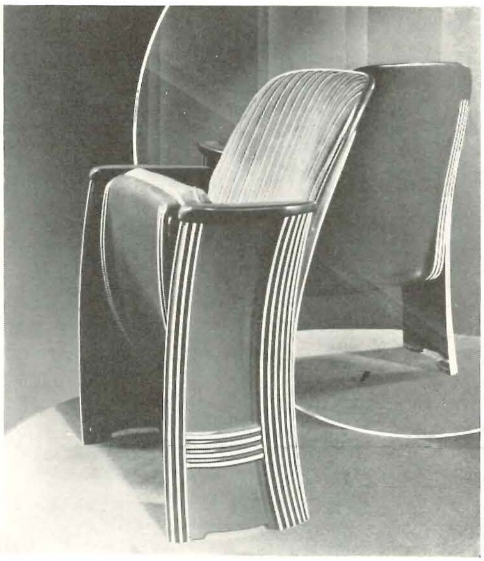
Underwood & Underwood

By a slight thrust backward the occupant sits erect, permitting others to easily pass. When not occupied, the seat retracts automatically until used again.

New Retracting Theater Seat Minimizes Annoyance

BECAUSE THE biggest annoyance of the modern movie theater is "standing to let others pass," the Kroehler Manufacturing Company of Chicago has developed the Push-Back theater seat. By the simple device of a retracting seat, patrons are permitted to pass through a row without causing undue annoyance to those seated.

The occupant merely places his feet under the chair and gives a slight thrust backward. The action is instinctive. Instantly and noiselessly the seat moves back on its emplacement. Ample passing space is thus provided without the occupant's standing—this gain is made with no loss of space to the row of seats immediately behind. When occupant relaxes, the chair automatically returns to normal position without noise or jar. The seat automatically retracts when not occupied. The addition of six inches more exit and entrance space between rows greatly increases safety. These seats may be installed on old emplacements.



Designs for Industry, Inc.

Streamlined Seat Features Removable Upholstery

A THEATER CHAIR, claimed to offer use values heretofore thought impossible, has recently been announced by the American Seating Company of Grand Rapids. The Bodiform Chair boasts a compound curve back, scientifically designed to fit the human body, and a new spring seat construction allowing the occupant to sit in and not on the seat.

The automatic three-quarter safety fold takes the seat out of the way to facilitate cleaning, yet not so far back as to cause the patron to miss the seat. The seat occupant, by slight pressure at back of legs, can push the seat back to a vertical position and stand between standards to allow ample passing room. It is impossible for the toes of a person in the rear to be caught between the seat and back, since the rear edge is concealed by the steel chairback. Completely encased hinge mechanism eliminates possibilities of soiling clothes. There are no exposed mechanisms, bolts, screws, or sharp edges to catch and tear hosiery or clothing. Also the stumbling hazard is minimized because the end and middle standards have no protruding feet, curving inward at the floor.

Seat and back covers are quickly replacable because a patented upholstery fastening eliminates tacks.

DESIGN TRENDS

New fabrication methods influence building . . . see pp. 76-80

ARCHITECTURAL RECORD

What Does Military Design Offer the

In this study—second of two on the subject—Mr. Douglas Haskell explores the effect of Europe's No. 1 trend—protection of the population against air raids—on national, regional, and city planning. The first study—on building design—appeared in the January issue of ARCHITECTURAL RECORD.

Only two certainties emerge from the literature on air-raid defensive planning. The first certainty is that decentralization is imperative. As chickens scatter and hover under the brush before the attack of a hawk, so must civilians "scatter for safety" before the war plane. The second certainty is that, in order to make decentralization possible, war-threatened countries are resorting to planning on a national scale, with private interests subjected to ever-widening government control.

Decentralization, as a criterion, is an old favorite of the peace-time planner. In all Europe, as well as in the Americas, planners have long attacked the now uneconomic congestion of super-cities. In the U. S. S. R. decentralized industry is the rule rather than the exception, and there are whole regions in the U. S. A. (notably the Southeast) where the trend is well advanced. The technical implements of decentralization are almost too familiar to need listing—the shifting of industrial production to the site of raw materials; the elimination of warehousing by rapid transportation direct from producers; the growth of the highway net; the development of the power grid and of instantaneous means of communication; etc., etc.

On the face of it, there would seem to be harmony of purpose among industrialists seeking more efficient sites, among planners seeking an open pattern for purposes of health, and among air-defense authorities in pursuit of safety. Thus the *Architects' Journal* of London points out that air defense may give town planners "the right solution to their chief problem for the wrong reason," and concludes that "anyhow, the wrong reason is good enough." The *Journal* goes farther, and roundly scolds the Government for not having prohibited outright recent industrial growth in Greater London. The German writer Schoszberger positively welcomes air defense because it creates the "necessity for making town-planning airier, for doing away with the horrid barracklike stone piles so frequently used as dwellings, and providing for bright stretches of grassy plots instead."

Unfortunately this easy optimism rests upon an attitude far from scientific. For the real question is not only, whether air defense will lead to decentralization, but *why*, *when*, and *where*. What *sort* of decentralization is this new decentralization going to be? For the answers we must go straight back to the implacable facts.

Why scatter?

The new planning requirements are set by the nature of the air attack. In the Architectural Record for January, a description was given of the effects of individual bombs on individual buildings. The planner, however, deals with the pattern of the air attack as a *whole*. For this attack there are no historical precedents, and diagrams of walled towns are less than worthless. The predicament of our cities is the predicament of those open, unwalled, civilized Roman coast towns that were suddenly struck from out of nowhere by the Vikings. Briefly summarized:

1. The air attack occurs suddenly, at high speed. London has only seven minutes' warning from the coast.

2. The atmosphere as a medium gives the attackers almost unlimited resources of surprise and evasion. Flight extends over the whole globe and bombers can climb into the stratosphere. The greater heights handicap the bomber, but they permit, under favoring circumstances, the technique of "silent approach" through gliding. When such an attack is successfully executed, there is no warning whatever until all the damage is done and the planes homeward bound.

3. Air attack is deliberately aimed not only at military objectives but also at civilian *morale*.

4. The rapid rate of innovation in air attack puts a special burden on planners accustomed to have their work hold good for at least a generation.

When scatter?

Emergency plans in Great Britain and France look to evacuating the women and children from concentrated areas after the war has begun. Paris is being supplied with quicker avenues of escape (new tunnels, subways, and highways) and the latest British plans provide 50 summer camps, each accommodating 350 civilians, at a cost of about 5 million dollars, or roughly $275 per person. But such plans hardly scratch the surface. *When* will the population start to scatter—at the declaration of war (if there *is* a declaration) or at the first explosion? *At what intervals* will the population scatter—every time there's a raid? *How long* will it stay scattered—until a given raid is over? Obviously, normal planning will have nothing to gain and all to lose until such questions are answered.

Where scatter?

Long-term air defense planning can content itself with no mere emergency measures. It must seek to replan the permanent industrial and population centers so that these are:

1. hard to reach,
2. hard to find,
3. hard to strike, or at least to destroy, by an enemy coming through the air. The very statement that a town should be hard to reach by plane suggests that there are some serious discrepancies to be reconciled between military and peaceful concepts of decentralization.

Planning of Peace?

1. EASY OR HARD TO REACH

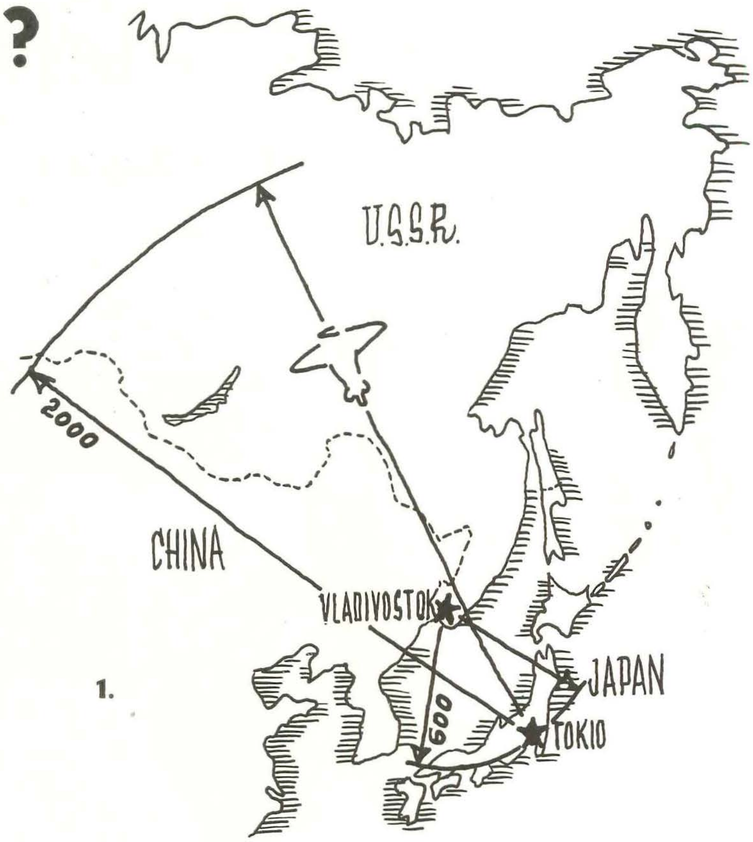
Geography. Remoteness of a nation's industrial and population centers from the frontier is the first weapon of the defense. The problem is endlessly complex. Technical considerations keep certain centers, such as harbors and mines, site-bound; economic considerations prevent large-scale industrial reorientation except in countries just beginning to industrialize; and rapidly expanding air cruising ranges limit the opportunity of effective removal to states of continental size—in short, the U. S. S. R., the U. S. A., and China.

Countries unable to withdraw their vulnerable concentrations sometimes find themselves in the situation of the fat duelist who felt that he was twice as close to his opponent as his opponent was to him. "From Vladivostok to Tokyo is less than 600 miles; nearly all Japan's great cities and harbors are within that range"*; a retaliatory Japanese raid would find no comparable target (Fig. 1).

Two well-known American strokes of planning have been well suited to military considerations: the removal of the gold supply to Fort Knox and the development of the T. V. A. power system behind the Appalachian barrier (Fig. 2).

Aerography—science of charting the air—has already discovered the best air lanes. Yet, for defensive purposes, cities theoretically require the worst air lanes—regions of turbulent mountain current or of swampy fog. **Actual aerographic control** is scarcely dreamed of. Yet the study of air masses by the air man has greatly furthered weather prediction; weather control is already possible on a laboratory scale; and we may expect valiant efforts at protecting cities by means of artificial fog and artificial storm.

* Air-Commodore Charlton, "War from the Air."



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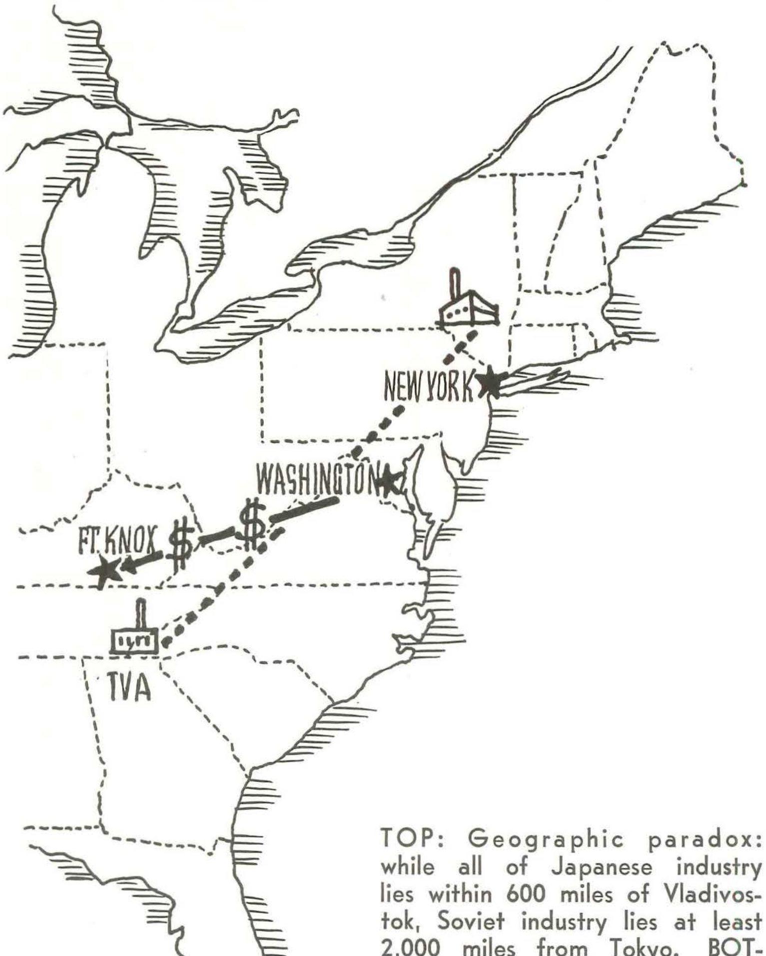


2.

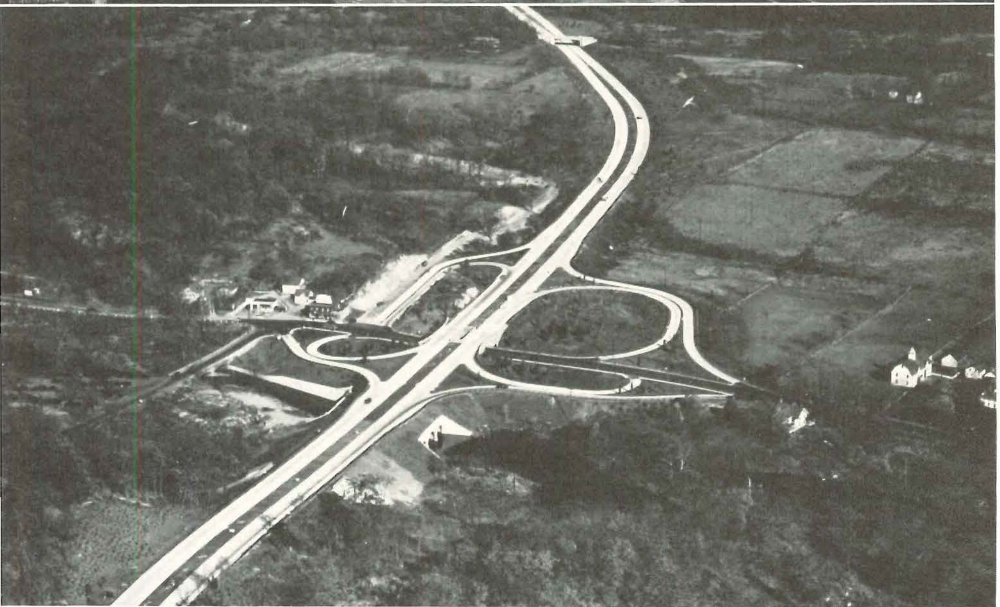
TOP: Geographic paradox: while all of Japanese industry lies within 600 miles of Vladivostok, Soviet industry lies at least 2,000 miles from Tokyo. BOTTOM: Uncle Sam has already moved a large part of his gold store, electric power, and textile industries behind the Appalachians.

2. EASY TO FIND . . .

Air targets are no longer confined to "military objectives." Only the darkness of night or conditions of very bad visibility can protect the populous areas of a whole city. But the typical features of the average community make it an aerial objective very easy to find and almost impossible to camouflage.

McLaughlin Aerial Survey

1\. I. PROMINENT NATURAL LANDMARKS. Water, the old friend of cities, is one of the worst offenders. No blackout of London in the World War could hide the river; "Father Thames was a complete giveaway."



McLaughlin Aerial Survey

2\. 2. PROMINENT ARTIFICIAL LANDMARKS. Among these are the long sweeping lines and reflective surfaces of canals, railroads, express highways.

Fairchild Aerial Survey

3\. 3. STRONG GEOMETRIC SHAPES. Other examples are blast furnaces, skylighted factories, public buildings only too successful in being impressive.

. . . HARDER TO FIND

Fairchild Aerial Survey

4.

4. FOG, CLOUDS, AND SMOKE are unreliable friends. No smoke screen has yet been devised that will hide effectively anything more than a single moving target, such as a ship or plane.

McLaughlin Aerial Survey

5.

5. TREE COVER. Certain German writers have advocated reforestation as an ideal camouflage, forgetting what incendiary bombs may do to continuous areas of forest (insert) in dry weather.

Fairchild Aerial Survey

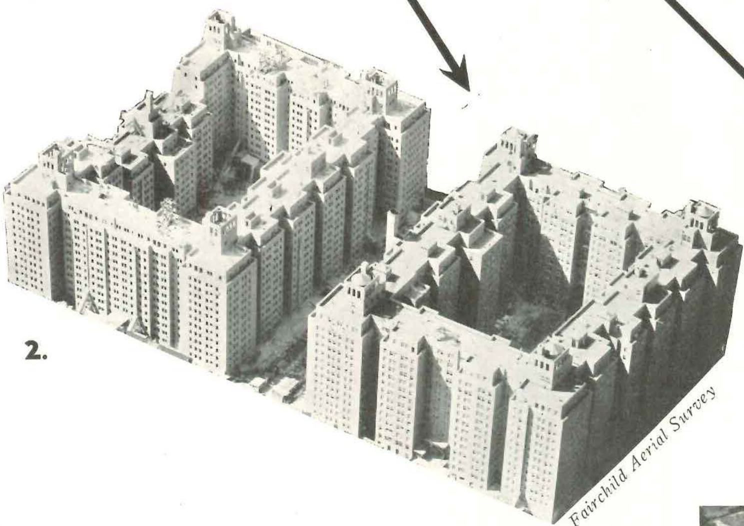
6.

6. VARIEGATED, TREE-DOTTED LANDSCAPE offers the best opportunity for blending and camouflage. The same qualities that make the open small town and the garden city pleasant to live in also confer air-raid protection. The American freeway is a splendid protective road type. The landscaping and curving make it less prominent, while the numerous connecting country roads provide emergency means of escape.

1. E

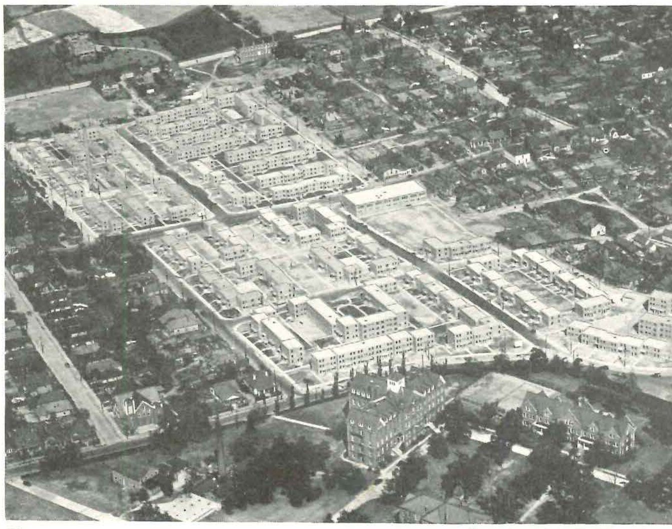
TO

1. *McLaughlin Photo Service*



2. *Fairchild Aerial Survey*

I. SLUMS: " . . . this was the pity of it, that the districts of flimsy, basementless houses, closely built and with teeming population, lay beneath the skyward approach . . . " (Harlem, New York). 2. DENSE REBUILDING: the tamping action of these closed courts would result in slaughter greater than that in the surrounding slums (Knickerbocker Village, New York). 3. MEDIUM DENSITY (University Housing Project, Atlanta, Ga.). 4. LOW DENSITY decreases slaughter; straight lines are less confining to explosions, hence less destructive (Rotterdam). 5. STILL GREATER SEPARATION (Karlsruhe, Germany). 6. HIGH DENSITY, VERTICAL CONCENTRATION: value controversial (Le Corbusier's Voisin Plan for Paris). 7. MEDIUM DENSITY, MAXIMUM PROTECTION. Outside explosions burst against one wall, only, are not confined. (Project by Walter Gropius.)



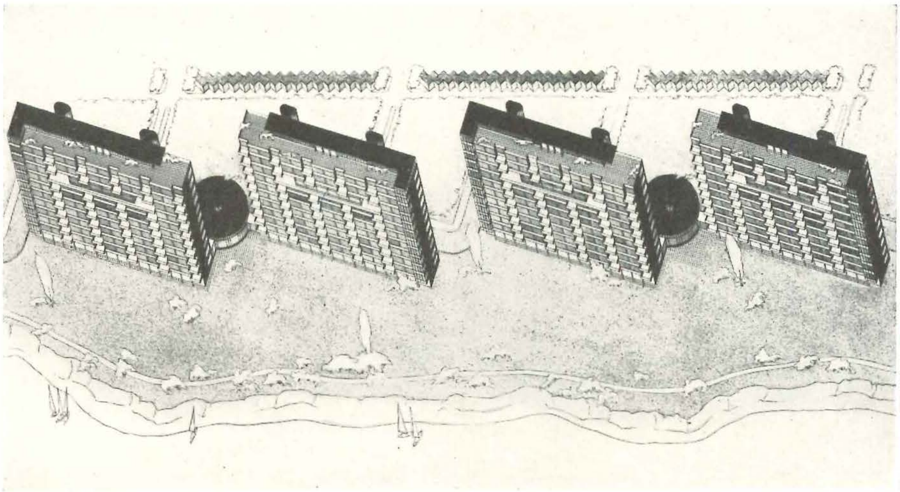
3. *Courtesy U. S. Housing*

. . OR HARDER

D TO DESTROY

IN HOUSING, the same patterns that favor light, air, and green surroundings, also favor air-raid protection. Wide spacing and the absence of courts decreases the number of direct hits and also decreases the tamping effect of narrow streets upon explosions; lower density results in fewer casualties. Decentralization of plan types may be *outward* (3, 4, 5) or *upward* (2, 6) or *both* (7). Single or in combination, they constitute a target harder to hit and destroy than the typical grid-iron pattern of most cities.

Unfortunately, no parallel planning expedients have been worked out for industry. The present type of factory layout, with its wide, top-lighted floor area, offers a target difficult to miss. Modernization of other kinds also increases vulnerability: e.g., electrification of railroads, use of wide-spread gas mains, the massing of telephone exchanges. Inefficient, duplicative railroad lines, on the contrary, acquire emergency value. Here, military and civil planning are very far apart.



Courtesy Walter Gropius

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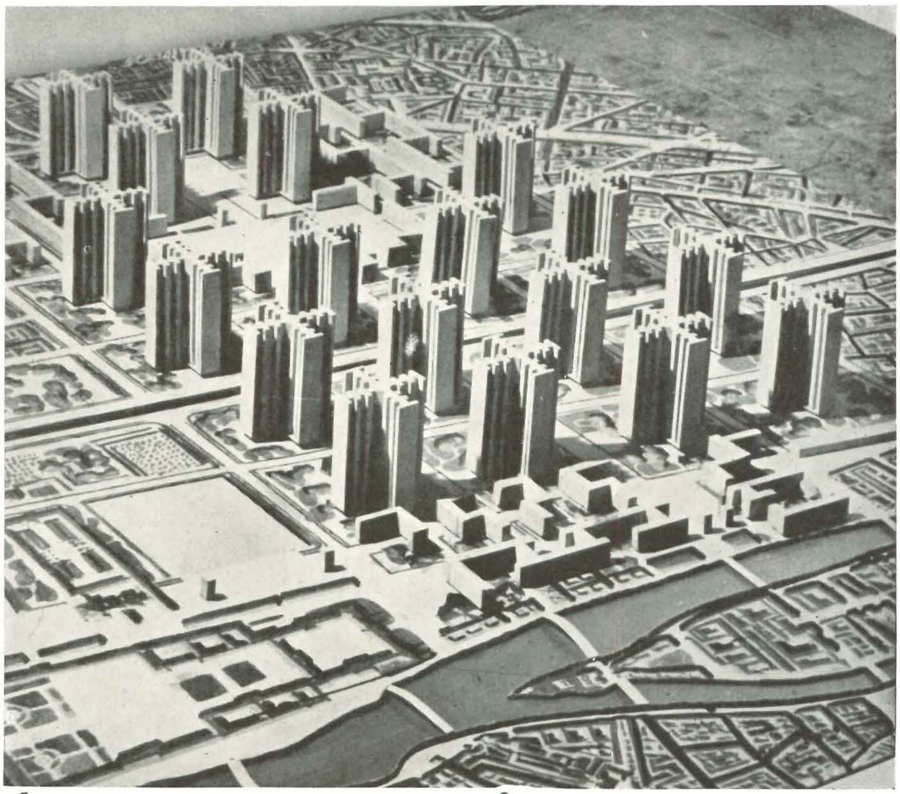

Photo from Three Lions

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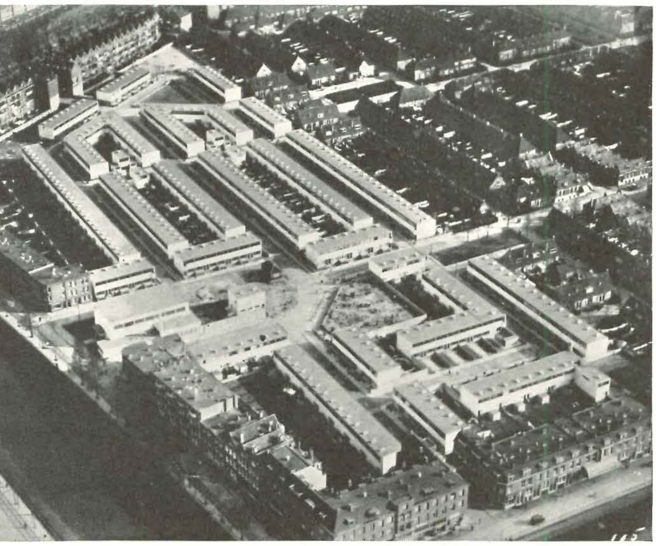
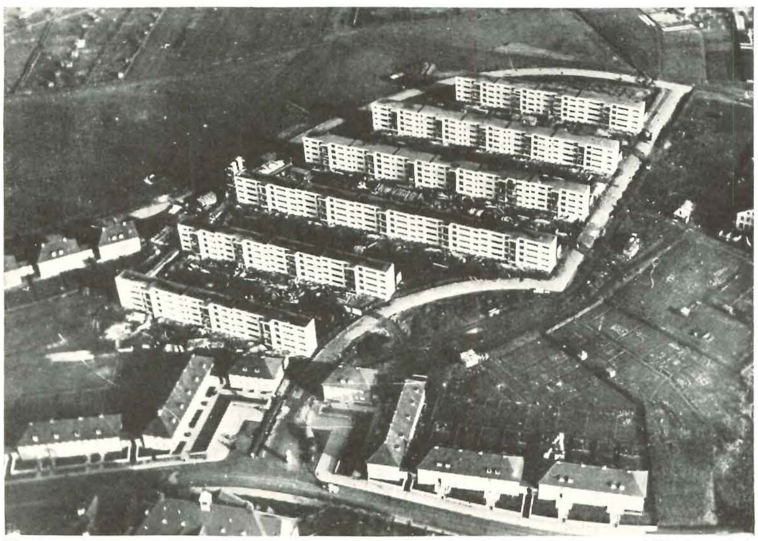


Courtesy National Museum of Modern Art



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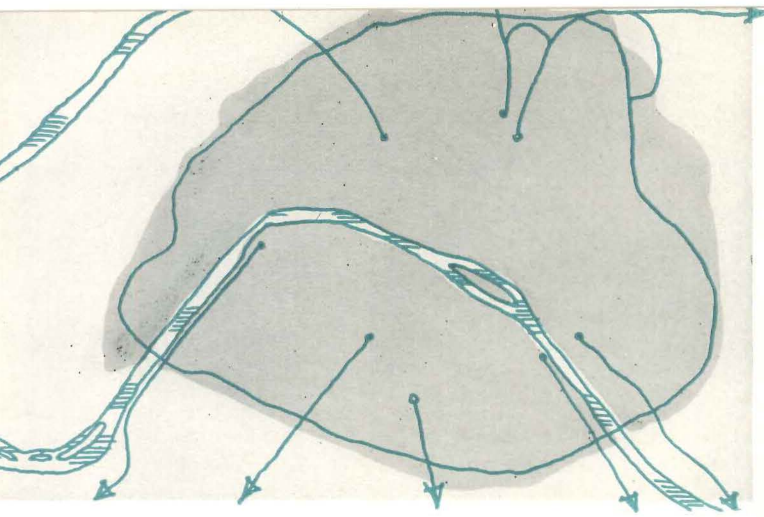
Courtesy National Museum of Modern Art



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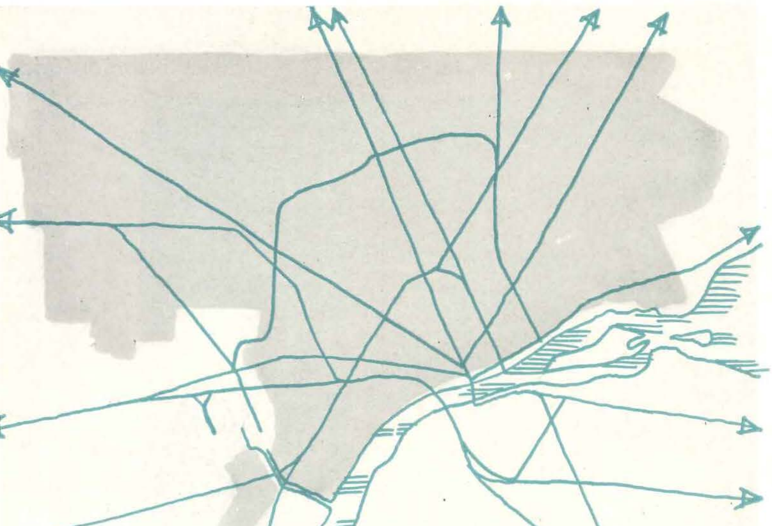

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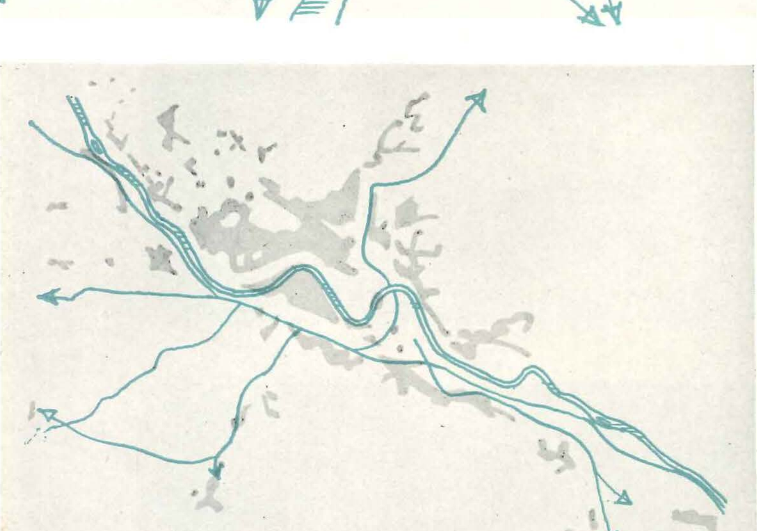

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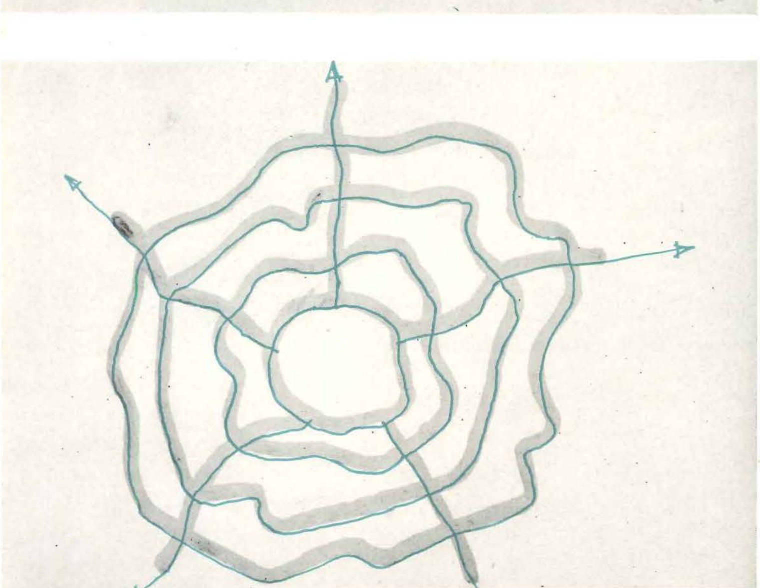


4.

3. EASY OR HARD TO DESTROY

1. ARTERIES FOR RAPID EVACUATION. Like many old cities, Paris was found to include large areas lacking ready means of escape. The new arteries, if executed, will give quick access to open country to large masses of people whose recreation has never been provided for hitherto.

2. ARTERIES AS LINES OF CITY ATTENUATION, the next step in defense evolution, are already familiar in cities such as Detroit. This tendency to attenuation has been fought by the garden-city school of planning, which prefers the service-economy of compact, clearly limited nuclear development, surrounded by well defined green belts.

3. ARTERIAL ATTENUATION is deliberately fostered, on the other hand, by air-raid authorities, as shown in this scheme for Dresden. This will lead to serious restudy of ribbon and road-town development, now condemned out of hand by the usual city and regional planner.

4. ATTENUATION COMBINED WITH BELT-LINES, retaining more of the economies of centralization, might be achieved by opening up still more radically the type of plan already adopted for Moscow. Success would depend on stringent city control over the open interstices.

5. RIBBON-TYPE DEVELOPMENT. Although long criticized by planners for its inefficiency, this type of "inch wide, mile long" community is obviously a difficult target.

6. MOBILITY OF THE TRAILER TYPE would have no time to operate once an attack had begun. But such mobility can be a useful instrument in dispersing the population pattern, provided cheap and effective mobile substitutes can be found for those city services now underground.

Fairchild Aerial Survey

5.

Wide World

6.

IN CONCLUSION . . .

The needs of air defense and peacetime planning both favor decentralization. But, having different aims, they call for decentralization of different kinds. Therefore glib optimism on the subject must yield to careful study.

Evacuation after hostilities have begun is a horrible prospect at best. Long-range air defense planning must seek to keep its industrial and population centers permanently hard to reach, hard to find, and hard to strike effectively by an enemy air force.

Only the countries of continental size —the U.S.A. and U.S.S.R.—have a good chance to put any large part of their resources out of reach, and in any country this aim raises obstacles to commercial efficiency. Out of the effort to protect cities against air approach will grow concentrated study of aerography, with incidental gains in the control of the atmosphere for peacetime purposes, an entirely new field of work. A second study is being made, the study of landscape seen from the air. The most protective use of landscape seems to be the blending that has been achieved by garden city planners and parkway designers. Housing patterns must be restudied; on the whole it seems that the open types which favor the amenities are also the most defensible. In city planning renewed attention is being paid to ribbon and roadtown types.

To a treatment so summary as the present one the warning must be added that decentralization is not the whole story. In war-threatened cities now built and lived in, there is no substitute for comprehensive shelter systems—underground.

Selected Bibliography

J. B. S. Haldane, *A.R.P.* Detailed and comprehensive on the immediate problem.

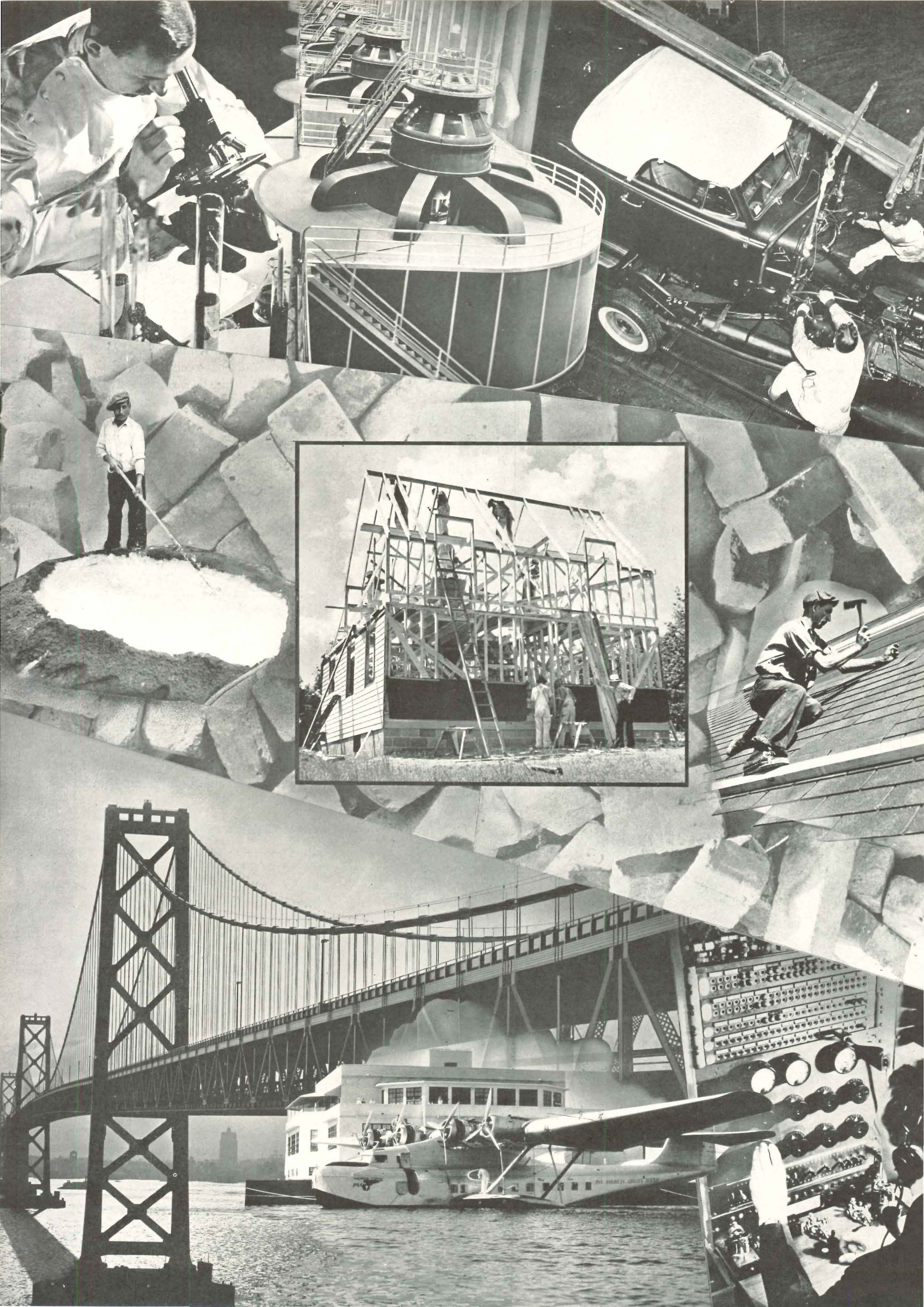
Langdon-Davies, *Air Raid.* Exaggerated emphasis upon the technique of "silent approach."

Air Commodore Charlton, *War from the Air.* Account of the air raids on London, plus two hypothetical future wars.

Jonathan Griffin, *Consequences of Rearmament.* Throws some light on the special problems of England: e. g. "freedom *from* the sea."

Hans Schoszberger, *Bautechnischer Luftschutz.* German thoroughness, not to say enthusiasm, in pursuit of the subject, serves to reveal how much disillusioned research remains to be done.

H. Knothe, *Tarnung u. Verdunklung als Schutz gegen Luftangriffe* (Camouflage and Darkening as Air-Raid Protection).



Precision Control in Building Production

THIS SUMMARY of trends in precision control in fabrication introduces a series of monthly studies of the operational systems of which a building consists. Subsequent studies on structural systems, materials, air conditioning, lighting, sound control, sanitation, etc., are scheduled. Building production is marked by an increasingly precise control of the fabrication of materials, their integration into equipment, operational systems, and structures. Over a period of years the RECORD has published scattered reports of these developments. Ralph E. Winslow, Professor of Architectural Design at Rensselaer Polytechnic Institute, reviews here the methods available for precision control in fabrication and interprets their implications for the designer.

DEVELOPMENTS in materials and fabrication technics are necessarily interrelated: both tend to modify the forms of finished products. Trends in both fields are important to the building designer; not only do they suggest new possibilities, but they indicate ultimately new requirements in the design of specific forms.

The great change in production, particularly in the last century, has been a rapidly accelerated industrialization—a transfer of productive activity from the hands of the artisan to the machine. This transfer has been characterized by increasing precision control in the development both of materials and fabrication processes. Handicraft production, with its lack of precision in design and fabrication, results in wide tolerances in measurement and performance; high safety factors are necessary and structural mass excessive. Today, new standards of performance result from developments in instruments and technics for testing and inspecting materials; and they indicate correspondingly higher standards of design and fabrication.

Attempts to improve and standardize fabrication processes have led to the perfecting of various types of precision control. First steps in this development introduced indicating and recording devices which eliminated human judgment, still requiring, however, some human manipulation. Later developments resulted in wholly automatic regulation of temperature, timing, pressure, humidity, flow, specific gravity, liquid levels, and speeds of moving parts. The resulting increased efficiency in the use of materials and of equipment has not only improved the quality of products and raised the productivity of labor, but has further reduced limitations imposed by fabrication technics, thus permitting greater freedom in structural design.

Trends in the development of materials are definitely toward greater resistance to internal stress, to deterioration of surface, and to combustion. An increasingly favorable strength-weight ratio is further apparent. As a result of greater precision control in manufacture, materials are more constant in specific performance. Fabrication is increasingly specialized, standardized, and integrated.

These trends have been best exemplified, perhaps, in the automotive and aircraft industries. About thirty years ago, Henry Ford began straight-line production on conveyors. Since that time, standardization of materials, methods, and dimensions have yielded a better and cheaper product as well as greater flexibility for the making of changes.

In the aircraft industry, increasingly stronger and lighter materials and simplified fabrication are revolutionizing plane construction. The use of new magnesium alloys and aluminum alloys, and the development of devices like spotwelding grids which fasten 960 spots per minute, permit great savings of weight. More recently, the use of phenolic resins and resin-impregnated woods is reported to make possible the construction of smoother, stronger wings and fuselages in one-twentieth the time required at present. What is true of the automotive and aircraft industries is also true, in varying degrees, of industry in general.

But what of the building industry? It is true that increasing industrialization has been reflected in building activity by a partial transfer of fabrication operations from site to factory. There has been, moreover, an increasing use of new products in building. But relatively little advance has been made in the development of new forms, either in individual structures or in the physical structure of the community.

Physical obstacles and limitations to man's activities are giving way to increasing control by science and technology. The obstacles and limitations created by man himself remain. Antiquated building codes limit advances; traditional trades and crafts oppose new technics; the consumer is attached to conventional forms. Liquidation and replacement of obsolete structures is slow and difficult.

Today, the wide range of new materials and the freedom allowed by new fabrication technics are a challenge and a stimulus in the search for better forms. The development of new forms—forms answering modern requirements and produced by taking full advantage of the possibilities of the new materials and fabrication methods—is the simplest way to promote the replacement of obsolescent buildings.

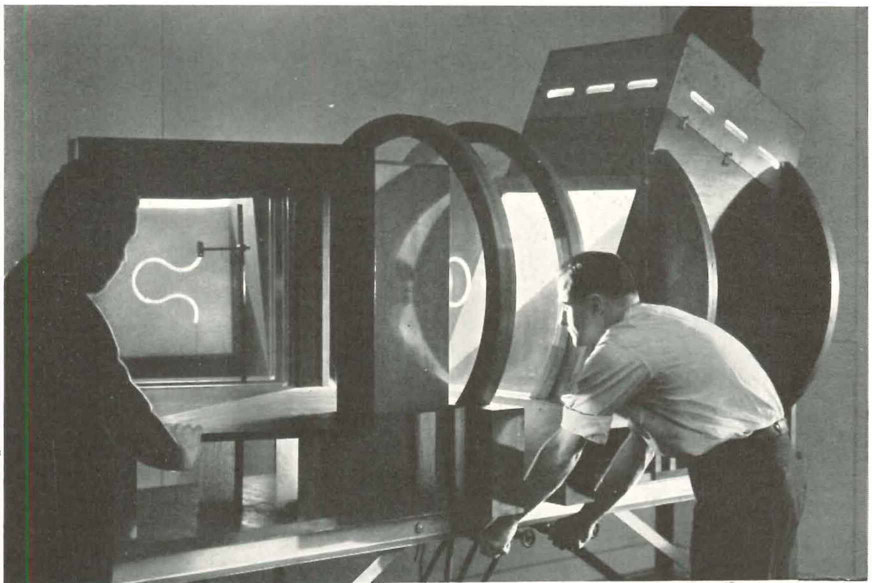
otos on opposite page are by Ewing lloway, Underwood & Underwood, Wide orld, Free-Lance Photographers' Guild, A. Douglas from Gendreau, and Pan nerican Airways.

Hedrich-Blessing

Courtesy Crane Co. Lab.

Courtesy "Modern Plastics"

Researcher at metallographic microscope. Below, typical microphotographs (l. to r.): steel at 100 and 5,000 magnifications; filler for plastic, 175 magnifications.



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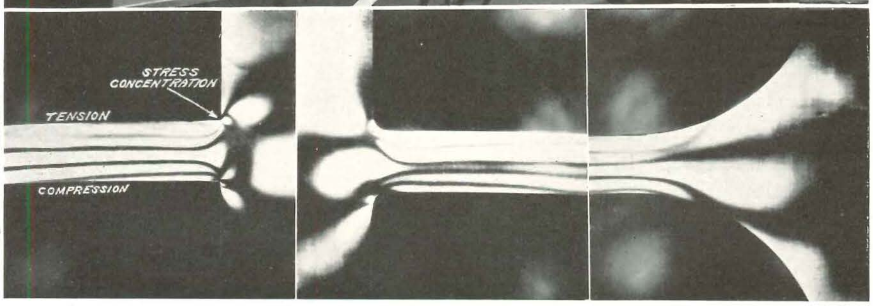


Courtesy Crane Co. Lab.

Analysis by photoelasticity. Below, typical stress analyses (l. to r.): stress concentration at corner; stress distribution at ordinary and in ideal fillet.

Precision Controls

METALLURGISTS depend upon the microscope for examination of the internal structure of metals and their alloys. This microscopic analysis answers many questions concerning the physical properties of metals, for their crystalline structure does appear to bear a definite relation to their strength, ductility, etc.; and metallurgists consequently require of the microscope the utmost limits in resolving power and magnification. Microscopic analysis is also used increasingly in examining the internal structure and properties of other materials, notably wood and plastics.

About fifty years ago, Ernst Abbé set the limit of magnification at about 1,500 diameters, but this limit has since been advanced to a point where good resolution of detail is obtained at 2,500 to 3,000 diameters. Today magnification up to 6,000 diameters is obtained with the new Graton-Dane microscope —the equivalent of enlarging an airmail stamp to slightly more than eight acres. And even this achievement is dwarfed by the new "electron microscope", which promises magnifications up to a million diameters.

The application of photography to microscopy has been of great value: it not only provides a permanent record, but, as the wave length of the light used limits resolving power, photomicrography extends the range of the microscope when used with ultraviolet light.

