

# BUILDING NEWS



**From natural disasters, new design principles . . .**

ARCHITECTURAL  
RECORD

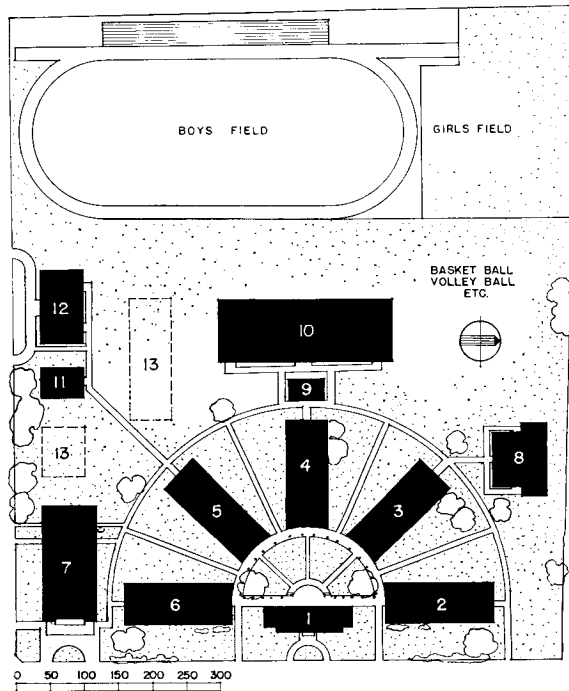
COMBINED WITH  
AMERICAN ARCHITECT AND ARCHITECTURE



Snider-Triangle

The Administration building—only one on campus of normal structural concrete design—contains school offices on first floor, library on second

H. L. GOGERTY and  
C. E. NOERENBERG  
Architects and Engineers



Plot Plan

1. Administration and Library
2. Typing, Bookkeeping
3. Domestic Science
4. Art and Academic
5. Photography
6. Science
7. Auditorium and Music
8. Cafeteria
9. Heating Plant
10. Gymnasium
11. Industrial Arts
12. Printing and Drawing
13. Future Buildings

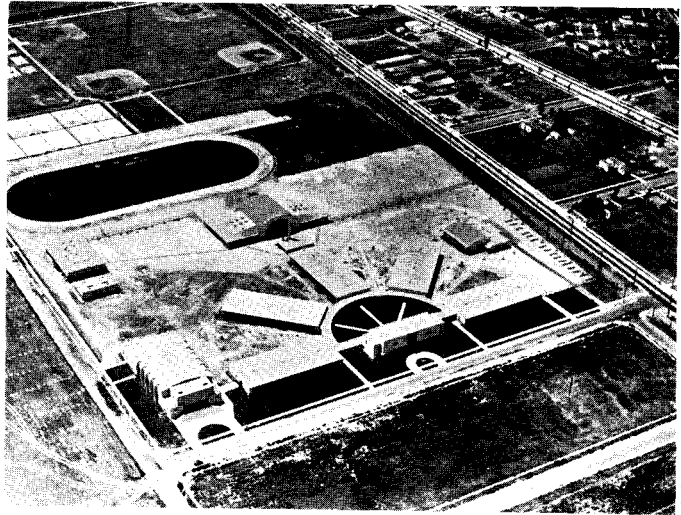
# MANY PLAN AND STRUCTURAL INNOVATIONS IN DORSEY HIGH SCHOOL

BECAUSE OF A WHOLE COMPLEX of technical, economic and social factors, resistance to change in the field of school building is high: only the impact of major events—earthquakes, fires, war—is immediately reflected in the design of new buildings. Such an impulse was furnished Southern California school design by the quakes of the early thirties; and the new design principles employed at Susan Dorsey High in Los Angeles stem directly from these natural disasters. For, to be earthquake-resistant, lightness of construction (in this instance already dictated by the low load-bearing foundation soil) is essential; and structural elements must be flexible to withstand lateral forces. The envelope must be reduced to its minimum volume and divested of all extraneous or projecting ornament. Finally essential is a low center of gravity.

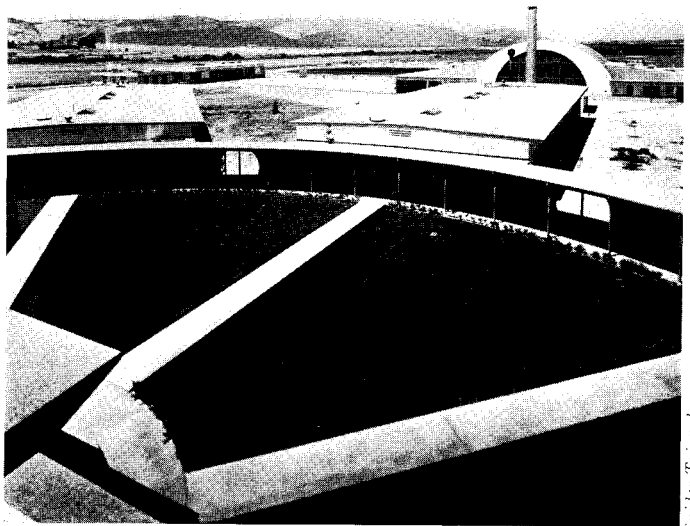
The plot plan of the buildings—spreading fanaped about a central administration unit—lends itself admirably to the breaking up of a program into requirements, each in its proper relation to the educational scheme. Instead of a jumble of classrooms, the project emerges as a departmental arrangement of units, each in its own building, complete with toilet facilities, storage, lockers, etc. The immediate result of segregating classrooms into departmental groups is a decentralization of the school population. Even in event of a complete change in the population of any unit between classes, circulation in the corridors could not exceed double the population of the unit. At the same time, the fan-shaped layout reduces travel distances between classrooms to a minimum, creating numerous traffic routes. A semicircular covered walkway, 15 ft. wide, joins the inner ends of the 5 classroom units; an uncovered semicircular walkway joins and encloses the outer ends of the units; and uncovered walkways extend radially from the administration building to each classroom unit.

The 100-ft. radius semicircular area behind the administration building suggested an outdoor assembly space. This was developed by locating a ball stage to the rear of the administration building at the junction of the radial walkways, and by sloping the ground as in a Greek theater. The amphitheater so created will accommodate 1,000 persons; 2,000 is the ultimate capacity of the school.

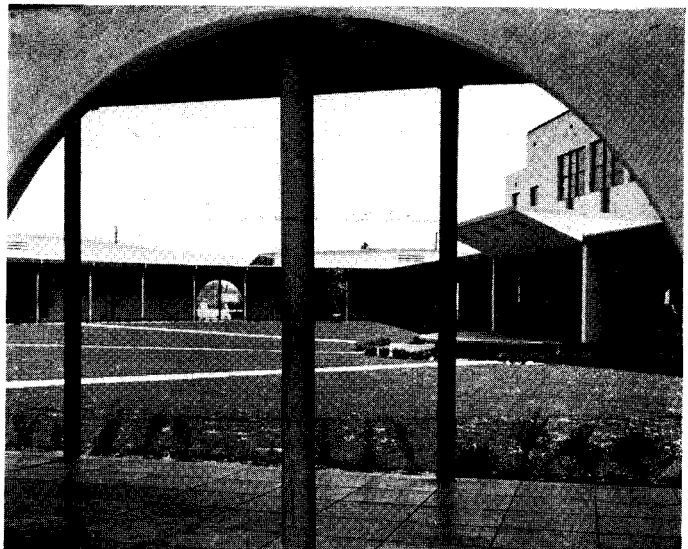
Beyond the central classroom group are located auditorium, industrial arts building, gymnasium building, cafeteria, and study hall building, and a central heating plant. Thus structures devoted to physical activity are removed from those devoted to more sedentary activities, yet are sufficiently proximal to one another to avoid isolation.



Snider



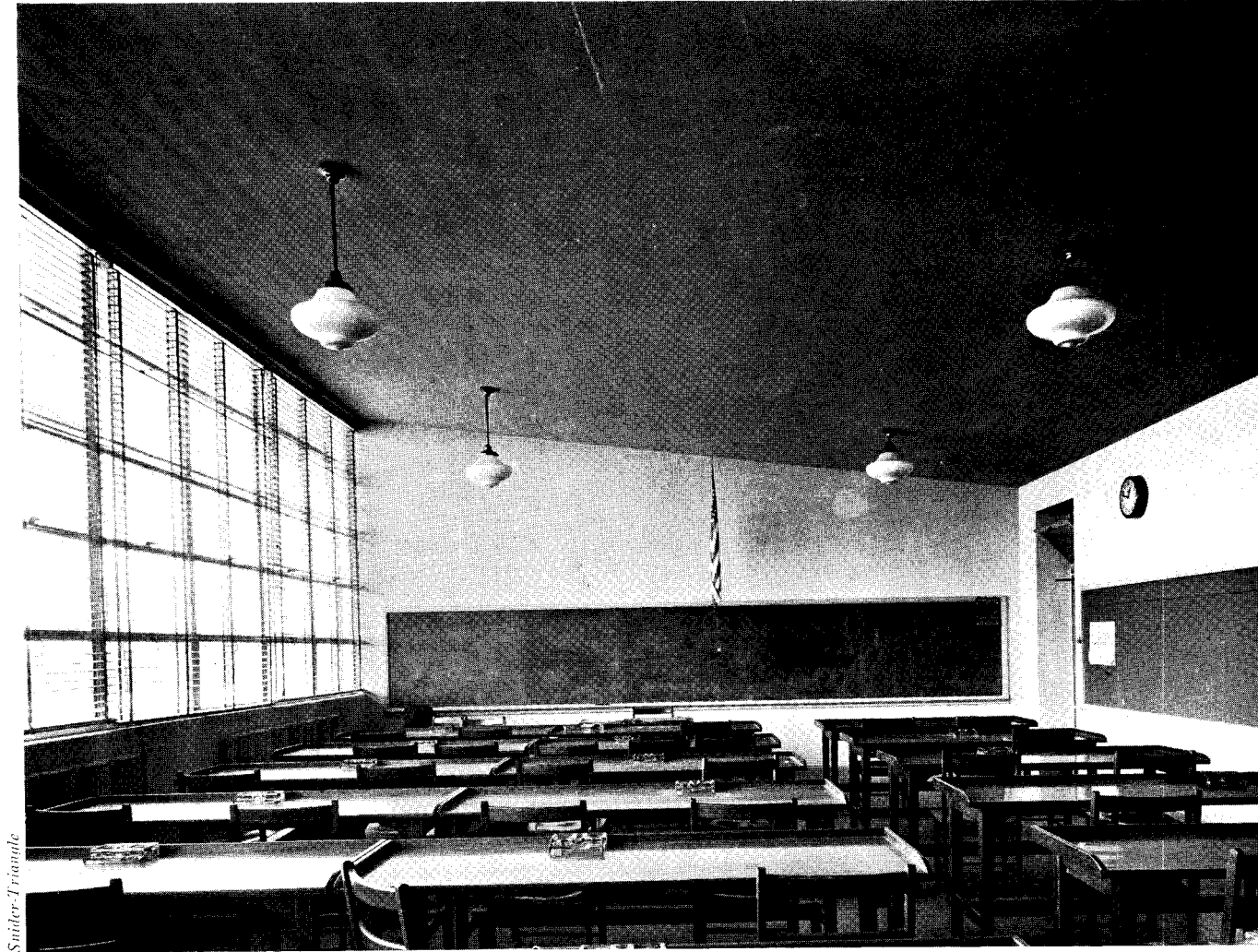
Snider-Triangulo



Starrett

The basic organization of the school plant—and the care with which it has been executed—is apparent in the air view (top), views from Administration Building (center), and view across the amphitheater (bottom) with open-air stage.

## CLASSROOM UNIT—DORSEY HIGH



Snider-Triennale

Classroom ceilings slope with lower chords of cantilever trusses; this eliminates waste space, aids daylighting, and prevents sound reverberations which occur when ceiling and floor are parallel.

FROM AN engineering standpoint, the most interesting feature of this project is the structural design of the classroom units. (Their weight per cubic foot of volume is about one-half the weight of the usual type of structure.) The roofs are supported on pairs of 8-in. H-columns located within the partitions forming the central corridors. These columns bear directly on Raymond concrete piles averaging 30 ft. deep, one column to a pile, the pairs spaced approximately 15 ft. center to center. The columns support and become integral parts of cantilever trusses extending from each side of the corridors to and beyond the outer walls of the buildings. Reinforced-concrete beams arranged in grid fashion tie the piles together at their tops and distribute at ground level all stresses other than direct vertical loads. One advantage of this construction is that it eliminates the necessity of supporting the weight of exterior walls on the foundation piles.

Exterior concrete walls extend only up to the window sills and are very thin; thus these walls are virtually all window. They assume no load other than their own weight, and are stayed by clips, 3 ft. on centers, to the cantilever trusses in a manner which (in event

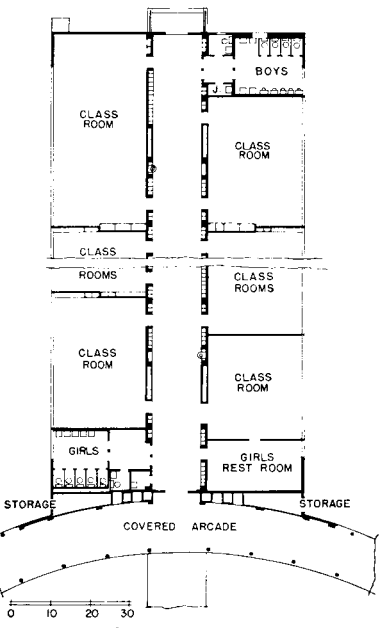
of an earthquake) permits 2-in. vertical movement of the truss at junction with the wall, but does not permit any horizontal motion caused by wind stress or earthquake. All wind stresses on the walls and possible horizontal earthquake stresses are resisted by the trusses and supporting columns, and cross-bracing between the load-bearing columns above corridor ceilings is designed to withstand wind-pressure of 20 lbs. per sq. ft. on the walls. Partitions between classrooms assume no load other than their own weight and can be removed, replaced, or relocated at will as other arrangements of classrooms may be desired.

Steel construction throughout is of the lightest commensurate with safety in order to keep soil-bearing load at a minimum. (The cantilever truss as designed is lighter than a normal span truss of equal load-bearing capacity.) Piling is relieved of the weight of the floor which are laid directly on the ground. Piping, wiring, and all utilities are confined in shallow concrete-lined trenches at the outer edges of the buildings. The concrete bottoms of these trenches are designed to act as footings for the lightweight exterior walls and are an integral part of these walls.

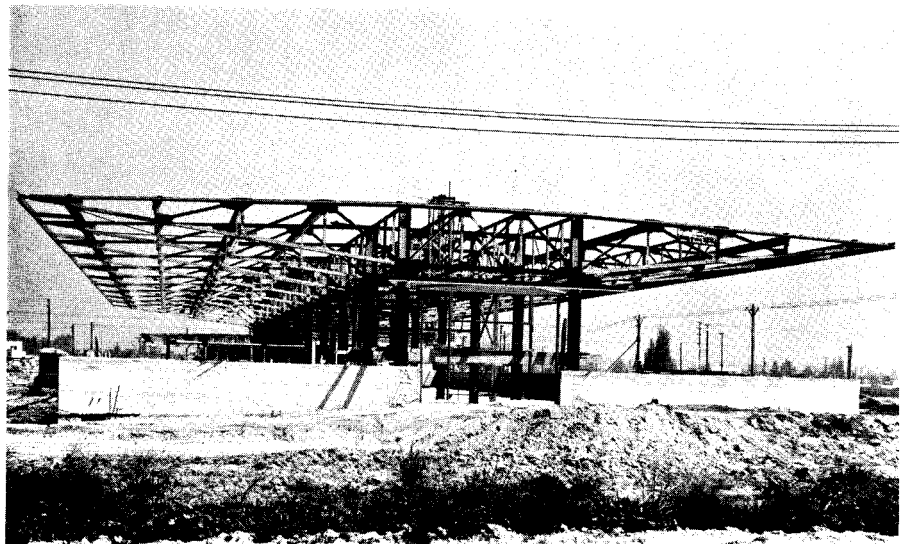


Snider-Triangle

Typical corridor

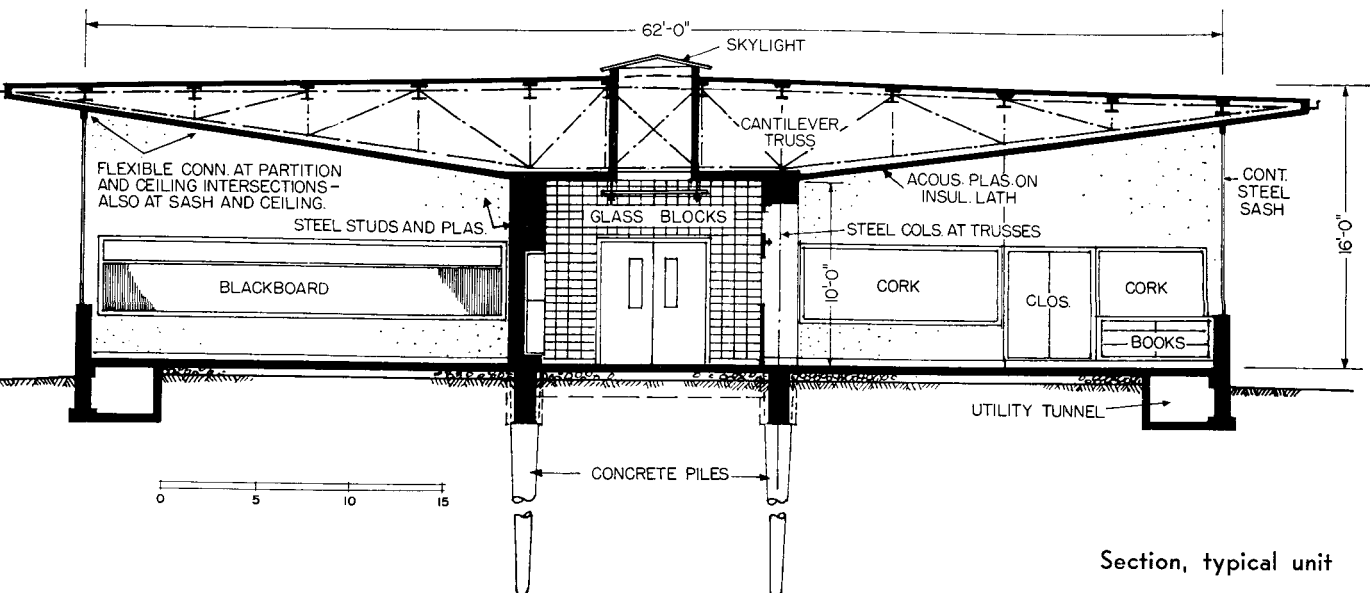


an, typical unit



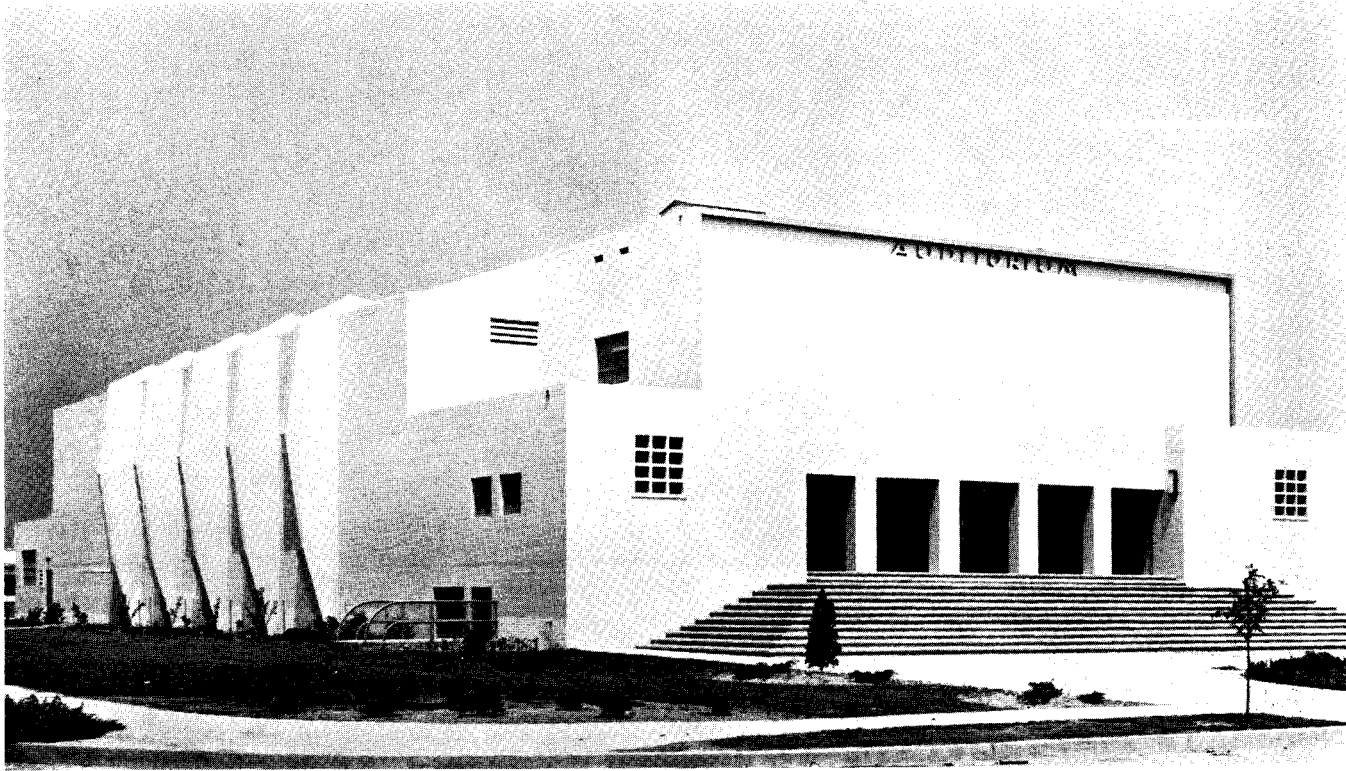
Starr

Structure without curtain walls



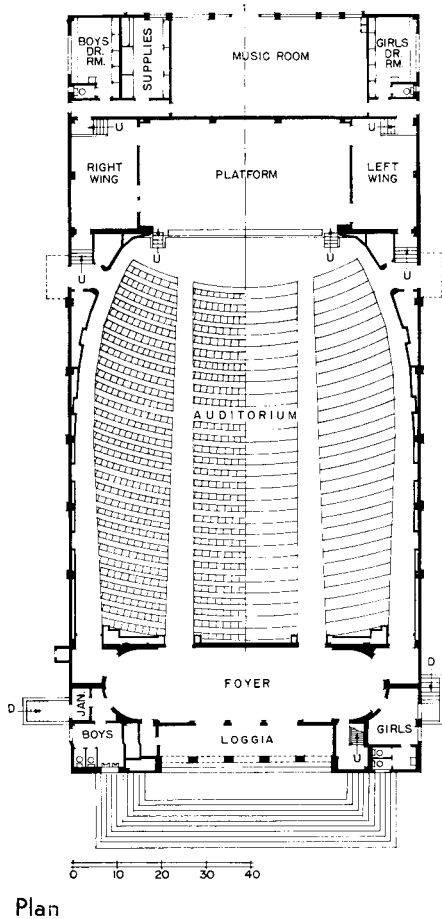
Section, typical unit

# AUDITORIUM—DORSEY HIGH



Starrett

**AUDITORIUM BUILDING:** By throwing the mass of the arches outside the structure, the interior is freed of all exposed steelwork; externally, they are treated as an organic part of the structure.

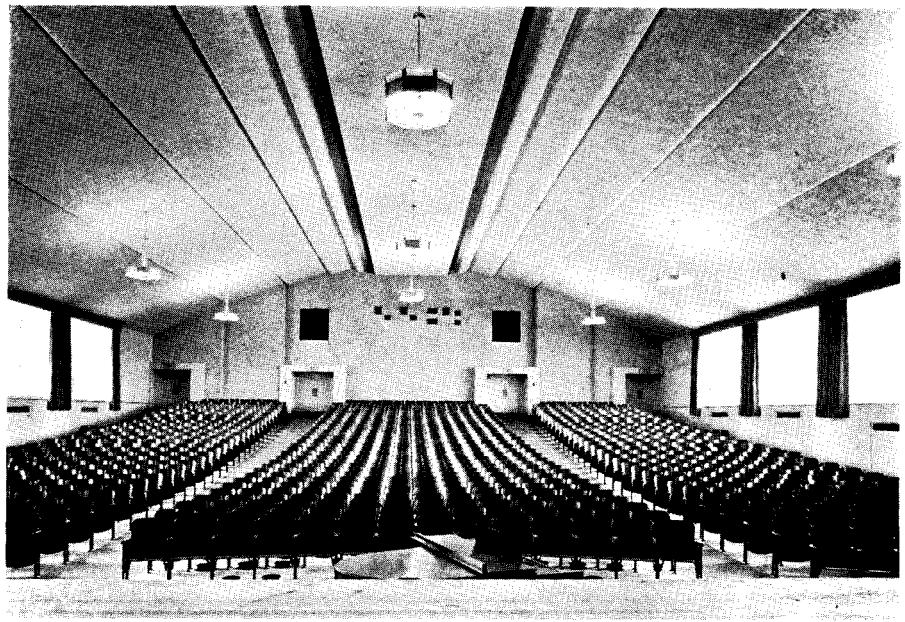


Plan

THE AUDITORIUM structure, of three-hinged arch construction, is interesting from several standpoints. It was desirable to have vertical auditorium walls, with no exposed steelwork jutting into the room, but at the same time it was recognized that a normal semicircular arch would entail much wasted space if vertical walls were erected within the arch. The problem of obtaining maximum clear interior space underneath the arch was solved by designing what is, in effect, an exaggeratedly hinged, flat arch whose two segments are tilted outward to permit vertical walls within; the bases of the walls correspond with the arch footings. The mass of the arch is thus thrown outside the building and is treated as an integral part in the architectural form of the structure.

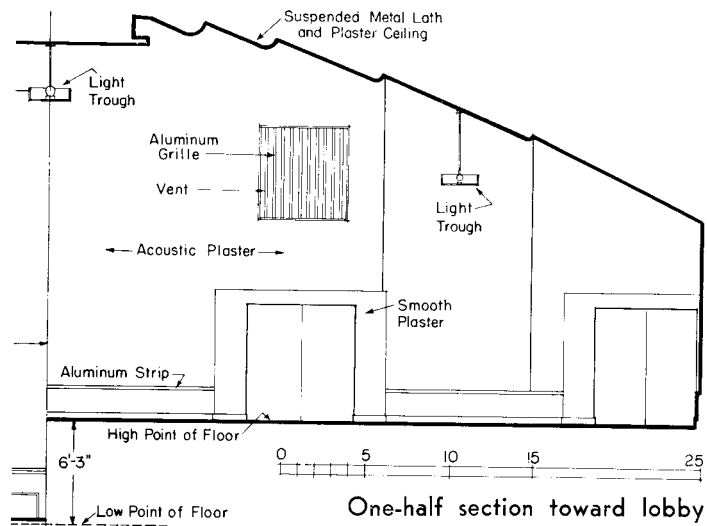
The barrel type of ceiling common to arched structures was supplanted by a ceiling composed essentially of planes presenting a uniform angle to the horizontal. This was done because acoustical calculations in barrel-type ceilings are difficult, complications arising because of the continually changing angles of reverberation. With all reverberating surfaces in the ceiling at the same angle to the horizontal, calculation of acoustical properties was a relatively simple matter.

The same system of parallel planes was used in construction of the rear wall of the auditorium. Instead of having the wall follow the curve of the seats, or of having broken rows of seats tucked in square corners, the wall was designed as a series of planes parallel to the stage and stepped to follow the contour of the rear row of seats.

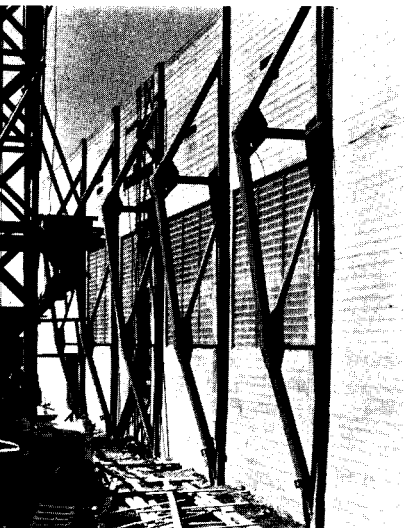


Snider-Triangle

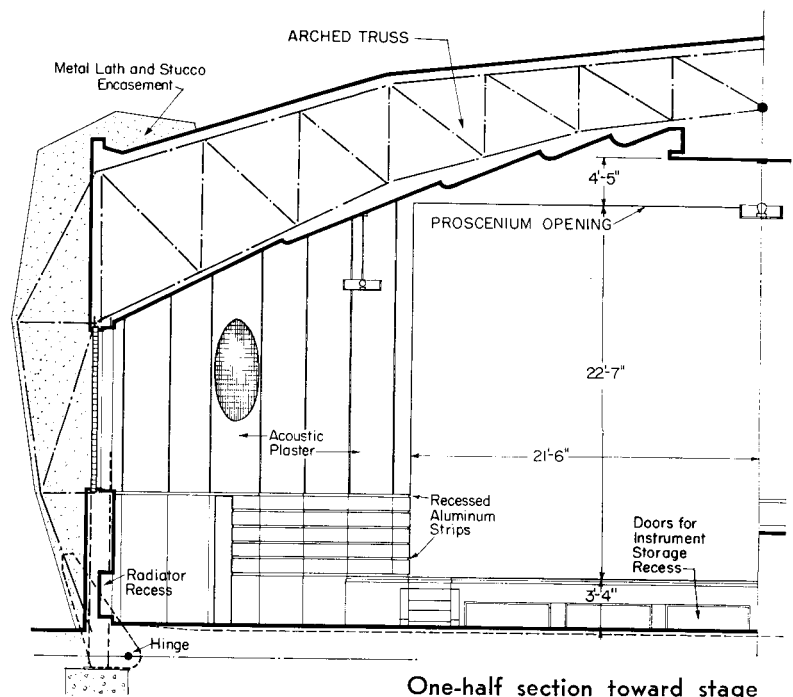
Auditorium, looking toward lobby



One-half section toward lobby

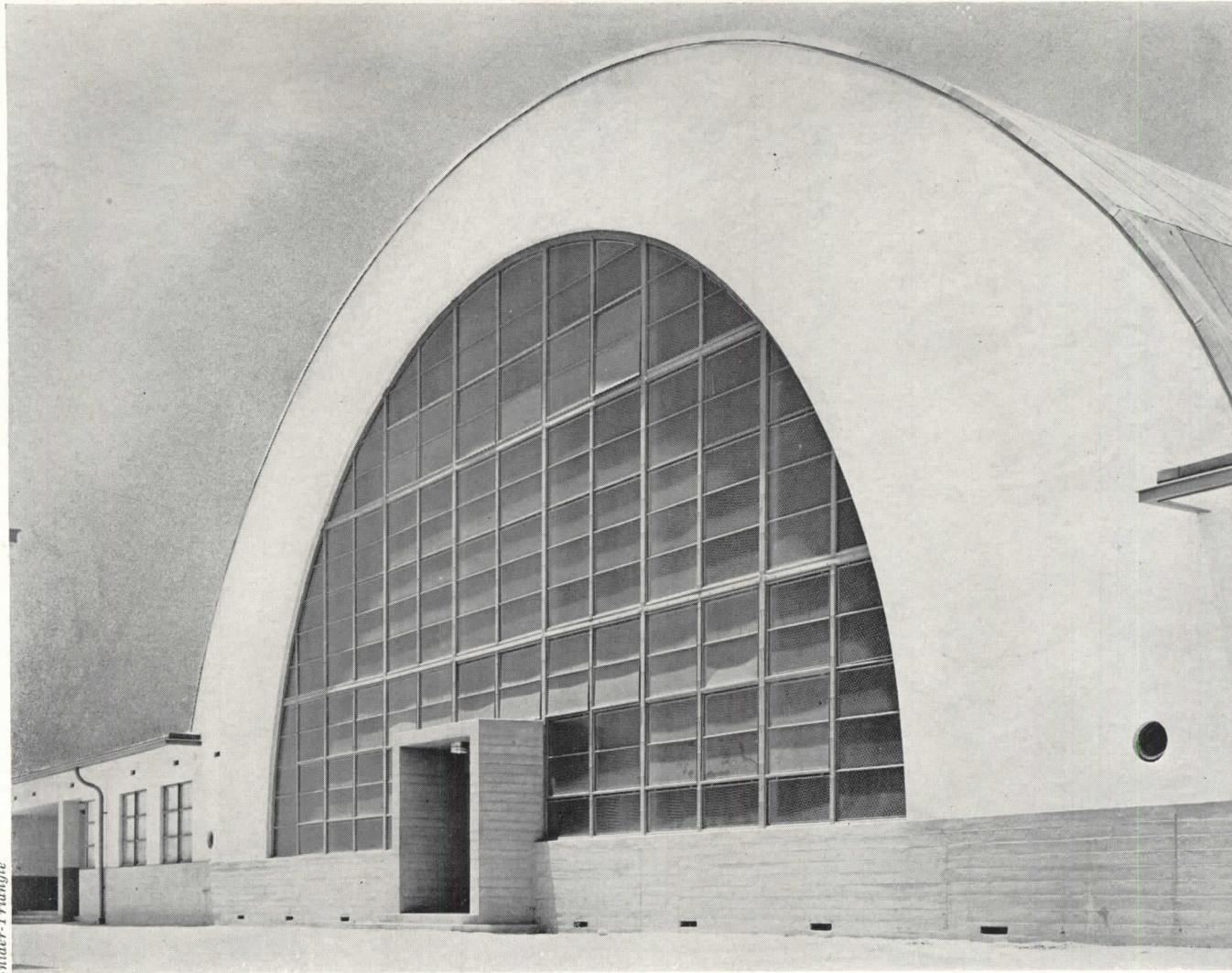


auditorium wall under construction, showing how the three-hinged arches are bowed outward from the structure to permit vertical walls within. These protruding "ribs" were later sheathed to become an integral part of the architectural form of the structure.