Photoelasticity

When light falls on a reflecting surface, part of the light is reflected and the rest is refracted, passing into or through the surface. This phenomenon is known as polarization. If the stresses set up in a design cannot readily be calculated by mathematics, the answer may sometimes be found by photoelastic analysis. Through the use of proper polarizing equipment, light may be guided through the planes of the stresses, and distribution and magnitude of the stresses determined. Dangerous stress concentrations can be detected by such analysis. Given a knowledge of the physical properties of the material tested, a quantitative analysis can then be made.

Heretofore the use of this method of analysis has been largely limited to two-dimensional specimens with flat faces, through which the polarized light enters. During the past year, however, advances have been made in the study of threedimensional stress distributions. It has now been shown that if stresses are applied to a specimen of a transparent plastic material which is heated to 110° C. and then quenched, the stress distribution is "frozen in"; the flat pieces can then be sawed out for optical examination. More accurate information about stresses in members of complicated shape may thus be obtained.

X-ray diffraction

Analysis of the atomic structure of a material may be made by X-ray diffraction. The physical structure of a material, the arrangement and order of the atoms and their slip-planes, is shown. The granular structure of metals, grain size and orientation, as well as the presence of strain, is readily determined. The importance of this knowledge lies in the fact that the physical structure of a material appears to determine to a great extent the physical properties of that material.

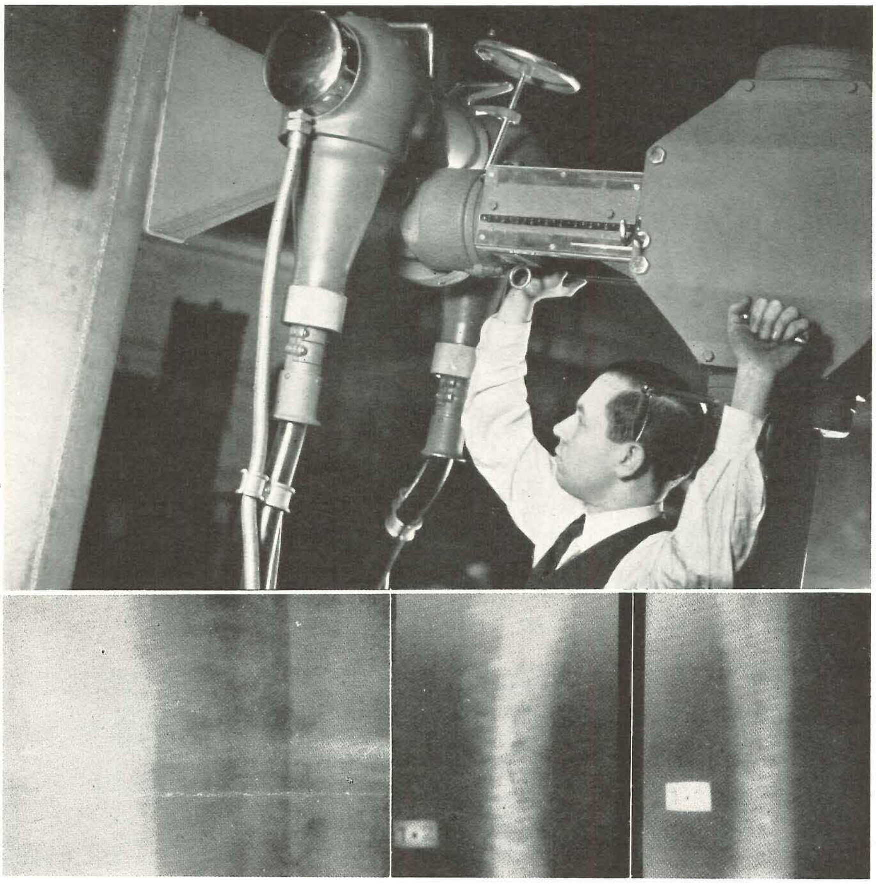
Radiography

Roentgen discovered X-rays only in 1895. Three years later came the Curie-Bémont discovery of radium, and, in 1900, Villard discovered gamma rays, the electromagnetic radiations of extreme high frequency and penetrating power.

Today radiography is used for inspection and nondestructive testing of welds and castings. The original objection by government authorities to welded joints—"we cannot see what is inside of them"—has been entirely dispelled by its use for detection of flaws. High voltage tubes in X-ray machines now permit radiography of steel up to six inches in thickness, and of aluminum alloys two to three feet in thickness. The gamma emanations of radium, radon gas, or thorium salts penetrate steel a foot thick. Findings lead to improved casting and welding techniques.

Spectrography

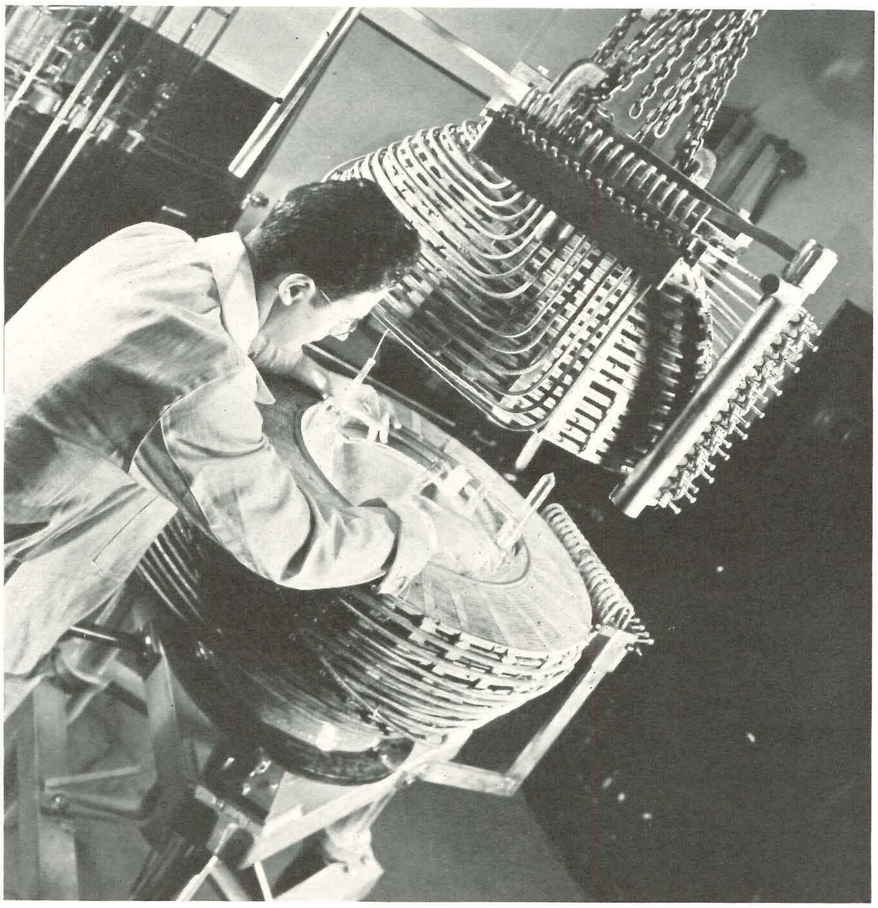
Spectroscopy provides a method of analysing the chemical composition of substances and has become an important adjunct of qualitative and quantitative analysis. As the microscope is supplemented by the camera, so precision spectroscopy today utilizes photography for similar reasons. The spectrograph furnishes photographic records in the ultra-violet and infra-red regions as well as in visible light. The presence of minute quantities of an element may be detected and the technique of quantitative analysis by spectrography, though limited at present, is advancing.



Courtesy Westinghouse

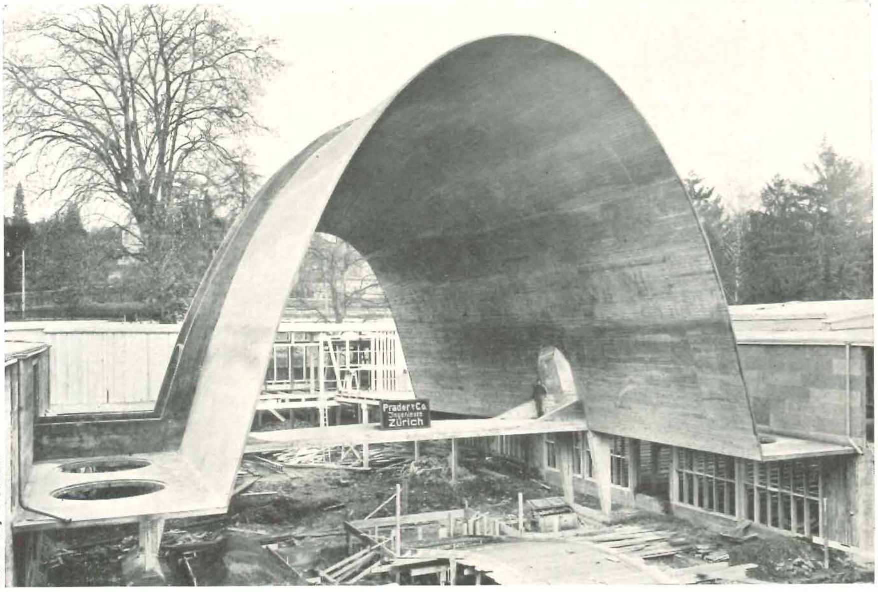
Courtesy "Mechanical Engineering"

A 220,000-volt portable x-ray machine examining welds for defects. Below: left, typical gammagraph through a 2-in. weld; center and right, typical exographs.



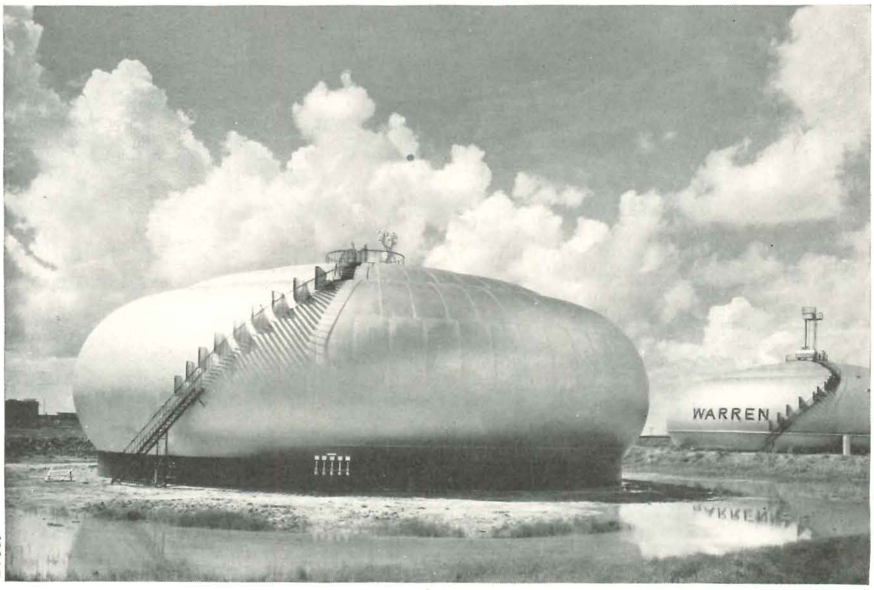
Courtesy Westinghouse

Mass spectrograph. Elements in a material can be determined by spectrography.



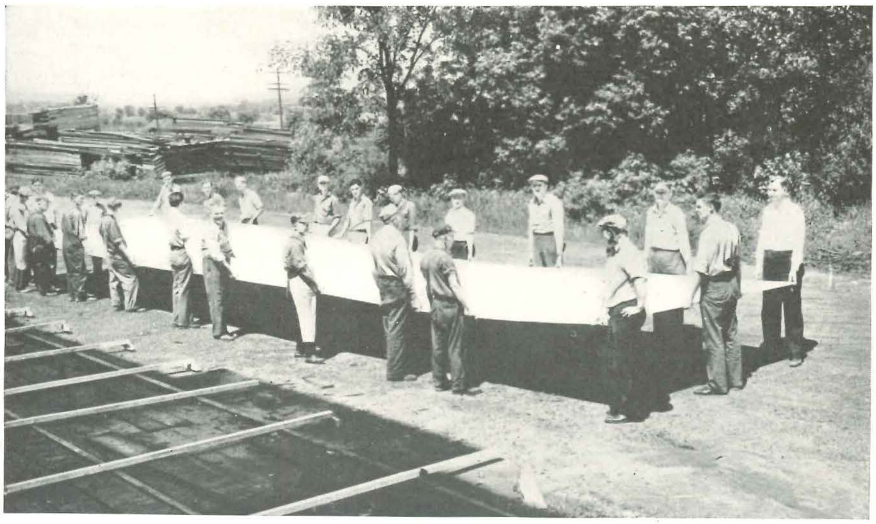
H. Wolf Bender

Hall, Zurich. Robert Maillart, Engineer. Vault is only about 3½ in. thick.



Trost

Use of alloy steels and welding contribute to the development of pressure vessels which employ maximum strength of steel in tension.



Courtesy Bakelite

Greater control in fabrication makes possible resin-bonded plywoods. Plybond bus floor (above) is 9 x 46 ft., 5 plies thick, and weighs only 750 lbs.

THE RESULTS of increasing precision control over the production of materials may be indicated by considering the more important building materials.

Steel

Steel fabrication is characterized increasingly by a high degree of control over composition and treatment, and the product is one that possesses, within relatively close limits, the exact properties desired. New high-strength steels, made by the open-hearth process without heat treatment, come from the rolling mills with improved physical properties and corrosion resistance. Their more favorable strength-weight ratio, with reduced dead load and greater resistance to corrosion, makes possible the use of thinner sections. Greater control over internal structure permits the increased use of welding.

Concrete

Supposedly identical specimens of concrete fabricated by the usual methods have, under test, shown extreme variations of properties; and safety factors have been correspondingly high. Greater uniformity has been obtained in recent years by more precise control of proportions and properties of ingredients in the concrete mixture. Handling methods and conditions of the hardening process have also been subjected to greater control. Strength, durability, volume change, and workability are more closely determinable.

Plastics

The development of plastics is a relatively recent one. Plastics weigh only about one-fifth as much as white metals; one plastic has been developed with the translucence of opal glass, weighing only one half as much. Plastics have a permanent nonhygroscopic finish that will not corrode, tarnish, chip, peel, or craze. Aerolite has such wear-resisting properties that it is used for bearings without lubrication: both phenolic and urea-formaldehyde types take their finish from the polished mold surfaces, requiring neither plating nor polishing; buffing, spraying, and baking operations are eliminated.

Wood

More precise control over internal structure has improved on natural wood. This is most apparent in plywoods, particularly the new resin-bonded plywoods, which are stronger and tougher than solid lumber, more flexible, more resistant to cracking and splitting, and far more homogeneous than natural wood.

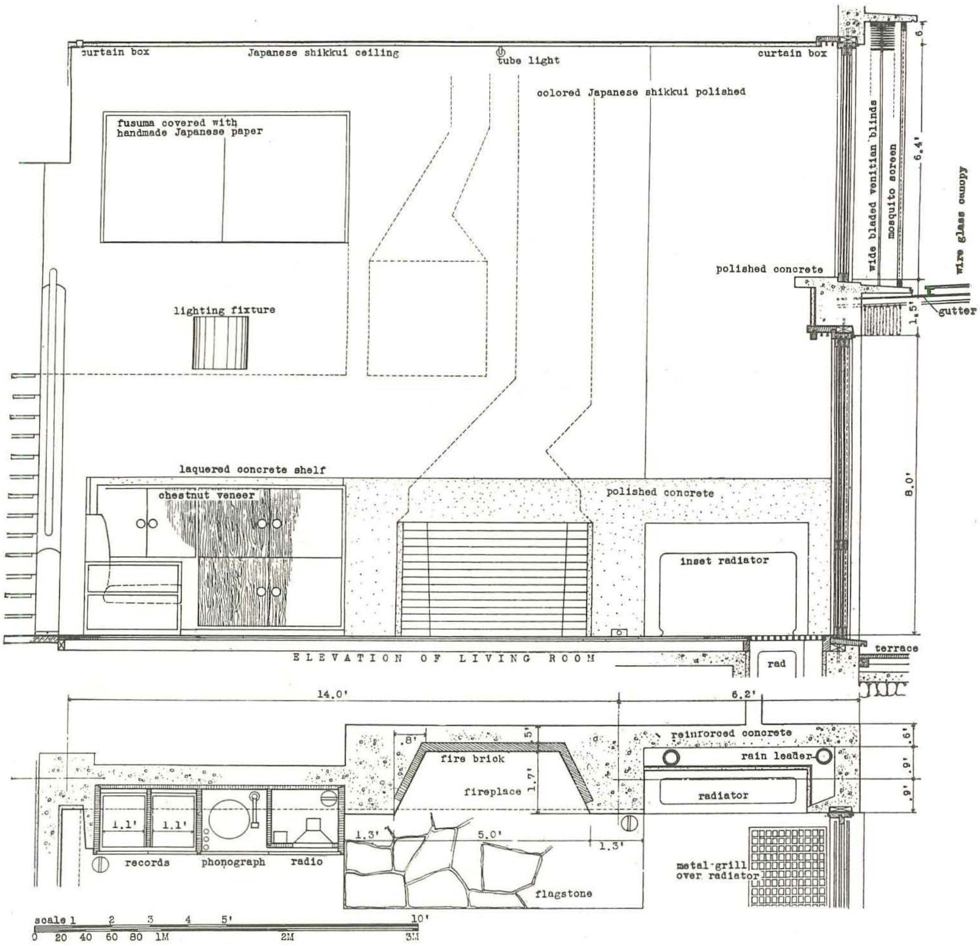
Review of New Books

COINCIDING WITH the author's return to America after a 17-year practice in Japan, the new book* of Antonin Raymond's works is, in fact, a biography as well as an important reference work in building design. There is only one page of text—a foreword by Mr. Raymond and his wife: the rest of the 118 pages are devoted to photographs and details of selected examples of his work in Japan. Yet the foreword reveals Mr. Raymond as a man of action (for whom proof must consist not of "abstract phrases but of actual examples of work constructed"). And the work illustrated shows him to be an imaginative and scrupulously careful designer. At the same time, he shows an interest in the broader technical and aesthetic aspects of building design. He hopes that "this work will be of value to the younger generation." He believes that "architects are actually beginning to create again." And he displays a lively wrath at attempts "to summarize the achievements of contemporary architecture by calling it the *International Style* . . . when the misguided efforts of the period preceding ours, in planting Greek, or Roman, or Gothic, or Renaissance forms, empty of meaning, in America or the Orient without regard to local conditions, were in fact much nearer true internationalization."

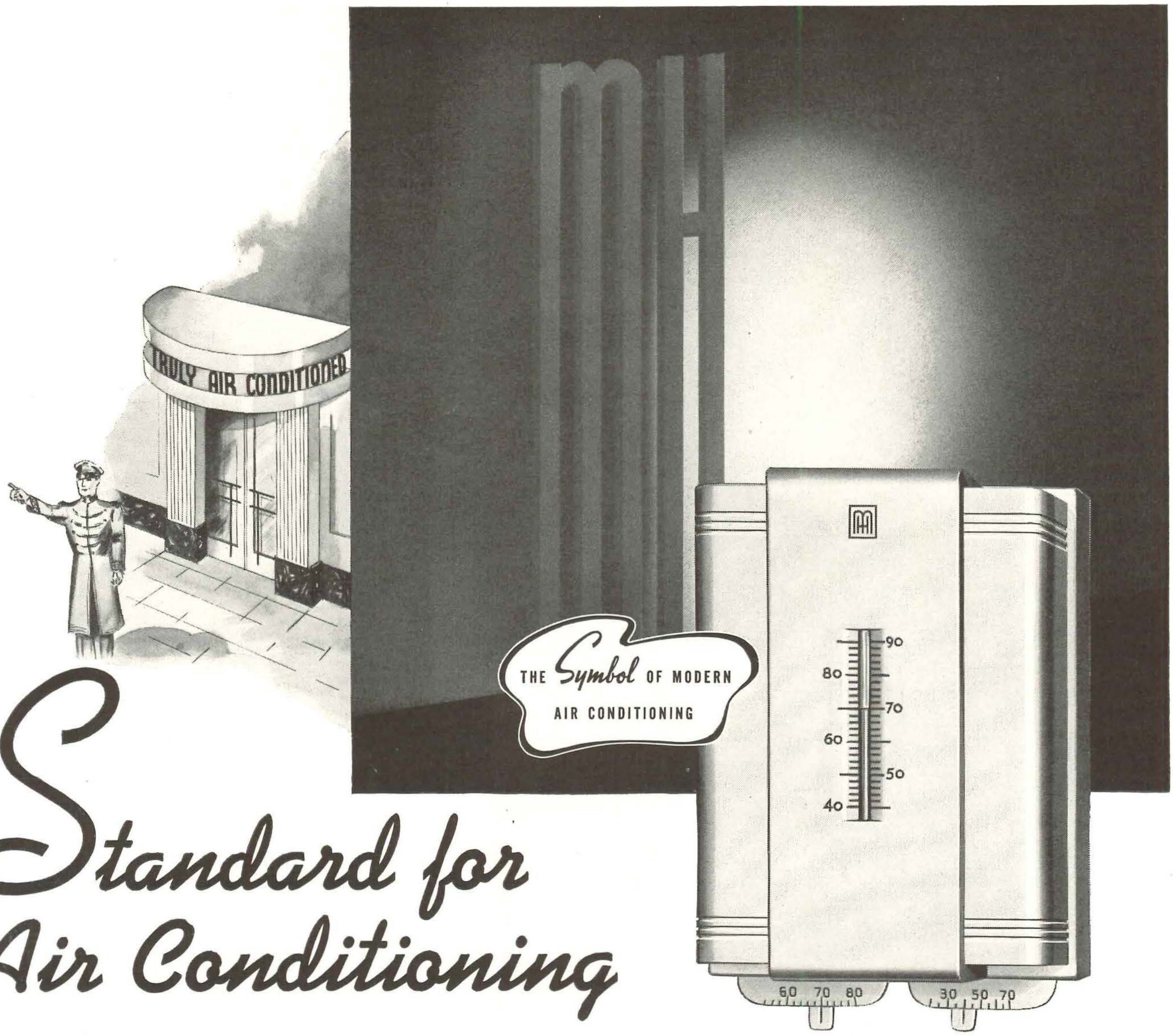
Respect for local conditions—cultural or climatic—is apparent in Antonin Raymond's work: yet this has not prevented his importing the more advanced design principles and materials of Europe and America. (In many instances he had not only to import his materials but train the craftsmen in their use.) At the same time he has freely used those features of Japanese building technology—wood framing systems, fenestration, even thatch roofing and oiled-paper—whenever they struck him as most suited to the specific problem.

The material in the book is not classified in the conventional way—by buildings—but by structural elements, planning units, and furniture and equipment. The book is a valuable contribution to building design.

*ANTONIN RAYMOND: ARCHITECTURAL DETAILS, 1938. Foreword by Antonin and Noémi Raymond. Architectural Forum, New York City. 118 pages, 9 x 12 in. 250 photographs and 530 drawings. Price, $5.00.



Characteristics of the care with which the material in Raymond's new book has been organized are the matching photograph and drawing above of the living room in a Tokyo house. Design of the furniture as well as selection (if not design) of all upholstery, curtain materials, and floor coverings is also Raymond's.



Standard for Air Conditioning

BECAUSE OF ITS PRECISION

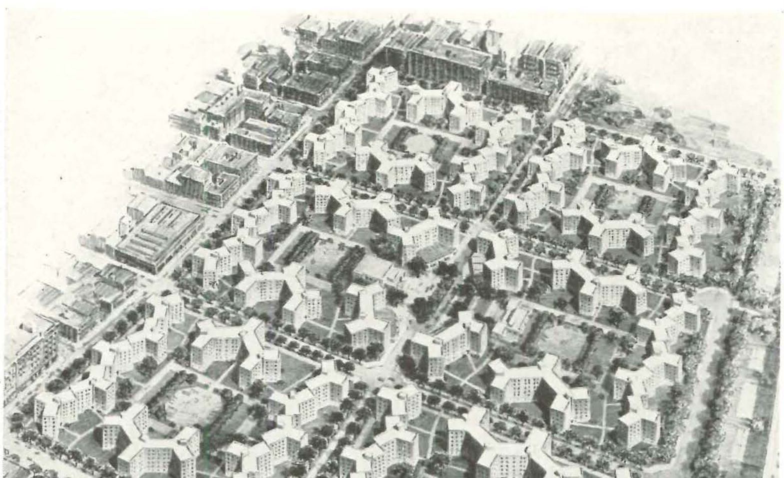
FIVE of the six air conditioning factors — heating, cooling, humidifying, dehumidifying and circulating — require constant and accurate balancing or control if satisfactory conditions are to be attained. The sixth factor, cleaning, is constant.

While different balancing of factors is used in accordance with the seasons, even the slightest variation in the control of one of them can throw the entire system out of balance. This can result in excessive operating costs in addition to discomfort or even unhealthful conditions.

Air conditioning, therefore, can be no better than its controls. And, because of its inherent precision, accuracy and balance, the Minneapolis-Honeywell Modutrol System is accepted as Standard for Air Conditioning. Dependable controls cost less than service. You can always depend upon the Minneapolis-Honeywell Modutrol System for air conditioning control. Minneapolis-Honeywell Regulator Company, 2804 Fourth Avenue South, Minneapolis, Minnesota . . . Branch and distributing offices are located in all principal cities.

MINNEAPOLIS-HONEYWELL
Modutrol System

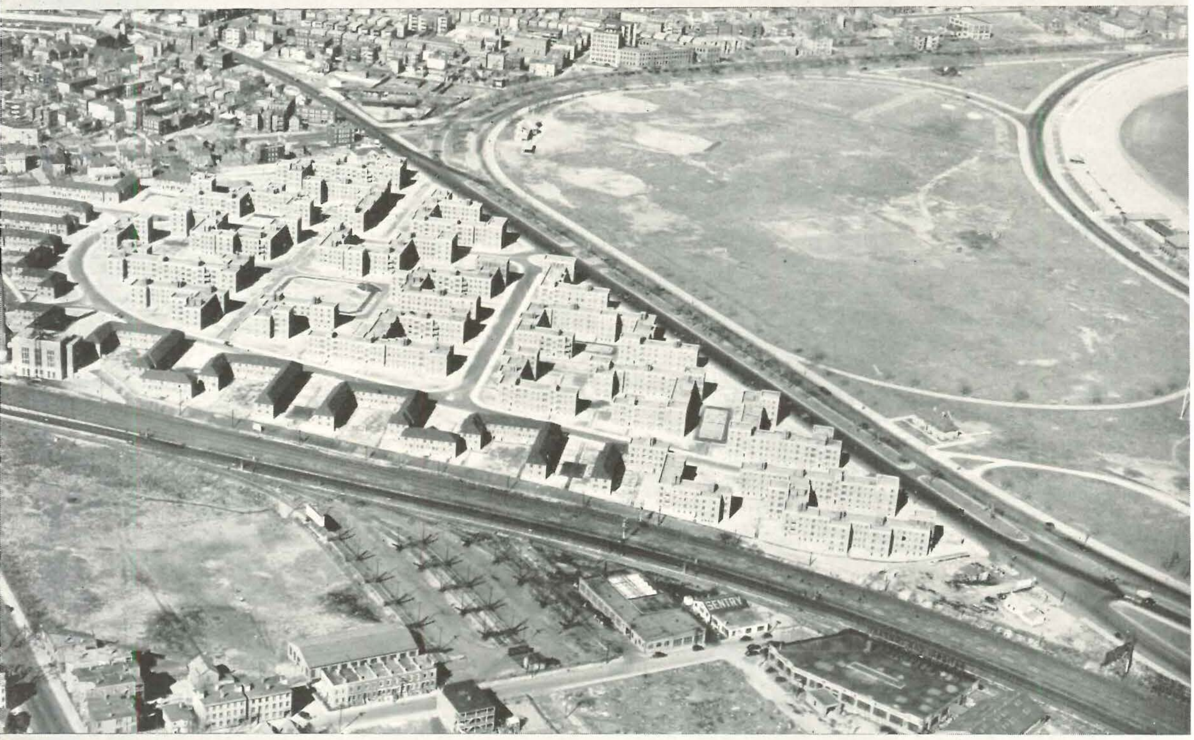
BUILDING TYPES

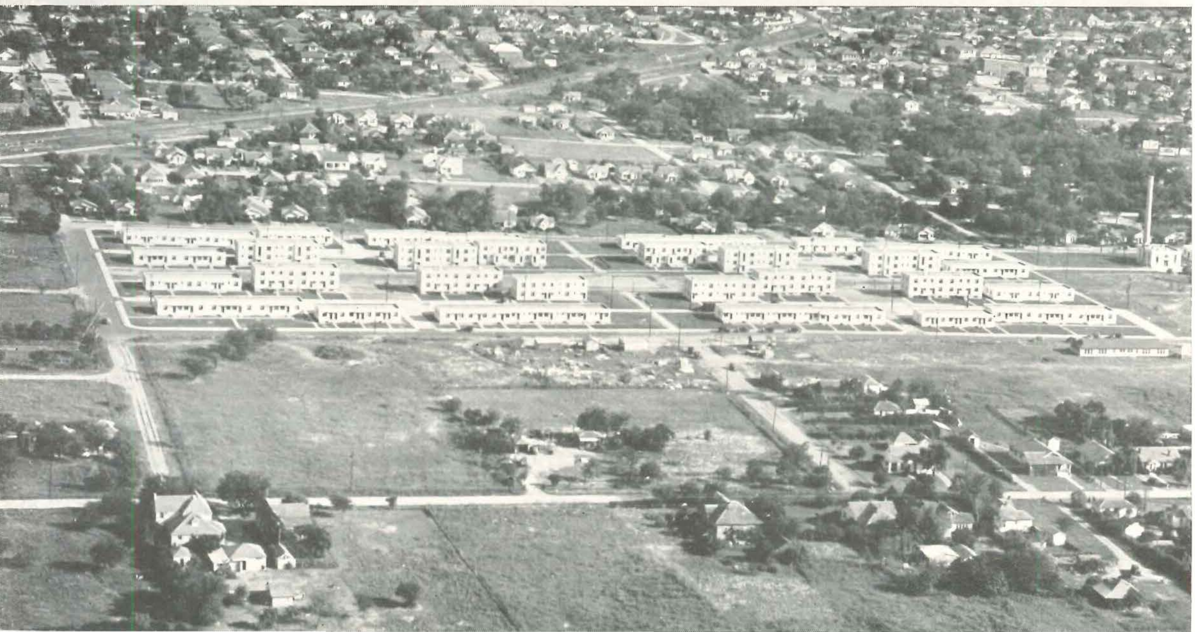


Drawing Copyrighted by Queensbridge Project Associated Architects; Photo by L. H. Dreyer

FORTHCOMING ISSUES: 1939 — April, Retail Stores; May, Houses; June, Factories; July, Houses; August, High Schools; September, Apartment Houses. PRECEDING ISSUES: 1939-1938 — February, Elementary Schools; January, Restaurants; December, Office Buildings; November, Houses ($25,000 and Up); October, Houses ($15,000–$25,000); September, Apartments

ARCHITECTURAL RECORD





INDEX

On this page: top, Williamsburg Hous- ing, New York City; center, Ol Harbor Village, Boston; both photos b Fairchild Aerial Surveys. Lower phot (Cedar Springs Place, Dallas, Tex.), a well as most photos and drawings i subsequent pages of this study, are re produced by courtesy of the Unite States Housing Authority. Individua credits refer to photographers.

SITE-PLANNING for LOW-RENT HOUSING

Material published on the subject of low-rent housing has, in the past, dealt largely with either the social need or the technical details involved in the design of low-rent dwellings. Little has been made available in reference form on site-planning; and for that reason this study attempts to correlate the various factors which make site-planning a fundamentally important part of the low-rent housing problem . . . The study is based upon the conclusions of designers and research workers in the Technical Division of the United States Housing Authority* who are primarily concerned with policies and procedures applying most directly to "public housing." However, information on the following pages is applicable in principle to the design of any project in which provision of low-rent housing is the end-objective.

PRINCIPLES OF SITE ORGANIZATION AND DESIGN

A HOUSING PROJECT is not merely a collection of dwelling units or an aggregation of families. It provides a basis for a way of life for its inhabitants within the planned framework of a neighborhood which, in turn, is encompassed by the larger framework of the community. The organization and physical delineation of this framework constitutes site planning.

A site plan for housing must therefore take into account much more than the arrangement of buildings upon a tract of land. It must provide solutions to the technical problems of dwelling unit design as these concern provision of utilities, location relative to circulation, privacy, sun and air circulation, access, and a pleasing arrangement. The site plan must also be developed to serve the needs of a group or community—needs for social contact, active and passive leisure time activity, and common services. Thus site planning becomes a process of integrating the various elements of a housing project—technical, social, and economic—relative to the limitations and potentialities of any given set of local conditions.

As such, careful site planning is one factor that is basic to the successful development of low-rent housing projects. Because the design of such projects is a comparatively new field, site planning, as defined above, is also a field in which there is much to learn and in which there exists a difference of technical opinion on a variety of points. Material in this study, therefore, should be regarded, not as a series of arbitrary recommendations, but as a frame of reference for the designer, useful as a basis for the solution of individual problems and as a guide in crystallizing standards of good site planning practice.

From past experience in large-scale residential planning certain principles of site organization and design have evolved, which, through testing and demonstration in use, have come to be generally accepted as fundamental.

Relation to community

The site plan is influenced by the factors which form the social, economic, and legal framework of the project; by climate, local housing customs, local economic conditions, and local laws; by the location of the site with respect to employment, transportation, utilities, and social institutions; by land values, the relative costs of various types of construction and heating, and the cost of maintenance labor; and by the shape and contours of the site, the number of dwelling units proposed for the site, and the traditional habits, the incomes, and the size and composition of the families to be housed.

Obviously the force of many of these factors upon the organization and design of the housing project will vary according to the relative importance of each in the community of which the project will become a part. For example, provision of recreational facilities as an element of site planning will be, to a great extent, conditioned by the type and extent of existing facilities and their relative proximity to the housing site. If the site adjoins a public park or encompasses a school site with play areas of adequate capacity to serve the project population, no further provision of major open areas will be required.

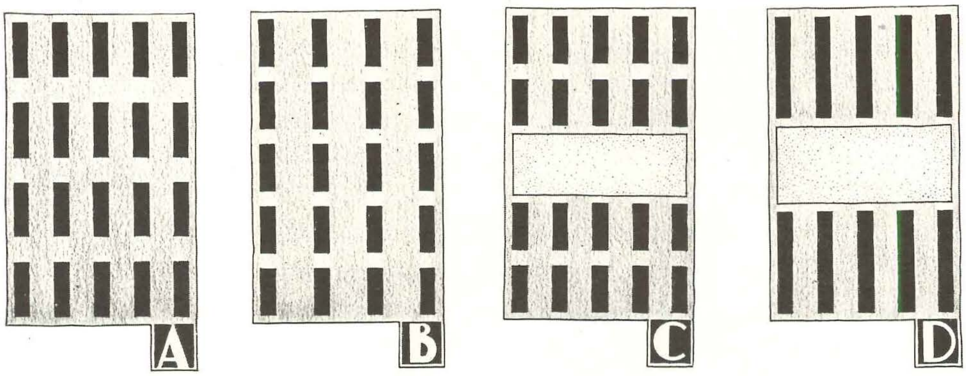
Again, the site may adjoin busy traffic ways or include unusually hilly country. Street layouts then may become relatively more important to provide safety and convenience to tenants of the project within the necessary limitations of rigid economy of development and maintenance.

Integration with a neighborhood plan is an essential element of any low-rent housing project. A small project, the site of which lies within an existing neighborhood, should be planned to form definitely part of such neighborhood.

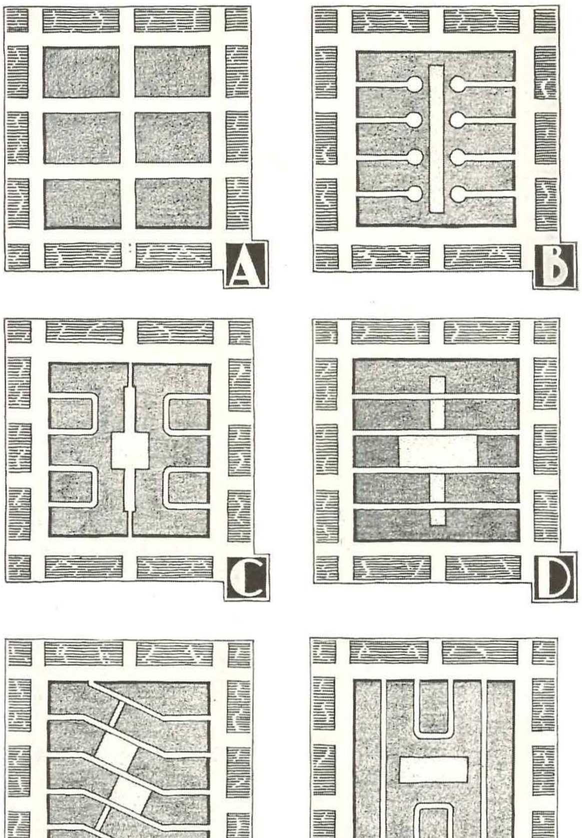
Very large or isolated projects will naturally tend to form neighborhoods of their own and should therefore be planned to provide the basic setting for neighborhood life. This means—in addition to integral provision of space and facilities for recreation—provision of space for stores, elementary schools, and other neighborhood facilities, although such facilities may not always be a part of the housing program. The site plan will necessarily be carefully integrated with the city plan, if one exists, or with a general scheme based on a study of population and industrial trends.

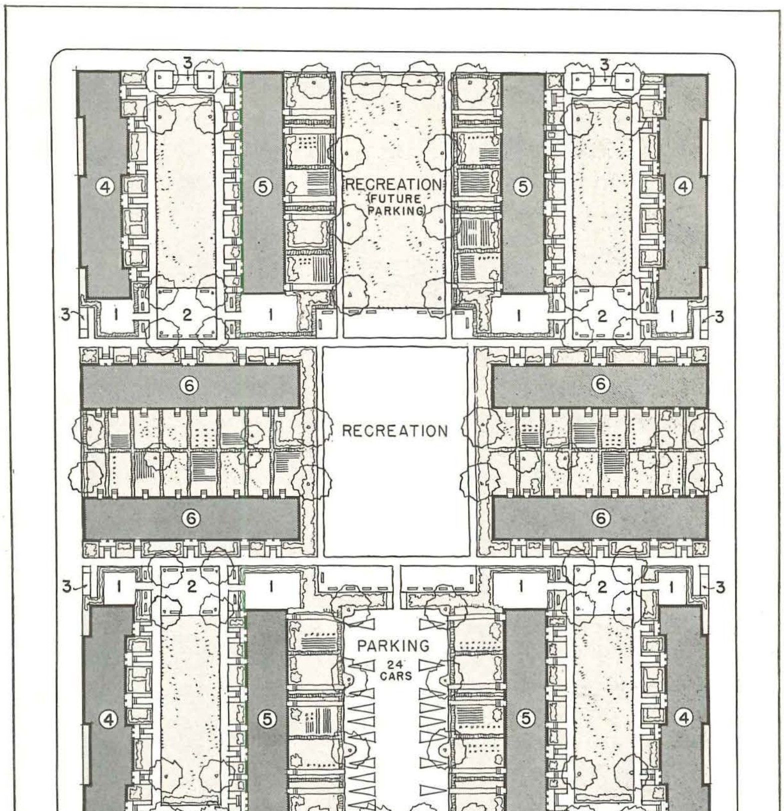
*Much of the data and many of the illustrations have been adapted from material which has been prepared by the staff of the USHA Technical Division for release as a Policy and Procedure Bulletin on the Design of Low-Rent Housing Projects.

DESIGN PRINCIPLES (continued)



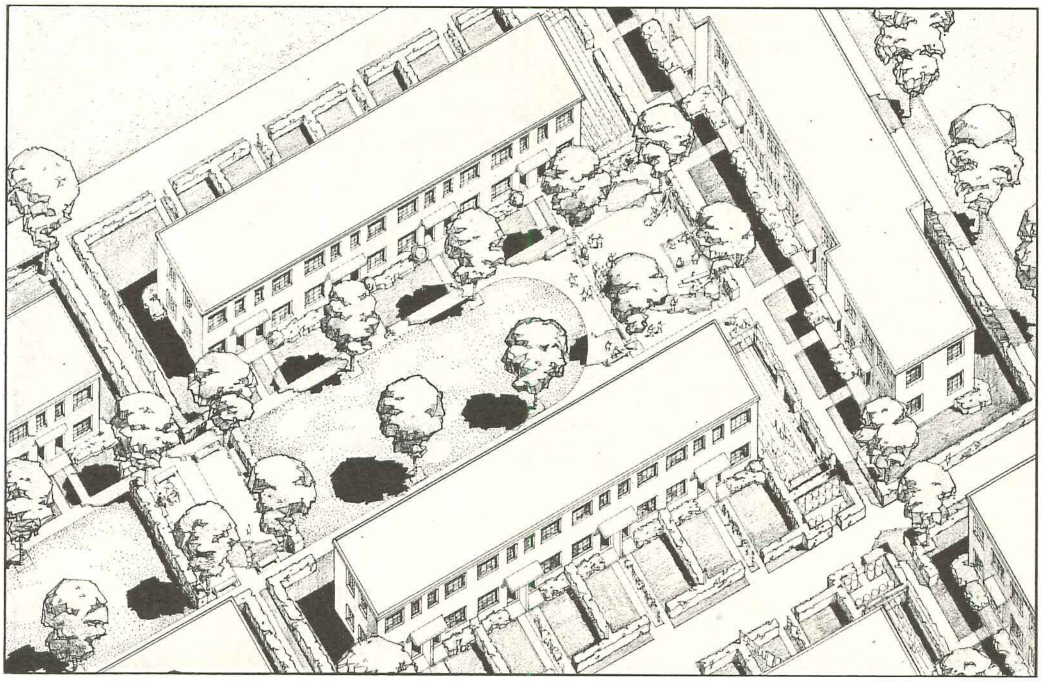
SPACE DISTRIBUTION. Liberal spacing between building-ends, in "A", tends to increase site development costs. Closer end spacing, wider row spacing, in "B" reduces development costs, gives tenants more air, light, and privacy. With row houses, all land could be tenant-maintained. By reducing spacing in "C", area becomes available for public use. The longer buildings in "D" increase this area with reductions (if site is level) in development and construction costs.





TYPES OF SUPERBLOCKS — Sketch "A" is the area to be replanned. In "B" a true superblock is subdivided only by cul-de-sacs. Turned lanes in "C" avoid use of turn-arounds and save time in route-servicing. Lanes run through the property in "D", are angled in "E" for improved orientation or better relation to topography. The large central area in "F" for common recreational facilities results when turned and through lanes are combined.

TYPICAL SUPERBLOCK DEVELOPMENT — Two-story row houses (6), three-story duplexes (5), and two-story flats (4) are grouped about a common recreation space. Each building group has a sitting area (2), each building a drying yard (1). Yards of duplexes and row houses are tenant-maintained. Entrances of all buildings are from inside the block area; and service stations (garbage, etc., at 3) are accessible from boundary traffic ways.



Building group detail in a typical low-rent housing project that suggests a desirable relation between dwelling units, recreation and service facilities, tenant-maintained yards, and traffic ways. Buildings facing each other are row-houses; the other contains flats. Note pooling of space for public use in the court and concentration of service areas with garbage stations located on traffic lanes. As a safety measure entrances to flats are from the court.

Superblock planning

Because most of the foregoing general factors can be coordinated, most economically and otherwise, in a relatively large area, the superblock is now regarded as a primary principle of low-rent housing project design. The superblock usually contains one or more common open spaces bounded in whole or in part by through traffic streets, but not intersected by such streets. Cul-de-sac or dead-end streets, branching from a circumferential traffic street, may be used to give internal access; or through streets, so reduced in width or so placed and shaped as to discourage any but local interior traffic, may serve the houses within the block. Many varieties of the superblock are possible, and one or more of these may be used as the basis for the organization of the site plan.

Directly related to the superblock are two corollary principles. The first involves the design and construction of streets and walks to serve particular functions — as through traffic, local traffic, service lanes, pedestrian walks, etc. This articulated street pattern results in economy of paving and utility costs, as well as desirable privacy for residential areas and freedom from traffic hazards.

The second principle involves a pooling of open spaces within the superblock to permit the most economical arrangement of buildings and thereby the most advantageous use of all open areas. Some of these may be common areas developed for group activities; others will be used by tenant families and maintained by them.

All areas—open or enclosed—have no purpose other than the service and pleasure of those living in a housing project. All space must therefore be organized—arranged, divided and allocated, enclosed or surfaced—to provide for its maximum use by tenants.

Application of these related principles will tend to promote economical development of the site, reduce traffic hazards and noise, increase privacy, integrate play areas with dwellings, and protect the project from deteriorating outside influences.

Maintenance of open areas

If rents are to be kept low, maintenance costs of all sorts must be minimized. As applied to a site planning problem, this suggests the desirability of allocating as much open space as possible to the private use and personal maintenance of individual families.*

In most projects all the land except that needed for common use may well be allocated to tenant-maintained yards. In the apartment superblock this may be difficult to accomplish, and from this standpoint projects with row houses, flats with private entrances, or single or twin houses will usually be preferable.

Development of privately maintained areas will vary with localities and projects. Yard marking with walks, shrubs, fences, or wires is generally desirable. In each yard, space is required for drying clothes and some area for sitting-out is highly desirable in most instances.

When extensive tenant maintenance of private yards is not attainable, open area development requires skillful utilization of natural site characteristics to minimize grading, equipment, and upkeep. Topographical features can be used to advantage and land not needed for housing is generally most useful and economical to maintain if kept in relatively large units of area. Compactness of layout is another important aid to efficient site development and maintenance, and collaboration with a site engineer is desirable to assure economies in technical development as well as intensive land use.

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*The USHA recommends the policy of placing upon the tenant as much responsibility for the maintenance of both house and land as is feasible and economical. A study of the site plans published here will make clear the careful planning that has been done to accomplish this objective.

ELEMENTS of SITE ORGANIZATION

The air-view above suggests the necessity of coordinating information on neighborhood conditions and trends, with complete data on site conditions as a preliminary to project design.

Sekaer

Sekaer

Low coverage and low density produce an open layout that is one desirable characteristic of a low-rent housing project. But all elements of site and neighborhood must be adjusted to develop the most practical solution to a specific local problem.

MANY FACTORS which constitute the framework of any housing project can and should be coordinated in schedules and calculations before any attempt is made to develop a graphic design. For example, all available data regarding the site should be assembled. These may include line and air maps, plans of existing utilities, soil investigations, topographic surveys.

On the basis of such data and the trends of community development, a thorough study of the site can be made relative to the surrounding neighborhoods. It is important that this include plans for possible future development.

Selection of the type of buildings will depend largely upon this study and upon the specific housing requirements of the locality. After building types have been chosen, schematic plans showing house-and-land patterns may be developed, based on varying arrangements of access, garden space, common open space, parking area, etc., and on specific concepts of density, coverage, orientation, and spacing of buildings. The broad, general organization and character of the plan will be determined in large measure in this way, but the final quality of the plan will depend upon the care with which building groups are arranged and adapted to topography.