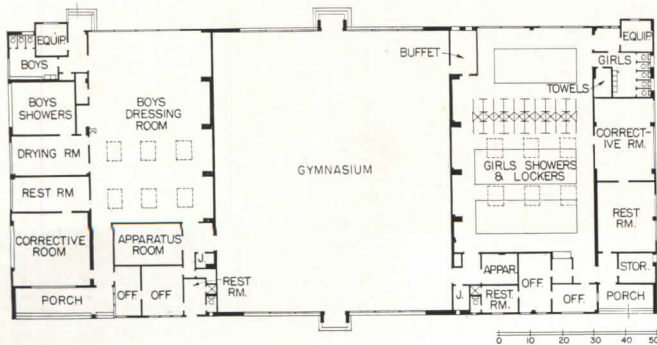
One-half section toward stage

# GYMNASIUM—DORSEY HIGH



Snider-Triangle

Front view

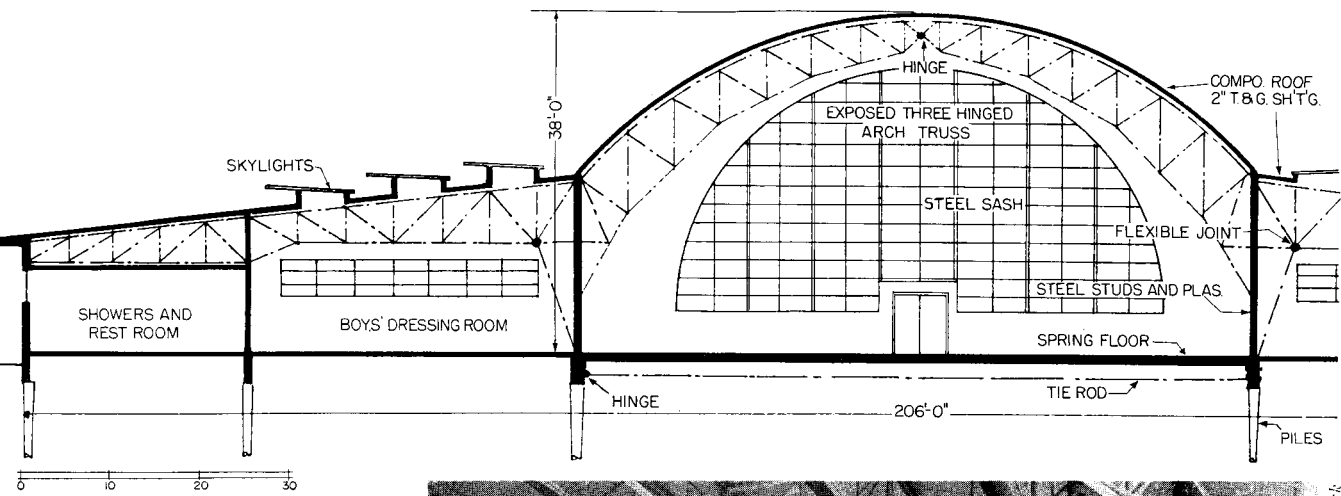


Plan

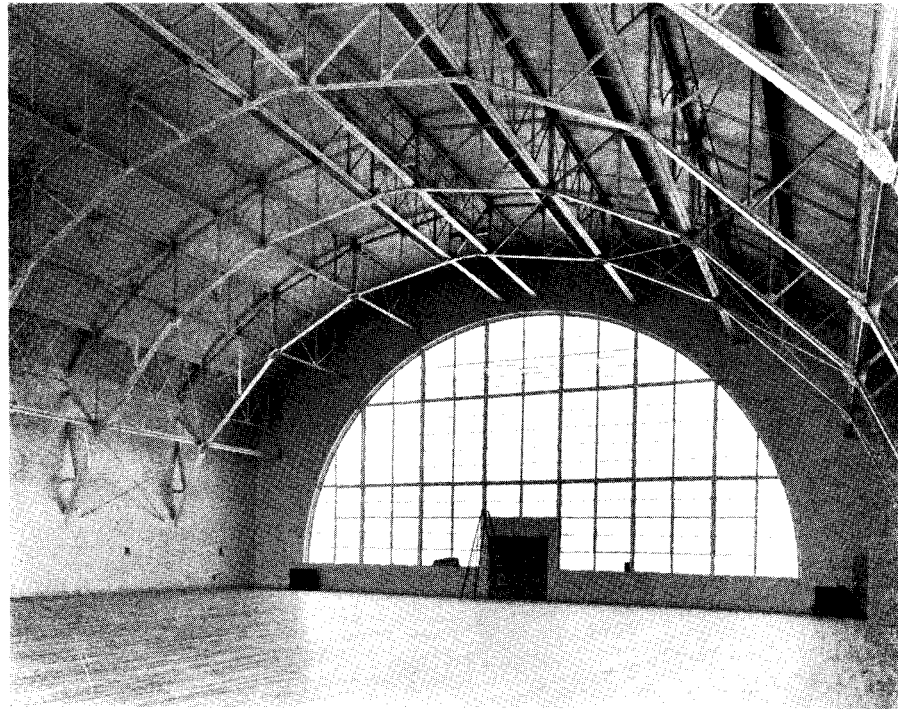
THE GYMNASIUM building is designed for flexibility event of earthquake. The gymnasium room incorporates a series of three-hinged steel arches 78-ft. span and 33-ft. clear height. Roof trusses spanning the dressing rooms on either side are supported at one end on projecting heels of the arches so that their loads tend to counterbalance the weight of each half of the arches. Although tie rods connect the arch footings, load at the lower pins is almost wholly vertical because of this counterbalance effect. The counterbalancing also reduces stresses in the arches, with consequent saving in weight. The roof trusses over dressing rooms are supported at their junction with the arch heel on roller bearings which permit lateral movement so that vertical load only is assumed by the arch.

This flexible, lightweight construction is highly earthquake-resistant. Its weight is about one-half that of the more conventional wall and span-truss construction, and overthrow effect is minimized and brought to the surface of the ground. In addition, it provides unusually high ceiling clearance in the gymnasium and reduces the area of exterior wall surfaces to a minimum.



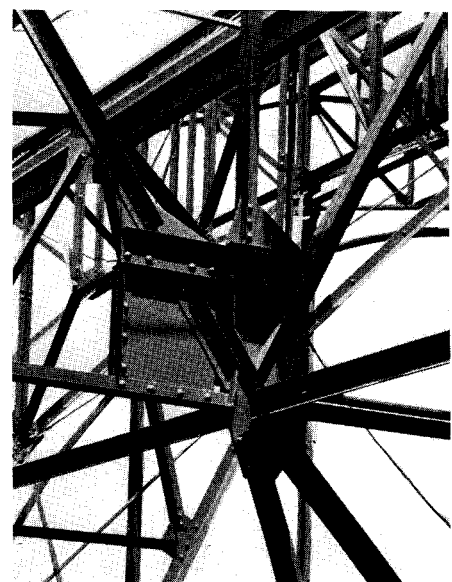
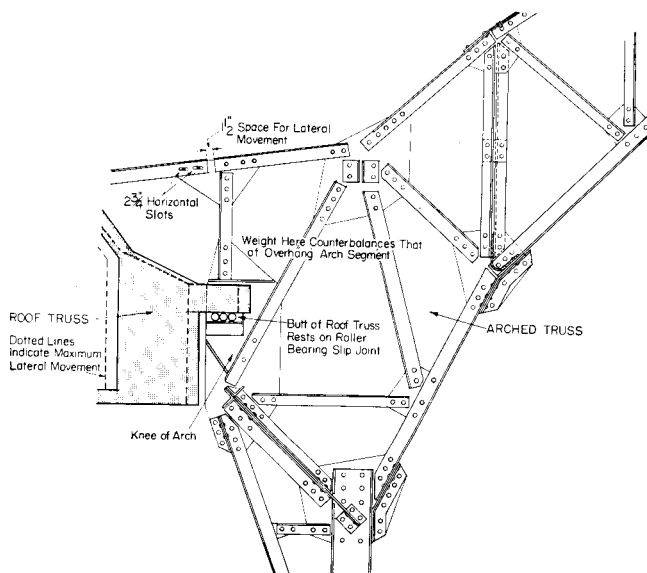


Longitudinal section (above);  
Gymnasium (right)



Woodcock

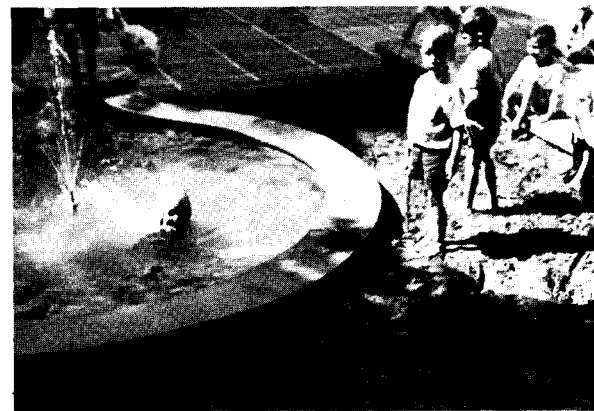
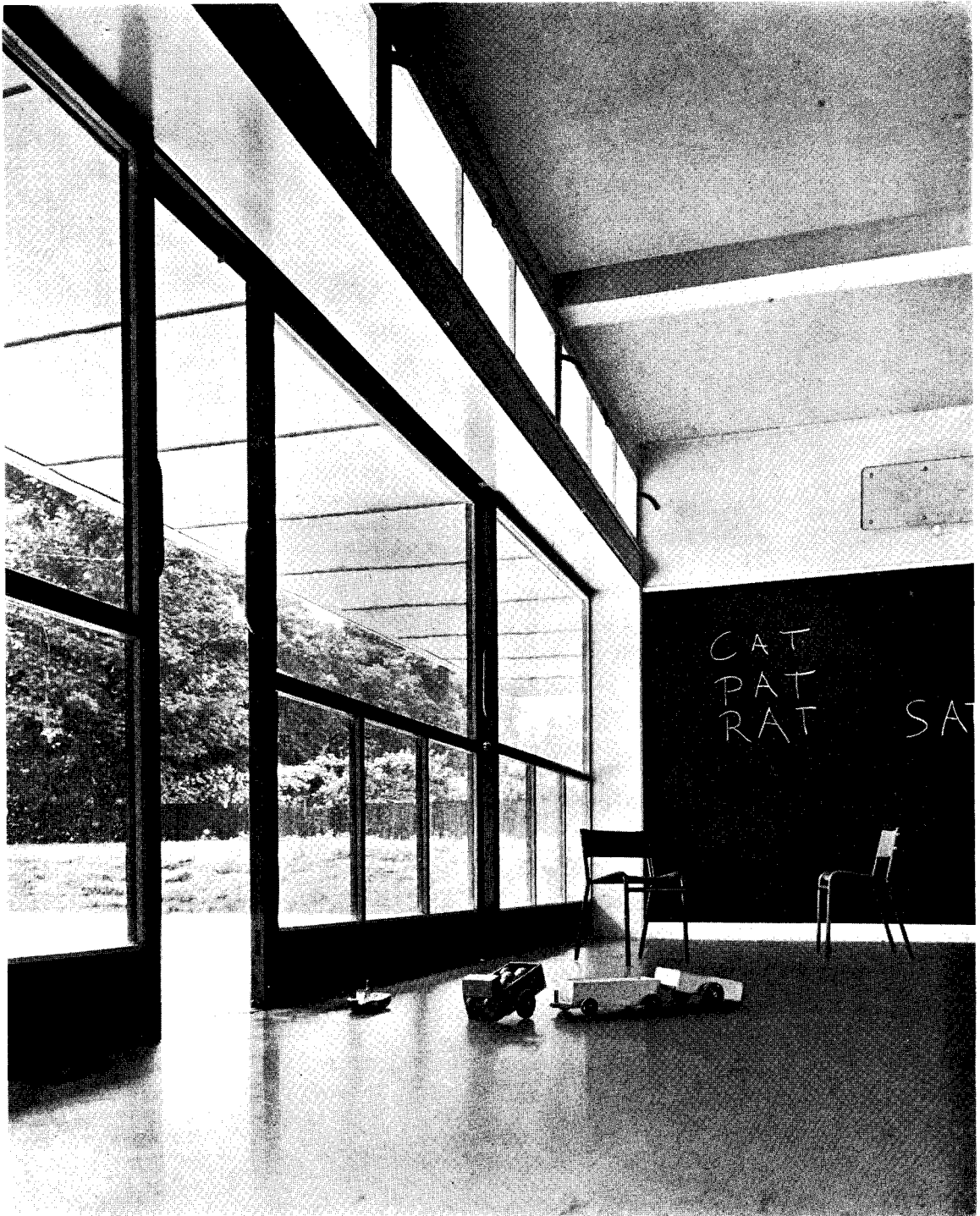
Photos courtesy "Southeast Builder & Contractor"



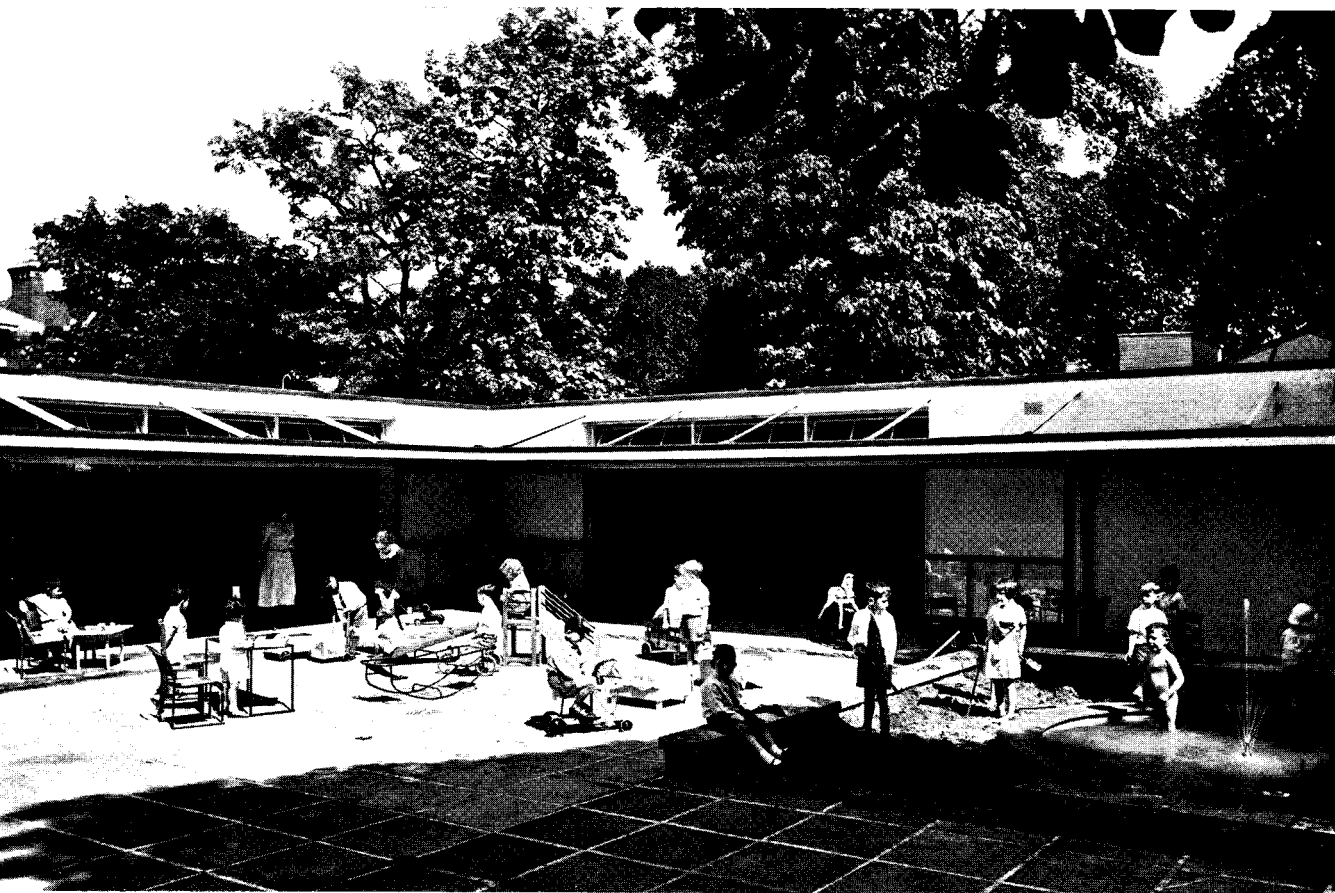
Starrrett

Detail and photograph of Gogerty & Noenberg's roller-bearing slip joint, with end of roof truss bearing on knee of hinged arches. This joint assumes vertical load only and permits

lateral motion caused by earthquakes. Thus such horizontal strain is not transmitted to the arch. Roof-truss weight on the knee helps counterbalance weight of arch about pin at ground level.

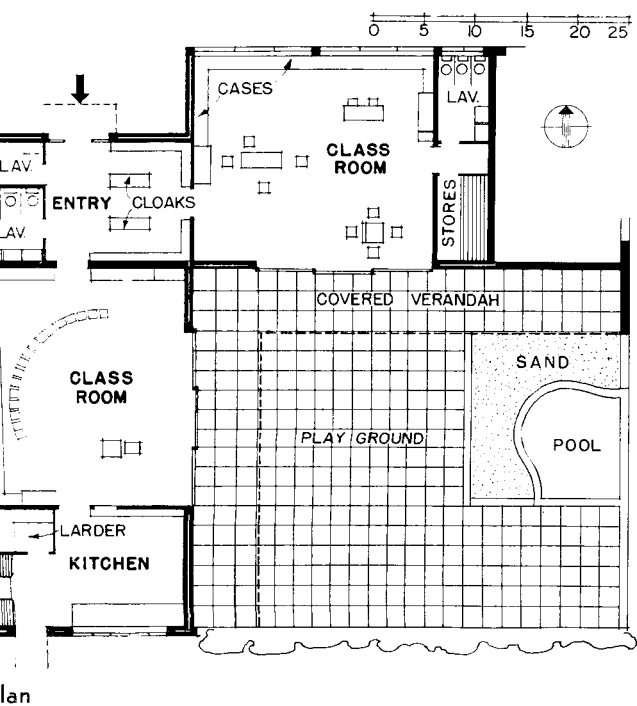


# NEW ENGLISH NURSERY GIVES CHILDREN LIGHT, AIR, AND PRIVACY

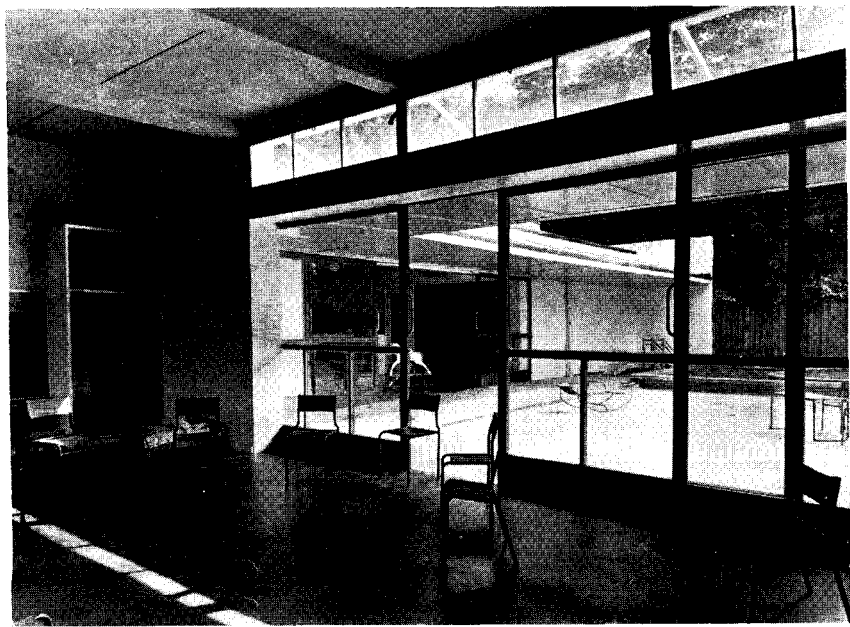
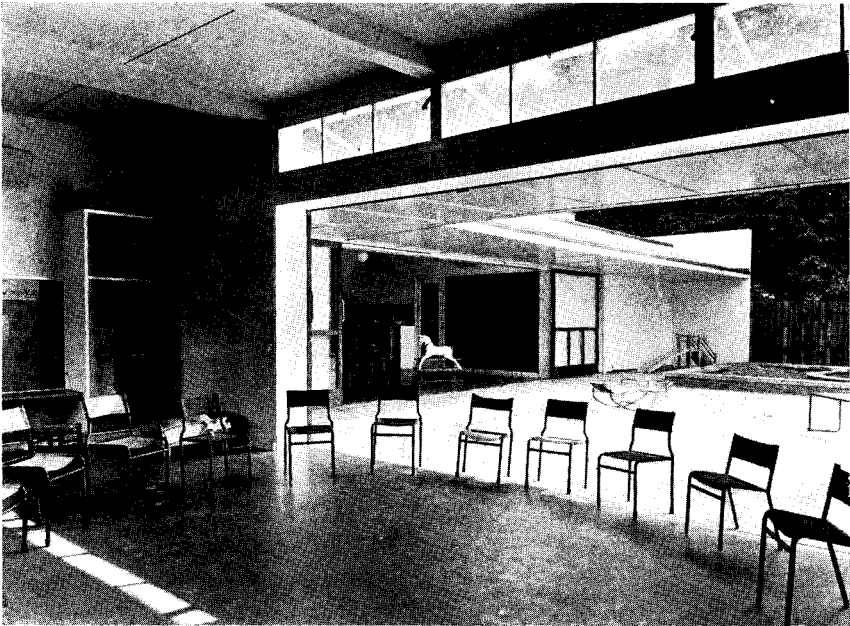
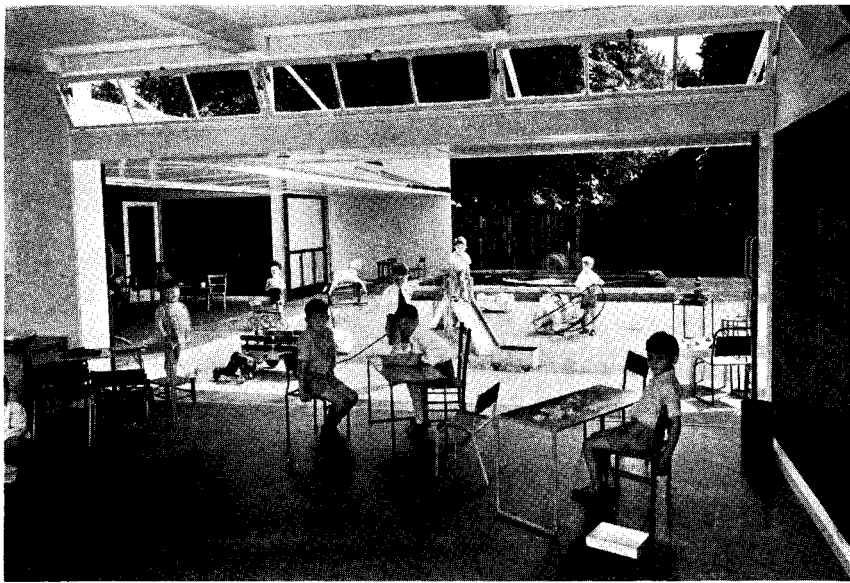


Hutbridge

**SAMUEL & HARDING**  
Architects



DESPITE ITS RELATIVELY small size, the nursery school at Dulwich, England, adequately accommodates its 45 pupils in two classrooms, whose careful planning provides a maximum of light, air, and seclusion. Because the nursery was built in connection with an existing school, its level site was naturally restricted. The L-shaped plan was inevitable because of these existing buildings; but this limitation worked out to an advantage, for the playground, protected on two sides by the building itself, is easily supervised. The other two sides, surrounded by a low fence, open on a paddock in which are many large trees. The building consists of a single story with a flat roof; each wing contains a large classroom with lavatories. The entry, in the exterior angle, serves also as cloakroom. The exterior is red brick, in accordance with a requirement of the landlords that the building conform with the surrounding late Victorian-Gothic buildings. The brickwork of the walls facing the playground, however, has been painted white. Brick carrying walls are used throughout; all wide openings are spanned by steel joists. The roof is of timber and is carried on steel binders. Total cost, including all equipment except movable furniture, was approximately \$9,500.



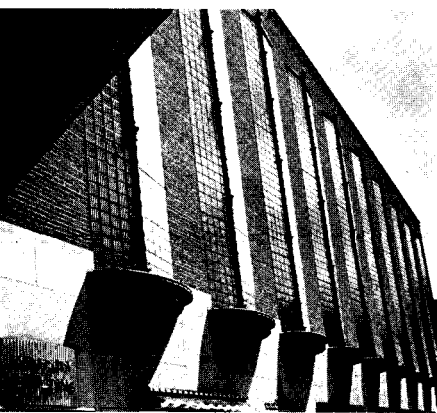
Clerestory windows above the projecting canopy give unshaded light and adjustable ventilation. The classroom can be completely open to the playground (1), or a lesser degree of openness can be obtained by closing the clerestories (2); when necessary, clerestory and sliding windows may be entirely closed (3). Sliding windows are of teak, and run on rubber tracks flush with threshold; all other windows are deal. Classroom walls are finished with cream-colored plaster; ceilings are untreated fiberboard; floors are linoleum; blackboards are green linoleum in one room, brown in the other. Heating is electrical, with radiators overhead and tubular convectors at floor level.



## MILWAUKEE: THREE-WAY AIR CONDITIONING IN TRIPLE-USE STRUCTURE

GRASSOLD & JOHNSON

Architects



Daylight for offices comes through these glass-block oriel windows, which are conspicuous from second floor through fourth.

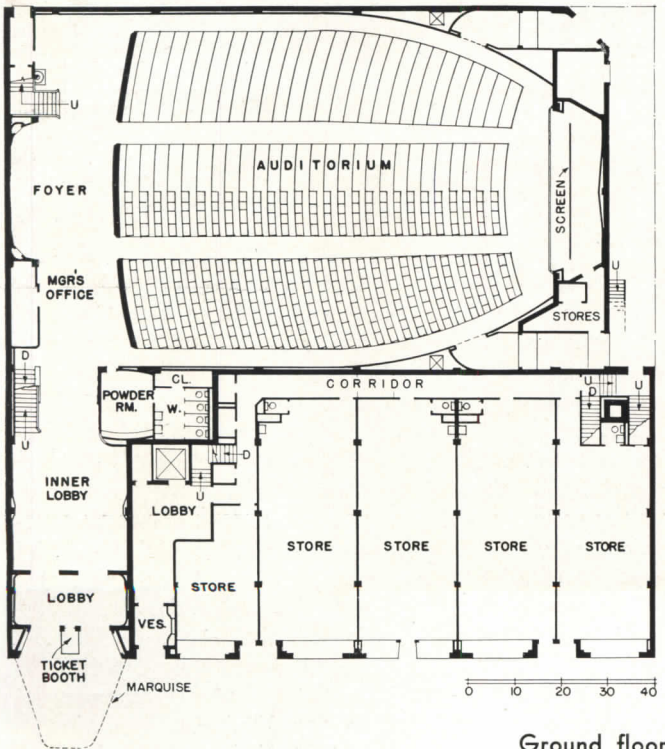
COMPLETE AIR CONDITIONING of the Varsity Theater Building in Milwaukee, Wis., makes windows unnecessary; thus the function of the vertical glass-block panels is simply to admit daylight. Housed in this windowless structure are 5 stores and a 1,400-seat theater on the ground floor, and offices on the 3 upper floors. Because of the diversity of uses for which the building was designed, the heating and air-conditioning systems are laid out on an individual basis, but distribution of conditioned air is from a central point on the second floor. Eight rows of coils are used in the theater's system and a continuous 3-in. grille in the ceiling cornice below the light troughs acts as a means of distribution. The stores are heated and cooled by individual units installed in the basement. The office portion of the building is divided into four zones and is supplied with conditioned air from the equipment room on the second floor. The building is steel-framed, with concrete floors and special ceiling arrangement in the office portion to accommodate duct work and piping. Exterior is of granite base construction with stone and face brick veneer.

Photos by Hedrich-Blessing

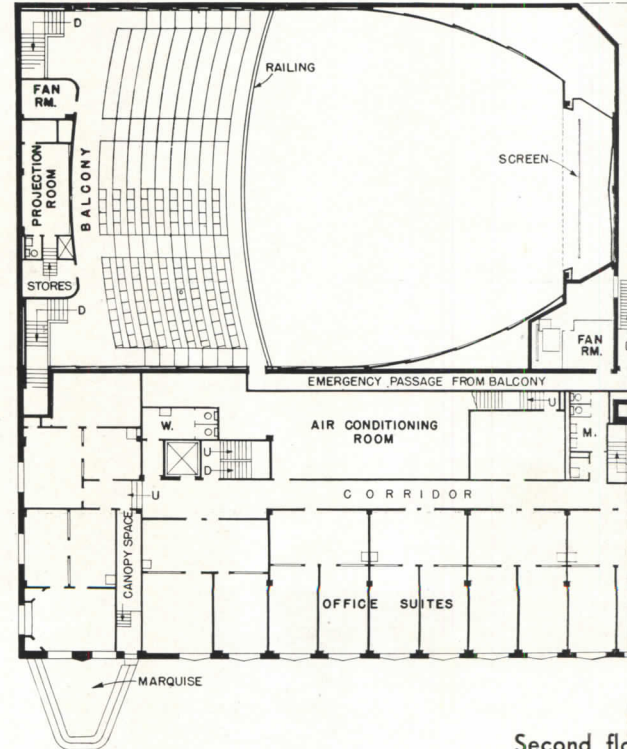


At night the building, lighted from within and from without, surprisingly assumes a horizontality which it lacks by day. Except for the brilliantly lighted theater

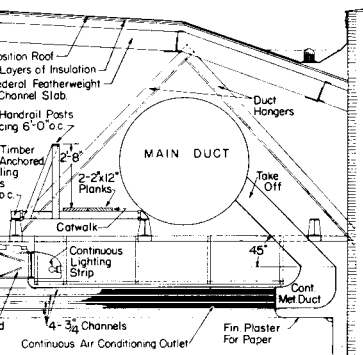
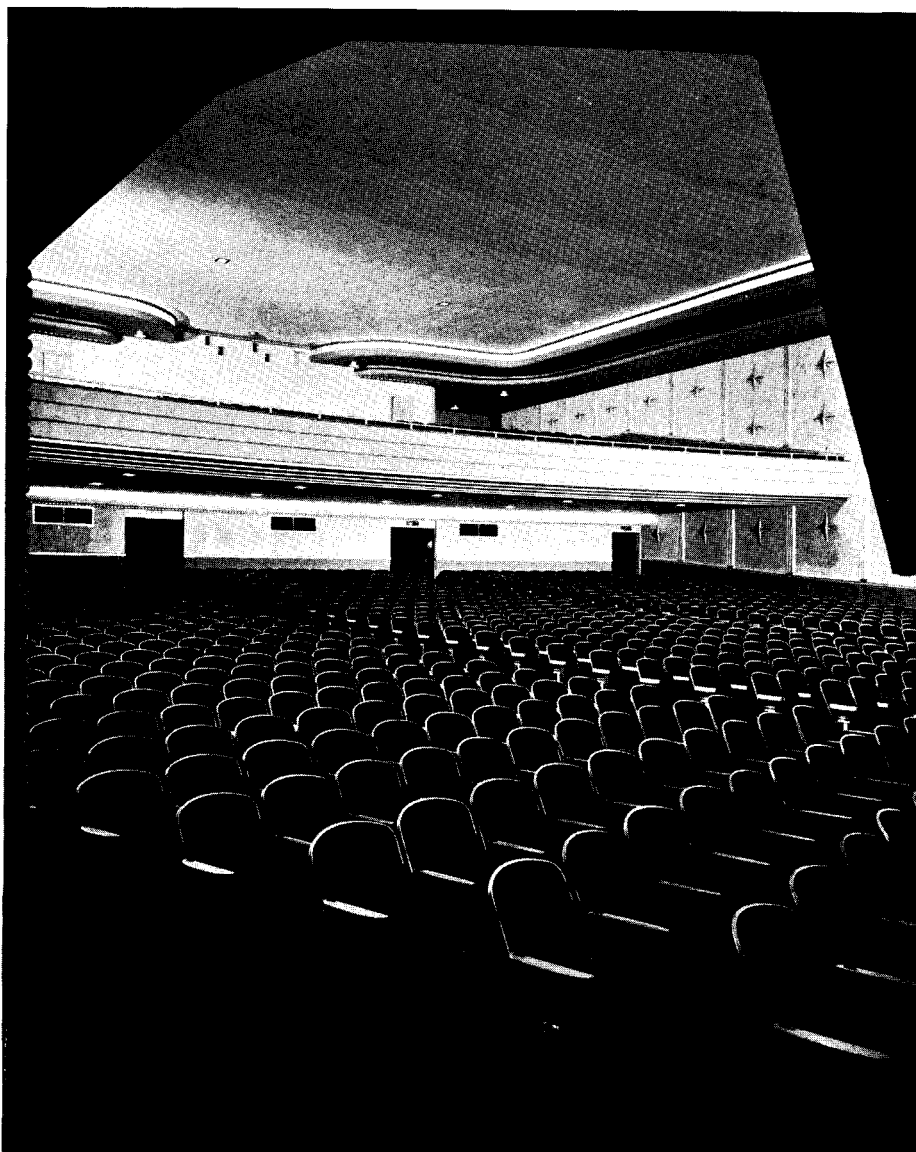
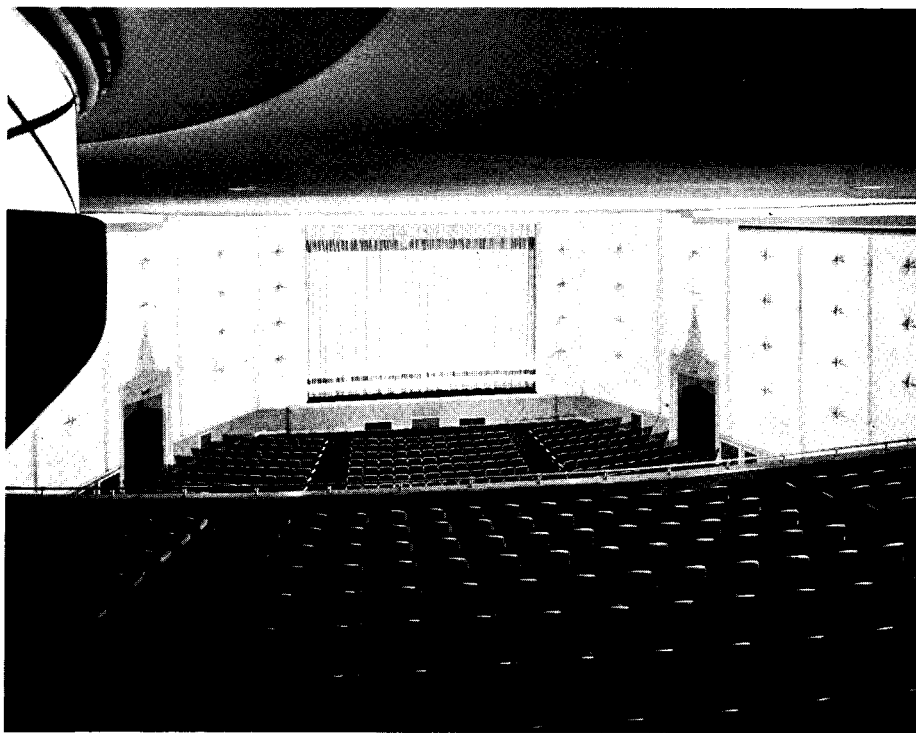
marquee, floodlights concealed in the round cornice at base of windows are the only external source of light.