Density

Unless otherwise qualified, "density" means the number of families per acre. In calculating the density it is general practice to use an area that excludes public boundary streets and large recreation, unbuildable, or reserved areas. Narrow drives, parking areas, and small recreation spaces are included.

Plans cannot be compared for quality on the basis of density alone. In general a low density is desirable. However, low densities imply comparatively greater land costs per housing unit.

Factors other than land cost may influence selection of a practical density. In an urban slum clearance project, for example, a relatively high density may be justified in view of the equipment that already may exist for servicing a large population.

In studying sites, an approximate density based on the assumed type of housing unit, whether row house, apartment, or other, may be set, or a scale of densities may be set up on the basis of a range of land cost. When the number of dwelling units in the proposed project is determined approximately (possibly varying according to the neighborhood under consideration), this combination of figures—total number of units and density—will give the area of land necessary for the project. Calculations may be reversed to give either the density which results from a given number of units, or the number of units which may be built at a given density.

Variations in density result from, or should parallel, different types of housing structures, and these variations can be fixed within rough limits. A layout of single houses cannot generally exceed 12 or 15 to the acre. One-story row houses give densities of 16 or 18 as a maximum, and two-story row houses are commonly planned with a density of from 15 to 20 families per acre. When row houses are supplemented by two-story flats, and one-quarter or one-third of the units are in flats, a two-story project with 100 percent automobile parking can have a density of 20 families without undesirable over-crowding. If the auto parking runs under 50 percent, and there is a large number of flats, a 2-story row house development can attain a density of about 25 families per acre. Beyond this it is usually desirable to introduce three-story buildings.

Coverage

The percentage of a site covered by buildings is commonly termed "coverage". This and the number of stories in the buildings determine the density of a housing project. A low coverage ranges from 10 to 14 percent, and the average desirable coverage for low-rent projects ranges from 16 to 30 percent.

In general, low coverage and low buildings are desirable, a statement that reflects the current trend of both public and private housing developments.

At a particular density the coverage depends upon the size of the units and the number of stories. If a site plan studied for a particular schedule of units, with the size and type of units established, shows an undesirably high density or coverage, the density may be reduced by using a larger proportion of small units, or the coverage may be reduced by use of higher buildings. Coverage and density are thus related variables which directly affect the site plan. In view of this fact, it cannot be too strongly emphasized that the design of the dwellings and of the site plan must proceed at the same time.

Land cost

The density of a project should reflect land costs in order to keep to a minimum all expenditures for non-dwelling facilities.

However, only a general relation between land cost and total development cost can be established. A proportion which may be clearly justified in a metropolitan slum clearance project may be clearly disproportionate in a project located in the outskirts of a small city. The special conditions bearing upon each case must be considered, since high land costs may sometimes mean low site development costs, and a higher expenditure for land may often effect a reduction in the total living costs of the tenants by reducing their expenditures for transportation.

Land cost is usually calculated on the basis of the money paid out and does not include an allowance for closed streets. In comparisons of site costs the cost per square foot is usually used. All the land made available for the project by purchase (including existing streets which are to be closed) may be included in the total number of square feet by which the total cost of the land is divided to give the average square foot cost. Where two sites are compared, one of which contains much unbuildable land and the other little or none, it may be necessary to base the calculation on the net amount of buildable land in each case and not upon gross area. This is true also in a calculation of land cost per dwelling-unit—the land cost divided by the proposed number of units.

Site development cost

Site development cost includes all outdoor construction such as roads, walks, utilities, grading, planting, fences, and playgrounds.

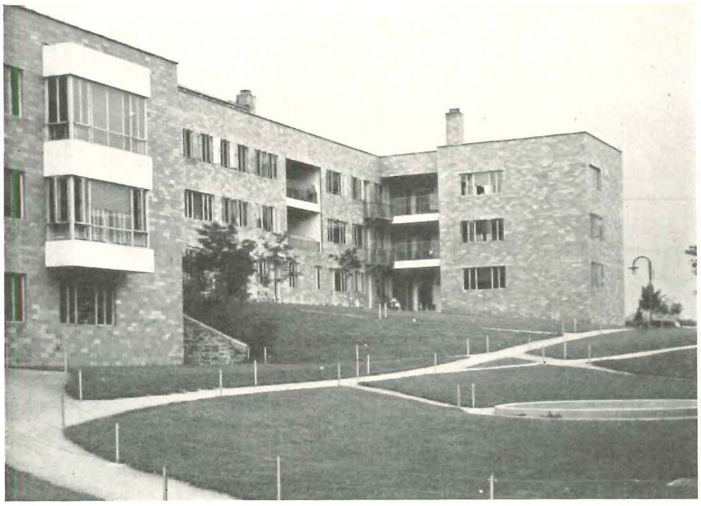
This factor has been found to vary between limits as wide as 5 to 20 percent of the total project cost. It is a greater proportion of the cost per dwelling unit when the density is low than when it is high and, at a fixed density, is greater when the coverage is high than when it is low.

A project which is surrounded or intersected by well-developed city streets in good condition, and utility mains which may be utilized in the project plan, will tend to show a lower site development cost than a project on vacant land. Steep topographic conditions or excessive flatness may increase development costs. And a scheme in which the tenants do not have yards of their own is likely to show higher costs of site development per unit than a scheme in which the land is divided among the tenants.

Buildable area

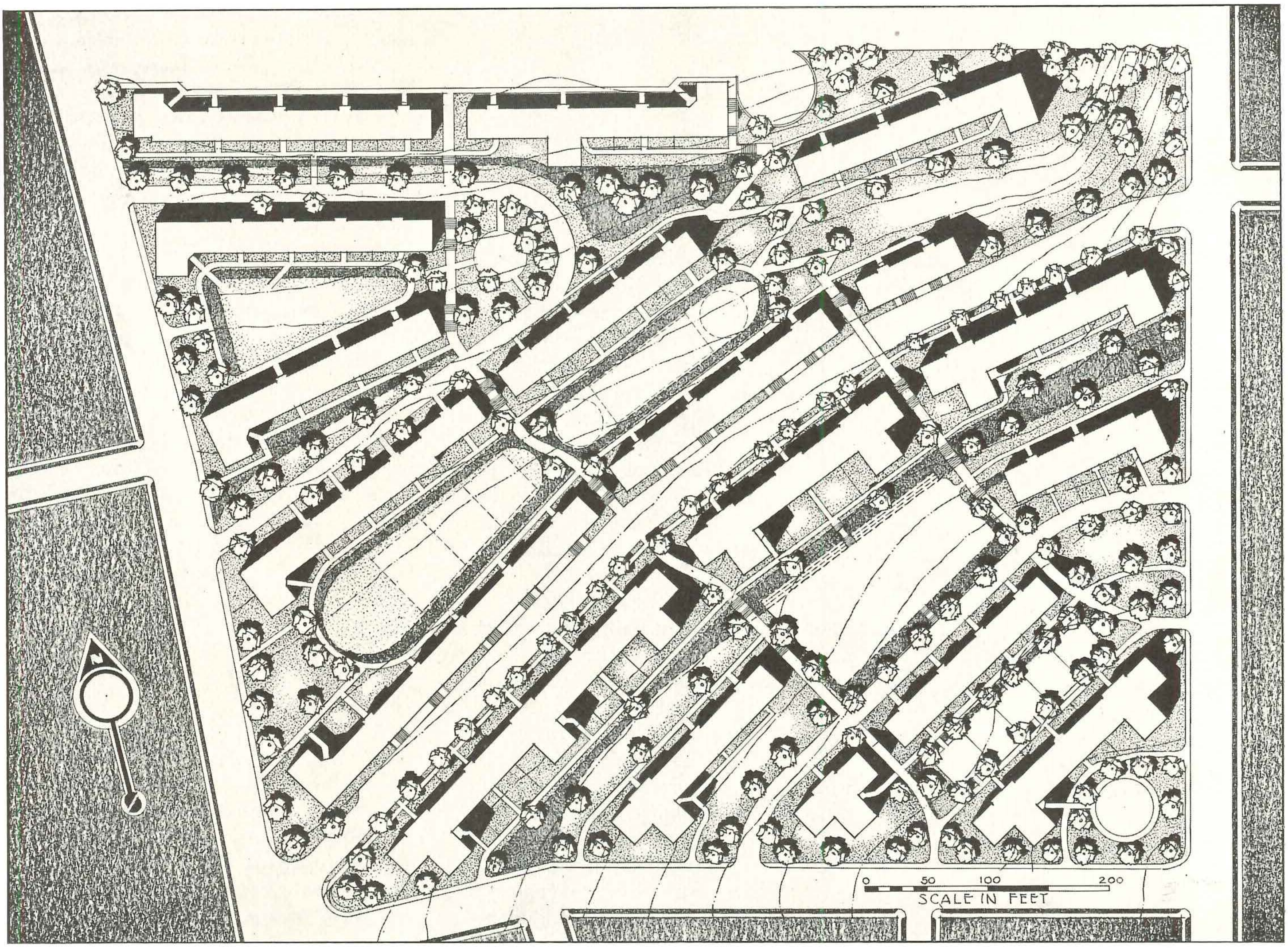
No site should be given even tentative consideration unless the amount of buildable area it contains is known. If the site includes steeply sloping land, at least a sketch topography should be available; data on soil conditions, particularly where there are areas of poor bearing due to natural conditions or to artificial fill, should also be obtained. It is desirable that a site engineer cooperate with the planner in laying out topographically difficult sites. Runs and depths of sewer cuts are an important element of cost. Unbuildable areas of poor bearing soil may often be used for parking or recreation areas, and thus need not cause a serious loss of useful area. Land which is unbuildable because it is so steep that construction cost becomes excessive is ordinarily of little use for other purposes; but even unusable land may be of value to the project in giving more light and air to the houses. Unbuildable land at the periphery of a project may provide useful protection against undesirable factors in the environment, acting as a miniature "green belt".

TOPOGRAPHY

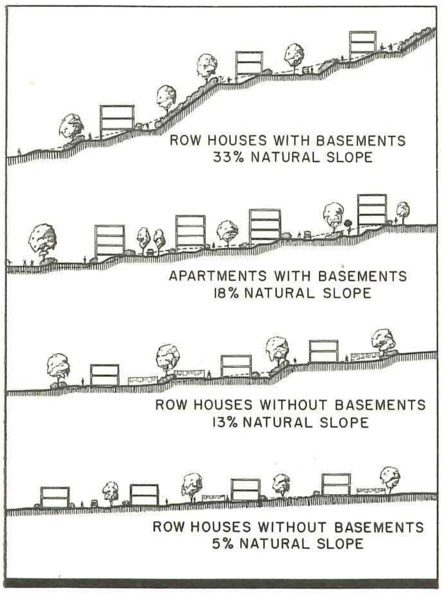


Apartments on a hilly site: Carl Mackley Houses, Philadelphia

A level site: Liberty Square project in Miami, Florida



Study for three-story apartment scheme on a steep slope in a small eastern city. Buildings and service drives are parallel to contours. South sides of buildings contain grade-level apartments and community facilities.



Cross sections showing treatments for varying degrees of slope. 33% slope: Basement stories contain apartments, and buildings act as retaining walls. 18% slope: Partially exposed basements contain apartments, laundries, and storage. 13% slope: Buildings are fitted closely to natural grade and necessary adjustments made between yards rather than near buildings. In all three of these cases, walks are adjacent to buildings.

In the bottom drawing (5% slope) buildings are also closely related to natural grade, but walks and drives are midway between buildings. All four cases are taken from existing projects.

In order to avoid costly construction, and to make maximum use of grade variations, plans should always be studied in relation to accurately drawn topographical maps or sketches—if possible, directly over them.

Level sites

Even though project land may be so flat that topography does not control site planning, the grouping of buildings needs study in order to arrive at a satisfactory system of drainage. Surfaces of recreation areas and yards require some pitch for discharging water to surface inlets; locations of these, and economical placing of areas in regard to cutting and filling, are important.

Steep or broken sites

If marked differences in elevation exist, correlation of the site plan with topography will result in economies of first cost and maintenance, particularly in relation to sewer and drainage lines. Careful use of topographic variations may give a site plan individuality.

Very steep or broken sites may give rise to excessive development costs, unless dwelling spaces or community facilities can be introduced at lower grade levels to make use of excess wall construction. Such common facilities include: community rooms for recreation or work; tenants' laundries, drying rooms, or storage space; perambulator rooms; heater rooms.

On even moderate slopes, the practice of placing buildings parallel to contours will eliminate much costly construction, grading, and filling. This holds particularly true when rock is encountered in excavating. If buildings must be placed on comparatively steep portions of the site, the buildings themselves may serve as retaining walls. By a study of topographical sections, it is possible to determine whether to draw buildings closely together along the entrance side, leaving the greater portion of the slope to be taken up in yards and gardens; or whether to concentrate all garden areas on one side of each row, leaving only sufficient room for access walks on the other side. Adjustments in grades are preferably taken up between yards rather than close to buildings.

Walks and roads

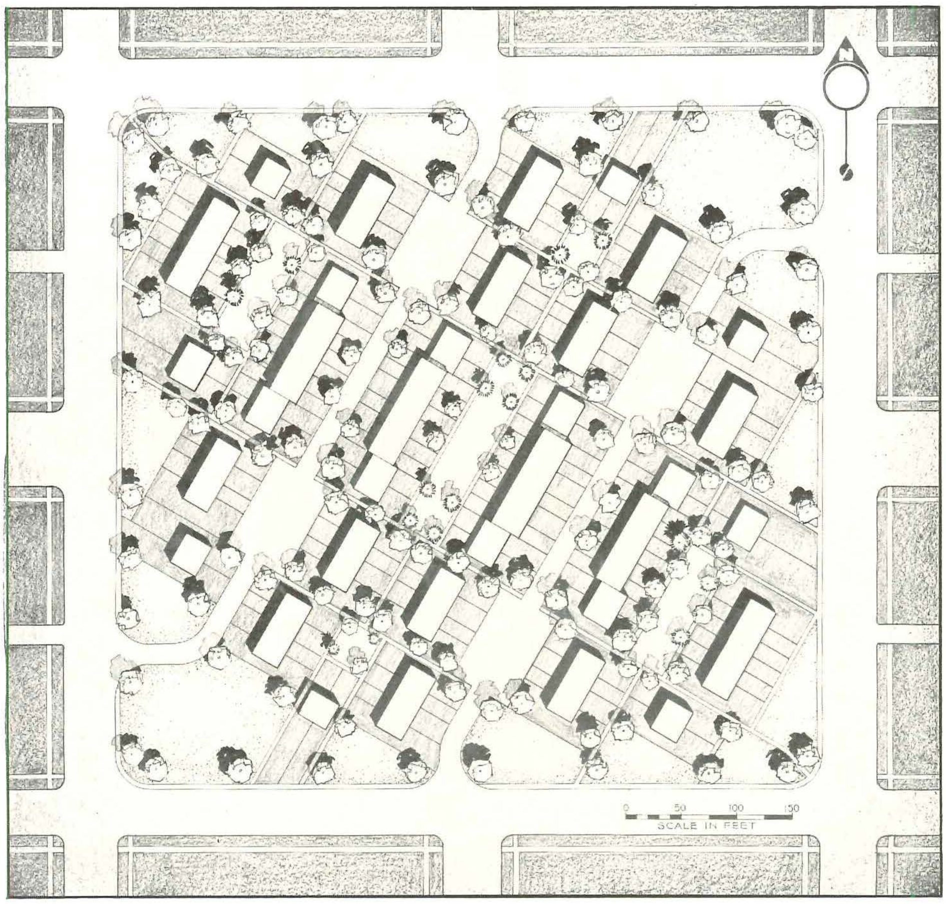
On sites having steeper slopes—say, greater than 5%—it is common practice, where conditions permit, to locate walkways close to buildings, in order to reduce further costs of cutting and filling. Depending upon the project, roads may be similarly laid out. It is desirable that roads run parallel to contours to avoid grading expense. Since steps are considered undesirable (see page 94), walkways also preferably parallel contours. Abrupt changes in level may in some cases be overcome by the introduction of "switchbacks".

Preservation of trees and buildings

Topographic surveys should show existing trees; efforts made to preserve them may save time and expense in producing necessary shade, besides adding charm. Slight variations in plan, necessary to accommodate them, may be taken advantage of to achieve a desirable informal appearance.

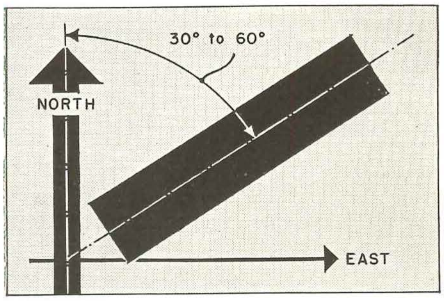
If the site is built up, some of the existing buildings may be worth saving. Imaginative handling of the plan may use such buildings for a variety of purposes and give variety to design.

ORIENTATION

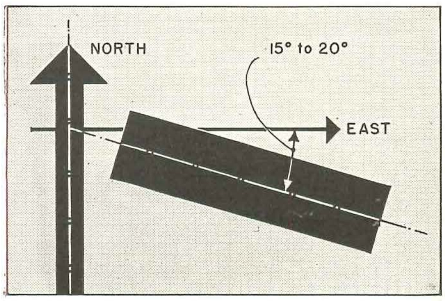


This site plan, developed for a project in a small mid-western city, will accommodate approximately 115 families in one-story, semi-detached houses and one- and two-story row houses.

Orientation for sunlight was the principal consideration, since the ground is comparatively flat. Notice that service driveways are not laid out in conformity with surrounding streets but are placed to discourage traffic through the site.



Orientation for sunlight in northern states; building angle approaches an east-west line as one goes south.



Secondary favorable zone giving good early afternoon sun in winter and protection from afternoon sun in summer

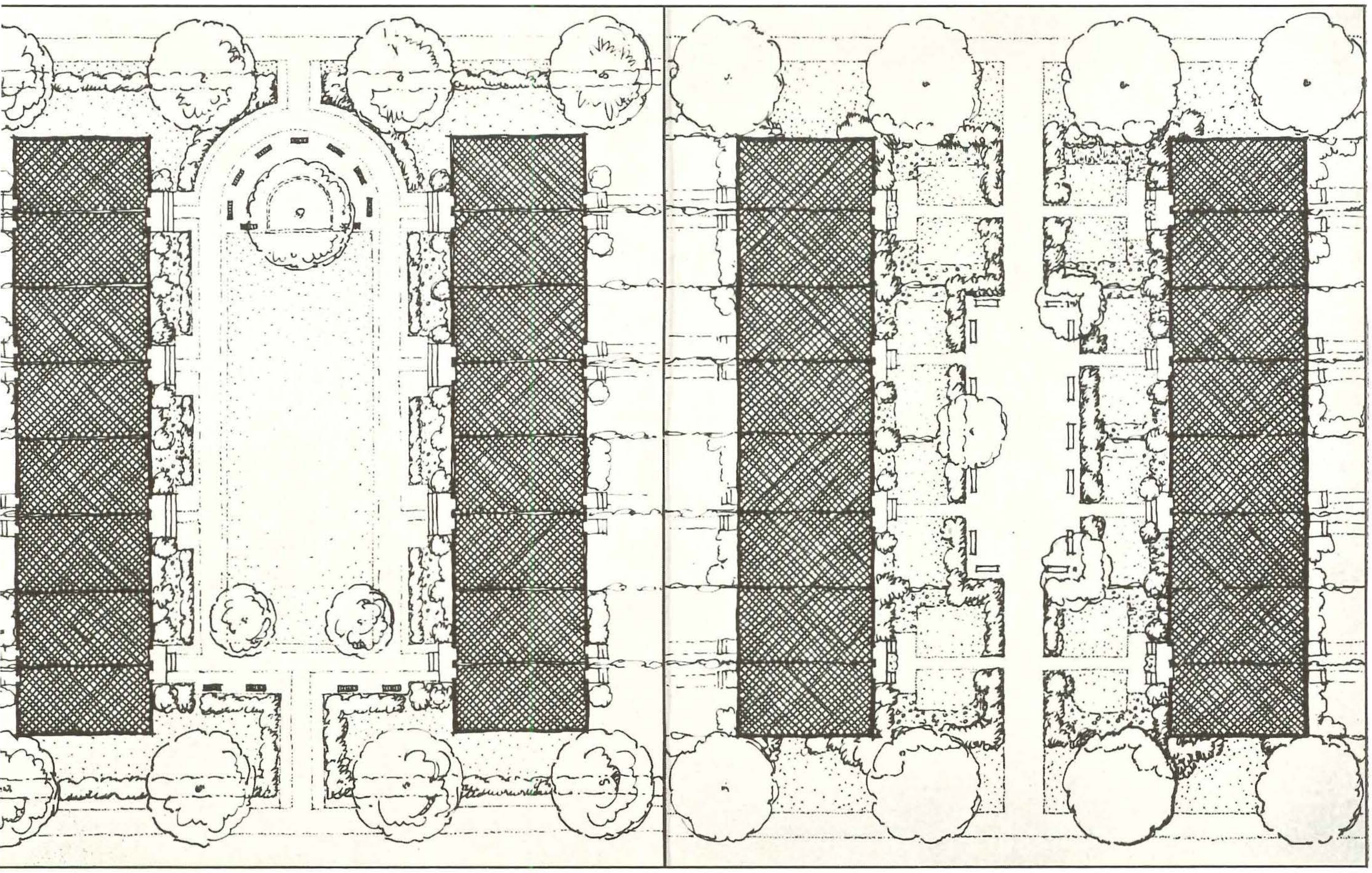
ORIENTATION for sun and prevailing summer breezes always merits consideration. Latitude largely determines the former, local conditions the latter. Orientation for sunlight is most successful when sunshine is made available in kitchens on winter mornings, and when some sun reaches living rooms in afternoons. When ideal conditions cannot be secured, a desirable minimum is considered to be achieved when some sun is available in each room at some time of day.

Although no absolute rules can be laid down, it is generally recognized that, in northern states, buildings should lie with their long axes northeast-southwest, at an angle of from thirty to sixty degrees off north. Such orientation will enable some sun to melt snow and dry ground on the northerly side of the building. Where winters are shorter and there is less snow, this approximate angle diminishes; until, in the extreme south, a true east-west alignment is usually preferred.

Under some conditions insolation—the sun's heat—becomes important, both negatively (in summer) and positively (at other seasons). This factor, considered alone, points to southerly exposures in winter, southwesterly in summer; the building is aligned northwest to southeast. The axis should not swing more than fifteen to twenty degrees from an east-west line.

Local atmospheric conditions also affect orientation, as, for instance, in the vicinity of New York City, where prevalent morning mists make southwesterly exposures the sunniest.

Satisfactory orientation for sunlight thus becomes a compromise between conflicting factors. Local conditions furnish the basis for choice, or for evaluating one factor against another.



pen planning designed to increase livability; at the left, project-maintained area; right, space principally tenant-maintained

THOUGH economy and rational or-nization are primary considerations the design of site plans for projects which low first costs and low operat-; costs are essential, modern housing ndards tend toward wider spacing of ildings than has been observed in the st. Privacy, sunlight, and air circula-n—all important to the standard of ing of the tenants—are directly af-ted by the location of and relation-ps between dwellings.

Once the most appropriate, useful, d economical scheme for a particular oject has been determined, necessary justments can be made. Principles of sign and organization previously de-loped have been carried to widely di-rse extremes both in this country and road. Some housing projects have ed rigidly formal parallel row plan-ng to give each dwelling uniform ientation and equal treatment with respect to land and services. Others have grouped the buildings into an infinite variety of small courts or enclosures, with varying treatment of open spaces and with varying orientation for sun and wind. Satisfactory results may be obtained in several ways; the choice of pattern is important primarily as it fits the project at hand.

Satisfactory building spacings

Local factors of topography, orientation, the location of utilities, population needs, and development costs are necessarily involved in building arrangements. Therefore, a generally desirable spacing may require some adjustment to compensate for the controlling importance of a particular site characteristic.

For apartment houses with their longer sides parallel, the following minimum spacings are at present considered satisfactory:

Three-story buildings:	60 ft. apart
Four-story buildings:	65 ft. apart
Six-story buildings:	75 ft. apart

For two-story row houses in parallel rows, desirable standards are as follows:

Center to center, average:	100 ft.
Alternating spaces between row houses grouped in pairs:	60 ft. and 85 ft. or 55 ft. and 90 ft.

In small groups, or for absolute minimum spacing, two-story row houses may be as close together as 55 ft.; one-story houses somewhat closer.

Distances given in the above tabulations may be decreased slightly on one side of a building if they are increased on the other. As a general rule, rows should be fairly close, end-to-end, in order to allow liberal spacing between rows; for it is between rows that openness contributes most to livability. End-to-end distances may be half the dimensions given above.

SERVICE SYSTEMS

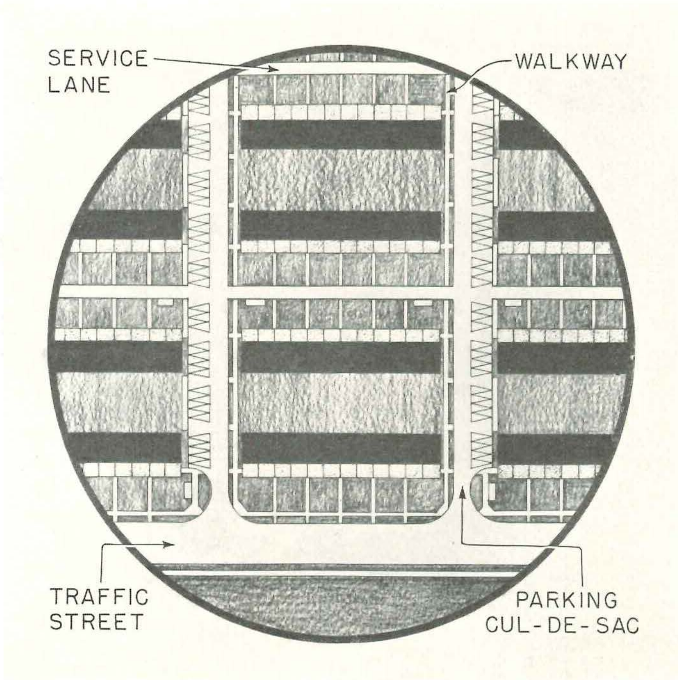
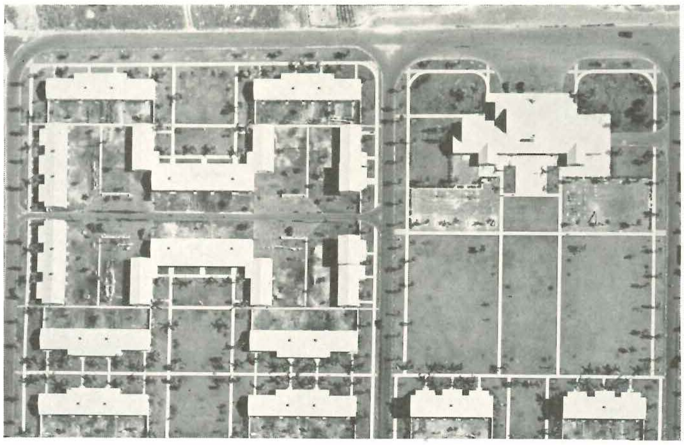


Diagram of articulated site circulation



From diagram to realization: air view of a Miami, Florida, project

Close-up: pedestrian circulation at Wm. Paterson Courts, Montgomery, Ala.

Photos by Sckaer

Service systems include: (1) site ci culation, or the physical system of road and walkways, and such related service as parking, delivery, and garbage re moval; and (2) utilities or mechanica building services such as heating, ligh ing, water supply, and sewerage. I planning for all of these, consultatio with a competent site engineer is desi able from the earliest stages of develo ment.

SITE CIRCULATION

Traffic ways may be generally sul divided into: major and minor throug traffic routes; service streets, drives, c lanes; and pedestrian walkways. As ha been previously stated, through traff should preferably be discouraged fro traversing projects. This may necessita setting peripheral buildings well bac from property lines in order to perm future widening of through traffic stree surrounding super blocks. Use of e isting streets or alleys will reduce costs their usefulness ought to be weighe against the value of land area, privac and safety to be gained by closin streets off. It is desirable that ne streets conform to local standards i anticipation of their eventual admini tration by local governing agencies.

Project service street or drive layou require study in relation to:

1. Topography: Roads are ordinar ly most economical to build when the parallel contours instead of cuttir across them.

2. Utilities: Streets usually are t most economical location for utili lines. Topographical or other loc conditions may, however, cause th consideration to be waived. Layouts d signed to minimize both initial an maintenance costs are desirable. Line in streets may be located at sides o pavement where practicable; and stud is required in relation to the positio of existing trees throughout the site.

3. Access: While direct vehicul access to all buildings is unnecessar only in extreme cases are distances e

eeding 200 ft. justifiable. Requirements of local fire departments govern planning for easy access to hydrants by all fire-fighting equipment. If houses are individually heated, access to each building for fuel delivery trucks becomes important. Local supply sources can furnish information as to maximum carrying, chuting, or piping distances compatible with economy of installation and maintenance of the traffic system.

4. Parking: Parking areas may be supplied in proportion to the ratio of car ownership among prospective tenants, and in consideration of total project costs. Provision of garages or even open sheds does not seem economically feasible at present. Parking lots or courts are acceptable alternatives, particularly in view of necessary all-night parking. Preferred locations are around the project's perimeter, where parking lots may lie between dwellings and noisy thoroughfares. In small projects, single parking areas near administrative offices, etc., for supervision, have proven satisfactory.

About 215 sq. ft. per car is needed for manoeuvering and parking in areas restricted to parking; space for two lines of cars "headed in," plus turning space, is approximately 54 ft. wide.

One side of two-lane, "one-way" drives, or three-lane, "two-way" streets, or the end of a cul-de-sac, may afford economical parking space since the traffic lane is used as manoeuvering space, and pavement is thereby reduced in quantity.

5. Garbage and trash removal: Methods of refuse disposal definitely limit freedom of site design and merit consideration relative to other planning elements. Street and driveway layouts may, in extreme instances, be governed primarily by garbage disposal requirements. Existing conditions and available services should be determined, such as: frequency of collections; types of material accepted; maximum distance from curb which collection employees will travel; type of service, whether municipal or private.

Garbage may be collected from yards or doorways, or may be carried by tenants to collection stations or to group incinerators. Incinerators require direct, paved access ways, preferably without steps, for wheeled trucks. Locations of group collection stations or incinerators are preferably within the maximum distances which tenants may be expected to walk, in view of local custom and climatic conditions. Collection from individual stations requires service drives between rows of buildings for economical operation. "Fronts" or street sides of dwelling units may be used for this purpose if economy and a reduction of project labor result.

6. Design and construction: Steps are to be avoided in walkways; single risers are extremely hazardous. Desirable pitches for various types of circulation routes are:

Main walkways: max., 6%; opt., 0.75%; min., 0.5%
Short walkways: max., 6%; opt., 2.0%; min., 1.0%
Driveways: max., 10%; opt., 6.0%; min., 0.5%

The following widths have been found generally satisfactory:

Main circulation walks: 5 ft. and up	
Main approach walks (apt. bldgs.): 5 ft.	
Secondary approach walks (apt. bldgs): 4 ft.	
Approach walks (row houses)—	
Single entrance, front:	3 ft.
Single entrance, rear:	2 ft.
Double entrance, front:	4 ft.
Double entrance, rear:	3 ft.
Service roads (curb to curb)—	
1-way, restricted:	9 to 10 ft.
2-way lane, no parking:	16 to 18 ft.
2-way lane, parallel parking 1 side:	18 to 20 ft.
2-way lane, parallel parking 2 sides:	26 ft.
2-way road, parallel parking 2 sides:	34 to 36 ft.
2-way road, diagonal parking 1 side:	36 ft.
2-way road, diagonal parking 2 sides:	45 ft.
2-way road, perpendicular parking 1 side:	36 to 40 ft.
2-way road, perpendicular parking 2 sides:	54 to 60 ft.

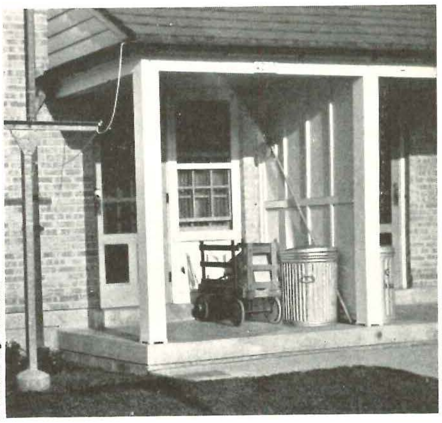
Walks require a cross slope when adjacent to buildings, and a crown when in the open; ¼ in. per foot is satisfactory for both. For vehicular ways, "dished" sections (drainage to center) are economical for service drives, permit street crossings at sidewalk grade, and permit elimination of curbs—although curbs furnish needed protection to adjacent areas. "Crowned" sections (drainage to gutters) are desirable for drives as follows: having surfaces other than concrete; more than 2 lanes wide; or for long, important, or "front" driveways. Soil and climatic conditions govern subsurface drainage requirements.

7. Surfacing: For walkways, surfacing materials should be durable, and inexpensive to install and maintain. Concrete divided by full-depth joints is subject to less cracking than when not jointed, and individual areas may be lifted and re-bedded if settlement occurs. Bituminous walk surfacing must be thoroughly compacted. Paving with small units is ordinarily too expensive unless second-hand materials are available.

For vehicular ways, soil and climatic conditions, type of traffic, and cost limitations govern selection of materials. State or local standards may be applied; local advice should be sought in most cases. Concrete has the advantage of low maintenance cost; bituminous surfacing may be less expensive to install if a satisfactory existing base can be utilized; where very low installation cost is imperative, macadam or gravel bases, with surfaces lightly treated or even untreated, may be the solution.

For parking areas, surfacing material depends upon project conditions and character; dustless, non-tracking material is preferred. Maintenance costs tend to rise as first cost is reduced. For repair-work areas, tar-mix topping is preferable to asphalt because it is less damaged by oil and gasoline. Curbs or other barriers are necessary around parking space edges.

Street improvements consisting principally of paving, sidewalks, main water and sewer lines, and appurtenances,



Photos by Sekaer

Service porch at Parklawn, Milwaukee, Wis., showing provisions for garbage disposal, clothes drying lines, roof drainage, and wheeled-toy storage.

Use of service drives—in this case a dead-ended, concrete-surfaced street, also at Parklawn—for food delivery.

Tenants' yards at Trumbull Park, Chicago: whether group or individual drying yards are provided, from 60 to 75 ft. of line is needed per family. Fencing facilitates use of yards for younger children's recreation; laundry poles may do double duty as fence posts.

which are to be assumed and maintained by a municipality, must conform generally to established local standards. It is advantageous that plans for such work be kept independent of plans for work within the site, in order to facilitate obtaining necessary municipal approvals.

MECHANICAL SERVICES

Heating systems: Choice of type of system—central plant, group plant, or individual—directly affects distances between buildings and location of vehicular ways as previously discussed.

Use of central heating plants requires that the site plan be relatively closely organized to reduce distribution costs. The building in which the plant is housed is preferably: 1, at a low point in the site and centrally located with respect to dwellings served, for economical distribution; 2, readily accessible for fuel delivery and servicing; 3, so located that smoke does not annoy tenants. These factors point to a satisfactory location at the edge of a project, near a paved road, at a low point where prevailing winds will blow smoke away from the project.

Similarly, group-central plants are preferably housed in buildings near paved roads, in apartment houses with basements, for example.

Individual plants using coal or wood require that dwellings must be within 15 ft. of service drives for fuel delivery and ash removal.

Drainage and sewerage: All yard areas should be sloped for drainage to walkways, vehicular ways, or special outlets, without depending on escape of water across grassed areas. Otherwise, water will form standing pools, and snow and ice will become sources of hazard. Desirable pitches are as follows: For lawns, min. 0.5%, opt. 1%; for play or sitting areas, 0.6% to 2%; for earth banks, a maximum pitch of 3 to 1. Depending upon soil conditions, topography, and climate, subsurface drainage may or may not be necessary over a or part of a site. While both surfac and subsurface drainage are costly t install, experience indicates that fai ure to provide adequately for them ma result in increased maintenance an property damage.

Sewerage system—including sanitar storm and combined sewers, culvert and subsurface drains—may be installe according to local codes and practi of local municipal departments; or i accordance with recommendations c the Bureau of Standards, U. S. Depar ment of Commerce. Special precau tions are necessary to make sure th existing mains or trunks have sufficie capacity to accommodate the project load; and that existing sewers inco porated in a project system are bot sound and adequate.

Roof drainage is ordinarily di charged to the sewerage system, excep in occasional cases where soil, topogr phy, and building coverage permit ro water to be discharged to splash bloc and thence to lawns or surfaced are

Layout of surface drainage and se erage systems should proceed joint with studies of project grades, in ord to avoid either excessive filling to sh water to border streets, or unnecessa ly expensive systems.

Water supply systems are generally go erned by local regulations and pra tices; these should be checked to insu adequate fire-protective and domest supplies. First costs are lowest whe each building is metered separatel but it has proven cheaper to tenants "pool" meter readings, or to purcha water at flat rates. If neither of the is feasible, project designers or ma agement may provide for one or mo master meters and a private distrib tion system. Choice of method depen on comparative first costs and opera ing costs.

Unless costs of providing separate fi lines are prohibitive, fire hydrants a not ordinarily located on metered line

UNIT SIZE - DWELLING TYPE SCHEDULE — 420 Units — 1748 Rooms

Family sizes within population group served	0 children Number ... % 0.5	1 child No. ... % 28	2 children No. ...... % 2.5	3 children No. ...... % 9.5	3-4 children No. .... % 42.5	more than 4 No. .... % 17	
Rooms per unit	2	3	3½	4	4½	5	Totals
Dwelling Type:							
Apartments - No. 1		44			70	12	
- No. 2		44			70	12	
- No. 3		44			70		
subtotals		132			210	24	
Flats - No. 4						10	
- No. 5						10	
- No. 6						12	
subtotals						32	
Row Houses - No. 7					11		
- No. 8					11		
- No. 9							
subtotals					22		
Total dwelling units		132			232	56	420
% for each unit size		31.4%			55.2%	13.4%	100%
Total rooms		396			1044	308	1748

Some method of scheduling the number of each size of unit included in each dwelling type will prove extremely valuable. If the completed project is to meet existing needs efficiently, a relationship has to be established between family sizes in the population group served and unit sizes selected. However, it is seldom possible to tabulate this information as conclusively as is indicated in the example above. Some schedules, therefore, omit reference to it.

Dwelling types

Dwelling types are the various building forms within which family housing units are assembled. They comprise: single and twin houses; row houses—one or two-story; flats; apartments; duplex combinations of these. Descriptions of typical plans and house-and-land patterns will be found on the following six pages.

Tentative selection of dwelling type or types to satisfy conditions of a given project may be based upon the preceding discussion of factors affecting site organization, including: density, coverage, costs, topography, orientation, building spacing, and services. Since, in order to arrive at an optimum solution, it is desirable that the design of buildings and of site plans proceed concurrently, selection of dwelling types will necessarily remain subject to some changes until the entire project scheme is decided upon.

Unit sizes

There is a close interrelation between the type and location of the site and the dwelling types selected; this, in turn, influences to a certain extent the sizes of the dwelling units. In general, "downtown" apartment layouts suggest use of small units; suburban single, twin, or row houses suggest large units.

Selection of housing unit sizes may be determined in relation to family sizes within the population group to be served. Population trends, relative to family sizes and to the drift toward or away from the center under consideration, while comparatively unimportant in planning for immediate needs, have definite bearing upon future success of developments.

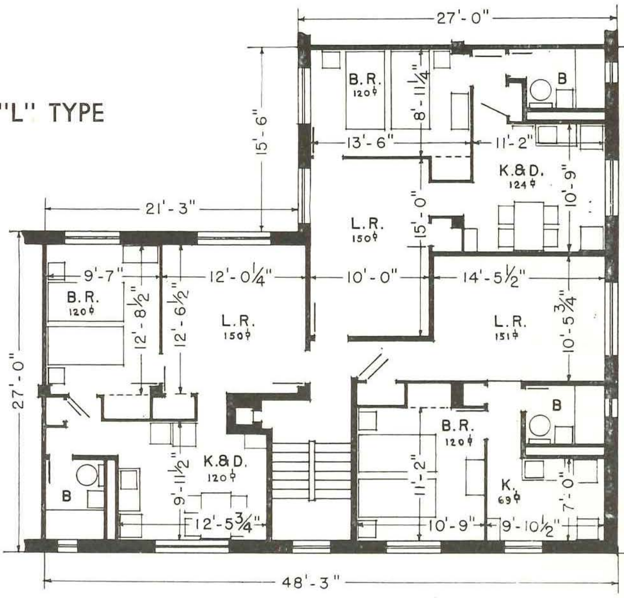
Statistics upon which to base selections of unit sizes are available in many forms: federal and local censuses; surveys made by various national or local agencies; and in some localities, data compiled by independent agencies.

Sizes commonly used range from 3 or 3½ rooms up to 5 or 5½ rooms; local conditions may sometimes justify units as small as 2 rooms or larger than 5 or 5½ rooms. In the average low-rent housing project, unit sizes are close to 4 rooms per unit.

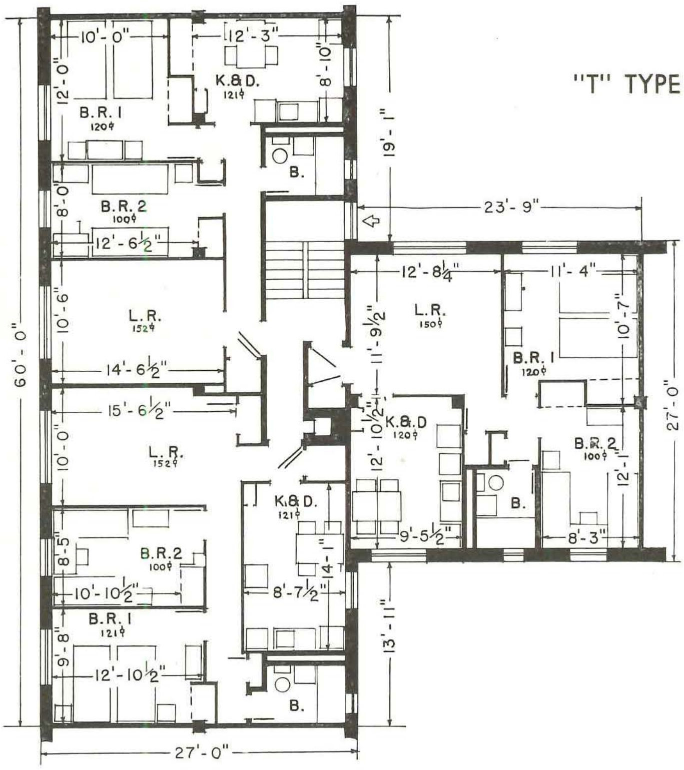
Effects of costs per housing unit and per room cause the selection of unit sizes, like the selection of dwelling types, to remain flexible until the ultimate scheme has been developed. If costs per room are unduly high, the number of rooms per unit may be increased and the number of units decreased. High costs per unit may necessitate decreasing the number of rooms per unit and increasing the number of units. These successive changes in unit sizes and dwelling types may necessitate departures from preliminary schemes in order to reach satisfactory compromise solutions.

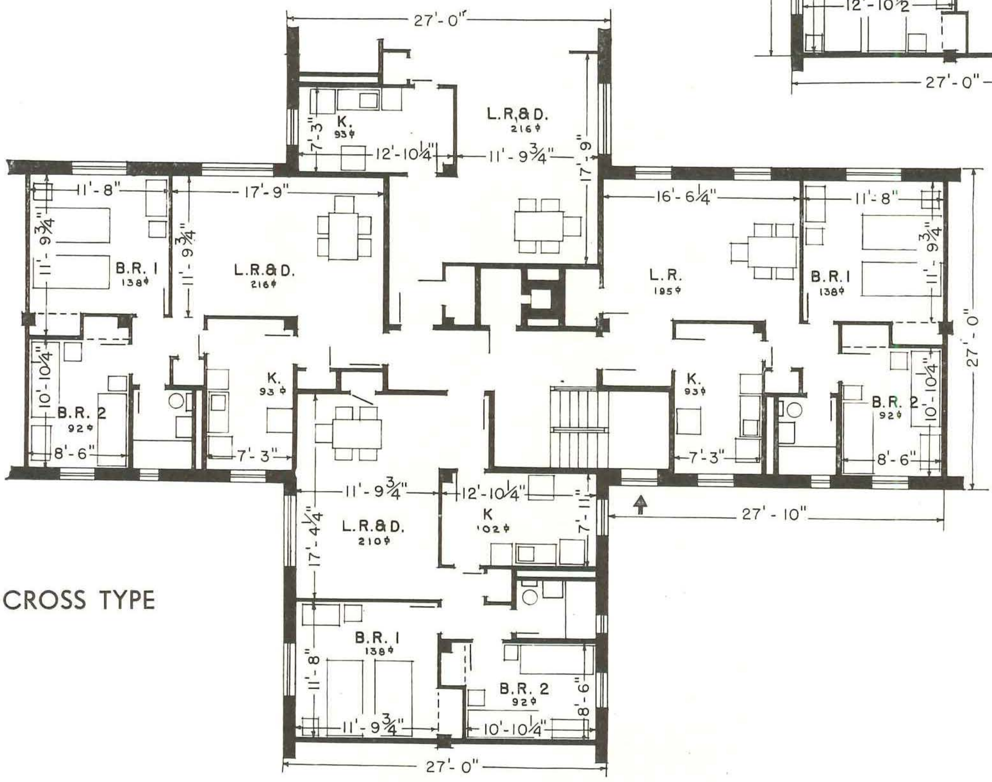
APARTMENTS

"L" TYPE

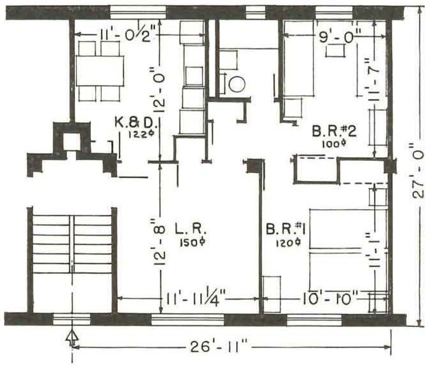


"T" TYPE





CROSS TYPE



STRIP TYPE

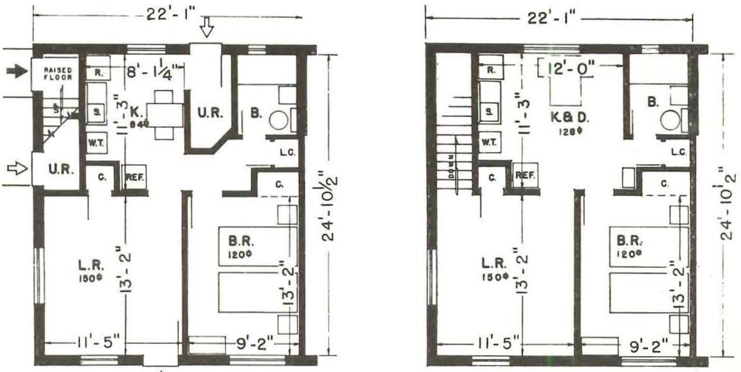
Plans are reproduced at Scale 1/16" = 1'-0"

Characteristics

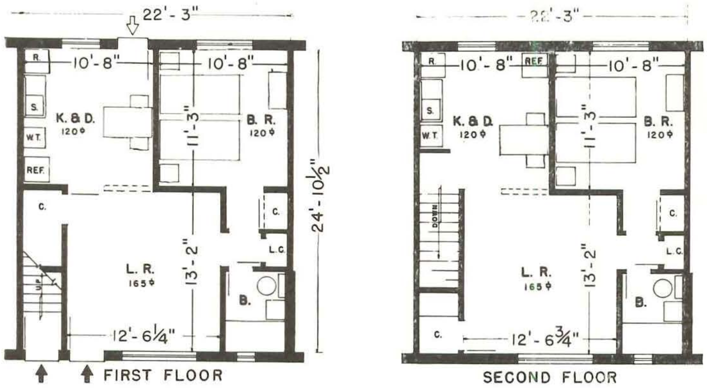
Of the many types of apartment buildings, the "ribbon" plan—one unit wide—is probably most livable. However, since only two units can be grouped around common services and stairwells, "ribbon" types are not as economical in first cost or maintenance as "T," "L," "Z," or "cross" groupings which permit more units per service shaft. With few exceptions buildings are 3 stories, or under, in height; 4-story walk-up buildings are contemplated in a few cases; very few 6-story elevator apartments have been used.