Ground floor

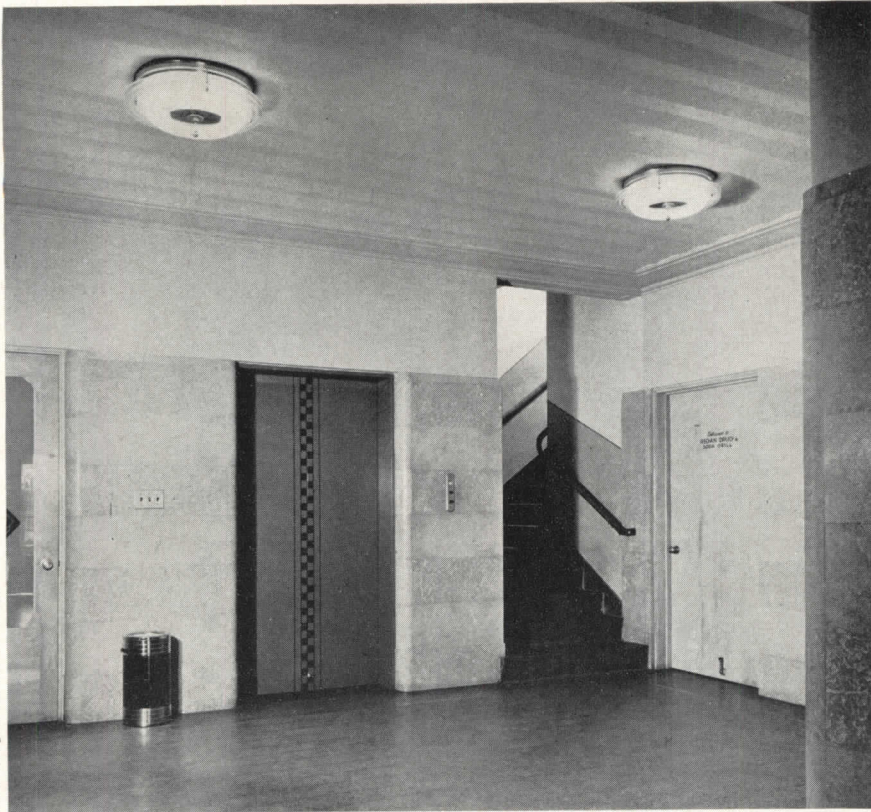


Second floor



theater, which seats 1,400 on floor and balcony, has its blast system of heating and cooling. The main duct (above) coming from the theater roof structure and forces air through each duct to the continuous channels running along the cornice, which distribute it to the theater. A separate exhaust fan for the balcony, connected to the plenum chamber with numerous holes in the risers of the balcony, prevents cigarette smoke from drifting into other parts of the auditorium.

Photos by Hedrich-Blessing



LOBBY of the office portion of building. Although small in area contains, besides elevator and stairway, a janitor's closet (left) and entrance to corridor at rear of store. OFFICE, furnished as a direct room, is typical in treatment of other suites. In outer offices, ceilings are 10 ft. high; in middle offices, 9 ft. 6 in.; in inside offices, 9 ft. and corridors, 8 ft. 6 in. The staggered heights permit branch ducts to enter each tier of offices and supply air through grilles on side walls.



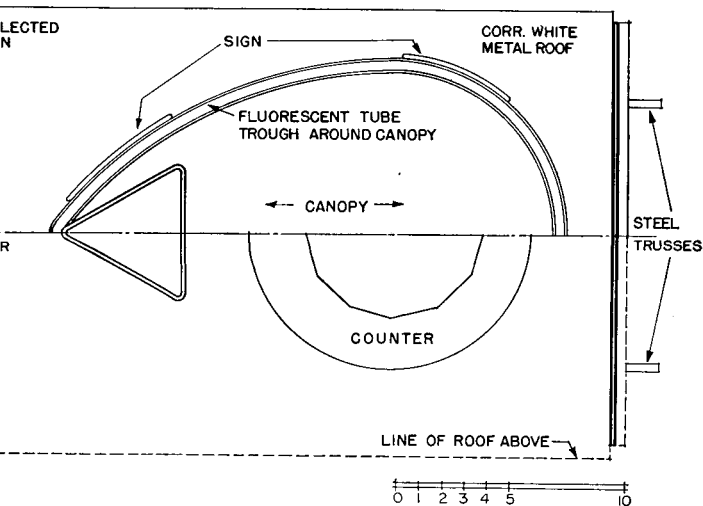


St. Thomas

## Y. WORLD'S FAIR OPENS GAY AND WEATHERPROOF BOOTH

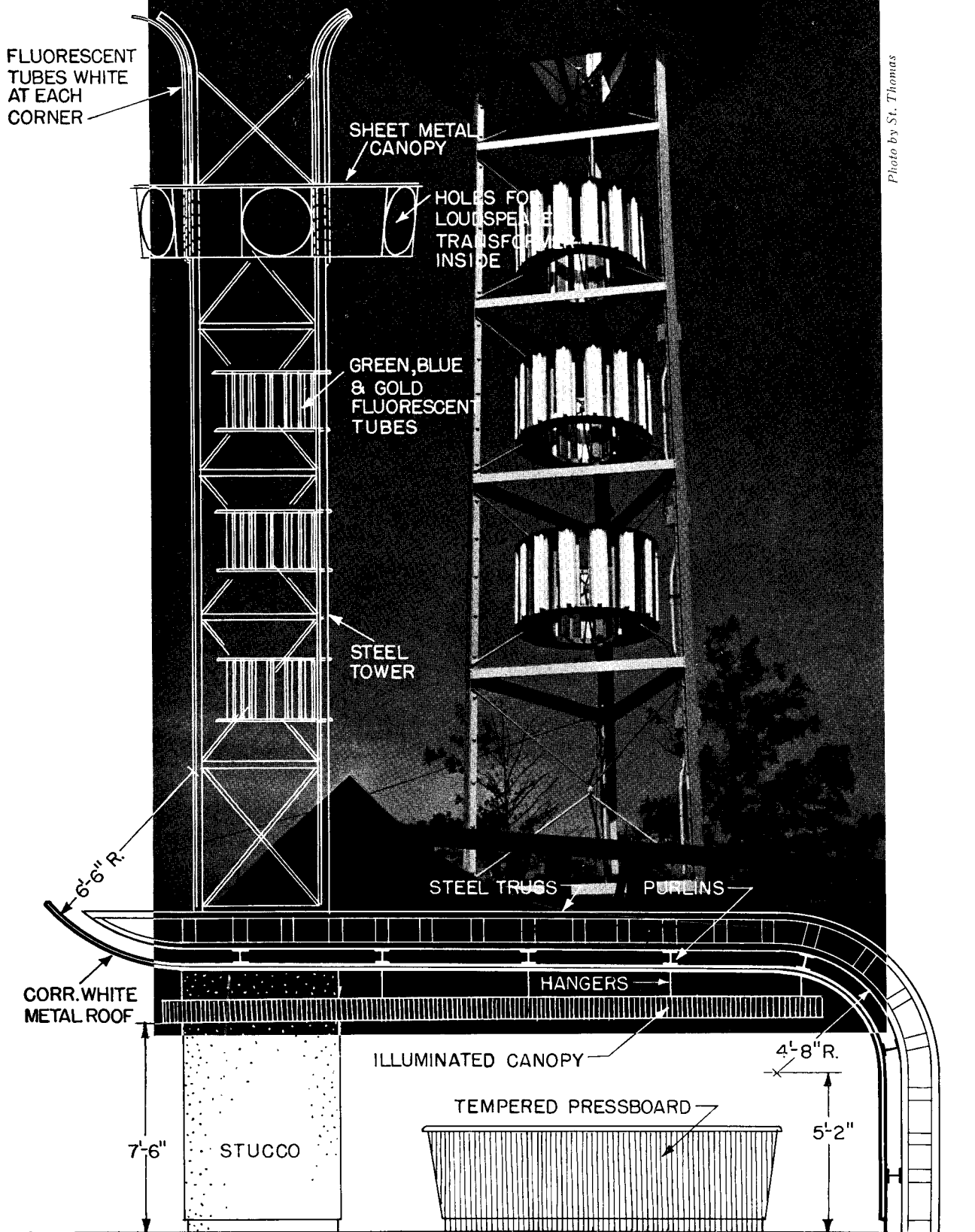
BOARD OF DESIGN

CONSTRUCTION DEPARTMENT, Designers



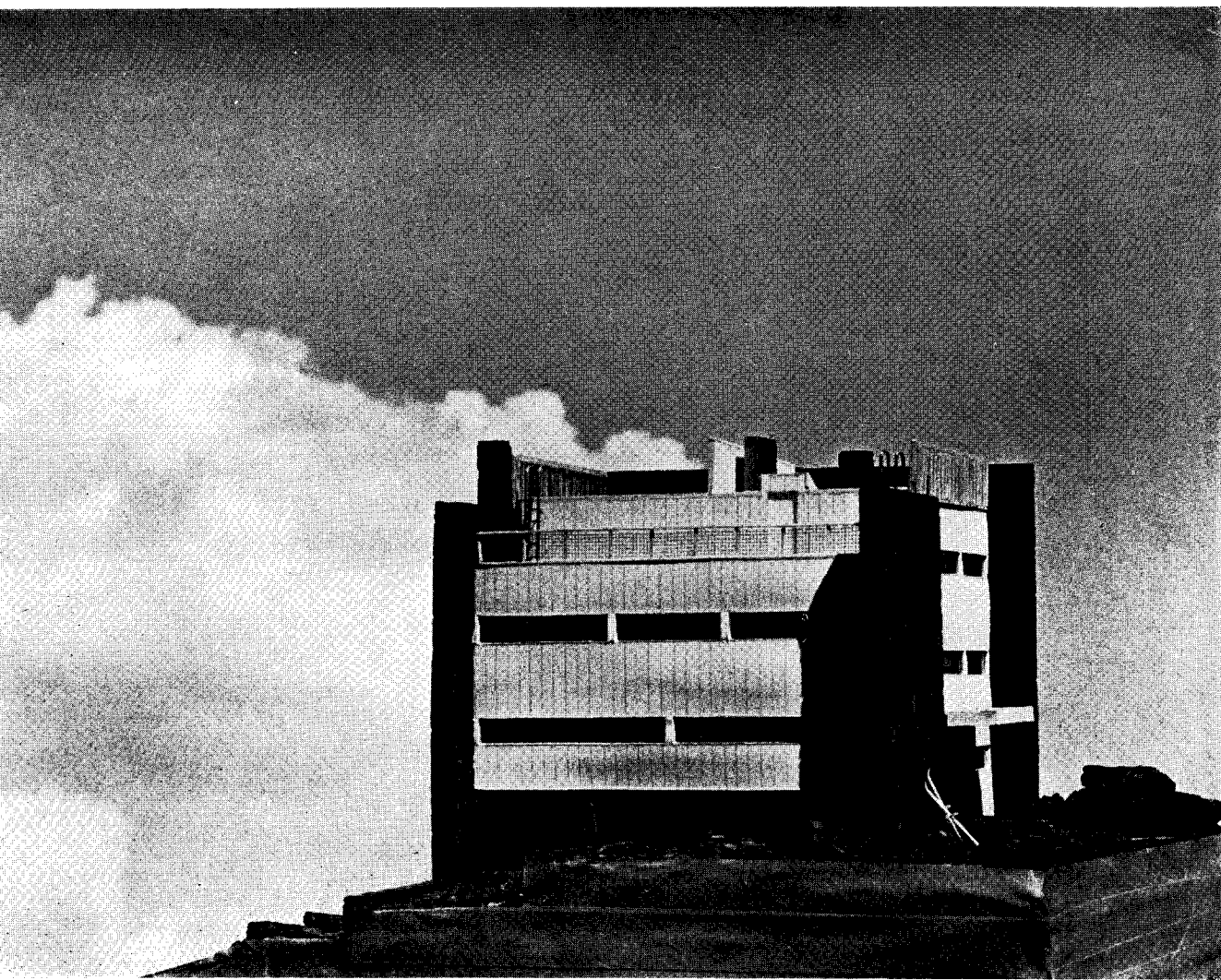
WITH NONE OF THE FANFARE usually attendant upon the opening of fair buildings, the Board of Design recently completed this information booth. One of the many smaller structures now under way, its interest lies not only in its use of materials but in its form. Actually, the only new material used is Zeon, a fluorescent neon light developed especially for outdoor use. The roof is of corrugated polished aluminum bent to specification at the factory, shipped in several sections, and assembled on the job. Since free circulation at an information booth is an essential, the complete openness of this design is an admirable solution to the problem. The tower, with its tubes of fluorescent light, is an easily recognizable landmark by day and by night.

Photo by St. Thomas



Most striking feature of the booth, the corrugated aluminum roof is hung by purlins from a steel truss of the same shape as the roof. An illuminated canopy hangs from the metal roof and supplies light by night and protec-

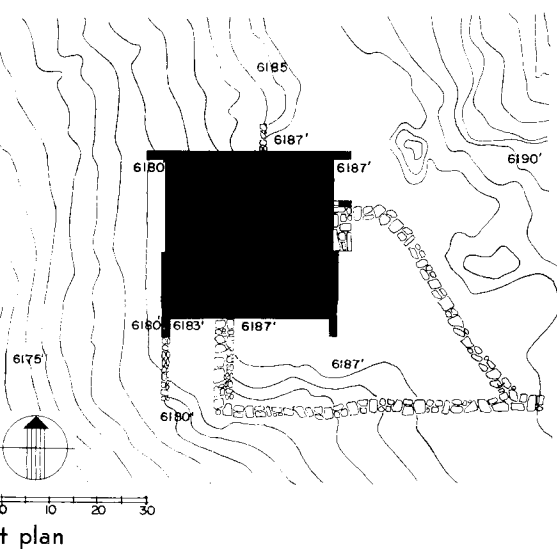
tion by day from the inevitable heat radiation from metal. The tower is of steel and contains, in the circular band near the top, a transformer and several loudspeakers for broadcasting announcements.



St. Thomas

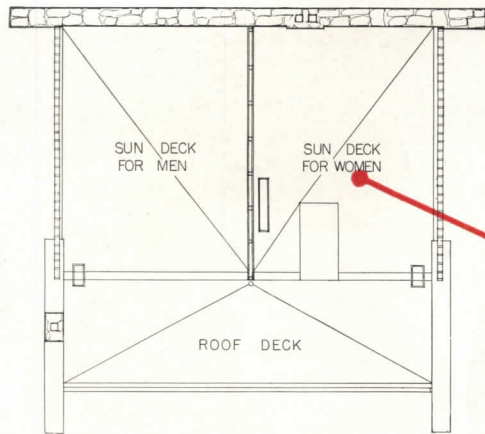
## BREUER DESIGNS, STUDENTS BUILD, HYPOTHETIC SKI CLUB IN AUSTRIA

MARCEL BREUER, Architect  
 HARVARD GRADUATE SCHOOL  
 OF DESIGN, Fabricators

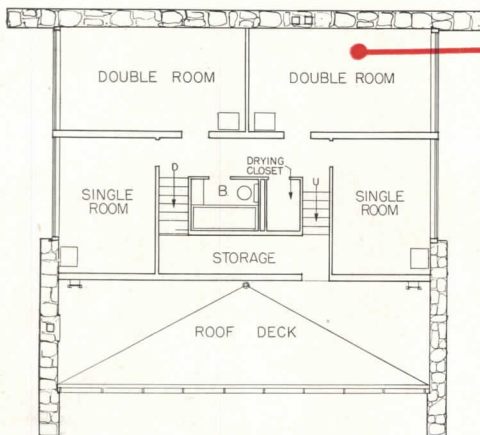


THIS SMALL SKI HOTEL, whose form is modern although it makes no use of such modern materials as concrete and steel, was designed for construction at Ober-gurgl in the Austrian Tyrol, 6,300 ft. above sea level. This winter sports resort—the highest in the Alps—is accessible only by sleigh; building in this location is thus complicated by the high cost of transportation of materials and equipment. This limitation presented to the architect the desired opportunity “to prove that modern forms are not dependent on steel, glass, concrete, or cantilevered balconies, and that modern architecture is based on a mentality, an approach to planning, and not on a certain technique.” Accordingly a system of construction which differentiates sharply between supporting and window walls was devised. All load-bearing walls and partitions are of stone, built solid from foundation to roof, except for a few minor openings which involve no lintel. Window walls are of wood, carry no weight but their own and are light enough to need no steel or concrete lintels even over continuous openings. The settlement of masonry and movement of the wood does not harm the structure, as the connection between the two materials allows for vertical play.

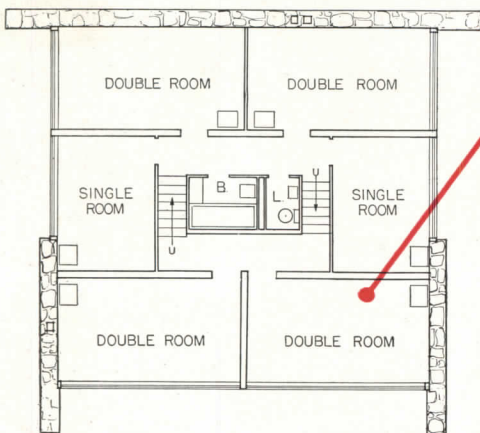
At the request of the RECORD, this model was made by students in the Graduate School of Design of Harvard University, under the direction and supervision of Mr. Breuer, now professor of design in Harvard's Department of Architecture. The recent unsettled political situation in Austria prevented construction of the hotel.



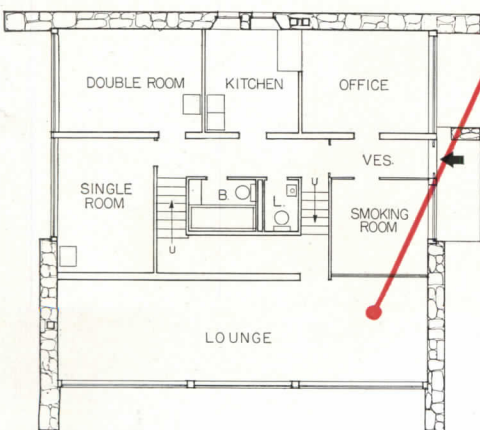
Roof



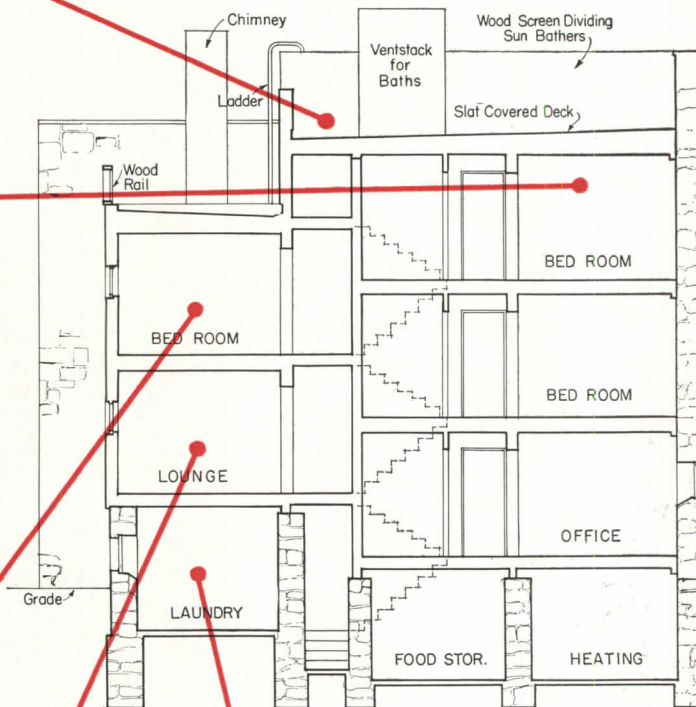
Third floor



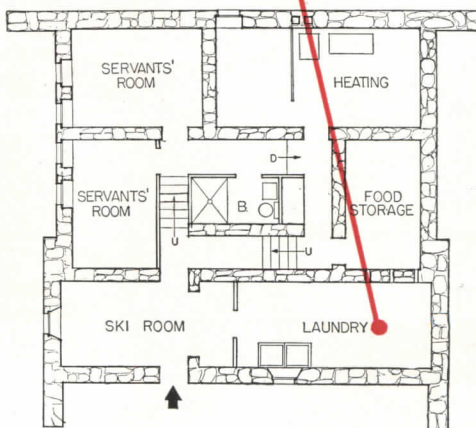
Second floor



First floor



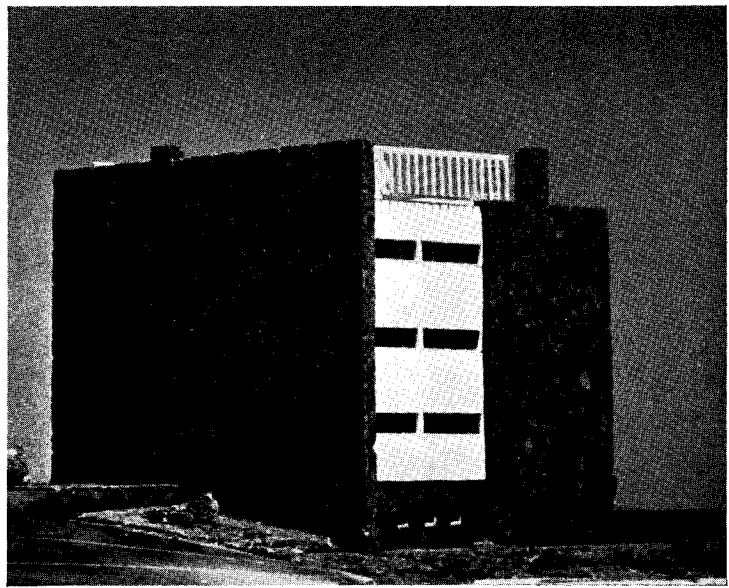
Ground floor



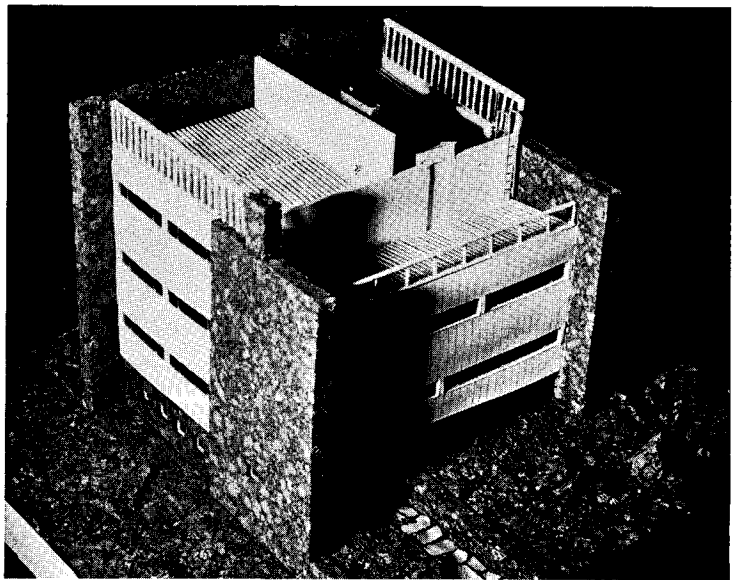
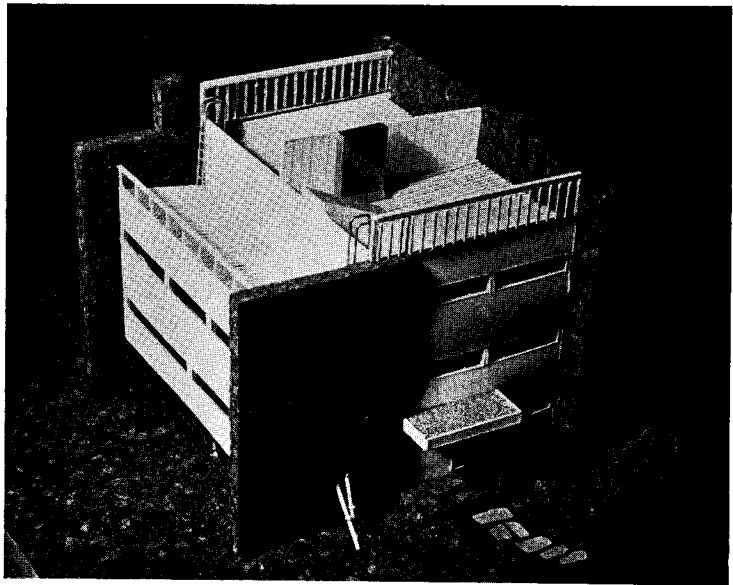
Ground floor

Economy of construction dictated the internal arrangement; landings between stories give access to all rooms; bath, toilets, clothes-drying rooms are grouped in the center of the building and are ventilated by a common internal shaft. The flat roofs are used as sun decks and are protected from wind and curious eyes by light screens of obscure glass and wood. Designed for sportsmen, not for the fashionable, the hotel has a capacity of 20 beds; the four baths—none private—are amply sufficient for the simple life of an Austrian ski resort.

# SKI CLUB IN AUSTRIA



Photos by St. Thomas

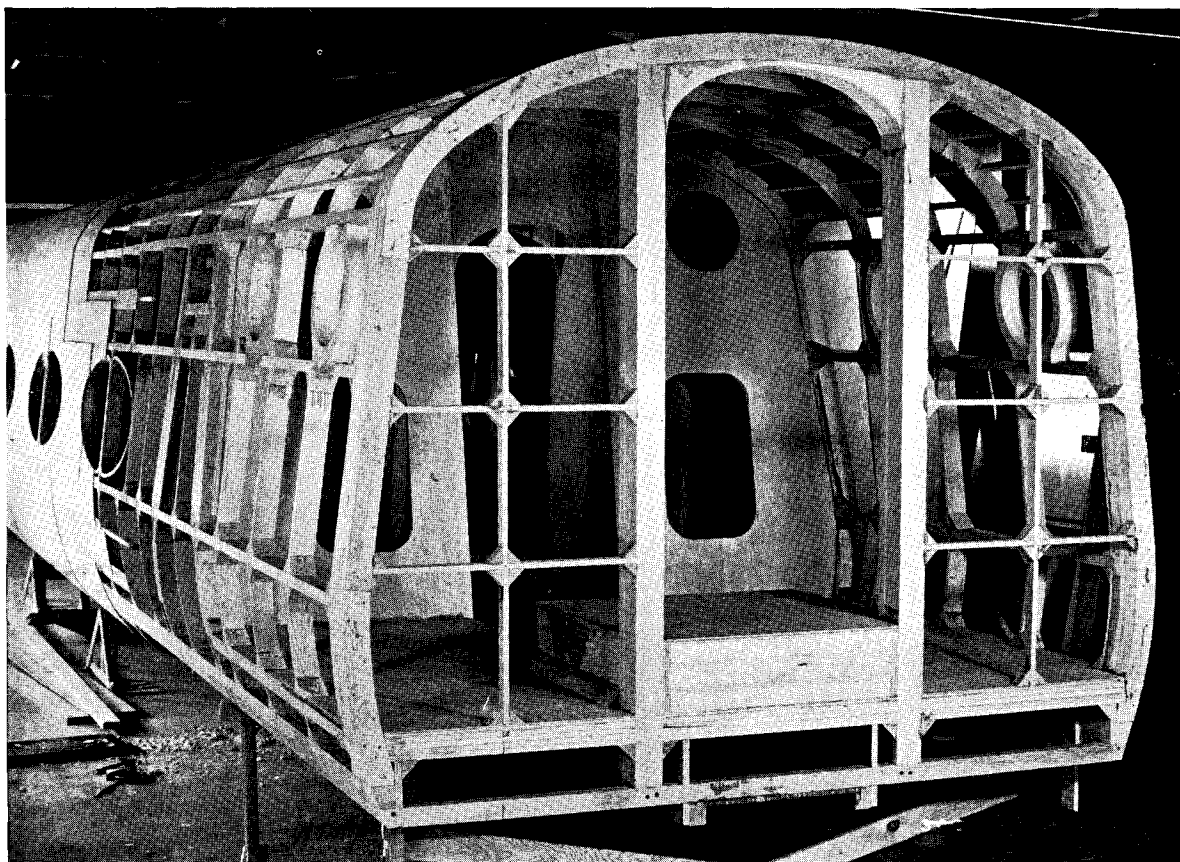


Three views of the model: elevation from northwest (above), from southeast (center), and from southwest (below).

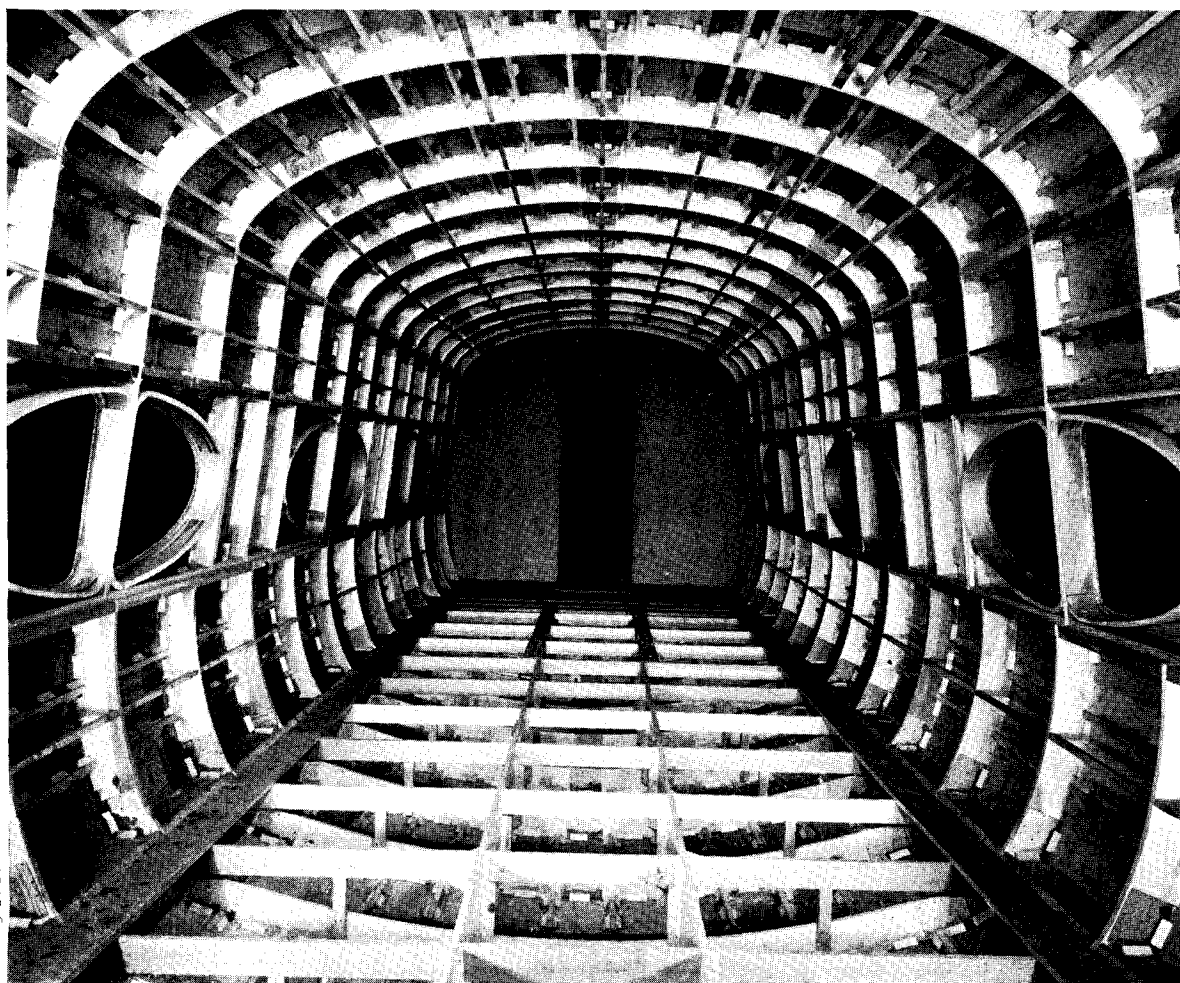
GENIOUSLY constructed, this model is a visual presentation of Mr. Breuer's constructive use of stone and wood. Materials used in making the model were chosen for their resemblance to the materials which would actually have been used had the hotel been built. The stone walls are represented by dark-brown cork sheets of the proper thickness for the scale of the model. The window walls are plywood-backed, faced with heavy drawing paper; plank widths are indicated by pencil lines. Continuous windows are made of Cellophane, with mullions of the same drawing paper as the window walls. The roof is made of rough sandpaper over which are laid wooden sticks to simulate slats. Separating the two sun decks is a plywood wall faced with drawing paper. Wind screens are of actual glass, with a wood railing. The ventstack is fabricated of light gauge chromium and ladders connecting sun decks and roof deck are of bent chromium tubing. Leading up to the entrance are stepping stones of Scotch tape. The model sits on a plywood base covered with dark-brown ink.

# NEW STRUCTURAL SYSTEMS

*Courtesy Engineering News-Record*



*Courtesy C. T. Hill*





Courtesy C. T. Hill

Interior of ATSF's trial car

### "Stressed Skin" System Makes Possible Plywood Railroad Car

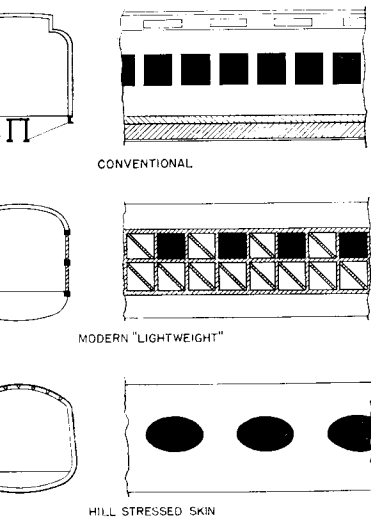
TO THE BUILDING DESIGNER in search of new construction ideas, use of the semi-monocoque or stressed-skin principle presents an almost virgin field, since it has heretofore been identified exclusively with airplane manufacture. The particular advantage of this system is that the resulting structure is light in weight but high in strength and economical of construction. The outstanding characteristic of this type of structure is that the outer covering or "skin", suitably stiffened and supported, is the principal load-bearing element, thus eliminating usual framing and trusswork.

As applied in the construction of airplanes, and, more recently, railroad cars, the stressed-skin body is a huge tubular beam which extends the full depth of the fuselage or car. With certain allowances, it acts elastically as any other beam. Under normal loads the roof acts as the compression flange, the bottom as the tension flange, and the two sides as the shear webs. Theoretically, the skin, if heavy enough to retain its shape, would constitute a complete structural system in itself. Actually, the effectiveness of this deep "beam" is such that only a thin skin (approximately 16 gauge) is needed; hence, the use of internal transverse ribs to hold the skin in shape, and of longitudinal stiffeners to reinforce the compression (roof) side. The longitudinal stiffeners, supported laterally at intervals by the transverse ribs, act as columns and, together with the adjacent portion of skin, carry increased loads under which unstiffened skin would buckle. The column prop-

erties of the skin-stiffened combination are determined by the rib spacing; usually this spacing is such that these parts are in the short-column range. The effective width of skin acting with each stiffener is a function of the stiffener stress, the thickness of the sheet, the stiffener spacing, and the modulus of elasticity of the material.

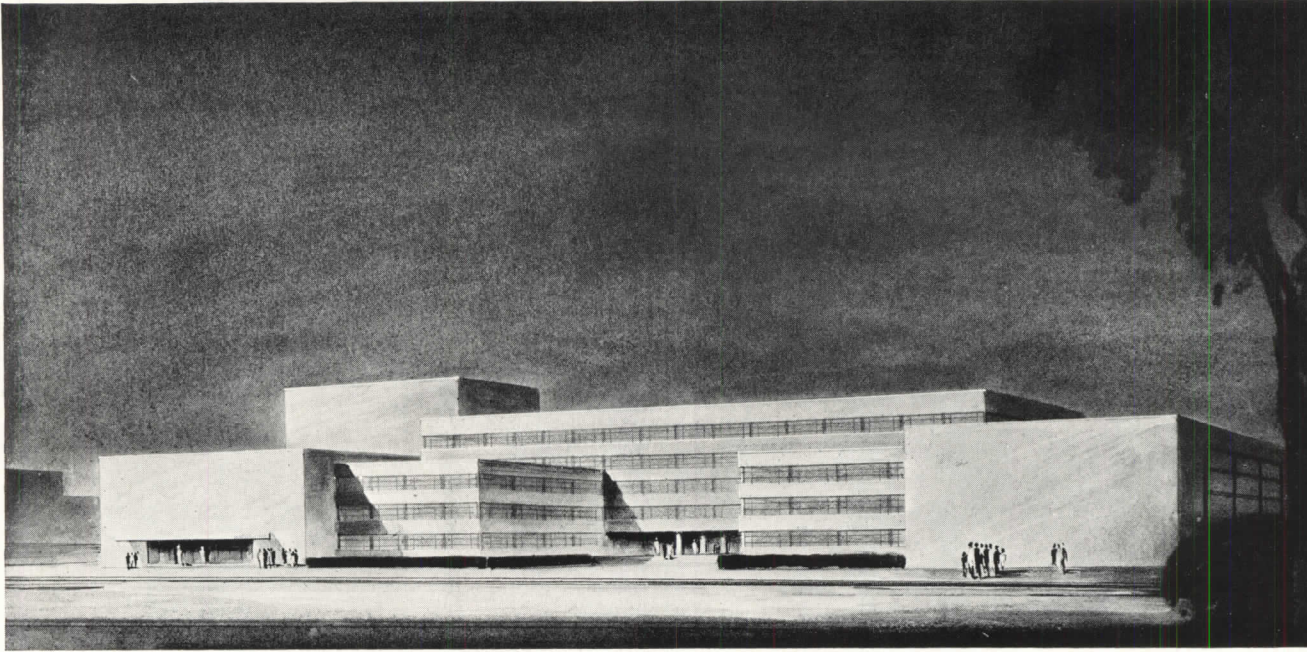
Analytical procedure simplifies considerably the calculation of stresses and makes possible use of standard beam formulas. In calculating the section properties, the full area of the skin on the tension side may be used, but on the compression side only that portion can be included which is considered to be acting with the stiffeners at their full stress.

The effectiveness of the semi-monocoque type of structure was recently demonstrated in the experimental cars for the Atchison, Topeka & Santa Fe Railway, photographs of which are here presented. These cars, because of their temporary character, are built of Douglas fir plywood; the final product will be all metal. Stressed-skin construction is suitable for use with a variety of materials— notably the recently developed high-tensile steels—but this is one of the first applications of the design principle in wood. (For earlier proposal see AR, 2/37, p. 47.) A static load test to twice the normal gross load was made to demonstrate the strength and rigidity of the car bodies and it was found that the creaks and groans usual with wood-framed cars were entirely lacking.



Evolution of load-bearing elements in the railroad car: first a simple beam (top); then parallel trusses along the sides (center); finally a tubular beam enclosing the car.

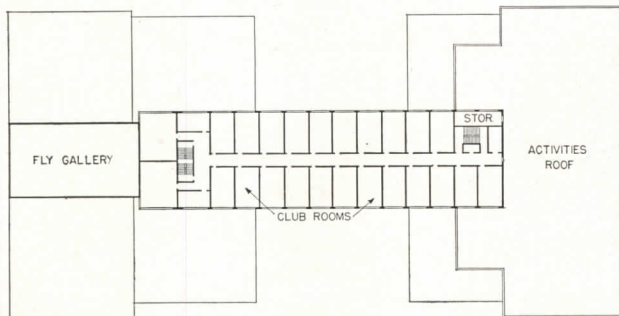
# PROPOSED BUILDINGS



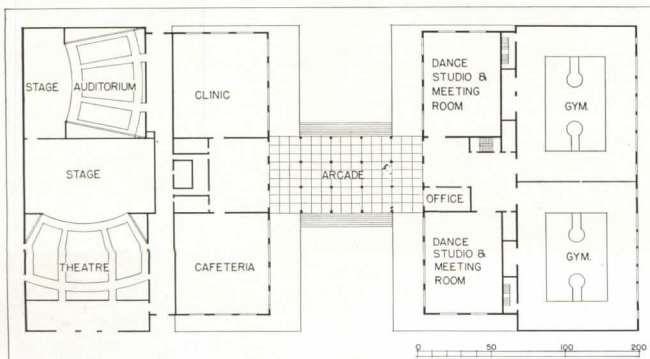
## Projected Youth Center Will Provide Recreation Facilities for New York's East Side

POMERANCE & BREINES

Architects



Plan at third and fourth floors



Ground floor

THAT ADEQUATE RECREATIONAL FACILITIES for young people in crowded metropolitan districts are a necessity is evidenced by the increasing interest in providing such facilities on the part of various governmental agencies. Once the concern of private individuals, a problem, complicated by unemployment among the youth of this country, is now too large to be handled privately. In New York City, where the acuteness of the problem on the lower East Side has reached "virtually a state of emergency", plans for a large centrally located recreation building were recently laid before city government officials as the first step toward obtaining funds in the city's capital outlay budget.

Suggested as a solution to the needs of the crowded conditions of the lower East Side is this Youth Center, which, if built according to present plans, would accommodate between 6,000 and 10,000 young people daily. The purpose of the building is to provide for both cultural and physical activities; in order that these may function independently of each other, each is housed in a separate wing, connected on the ground floor by an open arcade and on the second floor by a lounge. Entrance to each wing is through the arcade; in addition, the theater has an entrance from the street. On the "cultural" side of the building are a clinic, for neighborhood use, and a cafeteria, for use in connection with the Center's activities. Below ground level on this side are vocational training and crafts facilities. The lounge level contains provision for a branch public library, domestic science laboratories, and vocational guidance facilities. For the various club activities which are a feature of settlement house programs there are 50 club and meeting rooms on the upper floors.

Estimated cost of the building, designed to occupy a full block, 200 x 400 ft., is \$1,500,000.



# DESIGN TRENDS

“While I was in *New Connecticut*  
I laid out a town  
on the banks of Lake Erie,  
which was called by my name,  
and I believe the child is now  
born that may live to see that  
place as large as *Old Windham*.”

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Thus did MOSES CLEVELAND,  
*surveyor for the Connecticut Land Company, modestly report in 1796*  
*upon his return from the savage wilderness known as The Western Reserve.*

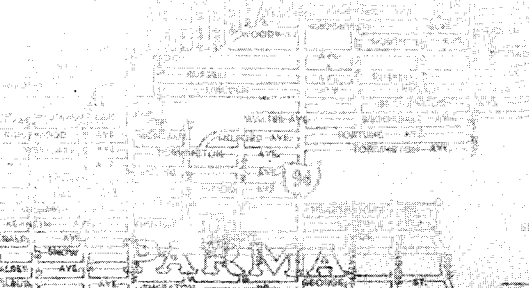
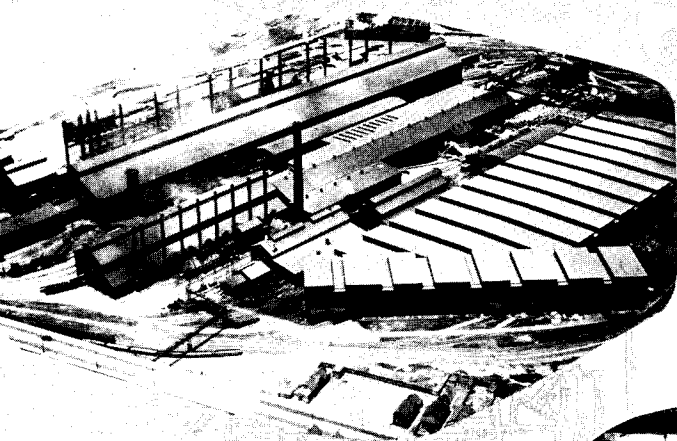
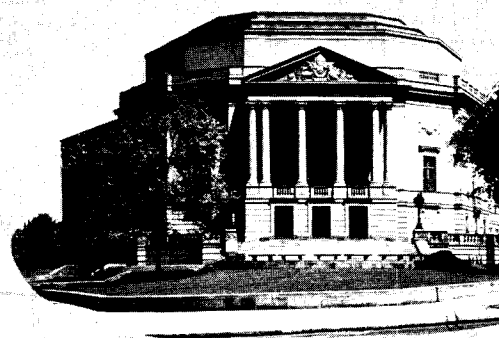
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**CLEVELAND**  
*METROPOLIS OF THE WESTERN RESERVE*

ARCHITECTURAL  
RECORD

COMBINED WITH  
AMERICAN ARCHITECT AND ARCHITECTURE

# CLEVELAND . . .



CUYAHOGA  
RIVER

68

176

# METROPOLIS OF THE WESTERN RESERVE

**This report on the background and present development of the country's sixth largest city was compiled entirely by Cleveland architects—members of the Cleveland Chapter of the AIA. Included were Leo J. Barrett, Chief Editor, and Edward G. Conrad, George B. Coombe, Robert W. Dickerson, I. T. Frary, Howard F. Horn, Bascom Little, Alexander C. Robinson, III, Harry L. Shupe, Walter Harrison Smith, Travis G. Walsh, and Joseph L. Weinberg.**

## Historical Background

by I. T. FRARY

WHEN MOSES CLEVELAND, in a moment of expansive optimism, prophesied that the new settlement on Lake Erie, to which he had given the name, might some day equal Windham, Connecticut, in population, he probably felt that his imagination was being freely indulged.

Today the City of Cleveland is the industrial and financial center of the Western Reserve—that rich section of northern Ohio that is “bounded on the north by Lake Erie, on the east by Pennsylvania” and reaches west 100 miles, embracing an area of 1,000,000 acres. This was originally part of Connecticut's holdings in the wilderness that stretched indefinitely toward the “Western Ocean.”

When the other states ceded their western holdings to the United States government at the close of the Revolutionary War, Connecticut showed its characteristic Yankee thrift by reserving this great area and selling it to the Connecticut Land Company for \$1,250,000, holding the proceeds as an endowment for the support of public schools.

A party of surveyors was sent west to the Company in the spring of 1796 to run the lines of purchase,

Moses Cleaveland being in command of the expedition. He came with orders to establish the first settlement where the Cuyahoga River flows into Lake Erie and gave to it the name of *Cleaveland*—which was later changed to Cleveland.

The Connecticut Land Company inaugurated our first land boom, in accordance with a carefully developed plan. The land was laid out in townships five miles square; shareholders in the Company were assigned their choice of land by lot; and those subscribing approximately \$13,000 were entitled to an entire township.

The first drawing was held in January, 1798; and after that the shareholders pursued their own methods in subdividing and selling their holdings to prospective settlers.

This undertaking was conducted largely by Connecticut businessmen. Thus it was obvious that the Western Reserve would be settled mostly by people from New England.

Like pioneers in any portion of the world, these New Englanders would naturally establish themselves in the far western Ohio country with surroundings as similar as possible to those to which they had been accustomed. It was the natural, simple, easy way. So the carpenters who came with the tide of immigration brought their few textbooks of design by Asher Benjamin, Minard Lafever, Edward Shaw, and perhaps a few others. They carried in their tool boxes molding planes with knives ground to the forms which they had used on work in the East; and they

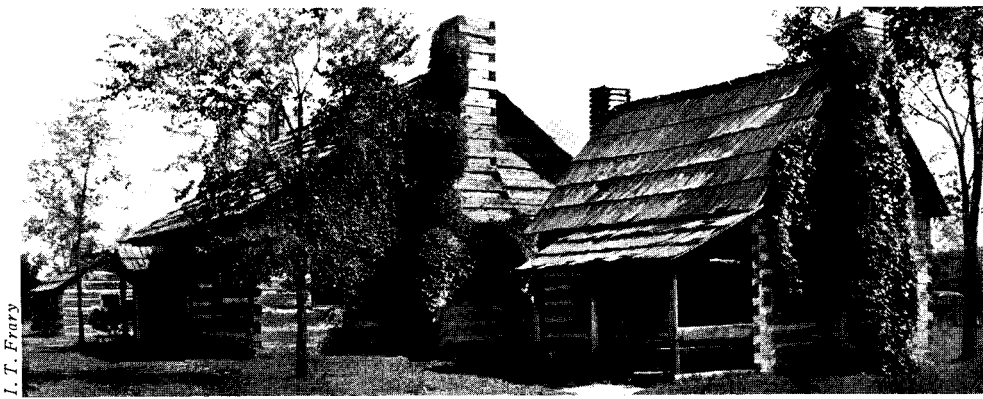
had stored in their minds details, plans, and methods of construction which they had learned during the period of apprenticeship.

So Cleveland and other communities of the Western Reserve grew up as architectural and cultural offspring of the New England towns from which the early settlers came. Their most vigorous growth took place during a period of change in architectural traditions. The fashion set by the Brothers Adam of England—fostered on this side of the Atlantic by Charles Bulfinch, Samuel McIntire, and their school—was beginning to wane. The new classicism that was being fostered by Thomas Jefferson, Benjamin Henry Latrobe, and Robert Mills, was sweeping the country.

Wealth sufficient to make possible fine architecture such as that of Salem, Boston, Annapolis, Tidewater Virginia, and Charleston was not common; and as a rule the pioneers did not begin to spend liberally on building until the Classic Revival had outmoded its predecessors of the eighteenth century.

These tendencies and influences are plainly evident in the early architecture of the Western Reserve and were evident in Cleveland until progress swept away the early records. The conservatives were quite content to build their houses as their fathers had built before them, while the progressives insisted on following in the footsteps of the Greeks.

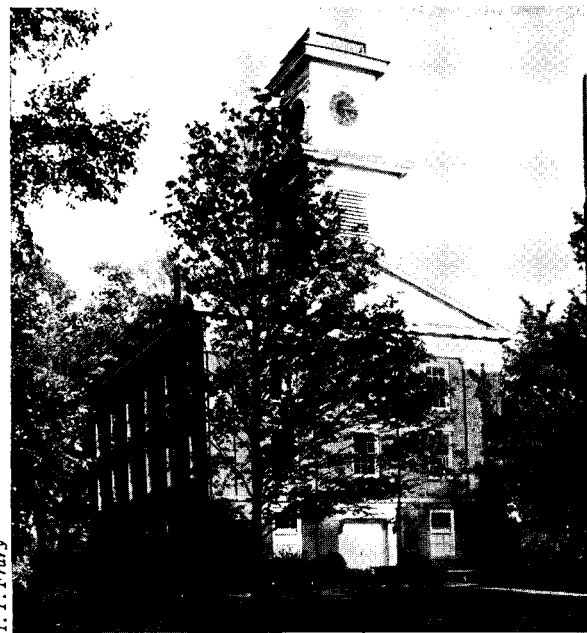
Consequently, we find various types represented. Some houses show eighteenth-century ancestry. Beside these are adaptations of



I. T. Frary



I. T. Frary



I. T. Frary

### 3 NEW ENGLAND TRADITION IN THE WESTERN RESERVE

Early structures of Cleveland and its hinterland were built by men trained to the architectural characteristics of New England. Pioneer homes were of logs, like 1 at Schoenbrunn. Later farmhouses were similar to 2, located near Ashtabula, a few miles out of Cleveland. 3, the Chapel of Western Reserve College at Hudson was derived from buildings of Yale University at New Haven, Conn. As wealth came to Cleveland, mansions were built in the eastern part of the city. 4 is a view of Euclid Avenue at the peak of its grandeur.



Greek and Roman temples that have been made to do duty as churches, courthouses, schools, and residences. Others show mixed parentage; and still others are carpenter-made boxes on which have been grafted cornice and doorways of classic types.

The men who designed and put together these old buildings were craftsmen, untutored in classic learning, but endowed with the pioneer's ability and facility in overcoming difficulties. They wrought most original interpretations of classic forms and details; theirs was a colloquial language, based on established forms but usually restrained by limited means. The old farmhouse may sometimes be crude, but they seldom miss being dignified and are rarely ugly.

Ugliness was reserved for the period that followed the Civil War—the period in which natural leadership deserted the arts for the more alluring and lucrative fields of invention, promotion, and finance. Men of mediocre ability took over building operations of the time and, with ample energy but little taste, met the ever-present demand for something new with the creations of lathe and jig-saw.

The vast wealth and growth of Cleveland were of this period. They were built the homes of men who founded and promoted The Standard Oil Company and The Western Union Telegraph Company, who made fortunes from iron and coal, and by building ships and railroads to transport these commodities. These mansions were in the current mode of Eastlake or of Richardson.

As wealth grew, so did the city. And as its property values climbed, the city's early architecture was erased to make way for structures dedicated to the production of dividends. The mansions of the '70s and '80s followed suit—deserted because of city grime, change in fashion, and the lure of a new suburban life.

Today, if we seek the story of Cleveland's architecture, we must depend on old photographs for illustrations of its earlier types, or go to the smaller towns in its vicinity. On Euclid Avenue may still be found pathetic monuments to its former grandeur now utilized largely as clubs and boarding houses. A very few still shelter descendants of the original builders. All await the inevitable coming of the wrecking gang.



Courtesy Chamber of Commerce

## Growth of Regional Planning

**ABRAM GARFIELD, FAIA**  
 Chairman, Cleveland City Planning Commission

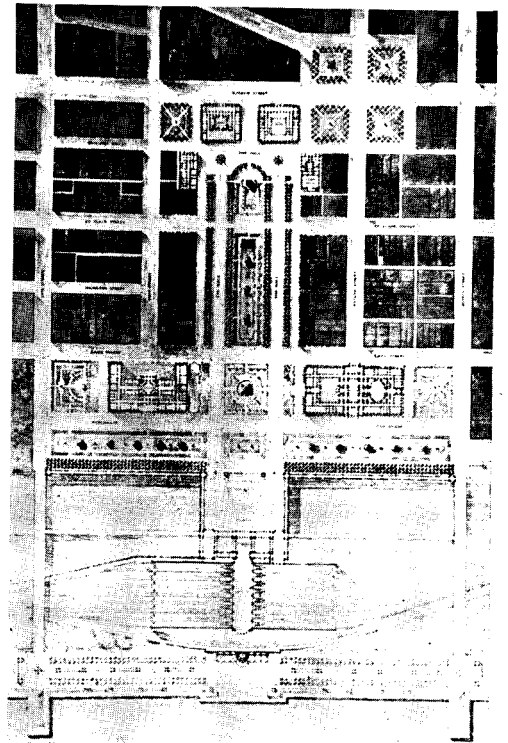
MORE THE DAYS of rapid transit Cleveland was a pleasant, prosperous city with deep lawns and shaded streets that had earned for it the name "The Forest City." Its limits had been naturally established by the distance one could travel in a horse-and-buggy in about an hour's time. The pattern of the town had developed as naturally. Roads came in toward the mouth of the Cuyahoga River from the east, west, and south. The roads came down the river valley along the lake shore. Here were the industrial areas; and from them, fan-wise, spread the residential neighborhoods. Downtown, where the roads converged, was the Public Square—the heart of the Western Reserve's fast-growing metropolis.

As problems of city planning existed, Cleveland's growth was rapid; during the three decades preceding 1900 the city grew upon the network of existing roads. The pattern had been set; no complications existed, apparently, to prevent expansion upon the already solidly established basis.

Then came rapid transit. With it came a new way of living which uprooted old habits almost overnight. Adjustment to the change created in Cleveland—as in many another city—a planning problem with which no one was prepared to cope.

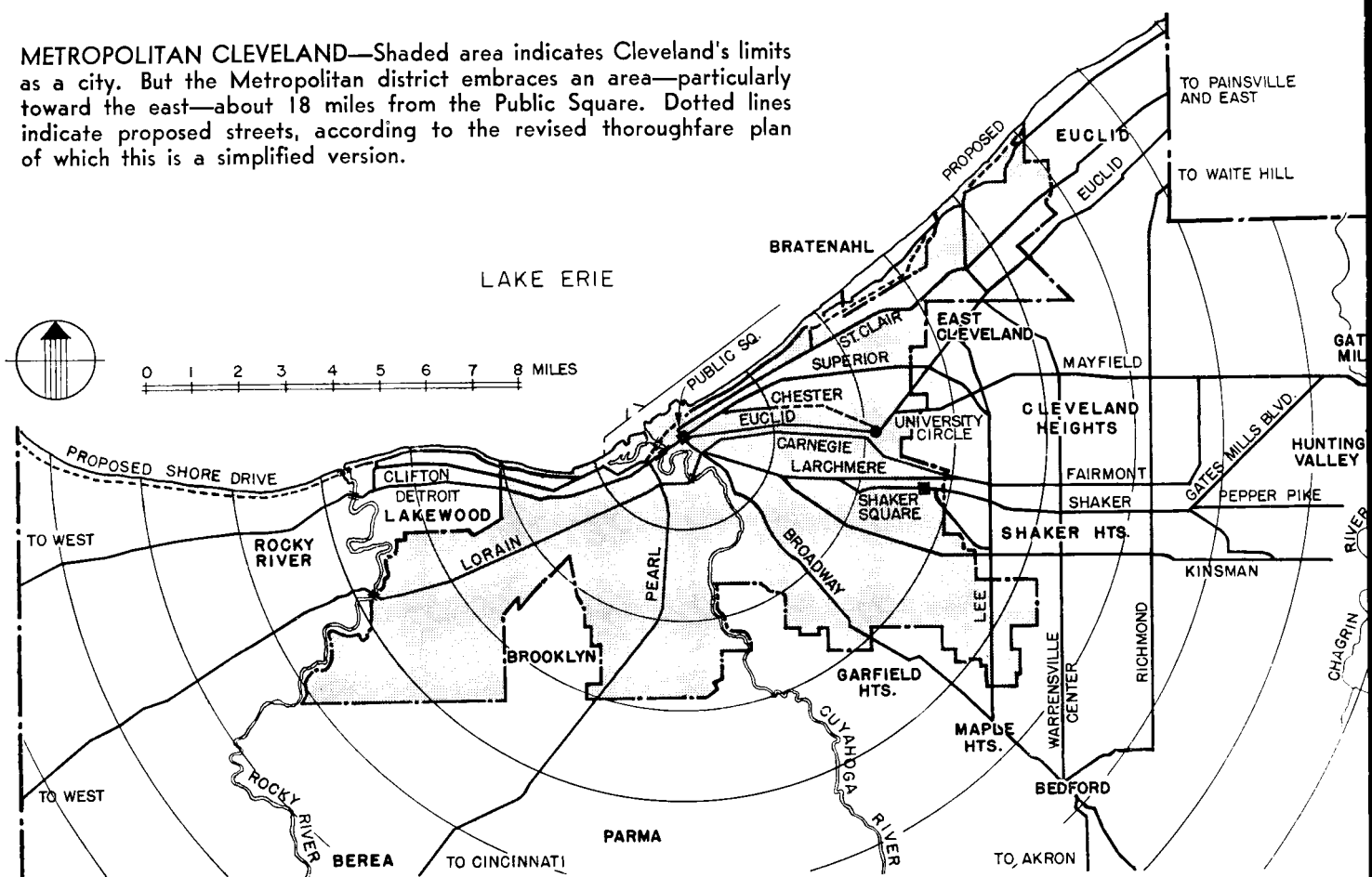
As in any city, rapid transit in Cleveland implied tremendous expansion. And yet the factors involved were so numerous and sometimes so obscure that only in the past few years has there been a realization of their importance. Knowledge of how best to relate them to the established city pattern is still incomplete. But in Cleveland a start has been made toward correlating the complicated factors of modern life with the physical characteristics which have developed as a result of the city's rapid growth. An example is the plan made in 1903 for grouping the City and County buildings around a central open space near the Public Square.

The old Public Square is the natural center of the city. The connection between the Group Plan and the Public Square is not yet satisfactory, but nothing has been done to forbid



**CIVIC CENTER, 1903 and 1936**—Above is the plan made in 1903 for grouping City and County buildings about a Mall leading from the Public Square toward the Lakefront. In the air view—taken during the Great Lakes Exposition in 1936—the Mall is evident, as are some public buildings (Auditorium, City Hall, and Courthouse). The horseshoe structure is the Stadium. The new Lake Shore Drive (see page 69) leads off the picture at the top, right.

**METROPOLITAN CLEVELAND**—Shaded area indicates Cleveland's limits as a city. But the Metropolitan district embraces an area—particularly toward the east—about 18 miles from the Public Square. Dotted lines indicate proposed streets, according to the revised thoroughfare plan of which this is a simplified version.



Air view of downtown Cleveland, looking east. The Public Square occupies an important place as the focal point of Cleveland's rapid-transit system and also is the center from which main streets—developed as the most direct routes from old Indian trails—radiate to the east and west along the Lakefront and south through the Cuyahoga River valley. Buildings in the foreground are those developed as a terminal group by the Van Swerigen brothers. They include the Hotel Cleveland and are used by the New York Central, Baltimore & Ohio, Nickel Plate, and the Big Four.

a proper solution. During the past two or three years the development of a lakefront highway running directly by the foot of the Central Mall of the Group Plan has brought these public buildings into a new and reasonable relation to the east and west action of traffic. For years the railroads had pre-empted all of the city lakefront; and an outside boulevard or parkway had seemed unattainable. In 1936, however, came the Great Lakes Exposition, on the Lakefront. The idea of a boulevard grew as a means of giving the lakefront back to the citizens of the city. Four or five miles of it have been built; more is to come.

Although Cleveland was one of the first American cities to develop a "Group Plan", no formal "City Plan" has yet been made. It is true that a thoroughfare plan exists. Indeed, it was so well worked out 15 or more years ago that almost every street opening and street widening which has taken place was indicated on this plan. It has stood the test of time and is an invaluable record. But this is not a city plan in the ordinary sense of the term—a comprehensive

picture of present and future traffic ways, parks, zoned areas for buildings, etc., extending far beyond the limits of the city itself.

Because of the complexities of the problems, it is doubtful if any made 20 or even 15 years ago could have indicated, with wisdom, all needed so that each family could quietly and securely according to income. That is an objective discussed but rarely achieved. Some did plans have been made in many cities. But too often they accomplish only an arrangement of traffic art leading to a central park or plaza project a connecting highway between two focal points. These have value; they add to the beauty of cities and help to simplify the problems. But how much do they promise as to comfort and security of living? Cleveland's Group Plan an accomplishment of this kind. good—even in its incompleteness. But it is not a city plan.

Traffic, though important in Cleveland, is not a compelling factor as is on Manhattan Island and in Edinburgh. It is therefore possible to Cleveland's planning problem not

ch upon traffic necessities, as upon industrial and residential needs. When rapid transit came, people moved to the distant areas chiefly along the main routes. New roads were opened and old ones improved and widened; almost no new principles had to be established corresponding, for instance, to the great Hudson River bridges which bypass the city streets for so many miles. The old layout, in general, satisfactory.

It is true that Cleveland has been busy in improving some of the connections between the city and surrounding regions. The important residential areas that have grown up

outside of the city itself have required special consideration. Developments south and east of the city proper have come into existence during the past 30 years as Cleveland Heights, Shaker Heights, and other separate municipalities. This whole residential area has been planned in care, but the connections between these districts and the city have taken place only gradually. University Circle, the educational and cultural center of the city, and Shaker Square, successful business center, are good solutions of individual problems. But they have thrown the backbone of the city, east of the river, a little out of joint. University Circle and East Cleveland drag towards the old main street, Euclid Avenue. The Heights have pulled things a little to the south, but have not been able fully to establish Carnegie Avenue as the new backbone of the city. When Chester Avenue, to the north of Euclid Avenue, has been opened through its whole proposed length, the drag in that direction will apparently bring the center back to Euclid Avenue.

These three streets, Chester, Euclid and Carnegie Avenues, lie upon the natural approach to the city from the east—the most direct route since the days of Indian Trails. Probably no other approach from that direction will become of such importance that this system of streets will deteriorate as highways. Within the city limits, the area adjacent to them has deteriorated. But so far as highways are concerned, connections between these particular streets from outlying districts are solved.

Other difficult connections are yet to be made. Splendid roads from the north indicate that probably the best approach into the city has been finally planned for and designed. But the

last five or six miles involve a network of streets which are difficult to travel for the uninitiated.

The new lakefront boulevard is in the making, but east and west connections to outlying highways have not been fully solved. Precisely what this boulevard will do to the city when completed is difficult to anticipate. It is now a busy thoroughfare, but its effect upon its immediate neighborhoods is problematical. In time a parkway will probably adjoin it as it runs along the lake, similar to that in Chicago. But an old industrial district still borders it on the city side.

The highway runs through four or five incorporated towns and cities, all within the area of Metropolitan Cleveland. And the difficulties of properly connecting them with the highway have caused an increasing demand for some master plan to offer solutions to the manifold problems involved. It is realized as well that a central agency is necessary to administer it.

To answer this demand the Regional Association was formed two years ago. This organization will develop a regional plan bringing together all appropriate material from various municipal planning boards and other related agencies. One agency seems particularly important—the Real Property Inventory. Formed about five or six years ago, this organization has brought its reports up to date each year as changes have occurred. It covers the activities, movements, and character of the inhabitants of every precinct within the city and the districts outside of the city. It also covers all industry and commercial activities and thus offers a broad basis upon which the future use of city and outlying areas can be projected as a regional plan.

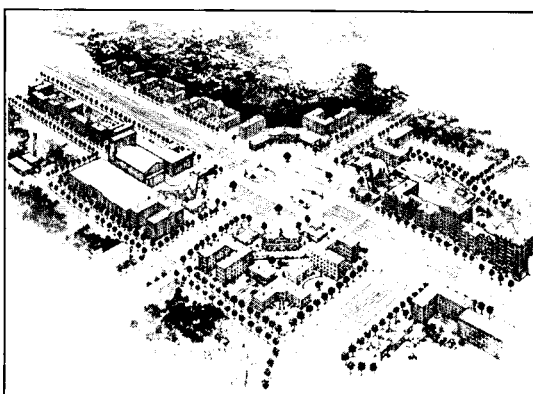
The Regional Association with the aid of the Inventory organization is making a complete restudy of existing zoning ordinances—not only for the city but for the region. Through this study may be determined the best locations for stores and factories and homes. Today, on the basis of the city's old plan no one could tell where and how Cleveland people might live comfortably with any assurance of permanence. Existing zoning laws are too wide open; and a new zoning ordinance is an absolute necessity before any broad city or regional plan can have practical value.



Callaway



McLaughlin Aerial Surveys



Ernest Studio

### THREE "COMMUNITY CENTERS"

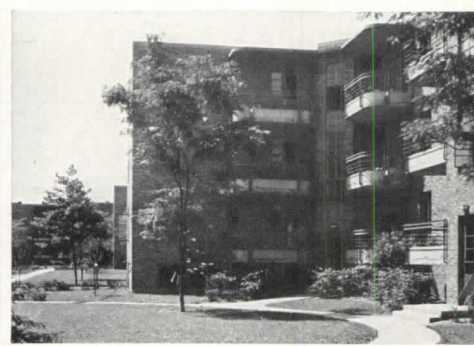
Solutions to individual planning problems have been generally good in Cleveland. Much, however, remains to be accomplished before connections between isolated centers and the rest of the city are satisfactory. And until this has taken place, future developments cannot be controlled or properly administered upon an integrated regional basis. Above, 1 is the Public Square, the natural center of downtown Cleveland and the terminus for suburban rapid-transit lines. Wade Park, 2, near University Circle (see map, opposite), is part of Cleveland's cultural center and includes the Museum of Fine Arts and Severance Hall. 3 is a sketch of Shaker Square, a well-planned and successful business center in Shaker Village, east of Cleveland proper.

Courtesy USHA



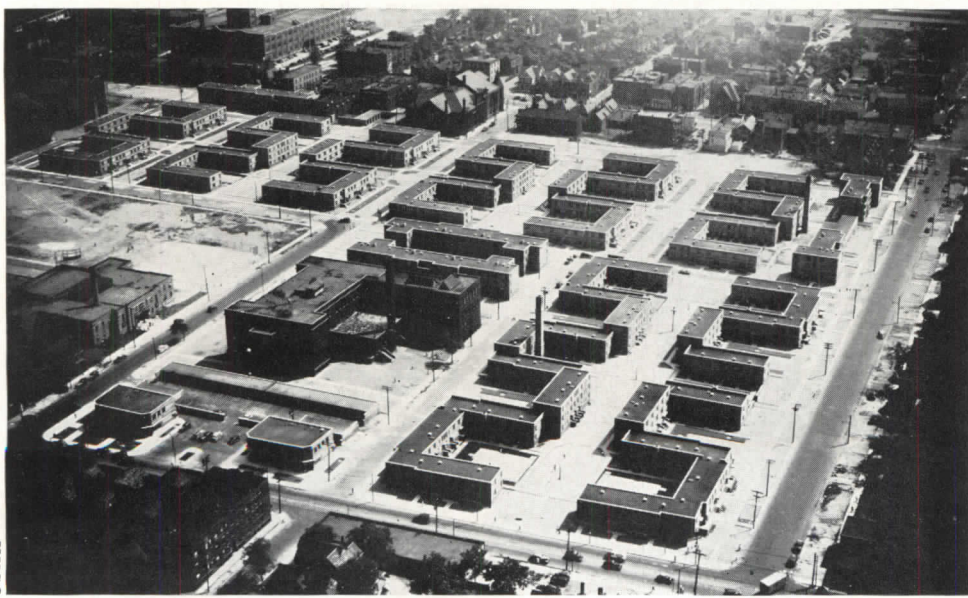
**LAKEVIEW TERRACE:** West-side housing of apartments and row houses; contains 620 living units, 2,311 rooms; average monthly rent without service, \$6.19 per room.