Indicated uses

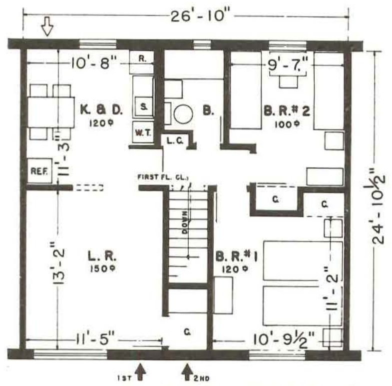
Because they entail higher project maintenance costs than other dwelling types, apartments are ordinarily to be avoided in low-rental projects. However, they may be used where high land costs or similar site planning conditions enforce relatively high densities. Apartments are: (1) appropriate for small units to be occupied by families with few children or none; (2) slightly lower in first cost per room than other dwelling types. Since necessary services are most expensive when restricted in scale, site plans should rarely, if ever, combine small numbers of apartments with larger numbers of other dwelling types.



FIRST FLOOR SECOND FLOOR END UNITS



FIRST FLOOR SECOND FLOOR 3½-ROOM UNIT



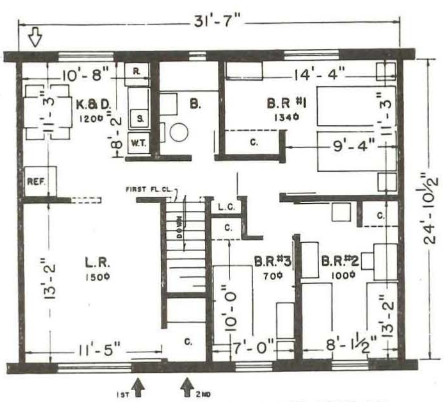
4½-ROOM UNIT

1ST 2ND

SECOND FLOOR — FIRST FLOOR SIMILAR

Plans are reproduced at Scale 1/16" = 1'-0"

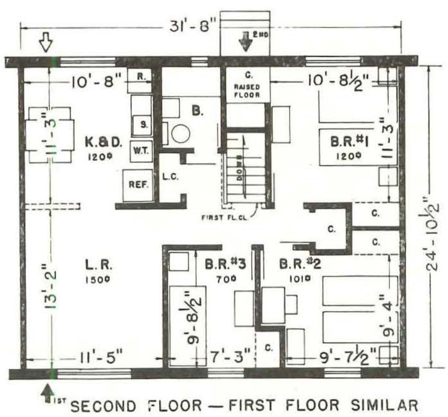
5½-ROOM UNITS



1ST 2ND

SECOND FLOOR — FIRST FLOOR SIMILAR

SCHEME A



1ST SECOND FLOOR — FIRST FLOOR SIMILAR

SCHEME B

Characteristics

A flat is a small apartment arranged so that the access hall or stairs are incorporated in the dwelling and maintained by the tenant. In the average low-cost housing project, flats are usually 2-story buildings. If these are grouped continuously in one building, the ground plan usually provides for a private yard for each first-story unit. Provision of yards for upstairs families in such an arrangement is difficult to make, except at greater cost per room, unless the site plan is such that entrance to the second floor is on the opposite side from the entrance to the first floor.

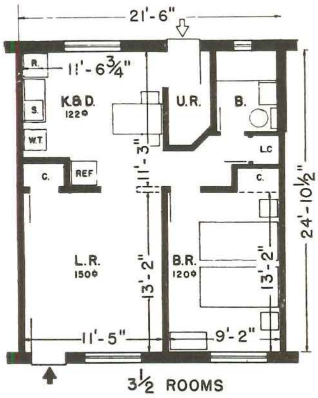
Indicated uses

Flats are appropriate when greater densities are desired than are obtainable with row houses, but when apartments or duplexes are not desired.

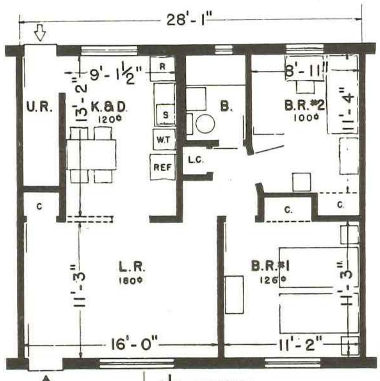
When a considerable number of flats are grouped closely, common space must be provided for outdoor recreation, for laundry drying, and special provision made for servicing, in particular for garbage collection. In close correlation of flats with row houses, for example, the use of two-story flats at one or both ends of a row of two-story row houses, it becomes possible to provide upstairs flats with private yards by using land at the ends of the buildings. This also facilitates a simple group servicing scheme, since wastes may be collected from either side of the building, the flats being as conveniently accessible as the row houses. Where buildings must sometimes stand close to busy public streets, entrances may be eliminated at the street side of a flat building and all access walks and doors placed on the project side of the building only. This tends to prevent children from playing in the public street, but usually results in a great proportion of land being thrown into project maintenance.

ROW HOUSES

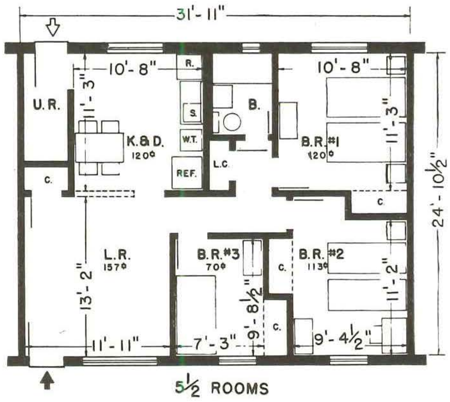
ONE-STORY ROW HOUSES



3½ ROOMS

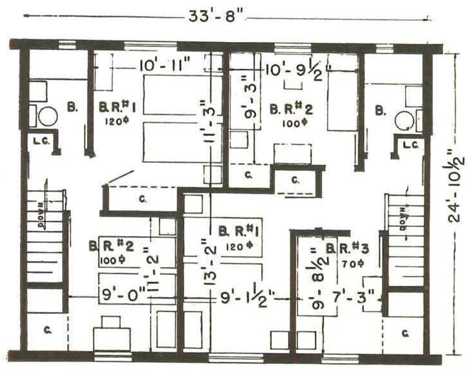


4½ ROOMS

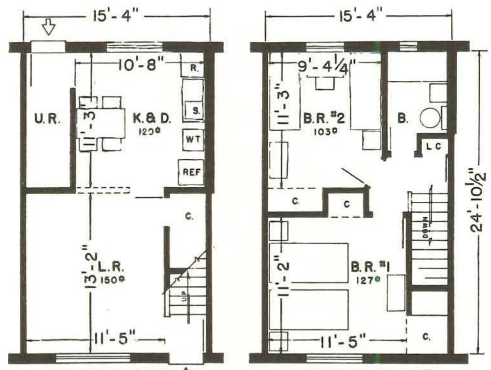


5½ ROOMS

TWO-STORY ROW HOUSES

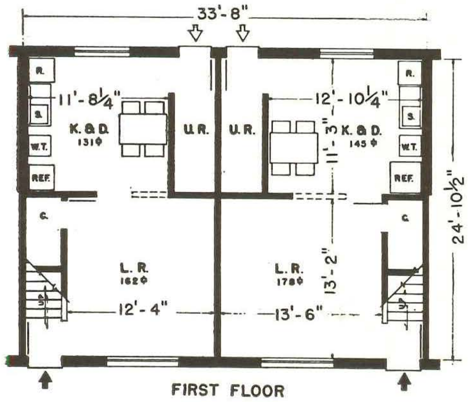


SECOND FLOOR

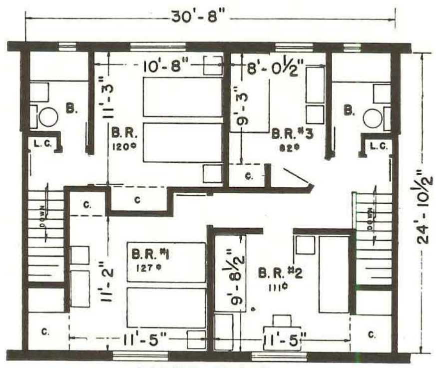


FIRST FLOOR — SECOND FLOOR

4½ ROOMS



FIRST FLOOR



SECOND FLOOR

FIRST FLOOR SAME AS TWO 4½ ROOM HOUSES

3½ - 5½ ROOMS

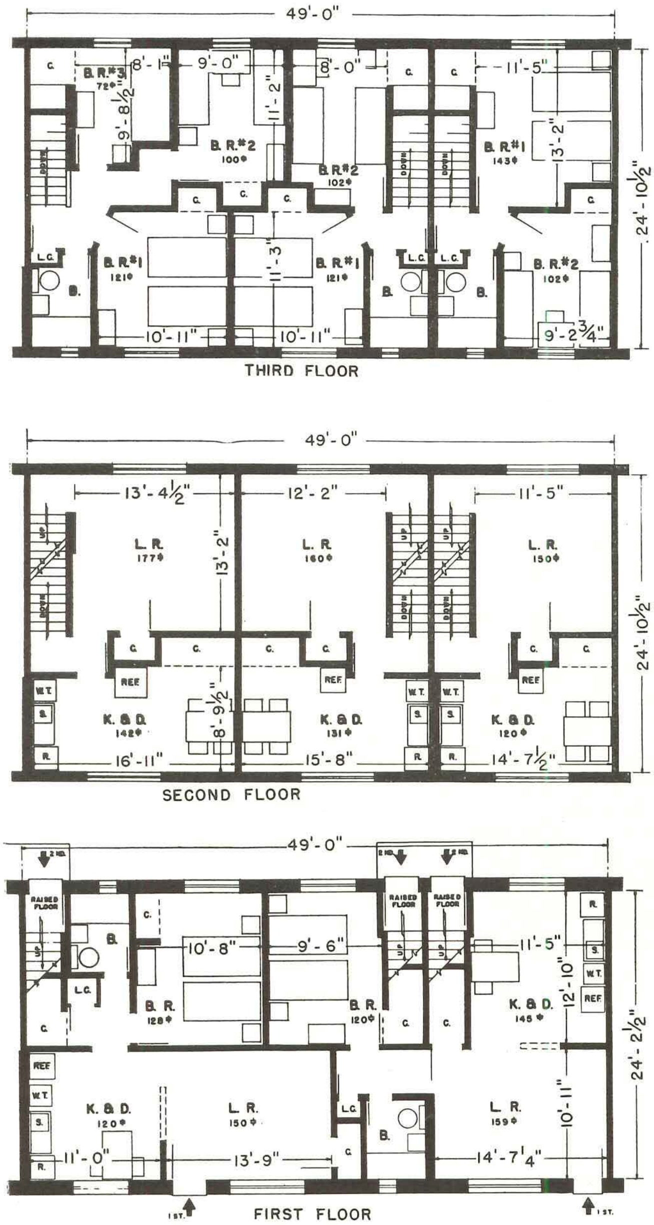
All drawings at scale of 1/16" = 1'-0"

Characteristics

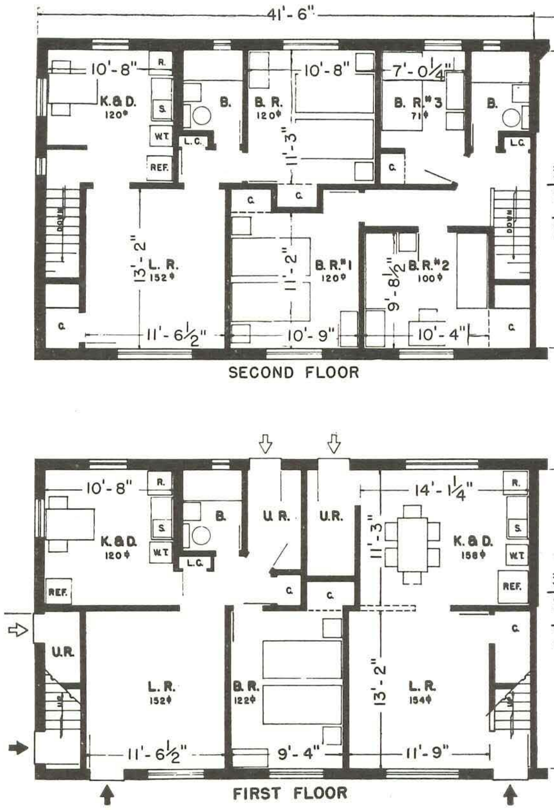
The row house is characterized by economy in land use, and in construction, maintenance, and operating costs. Economies derive from the length of the rows, although the per unit saving diminishes with the building's length. Economic advantages of a long building result in part from elimination of end walls, in part from savings in land, utilities, walks, and in some cases pavement.

Indicated uses

Row house patterns in general fall into two types, court plans and parallel row plans. A court layout may attain spacious effects; when the rows are predominantly parallel, perpendicular distances from row to row will be somewhat less than average court widths, but longitudinal views will be longer. When a particular orientation for sun or prevailing wind is strongly favored, the result is usually parallel rows; also these usually facilitate simple and practical servicing schemes in which all units are handled uniformly. In organizing a row-house plan an effort should be made to avoid traffic movement parallel to rows; with court plans this is difficult. Longitudinal slopes can only be accommodated by horizontal breaks in floor level or by heavy cutting; hence, buildings should ordinarily tend to parallel contours.



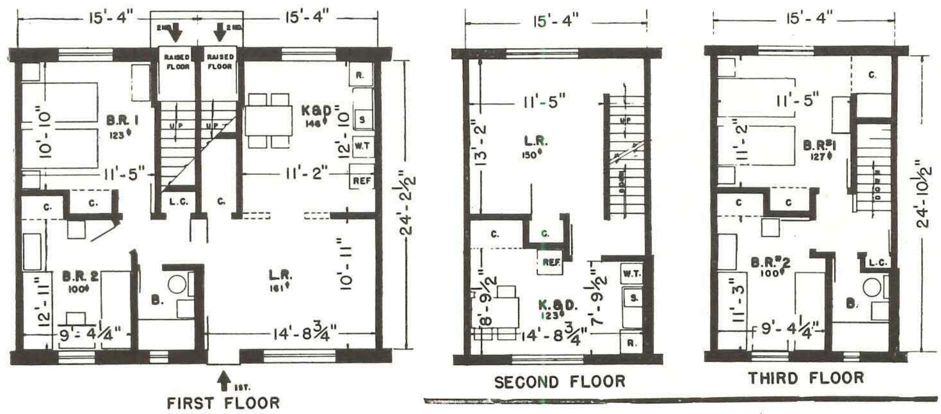
3-STORY COMBINATION: Two 3½-room flats, two 4½-room houses, one 5½-room house



2-STORY END UNIT: Two 3½-room flats, one 5½-room house

All drawings at scale of 1/16" = 1'-0"

3-STORY COMBINATION



Characteristics

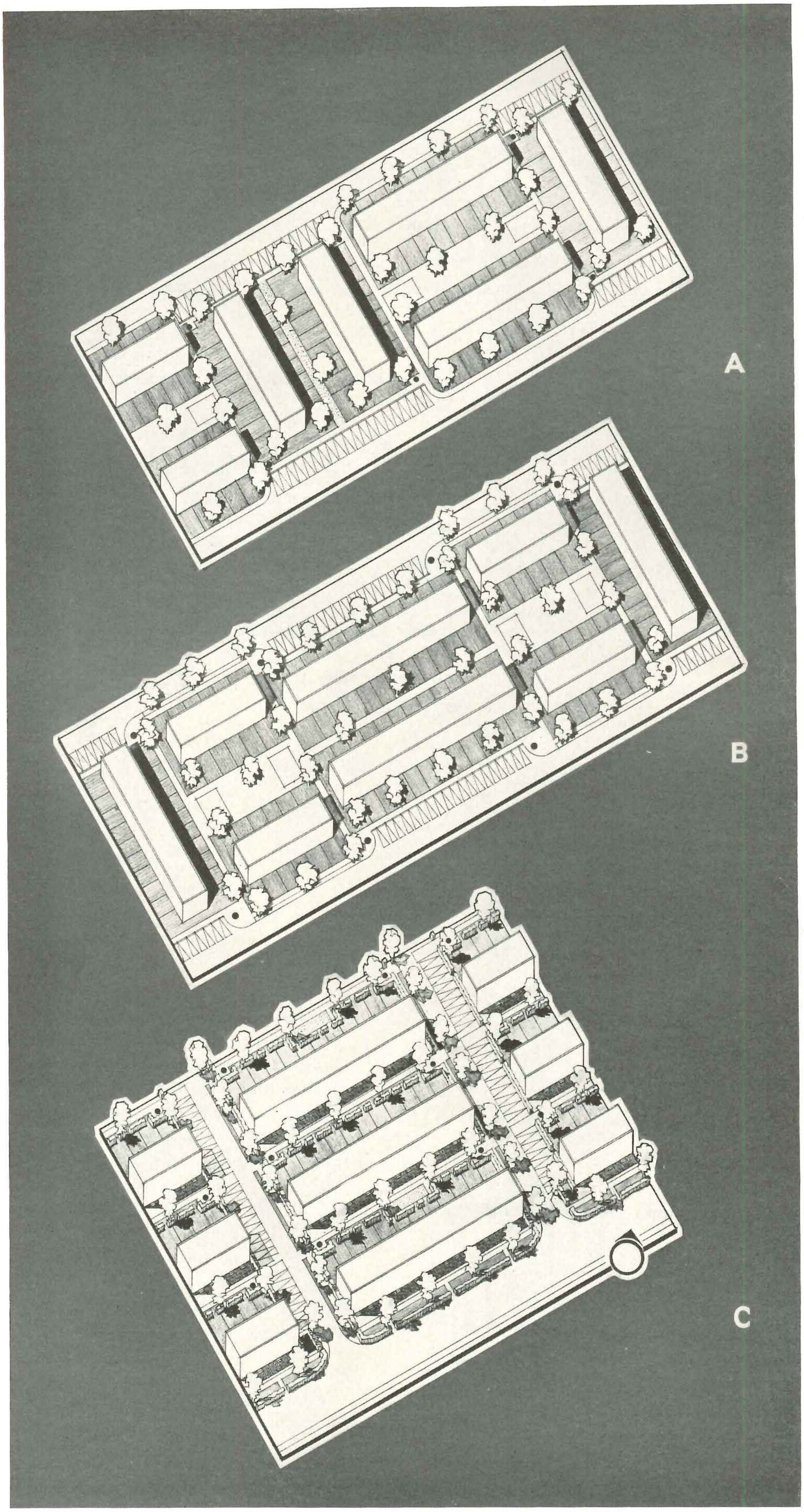
Three-story duplexes are buildings in which the ground floor is occupied by flats and the two floors above are divided vertically into row houses.

Difficulties inherent in flats are found in substantially the same form in 3-story duplexes. If many flats and 3-story duplexes are to be used, it is desirable to group them closely, and to plan for common use of simply-designed, paved land areas by those families which do not have first floor access to the ground.

Indicated uses

Three-story duplex units are used to increase density without producing excessive coverage; or to avoid placing row houses undesirably close together.

HOUSE and LAND PATTERNS



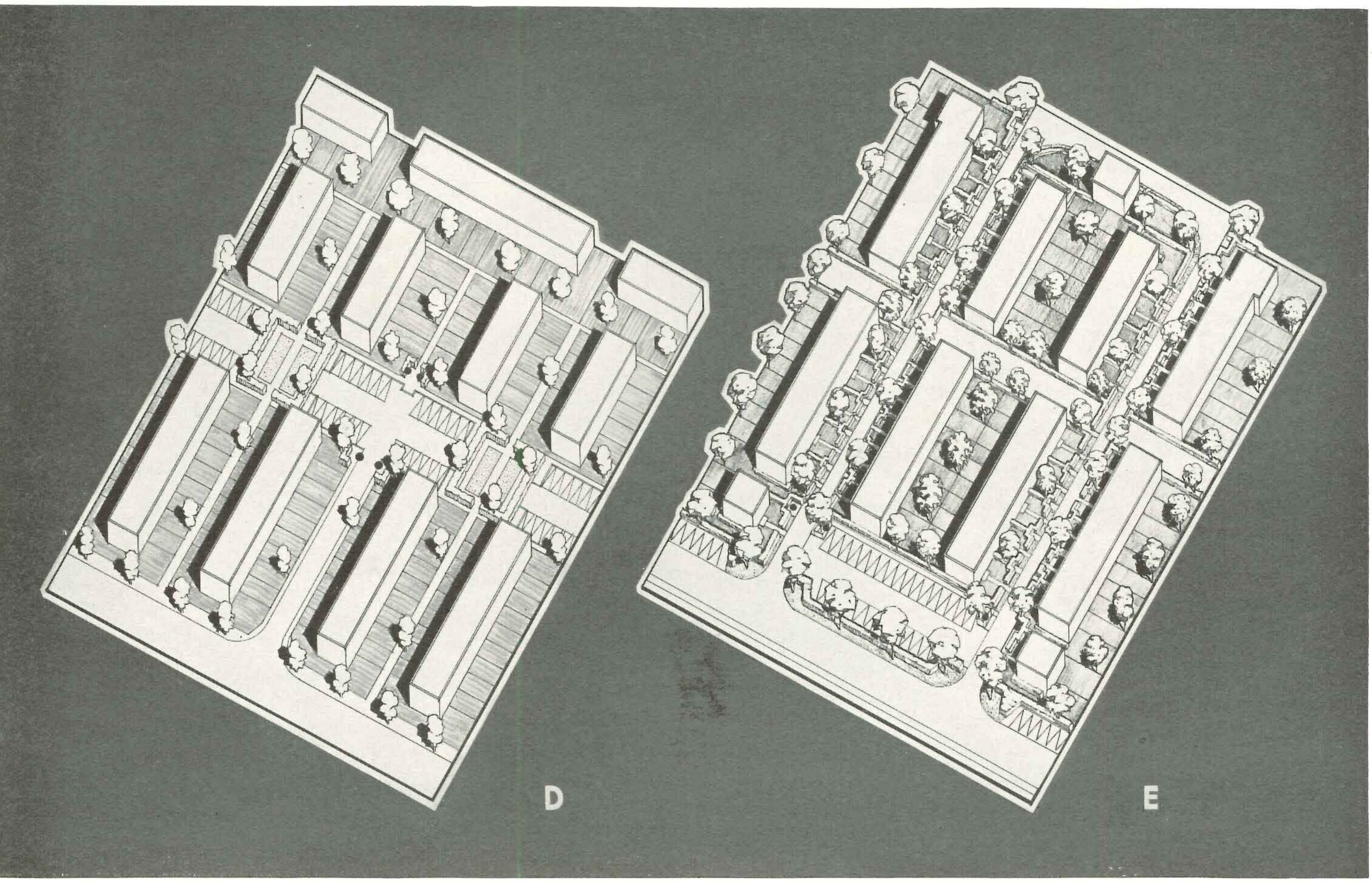
SCHEME A: A court arrangement of row houses with an approximate density of 23 families per acre and coverage of 20 per cent. Favored orientation is ordinarily available to only half the dwelling units. Land, except play spaces and paved walks, is tenant-maintained. Play spaces are well located for supervision. Kitchen gardens have laundry drying areas facing the interior. Interior parking space is provided for every dwelling unit. Maximum carrying distance for garbage collection is 120 feet.

SCHEME B: A court arrangement of row houses with approximate density of 24 families per acre and coverage of 22 per cent. A high percentage of land is tenant-maintained, and play areas are conveniently located. Concentrated and convenient interior parking space is provided for each dwelling unit. Maximum carrying distance to garbage collection stations is 100 feet.

SCHEME C: Row houses arranged perpendicularly to access, with approximate density of 27 families per acre, and coverage of 24 per cent. Orientation for each dwelling unit and room is uniformly desirable.

Living room gardens in each case face kitchen yards of the neighboring row. All land, except play areas, parking areas, and service drives, is tenant-maintained. Small play lots are observable from all dwellings which they serve. Cul-de-sac service drives are designed for two-way traffic and provide parking space at ends of rows for 70 per cent of the dwelling units.

Each dwelling unit has a paved or hard surfaced kitchen yard for laundry drying, etc., which is accessible from a pedestrian walk parallel to the buildings, and a private garden opening off the living room. Maximum carrying distance for garbage collection is 85 feet.



SCHEME D: A cul-de-sac arrangement of row houses in "U" shaped open courts, with short service drives terminating in parking areas which accommodate 57% of the dwelling units and are centrally located for all buildings. Density is approximately 23 families per acre; coverage, 21%. Some sacrifice in orientation is made in order to close one end of each court. Play lots are centrally located and must be protected by fences or hedges from parking areas. Maximum carrying distance for garbage collection is 200 feet.

SCHEME E: Row houses in modified courts parallel to access, with approximate density of 24 families per acre; coverage, 22%. Orientation is not uniform for all rooms, but sun can be obtained in all at some time of day. Parking space is provided for 50% of dwelling units. Maximum carrying distance for garbage is 100 feet, or it may be collected from kitchen yards. Living rooms face away from service lanes, insuring privacy but making management supervision difficult. Play areas are ample, but not readily supervised.

Economy in the layout of access drives and utility services requires that the skeletal frame of any plan of site organization be based on parallel rows of buildings—even if these rows are curved or closed at one or both ends by buildings at right angles. It is important, however, that the site plan grow logically out of the requirements of building types, topography, orientation, and servicing, rather than out of pre-conceived patterns.

Thus, when local requirements make the use of apartments necessary, a series of courts may result from use of "T," cross, "L," and "Y" building units. And the effect of courts may be logically developed by the arrangement of row houses to take greatest advantage of certain site conditions.

The five house-and-land patterns on this and the facing page suggest the many possibilities for the economical and efficient arrangement of buildings. They show a few diagrams of row houses, but may serve as a guide to development of additional satisfactory schemes for both row houses and other building types. It is obvious that the application of these patterns to particular sites will involve varying degrees of adjustment to actual site conditions.

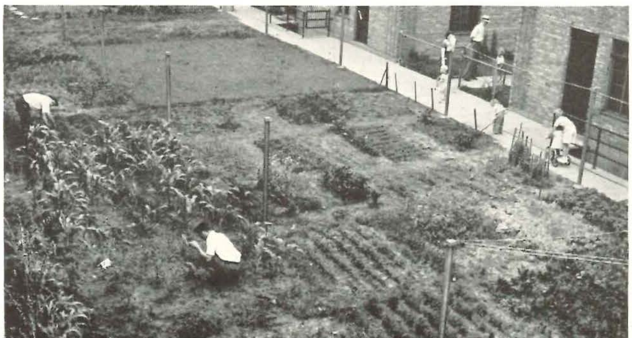
Where flats are used, some provision should be made for outside drying space for the upper dwelling unit. This may be accomplished by arranging access to the dwelling units from opposite sides, and assigning a pair of yards to each dwelling; or by providing common drying space. In apartment plans, it is obviously difficult or impossible to assign land to tenant gardens which will be closely related to dwelling units, and in most apartment projects such use of land may be inappropriate.

RECREATIONAL FACILITIES

Air view of Will Rogers Court, Oklahoma City, showing use of adjacent recreational developments, municipally administered, to reduce project costs

Sekaer

Project - maintained surfaced recreation area at Parklawn, Milwaukee



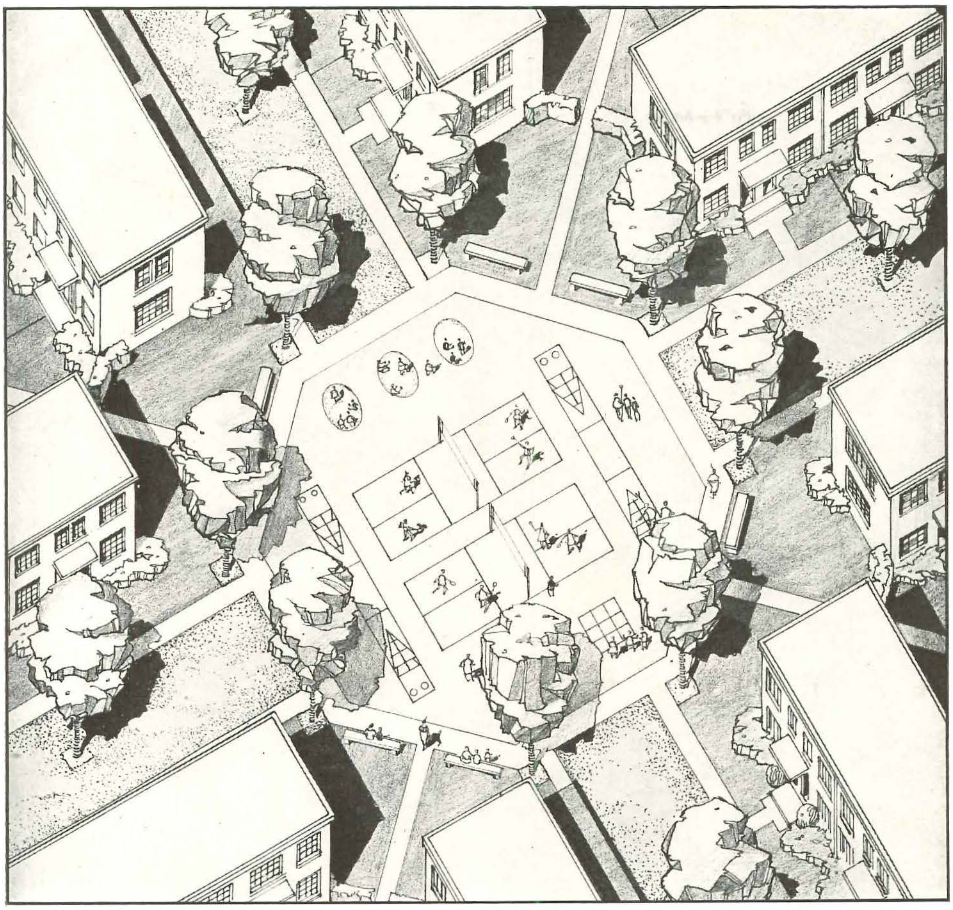
Sekaer

Tenants' gardens at Julia C. Lathrop project, Chicago; besides relieving the project of maintenance, gardens furnish facilities for adult recreation.

TENANTS OF both sexes and all ages require recreational facilities; the maximum of utility compatible with economy is desirable. Project-maintained supervision of recreation is ordinarily too expensive for consideration, but necessary large common areas require a relative large proportion of project-maintained space.

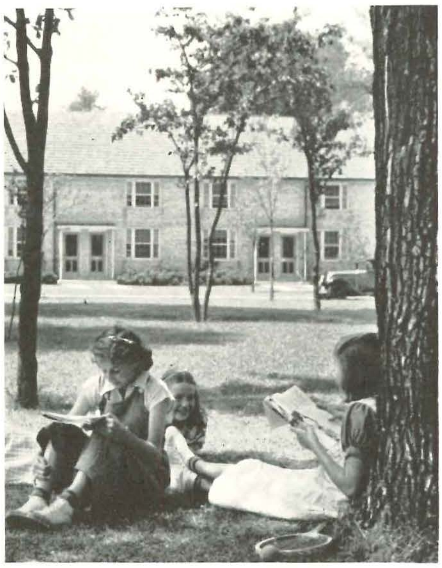
Kinds of spaces, their treatment and equipment, to be satisfactorily useful, must be keyed to the customs of the expected residents. Elaborate playground equipment, for instance, is unnecessary if tenants do not know how to use it. Social and recreational needs must be balanced against costs, before determining space or equipment needs.

Existing facilities: One means of reducing costs is to make use of such municipally provided areas as exist adjacent to the project. Where such facilities are non-existent, conferences with local officials—park and playground commissions, boards of education, and health departments—may reveal pro-



Typical court game area, convenient to eight buildings and adaptable to multiple use

Adult recreation: a Mothers' Club picnic race



Resting in a municipal park adjacent to Parklawn, Milwaukee

Photos by Sekaer

Adult recreation: horseshoe pitching, Parklawn, Milwaukee

jected local plans, local standards or conditions which must be met, and the possibilities for existing local agencies to assume expenses, partially or completely.

Existing site characteristics may be enhanced and modified by study of building locations and site circulation. Organized field games require comparatively large open, level areas; wooded rises or depressions may become naturalistic parks. The entire open site area is the project population's outdoor living area.

Types of areas vary in relation to dwelling types served. For apartments and flats, common play areas are ordinarily needed, whereas yards attached to row houses and semi-detached dwellings may provide safe, supervised play space for younger children.

Areas used by all tenants in common may be classified as: 1, play lots for preschool children; 2, areas for active recreation, for older children and adults; 3, areas for inactive, adult recreation.

Facilities for adults

Inactive recreation: Resting, or "sitting-out," space is necessary and may be located conveniently to dwelling units, or adjacent to other types of play areas to permit adults to supervise them. Sitting-out areas are preferably paved or at least hard-surfaced, equipped with benches, and shaded by trees in summer. Sunlight is desirable in spring and autumn, preferably in afternoons.

Space for mothers to wheel baby carriages, and to converse while doing so, is essential. Areas may consist of a hard-surfaced common space, plus paved places, perhaps combined with sitting-out areas, with walkways, or situated before dwelling doors. Experience indicates that provision for 10 baby carriages per 75 families would be reasonable in an average-sized project.

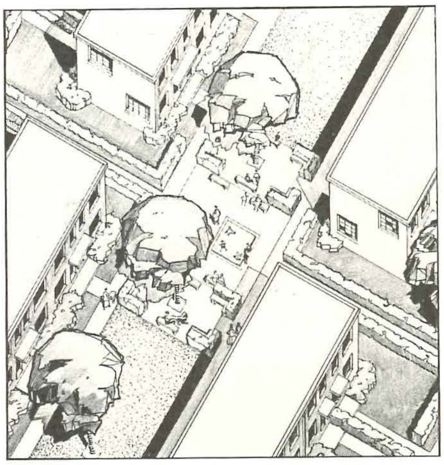
Active recrational requirements, including spaces for free play, and surfaced areas for organized or court games, are similar to those necessary for older children (see page 106).

Photos by Sekaer

Older children's play area, La Salle Place, Louisville, Ky.

Spray showers, Jane Addams Housing, Chicago

Parent-supervised children's play, Stanley Holmes Village, Atlantic City, N. J.



Typical pre-school children's common play area with sandbox, natural surfaces, paved place, benches, shade

RECREATIONAL areas are generally most satisfactory when children of various age groups can be segregated in spaces separated by planting, benches, fencing, or walkways. All play areas are preferably located so that children do not cross traffic-ways to reach them, and away from parking areas.

Small children's facilities: Type, size, and distribution of play lots depend to a great extent on individual circumstances. Many small areas may be located conveniently for parental supervision; a few larger areas may be provided; or, in some cases, one central space. A combination of small areas and a central space is desirable.

Square feet per child may be misleading as a basis for sizing areas, unless it is borne in mind that play areas cannot be smaller than certain minima, and that requirements vary with the area's location and use.* For spaces immediately related to groups of dwellings, 40 to 50 sq. ft. per child is adequate. Open areas for common use may total 1,200 sq. ft., plus room for 8 to 10 baby carriages and 4 or 5 benches, for a group of 75 families. Favored orientation is similar to that for adult sitting-out places (page 105).

Equipment usually consists of: 1, a sandbox and soft or natural-surfaced area for digging, jumping, running; 2, hard-surfaced area for wheeled toys, etc.; 3, paved area with benches and trees, for parents. Water play facilities are also highly desirable. Drinking fountains are required at centralized areas, also toilets if distances to farthest homes served are excessive.

Older children's facilities: Total area is determined partly by the number of children using the playground*, principally by activities, which in turn develop from tenants' recreational habits. Usual minimum for a school-age child population of 100 to 500 is 3½ acres. If space is very limited, an area 75 by 150 ft. will allow room for some apparatus, free play, and organized games for 100 children at play, or 300 family units. A central location, though convenient, is not mandatory. Connection with community facilities is desirable.

Activities which engage large numbers of participants, and permit multiple uses of areas, are preferred. As many varied types are desirable as can be accommodated. Areas may be arranged conveniently for supervision, by placing the oldest age-group farthest from the point of supervision.

Shelters, with toilets, drinking fountain, supply-storage room, and space for quiet play in hot or wet weather, are preferably located adjacent to closely supervised play areas. Shade trees may be limited to the playground's periphery or to spaces for quiet play.

*Existing public housing projects average .54 children of school age per family, .58 children of pre school age; this figure is probably slighty higher in low-rent housing, such as USHA projects, because of the generally larger average dwelling unit provided. Possible use of playgrounds by children from surrounding areas must also be considered. Dimensions of game layouts are available from the National Recreation Association.

'lay area surfacing, Trumbull Park Housing, Chicago

. . . and at Meeting Street Manor, Charleston, So. Car.

Playgrounds may be considered as ıaving three types of surface requirenents: one for field sports, firm, yet reilient; one for court games on which ɔalls must bounce true; one for play ıreas on which apparatus is installed. Local experience and advice are helpful n selecting materials and methods.

.ow cost: Costs need to be held to reaonable minima. Expense of replacing ınd maintaining *turf* renders it impracical. *Concrete* is expensive initially, but nexpensive to maintain. *Gravel* is less costly at first, less expensive to mainain when confined to relatively small ıreas bounded by curbs or hardy hrubs. *Sand-clay* mixtures, satisfactory rom most points of view when propɛrly proportioned and mixed, may be ɔrohibitive in first cost unless suitable ıatural mixes are found locally. *Bituninous* surfaces, which vary widely in ype and availability, are comparatively xpensive at first cost, low in maintennce.

Itility: If frost or moisture destroy the ıtility of play surfaces, even temporarily, heir purpose is defeated. *Concrete*, ɔroperly laid, is satisfactory. *Gravel* urfaces are comparatively satisfactory n areas for quiet play. *Bituminous* urfaces have proven highly satisfactory s to utility, especially on intensively ısed areas.

Resilience is usually desirable to reduce shock to players. However, the value of this quality must be weighed against durability. *Concrete* lacks resiliency and is generally used only in limited areas. *Sand-clay* mixtures cause little player-shock. *Bituminous* surfaces are more resilient than concrete, less so than turf. Mixtures of cork and sawdust with bituminous materials have been used experimentally to increase resiliency.

Smoothness: Irregularities and rough spots are to be avoided, especially for most court games. Since players fall frequently, non-abrasive textures are desirable. *Concrete*, though not subject to irregularities, is abrasive in texture. *Gravel* surfaces are ordinarily both irregular to a degree and abrasive. *Sand-clay* mixtures, when properly maintained, are satisfactory on both counts; but maintenance may be expensive. *Bituminous* surfacing, if smooth, even, fine-grained, and non-abrasive, is desirable.

Drainage must occur quickly without causing erosion. *Concrete*, properly laid, is excellent. *Gravel* areas, and *sand-clay* mixtures, often require extensive preparation of the subsoil, proper grading, surface drains, and possibly subsurface drains. *Bituminous* surfacing requires proper grading, and thorough compaction of both base and topping.

Freedom from dust is necessary; surfaces should be non-porous and firm. Injuries to clothing are to be avoided. *Concrete*, if surface-hardened, is non-dusting; its abrasiveness may damage clothes. *Gravel* is satisfactory for quiet play areas. *Sand-clay* mixtures, again, require expensive maintenance to reduce surface dusting. *Bituminous* surfaces are satisfactory.

Appearance: Surfaces which remain neat without extensive care, and which do not cause glare, are desirable. *Concrete* can be colored to reduce glare. If not constantly used, *gravel* may require weeding. *Sand-clay* mixtures require attention after thaws and rains.

Other factors: *Surfacing under apparatus* may be of a special nature to avert injuries. Soft landing pits of tanbark, sawdust, shavings, sand, or loam frequently spaded and raked, are suitable.

Pre-school play areas may require some natural earth surfacing. Wherever feasible, a hard-surfaced area or walkway is desirable immediately adjacent.

Need for utmost economy may not permit completely surfacing necessary areas. In these cases well-compacted, natural sub-grade material may be used for areas subject to hard use. An alternative consists of some method of soil stabilization such as that used for secondary roads or airports.

TYPICAL SITE PLANS

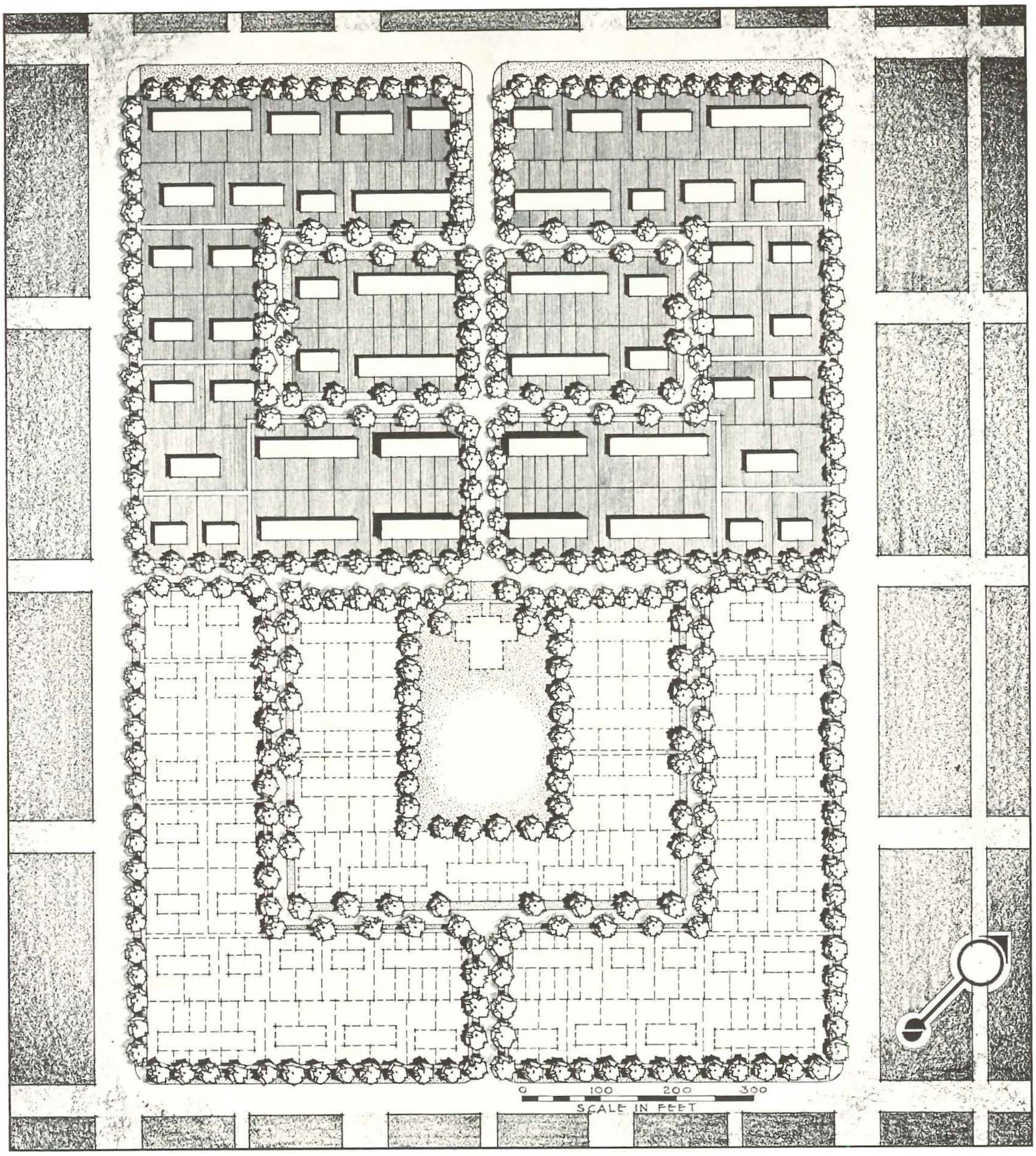


FIGURE 1: One - story semi-detached and one- and two-story row houses on a flat site to provide ultimately for about 300 families. Each dwelling unit has a private yard. Traffic circulation provides end access to about half the buildings; walking distances are limited to 150 ft. Parking areas are relatively small, for percentage of car ownership is low. The central playfield and future administration building occupy about an acre.

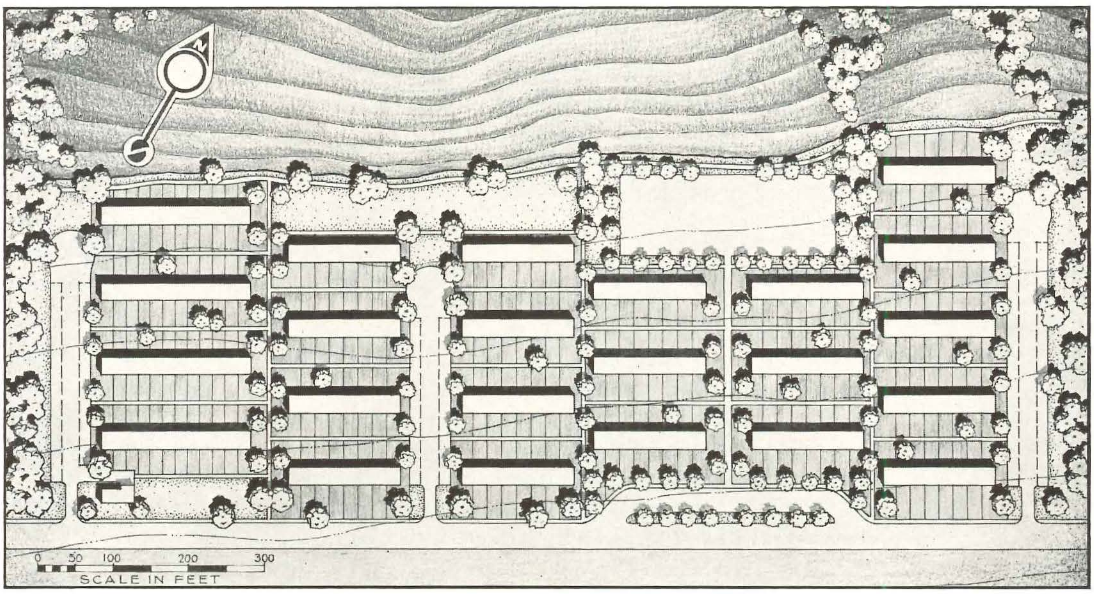
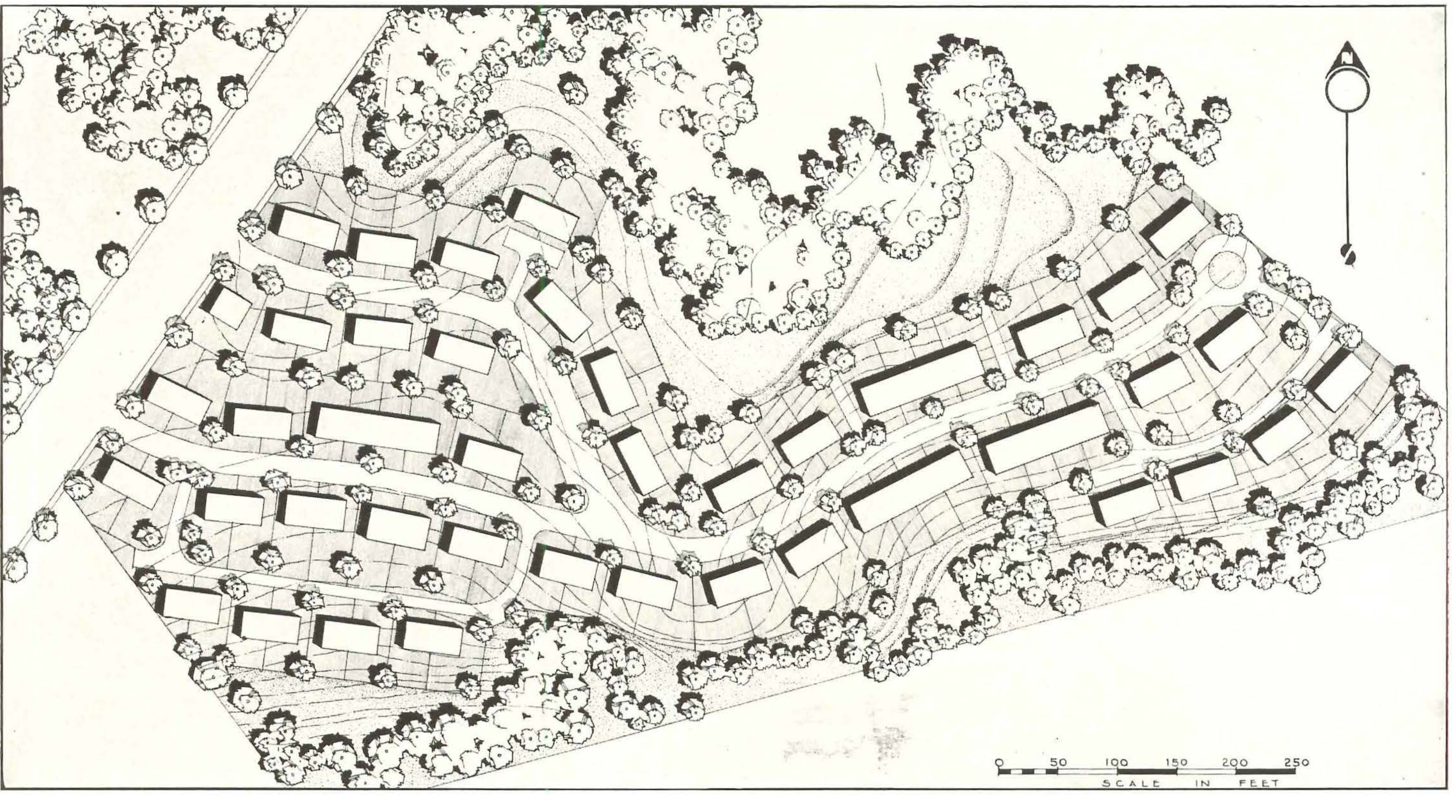


FIGURE 2: Sloping sit with staggered arrangement of row-houses. Eac dwelling unit has fron and rear yard and en access for servicing. Cu de-sacs permit parking Recreation areas on hi above may be reache from every dwelling with out traffic hazard, elim inating need for larg common play lots. Builc ing spacing is controlle primarily by orientatio



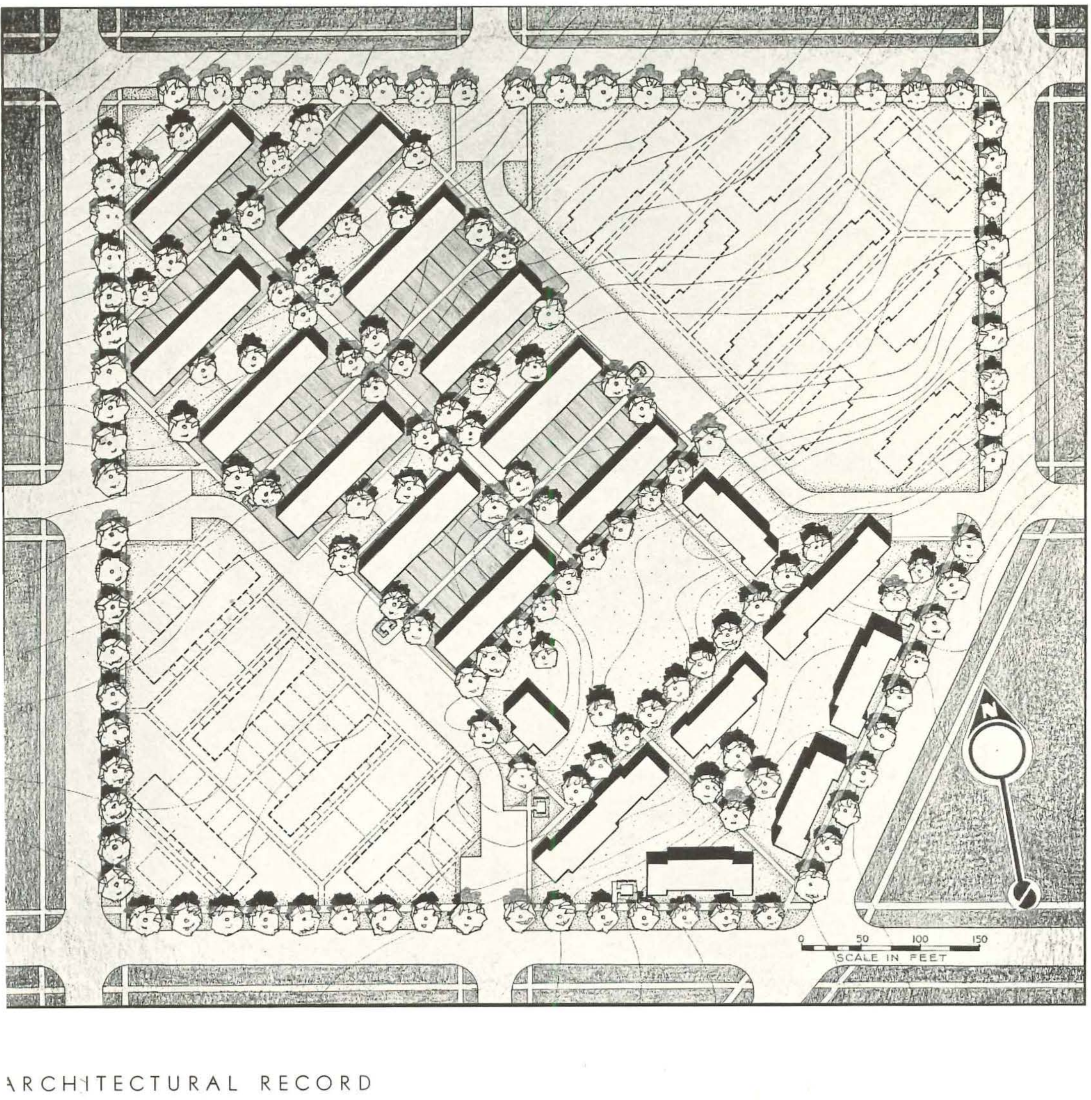


FIGURE 3: One - story semi-detached and short one-story row houses on a sloping site to provide for about 90 families. Orientation has been sacrificed somewhat to building arrangement because of topography. Special play areas are omitted because private yards are unusually large. Ample space for parallel parking has been provided.

FIGURE 4: Two - story row houses and flats on a sloping site to provide, ultimately, for about 265 families. The diagonal arrangement provides good orientation and good relation to topography. Most buildings have end access; all have private yards with play spaces for each group. Service and parking areas are centrally located.

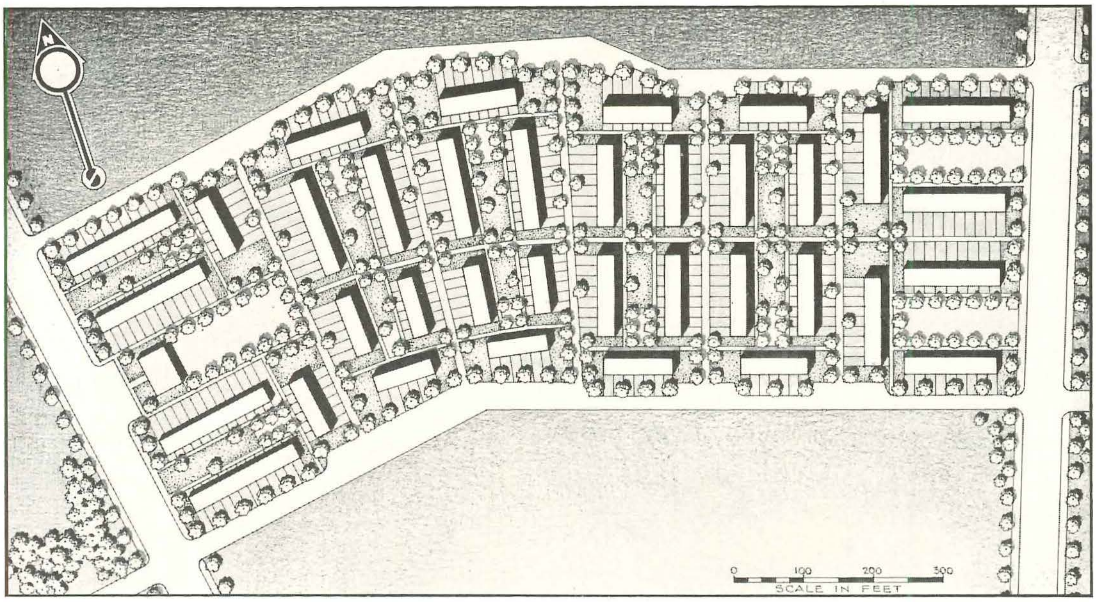


FIGURE 5: Court arrangement of one- and two-story row houses on a flat site to provide for about 230 families. Each dwelling unit has a private yard, and each court includes a play space. Parking is confined to boundary streets. All traffic is excluded from the site except that for servicing on five narrow lanes.

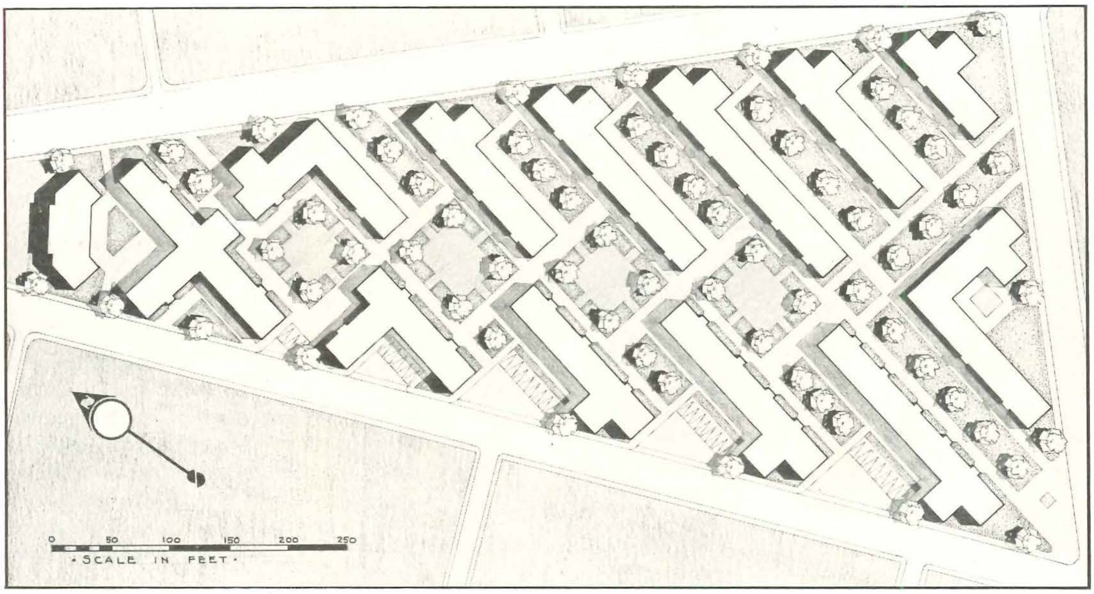


FIGURE 6: Three-story apartments on a flat site for about 300 families. Building arrangement, a result of good orientation and economies developing from apartment layout and construction, produces centrally located courts for recreation. Interior traffic is eliminated. Servicing is accomplished from boundary streets, and parking is provided on street courts.

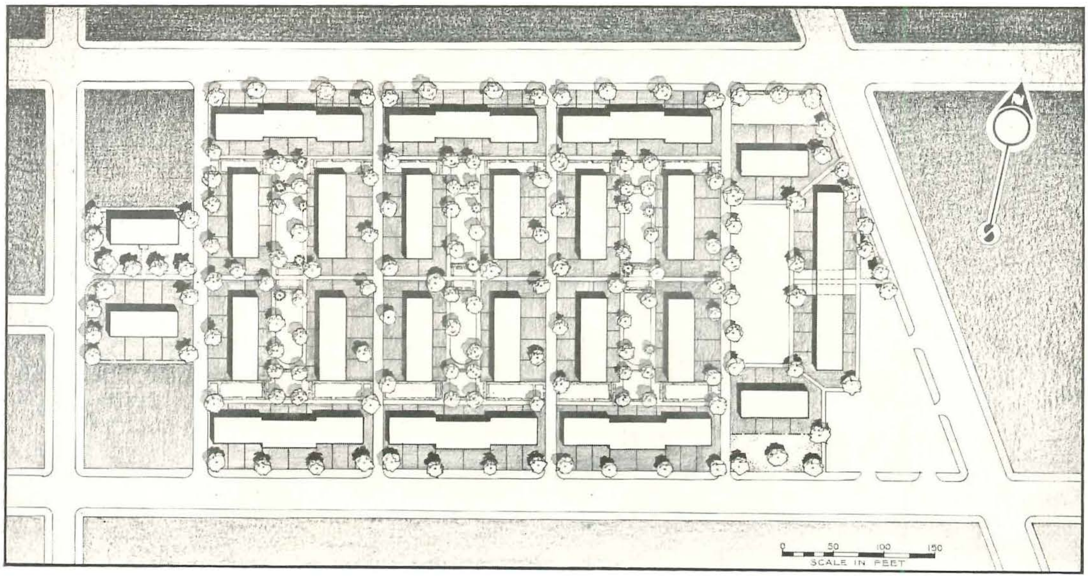


FIGURE 7: Two-story flat and row-house combinations and two-story row houses on a comparatively level site to provide for about 160 families. Row houses and first-floor flats have private yards. Common drying yards and play spaces are grouped in courts. Through lanes are for service traffic only. Parking and play spaces for older children are provided at the eastern end of site.

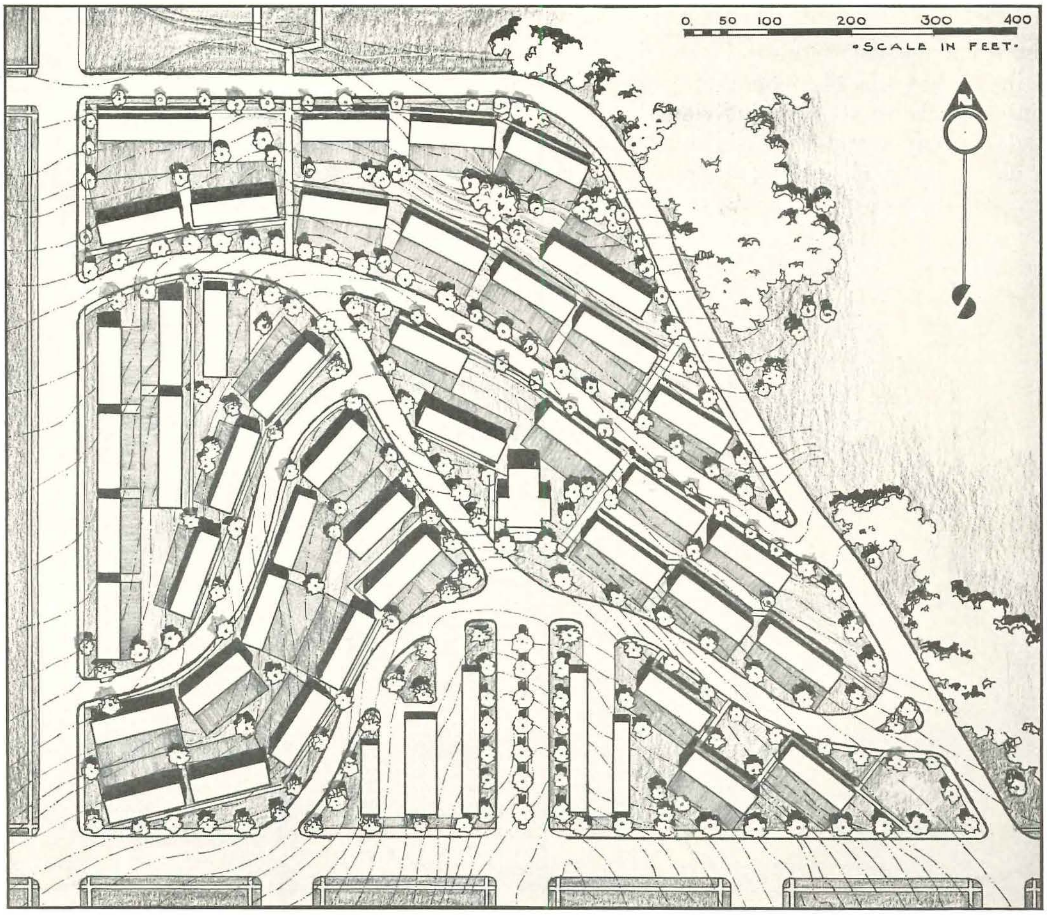


FIGURE 8-A: Preliminary study for row houses to provide for about 320 families on a very steep site. This does not show economical utilization of site characteristics. Buildings cut across natural contours and are too close together. Also, several could be eliminated without reducing housing accommodations if basements were utilized as garden apartments. Traffic ways are excessive and involve undesirably steep grades.

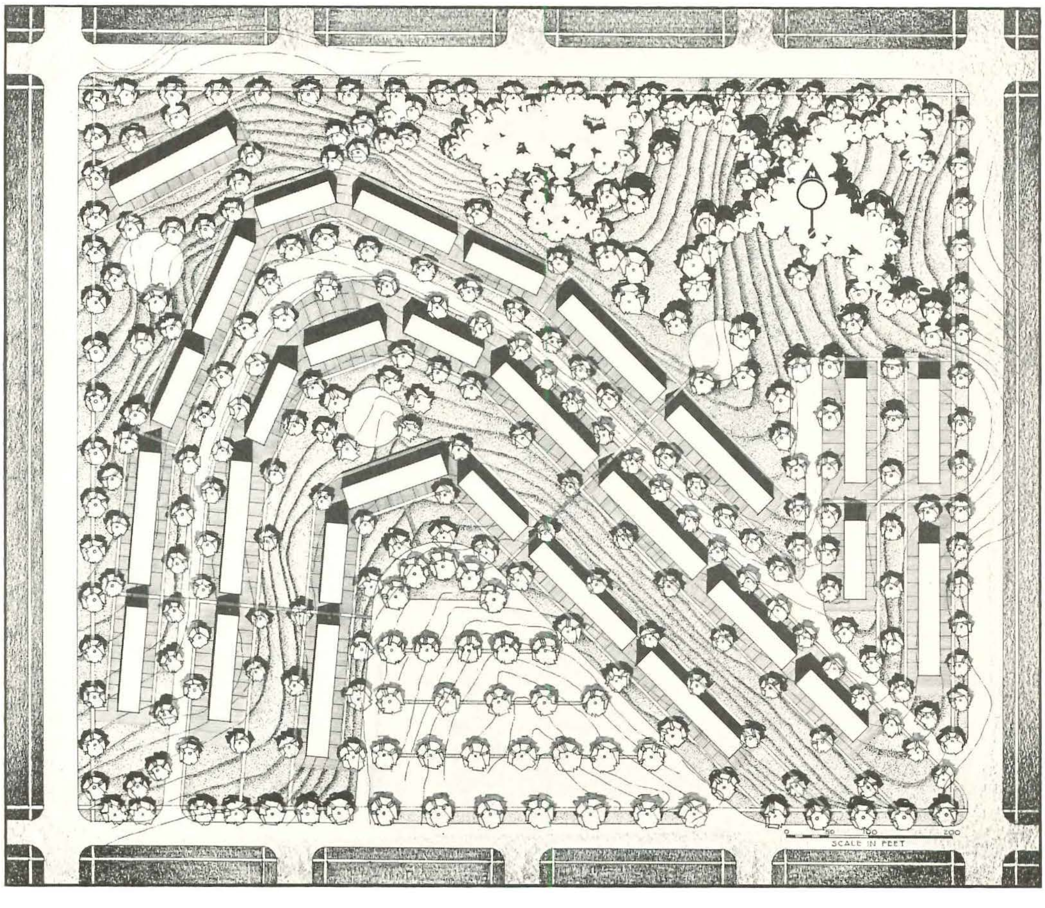


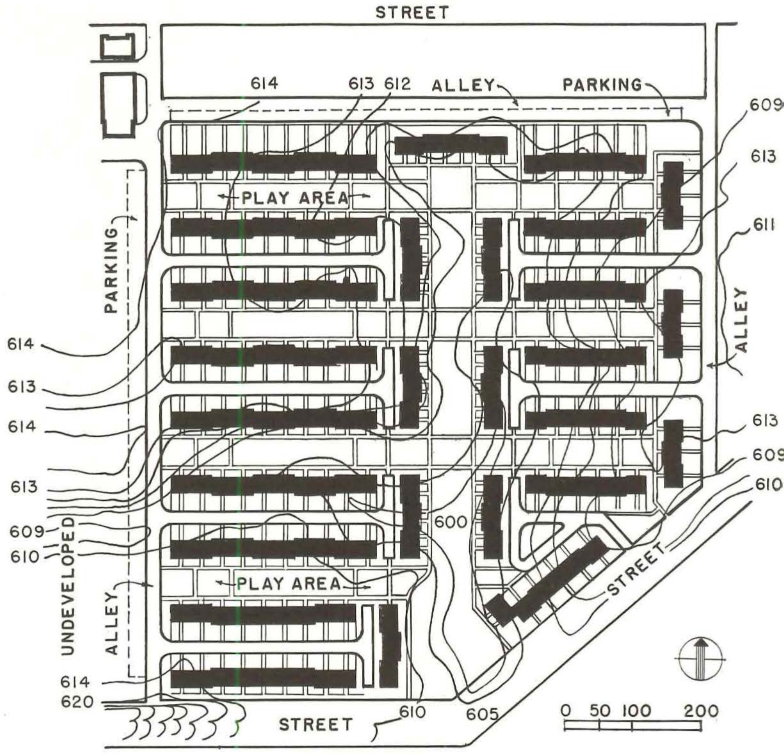
FIGURE 8-B: A revised plan of the site above. Without sacrificing housing provisions, the number of buildings has been reduced and arranged to follow natural contours. Steep slopes have been partially used to provide basement garden apartments, the buildings themselves acting as retaining walls. Service drives, carefully related to contours, are provided for all but one building. Two small parking lots are located on the drives, and a large centrally located parking area has been obtained by filling in the valley at the south side. Three play spaces have been developed for smaller children. The character of the northern part of the site makes other recreational facilities unnecessary.

SITE PLANNING CASE STUDIES

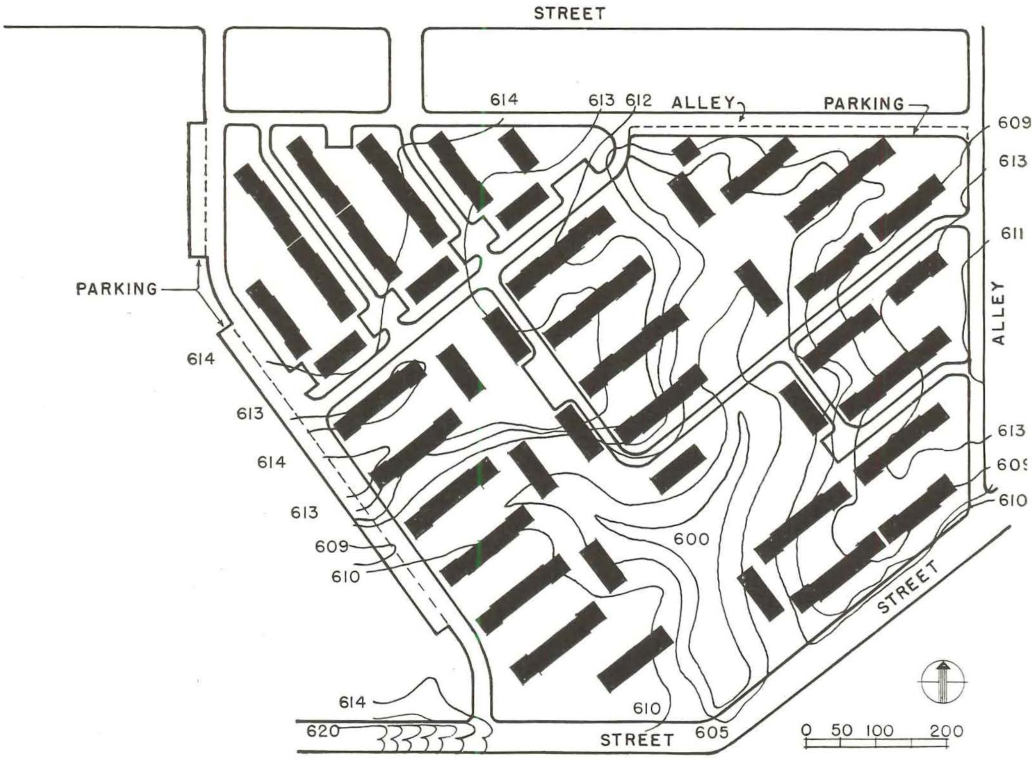
ON THIS and the following three pages are reproduced studies of site plans in the process of evolution. Although initial schemes are often somewhat formalized, the increasingly apparent effects of local site conditions—topography, orientation, services, recreational needs, and the like—tend to give each final scheme its own individuality.

In many cases, shifting the originally contemplated house-and-land pattern to a new orientation will reduce the number of buildings which cut across contours; in others, new patterns evolve. The objective remains the same: to achieve the most intensive use of available land compatible with all factors of site design and organization.

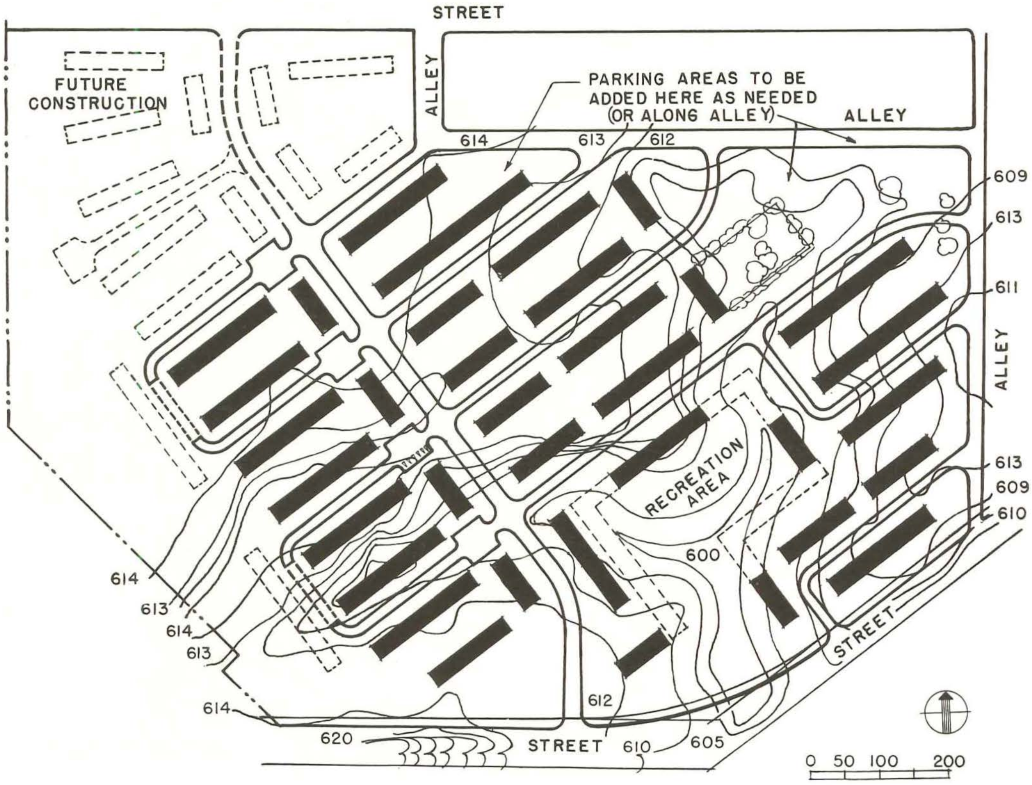
A PROJECT containing two-story row houses and flats accommodating approximately 385 families, on an irregular site in a large Midwestern city.



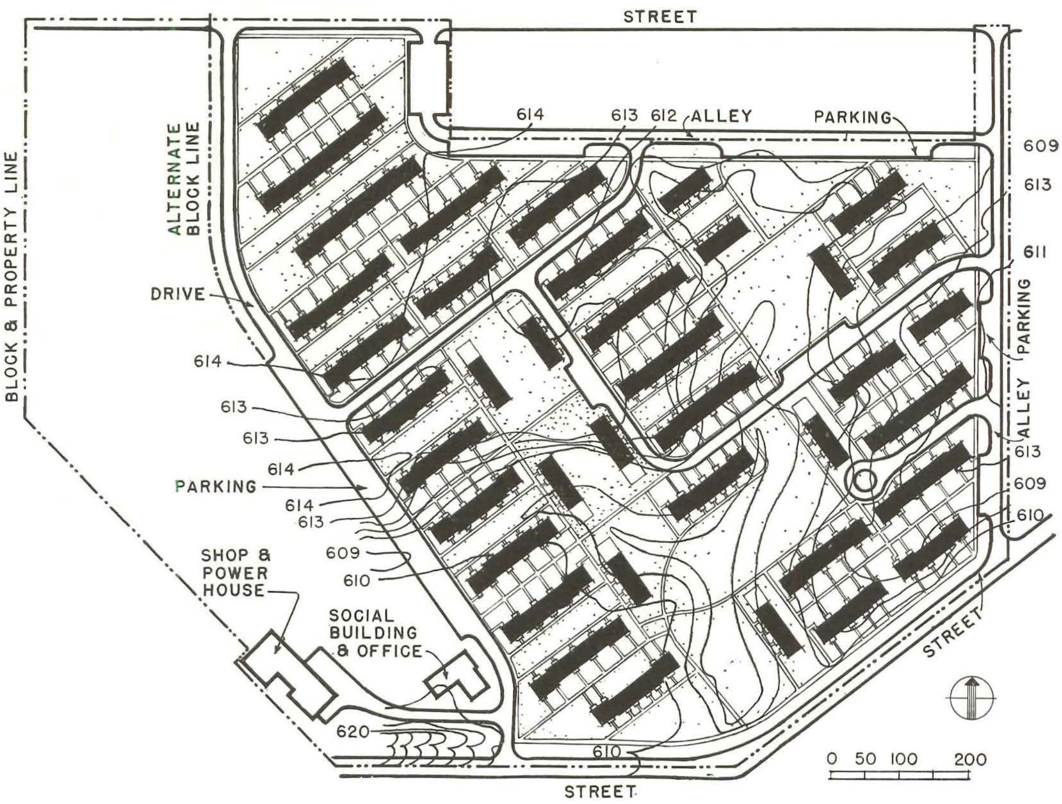
FIRST STEP: Buildings are badly related to the topography; excessive filling would be required, and a natural meadow and a group of beautiful old trees would be destroyed. Only four of the row houses are well oriented for sunlight, and many are too long for economical construction. Not all of the available land is considered in this study.



SECOND STEP: This is a revision to show the possibility of using northeast - southwest orientation and to relate the buildings to the natural topography.

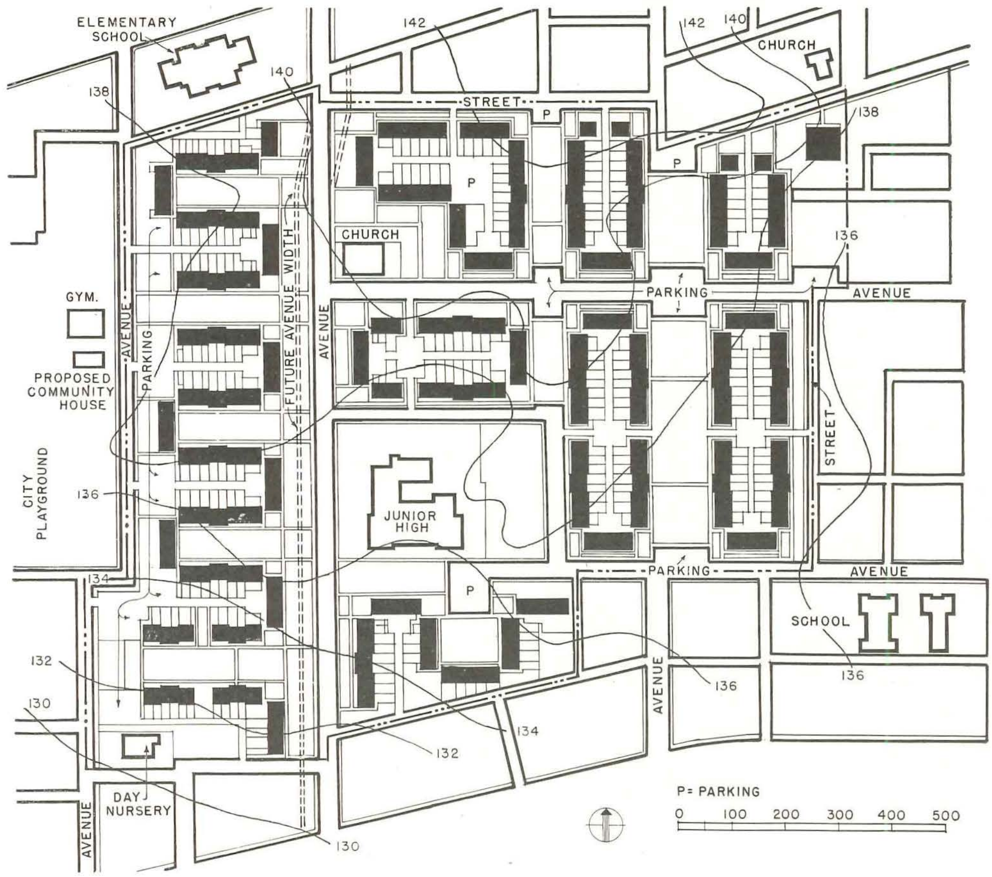


THIRD STEP: This study preserves the existing meadow in the southern part of the site, which will be used as a playfield, and provides an open space or "green" shaded by several large trees in the northeastern portion. Use of the entire site for dwellings is considered. Service drives run between alternate pairs of buildings.

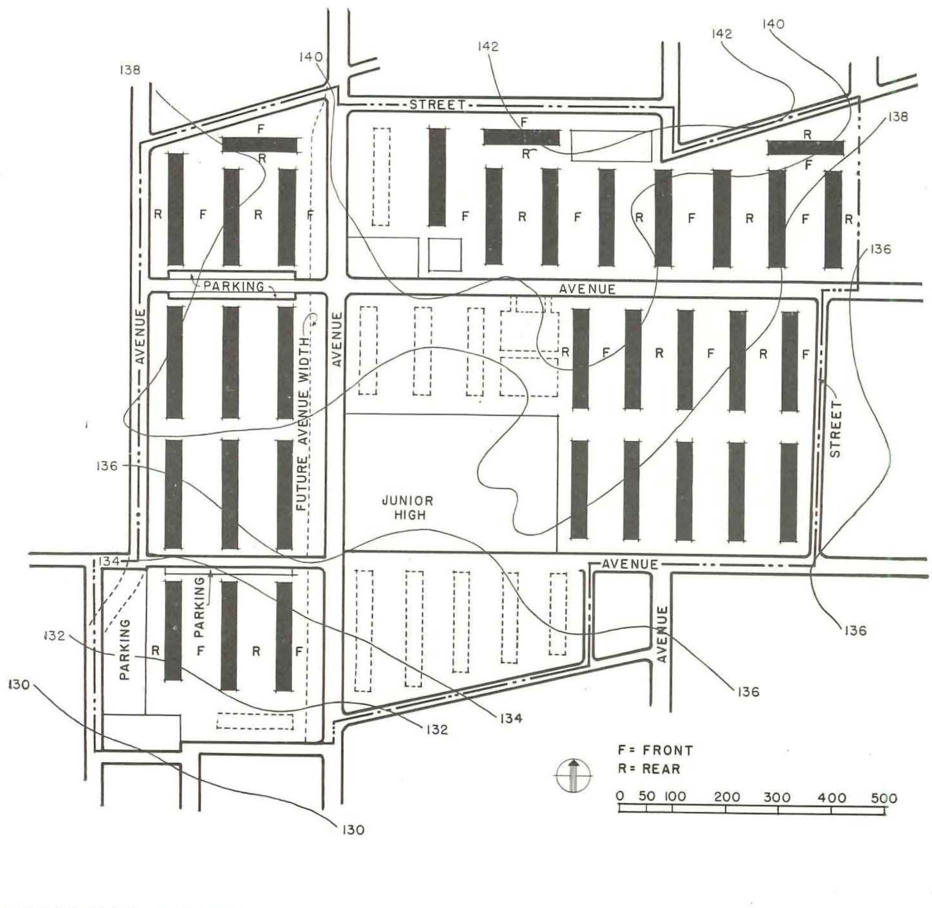


FINAL STEP: Building locations have been adjusted to concentrate play and protective areas along the southwest boundary of the site.

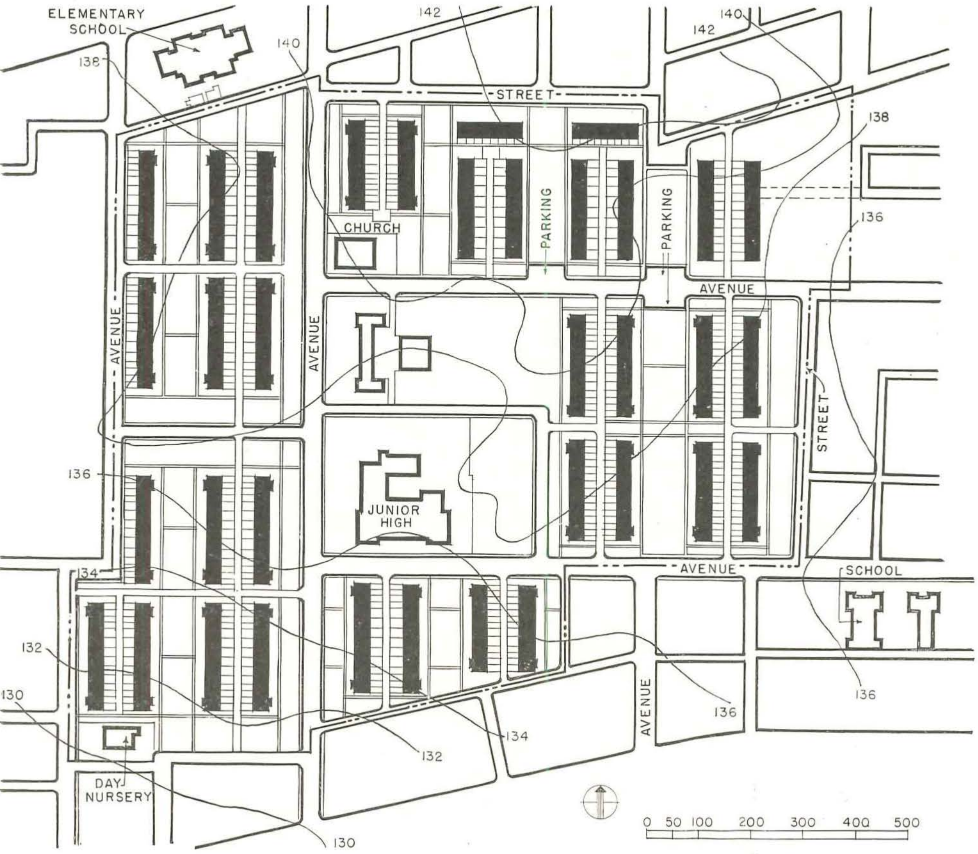
Buildings with flats are shown with drying yards at one end. The flats, placed at strategic intervals, provide basement space for community laundries, and serve as distributing centers for the heating system. In order to keep the number and extent of service drives to a minimum, end access only is provided most of the buildings, and parking spaces are limited almost entirely to boundary streets. As in the preliminary study, numerous small play areas are provided for preschool children.



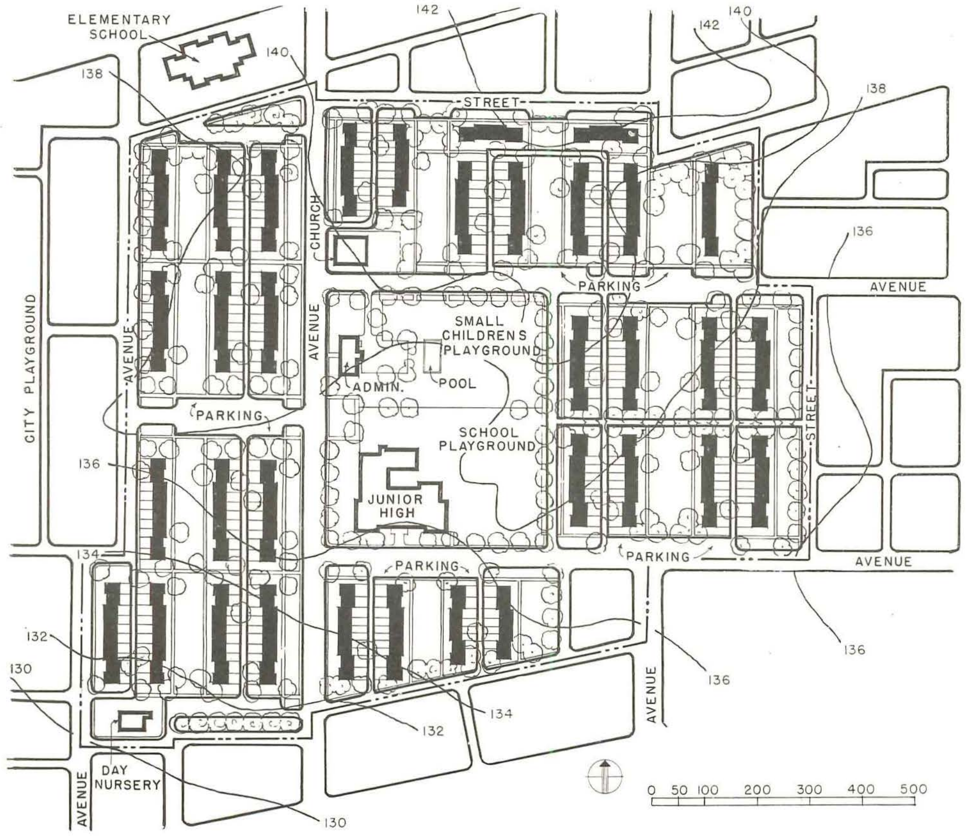
FIRST STEP: The preliminary scheme for this project accommodates ap- proximately 456 families, on a com- paratively level site in a midwesterr city. Dwellings are arranged in a pattern of courts. Buildings arounc each court are served by alleys which terminate in parking spaces from these, other alleys run tc farthest buildings. Such parking space is inefficient; paving cost is prohibitive, and traffic hazards are magnified. Although a small addi- tion to the junior high school yarc is contemplated, the project does not make full use of existing commu- nity facilities—schools, churches, play- grounds, and a nursery. Periphera parking spaces are interposed be- tween the project and an adjoining municipal playground; coverage is relatively high; utility installation wil be expensive.



SECOND STEP: This sketch study shows a dwelling layout simplifiec into a parallel row scheme, witl buildings at the upper right stag- gered to terminate vistas. Utilitie planning is greatly simplified; park- ing space between westerly building and city playground has been elim- inated. End access only is providec for most buildings, and the possibility of increasing the number of dwelling is explored. Coverage is reduced Dwellings are planned in length which are economical to build, anc the total number of buildings is sub- stantially reduced without decreasinc the number of dwelling units.

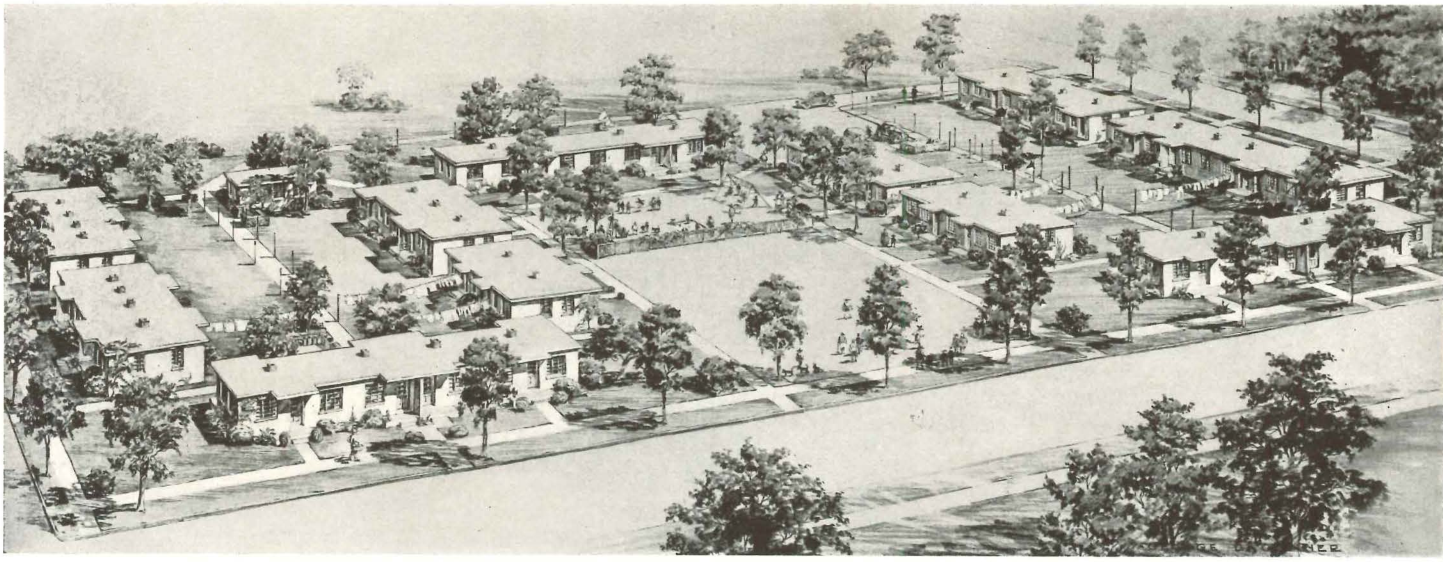


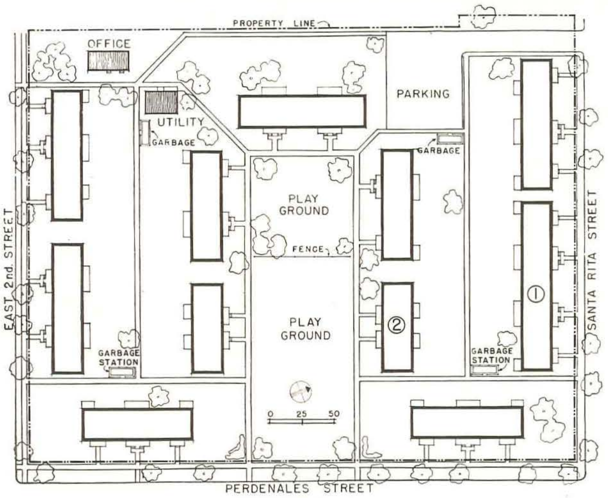
THIRD STEP: At this stage of planning, buildings are paired around the site's periphery. This results in the pooling of open project-maintained spaces in a few locations, and in a large central common on which stand the junior high school, administration buildings, and a church. Each service drive provides access to at least one pair of buildings; one of these drives still cuts across the open central area. The parking problem has not yet been completely solved.