USHA



**CEDAR CENTRAL APARTMENT DEVELOPMENT:** East-side slum, clearance housing development; contains 650 living units, 2,329 rooms; average monthly rent without service, \$6.01 per room.

USHA



**OUTHWAITE HOMES:** East-side project of apartments, row houses, and flats; contains 579 living units, 2,201½ rooms; average monthly rent without service, \$5.07 per room.



# Cleveland's Slum-Clearance Housing and Cultural Buildings

WALTER McCORNACK

THREE LOW-RENT housing projects have been completed in Cleveland—review Terrace on the west side, Star Central Apartments and Outhite Homes on the east side. As developed with the aid of the Public Works Administration, each involves an area of about 20 acres and processes approximately 600 dwelling units for Cleveland's low-income families.

These projects are considered large enough to prevent neighborhood deterioration during the life of the buildings. But whether or not this is the case remains to be seen. Much depends upon future improvements in areas which surround them.

Each of these Government housing developments has had slum elimination and the housing of slum inhabitants as an objective. In Cleveland—as in every other large American city—eradication of slum areas and the consequent reduction in crime and disease involves much more than the erection of new, adequate housing in place of old, inadequate housing within blighted districts. Park and recreation areas adjacent to large housing projects are almost as necessary as the housing projects themselves, for these offer one of the surest means for eliminating slum-bred crimes. The cost of such crime is staggering. It can be reduced by eliminating the conditions which promote crime; and the savings will pay for the play areas and housing which have replaced the crowded streets and hovels of the slum districts.

In Cleveland only a small start has been made toward this objective. It is true that the city's three Government housing projects are, in some respects, models of their kind. In each low land coverage—25%—is one of the surest known safeguards against neighborhood blight in the future. Unfortunately, however, these projects are not within economic reach of the lower third of our population.

"Clearing the slums" has gener-

ally entailed razing the buildings on costly land, allowing the owners good prices, and subsequently rebuilding with improved, fireproof construction. The method has been economically unbalanced and actually disastrous to the slum dwellers. Costs have been enormous; rents—even with subsidies of various sorts—have been too high; and the slum dwellers, driven from their old haunts, have sought new hovels—a fact that inevitably means new slums. Thus the objective has been lost because of the very means selected to reach it.

The situation is particularly serious in Cleveland. The city's industrial character, its physical pattern, and the absence—until very recently—of any centralized authority for regional zoning and co-ordinated project planning have combined to make Cleveland's attempts at slum clearance and housing for low income groups merely individualistic enterprises that bear little relation to the city as a whole. As a result they offer no far-reaching solution to the real problem of public housing and slum rehabilitation as it exists today.

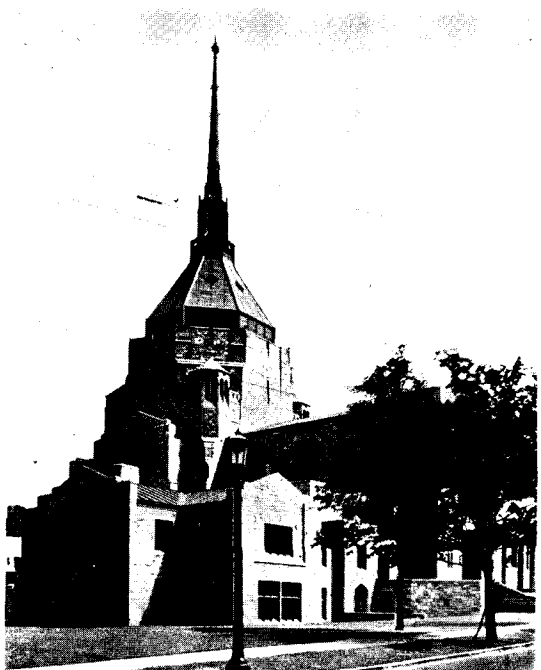
This is a problem that is closely linked to city and regional planning. A broad-visioned, public-spirited planning and zoning board, free from politics and supported with adequate funds, might see the advantages of removing slum dwellers to the city's edge where land is plentiful and inexpensive and where housing costs are such that governmental subsidies can help produce rents that are within reach of the city's lower third.

Cleveland's three mid-town housing projects cost about \$5,000 per family. If the really needy are to use them, most—if not all—of this cost must be subsidy. Out of the city these people could be housed for a quarter to a third of this cost—and the money saved could help house more needy families or serve, perhaps, as a basis for a solution to employment problems.

But this cannot be accomplished



Air view, looking east, of the Cleveland Stadium and Lake Shore Boulevard. The City Hall at the end of the Mall is just above the Stadium at the right.



The Epworth-Euclid Methodist Episcopal Church. It is located at Wade Park, opposite Severance Hall and flanking the Museum of Fine Arts (see cuts on pages 69 and 70).

Photos by Evening Gallery



Severance Hall, home of the Cleveland Symphony Orchestra and one of the Wade Park group of cultural buildings

Courtesy Cleveland Museum of Art



Museum of Fine Arts, the dominating building of the Wade Park development, of which all Cleveland is proud



Cleveland's Civic Auditorium, one of the Mall buildings and scene of many convention meetings

until a city planning and zoning bo-  
accords recognition to housing as  
element of major importance in  
broad scheme for regional devel-  
ment. Basic principles that re-  
housing to other necessary parts  
Cleveland's metropolitan comp-  
*must not* be compromised for te-  
porary gains. Cleveland needs *ho-*  
*ing*—which takes into account  
social and economic factors invol-  
—not merely *houses*, however ex-  
lent these may be as isolated exam-  
of individual groups of buildings.

This necessity for city and regio-  
planning has been treated elsewh-  
in this issue. But it is impossible  
mention either Cleveland's hous-  
projects or public and cultural bu-  
ings without emphasizing the pres-  
lack of city and regional integrati-

A disheartening example of hit-  
miss planning is found in Clevelar  
cultural center. Within a dec-  
approximately \$20,000,000 has b-  
spent in developing monumer  
structures and a beautifully la-  
scaped setting. Many more milli-  
will be spent within the area that  
cludes the Museum of Fine A-  
Severance Hall (home of the Cle-  
land Symphony Orchestra), West  
Reserve University, and many of  
institutions.

As a cultural center, Cleveland  
be proud of this fine group. But  
an example of orderly planning,  
lated properly to the rest of the c-  
it is costly and shortsighted. I-  
penditures have been made with-  
relation to housing needs or to so-  
tion of traffic problems within  
area. As a result, the business  
residential territory surrounding  
great cultural center is develop-  
the characteristics of a serio-  
blighted area.

Such conditions can only be ov-  
come in Cleveland—as in any ot-  
city—by co-ordinated action on  
part of all its citizens. Blight of la-  
areas is a city-wide problem. Cau-  
of blight in one section generally a-  
first outside the affected area. P-  
vention of such blight—which me-  
prevention of eventual slum con-  
tions—requires a comprehens-  
scheme of city development in wh-  
all elements of urban life—indus-  
commerce, transportation, recreat-  
education, and housing—are integ-  
ted to provide adequacy in all  
pects for the expanding needs of  
vigorously progressive community



McLaughlin Aerial Surveys

## Cleveland's Industrial Areas

WILBUR J. WATSON

CLEVELAND is essentially a production city. The majority of its population is identified with manufacturing; and the extent of this activity has developed the city into one of the country's principal industrial centers. Among many reasons for this are: first and most important, convenient transportation; second, proximity to coal mines in the south and to iron ore in the north; third, ample supply of water and finally the most cogent reason—the fact that Cleveland people seem to have been naturally mechanically inclined.

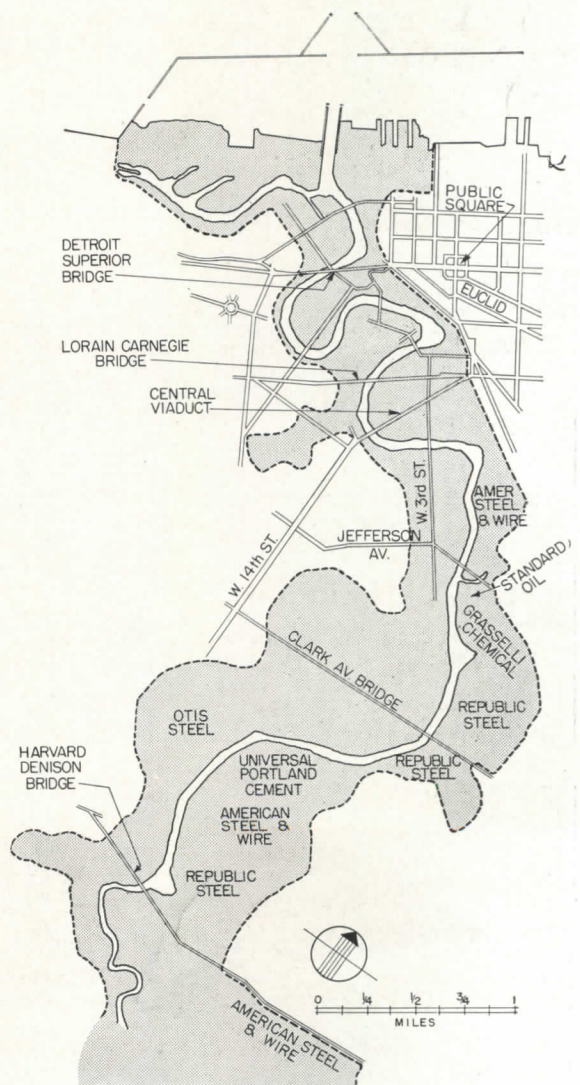
Cheap iron and cheap coal furnish economical bases for production of many and various metal products. Consequently, it is for the manufacture of such things that Cleveland is famed today. For instance, Pittsburgh—only about 140 miles to the west—leads in production of iron and steel as such; but Cleveland leads in the output of iron and steel products, as machine tools and heavy machinery of all kinds. Again, De-

troit—about the same distance from Cleveland to the northwest—leads in automobile production, but Cleveland manufactures far more automobile parts.

Industrial Cleveland may be roughly divided into four major districts—the Cuyahoga Valley, the Lakefront, the railroad frontages, and the suburban areas. The last named are related to the Lakefront, for many industries have moved beyond the city limits, although they remain on the lakefront.

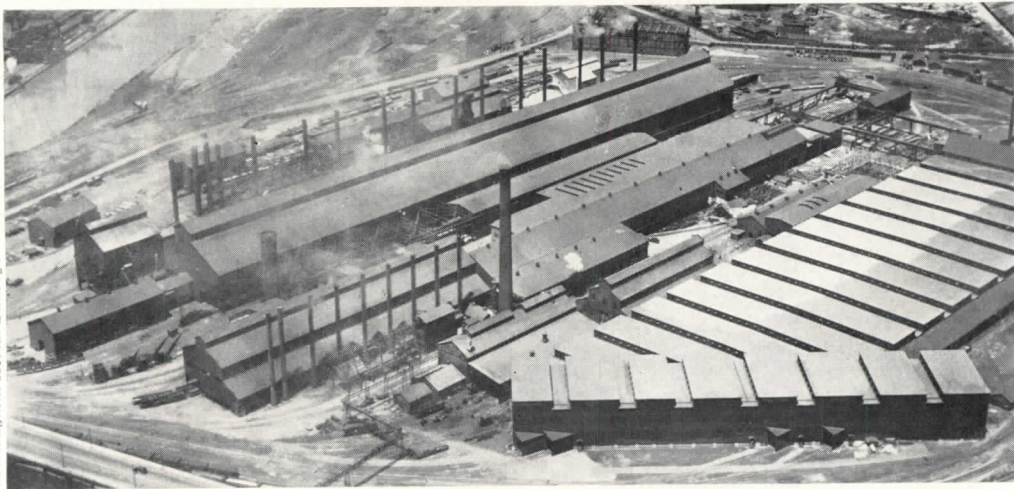
The Cuyahoga Valley, which divides the city into two parts, contains a navigable river—the “kinky Cuyahoga”—that provides a large docking frontage for industrial plants. It is navigable for a distance of five and one-half miles along the crooked, winding course and is now being deepened to provide in the near future an additional one and one-half miles of navigable frontage.

The Cuyahoga's lower reaches are devoted largely to docks for the interchange of goods between water-borne





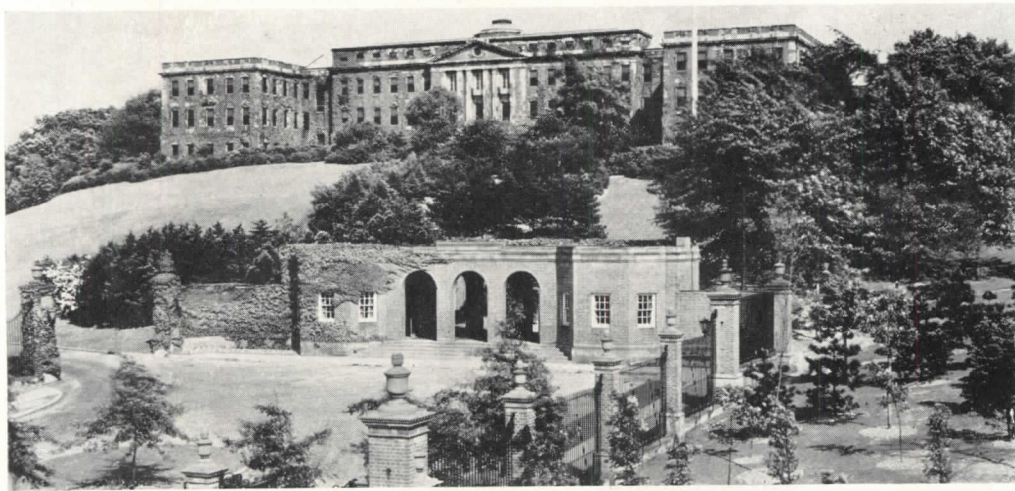
Carl McDove



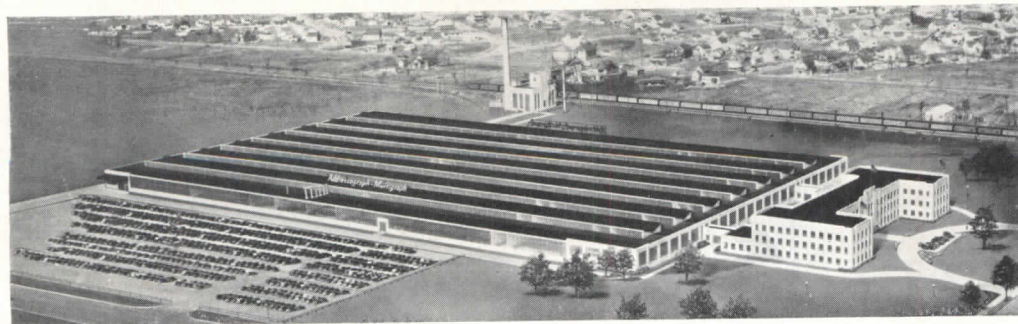
McLaughlin Aerial Surveys



3

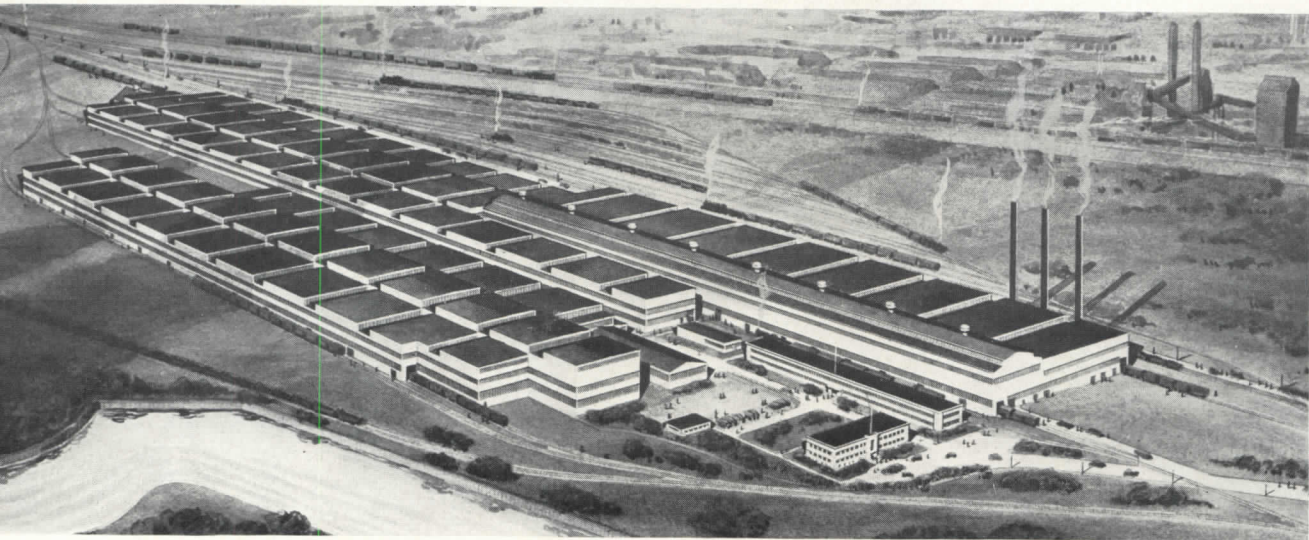


4



5

Among the most important of the country's industrial centers, Cleveland contains a wide variety of manufacturing plants. Most of them use iron ore from the south; they take coal from nearby mines to the north; and above—1 is the industrial part of the lakefront where ore boats are unloaded. 2 is the Bryant Heater Plant; and 3, the furnaces and mills of the Otis Steel Company in the upper portion of the Cuyahoga valley. In East Cleveland is Nela Park, containing the laboratories of the General Electric Co. (4). Among new plants farther east of Cleveland is that of the Addressograph-Multigraph Company, shown in 5.



Rendering of the new strip mills of the Republic Steel Corporation recently erected in the upper reaches of the Cuyahoga River valley

fic and the railroads, storage and houses, huge yards for lumber, stone, and cement. Farther up river are the oil industries, including the original refinery of the Standard Oil Company, and numerous storage plants for gasoline and kerosene. In upper reaches of the river valley are the great steel plants—the principal furnaces and mills of the Republic Steel Company, the wire works and coke ovens of the American Steel and Wire division of the United States Steel Corporation, the Corwin and McKinney Plants and the new strip mills of the Republic Steel Corporation.

Architecturally speaking, these new plants are the most interesting in the city for the successful application of modern design to industrial needs. The Republic Steel plant covers 180 acres of ground, for all but the office and laboratory are one story in height.

With few exceptions, the buildings of these great industries contain little that is new or distinctive in appearance. The steel plants cover large areas because they are generally one story high; and are of steel and brick construction for heavy work and maximum utility. In the industrial areas of the Lakefront and several miles eastward from the mouth of the river, but only a short distance to the west. Industries located here have rarely used water transportation; and lakefront dockage has been developed to a very limited extent. Plants are generally served by the railroads whose tracks parallel the lake frontage through the area. Here is the original plant

of the Otis Steel Company and many of the city's oldest industries. Buildings are mostly old and dingy—some are even dilapidated and empty. The district is a blighted one and eventually will probably be claimed and cleared for other purposes. What developments will take place in such obsolete industrial areas is one of the city's problems—a problem to be faced not only by Cleveland, but by most of our industrial cities.

The newer plants are not on the lakefront at all, but are built near the railroads—the main lines—on industrial spurs east of Cleveland and six to nine miles from the center of the city. Here are excellent examples of modern industrial construction, among them plants of the Foote-Burt Manufacturing Company, the White Motor Company, the Cleveland plant of the Fisher Body Company, the Lincoln Electric Company, the National Acme Company, glass factories of the General Electric Company, the Harris Calorific Company, and many others.

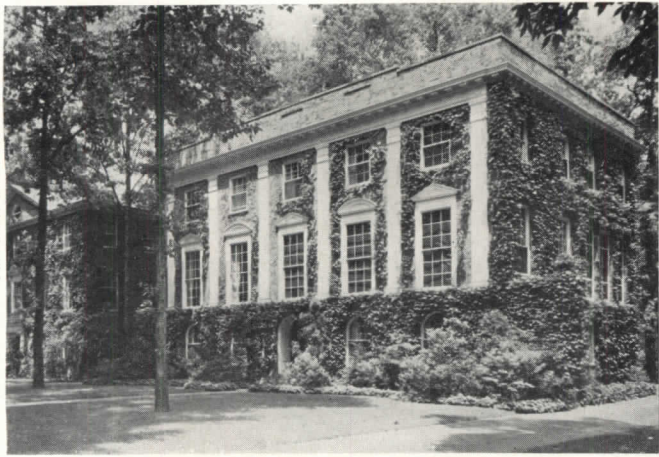
Many industrial plants with excellent buildings are still located within a few miles of the Public Square. Included are such plants as the Warner and Swasey Company, famous for telescopes; the Wellman Engineering Company, makers of modern conveying machinery; the W. S. Tyler Company, noted for metal work.

Outstanding developments in the construction of industrial plants have taken place in the suburbs. In East Cleveland is Nela Park, built by the National Electric Lamp Association prior to its absorption by the Gen-

eral Electric Company. Situated in the midst of a well-planned and beautifully landscaped park on the top of a hill, it is an excellent example of architectural style consistently adopted on a large scale. Most of its buildings are devoted to scientific research and laboratory investigation, but some are factories and storehouses. With its red-brick colonial buildings covered with ivy, the group more nearly suggests a college campus than a center of commercial and industrial activity.

Farther east, about 11 miles out, are the Cleveland plant of the Chase Brass & Copper Company and the new buildings of the Addressograph-Multigraph Corporation, a good example of recent industrial architecture that covers about 8 acres of ground. Still farther—about 30 miles to the east, on the lakefront at Painesville, is the 16-acre plant of the Industrial Rayon Corporation, with new, modern and air-conditioned building—the *ne plus ultra* in the construction of rayon plants.

The Cleveland industrial area may be considered to extend this far and even into the city of Akron, some 35 miles to the south, which is the rubber center of the world. Most of the buildings devoted to the manufacture of tires are of the multi-story type. Probably the two outstanding examples of industrial architecture in Akron are the tire plants of the Firestone Tire & Rubber Company and the airship factory of the Goodyear Zeppelin Corporation, a subsidiary of the Goodyear Tire & Rubber Company.



1

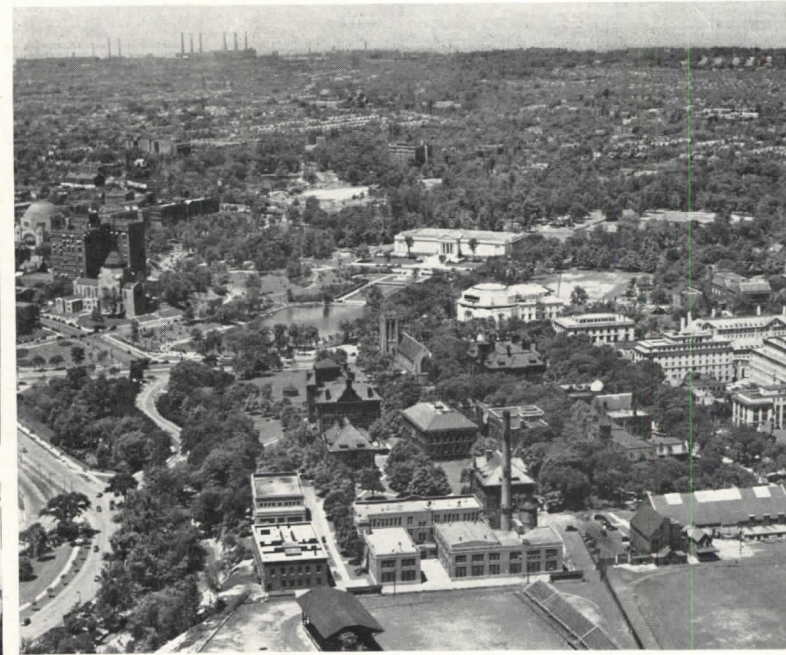


2

WEST SIDE: Well-established residential communities border lakefront in the northwestern part of Metropolitan Cleveland. This air view shows Rocky River and Lakewood, two of Cleveland's important satellite towns—and the only residential communities in Cleveland (except Bratenahl) with Lake Erie frontage. 1, above, shows the type of London town house in the Lake Avenue section of Cleveland; 2 is a house in the Clifton Park area of Lakewood.



3



4

EAST SIDE: The Wade Park area lies along Euclid Avenue, close to the city limits and adjacent to East Cleveland and Cleveland Heights, and has developed around the cultural center of Cleveland that includes the Case School of Applied Science and Western Reserve University. 3, above, suggests the character of the houses that once lined Euclid Avenue; 4 is a house on Magnolia Drive in the Wade Park district.

# Residential Development of the Western Reserve

by TRAVIS GOWER WALSH, AIA

TO CONSIDER the domestic architecture of Cleveland and its immediate environs as completely representative, would be to miss much that is worthwhile. A broader area has become identified with the pattern of Metropolitan Cleveland. It embraces a number of communities and is referred to as the Western Reserve.

Cleveland's growth has been fan-shaped, extending from Lake Erie to the north and radiating from the Cuyahoga River to the east, south, and west. The westerly growth has penetrated far beyond Rocky River and includes the comparatively modern Lake Avenue Section of the city, the City of Lakewood, Rocky River, and Bay Village.

These areas, in the process of their development, have followed the Lake Shore and represent the only instances (with the exception of Bratenahl to the east) where fine residential neighborhoods have capitalized the natural opportunities afforded by the coast line of Lake Erie. This, on the face of it, represents an irony and commentary on the lack of foresight exercised by a large metropolis seeking to develop the acme of its residential possibilities. Be that as it may, any true picture of Cleveland must present this paradox as a community characteristic.

Due credit must be paid, however, to the fine domestic architecture which greets the motoring traveler who enters the city from the west. Examples of the London town-house type (the only ones in the city, to my knowledge) line the sides of tree-lined Lake Avenue.

Other creditable examples, reflecting the architect's intelligence and taste, adorn the Clifton Park Section of Lakewood.

Thus, the entire westerly portion of the city has not only afforded the architect a profitable area in which to exercise his skill, but presents, in many of its aspects, an unusually

pleasant solution to the inevitable American problem of marriage between the sordid daily grind and the art of gracious living.

Beyond the heart of downtown Cleveland, the journey east takes one along Euclid Avenue—one of the oldest residential portions of the city. It is a far cry to that day when Euclid Avenue was famed as one of the country's finest residential streets.

As commerce and industry pushed on, many fine homes appeared around what is now Wade Park and University Circle.

The presence of Western Reserve University and the Case School of Applied Science, with the Art Museum, gave pleasant impressions of a cultural neighborhood. Even to this day, the Wade Park area is conceded a place of residential importance and is a civic center of the first magnitude.

Of all satellite communities east of Cleveland, Bratenahl is the only fine residential neighborhood related to the Lake Shore. It is reminiscent of communities along the pleasant drives of Boston's North Shore, for most of the large estates have lakeshore frontage; and the winding Lake Shore Boulevard reveals flashes of blue Lake Erie as a background to well-groomed grounds and, in most cases, gracious architecture.

But Bratenahl lies in the path of Cleveland's growth. Already the city has encompassed the little community. Today it is a small civic entity. It is still an area of fine dwellings; but its character must inevitably change, for the trend of the city's enveloping growth is mainly industrial.

Some years ago, after the "discovery" of Bratenahl, the property of the Euclid Golf Club was placed on the market. There resulted an intense development of what is now the bustling community of Cleveland Heights. Residential work in this locality is generally excellent.



View looking toward Lake Erie from the old Reservoir Walk, taken from a drawing made in 1872 when Cleveland was known as "The Forest City"



... and a view along Fairmount Boulevard, near Cleveland Heights, that suggests the broad lawns and shaded streets which characterize many residential districts of modern Metropolitan Cleveland.

Courtesy Chamber of Commerce



Carl F. Waite



**EAST OF CLEVELAND:** For about 10 miles beyond the city's eastern limits and north east to Lake Erie are several comparatively new, rapidly growing residential communities. The air view shows Shaker Village widely regarded as a model development. Above is a typical Shaker Heights house. Left, a house on one of the great country estates in the Chagrin River valley.

Relatively one of the city's oldest residential areas, Cleveland Heights is well developed with good schools, churches, and parks that help to make it one of the fine dwelling areas of Metropolitan Cleveland.

Chronologically, Shaker Heights followed the development of Cleveland Heights. It is a product of severe but successful standardization—one of the most outstanding in the country.

Developed as a byproduct of a great railway empire through the ambition of the late Van Swerigen brothers, it grew amazingly as a result of excellent merchandising combined with stringent deed and architectural restrictions.

Originally a few scattered ponds constituted the only physical advantages in the entire Shaker Heights area. But astute landscaping and strict adherence to development policies has helped create a community—Shaker Village—that is one of the most generally satisfactory residential areas of the country.

Few residential communities exist in which so many worth-while and varied examples of domestic work may be seen in such a compact area.

Even before Shaker Heights had reached its building peak, the trend of development in the Chagrin River Valley was apparent. This is a comparatively narrow area extending from the village of Chagrin Falls through Gates Mills and continuing to Willoughby near Lake Erie—a section that partially encircles Metropolitan Cleveland on the east.

With long graded roads and forest-covered ridges, it has become a close-knit community through the agency of polo, riding, hunting, country clubs, and other social amenities.

Architecturally, it is developed as an area of complete country estates that generally include stables, service buildings, swimming pools, and occasionally a private polo field—products of a "landed gentry" urge that more and more claims isolated areas beyond the Valley.

*"Vive hodie et nosce te ipsum"*—a city, like an individual, should live today and know itself. Cleveland, through the medium of the Real Property Inventory and numerous other means, has performed diagnoses and post mortems until the most begrudging concede that we know something about the town.

What will be done about it has not progressed from "precept" into the "practice" stage. To be sure there are the three large Federal slum-elimination projects, but they are intended only as a demonstration, not as a complete remedy.

But large-scale housing is a thing apart. Cleveland's residential growth and progress seems to have been peculiar to itself. It is pointed out elsewhere that the city has in no sense been obedient to its physical characteristics. It has also had to contend with the added complication of large ethnic tracts. These have tended to impose further barriers, not always logical, but almost always forceful.

Hence, an honest summation can only present the actual physical facts. These indicate a complete decentralization of the better type of private-dwelling neighborhoods which in these days of motor transportation, have hurdled natural barriers and defied distance. Like Moscow, Cleveland, when comparing her pioneer settlement with old Winham, Connecticut, one wonders what the next page reveals. Will Clevelanders someday be commuting to Allegheny mountain tops?





Entrance to an old garden in Worcestershire, England

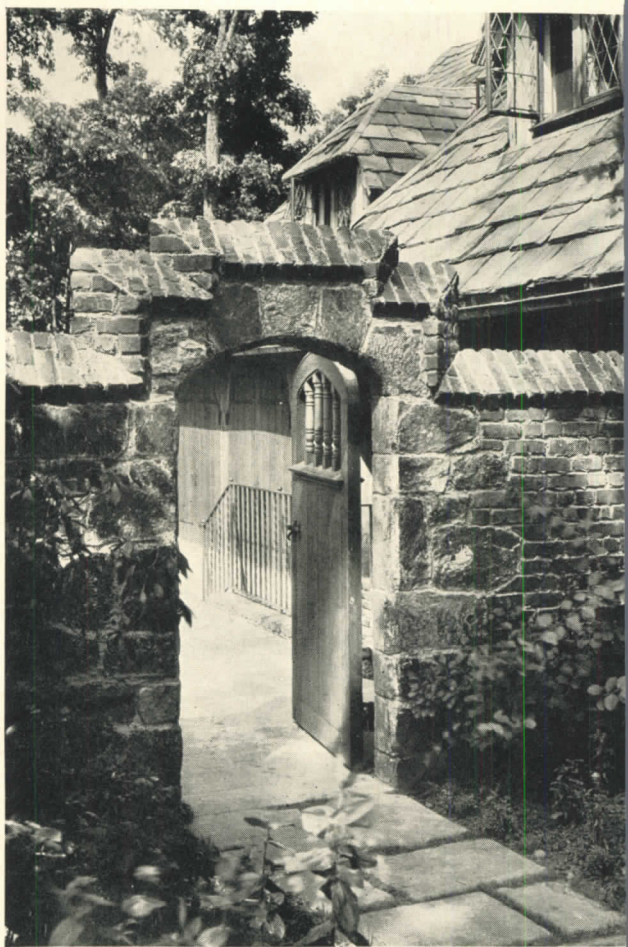
*Galloway*

# GARDEN STRUCTURES

John Wallace Gillies



1



John Wallace Gillies



2





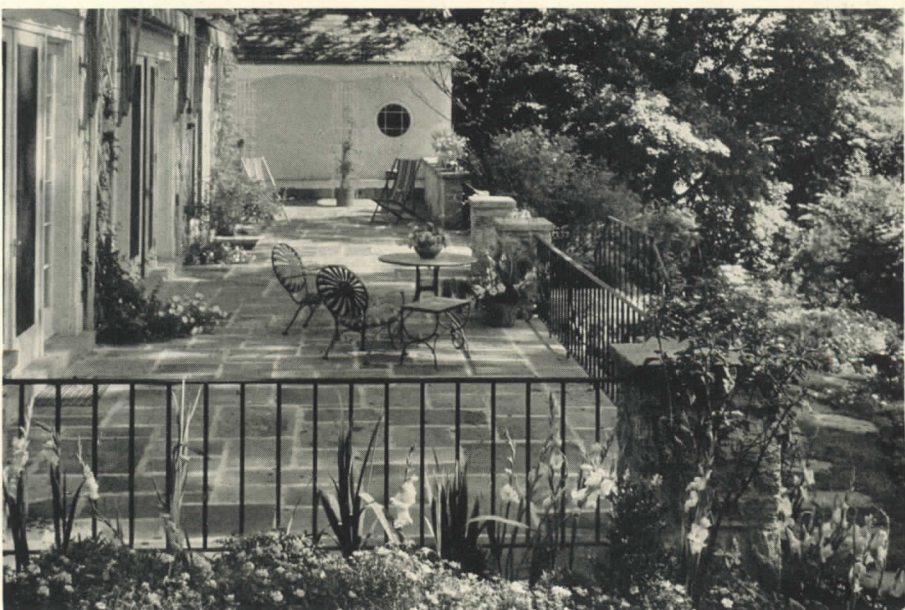
Gottschalo

5



Sigurd Fischer

6



Gottschalo

7

FRANCES, facing page: 1 is  
 yosset, Long Island, N. Y.,  
 no and Aldrich, architects;  
 2, designed by Dwight James  
 n, architect, is in a small city  
 en at Brooklyn, N. Y. 3 is at  
 mont, N. Y., and was de-  
 d by the Office of John Rus-  
 Pope, architect; and 4, from  
 ame architect's office, is on  
 ountry estate at Wheatley  
 Long Island, N. Y.

FRANCES, this page: 5, de-  
 d by Delano and Aldrich,  
 cts, is in Bronxville, N. Y.;  
 Brookville, Long Island, N. Y.,  
 or Bullard, architect; and 7,  
 which Dwight James Baum  
 architect, in Scarsdale, N. Y.



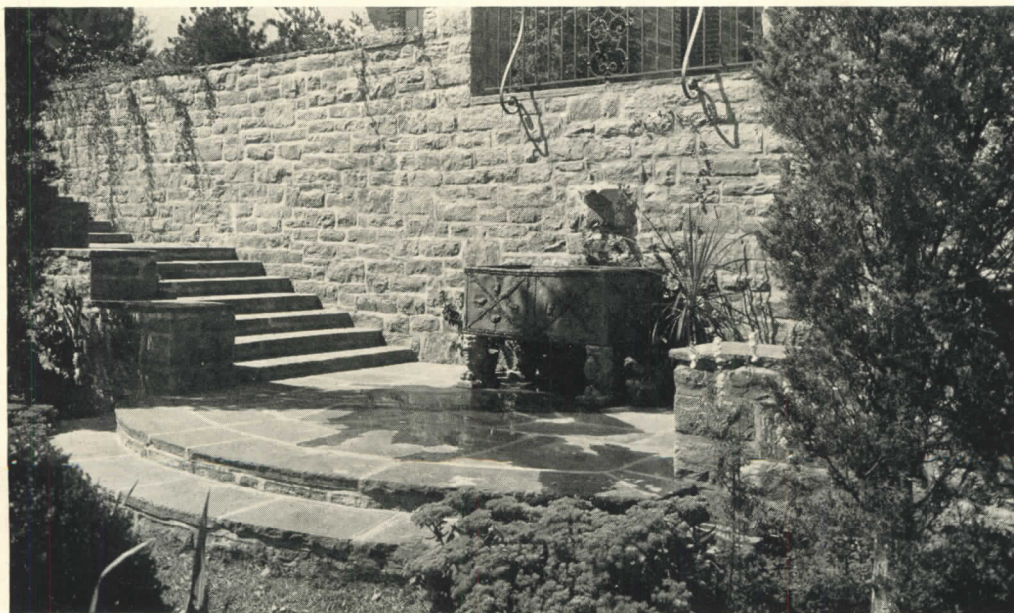
Mott Studios

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Corttscho

9

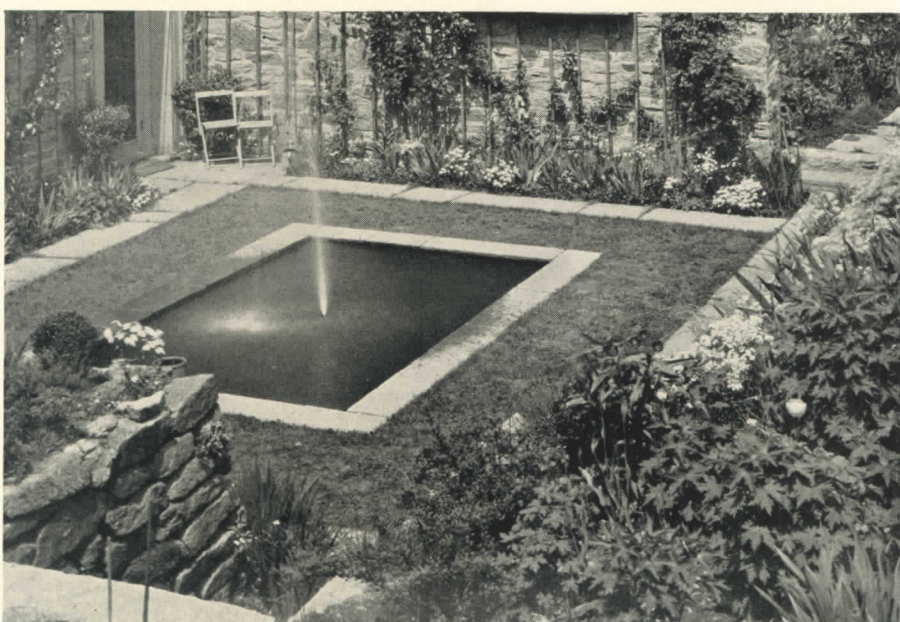


Amemiya

10



11



12

TOOLS AND FOUNTAINS

On facing page: 8 is part of a garden patio in Los Angeles, Calif., designed by Morgan, Walls and Clements, architects; 9, a retaining wall at Mill Neck, Long Island, N. Y.; and 10, a garden approach in a suburban community near New York, Foster and Essar, architects.

On this page: 11, pool and fountain at Pasadena, Calif., for which Wallace Neff was architect. 12 is the front yard of a house at Wallingford, Pa., designed by Lewis, Dunlap and Barney, architects; and 13 is a garden approach from the terrace of a house in Woodlawn, N. Y.



13



14

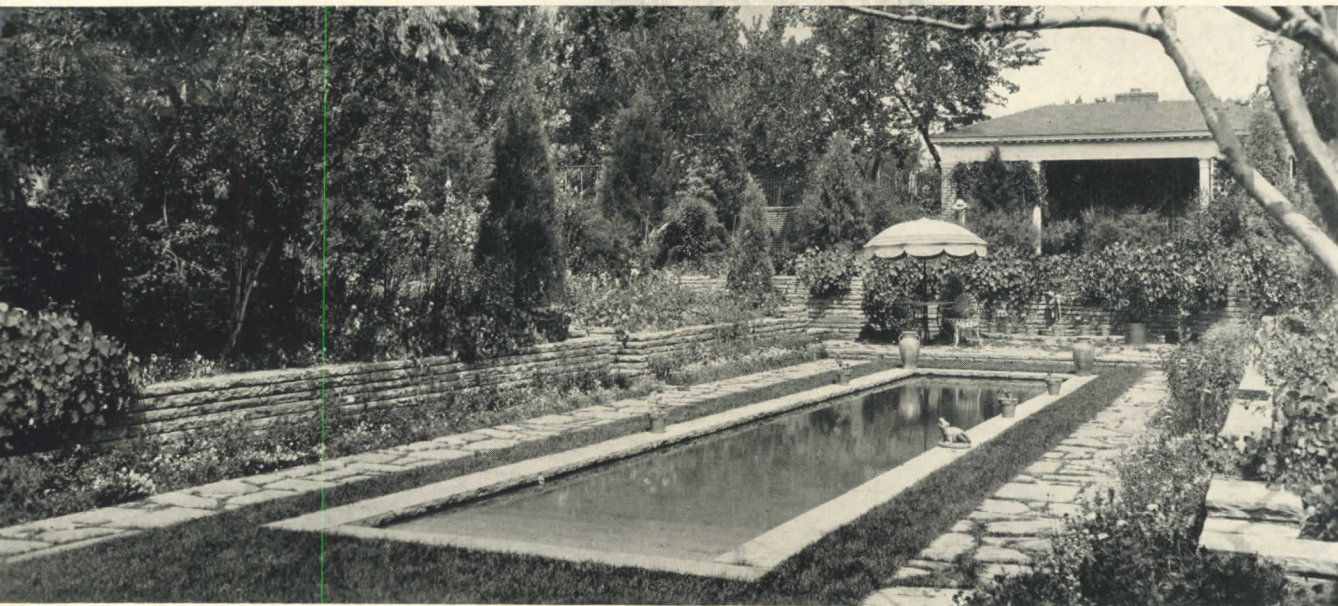


Richard Averill Smith



15





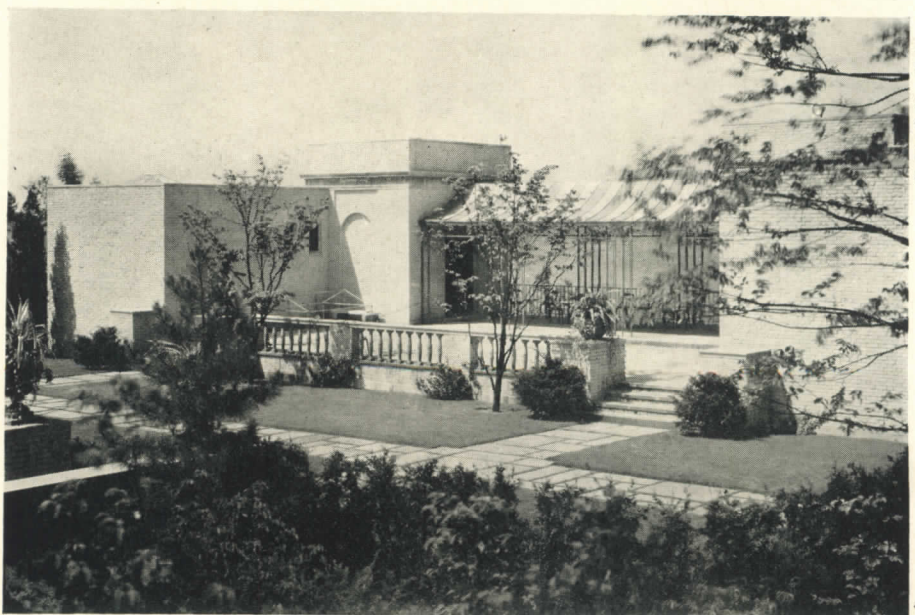
Lindeman

18



Mattie Edwards Hermit

19



Tebbs & Knell, Inc.

20

REFLECTING POOLS, facing page: 14 is part of an old garden in Gloucestershire, England; 15 a tea-house at Great Neck, Long Island, designed by Mrs. A. K. Billstein; and 16 a more elaborate garden house at Greenwich, Conn., designed by W. F. Dominick, architect. 17 is a shelter in a small patio of a house in Los Angeles, Calif., designed by Elmer Grey, architect.

REFLECTING POOLS, this page: 18, a reflecting pool and garden pavilion in Denver, Colo., designed by R. De Boer, landscape architect. 19 is a similar type of structure and 20 is a bathhouse and terrace adjoining a swimming pool on an estate at Detroit, Mich.



21



22



23

Above, 21, is a walled garden, New Rochelle, N. Y., that combines most elements shown in foregoing pages. 22 is a garden house at Miami Beach, Fla., designed John N. Bullen, architect; and 23 a greenhouse designed by William Sims and Talbot, architects, at a garden at Chestnut Hill, Pa.



# Current Trends of Building Costs

Compiled by Clyde Shute, Manager, Statistical and Research Division, F. W. Dodge Corporation, from data collected by E. H. Boeckh & Associates, Inc.

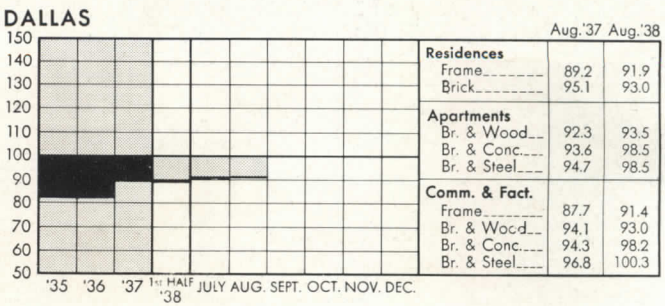
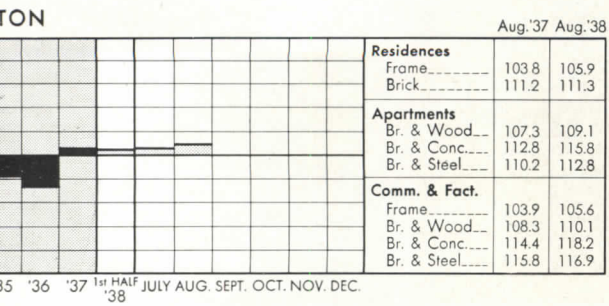
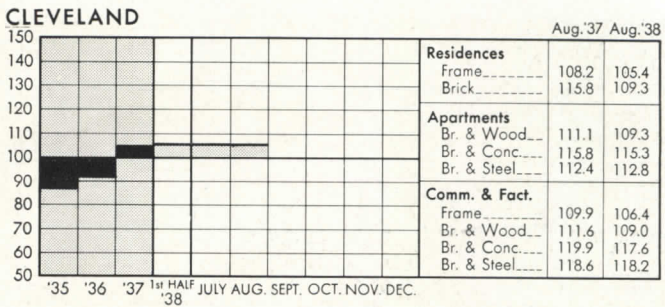
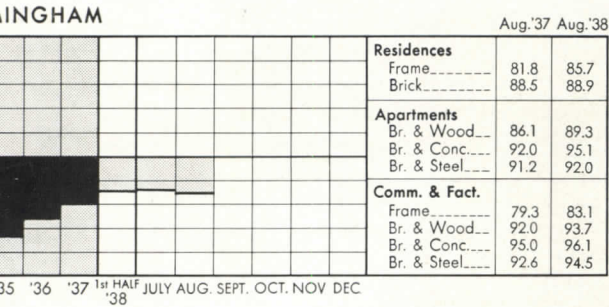
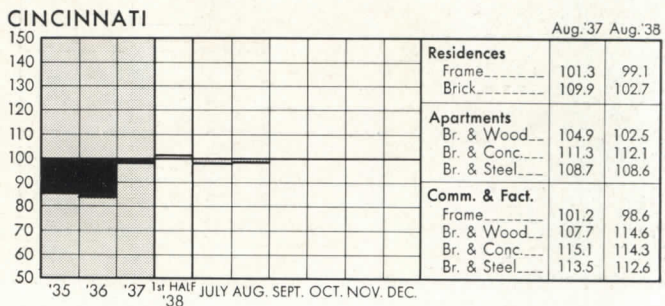
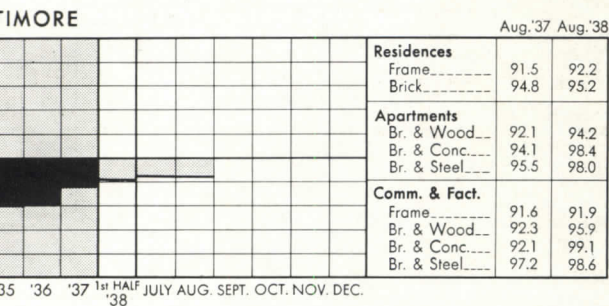
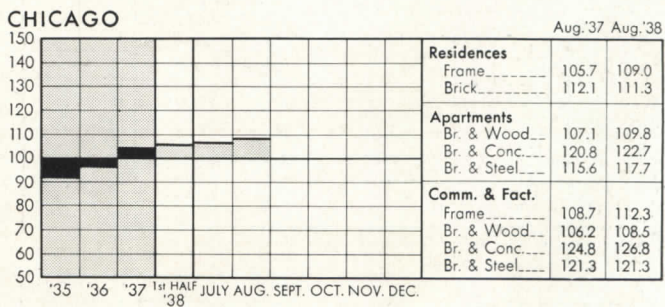
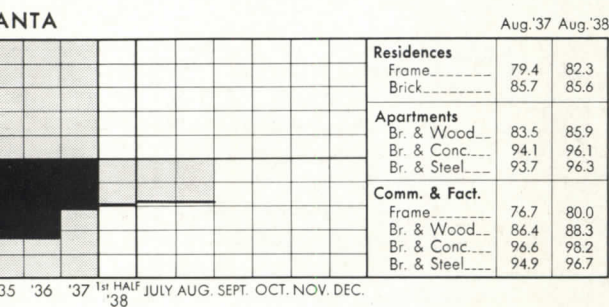
CHARTS INDICATE control trends in combined material and labor costs in the field of residential frame construction, the monthly curves being an extension of the local cost average during the years 1935, 1936, and 1937. The base line, 100, represents U. S. average for 1926-1929.

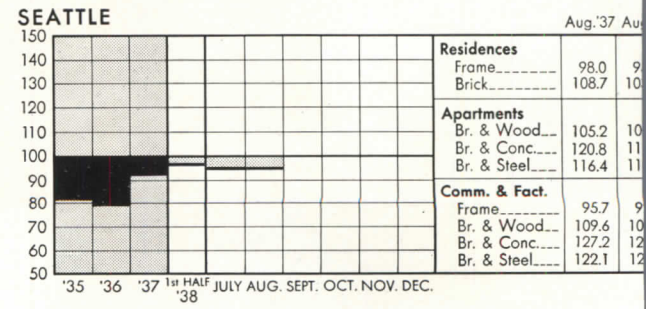
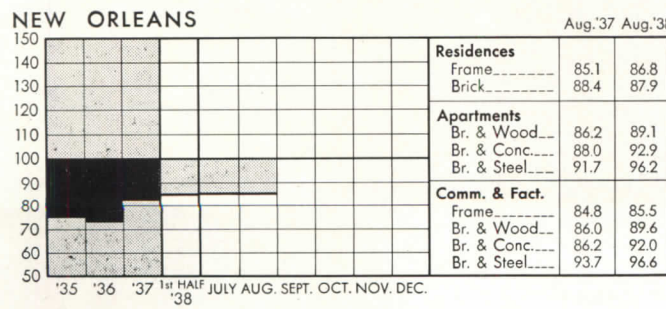
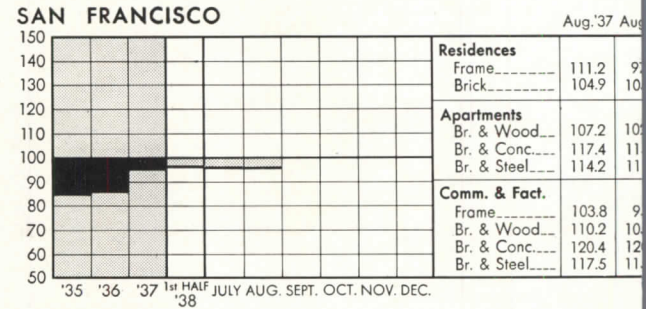
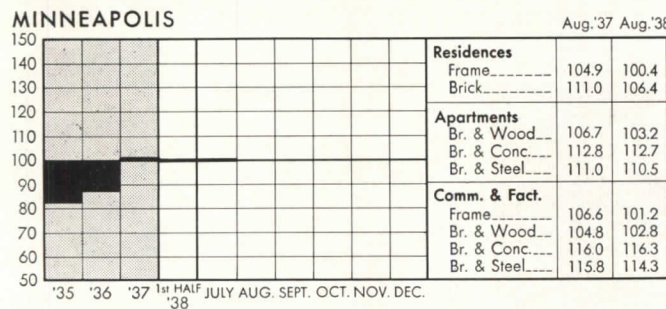
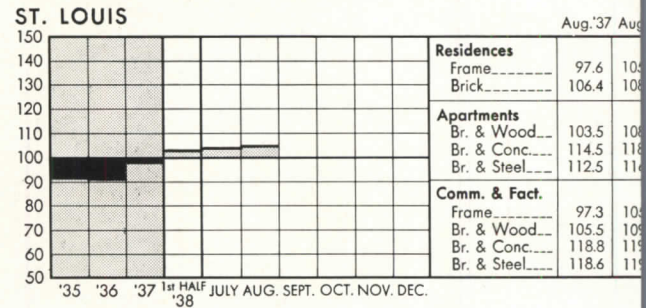
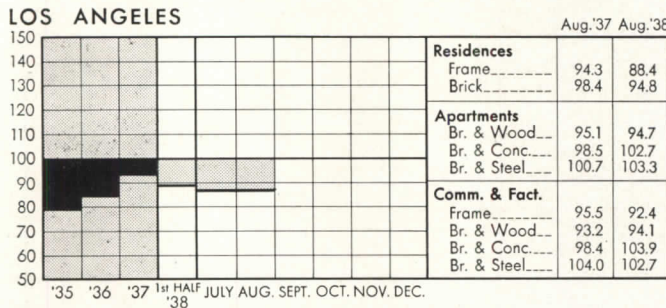
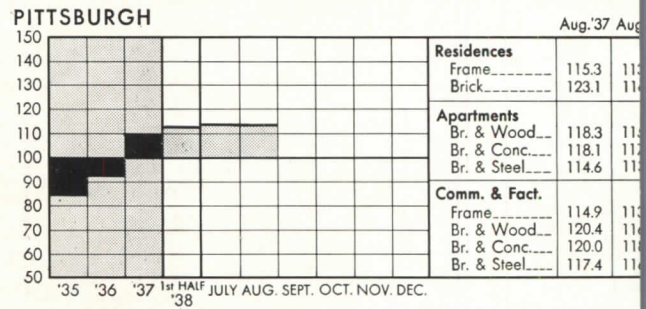
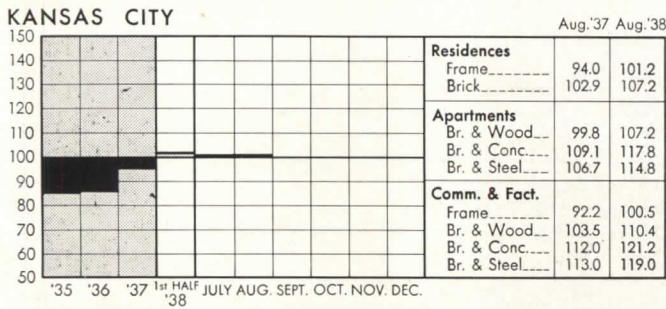
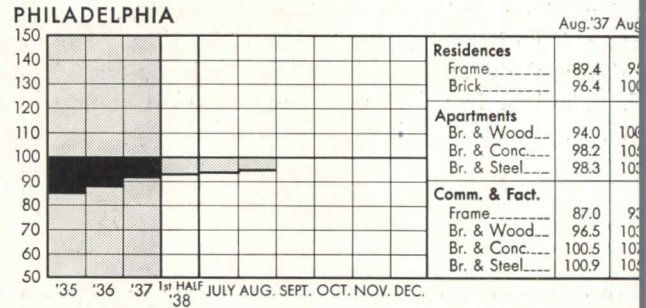
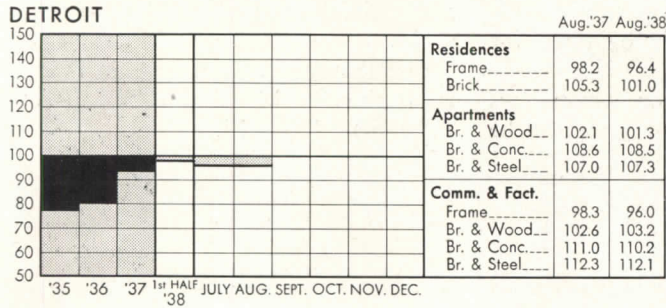
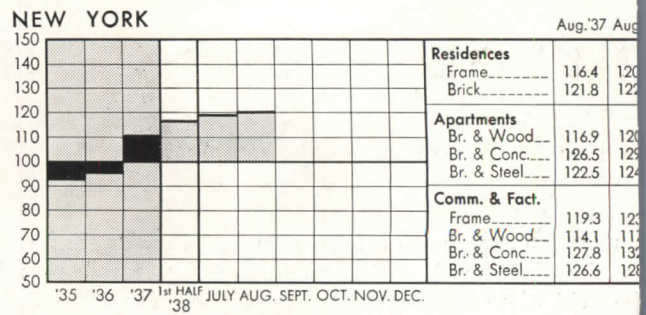
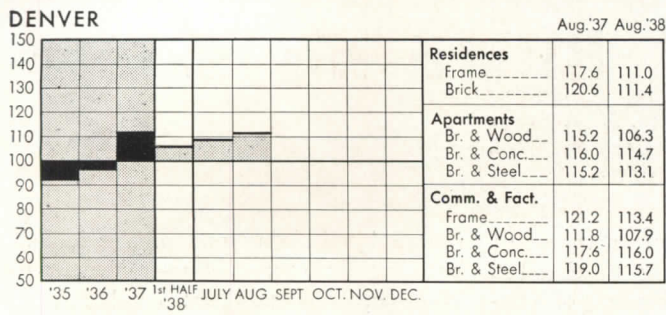
Tabular information gives cost index numbers relative to the 100 base for 9 common classes of construction, thus showing relative differences as to construction types for this year and last.

Cost comparisons or percentages involving two localities can easily be

found by dividing one of the index numbers into the difference between the two. For example: if index A is 110 and index B, 95,  $(110-95) \div 95 = .16$ . Thus costs in A are 16% higher than in B. Also costs in B are approximately 14% lower than in A:  $(110-95) \div 110 = .14$ .

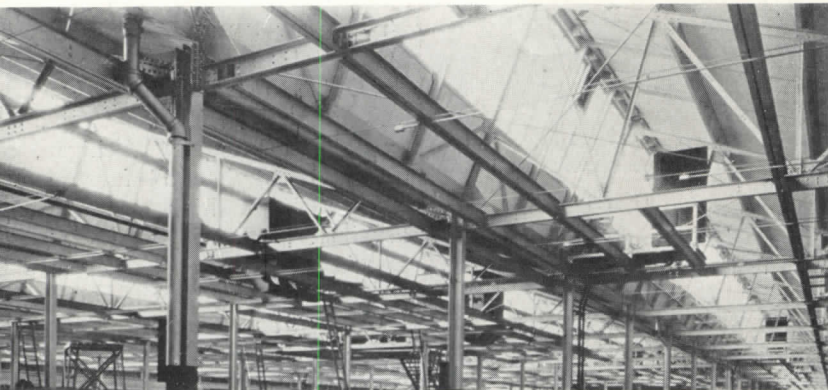
**CONSTRUCTION COST INDEX** U. S. average, including materials and labor, for 1926 - 1929 equals 100.





# rend Notes on a Building World

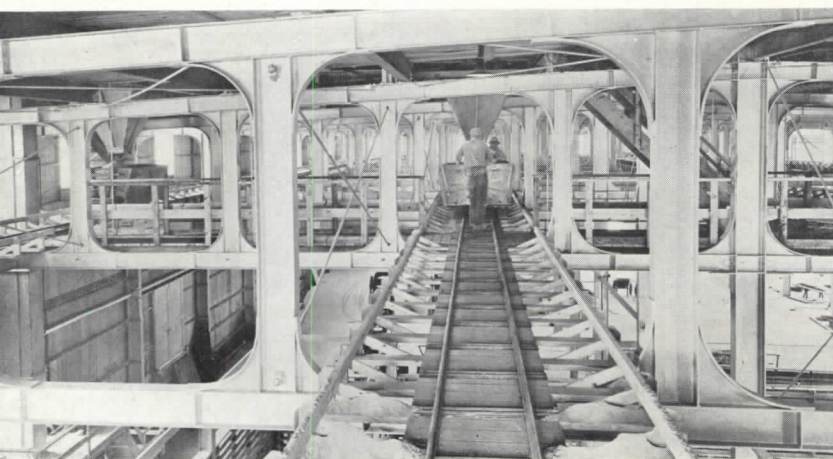
Each month these pages record significant developments in the realm of design and in the fields of materials, equipments, and services.



Sawtooth roof design and riveted construction common to many industrial structures



Simplified assembly using welded "Columbeam Construction" bolted to running members



All-welded "Portal Truss" designed without diagonals to permit use of overhead conveyor systems.

## DESIGNS IN WELDED STEEL

ENGINEERS ARE, apparently, searching constantly for new ways to "do the most with the least." Illustrated in 2 and 3 are two recent designs—welded steel structures for industrial use that are unique in comparison with the type of riveted construction shown in 1.

"Columbeam Construction" (2), for which a patent application has been made by Battey and Childs, Chicago engineers, is an example of "rigid frame" design. By welding elements of beam and column into a single unit—strength is increased, dead load reduced. This type of construction makes practical the use of shallower beams and lighter sections for long spans (see AR, May 1938, pp. 100—103).

The "Portal Truss" (3) was designed by engineers of the Austin Co., East Cleveland, Ohio, building firm, for a new fertilizer plant of the International Agricultural Corp., at Chicago Heights, Illinois. By eliminating diagonals from the trusses of this all-welded structure, 12 seven-foot passageways were made available. In the passages are tracks on which cars convey raw materials to various parts of the factory. Cars are loaded from a conveyor belt above the trusses, fed from a bucket elevator near a railroad siding. Tracks through trusses are intercommunicating and give access to all portions of the plant's floor area.

According to Austin Company engineers, the portal truss makes available three new conveyor levels, all of which can be utilized in the bulk handling of materials for chemical, paint, rubber, food industries, and metal-working plants. Tram rails can be suspended from the upper chord of a truss and stretched between trusses to carry materials through the upper part of the portals, while tram cars operate below, in the portal. Also, monorails can be installed directly on the bottom chord to operate below the truss, the lower flange of which can serve as a rail.



Method of testing soil with "Drop-Penetration Rod". Load-bearing values are determined by noting the number of times a sliding weight must be successively dropped against the collar to drive rod each foot.

### TESTING SOILS WITH A STEEL ROD

ONE FACTOR of building design which has been difficult to calculate accurately is the safe load-bearing capacities of various soils. Larger building operations have utilized load tests, soundings, and borings to determine soil-bearing capacities. Smaller operations, limited by cost, have too often been constructed with only meager estimates of subsoil conditions. Foundation beds of average soils vary in compactness and bearing value at different parts of the same site. Variations may occur within limits of a single footing; hence a load test made on one part of a site often does not represent bearing values for other parts.

As a simple, convenient and inexpensive method for gaining complete information of this kind, Frank H. Kneas, consulting engineer of Philadelphia, Pa., has developed the "Drop-Penetration Rod Test". This soil-testing method has proved helpful under widely varied conditions in showing both the character and bearing value of soils. It has been used prior to the construction of some 300 buildings and can be run in from 3 to 10 minutes by 2 unskilled laborers and a recording observer.

The test involves use of a steel rod, of 1 in. diameter, 8 ft. long, with a ring welded at the middle. A 25-lb. weight drops 3 feet down the top half, hits the ring and drives the bottom of the rod into the soil. The bearing capacity of the soil is determined by the number of blows necessary to drive the rod each successive foot.

Variations in cohesiveness of soils

make it impossible to establish absolute bearing values related to the number of blows per foot. However, Mr. Kneas maintains that "direct comparisons can be made between the relative penetrations at different parts of the same sites and also between tests on the same type of soil at different sites."

Hundreds of such drop-penetration tests have been made. Results have been charted and compiled in a report on "Bearing Value of Soils," published in the Journal of the Franklin Institute for April, 1937.

In average soils, "the maximum settlement occurs within the first few feet of soil beneath the footing and most of that in the first foot of depth". The drop-penetration rod explores these few feet under footing excavations; or when test pits are dug, the soil may be tested at different levels. After the general excavation is completed, tests with the rod may show variations in resistance at different parts of the site or footings. As a result of the tests the footing can be redesigned to suit actual conditions.

### NEW UNITS FOR HEATING AND AIR CONDITIONING

ACCORDING TO A RECENT REPORT issued by the Department of Commerce—No. 17 of the Market Research series—the number of air-conditioning installations in this country increased about 1,400% from 1933 through 1936. Rapid acceptance of air conditioning has caused a widespread fear that use of water as one conditioning medium would overtax water or sewer systems of many localities.

However, a survey made by the

New York Trust Company and published in the current issue of its publication, *The Index*, states there exists no cause for alarm. During the past year a growing trend has been observed among buyers of air-conditioning equipment to use water-conserving types which waste only 10% of the water utilized.

TWO NEW UNITS have recently been perfected to make air conditioning available to small houses. One, manufactured by the Round Oak Company of Dowagiac, Michigan, combines a complete oil furnace and winter air conditioner within a single cabinet. Delivering up to 80,000 Btu's per hr., the "X-80 Air Conditioner" is said to make automatic heat practical in houses costing little as \$4,000.

The other is a direct-fired unit made by the Carrier Corporation, Syracuse, New York. Occupying 11 sq. ft. of floor space, the unit burns either gas, oil, or coal, the latter fed by the Carrier automatic stoker. It includes complete facilities for winter air conditioning; and summer air conditioning can be made available by adding a matched Carrier cooling unit.

A UNIT COOLER of the blower type announced as a new product by the Modine Manufacturing Company, Racine, Wisconsin. Designed for installation in stores, offices, and restaurants, it is available in two sizes, both of which may be equipped with either cold water or Freon cooling coils.

FROM THE MAJESTIC COMPANY, Huntington, Indiana, comes an announcement of a new convertible oil or gas winter air-conditioning unit. Two sizes are available with BTU capacities ranging from 90,000 to 175,000. Both are adaptable to a standard make of burner and conversion from gas or oil is accomplished by a removable fire chamber front.

"SILENTAIRE"—made by the Berg Manufacturing Division, Republic Steel Corporation, Canton, Ohio—a new window ventilator unit. It is portable and is said to operate silently "with a completely soundproof mechanism".

YORK ICE MACHINERY CORPORATION of York, Pennsylvania, has added a new, automatically operating conveyor

(Continued on page 138)

# Reviews of New Books

**MORE LIVES THAN ONE.** By Claude Bragdon. Alfred A. Knopf, New York, 1938. 6¾ x 9½ in. 368 pages. Price, \$7.75.

CLAUDE BRAGDON—architect, author, designer of ornament and stage sets, and occultist—has written his autobiography. This appropriately titled volume is intensely readable and, as a relation of a complex artistic personality, has the rare value of complete sincerity. Mr. Bragdon eschews chronological arrangement of his material, and groups it according to various activities in which he has engaged, since as he says, “in retrospect the time-element disappears; and memory passes easily from year to year—the sequence having become simultaneity.” As Mr. Bragdon has now passed his seventieth year, this account of his life may be reasonably considered to be definitive.

To the architect the most interesting parts of the book will be those which deal with Mr. Bragdon's activities in architecture, projective ornament, and stage design. Although in his latter years, architecture has occupied a lesser place in his interests than stage design and that philosophy of life which he says is “the Polar of my age and of my agelessness”, it was as an architect that Mr. Bragdon first attained prominence. With no formal architectural education the young man obtained a job as a draftsman in the office of a “great fat-like man with grandiose ideas”, P. Rogers of Rochester, N. Y., on a salary of nothing a year. After some time here, he felt that he was earning nothing and was progressing so slowly in his chosen profession. Accordingly he moved on, and in due time went to New York City, and—just as his money was about to give out—found work in the office of Bruce Price. Here he remained until his return to Rochester, where he formed a firm of his own. From 1886 to 1919 he was engaged in the practice of architecture.

In 1919 Walter Hampden asked him to design the sets for a production of “*Hamlet*”; and Mr. Bragdon began his career as stage designer. From this time until his retirement in 1934 he was pre-eminent in this

field. It must not be supposed, however, that so versatile a person as Mr. Bragdon would devote himself to attaining eminence in one field to the exclusion of all others. In addition to, and simultaneous with, his achievements in the architectural and theatrical worlds, he experimented with light and color-music; derived a new ornamental mode from numbers and geometry which he call “projective ornament”; established and managed a small publishing business, the *Manas Press*; wrote prolifically on such varied subjects as philosophy, art, occultism, love, and sex; and translated in collaboration with Nicholas Bessarhoff, Ouspensky's “*Tertium Organum*.”