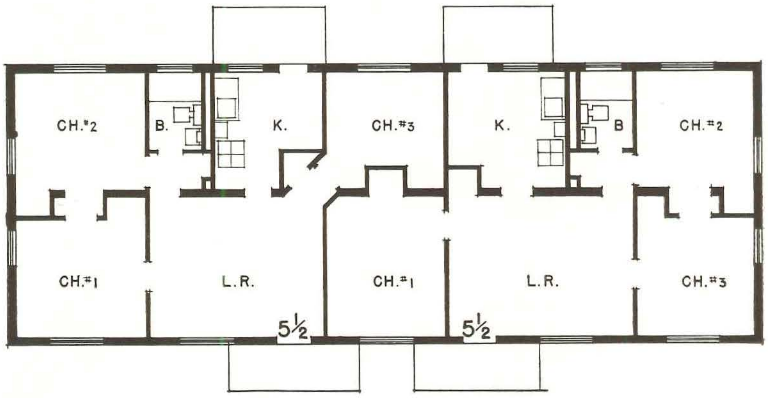


FINAL STEP: The parking scheme, as finally developed, provides spaces adjacent to the ends of buildings, in a combination of peripheral and internal locations, none of which interfere with the use of project or municipal playgrounds. Service drives have been extended so that all but a few of the buildings have both end and front access; the central common is no longer bisected by vehicular traffic. The walkway layout has been simplified. The amount of land is actually reduced, since the portion in the northeast corner is no longer needed. In view of the various economies achieved, it has become possible to use part of the central common for a playground for younger children, adjacent to an administration building which is smaller than it previously was.

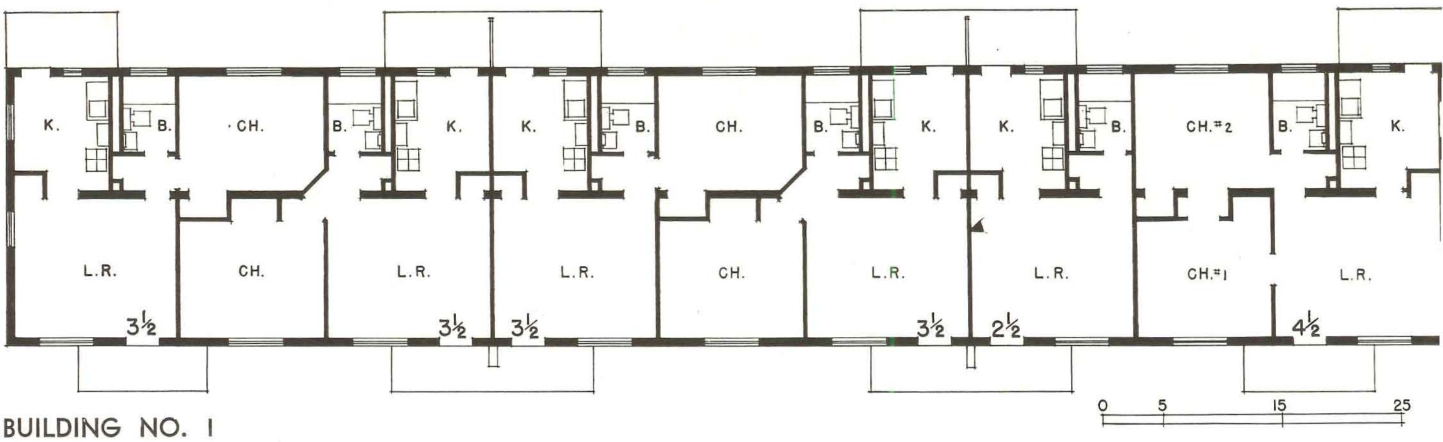
TYPICAL HOUSING PROJECTS







BUILDING NO. 2

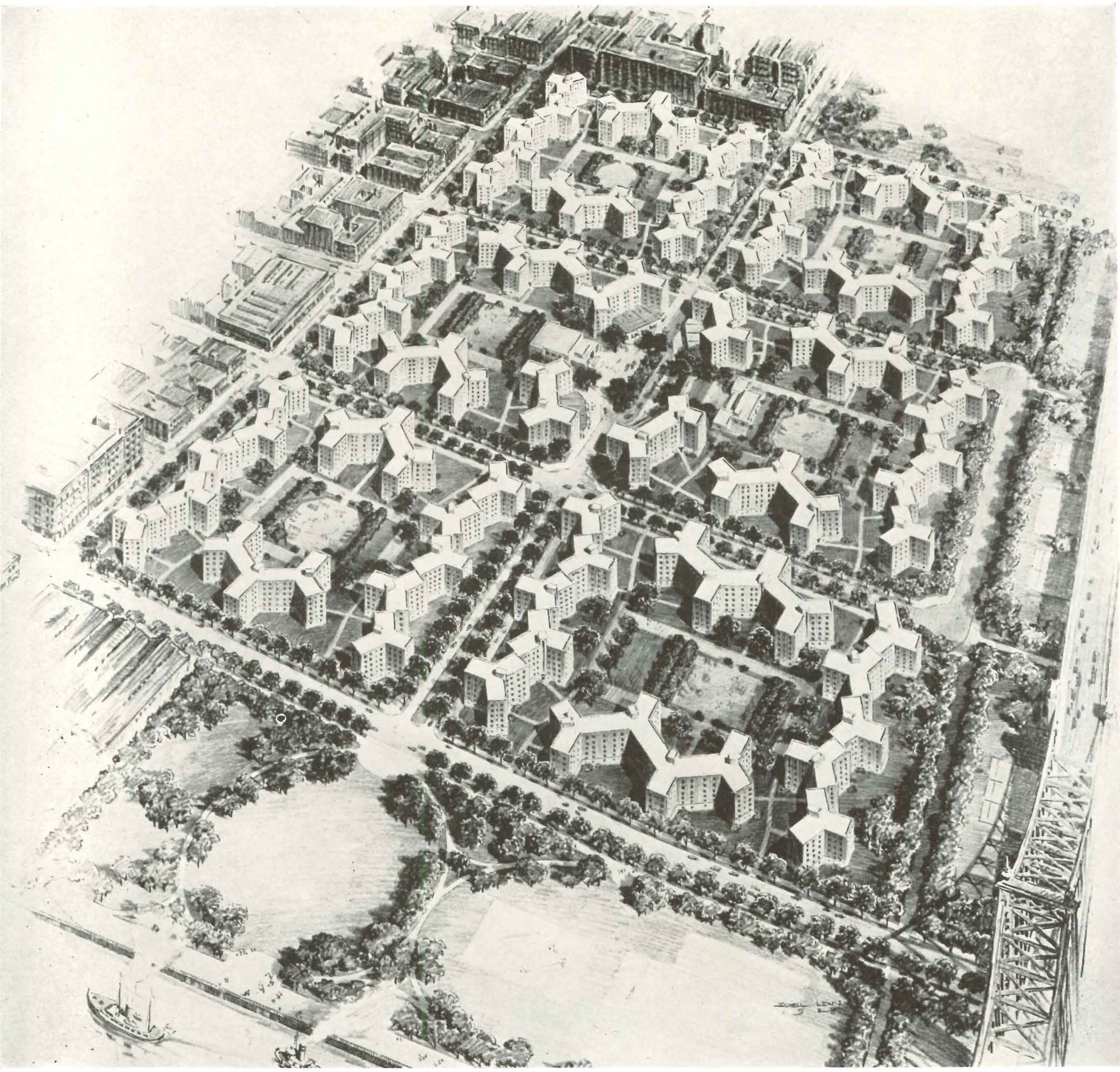


BUILDING NO. 1

MEXICAN HOUSING PROJECT
AUSTIN, TEXAS

Giesecke and Harris, Architects
H. F. Kuehne, Supervising Architect

This comparatively small slum clearance project might be regarded as typical of many low-rent housing developments built near the outskirts of small cities. It provides a total of 40 dwelling units aggregating 142 rooms in one-story row houses on a level site. The project was built at a cost averaging $3,657 per dwelling unit. Coverage is 12 per cent of the buildable area, and population density is 32 persons pe acre. Each dwelling unit has a privat yard to be maintained by the tenant The centrally located common and rec reation ground provides a safe play are for children that is easily supervised. A rental scale for the project has been es tablished at $2.50 per room per month On this basis the average rental for each dwelling unit will be $8.25 per month



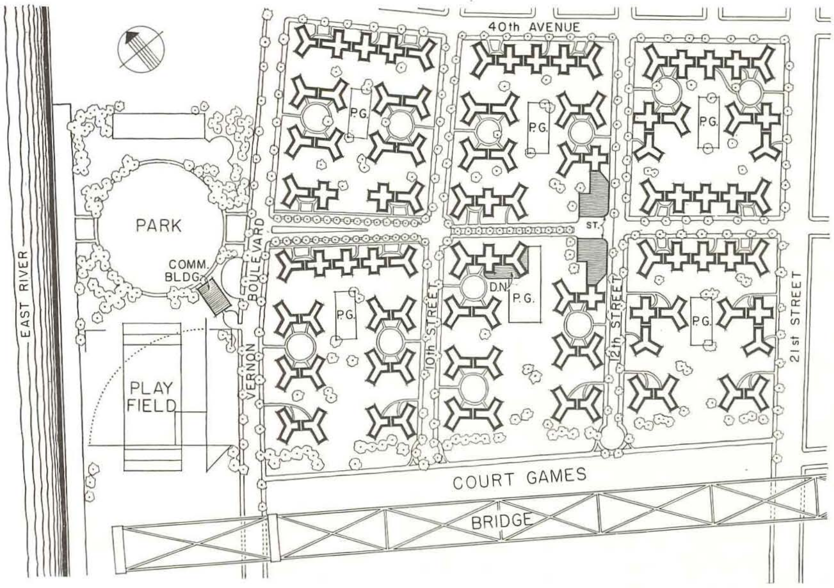
Drawing copyrighted by Queensbridge Project Associated Architects

QUEENSBRIDGE HOUSES
NEW YORK, N. Y.

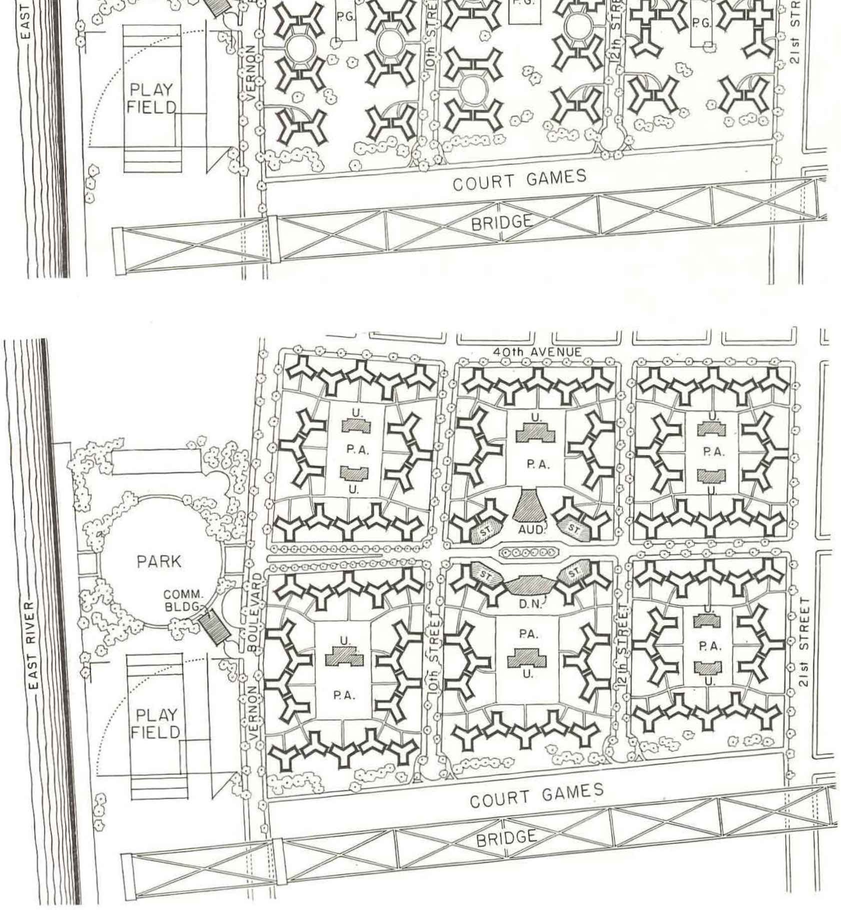
William F. R. Ballard, Henry S. Churchill, Frederick G. Frost, Burnet C. Turner, Associated Architects

THE LARGEST PUBLIC low-rent housing development ever undertaken in this country, Queensbridge Houses is being built as a slum clearance project by the New York City Housing Authority with the assistance of the United States Housing Authority. Upon completion it will provide 3,161 apartments renting at less than \$5 per room per month for a tenant population of about 11,399. The project covers twelve city blocks with an area of 44.39 acres and will have a population density of 256.79 persons per gross acre. Coverage on the net buildable area is 25.424 per cent.

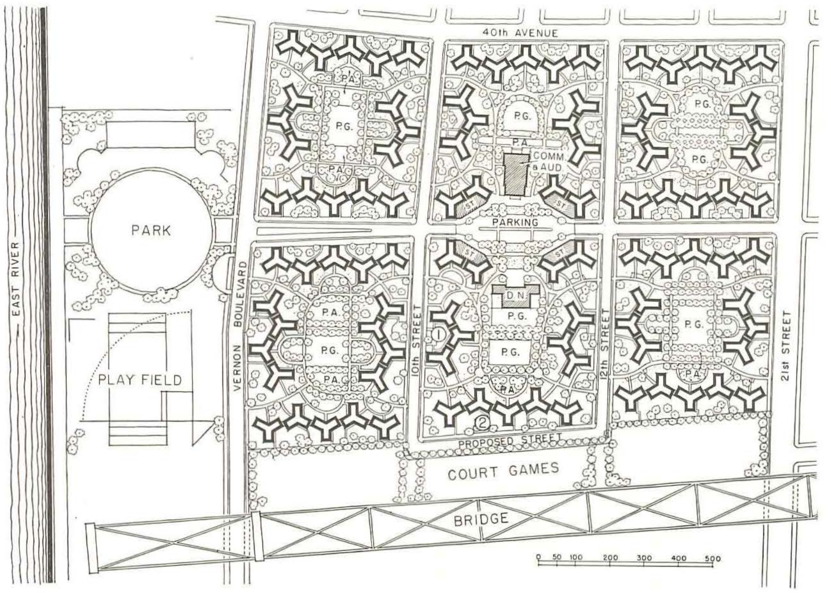
Apartments range in size from 2½ rooms to 5½ rooms. Units of 2½ rooms (222) comprise 7.02 per cent of the total; 3 rooms (24), .77 per cent; 3½ rooms (1,176), 37.2 per cent; 4½ rooms (1,340), 42.39 per cent; and 5½ rooms (399), 12.62 per cent.



A



B



C

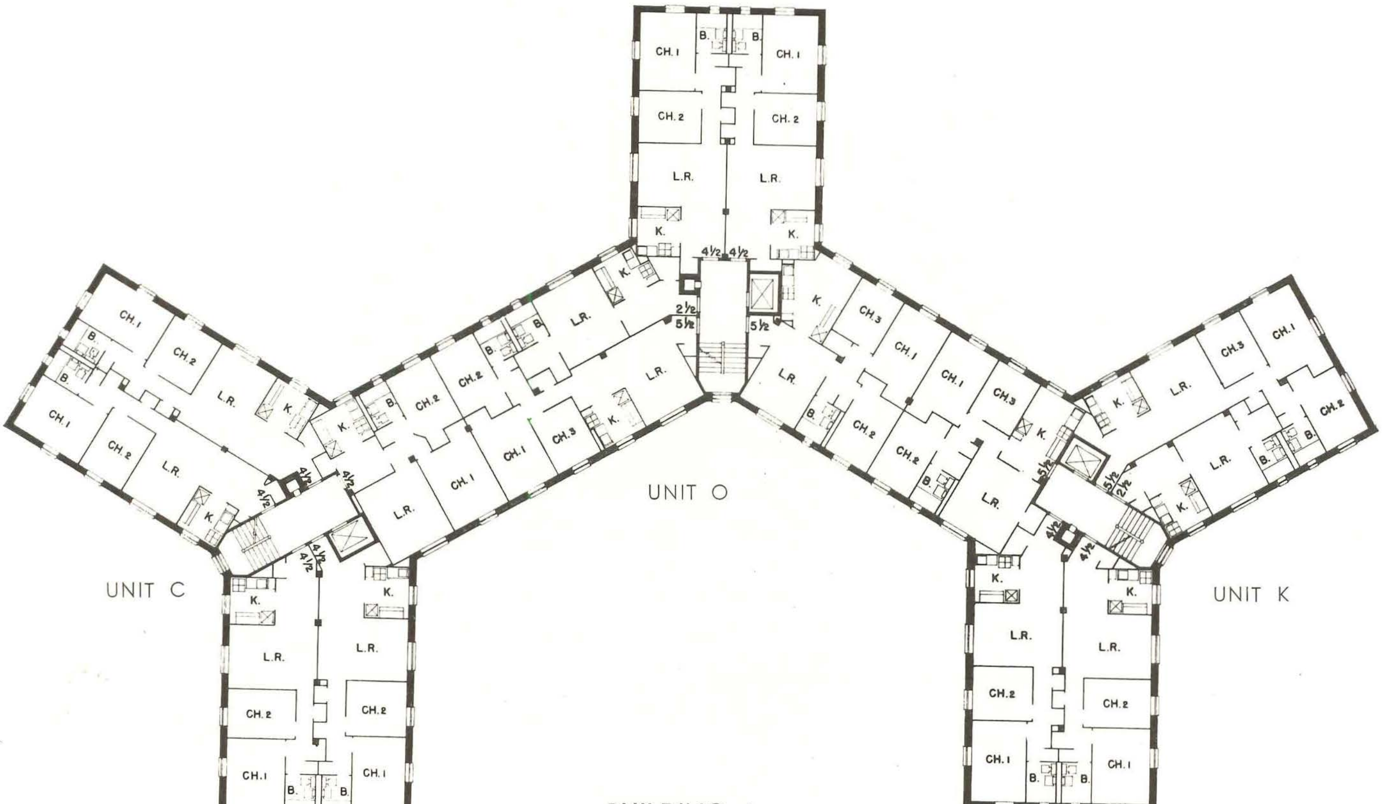
Buildings are fireproof, six stories in height, and are serviced by elevators. Heat is supplied from six plants, each one of which serves all buildings within a superblock. Apartment units are equipped for gas cooking and electric refrigeration.

In developing the project, intermediate streets were closed and buildings arranged about the perimeter of four superblocks. Courts thus formed are provided with children's play areas and paved sitting spaces. All buildings are entered from the court side. A particularly noteworthy feature of this project is the concentration of stores, parking court, nursery school and clinic, community building, project offices, and library in a community center easily reached from all parts of the development.

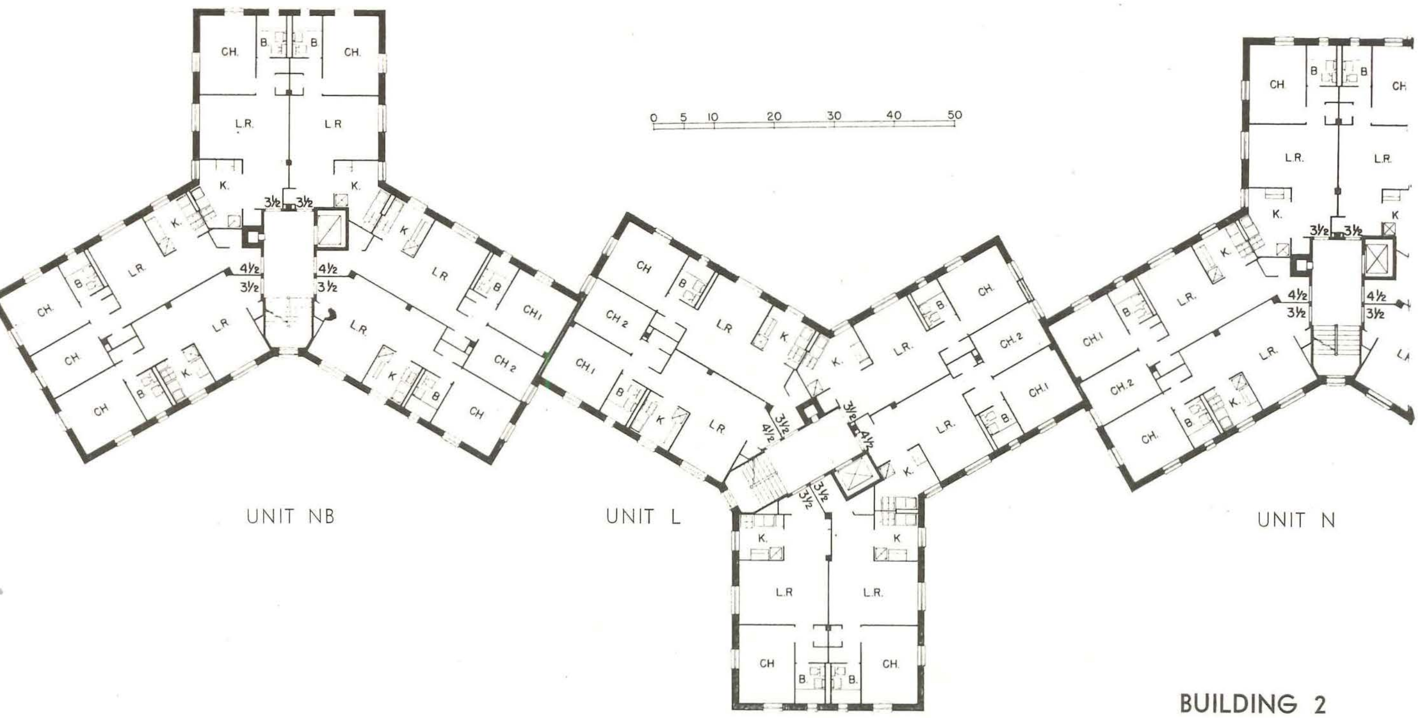
Space allocation for other than living areas, expressed in totals for the six blocks are: management offices, 2,320 sq. ft.; social rooms, 4,800 sq. ft.; utility rooms, including tenant storage areas, 32,937 sq. ft.; perambulator rooms, 31,-478 sq. ft.; laundries, 30,433 sq. ft.

Costs:	Per cu. ft.	Per room
Piling,		$ 31.12
Total construction cost, except piling,	$.4015	702.97
Equipment in buildings—refrigerators, ranges, medicine cabinets, shades, etc.,	.0264	46.25
Plumbing,	.0442	77.34
Heating,	.0257	44.99
Electric,	.0198	34.69
Elevators,	.0174	30.53
Hardware,	.0023	3.99

Sketches A, B, and C indicate respectively preliminary, intermediate, and final site plans. Legend: P. G.—Playground; P.A.—Paved Area; U—Utility building; D.N.—Day Nursery; St—Store. The numbers in the circles in the lower center block of sketch C refer to plans shown on the facing page.

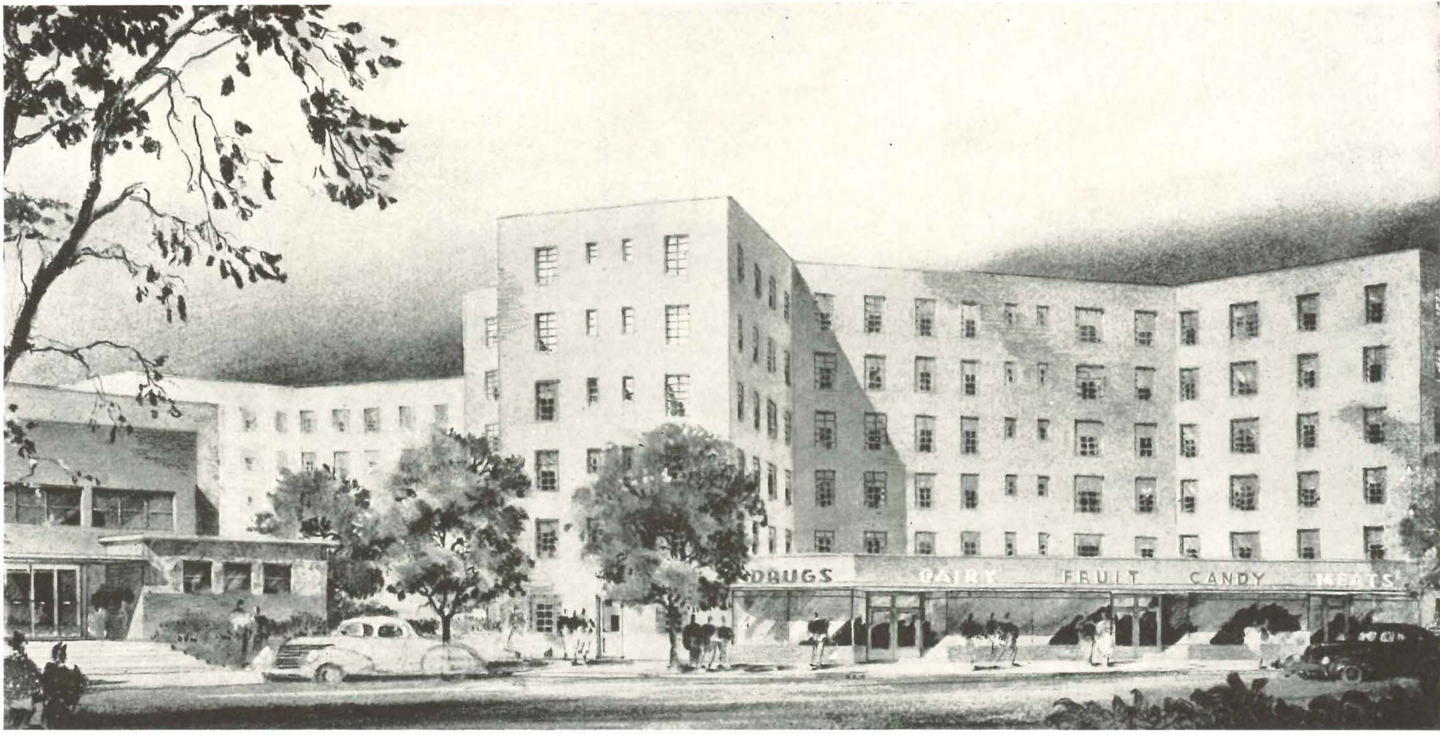


BUILDING I

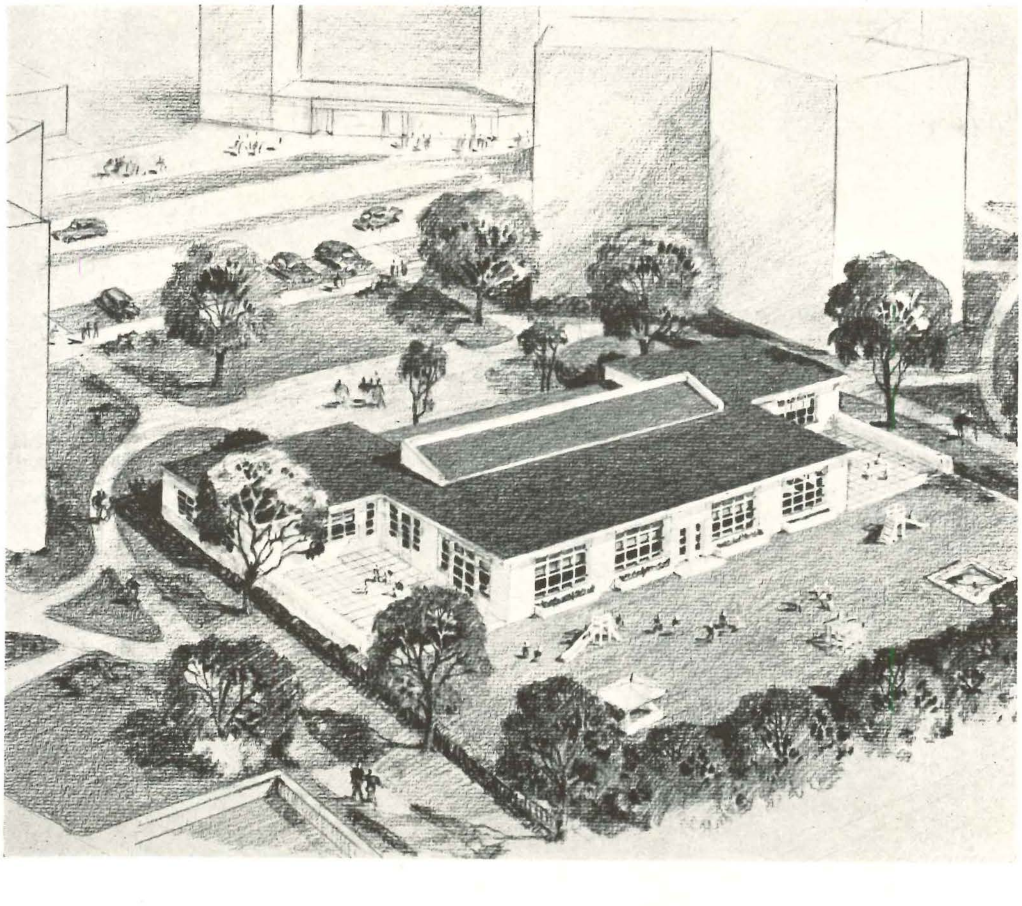


BUILDING 2

he six typical plan units shown here have been variously ombined, reversed, and enlarged to produce the project ayout shown in Sketch C on the facing page. The "Y" hape permits sunlight to enter the maximum number of apartments no matter what the orientation. In addition, it affords a greater-than-usual degree of privacy from one apartment to another because windows are in walls that intersect at 120° instead of 90°.



View of stores in community center. At the left is the auditorium entrance.

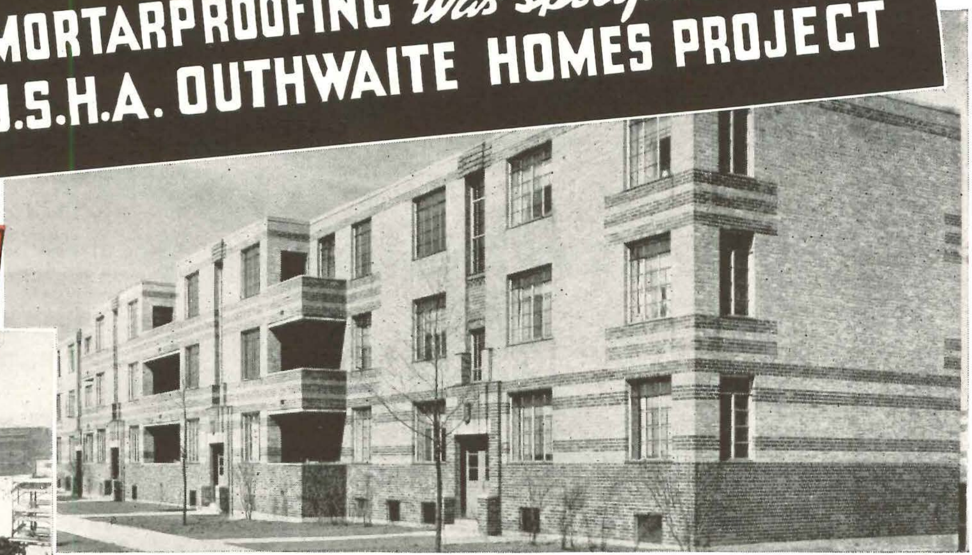


Bird's-eye perspective of nursery school and clinic looking toward central parking area.

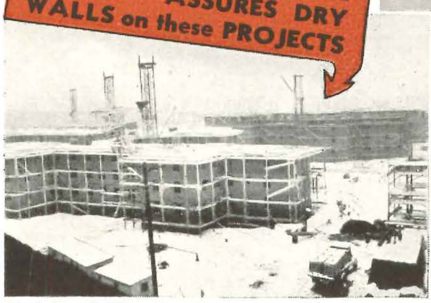
Queensbridge Houses is the first public housing project to include a community auditorium and a children's center as an integral part of the development. The auditorium will be a two-story building covering 18,100 sq. ft. The children's center will cover 6,763 sq. ft. and will contain a day nursery, nursery school facilities including two large playrooms, and a well-equipped health clinic.

OMICRON MORTARPROOFING *was specified and used* *on* THE U.S.H.A. OUTHWAITE HOMES PROJECT

MASTER BUILDERS PRINCIPLE "CUT WATER AND ELIMINATE SHRINKAGE CRACKS" ASSURES DRY WALLS on these PROJECTS



Outhwaite Homes, U. S. H. A. Housing Project, Cleveland, Ohio.
Architects: Maier, Walsh & Barrett. *General Contractor:* Geo. A. Fuller Co. *Masonry Contractor:* C. O. Struse.



Red Hook Housing Project, Brooklyn, N. Y.
General Contractors: Geo. A. Fuller Co., New York City. *Mason Contractor:* J. H. McNally Const. & Engr. Co., New York City. *Associated Architects:* Alfred Easton Poor, Supervising Chief, F. T. Fee & W. T. McCarthy, William I. Hohauser, Edward J. Rubin, Jacob Moskowitz, William F. Dominick, E. D. Litchfield.

Grand View Heights Apartment Project, Lancaster, Pa. *Architects:* A. R. Clas Associates, Washington, D. C., Floyd A. Kline, Lancaster, Pa. *Gen. Contractors:* C. H. Shufflebottom, Lancaster, Pa.

The brickwork of the Outhwaite Homes Project, Cleveland, Ohio, does not leak. Omicron Mortarproofing protects it against the most prevalent cause of leaky brickwork — mortar shrinkage.

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The "O. M." principle — Less Water, yet More Workability — is being applied to many projects, large and small, throughout the country. Two examples, now building, are the large government Red Hook Project, at Brooklyn, N. Y., and the apartments being erected at Lancaster, Pa., by the Grand View Housing Corporation.

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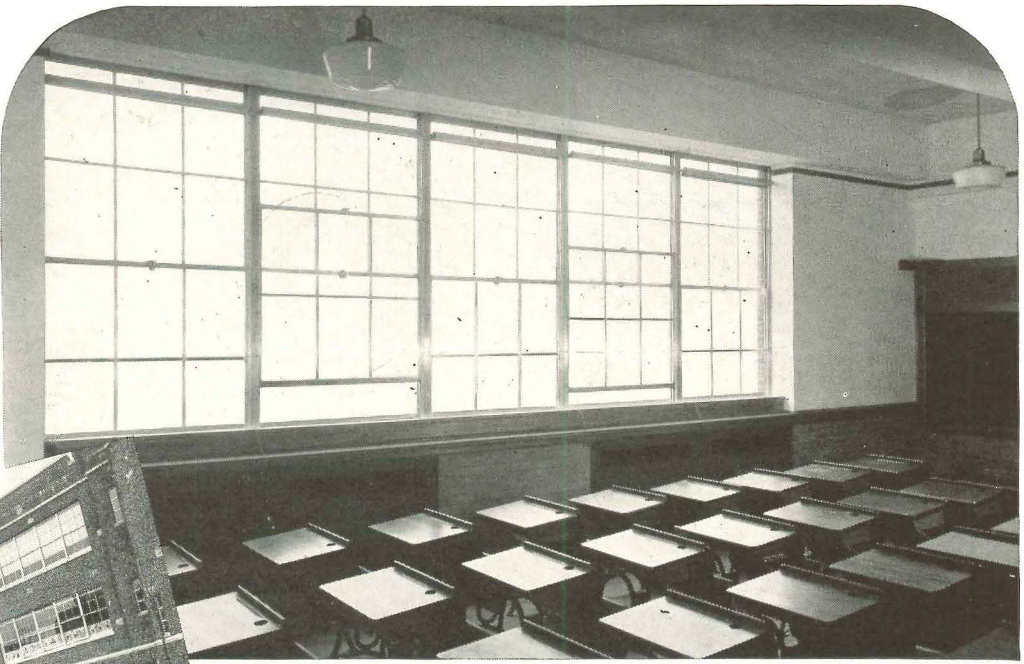
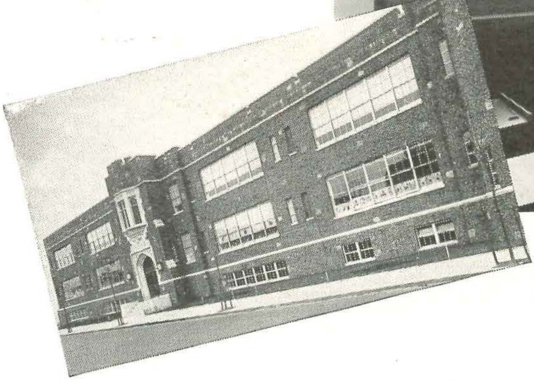


St. Pascal's Baylon School,
St. Albans . Long Island
FRED J. BURMEISTER, *Architect*



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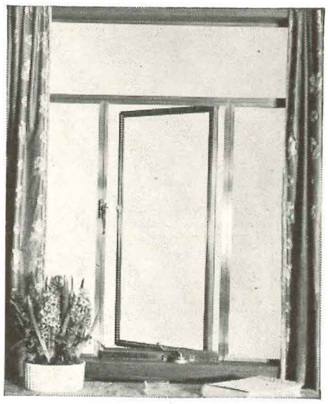

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Nairn Linoleum — *Sealex* Veltone with *Sealex* Feature Strip and Border

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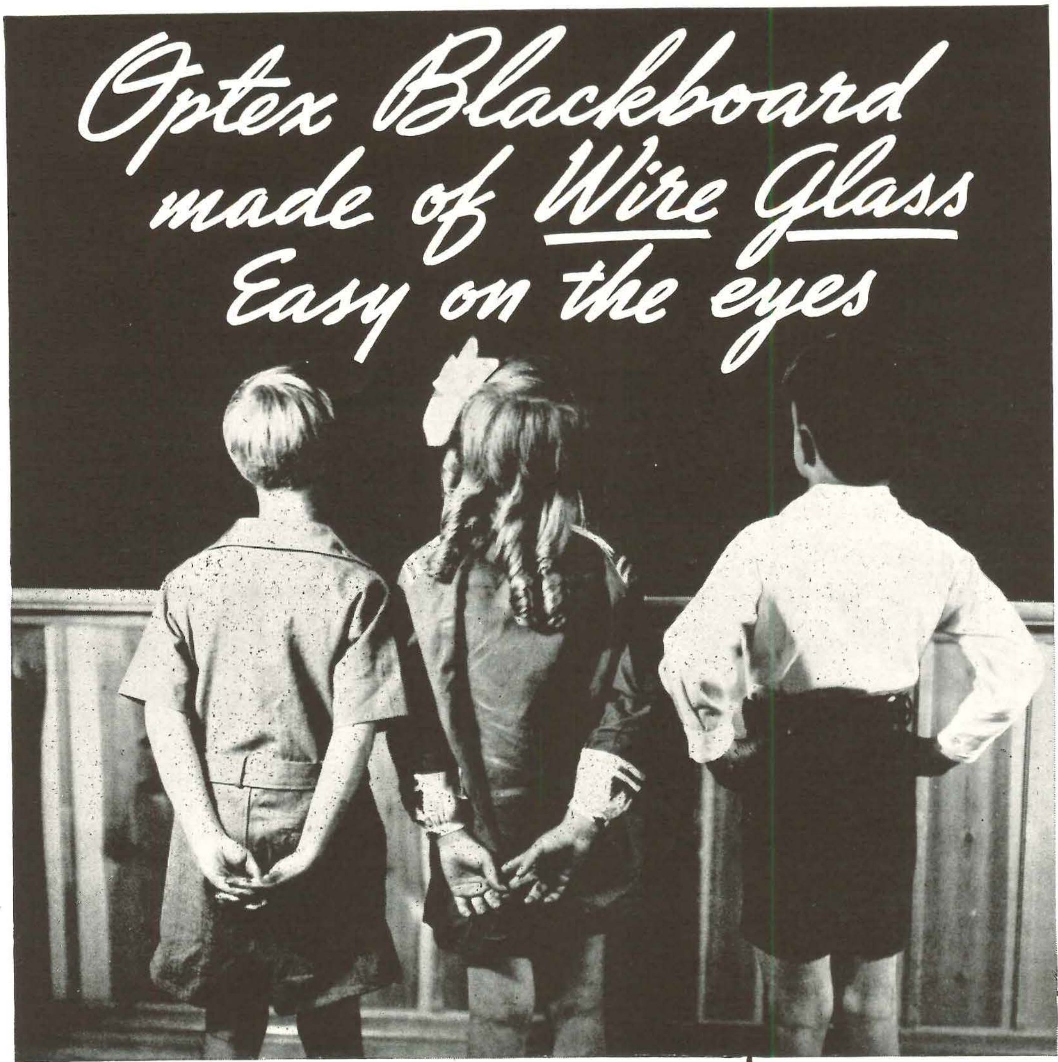

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OPTEX IS ECONOMICAL

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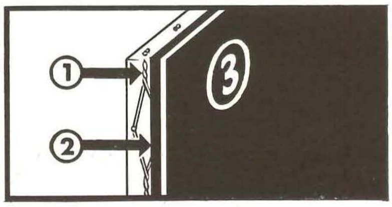

Optex Wire Glass Blackboards are ingeniously comprised of 3 sheets of glass cast simultaneously . . .

1. **A base of clear glass with imbedded wire to reinforce the entire structure.**
2. **An interlayer of dead-black or green opaque glass.**
3. **A thin top surface of clear glass ground and treated to provide a velvety writing finish and soften the reflected light.**

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For a Housing Project

CENTRAL HEATING SYSTEM

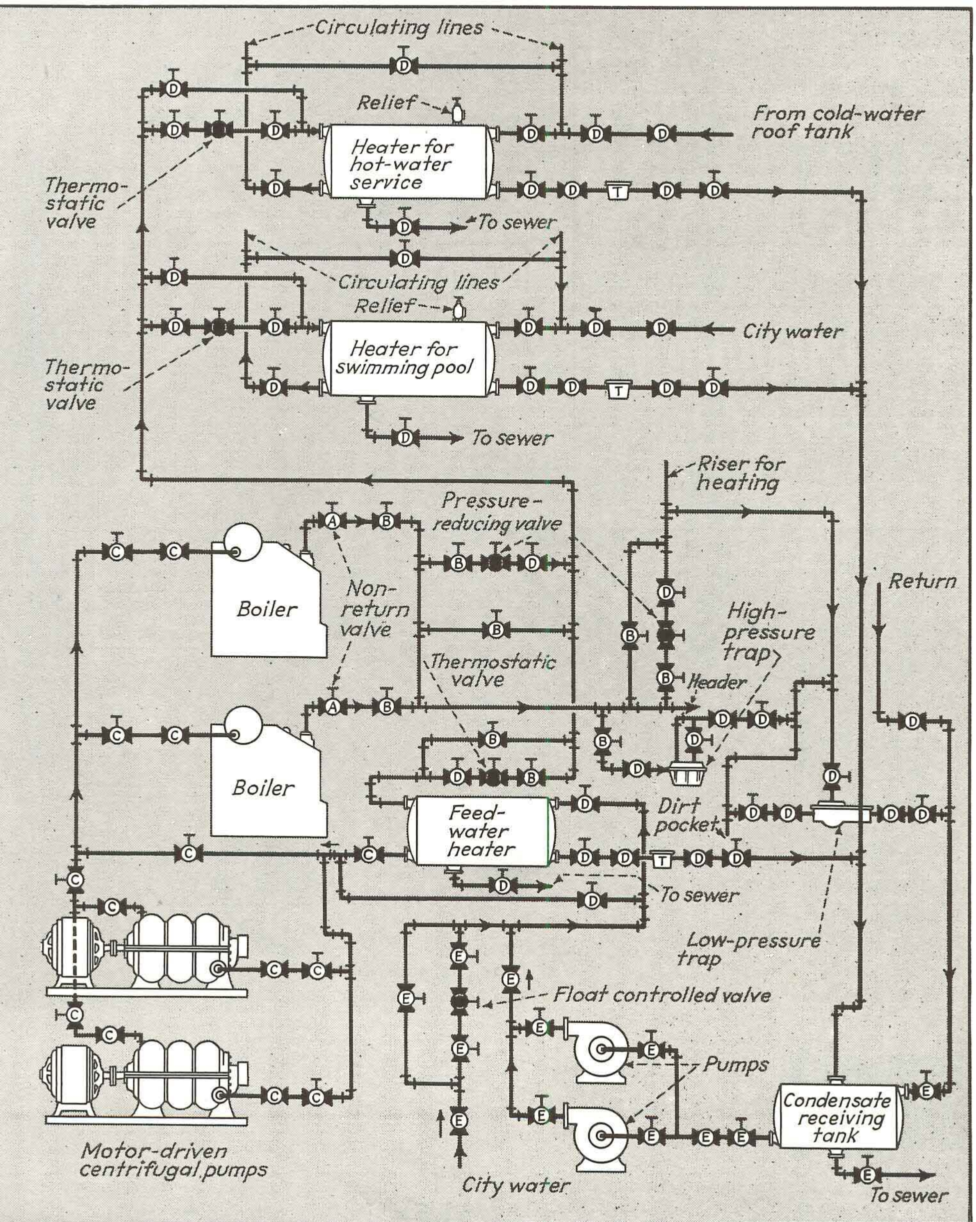
Jenkins SUGGESTS . . .

BY CONSULTING the diagram below and the table at the right, you have the answer to two pertinent questions. How should valves be placed in the hookup to adhere to good valve practice? And what are the correct types of valves for each specific service?