Of his experiments with projective ornament—that specialized form of geometric design of which Mr. Bragdon is commonly known as the father—the author says little, preferring only to refer to his other works on the subject. This is true also of his theories on the Fourth Dimension, although the appendix of *More Lives Than One* contains an essay which sums up his opinions on fourth dimensional space, in addition to “*The Immortal Beloved*”, a pantomime illustrative of his experiments with color music.

**CHANGING THE SKYLINE.** By Paul Starrett. Whittlesey House, McGraw-Hill Book Company, Inc., New York, 1938. Illustrations from photographs. 6½ x 9½ in. 319 pages. Price, \$3.

AS AN AUTOBIOGRAPHY of one of the five Starrett brothers—all of whom were prominently identified with the construction industry—this book will undoubtedly interest every architect who reads it. It is an informal, conversational account of Paul Starrett's contact with the great era of expansion which created frenzied activity in almost every branch of American life in the 50 years between 1880 and 1930. Names—great names in finance, railroading, architecture, merchandising, and industry—appear constantly throughout the book. The author treats them casually—almost too casually in some instances, for almost invariably they touch situations which would be more interest-

ing—and informative—if recounted in greater detail.

Paul Starrett's career began in 1888 in the office of D. H. Burnham, whom he remembers as one of the ablest men he knew. Building design was on the threshold of great change: cast-iron columns were being introduced to carry floor loads; later with the development of the Bessemer process, steel was used for the floor beams as well; hollow-tile floor arches came into use for filling; the elevator was being perfected. Here were the inventions which made the skyscraper a practical possibility.

Starrett soon found that his abilities were not those of the designer, but those of the builder, of the organizer of the construction work itself—a task which grew increasingly complex. He became a superintendent for Burnham. Later he joined the George A. Fuller Company, an organization with which he remained for 25 years. The climax to his career was the erection by his own company, Starrett Brothers & Eken, at a speed of one story a day, of the Empire State Building.

**THE STONES OF SCOTLAND.** Edited by George Scott Moncrieff, with contributions by W. Douglas Simpson, G. P. H. Watson, W. Mackey Mackenzie, Ian G. Lindsay, and Ian C. Hannah. Charles Scribner's Sons, New York, 1938. Illustrated from photographs and drawings. 6½ x 9 in. 132 pages. Price, \$4.50.

BECAUSE relatively little has been published on Scottish architecture, designers will find much interesting material in this book. Text—which is simply and clearly written for the most part—deals with structures of prehistoric Scotland; the development of ecclesiastical architecture up to the Reformation; post-Reformation churches; Scottish castles and towers; and the nature and development of the Scottish “burgh.”

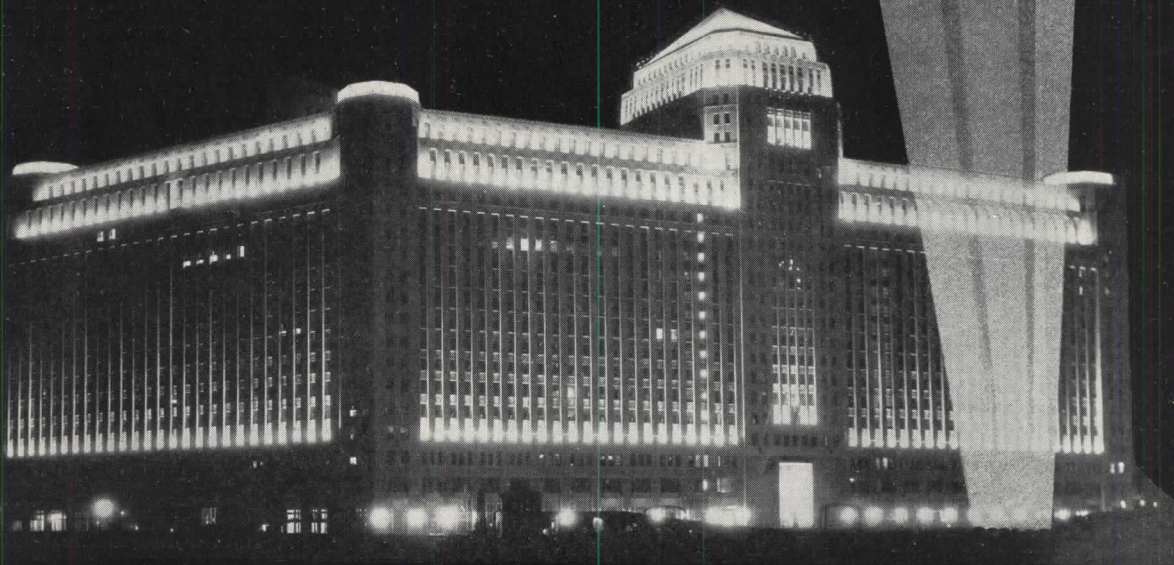
Illustrations are largely from photographs—most of them well-taken and all of them excellently reproduced on coated paper. They are grouped according to the subjects of the text for convenient reference.

(Continued on page 140)

# M-H CONTROL SYSTEM REDUCES FUEL COSTS FOR MERCHANDISE MART...

# 22%

■ When a Minneapolis-Honeywell Weatherstat control system combined with Brown Instruments was installed in the Merchandise Mart, the world's largest building, it was important news to the building, heating and temperature control industries. But when this installation provided a saving, based upon degree days, of more than 22% it became important news to every building owner and operator as well. The Merchandise Mart requires approximately 20,000 tons of coal annually to heat its 4,000,000 square feet of floor space and keep its 25,000 tenants comfortable. It is obvious that a 22% saving on such fuel consumption will quickly pay the cost of the control system. A similar result can be expected in your building - old or new, large or small . . . Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota. Branches everywhere.



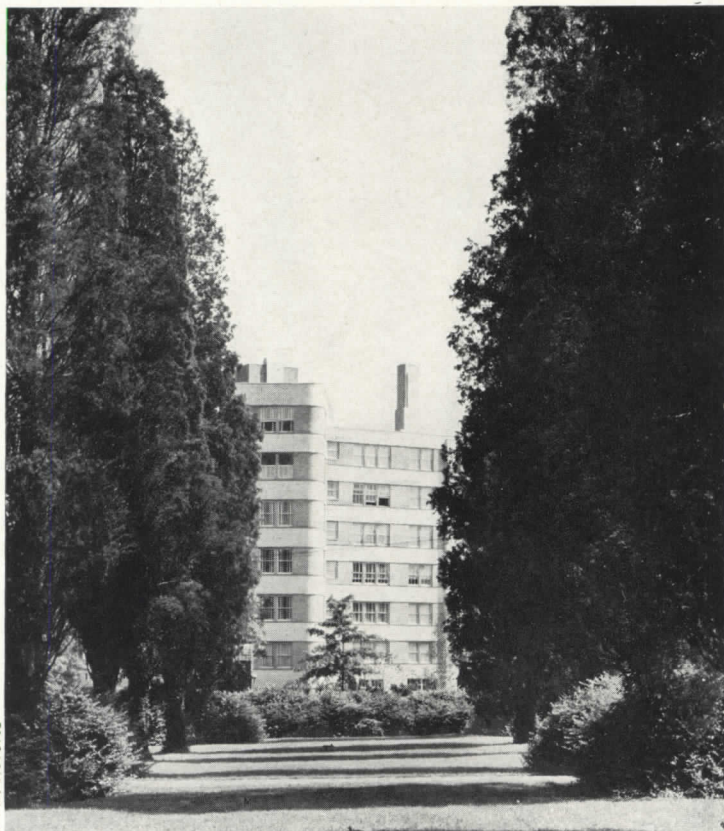
## MINNEAPOLIS-HONEYWELL

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# BUILDING TYPES



*W. F. Roberts*

## A P A R T M E N T S

**FORTHCOMING 1938 STUDIES:** Houses (\$15,000-\$25,000) — October; Houses (\$25,000 and up) — November; Office Buildings — December. **PRECEDING 1938 STUDIES:** Hospitals — August; Theaters — July; Factories — June; Schools — May; Houses (\$7,500-\$15,000) — April; Houses (\$7,500 and under) — March; Retail Stores — February; Hotels — January.

ARCHITECTURAL  
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F. S. Lincoln

Carl Mackley Apartments, Juniata Park, Philadelphia. W. Pope Barney, Architect; Kastner & Stonorov, Assoc.

The evolution of community apartment-house developments suggested emphasis in this issue be placed on such projects. Though general trends and management needs are surveyed (see next page) and a few illustrative case studies concern projects with which FHA had no connection, a major portion of the information presented was obtained with the cooperation of FHA. Since its recommendations derive from experience gained in considering hundreds of proposals, we believe RECORD readers will find this report a worthwhile contribution to their reference library.



## Community

THERE IS a slight trend toward suburban living, caused partly by the possibility of better orientation, use of open space, cleanliness, and quiet; partly by desirable community facilities; partly by lower construction and maintenance costs.

## Neighborhood

Present taxation generally discourages construction along main thoroughfares, forcing selection of sites in quieter neighborhoods. Restaurants, shops, and transportation system should be convenient.

## Site

A site at the edge of a city or near a park is desirable, with buildings located to insure adequate light and air, and freedom from noise, odor, and smoke. Site landscaping is equally important.

## Buildings

Tenants surveyed preferred low buildings and small units grouped around common recreation areas. Research undertaken by Downs, Mohl & Company of Chicago, indicates that developments containing less than 100 apartments are economically obsolete. In some cities developments containing as few as 20 units are economically justified. Building managers request planning and construction quality which reduces operating and maintenance costs.

## Dwelling units

*Location, size, and layout.* Basements and first floors are not generally wanted by tenants. Three-room suites are most in demand; four-, two-, five- and six-room units follow in order. Dinettes are reported "unpopular" by managers and tenants, combination living-dining-rooms being preferred, or an additional sleeping room. Many tenants like two-floor arrangements of even small apartments. Managers state that efficient layout is more important than large room sizes. Size, equipment, and layout of kitchens and bathrooms are subject to critical inspection. Small, semiprivate entrances are preferred to large foyers.

*Room sizes.* Managers state minima are: living rooms, 12 x 18 ft.; bedrooms, 10 x 12 ft.; dining alcoves (if included), 8 x 8 ft. Tenants prefer: living rooms, 16 x 24 ft.; kitchens large enough to include counter space in addition to equipment surfaces.

## Services

*Mechanical services* desired by tenants include: garbage disposal (incinerator or electric crusher); ventilation and deodorization of kitchens; mechanical refrigeration; numerous convenience and radio outlets; and self-operated elevators.

*Social and recreational facilities.* Roof gardens or balconies, playgrounds, and kindergartens are considered desirable by managers consulted as well as by tenants. Such areas as indoor social or athletic rooms and swimming pools, termed desirable by tenants, are regarded by managers as economically impractical.

## Equipment

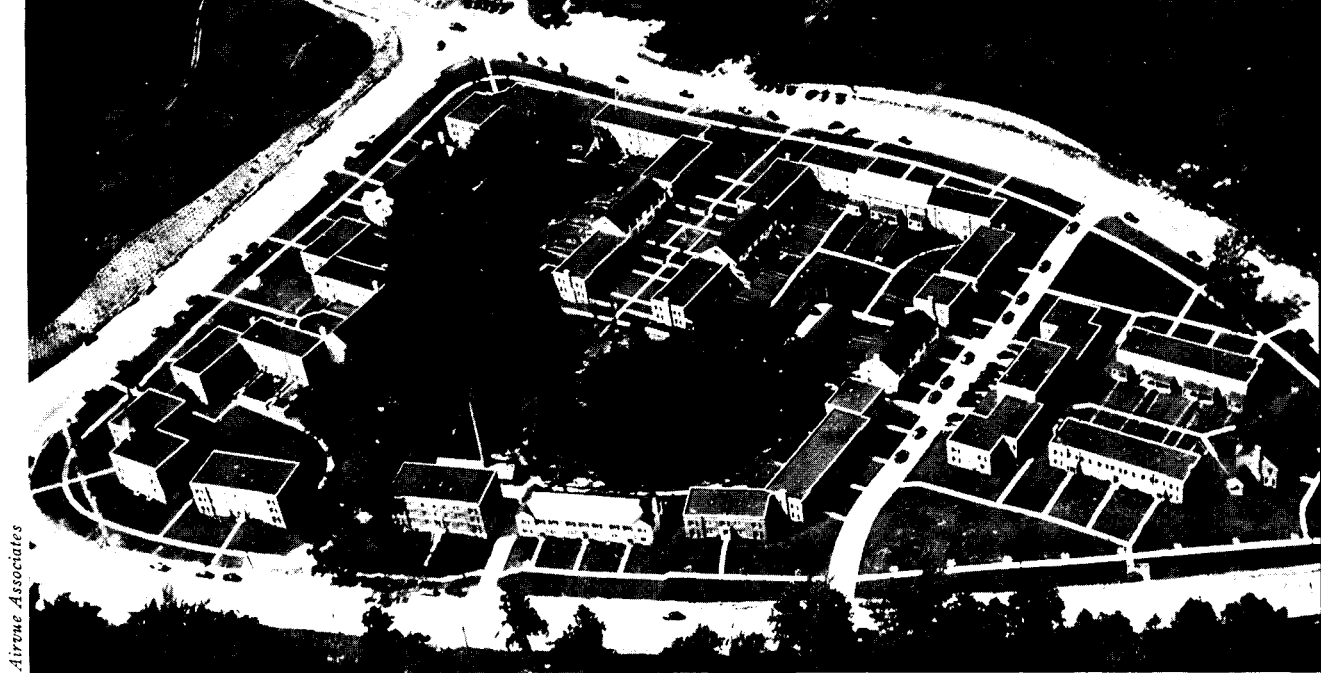
Tenants and managers both desire the following: for kitchens, table-top gas ranges, large sinks set high, ample cabinet space, laundry facilities, built-in ironing boards; for bathrooms, lavatory mirror with diffused lighting, separate medicine cabinets, shower stalls, footflush water closets, tubs with seats, and linen cabinets, in addition to the usual fixtures.

Elaborate systematized equipment, such as community laundries in cellars, is likely to be of little value unless tenants are accustomed to using it.

## Cost

Managers state that improvements should cost from 6 to 10 times the land value and that first cost should be liberal enough to permit specification of good mechanical and other equipment as well as sound structure.

\*Based on surveys of management organizations completed with the assistance of Stanlee T. Bates, Secretary, Carlton Schultz Management, Inc., Cleveland; William H. Brown, Secretary, Robert E. Hill, Inc., New York; James C. Downs, Jr., President, Downs, Mohl & Company, Chicago; Olin O. Ellis, President, Guilford Realty Company, Baltimore; Delbert S. Wenzlick, President, Wenzlick Sales & Management Organization, St. Louis; and on "What Tenants Want in Apartments," Thyrsa W. Amos (Architectural Record, August 1938) and "105 Tenants Suggest Improvements for Apartment Living," Thyrsa W. Amos (Real Estate Record, June 4, 1938).



Falkland Properties, Inc., Silver Spring, Maryland. Louis Justement, architect.

## Multiple Housing Under FHA

By **MILES L. COLEAN**,  
Deputy Administrator, Federal Housing Administration

More important than the renewed volume of multiple housing being constructed is the character of design and construction which this volume embodies.

The results of the thought and research which have been undertaken by architectural offices, lending institutions, government agencies, and independent workers in recent years can now be seen. We can begin to see a new expression of housing development in terms of comfort, amenity, and convenience, realistically related to considerations of cost and demand. We begin at last to find housing produced not as a luxury article or as a speculative commodity, but as honest merchandise designed to meet the needs of broad classes of the people in a manner to hold their occupancy and to resist obsolescence.

The rental projects financed under the insured mortgage system of the Federal Housing Administration which are shown in this issue illustrate these new standards. The contrast with multi-family structures typical of the Twenties is startling. The following characteristics common to the new developments stand out:

1. They are large, cohesive and efficiently organized groups, and provide a measure of community identity which has already proven a potent course of tenant appeal and which may be expected to provide resistance against neighborhood disintegration.

2. They provide a low density of families to the project and allow open space ample to give a high degree of privacy to the dwellings, to assure air and sunlight to offer areas for recreation. These features, too, are important to offer tenants to the projects and keep them there.

3. The buildings are low in height, modest in scale and domestic in character. They have fairly succeeded in avoiding an institutional atmosphere.

4. The dwellings are convenient and comfortable in their interior arrangements as they are inviting in their exterior aspect. They are designed to be operated efficiently and are thus able to offer a bargain relationship between the merchandise offered and the price charged for it. The long waiting lists which so generally attend projects of this type testify to the lure which such qualities exert.

More noteworthy than the appeal to business enterprise which plainly exists in the new type of rental housing is its broader social and economic implications. The standards which they lend to investment, to real estate values, to municipal income cannot but have a wholesome effect upon the community. The openness of the planning, the sunshine, the park-like environment, combined with the vision for competent and responsible management mean insurance against future slums. The comprehensive manner of handling large groups of dwellings provides an excellent unit in the larger concept of the city plan.

# Government Housing Standards\*

**FHA . . .** has insured mortgages for 51, and has outstanding commitments for 117, rental housing projects, accommodating 18,636 families

- housing will accommodate approximately 1,419 families in single-family dwellings; 6,647 in 2-story buildings; 3,085 in 3-story buildings; 3,901 in elevator buildings; the remainder in combinations of types, 2-story buildings predominating
- construction costs range from \$500 to \$1,400 per room, most averaging \$1,100
- insured mortgages average \$1,004 per room; the largest project mortgage to date being \$3,500,000
- rentals range from \$4 to \$22 per room, average approximately \$14.50
- project sites average 10 acres each in area

A STANDARDS are set up to promote the use of mortgage money; hence FHA financing is intended to accommodate financially stable, middle-income people. Rentals can range from as low as \$15 per month to as high as \$80. The average need is for \$50 per month rentals. Projects must be self-sustaining.

The FHA realizes that it can not impose strict architectural standards. In the interests of protecting its mortgagors, however, it must impose limits on how and above which designers may not go. In many cases limitations of local codes or customs are more than the corresponding FHA minimum; in such instances, local codes govern. Where the reverse is true, FHA standards become the absolute minimum.

## Community

FHA requires: that there exist a number of diverse sources of income to serve the families to be served; that there exist a need for the type of development contemplated; that finances and administration of the community be sound and the general and special burden permanently reasonable.

## Neighborhood

FHA requires: assurance of continued harmonious land uses; integration of the neighborhood and project; conformity to predominant racial ethnic groups; convenience to religious, business, education and recreation centers, and transportation systems.

## Site

FHA requires: freedom from adverse adjacent topographic, industrial, psychological influences; acceptable present and future local land planning; freedom from flood or other dangers and from conditions causing excessive construction costs; conformity to site characteristics; land coverage per acre, for large-scale projects, is as a rule limited to 20-25%; urban elevator units should not ordinarily exceed 35% in coverage.

## Buildings

FHA prefers: buildings not over 3 stories high; elevators required for higher structures, which are permitted only in exceptional cases; conformity to local zoning, sanitary and other regulations; building disposition to avoid narrow courts, assure minimum reasonable land coverage; densities in families per acre not ordinarily exceeding, in suburban areas, 20 to 25 for 2-story apartments, 30 for 3-story, and 50 for 6-story buildings; in urban areas, more than 100 families per acre will not ordinarily be approved; construction methods must be suitable to the site and to other local conditions, and must result in low maintenance and depreciation costs.

## Dwelling units

FHA recommends: maximum number of dwelling units containing at least 3 habitable rooms and 1 bath with a few smaller units; economical

layouts providing a maximum of cross ventilation, and privacy in sleeping quarters. Living rooms average over 220 sq. ft. in area and many are over 260 sq. ft. Major bedrooms average well over 145 sq. ft. and minor bedrooms over 120 sq. ft. Kitchens average between 60 and 70 sq. ft. when not used for dining, and over 90 sq. ft. when used for dining. Dining alcoves average between 50 and 60 sq. ft. Dining rooms average 110 sq. ft. Baths are usually 5 x 7 ft.

## Services

FHA: provision for safe garbage and refuse disposal; laundry facilities in dwelling units or grouped for community use if local customs demand; electric service installed underground, with adequate outside lighting; garage service, or in some cases outdoor parking spaces; adequate, durable, economical heating systems; noncorrodible plumbing piping.

## Cost

FHA requires: co-ordination of rental levels with existing community levels; land values comparable to other local developments; reasonable expectation of long-term occupancy; sufficient sponsors' equity in, and profit from, the project to insure satisfactory and continuing maintenance and management; experienced and reliable building contractor.

\*FHA data contained in this and the following pages, including examples of FHA projects, have been obtained through the co-operation of Chloethiel Woodard, Assistant Chief, Architectural and Planning Section, Rental Housing Division, Federal Housing Administration.

# Communities and Neighborhoods

THE COMMUNITY must have a satisfactory economic background in general, and specifically with reference to sources of employment for the proposed tenancy. Projects which depend on the continued existence and prosperity of a single industry are generally not as safe as those located in communities with a variety of industrial or business employment. Hence, only exceptional circumstances can warrant the insurance of mortgages on the former type.

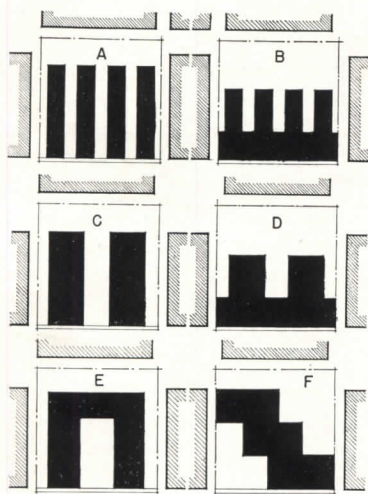
## Community needs

The need for dwellings meeting approved physical standards and available for rent at prices within the rent-paying capacity of the income group the project is to serve must be demonstrated. City-wide demands, vacancies, types of housing in which occupancies are highest, existence of competitive construction, housing sup-

plies, income levels, and other phases in the determination of housing needs must be analyzed. Since the real need for new dwellings in most communities lies below the \$50 per month rental level, particular study must be given to projects which propose to furnish accommodations at rentals higher than this.

## Financial condition

The financial condition and administration of the community must be sound, particularly with reference to tax rates. The probability of future special assessments and the general tendency of the community with respect to the placing of further levies must be studied in relation to the surplus available to meet added burdens. This involves careful analysis, since the condition of heavy tax burdens may jeopardize the otherwise safe investment in properties.



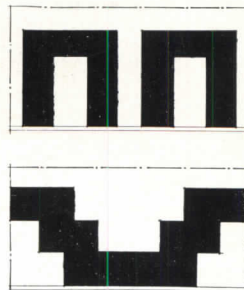
All 6 schemes have exactly the same coverage of a 100 x 100 ft. lot (approximately 45%). In schemes A and B, separate 25-ft. lots are considered, and in C and D, 50-ft. lots. Scheme E shows the entire 100-ft. property developed with the typical "U" court, with apartments dependent for all light, air, and views on the narrow entrance court or the narrow side and rear yards. In scheme F, a much improved condition is created by opening up two large side yards. In scheme D, there is the same amount of open land as in scheme F, but in F it is collected and made effective.

## FHA Urban Developments for Small Lots

ONE OF THE most difficult problems is to prevent buildings on small pieces of property from depending on adjacent properties for their views, light, and air. The developer who has a piece of land surrounded by open residential development feels himself to be very fortunate. He believes he can crowd his land and borrow light and air from neighboring properties. He forgets that his intensive development may start a run of similar projects on these neighboring lots. This may not happen in the next year or two, but it

will probably happen; and the lot owner will usually allow a very overcrowded condition.

The old type of speculator who got "out from under" as soon as his building was completed by pawning it off on some ignorant "investor" could ignore this problem. The unsuspecting investor took the loss in rentals which was caused by the development of adjacent properties cutting off light, air, and views from his property. This condition has changed and will probably not be repeated to the same degree as in the past.



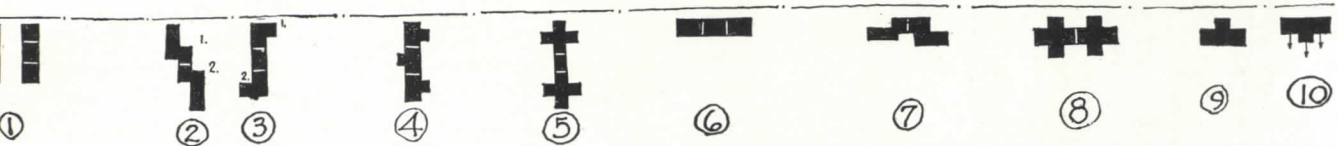
Repetition of "U" courts on a 200-ft. lot does not improve conditions, but repetition of scheme F produces a development with large garden and good light and air in rooms. This scheme has a minimum dependence on surrounding lots. The two-room dwellings adjacent to the lot lines do not require windows in end walls, so that adjacent buildings erected on the property lines do not greatly affect the scheme.



Community and site relationship in a government housing project in Dallas, Texas

## RECOMMENDATIONS

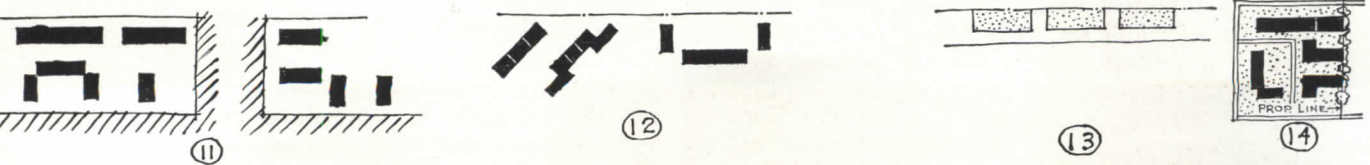
### RELATIONSHIP OF BUILDINGS TO ADJACENT PROPERTIES



Effect of adverse adjacent influences on buildings within project: 1 to 5, buildings set with ends to property line; 2, 3, Ell and Zee buildings set similarly force a poor look on dwelling units whose living rooms face the

property line; 6 to 9, if buildings must parallel the property line, strip units with living rooms facing inward offer the best solution, some units in Ell, Cross and Tee units always facing poor views; 10, reversed Tee helps.

### PROPERTY ZONING, SIZE, AND SHAPE



Maximum heights and uses of adjacent properties greatly affect the site plan. Present conditions are not usually the best indication of future developments, except as they are studied in relation to legal and other restrictions or possibilities. In Figures 11 and 12, for instance, the walls of project buildings face undesirable frontages.

Figures 13 and 14 illustrate the desirability of assembling property in as compact a unit as possible. In Figure 13, it is easily seen that the entire area of the project is subject to adverse influence from without; a plot such as Figure 14 can be developed into a self-contained unit, independent of exterior forces.

# Sites



Children's play area, Brentwood Apartments, Washington, D. C.; Raymond Snow, architect. The inclusion of such areas within project sites, while not required by law, is an instance of advanced planning favored by FHA because it helps to defer obsolescence and hence aids in protecting mortgages.

IN GENERAL, for multiple housing, all land offered as security for an insured mortgage should be contiguous, forming a single plot. The land may be divided by public highways but should not be separated by property owned by others.

#### Access

Each project site or plot should have adequate and immediate access to a public street or way, or a private way protected by a permanent easement, of width and construction suitable to vehicular traffic requirements. This is not construed to include alleys or service ways.

General site-planning standards require that project plans shall not conflict with city or regional plans or with existing or probable future public works, transportation or industrial developments. Provision should be

made for the possible extension or widening of important thoroughfares.

#### Internal Traffic

Minor residential streets within the plot should be designed to discourage through-traffic and create as few intersections with main thoroughfares as possible. Driveways where necessary within the plot should be of such width and location as to provide convenient access for delivery of goods and collection of refuse without annoyance, danger, or excessive walking. Streets and driveways should be surfaced consistently with local practice. Hard-surfaced sidewalks constructed at easy grades are required, in most cases, for each entrance door and for convenient circulation within developed areas. Where traffic hazards warrant, suitably constructed sidewalks should parallel streets or drives. Adequate landscape work is

provided in the form of lawns, tree hedges, or other planting.

Either drives or walks of sufficient width and accessible from streets should be provided for fire-fighting equipment. Adequate water supply for fire fighting must be reasonably accessible. As a rule, garages and parking areas shall be of such size and located as to provide space off public streets for not less than one car per living unit. Parking areas or garages located off drives are preferred to parking spaces at the curbs of streets.

#### Play Areas

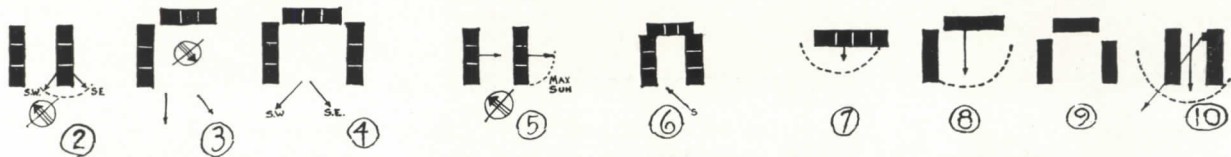
In large-scale projects play areas for small children should be provided, largely hard-surfaced and protected with fencing, walls, or heavy planting.

Adequate outside lighting should be installed, particularly at intersections of walks and drives and at steps. Electric service is installed underground



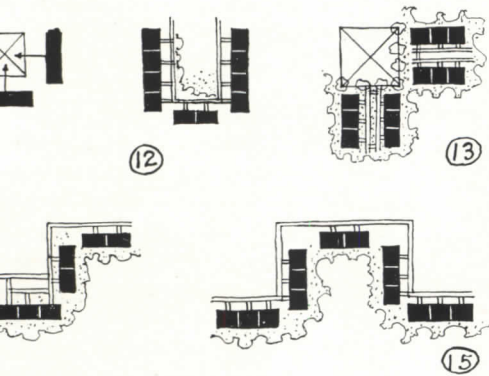
Site development, government housing in Austin, Texas

## RECOMMENDATIONS

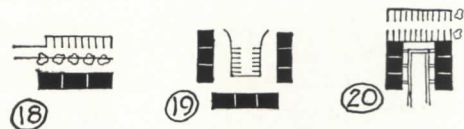


Orientation of building groups: Figure 1 shows orientation permitting a maximum of sunlight penetration into all the rooms; Figure 2, orientation permitting some sunlight to enter all rooms; 3 and 4, conditions requiring orientation of all space facing south for living areas,

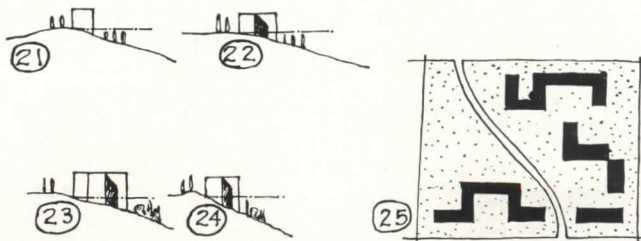
services and stairs being concentrated on the north. Figures 7, 8, 9, orientation for preferred views; 10, buildings set at 90° to best view offer a compromise which affords some desirable outlook from all apartments rather than limiting vistas to one group.



Locations and recreation areas: 11 and 12, noisy, usually desirable locations for recreation areas, but highly satisfactory for gardens; 13, better placement for recreation area; 14, 15, all living rooms face on garden areas; 16, 17, segregation of recreation areas (squares in diagram) from gardens and living rooms.



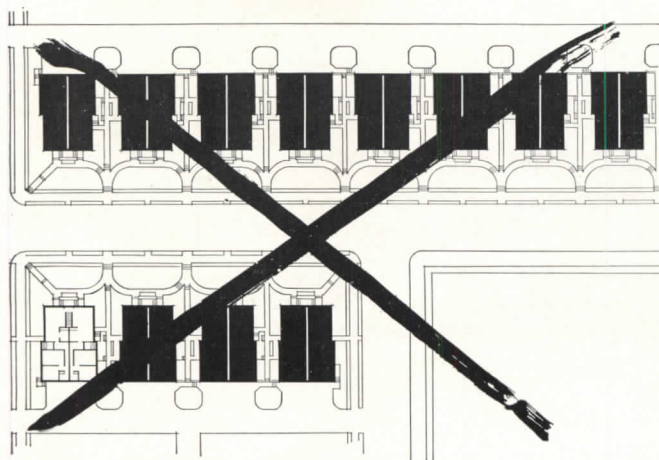
Placement of services, such as garage compounds: 18, location of garages will cause disturbing noise; 19, garage compound surrounded by a wall which may serve as a garden feature; 20, garage compound at ends of buildings, where windows are few and disturbance is minimized.



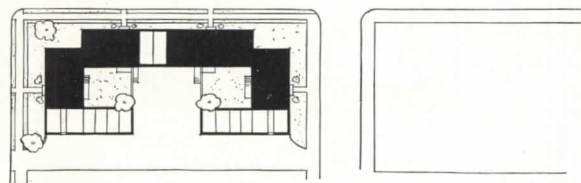
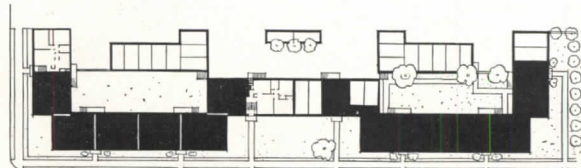
Topographic influences: 21, narrow strip running parallel to contours is most economical; 22, 23, 24, Ell, Tee, Zee, and Cross units require more foundation wall. Roadway layouts, Figure 25: curved, dead-end or offset streets through site are preferred to continuations of adjoining thoroughfares.

# Comparative Site Plans

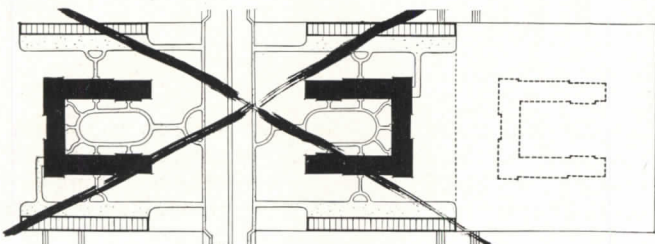
THE FOLLOWING schemes illustrate revisions of typical site plans to develop project possibilities as fully as possible. Unit plans are not indicated because all are based on one or more of the types shown on page 33.



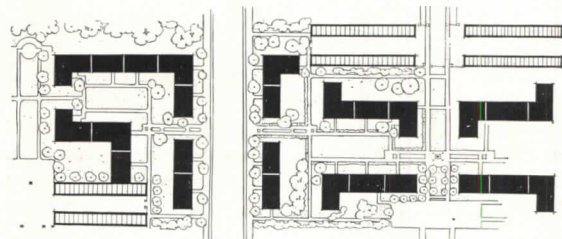
Four-family units on single lots—available open space is cut up and ineffective. Kitchens do not receive natural light; dining alcoves and bedrooms face adjacent units.