Valves are properly located and identified with a Key letter. The same letter in the chart gives you Figure Numbers of valves which Jenkins recommends. For services where more than one type may be used, you make your own choice.

JENKINS BROS., 80 White St., New York, N.Y.; Bridgeport, Conn.; Boston; Chicago; Philadelphia; Atlanta; Houston; Montreal, Can.; London, England

NEXT MONTH — Commercial Building



REFERENCE CHART FOR JENKINS FIGURE NUMBERS

	BRONZE	IRON
A BOILER STOP AUTOMATIC EQUALIZING STOP & CHECK NON-RETURN		*STANDARD* *MEDIUM* *EXTRA HEAVY* 293 Fl. I.B.B.M.
B HEADER AND SUPPLY LINES GLOBE.........	*STANDARD* 106A Sc. Disc Type 750 Sc. Regr. *MEDIUM* 950 Sc. Regr.-Ren. *EXTRA HEAVY* 1140 Sc. Regrinding 1150 Sc. Regr.-Ren. 970 Sc. Regr.-Ren. 801 Sc. Disc Type	*STANDARD* 613 Fl. Regrinding 142 Fl. Disc Type *MEDIUM* 919 Fl. Regrinding 775 Fl. Disc Type *EXTRA HEAVY* 923 Fl. Regrinding 162 Fl. Disc Type
ANGLE.........	*STANDARD* 108A Sc. Disc Type 752 Sc. Regr. *MEDIUM* 952 Sc. Regr.-Ren. *EXTRA HEAVY* 1141 Sc. Regr. 1152 Sc. Regr.-Ren. 972 Sc. Regr.-Ren. 803 Sc. Disc Type	*STANDARD* 615 Fl. Regrinding 144 Fl. Disc Type *MEDIUM* 921 Fl. Regrinding 777 Fl. Disc Type *EXTRA HEAVY* 925 Fl. Regrinding 163 Fl. Disc Type
GATE..........	*STANDARD* 47 Sc. Trav. Spind. 370 Sc. Non-Rising *MEDIUM* 270 Sc. Non-Rising 275 Sc. O.S. & Y. *EXTRA HEAVY* 280 Sc. Non-Rising 282 Sc. O.S. & Y.	*STANDARD* 325 Sc. Non-Rising 326 Fl. Non-Rising 650 Sc. O.S. & Y. 651 Fl. O.S. & Y. *MEDIUM* 251 Sc. Non-Rising 255 Fl. Non-Rising 277 Sc. O.S. & Y. 253 Fl. O.S. & Y. *EXTRA HEAVY* 208A Sc. Non-Ris. 203 Fl. Non-Ris. 204A Sc. O.S. & Y. 204 Fl. O.S. & Y.
C FEED WATER HEATER, BOILER FEED PUMPS GLOBE.........	Same as "B" above	
ANGLE.........	Same as "B" above	
GATE.........	Same as "B" above	Same as "B" above
SWING CHECK.	*STANDARD* 352 Sc. Disc Type 762 Sc. Regr. *MEDIUM* 762 Sc. Regr. *EXTRA HEAVY* 260 Sc. Disc Type 962 Sc. Regr.	*STANDARD* 623 Sc. Regrinding 624 Fl. Regrinding 294 Sc. Disc Type 295 Fl. Disc Type
D HEATERS AND L.P. RISERS GLOBE.........	*STANDARD* 106A Sc. Disc Type	*STANDARD* 612 Sc. Regrinding 613 Fl. Regrinding 141 Sc. Disc Type 142 Fl. Disc Type
ANGLE.........	108A Sc. Disc Type	614 Sc. Regrinding 615 Fl. Regrinding 143 Sc. Disc Type 144 Fl. Disc Type
GATE..........	47 Sc. Trav. Stem 370 Sc. Non-Rising	325 Sc. Non-Rising 326 Fl. Non-Rising 650 Sc. O.S. & Y. 651 Fl. O.S. & Y.
SWING CHECK.	352 Sc. Disc Type 762 Sc. Regrinding	623 Sc. Regrinding 624 Fl. Regrinding 294 Sc. Disc Type 295 Fl. Disc Type
E CONDENSATE TO PUMPS AND WATER SUPPLY GLOBE.........	Same as "D" above	Same as "D" above
ANGLE.........	Same as "D" above	Same as "D" above
GATE.........	Same as "D" above	Same as "D" above
SWING CHECK.	Same as "D" above	Same as "D" above

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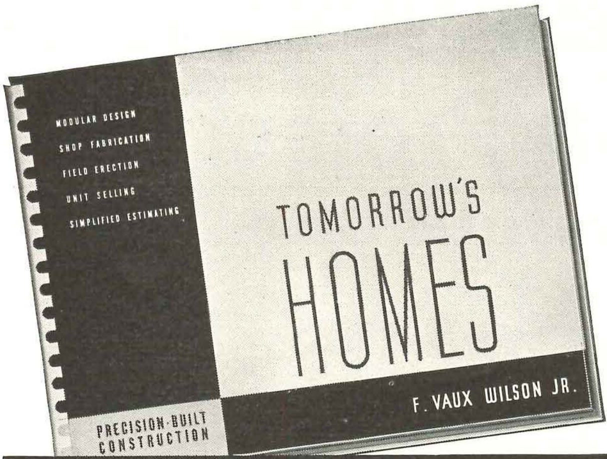

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PRECISION-BUILT HOMES

The knowledge resulting from 15 years of research by Bemis Industries—and 3 years of practical merchandising by Homasote Company—now brings to the building industry a new technique. This technique cuts costs—saves time—benefits all members of the industry proportionately.

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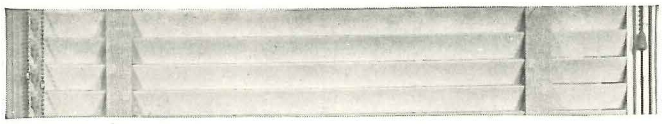

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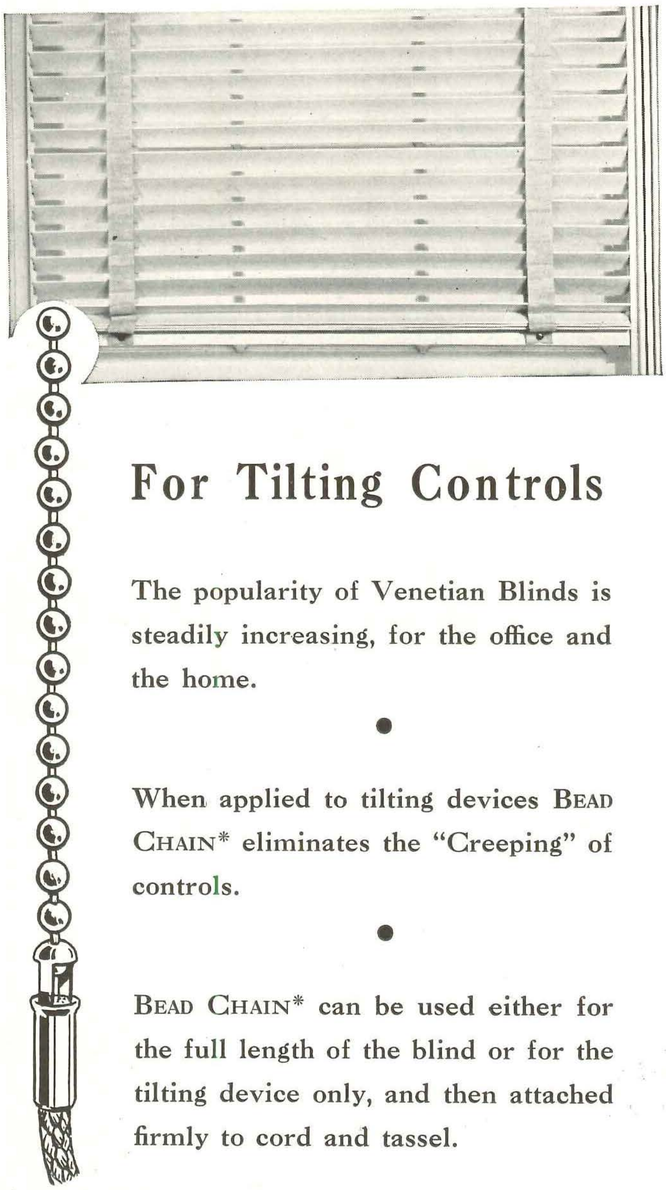

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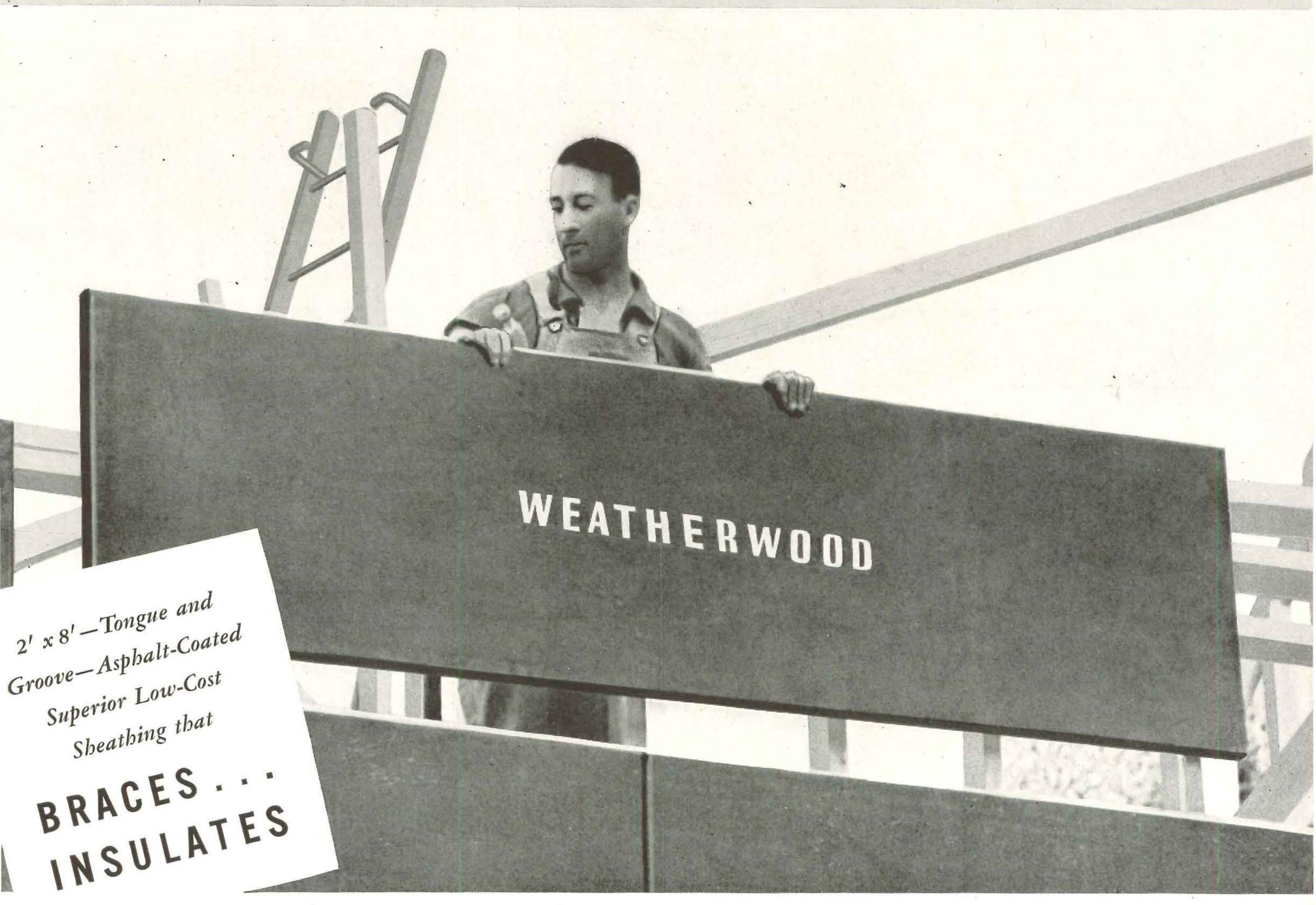

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THIS PLAN BOOK one architect writes, "is just what we have been looking for." Illustrates efficient arrangement of cabinets, counters, sink, range and refrigerator for "L" or "U" or straight line kitchen layouts ... to fit a wide range of building budgets. Sent FREE, write for Plan Book AR-39.

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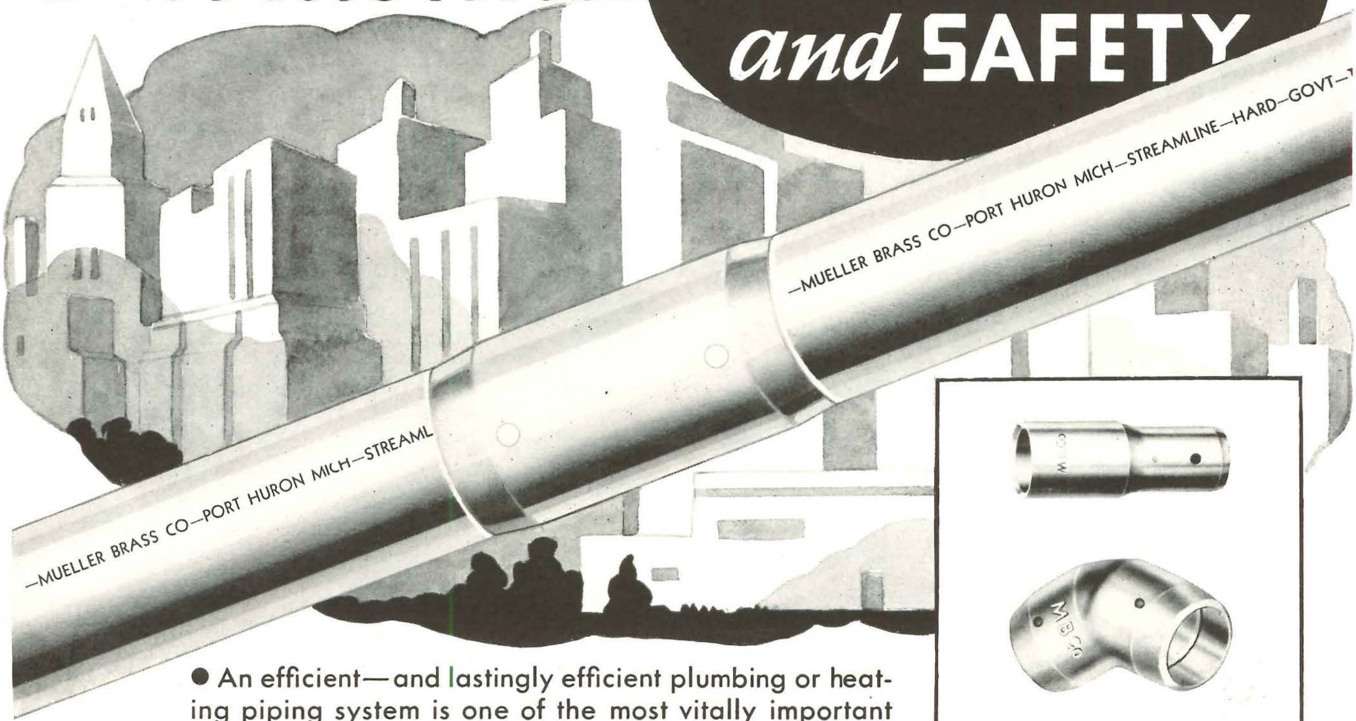

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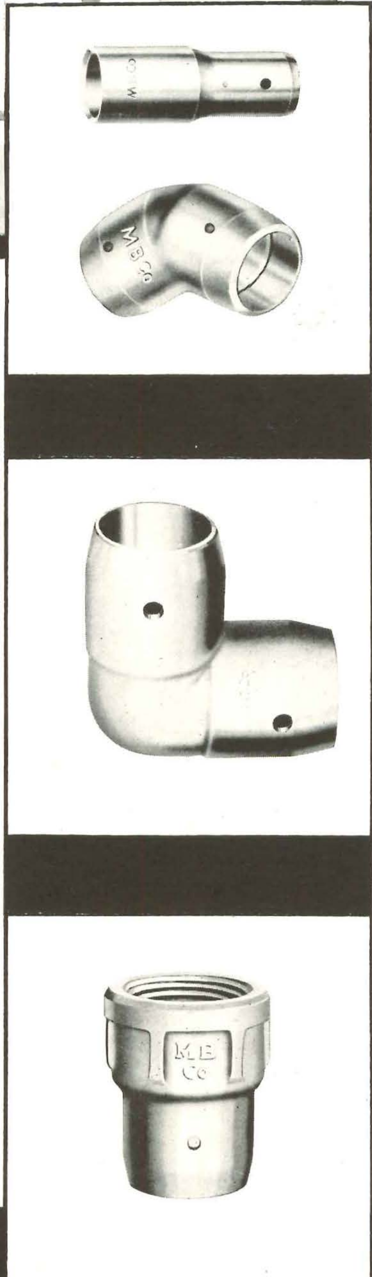

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Architect, Jerome B. Foster, Winchester, Mass.

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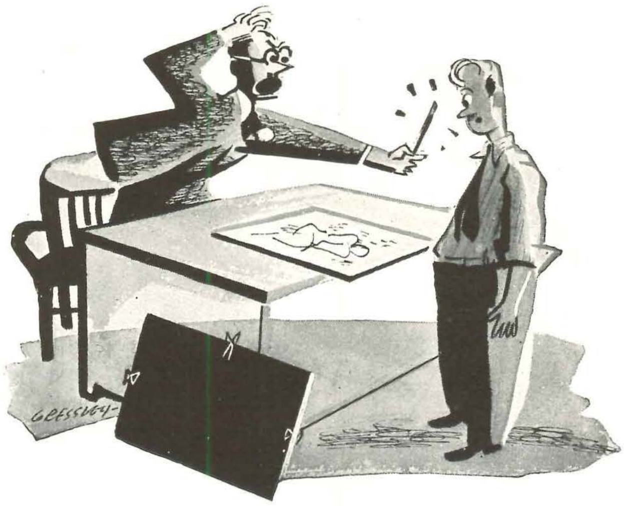
Before you draw another sketch
Remember this, untidy wretch—
'Castell's' the only pencil made
That does not flake, my fine young blade!"



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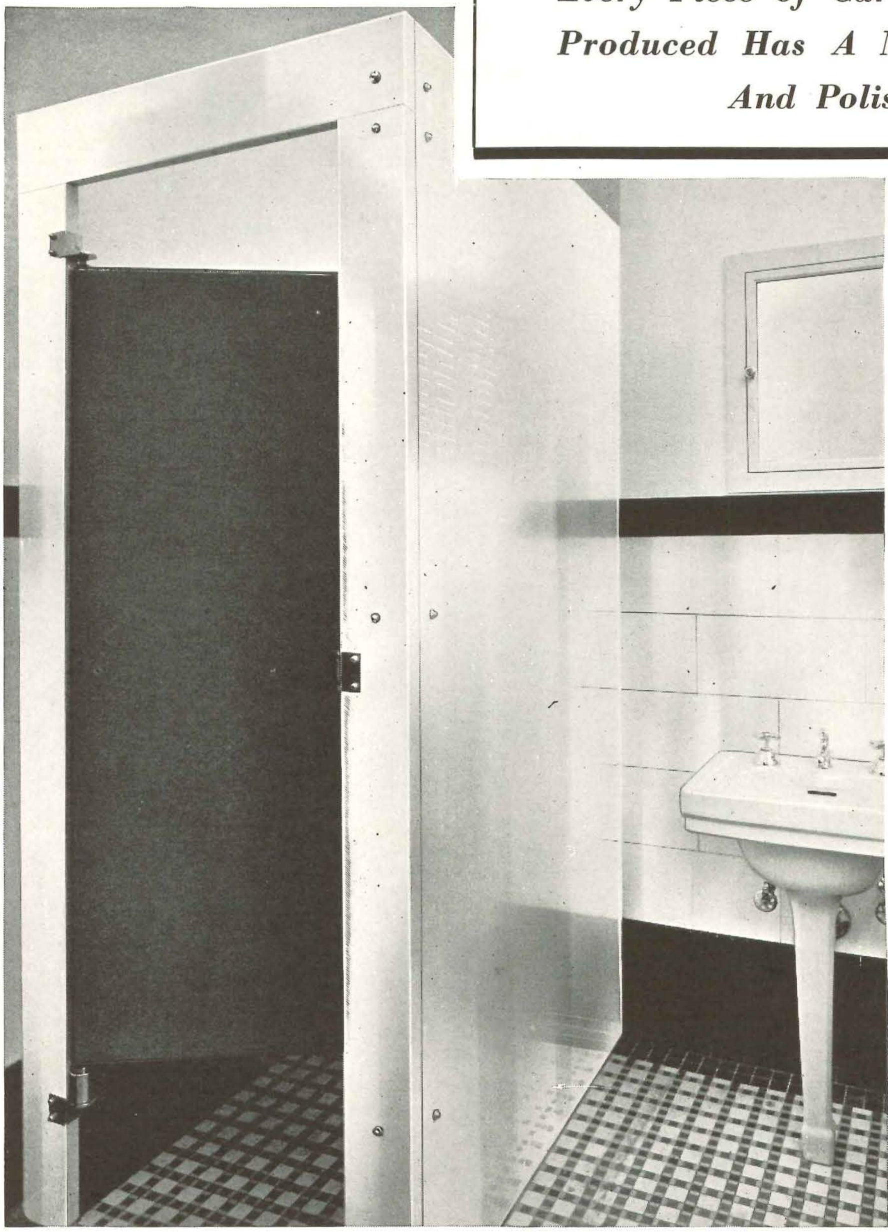

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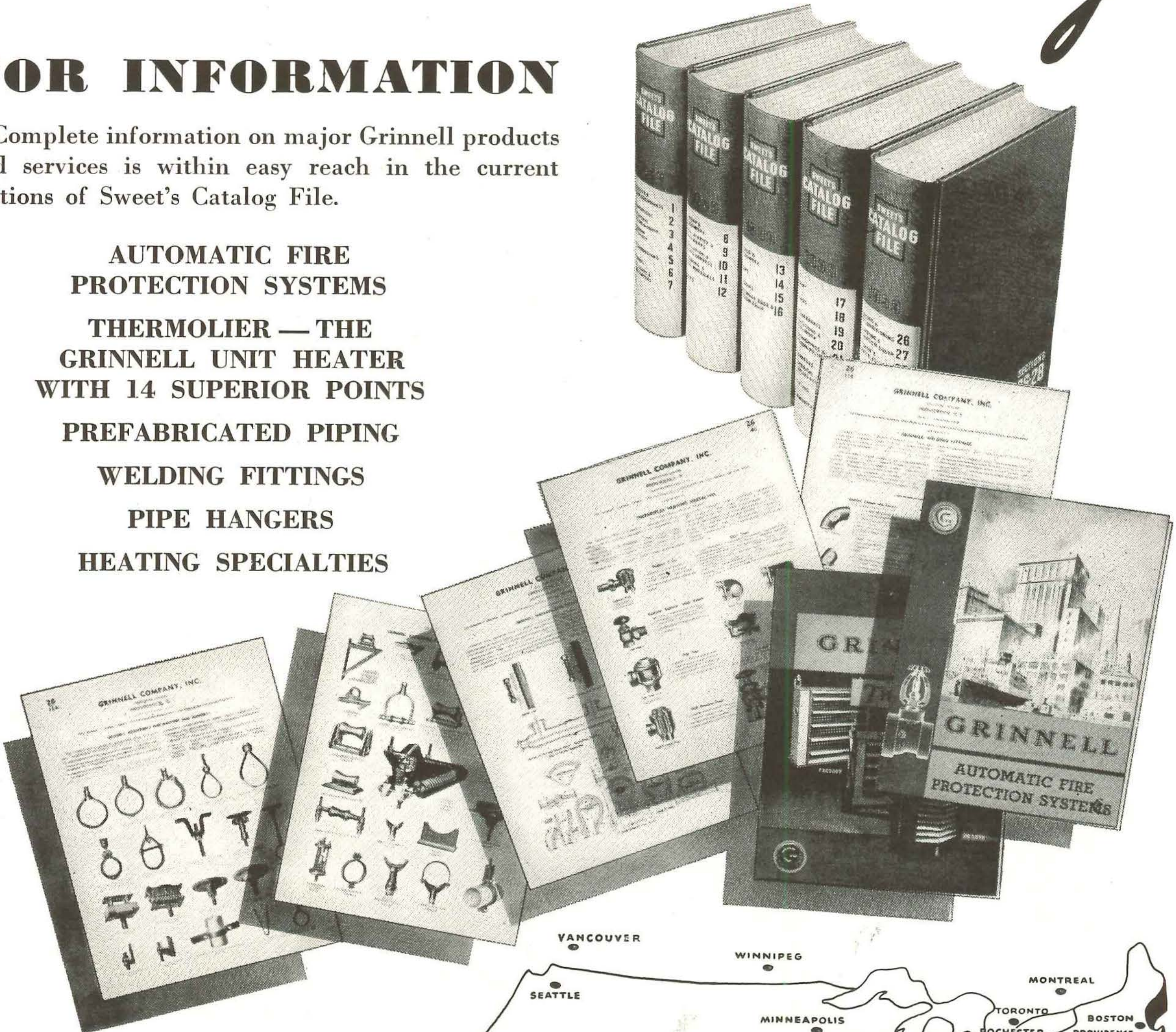

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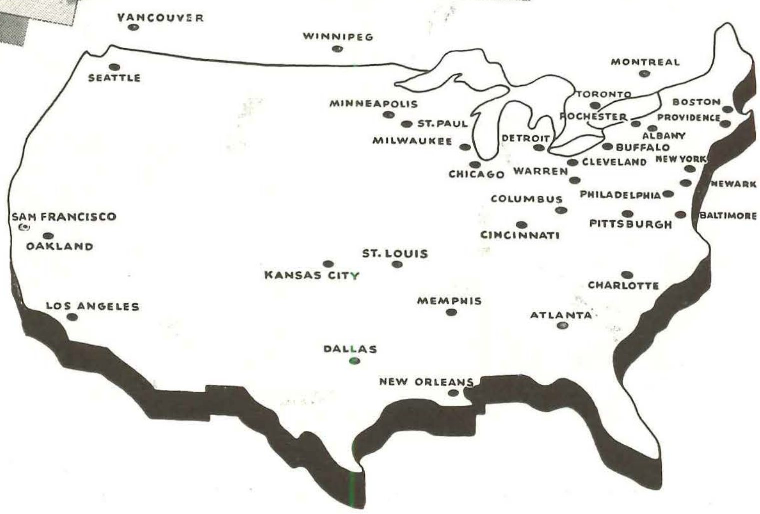

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Carthage Marble Co.
Cartier, M. N. & Sons Co.
Case, W. A., & Son Mfg. Co.
★Casement Hardware Co.
Cast Stone Institute
★Ceco Steel Products Co.
Celcure Southern Corp.
★★★Celotex Corp.
Cemline Corp.
Central Commercial Co.
Central Wire and Iron Works
Century Brass Works, Inc.
Century Fan & Ventilator Co.
Century Lighting, Inc.
Ceresit Waterproofing Corp.
★★Certain-teed Products Corp.
Chamberlin Metal Weather Strip Co., Inc.
Chase Brass & Copper Co., Inc.
Chelsea Elevator Co.
Cheney Co.
Chicago Dryer Co.
Chicago Hardware Foundry Co.
Chicago Spring Hinge Co.
Church, C. F., Mfg. Co.
Cincinnati Fly Screen Co.
Cincinnati Iron Fence Co., Inc.
Clancy, J. R., Inc.
★Clarage Fan Co.
Clark, R. W., Mfg. Co.
Clay Equipment Corp.
Claycraft Co.
Cleveland Lock Works
Clinton Metallic Paint Co.
Coburn Trolley Track Co.
Cohoes Rolling Mill Co.
Cold Spring Granite Co., Inc.
Coleman Lamp & Stove Co.
Colonial Fireplace Co.
Colonial Lumber Specialties, Inc.
Columbia Metal Box Co.
★Columbia Mills, Inc.
Columbia Radiator Co.
Columbus Coated Fabrics Corp.
Combo Corp.
★Combustioneer, Div. Steel Products Engineering Co.
Compound Injector and Specialty Co.
Compound and Pyrono Door Co.
Concrete Plank Co., Inc.
Concrete Steel Co.
Condensation Engineering Corp.
★Congoleum-Nairn Inc.
Conkling Armstrong Terra Cotta Co.
★Consolidated Expanded Metal Cos.
Continental Car-Na-Var Corp.
Continental Clay Products Co.
Cork Import Corp.
★Cork Insulation Co., Inc.
Cornell Iron Works, Inc.
Corning Glass Works
Corry Metal Corp.
Covert, H. W., Co.
Crampton-Farley Mfg. Co.
★Crane Co.
Creo-Dipt Co., Inc.
Crex Patent Column Co.
★Crittall-Federal, Inc.
Croessant Machine Works
Croft Steel Windows, Inc.
Cromar Co.
Crooks, W. D., & Sons
Cuprinol Inc.
Curtis Companies Service Bureau
Curtis Lighting, Inc.
Curtis Refrigerating Machine Co.
Custodis, Alphons, Chimney Construction Co.
Cut Stone Assn. of Indiana
Cutler Mail Chute Co.
Cyclone Fence Co.

D

★Dahlstrom Metallic Door Co.
Davidson Enamel Products, Inc.
Day-Brite Lighting Inc.
Dayton Pump & Mfg. Co.
Deagan, J. C., Inc.
DeBothezat Ventilating Equipment Div. American Machine & Metals, Inc.
Decatur Iron & Steel Co.
★Delco-Frigidaire Conditioning Division, General Motors Corp.
Del Turco Bros., Inc.
Deming Co.
Dennis, W. J., & Co.
Detroit Lubricator Co.

COVER CATALOG
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FLINTKOTE
FITZGIBBONS
STEEL BOILERS
FOR HEATING AND AIR CONDITIONING
FIAT
Distinctive Beauty
FIAT METAL MANUFACTURING CO.
Featherweight Concrete Insulating Roof Slabs
FEDERAL-AMERICAN CEMENT TILE CO.
DESIGN HARMONY
AWNINGS
WINDOWS
GENERAL BRONZE CORPORATION
GENERAL ELECTRIC
HOME WIRING
ARCHITECTS MANUAL
Gilbarco
OIL HEATING
AIR CONDITIONING
FORMICA
WALL COVERING
A MODERN MATERIAL OF STRIKING COLOR, SURFACE AND DECORATIVE FLEXIBILITY!
BROCHURE
ON PLANNING AND EQUIPPING THE MODERN LIBRARY FOR SCHOOL OR COMMUNITY
by Gaylord
BATHROOM ACCESSORIES AND SEAMLESS MEDICINE CABINETS
HALL-MACK
GRINNELL
THERMOLIER
GRINNELL
AUTOMATIC FIRE PROTECTION SYSTEMS
Architectural Specifications
FLOOR PLAN
PAINTING AND DECORATING
GLIDDEN
GOODYEAR
WINGFOOT RUBBER FLOORING AND WALL RUBBER
HerZim
Mouldings of Metal
HERRON-ZIMMERS MOULDING COMPANY, DETROIT
HASTINGS
ASPHALT BLOCKS
MASTERWALLS
movable partitions
BY HAUSERMAN
INFORMATION ON SUPER-Harbord
Roof Ventilators and Auxiliary Equipment
The Name HOPE'S Guarantees
WINDOWS 1939
1818
HOPE'S WINDOWS, INC. JAMESTOWN, NEW YORK
Watrous
FLUSH VALVES
Silver Jubilee
INSUL
INTERNATIONAL "FUEL-SAVER" WATER TUBE STEEL HEATING BOILER

Catalogs filed in Sweet's are UP TO DATE— obsolete information is automatically eliminated

★Detroit Show Case Co.
★Detroit Steel Products Co.
Detroit Stoker Co.
Devoe & Raynolds Co., Inc.
Diamond Mfg. Co.
Diebold Safe & Lock Co.
Dieterich Steel Cabinet Corp.
Dixon, Joseph, Crucible Co.
★Dodge, F. W. Corp.
Dolge, C. B., Co.
Domestic Hill Laundry Equipment Co., Inc.
★Donley Brothers Co.
Doran Co.
★Douglas Fir Plywood Assn.
Doyle, John M.
Dravo Corp.
Driwood Corp.
Drouvé, G., Co.
Dubois Fence & Garden Co., Inc.
★Dunham, C. A., Co.
Duplex Hanger Co.
Duplex Inc.
Duplex Incinerator Div. of the Consolidated Iron-Steel Mfg. Co.
du Pont de Nemours, E. I., & Co., Inc.
Durabilt Steel Locker Co.
Duraflex Corp.
Duriron Co., Inc.
Duro Co.
Durr, A., & Co.
Dusing & Hunt, Inc.

E

★Eagle-Picher Sales Co.
Eastern Terra Cotta Co.
Ebco Mfg. Co.
Econ-O-Col Stoker Div. Cotta Transmission Co.
Economy Pumps, Inc.
Edison General Electric Appliance Co., Inc.
Edwards and Co., Inc.
Edwards Mfg. Co.
Ehret Magnesia Mfg. Co.
Elaterite Paint & Mfg. Co.
Electrol Incorporated
Elevator Supplies Co., Inc.
Elgin Stove & Oven Co.
Elhide Co.
Elian, Frank, & Co.
Elkay Mfg. Co.
Elkhart Brass Mfg. Co.
★Ellison Bronze Co., Inc.
Ellison Louvre Co., Inc.
Emerson Electric Mfg. Co.
Empire Varnish Co.
Enamel Products Co.
Energy Elevator Co.
Equal-Aire Incinerator Div. Sargent Building Specialties Co.
Erie Enameling Co.
Erikson Electric Co.
Ernst, Charles K., Inc.
Evans, W. L., Co.
Everhard Mfg. Co.
Everseal Mfg. Co., Inc.
Everson Mfg. Co.
Ewing Incinerator Co.
Excel Metal Cabinet Co., Inc.

F

Fairbanks, Morse & Co.
★Fairfacts Co., Inc.
Fairhurst, John T.
★Fanner Mfg. Co.
Faries Mfg. Co.
Farley & Loetscher Mfg. Co.
Farrar & Trefts Inc.
Fedders Mfg. Co.
★Federal-American Cement Tile Co.
Federal Seaboard Terra Cotta Corp.
Ferro-Co Corp.
★Fiat Metal Mfg. Co.
Filtrine Mfg. Co.
Finishing Lime Assn. of Ohio
Finnell System, Inc.
★Fir-Tex Insulating Board Co.
Fiske, J. W., Iron Works
★Fitzgibbons Boiler Co.. Inc.
Fletcher, H. E., Co.
★Flintkote Co.
Flour City Ornamental Iron Co.
Flush-Metal Partition Corp.
Flynn, Michael, Mfg. Co.
Forman Co.
★Formica Insulation Co.
Foster, Guy C., Inc.
Fourco Glass Co.
Fox Furnace Co.
Frantz Mfg. Co.
Frederick Iron & Steel Co.
Frick Co.
Friedrich, E. H., Co.
Fries and Son Steel Construction and Engineering Co.
Fulton Sylphon Co.

G

Gail, G. W., Inc.
Galloway Terra Cotta Co.
Garcy Reflectors Div. of Garden City Plating & Mfg. Co.
Garden City Plating & Mfg. Co.
★Gaylord Bros., Inc.
General Alloys Co.
★General Bronze Corp.
General Controls Co.
★General Electric Co.
General Insulation & Mfg. Co.
General Sheet Metal Works, Inc.
Gerity-Adrian Mfg. Corp.
Germain Mfg. Co.
Gerstein & Cooper Co.
Getty, H. S., & Co., Inc.
Gibson & Kirk Co.
★Gilbert & Barker Mfg. Co.
Gillis & Geoghegan, Inc.
★Glazed Brick & Tile Institute
Gleason-Tiebout Glass Co.
★Glidden Co.
Goder, Joseph, Incinerators
Goldsmith Metal Lath Co.
Goodrich Electric Co.
★Goodyear Tire & Rubber Co., Inc.
Goss, John L., Corp.
Governale Bros., Inc.
Grand Rapids Hardware Co.
Granidur Products Co.
Granite Assn.
Grant Elevator Equipment Corp.
Grant Pulley and Hardware Co.
★★Grinnell Co., Inc.
Guastavino, R., Co.
Gullborg, John S., Mfg. Co.
Guth, Edwin F., Co.

H

H. L. G. Co.
Hachmeister-Inc.
★Hallenscheid & McDonald
Hamilton Mfg. Co.
Hamlin, Irving
Hamm, S. H., & Son
Hammond Instrument Co.
Hansell-Elcock Co.
★Harbor Plywood Corp.
Hardwood Products Corp.
Harrington & King Perforating Co.
Harris Mfg. Co.
Harrison-Weise Co.
Hart & Cooley Mfg. Co.
Hart Mfg. Co.
Hartmann-Sanders Co.
Hartshorn, Stewart, Co.
Haskelite Mfg. Corp.
Haslett Chute and Conveyor Co.
Hastings & Co.
★Hastings Pavement Co.
★Hauserman, E. F., Co.
Hausman Steel Co.
Hazard Insulated Wire Works, Div. of Okonite Co.
Healy-Ruff Co.
Heatilator Co.
Heil Co.
Henderson Bros.
Hendrick Mfg. Co.
Hermann & Grace Co.

COVER CATALOG
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INTERNATIONAL REVOLVING DOORS
Johns-Manville SOUND CONTROL
JOHNS-MANVILLE
Bonded
BUILT-UP ROOFS
TRANSITE WALLS
JOHNSON WINDOW Screens
JOHNSON CONTROL
KINNEAR ROLLING DOORS
J&L
JUNIOR BEAM FLOORS
FOR RESIDENCES SCHOOLS AND OTHER LIGHT OCCUPANCY BUILDINGS
JOSAM PRODUCTS
Kawneer
STORE FRONTS
Kawneer
Marlite
FOR CREATING BEAUTIFUL INTERIORS
KOPPERS Specifications
LAWSON BATHROOM CABINETS
LOF
Glass
Versatility in TERRAZZO
with DIVIDING STRIPS
MERKIN
PAINTS AND ARCHITECTURAL FINISHES
MERKIN
MASTER METAL WEATHERSTRIPS
MASTERBUILT PRODUCTS
MASONITE
STRUCTURAL INSULATION
MASONITE CANEC—MASONITE DUBLSEAL
INSULATING LATH—QUARTRBOARD
PRESDWOOD TEMPRTILE
PRESDWOOD AND TEMPERED PRESDWOOD
1939
MASONITE Corporation
111 W. Washington Street, CHICAGO, ILLINOIS
Genuine
MASONITE TEMPERED PRESDWOOD
1939
MASONITE Corporation
111 W. Washington Street, CHICAGO, ILLINOIS
MILCOR MANUAL
FIREPROOF BUILDING PRODUCTS
MILCOR STEEL COMPANY
MODERNIZE!
THE MILLS COMPANY, 965 Wayside Rd., Cleveland
Miami
CAREY • COLONIAL
Bathroom Cabinets
Bathroom Accessories and Mirrors
Mesker METAL WINDOWS
SINCE 1879
FERROMETAL

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★Herron-Zimmers Moulding Co.
Hess Warming & Ventilating Co.
Hetson-Sommers Co., Inc.
Hetzel Roofing Products Co.
Higgin Products, Inc.
Hill, C. V., & Co., Inc.
Hillyard Sales Co.
★Himmel Brothers Co.
★Hirschman, W. F., Co., Inc.
Hitchings & Co.
Hobart Mfg. Co.
Hockaday, Inc.
Hoegger, Inc.
Hoffman, Andrew
Hoffman Specialty Co., Inc.
Holland Furnace Co.
Holmes Products Co.
Holophane Co., Inc.
Holt Hardwood Co.
Homasote Co.
Hood, B. Mifflin, Co.
Hood Rubber Co., Inc.
★Hope's Windows Inc.
Horn, A. C., Co.
Horn Folding Partition Co.
Houston Metal Products Div. of Vent-O-Lite Co.
Howie Co.
Hubbell, Harvey, Inc.
Huck-Gerhardt Co., Inc.
Hunt, Robert W., Co.
Huntington Laboratories, Inc.
Hussey, C. G., & Co.
Hydraulic-Press Brick Co.
Hydrolithic Waterproofing Co., Inc.
Hy-Test Cement Co.

I

Ideal Hanger Co.
Ideal Ventilator Co.
Ilg Electric Ventilating Co.
Illinois Bronze & Iron Works
★Imperial Brass Mfg. Co.
Inclinator Co. of America
Independent Register Co.
Indiana Foundry Co.
Indiana Limestone Corp.
Ingersoll-Rand Co.
Ingram-Richardson Mfg. Co. of Indiana, Inc.
Inland Steel Co.
★Insulite Co.
★International Boiler Works Co.
International Business Machines Corp., International Time Recording Div.
★International Revolving Door Co.
Interstate Shade Cloth Co.
Iron Fireman Mfg. Co.
Irving Subway Grating Co., Inc.
Ives, H. B., Co.

J

Jackson, Wm. H., Co.
James Lumber Co.
Jamestown Metal Corp.
Jamison Cold Storage Door Co.
Janes & Kirtland, Inc.
Jenkins Bros.
Jennison-Wright Co.
Jewel Electric & Mfg. Co.
★★★Johns-Manville
Johnson, Geo. W., Mfg. Co.
★Johnson Metal Products Co.
Johnson, S. C., & Son, Inc.
★Johnson Service Co.
Jones, Harold K., Co.
★Jones & Laughlin Steel Corp.
★Josam Mfg. Co.
Just Mfg. Co.

K

Kalman Floor Co., Inc.
Kane Mfg. Corp.
Kason Hardware Corp.
Kaustine Co., Inc.
★★Kawneer Co.
Keasbey & Mattison Co.
Kelley Island Lime & Transport Co.
Kellogg, M. W., Co.
Kellogg Mann Corp.
Kennedy, David E., Inc.
Kentucky Metal Products Co., Inc.
Kerlow Steel Flooring Co.
Kerner Incinerator Co.
Ketcham, G. M., Mfg. Corp.
Kewanee Boiler Corp.
Kewaunee Mfg. Co.
Keystone Shower Door Co.
Keystone Varnish Co.
Kiesling, John W., & Sons, Inc.
Kimberly-Clark Corp.
King, E. & F., Co., Inc.
★Kinnear Mfg. Co.
Kiromac Mfg. Co.
Kitchen Maid Corp.
Kleistone Rubber Co., Inc.
Klemp, William F., Co., Inc.
Kliegl Bros.
Kloes, F. J., Inc.
Knape & Vogt Mfg. Co.
★Knapp Bros. Mfg. Co.
Knight, Maurice A.
Knowles Mushroom Ventilator Co.
Koch Refrigerators, Div. of Koch Butchers Supply Co.
Kokomo Sanitary Pottery Corp.
Kompolite Co., Inc.
Kopp Glass, Inc.
★Koppers Co.
Kosmos Portland Cement Co., Inc.
Kraftile Co.
Kuhls, H. B. Fred

L

Lally Column Co.
Lamella Roof Syndicate, Inc.
Lamson Co.
Lastik Products Co., Inc.
Lathrop-Hoge Gypsum Construction Co.
★Lawson, F. H., Co.
Ledkote Products Co.
Lehman Sprayshield Co.
Lennox Furnace Co., Inc.
Leonard, P. C., Co.
Leonard Valve Co.
Levow, David
Lewis Asphalt Engineering Corp.
Lewis, Fred H., Co.
★Libbey-Owens-Ford Glass Co.
Lingo, John E., & Son, Inc.
Link-Belt Co.
Lith-I-Bar Co.
Locher & Co., Inc.
Lockstrip Mfg. Corp.
Logan Co.
Long Fir Gutter Co.
Lord & Burnham Co.
Louden Machinery Co.
Louisville Cement Co., Inc.
Lucke, William B., Inc.
Ludowici-Celadon Co.
Lundell-Eckberg Mfg. Co., Inc.
Lutton, Wm. H., Co., Inc.
Lynch, Kenneth, Inc.
Lyon, Conklin & Co., Inc.
Lyon Metal Products, Inc.

M

MacArthur Concrete Pile Corp.
MacDonald Hardware Mfg. Co.
Machinery Builders, Inc.
Macomber, Inc.
Mahogany Association, Inc.
Mahon, R. C., Co.
Majestic Co.
Majestic Flashing Co.
★Manhattan Terrazzo Brass Strip Co., Inc.
Manly Jail Works
Maple Flooring Mfrs. Assn.
Marbleoid, Inc.
Marcrome Art Marble Co.

★ COVER CATALOG
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MODINE
MUELLER
MORTON
MOSAIC
CLAY-TILES
Williamsburg
Gold
HANDBOOK
Bond
CATALOG OF GOLD BOND
WALL AND CEILING
BUILDING MATERIALS
- 1939 -
A Manual of STANDARD CONSTRUCTION for STOCK SASH DOORS and FRAMES
natco
GLAZED STRUCTURAL FACING TILE
50 YEARS
JOINTITE
CORK PRODUCTS
LCN
Overhead-Floor-Surface
DOOR CLOSERS
LCN THE COMPLETE LINE OF CONCEALED AND SURFACE DOOR CLOSERS FOR EVERY PURPOSE
DETAILS AND DATA for SCREEN INSTALLATIONS
NATIONAL
"Cabinets with Character"
NATIONAL WOOD PRODUCTS
FLOORING
glass blocks
CORRUGATED WIRE GLASS
PARKER
BATHROOM
ACCESSORIES
CABINETS
MIRRORS
PEELLE
FREIGHT ELEVATOR • DUMBWAITER • INDUSTRIAL ENTRANCE
DOORS
THE PEELLE COMPANY • BROOKLYN, N.Y.
OWENS-ILLINOIS
INSULUX
GLASS BLOCK
PITTCO
STORE FRONT METAL
PITTSBURGH
PLATE GLASS COMPANY
PERMAFLECT
GLASS PRODUCTS
PITTSBURGH
PLATE GLASS COMPANY
PITTSBURGH PAINTS
Smooth as Glass
of the PITTSBURGH PLATE GLASS COMPANY
CONCRETE INFORMA
POMEROY
ARCHITECTS'
HANDBOOK OF

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Market Forge Co.
Marsh Electro Chlorination Co., Inc.
★Marsh Wall Products Co.
★Masonite Corp.
Massachusetts Blower Div. of Bishop & Babcock Mfg. Co.
★Master Builders Co.
★Master Metal Strip Service
Masury, John W., & Son
Mathieson Alkali Works, Inc
Matot, D. A.
Matthews, Jas. H., & Co.
Maximent Co.
May Oil Burner Corp.
McCormick Longmeadow Stone Co., Inc.
McCray Refrigerator Co.
McDonnell & Miller
McGann, T. F., & Sons Co.
McIntire, F. N., Brass Works
McKee Door Co.
McKeown Bros. Co.
McKinney Mfg. Co.
McMillen, R., Co.
McShane Bell Foundry Co.
Medart, Fred, Mfg. Co.
Medusa Portland Cement Co.
Meierjohn-Metalcrafts-Wengler, Inc.
Meneely Bell Co.
Mercoid Corp.
Merit Shower Cabinet Corp.
★Merkin, M. J., Paint Co., Inc.
★Mesker Bros. Iron Co.
Metal Clad Doors, Inc.
Metalace Corp.
Metropolitan Greenhouse Mfg. Corp.
★Miami Cabinet Div., Philip Carey Co.
Micro-Westco, Inc.
Middleton Metal Products Co.
Midland Chemical Laboratories, Inc.
Midwest Concealed Bed Corp.
★Milcor Steel Co.
★Mills Co.
★Milwaukee Stamping Co.
Milwaukee Valve Co.
Minneapolis-Honeywell Regulator Co.
Minwax Co.
Mississippi Glass Co.
Mitchell Mfg. Co.
Modern Steel Equipment Co.
★Modine Mfg. Co.
Moeschl-Edwards Corrugating Co., Inc.
Mogul Corp.
★Mohawk Asbestos Shingles, Inc.
Monarch Metal Weatherstrip Corp.
Monroe, Lederer & Taussig, Inc.
Moore, P. O., Inc.
Morse Boulger Destructor Co.
★Morton Mfg. Co.
★Mosaic Tile Co.
Mosler Safe Co.
Motorstokor Div. Hershey Machine & Foundry Co.
Moulding, Thos., Floor Mfg. Co.
★Mueller, L. J., Furnace Co.
Muellermist Irrigation Co.
★Mundet Cork Corp.
Muralo Co., Inc.
Murphy Door Bed Co.
Murray Tile Co., Inc.
Mutschler Bros. Co.
Myers, F. E., & Bro. Co.

N

N. S. W. Co.
Nailcrete Corp.
Nash Engineering Co.
National Chemical & Mfg. Co.
★National Door Mfrs. Assn., Inc.
★National Fireproofing Corp.
★★National Gypsum Co.
★National Lead Co.
★National Metal Products Co.
National Mortar & Supply Co.
National Naylegrip Co., Inc.
National Oak Flooring Mfrs. Assn.
National Pipe Bending Co., Inc.
National Steel Partition Co., Inc.
National Store Fronts
National Terrazzo & Mosaic Assn.
National Tile Co.
★National Wood Products Div. Evans Products Co.
Natural Slate Blackboard Co.
Nessler Mfg. Co.
Never-Split Seat Co.
New Castle Products
New Jersey Fence Co.
New York Awning Co., Inc.
New York Silicate Book Slate Co., Inc.
Norquist Products, Inc.
North American Iron & Steel Co.
North Bangor Slate Co.
North Carolina Granite Corp.
Norton Co.
★Norton Door Closer Co.
★Norton Lasier Co.

O

O'Brien Brothers Slate Co., Inc.
Ohio Hydrate & Supply Co.
Ohio Rubber Co.
★Orange Screen Co.
Ornamental Iron Work Co.
Otis Elevator Co.
Overhead Door Corp.
Overly Mfg. Co.
★Owens-Illinois Glass Co.

P

Page Fence Assn.
Page & Hill Co.
Paine Co.
Paine Lumber Co., Ltd.
Palmer Products, Inc.
Paraffine Cos., Inc.
★Parker, Charles, Co.
Parker Rust-Proof Co.
Parsons Co.
Partrick & Wilkins Co.
Pass & Seymour, Inc.
Passonno-Hutcheon Co.
Patterson-Kelley Co., Inc.
Pauly Jail Building Co.
Payne, F. S., Co.
Payne-Spiers Studios, Inc.
Peaslee-Gaulbert Paint & Varnish Co., Inc.
Pecora Paint Co., Inc.
★Peelle Co.
Peerless Mfg. Corp., Inc.
Penberthy Injector Co.
Penn Brass & Bronze Works
Penn Metal Co., Inc.
Penn Ventilating Co.
★Pennsylvania Wire Glass Co.
Penrod, Jurden & Clark Co.
Perey Turnstile Co.
Permutit Co.
Peterson and Neville, Inc.
Phelps Dodge Copper Products Corp.
Philgas Dept., Phillips Petroleum Co.
Philipp Mfg. Co.
Phoenix Glass Co.
Phoenix Ventilator Co.
Pitt, William R., Composite Iron Works
★Pittsburgh Corning Corp.
Pittsburgh Incinerator Co.
★★★Pittsburgh Plate Glass Co.
★Pittsburgh Reflector Co.
Pittsburgh Testing Laboratory
Plastic Products Co.
Pole and Tube Works, Inc.
★Pomeroy, S. H., Co., Inc.
Porcelain Metals, Inc.
Porcelain Products Co.
Porete Mfg. Co.
Porter, H. W., & Co., Inc.
★Portland Cement Assn.
Potts Ash Hoist Corp.

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PROTEX
Weatherstrips
Facts about
FIREPROOFED
WOOD
RAYMOND
REPUBLIC
STEEL
Revere
COPPER BRASS BRONZE
AND NICKEL SILVER
Architectural
Shapes & Sheets
Richmond
Doors
by
RODDIS
Pella
PRODUCTS
BUILT-
27
Revere
COPPER
& BRASS
Pipe
& Tubing
6
Revere
COPPER
Roofing
& Flashings
Sanymetal
TOILET ROOM ENVIRONMENTS
CATALOG NO. 76
SCHWITZER-
CUMMINS
and its Products
Flooring
BY SERVICISED PRODUCTS CORPORATION
RU-BER-OID
Asbestos-Cement
SHINGLES
Asphalt
RUUD
gas
WATER
HEATERS
GO GAS
SLOAN
FLUSH VALVES
SLOAN VALVE COMPANY
CHICAGO, ILL., U.S.A.
BUILDING
Beauty
UNDERFOOT
Sloane-Blabon
LINOLEUMS
SNEAD & Company
Steel
MOBILWALLS
SOUND PROOFED AND SOUND ABSORBING
A
Guide
to
PAINTING
VARNISHING
and
FINISHING
Cleveland · Ohio
DEPARTMENT of ARCHITECTURAL SERVICE
WHEELOCK APPARATUS
Wheelock STANDARDS
SIGNAL
FOUNDATIONS
UNDERPINNING
SPRAYO-FLAKE
INSULATION
COVERS LIKE A BLANKET
TECHNICAL DATA and
SPECIFICATIONS
SPRAYO-FLAKE COMPANY
STAR
GLAZED · UNGLAZ
FACING AND FLOOR
PRODUCTS
THE STARK BRICK COMPANY, CANTON
SILVERCOTE
BRAND OF
REFLECTIVE
INSULATION
TUFCOTE
REINFORCED
WATERPROOF
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STRAN-STEEL
Architectural and Engineering Data
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Pratt & Lambert-Inc.
Pressed Prism Plate Glass Co.
Procter & Gamble Co.
★Protex Weatherstrip Mfg. Co.
★Protexol Corp.
Pryne & Co., Inc.
Pullclean Towel Cabinet Co., Inc.
Pullman Mfg. Corp.
Puro Filter Corporation of America
Pyramid Metals Co.
Pyrofax Div., Carbide and Carbon Chemicals Corp.
Pyroneel Co., Inc.

Q

Quaker City Metal Products Corp.

R

R-C-A Rubber Co.
Rackle, Geo., & Sons Co.
Rawlplug Co., Inc.
★Raymond Concrete Pile Co., Inc.
Reardon Co.
Receivador Div. Metal Office Furniture Co.
Recreation Equipment Co.
Red Cedar Shingle Bureau
Reese Metal Weather Strip Co.
Rees-Volckmann Co., Inc.
Register & Grille Mfg. Co., Inc.
Reilly Tar & Chemical Corp.
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Riesner, Benjamin
Rittenhouse, A. E., Co., Inc.
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COVER CATALOG
Please see note on last page

This list continued on second page following


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COVER CATALOG
Please see note on last page

GROWTH OF COVER CATALOGS IN SWEET'S
and what it signifies

Of all the suggestions from Sweet's users for the improvement of the service, one occurs more frequently than any other —

> **"Get the manufacturers to put *more information* in their catalogs in Sweet's."**

The mutual advantage of such a move is being increasingly recognized. Each year, more and more manufacturers call on Sweet's Consulting Staff to assist them in the preparation of catalogs which shall be adequate to meet your information requirements.

Many requested that their catalogs, so prepared, be filed in their own individual covers. Sweet's made covers optional on catalogs of twelve pages or more. Nearly two-thirds of all the information in the current Sweet's Catalog File is presented in the form of cover catalogs, like those illustrated in the foregoing pages. Ten years ago there was only one such catalog. In the following year, there were nine. Today there are 189!

A MEASURE OF PROGRESS
in the development of SWEET'S CATALOG FILE

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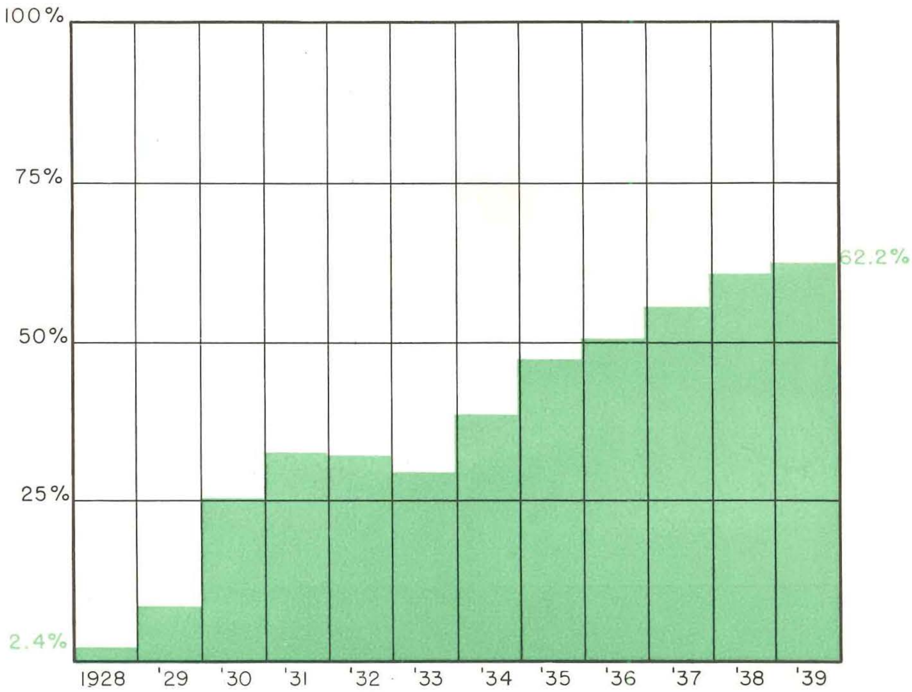

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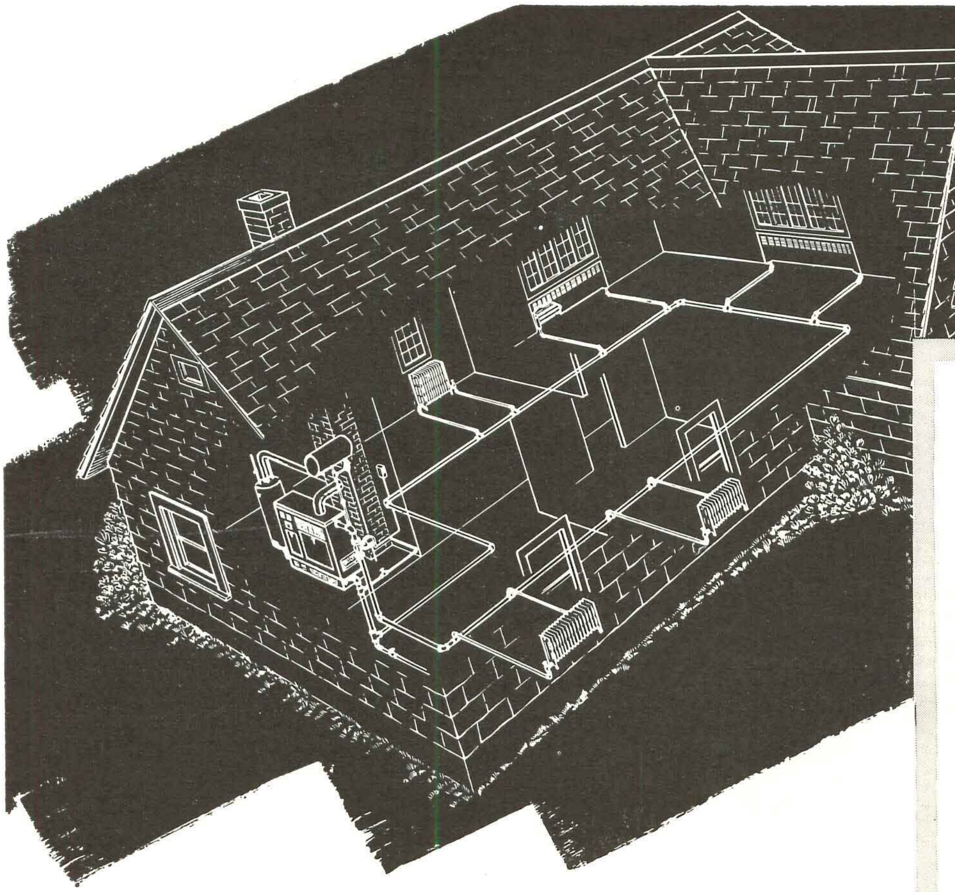


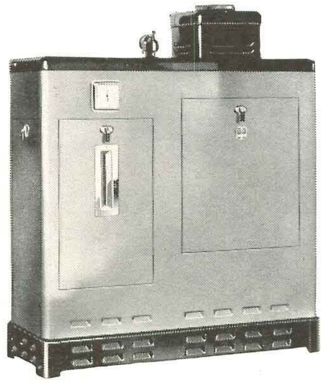
CLIENTS ARE ASSURED COMFORT

when heating specifications read CRANE

HERE is a Monoflo, single main hot water system planned for a one-story house with a utility room. From the gas fired boiler—the valves and fittings—the controls—to the convectors and radiators, it is a Crane *Complete* Automatic System.

Architects interested in the newest developments in heating will find in the Crane line equipment designed to suit today's needs and today's standards of comfort. Included are boilers, attractive in appearance, compact and efficient in design, each engineered to burn one fuel, coal, oil or gas, most economically. Here, too, are slim tube radiators that require little floor space, convectors that may be fully recessed into walls—automatic controls that guarantee any temperature desired and maintain that temperature faithfully—with no attention from the owner.

Crane Heating Systems are complete—including equipment for any steam or hot water installation. The whole system is a single unit; and one source of supply, a single responsibility, is your guarantee of quicker installation—of maximum heating service and satisfaction for your clients. It will pay you to use your Crane Catalog when writing specifications or to consult the nearest Crane Branch for suggestions on the design of a heating system best suited to your plans.



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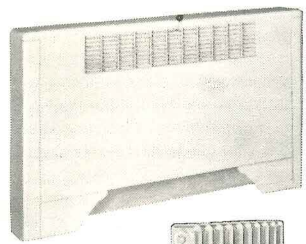

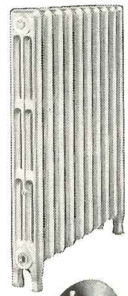

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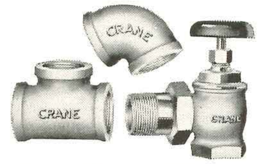
Crane Automatic Controls



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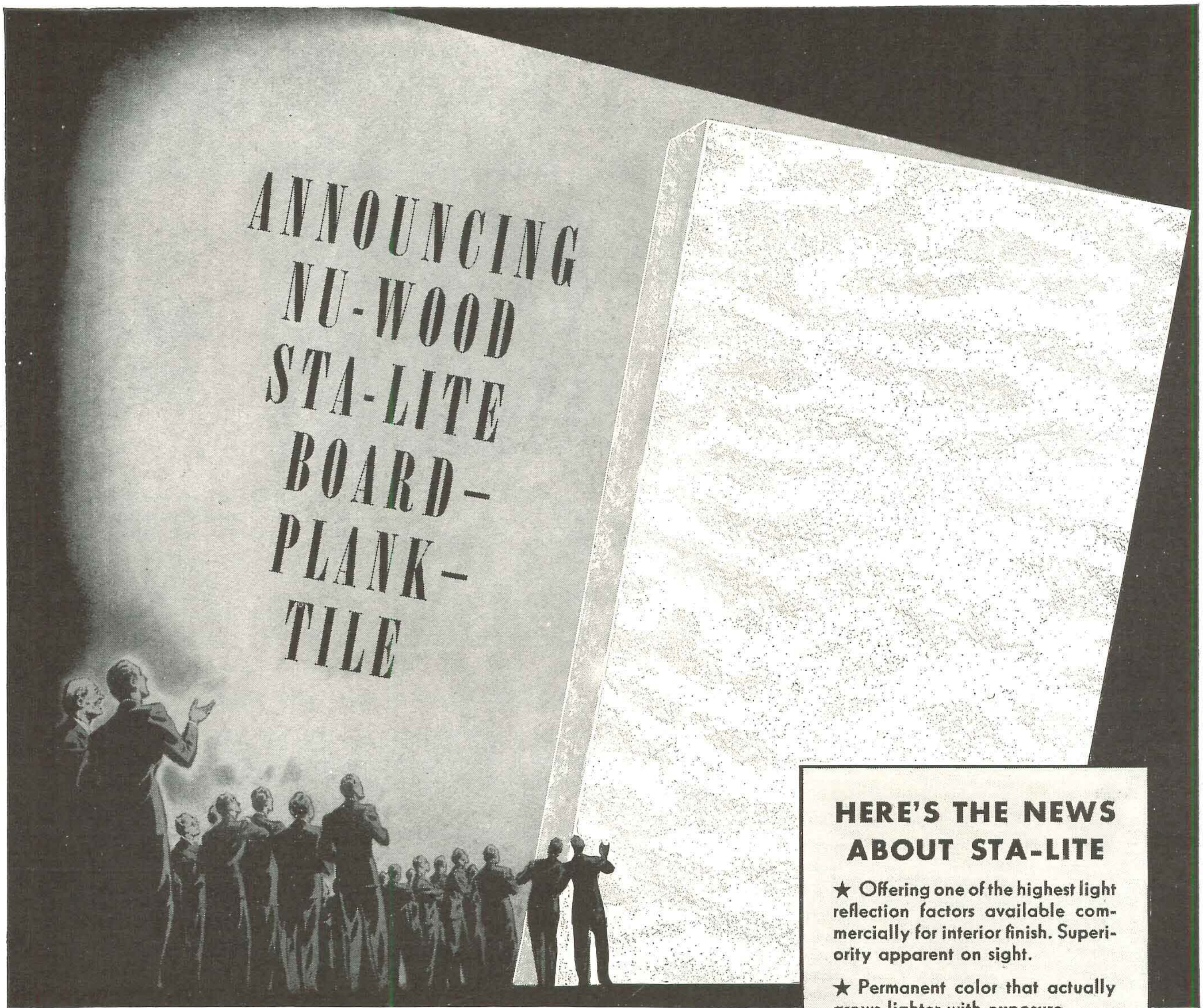

The greatest innovation in insulating interior finish since NU-WOOD introduced Tile and Plank

THERE'S a *new* Nu-Wood product for 1939—the greatest innovation in insulating interior finish since Nu-Wood introduced Tile and Plank. Here's a product that increases Nu-Wood leadership still further and gives YOU new interior finish usefulness! It's NU-WOOD STA-LITE—a unique wall and ceiling covering that combines well-known and approved Nu-Wood qualities with extremely high light reflection value and color permanence. "Better Sight" campaigns have paved the way for Nu-Wood Sta-Lite . . . and this unique new product fills a long-sought need in homes . . . in business and industrial buildings . . . in a multitude of uses everywhere. It offers additional evidence that Nu-Wood—the best-known interior finish in its field—is forging ahead again in 1939.

Get the facts—learn the complete story of this striking new interior finish. Write us for a sample of Sta-Lite today!

HERE'S THE NEWS ABOUT STA-LITE

★ Offering one of the highest light reflection factors available commercially for interior finish. Superiority apparent on sight.

★ Permanent color that actually grows lighter with exposure.

★ Beautifully textured, matched surface—an outstanding, exclusive feature.

★ Maintains insulating, acoustical and decorative features of Nu-Wood interior finish.

★ New tongue-and-groove joints which assure easier, more foolproof application.

★ Easily cleaned with a sponge or cloth—excellent paint coverage.

★ Ties in with "Better Sight" movement—opens up an entirely new field for Nu-Wood interior finish.

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ROOM 115-3, FIRST NATIONAL BANK BLDG.
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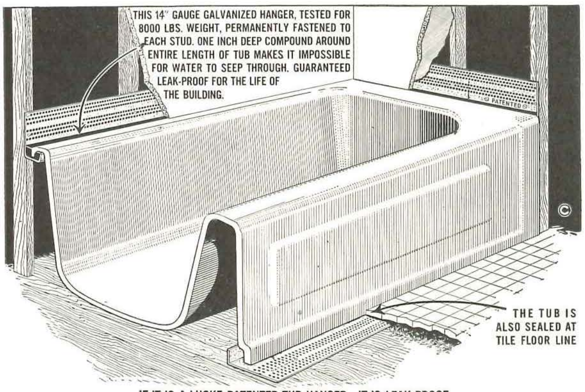
BALSAM-WOOL AND NU-WOOD INSULATION

YOU CAN TIE

This Leak Proof Protection Into Your Bathroom at Small Additional Cost



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No more cracks at tub rims. No more leaks. Guaranteed for the life of the building because Hanger is built into wall and holds tub securely for its entire length.

The exclusive leak-proof filler seals tub edges, makes water penetration impossible.

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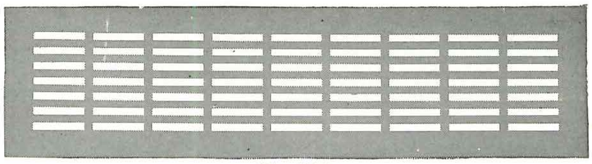

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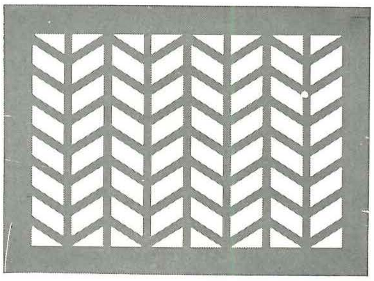

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CONSTRUCTION • COST • PROBLEMS

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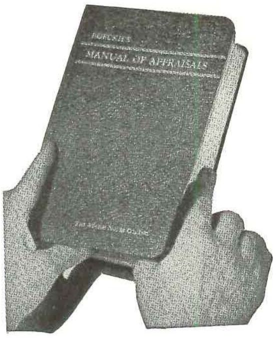

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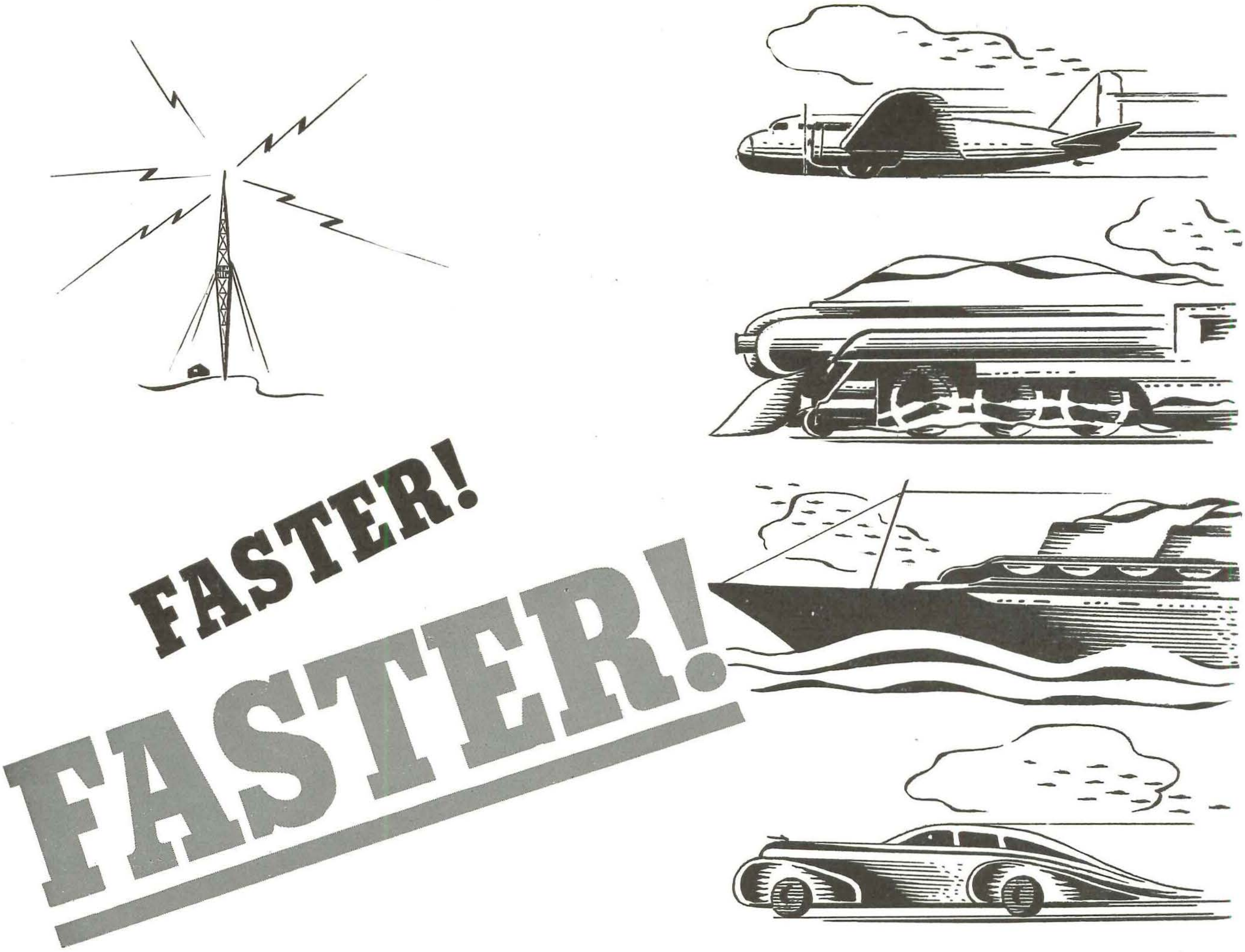

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Radio communications . . . streamlined transportation . . . faster, faster is the tempo of the times. Speed has become the rule of the day.

And building construction is no exception. Property owners want structures completed quickly . . . with as little delay as possible.

That is why many architects and engineers are specifying Penn-Dixie Quality — the modern High Early Strength Portland Cement for quick-use concrete.

Here's a cement that develops service strength concrete in much less time than is possible when regular cement is used.

"Penn-Dixie Quality" for quick-use concrete reduces waiting time . . . often permits substantial savings for property owners by permitting earlier use of completed structures.

That's why we say: Consider "Penn-Dixie Quality" for quick-use concrete on ALL types of concrete construction work where speed is urgent.

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The modern High Early Strength Cement

For all types of Concrete Construction

PORTLAND PENN-DIXIE CEMENT

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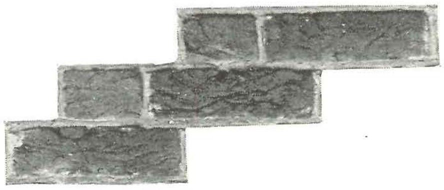

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FAITHFUL reproductions of the mellow soft effects so outstandingly noticeable in the Williamsburg, Virginia restoration buildings. No dark red or purple bricks.

Color range is approximately 80 per cent varying shades of brown, blending into orange and pink, and 20 per cent medium reds.

These bricks have the approval of the restoration architects, Perry, Shaw and Hepburn, for faithfulness of reproduction.

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It was designed by an architect to best cover the working facts you architects want.

No needless verbiage.
Just shirt sleeve facts.
Facts and the essential illustrations.
Thought you would like to know about it.

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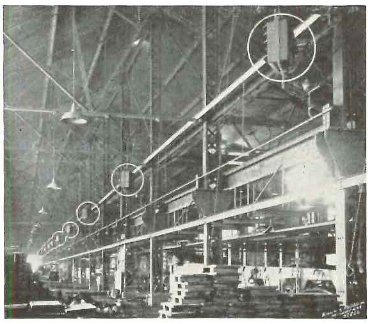
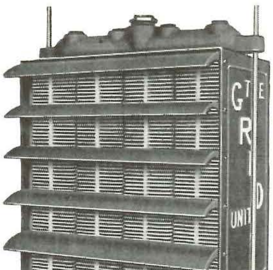
Irvington, New York Zanesville, Ohio

Burnham Boiler

DIFFERENT FROM ANY UNIT HEATER YOU HAVE BEEN SPECIFYING IN THE PAST





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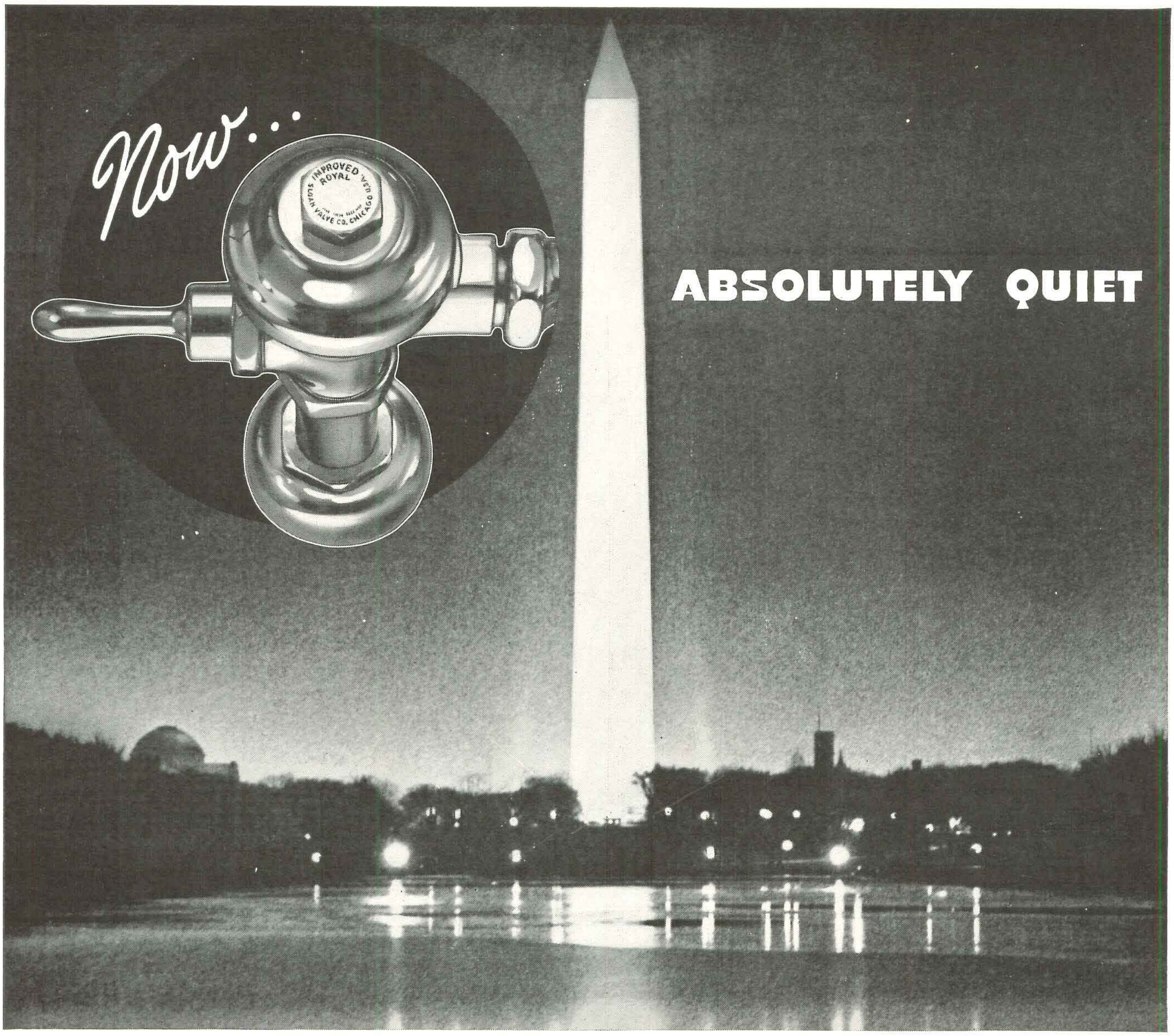

No longer need flush valves be annoyingly noisy. They can be absolutely quiet. Indeed, the Sloan Quiet-Flush Valves *are* absolutely quiet. Sloan Quiet-Flush Valves are available in the Royal, Star, Crown and Naval models.

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Typists love the "touch" of the new Underwood Master because years ago Underwood discovered that "touch" was as *individual* as a thumb print and then *did* something about it.

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Bull Dog Electric Products, Catalog No. 391. Bull Dog Electric Products Co., Detroit, Mich.

Major Stage Pockets (Floor Type, Flush and Surface Wall Type) Portable Plugging Boxes, Bulletin No. 31. Major Equipment Co., 4603-19 Fullerton Ave., Chicago, Ill.

Equipment

Concrete Accessories and Specialties and Building Accessories for Masonry, for Floors, Walls, and Doorways (2 new catalogs). Ankortite Products, Inc., Kansas City, Mo.

Design in Monel. The International Nickel Co., Inc., 67 Wall St., New York, N. Y.

Kinnear Rolling Doors. The Kinnear Mfg. Co., Columbus, Ohio.

Knickerbocker Refrigerated Food Lockers, Bulletin No. 145-C. Frick Co., Waynesboro, Pa.

Portfolio of Planned Kitchens Equipped with St. Charles Steel Kitchen Cabinets. St. Charles Mfg. Co., St. Charles, Ill.

Revere Extruded Architectural Bronze and Aluminum Thresholds, Edgings, Nosings. Revere Copper & Brass, Inc., 230 Park Ave., New York, N. Y.

See Your Master Plumber, Briggs Beautyware. Briggs Mfg. Co., Plumbing Ware Div., Detroit, Mich.

The Foster U-Type Pressure Reducing Regulators for Water or Air, Bulletin 5. Foster Engineering Co., Newark, N. J.

Floors, walls, and ceilings

A New Development in Fireproof Floor Construction. Fireproof Floors, Inc., 8 E. 41st St., New York, N. Y.

Ankortite Dividing Strips and Bars for Terrazzo Floors. Ankortite Products, Inc., Kansas City, Mo.

Floors That Endure and Decorative Walls by Tile-Tex (2 new Catalogs). The Tile-Tex Products & Chemical Co., Chicago Heights, Ill.

Johns-Manville Decorative Asphalt Tile Flooring. Johns--Manville, 22 E. 40th St., New York, N. Y.

Metal Lath News (2-Inch Solid Partition Edition), July, 1938. Metal Lath Manufacturers Ass'n., 208 S. La Salle St., Chicago, Ill.

Norton Floors. Norton Co., Worcester, Mass.

Smooth, Tough Floors Save Money! Flexrock Co., Philadelphia, Pa.

Heating and air conditioning

Banish Summer Heat, De Bothezat Attic Ventilator. De Bothezat Ventilating Equipment Div., 100 Sixth Ave., New York, N. Y.

Carrier Air Conditioning, Refrigeration, Heating. Carrier Corp., Syracuse, N. Y.

Hotstream Illustrated Price Catalog. The Hotstream Heater Co., Cleveland, Ohio.

The Econotrol System of Zone Regulation. Barber-Colman Co., Rockford, Ill.

Kewanee Type "R" Round and Square Boilers, Circular 93a. Kewanee Boiler Corp., Kewanee, Ill.

Spencer Type A Steel Tubular Heating Boilers. Spencer Heater Div., Lycoming Mfg. Co., Williamsport, Pa.

The 1939 Basement Plan Book for Bituminous Coal Heating. (Including plans for basementless houses and for those with basements.) National Coal Assn., Washington, D. C.

Trane Air Unit Ventilators, Bulletin S340. The Trane Co., La Crosse, Wis.

General

American Building Association News; The Home Makers Magazine (Financing, Planning, Building). 22 E. 12th St., Cincinnati, Ohio.

Financing Sewerage Works (with special emphasis on the revenue bond-user service charge method). Portland Cement Assn., 33 W. Grand Ave., Chicago, Ill.

Underwriters' Laboratories, Inc., List of Inspected Gas, Oil, and Miscellaneous Appliances, December 1938. Underwriters' Laboratories, Inc., 161 Sixth Ave., New York, N. Y.

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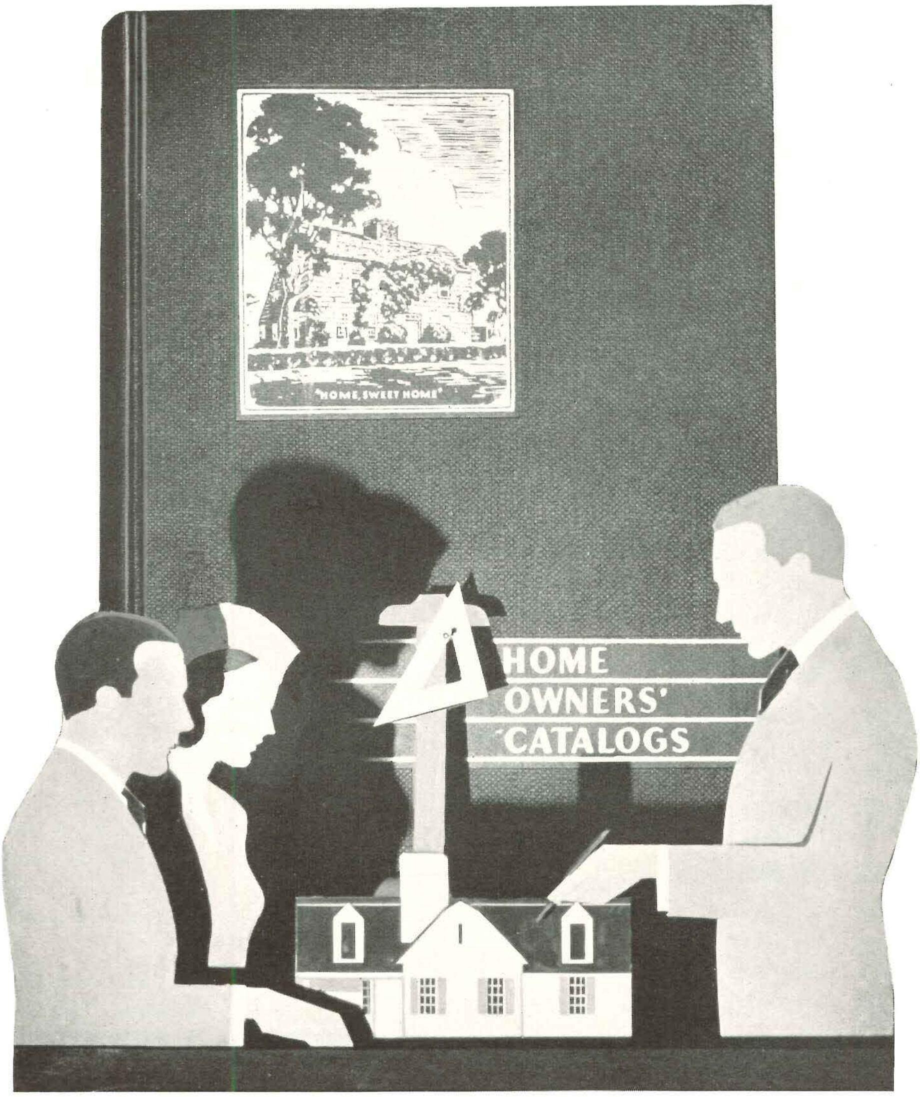

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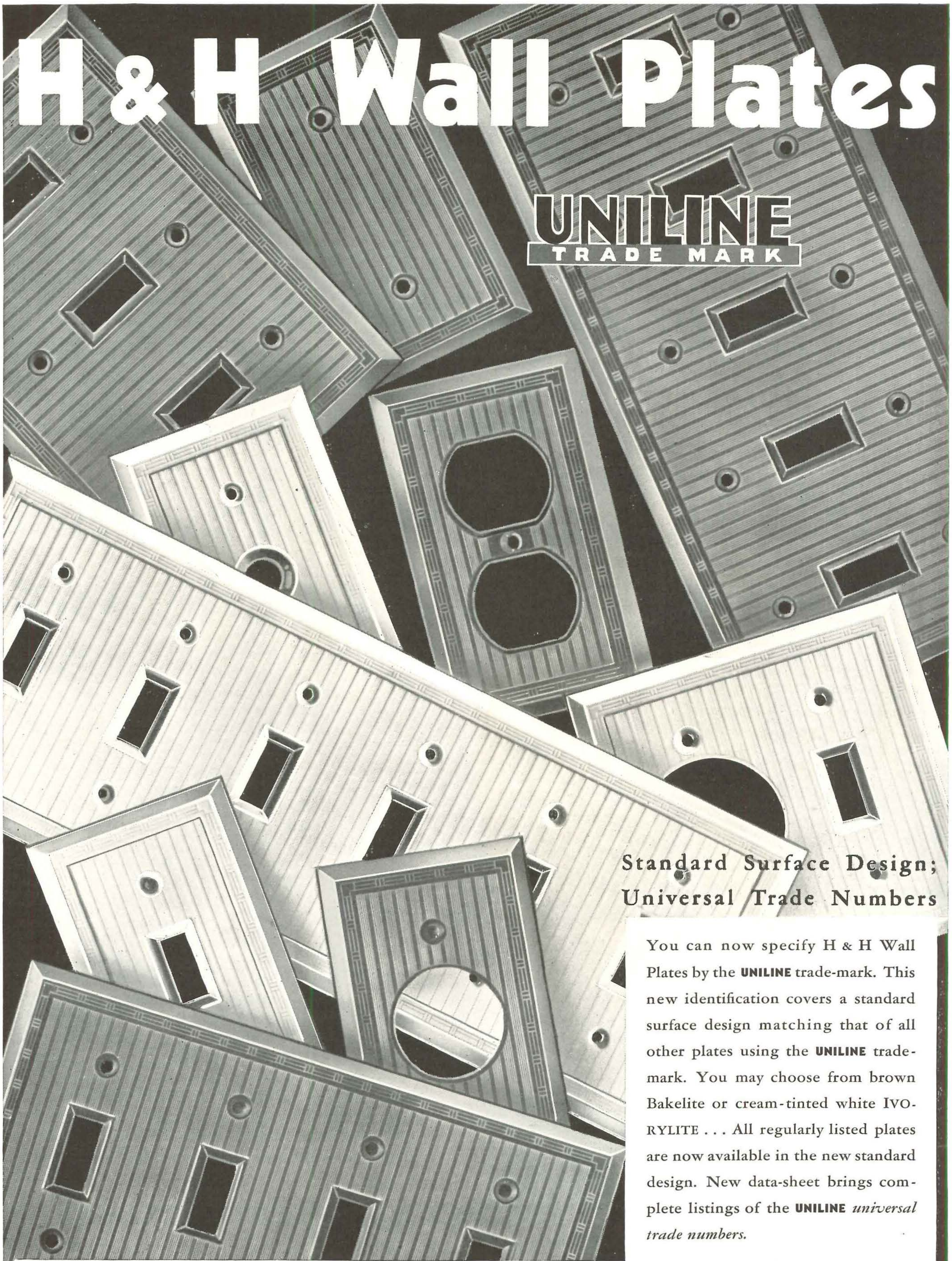

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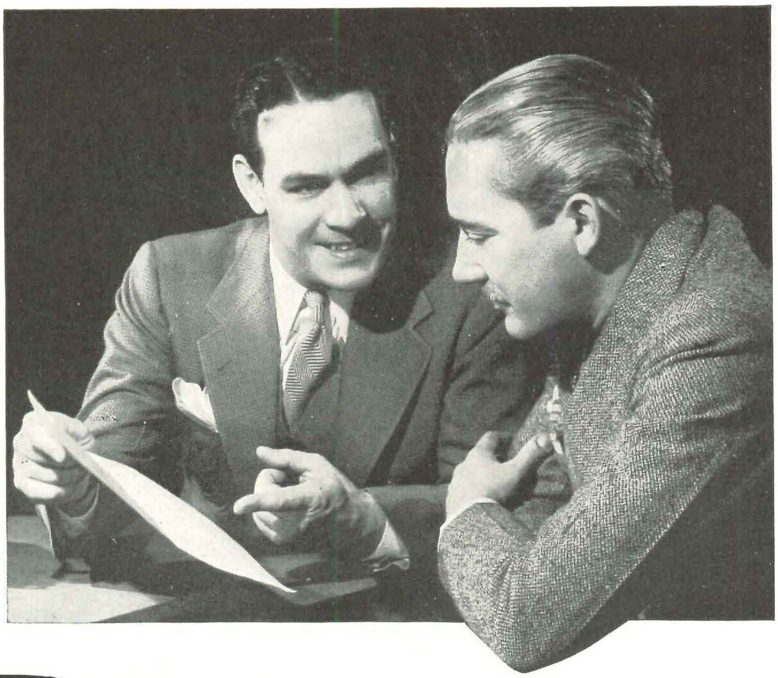
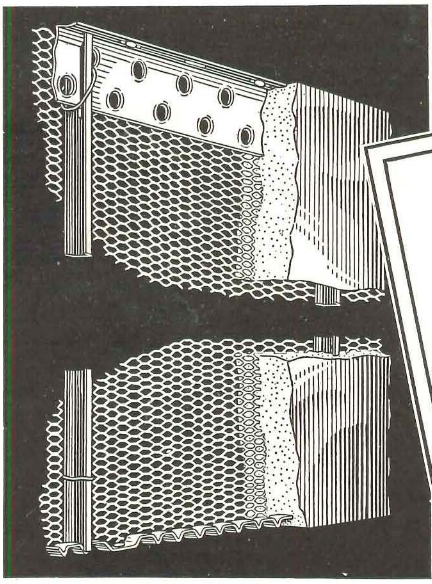


You give your clients a pleasant surprise — with the fire-safety, space savings, and *amazingly low cost* of the

MILCOR Solid Partition and Furring System



• Three simple prefabricated members — Ceiling Angle Runner, continuous Crimped Floor Runner, and Slotted Channel Studs (patents pending)—form a supporting structure for standard Milcor Metal Lath. Used for solid partitions and as a free-standing furring system.

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The most important money saving introduced into fireproof construction in 20 years — making possible new fire-safety for housing, new low costs for fireproof buildings of all types.

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Introduced a year ago, this new method has set amazing cost records on large-scale housing projects. Using three simple prefabricated members, one man erects *on the average* 150 studs per hour. Completion is so fast that the figures seem incredible until you see it done.

You get all the well-known advantages of 2-inch solid plaster partitions at this new low cost: (1) saving of floor space — 4" per partition . . . (2) full 2 hour fire rating . . . (3) increased strength, especially under impact . . . (4) reduced dead floor load — 1/3 as much as some types . . . (5) reduced sound transmission.

For large or small projects, remodeling or new construction, the Milcor Solid Partition and Furring System is a tested method for economical, enduring construction. Patent No. 2,105,770.

Write for the Milcor Solid Partition Bulletin, today.

F-47

• The Ten Eyck (Williamsburgh) Housing Project. A 50,000-yard installation, of Milcor Solid Plaster Partitions in Buildings 1, 2, 3, 4, 6, 7, 8. Photo courtesy of FHA.

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