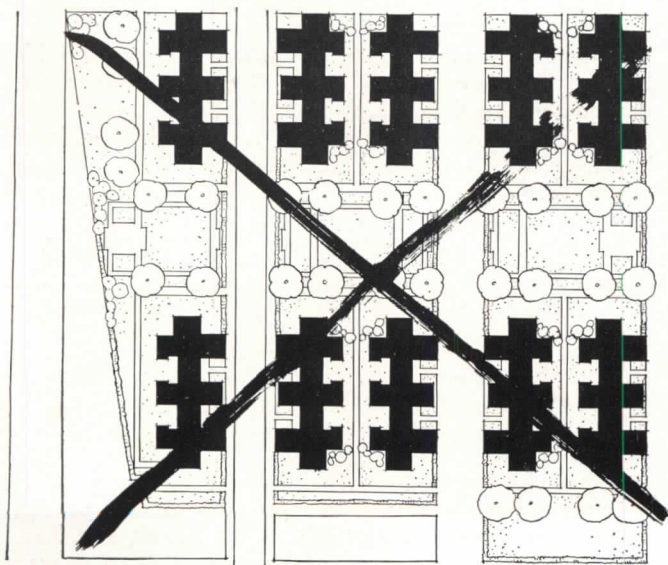
The same number of families are accommodated in rooms having ample light and air. The group plan is not only more attractive, but also cheaper to build.



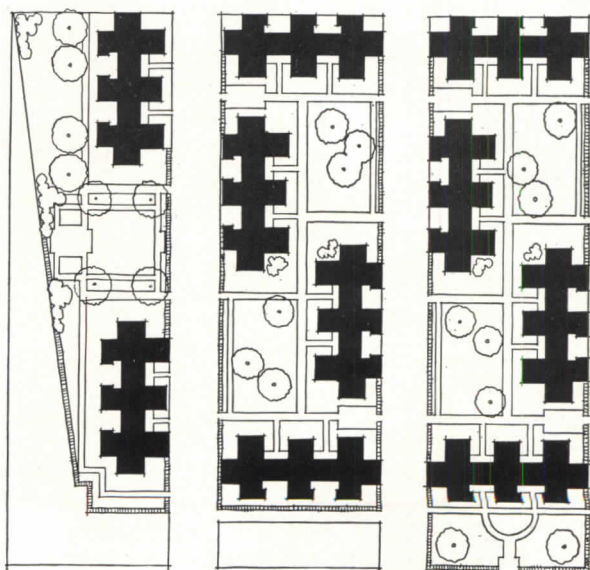
These 3-story U-court buildings, derived from plans for small urban lots, afford little protected garden area because most of the space opens to the street traffic. Access to garages requires twice the driveway it should.



All major rooms face protected courts. Garage pounds are entered from dead-end streets with rear garages forming a garden wall. No additional rent is required, since construction costs are not increased.

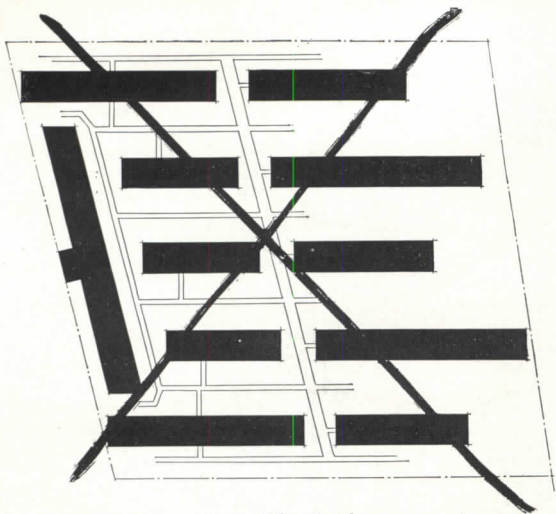


Elevator buildings with a central garden: this area can be seen from few apartments and crowds the buildings.

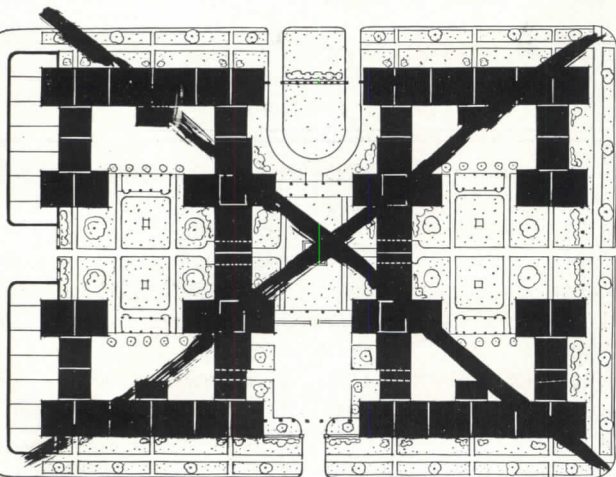


The same buildings rearranged with open space adequately disposed—eliminating narrow courts.

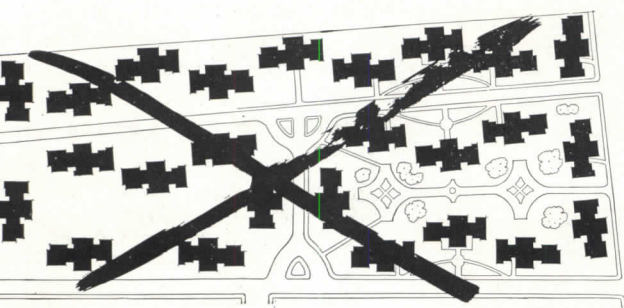




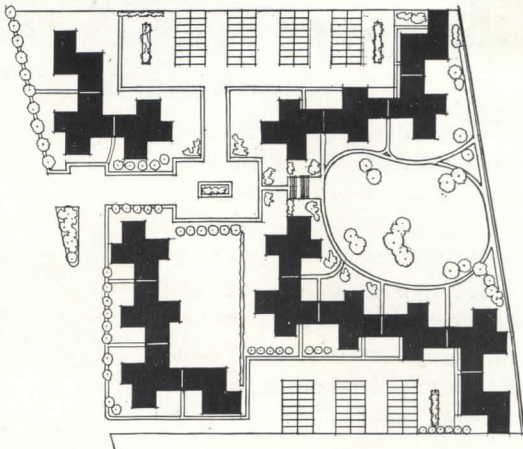
A river-front property with fairly expensive elevator apartments. Corridor type plans do not afford cross ventilation. Garages, though needed, are not included, and access to some of the buildings is not convenient.



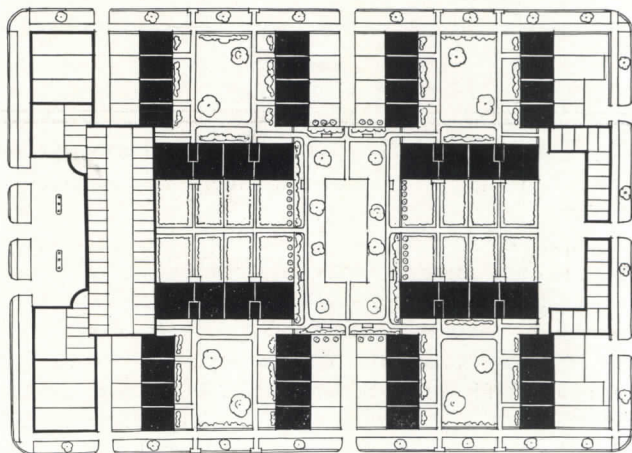
A large city block surrounded by tenements and small shops. Many major rooms suffer from street noises and bad views. Apartments above store roofs are difficult to rent and undesirable. Courts are unattractive, gravel play areas reduce rental values of apartments adjoining. Necessary garages are not provided.



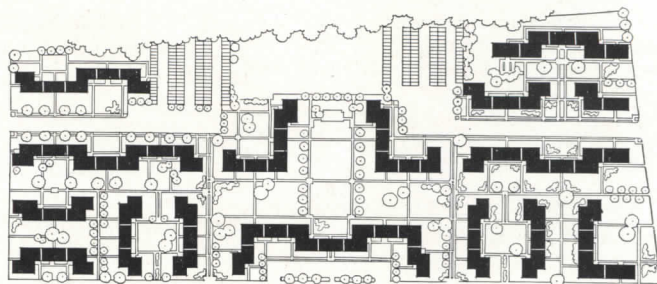
The complicated perimeter of the buildings is unnecessary and costly and does not appear to justify the increased costs. Site plan, utilizing repetitive building types which cannot be connected or grouped, lacks integration. The road which cuts the project in three parts is not desirable and an excessive amount of road is required. No garages are provided, although at least 200 are necessary. The only available space for playgrounds is adjacent to buildings. The buildings along the unprotected property line have many apartments viewing property not controlled by the project.



This revision accommodates the same number of family units, all having at least two exposures. The offset cross, as shown, opens the main group to the view. Garages and adequate parking space are added.



In this scheme only end walls of two-room deep plans have views away from the property. Facilities provided include one central playground and garages; no rooms are placed over store roofs. Because of these factors and the resulting site isolation this plan creates its own environment independently of surrounding properties.



The revision utilizes 2-room-deep plans for the same number of families, adds over 200 garages and a large playground which is located between the garage compounds and arranged so that disturbing noises do not affect the occupants. Two cul-de-sacs serve as access to apartments which cannot be reached conveniently from surrounding public streets and as access to garages. All apartments have at least two exposures, are well arranged, and have views into quiet and protected garden areas. Open spaces and building units are grouped to form attractive courts.

# Buildings

The standards herein presented, including the following unit plan types as well as the preceding information on communities, neighborhoods, and sites, are intended for use as guides to the development of suitable plans. Plans are in no sense to be construed as rigid standards, or "stock plans."



Country Club Apartments, Greensboro, N. C. Charles C. Hartmann, Architect

THE ADMINISTRATION interprets the word "Housing" to mean dwelling quarters offering complete facilities for family life, as a result of desirable planning and environment. A large variety of project types is possible: groups of single-family dwellings, row or group houses, row flats, walk-up apartments, and elevator apartments.

## Characteristics

Preferred projects have the following characteristics:

1. A preponderance of units for complete family living, appealing to stable rather than impermanent tenancies.
2. Location in distinctly residential areas.
3. Income from dwellings adequate to assure success of the project, assumed income from accessory uses (garages, stores, etc.) being only a small fraction of total estimated income.
4. Tenants whose prospective ability to pay rental is not largely or solely dependent on a single industry.

Absence of these characteristics will ordinarily preclude the approval of housing in distinctly commercial areas; of hotels; of apartment hotels; of boarding houses or dormitories; of society buildings partly devoted to residential use.

## Layouts

Apartments should include living, sleeping, cooking and dining accommodations, and sanitary and storage facilities. Layouts containing not less than three habitable rooms and one bathroom should predominate,

but a small proportion of smaller units may be justified in some cases. All habitable rooms must ordinarily have a clear ceiling height of not less than 8 ft. Where dining rooms are not provided, kitchens or living rooms, whichever are used for dining, must be increased in area. At least one or more closets not less than 5 sq. ft. in area and 22 in. in depth must be provided for each bedroom, and near each living unit entrance door. A linen closet not less than 14 in. in depth must be provided.

## Circulation

Each living unit must have a means of access without passing through any other living unit, cooking and sanitary facilities independent of any other living unit, doors to bedrooms, to bathrooms or toilet compartments, and between a living room and a "bedroom-bath hall" in most cases. Access from a bedroom to an only bathroom cannot be through another habitable room. Access from apartment entrance doors to kitchens must be directly from foyers or only through living or dining rooms.

## Light and air

Habitable rooms must be provided with windows whose total glass area is not less than 10% of floor area and whose ventilating portion is not less than 5% of floor area, both computations including areas of alcoves opening from hab-

itable rooms. There must be unobstructed opening between the alcove and the main room of at least 90% of the common wall area unless the alcove is separately lighted and ventilated. Bathrooms and water closet compartments must have light and air from a window having not less than 10% of the floor area, not less than 3 sq. ft., and at least 50% of the required glass area openable; it must open directly on a yard, street, court, or approved public space. Sky lights and exhaust ducts may be permitted in special cases.

## Public ways

Public stairways and halls may be ventilated or lighted in a number of ways. However, the majority of projects having building units with single exit stairs will have these so located that natural lighting and ventilation are possible.

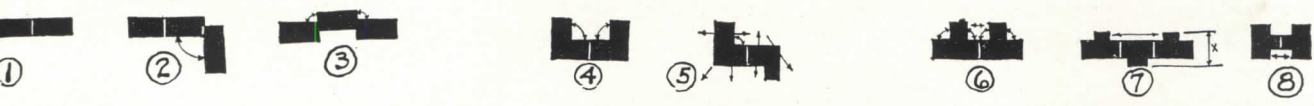
## Basements

Heater or utility rooms, open basements, or basement storage must be ventilated by windows or doors in exterior walls or adequate ducts. Garages for multiple storage located underground or under dwellings must have natural ventilation or approved mechanical ventilation.

As a rule, living units located below grade are not permitted; but when permitted, the distance from the adjoining outside finished grade down to the finished floor at each required window may not exceed 2 ft. 6 in.

# A RECOMMENDATIONS

## EFFECT OF UNIT TYPE ON SITE PLANNING FACTORS



Single strips, 1, are most adaptable units; angles and angles in 2 and 3 reduce privacy.

Angles formed by repeated Ells; note difficulty in orienting for view, sun, etc.

Reversing the center unit as in 7 increases the narrow courts formed in 6 and 8.



Forms combined; note narrow courts, 9; courts eliminated, 10.

Multiple crosses again cause excessively narrow courts.

Insertion of strip units between other forms effectively widens courts.

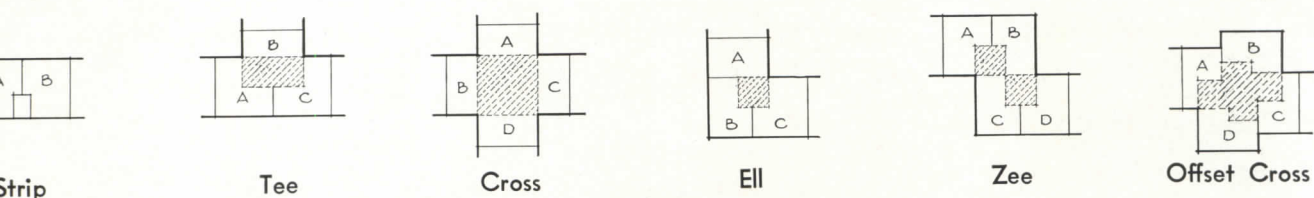
## BUILDING HEIGHTS AND VENTILATION



Though tall buildings may not overshadow each other, the eye tends to look out and only slightly down, the view to ground being too sharp. Lower buildings increase privacy and usefulness of site landscaping.

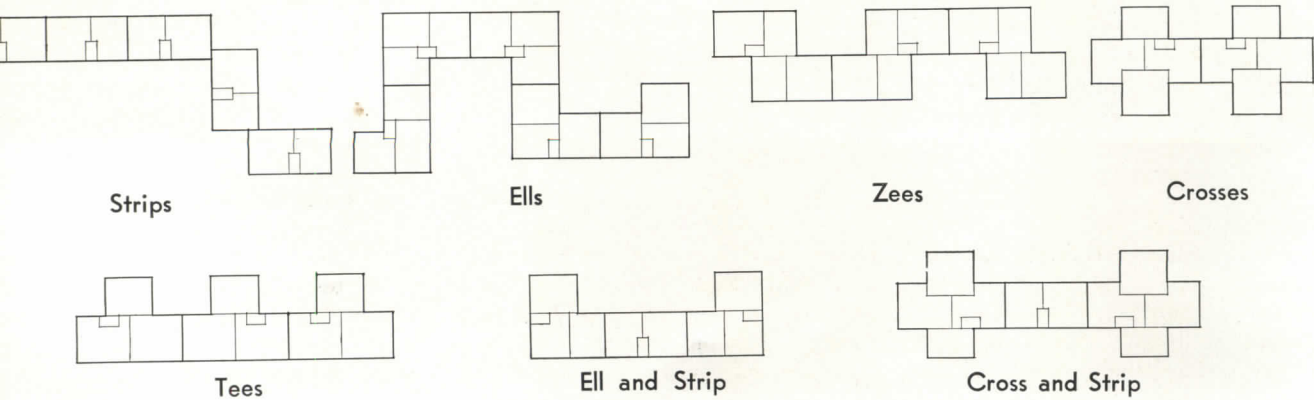
All two-room-deep units of FHA standard types ordinarily have good natural ventilation. However, center-corridor plans with units having only one exposure are usually difficult to ventilate, generally not approved.

## COURT SPACES



Shaded areas indicate portions receiving little light and air, and principally useful for stairs, stacks, or similar services.

## TYPICAL UNIT COMBINATIONS

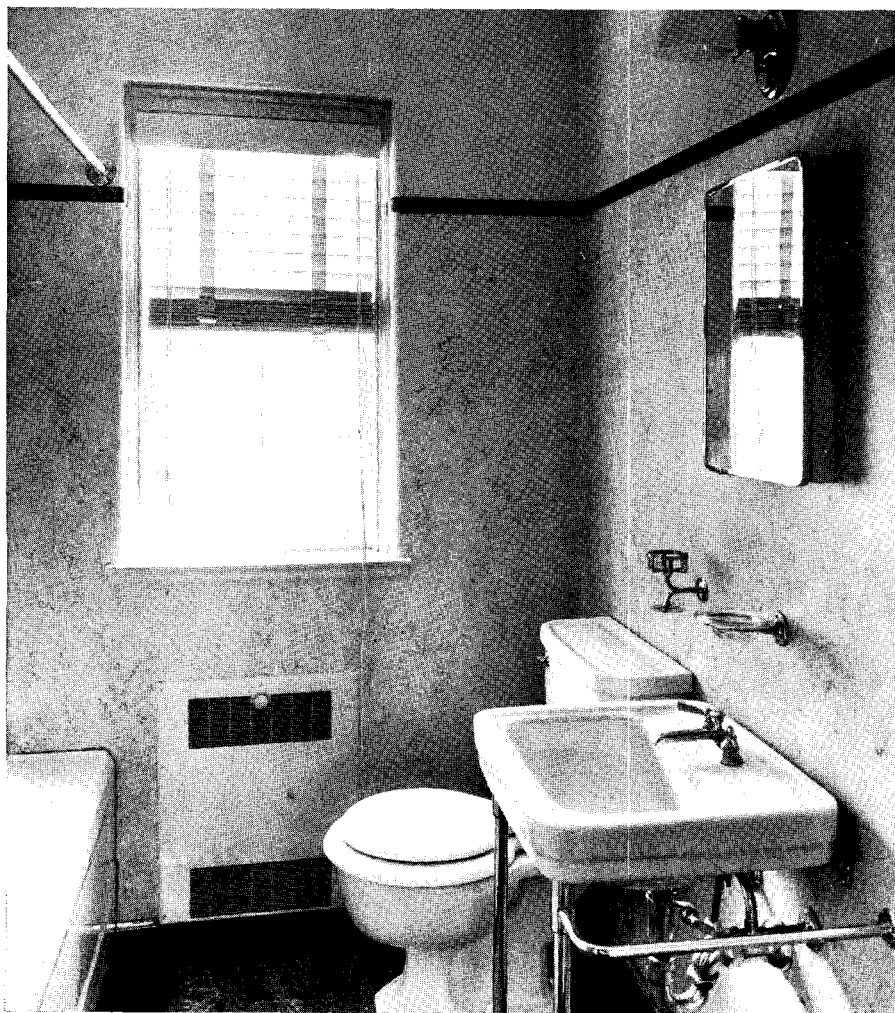


# Dwelling Units

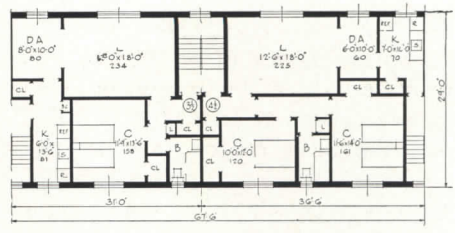
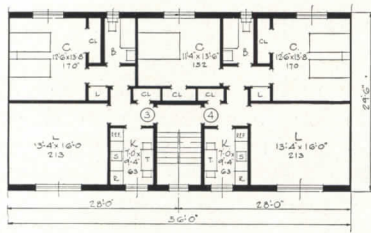
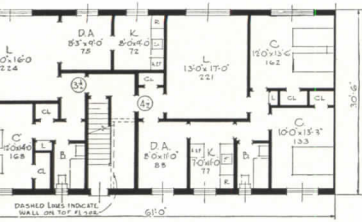
Photos by W. F. Roberts



Typical interiors, Falkland Properties, Inc., an FHA-insured project in Silver Spring, Maryland, of which Louis Justement was architect. Above, living room; below, bath, showing type of finish and fixtures.



**A UNITS** (Scale, 1/32" = 1'-0")

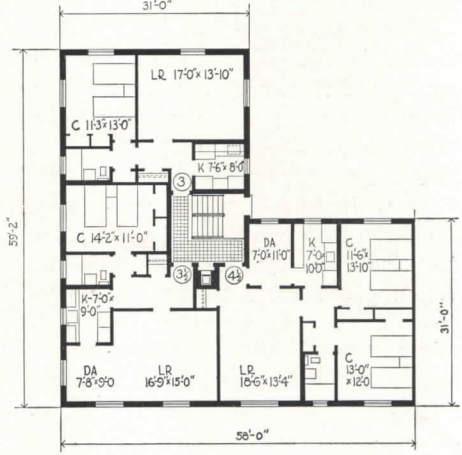
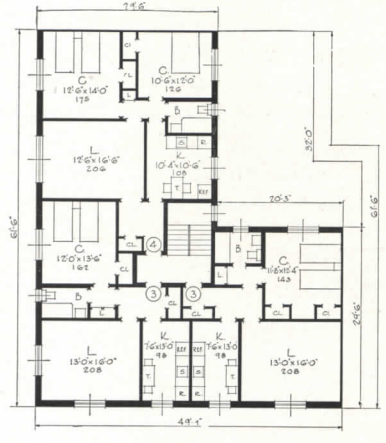


"25" — 3 1/2, 4 1/2 rooms  
Strip (S) Units

"25" — 3, 4 rooms

"25" — 3 1/2, 4 1/2 rooms

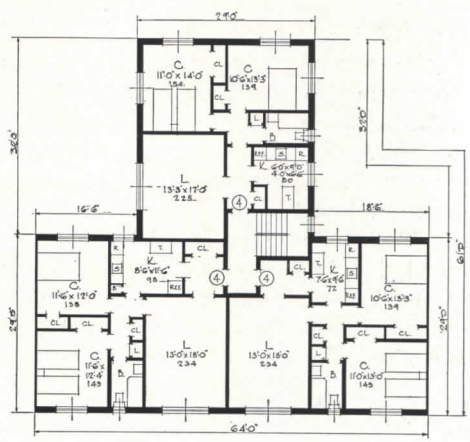
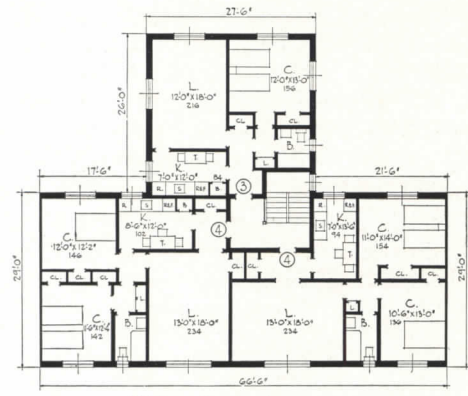
**L, Ell Units**



"33" — 3, 3, 4 rooms

"33" — 3, 3 1/2, 4 1/2 rooms

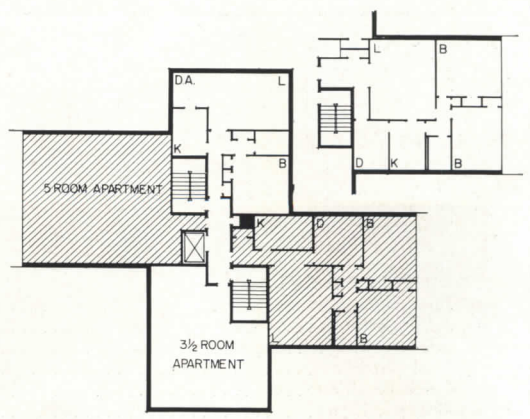
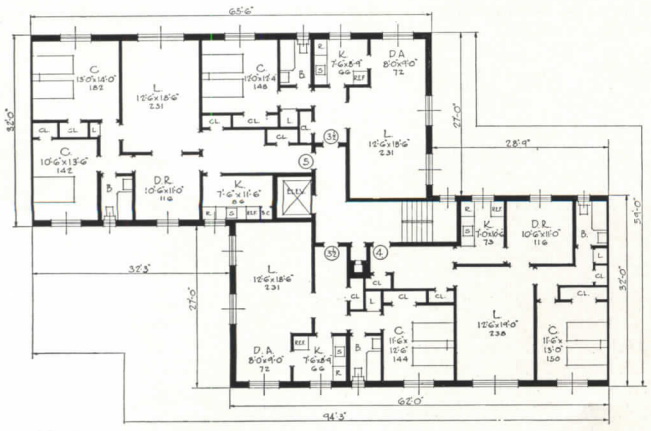
**Tee Units**



"33" — 3, 4, 4 rooms

"33" — 4, 4, 4 rooms

**and Cross Units**



"42" — 3 1/2, 3 1/2, 4, 5 rooms

"42" — 5, 3 1/2, 5, 3 1/2 rooms

# FHA Comparison of Plan Types

IN THE OPINION of FHA, development of desirable apartment plan types has been retarded by the belief that the most economical buildings are those with a large number of apartments grouped around a common set of services (stairs, elevators, incinerators, public corridors, etc.). Studies by the Washington office indicate that the 2S, 3L, and 4Z plans are appropriate for walk-up apartments, the 3L, 4Z, and 4X for elevator apartments, and that more than 4 apartments per floor cannot be justified in the majority of cases. Slight cost savings shown for some plans with more than four apartments per floor must be balanced against the fact that accommodations are inferior. When plans are approved for long-term financing, compromises which might result in slight rent reductions must be considered in relation to possible rapid obsolescence and loss of attraction in a few years. In many cases, the most desirable plans are the most economical.

## Plan types

The accompanying plans for 3-story walk-up apartments are to be regarded as diagrams rather than as examples of the best arrangements for any given plan types. They have been developed to be as closely comparable as possible; but it will be noted that in larger units, standards are more loosely interpreted than in smaller units. In comparing rental variations, it must be kept in mind

that definite compromises have been made on X units. It is impossible to develop complicated plan shapes which contain as desirable apartments as those in the smaller buildings without increasing "waste" space.

Offsetting cost decreases arising from grouping many units around common services, are increases arising from additional area, public corridor, excessive private corridor, and other necessary "waste" space.

All plans have been designed to develop an average apartment size of 3½ rooms. Kitchen and bath equipment are identical in all plans. Average net area per room is 150 sq. ft. for all units except the 5X, 6X, 7X, and 8X, in which room sizes are slightly reduced.

## Costs

Construction and operating costs are figured on the per-room quantity system noted in the tabulation below.

## Rent per room

Construction costs are converted into rent per room by a factor which includes vacancies, debt service, taxes, and all other charges, except those attributable to land (this varies independently of structure). Rent per room arising from operating costs is added to that from construction costs. Resulting total rent is shown on each plan and is expressed in percentages of the lowest rent for any plan type, in this case the Z unit, which is taken as 100%.

Six-story elevator apartments based on the same type of plans result in following rental range:

2S	116.14%	3L	105.83%	3T	109.
4Z	101.64%	4X	106.52%	5X	104.
6X	102.06%	7X	101.47%	8X	100.

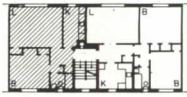
It will be seen that the 2S and 3T are quite expensive. The differences in rent among the other units do not justify the use of the larger units, particularly in view of the increase in desirability. It is important to consider the fact that the 4Z unit requires only 0.0164 more rent than the 8X.

Other studies, based on the same plans with 2 stairs instead of 3, show that the 4Z 3-story walk-up requires only 0.006% more rent and the 4Z 6-story elevator requires only 0.041% more rent than the 8X. In those localities with building codes which require 2 stairs for units with more than a given number of apartments or rooms per floor, it is likely that only the 5X, 6X, 7X, and 8X will require 2 stairs. This situation results in higher rents for these buildings and, consequently, a less favorable balance between them and smaller buildings.

These and similar studies, while not entirely conclusive, have provided a method for the comparative analysis of plan types. Sufficient study has been made to satisfy the FHA that, in general, *the smaller building units with from 2 to 4 apartments per floor should form the basis for further studies.*

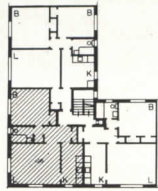
PER ROOM QUANTITIES USED FOR CONSTRUCTION AND OPERATING COST ANALYSIS

PLAN TYPES	2S	3L	3T	4Z	4X	5X	6X	7X	8X
<b>APARTMENT CONSTANTS</b>									
Kitchen	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5
Bath	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5
Miscellaneous	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5	1/3.5
<b>BUILDING CONSTANTS</b>									
Basement	1/7	1/10.5	1/10.5	1/14	1/14	1/17.5	1/21	1/24.5	1/28
Stair	1/7	1/10.5	1/10.5	1/14	1/14	1/17.5	1/21	1/24.5	1/28
Entrance	1/7	1/10.5	1/10.5	1/14	1/14	1/17.5	1/21	1/24.5	1/28
Incinerator	1/7	1/10.5	1/10.5	1/14	1/14	1/17.5	1/21	1/24.5	1/28
Party wall	1/7	1/10.5	1/10.5	1/14	1/14	1/17.5	1/21	1/24.5	1/28
<b>BUILDING VARIABLES</b>									
Apartment area	233.3	224.7	236.1	224.4	236.2	236.2	245.2	239.8	232.2
Public area	0	1.8	2.6	4.0	5.2	10.6	9.0	12.9	15.1
Exterior wall	16.1	15.9	17.0	15.9	17.9	17.1	16.1	16.2	16.1
Stud partition	26.3	24.9	29.7	24.5	27.6	26.2	28.9	27.6	27.7
Block partition	1.5	4.0	3.2	5.3	4.6	5.2	7.3	6.9	7.1
Fire partition	4.8	4.2	4.4	4.0	4.1	5.0	3.8	5.0	4.1



**2-S Type: Rent 107.92%**

Total Gross Area	1634+ Sq. Ft.
Average Net Area per Room	148.5 Sq. Ft.
Percent Efficiency	63.8 %
Public Space per Room	Sq. Ft.
Closet Space	O.K.
Foyer Space	100 %
Kitchen Dining Space	100 %
Separate Dining Space	0 %
Cross Ventilation	100 %
Corner Ventilation	%
Privacy of Exit	100 %
Similar Living Room Orientation	100 %
Pocketed Living Rooms	0 %
Interior Stairs	0 %
Furniture Lay-out	O.K.
Room Loss on First Floor	0



**3-L Type: Rent 101.92%**

Total Gross Area	2291 Sq. Ft.
Average Net Area per Room	151 Sq. Ft.
Percent Efficiency	66 %
Public Space per Room	Sq. Ft.
Closet Space	O.K.
Foyer Space	100 %
Kitchen Dining Space	100 %
Separate Dining Space	0 %
Cross Ventilation	66 %
Corner Ventilation	33 %
Privacy of Exit	66 %
Similar Living Room Orientation	66 %
Pocketed Living Rooms	0 %
Interior Stairs	0 %
Furniture Lay-out	O.K.
Room Loss on First Floor	0



**3-T Type: Rent 106.20%**

Total Gross Area	2440 Sq. Ft.
Average Net Area per Room	152 Sq. Ft.
Percent Efficiency	62.3 %
Public Space per Room	Sq. Ft.
Closet Space	O.K.
Foyer Space	100 %
Kitchen Dining Space	100 %
Separate Dining Space	0 %
Cross Ventilation	100 %
Corner Ventilation	%
Privacy of Exit	66 %
Similar Living Room Orientation	66 %
Pocketed Rooms	1L; 33 %
Interior Stairs	0 %
Furniture Lay-out	O.K.
Room Loss on First Floor	0



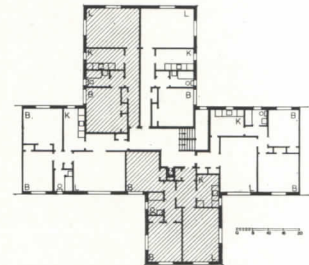
**4-Z Type: Rent 100%**

Total Gross Area	3208 Sq. Ft.
Average Net Area per Room	149+ Sq. Ft.
Percent Efficiency	65.2 %
Public Space per Room	Sq. Ft.
Closet Space	O.K.
Foyer Space	100 %
Kitchen Dining Space	100 %
Separate Dining Space	0 %
Cross Ventilation	50 %
Corner Ventilation	50 %
Privacy of Exit	50 %
Similar Living Room Orientation	50 %
Pocketed Rooms	K; 25 %
Interior Stairs	0 %
Furniture Lay-out	O.K.
Room Loss on First Floor	0



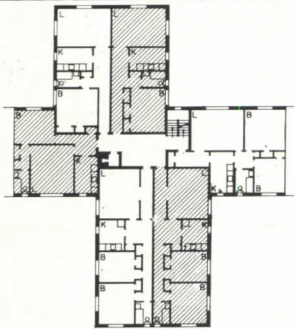
**4-X Type: Rent 105.19%**

Total Gross Area	3381 Sq. Ft.
Average Net Area per Room	149.7 Sq. Ft.
Percent Efficiency	62 %
Public Space per Room	Sq. Ft.
Closet Space	O.K.
Foyer Space	100 %
Kitchen Dining Space	100 %
Separate Dining Space	%
Cross Ventilation	100 %
Corner Ventilation	50 %
Privacy of Exit	50 %
Similar Living Room Orientation	75 %
Pocketed Rooms	2L; 50 %
Interior Stairs	0 %
Furniture Lay-out	O.K.
Room Loss on First Floor	0



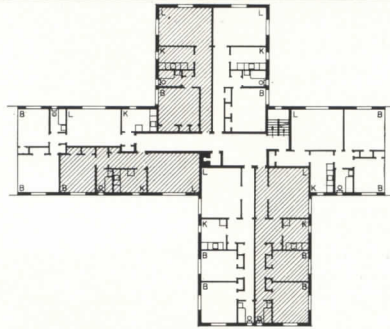
**5-X Type: Rent 104.26%**

Total Gross Area	4215 Sq. Ft.
Average Net Area per Room	144.5 Sq. Ft.
Percent Efficiency	58.2 %
Public Space per Room	Sq. Ft.
Closet Space	O.K.
Foyer Space	100 %
Kitchen Dining Space	100 %
Separate Dining Space	0 %
Cross Ventilation	60 %
Corner Ventilation	40 %
Privacy of Exit	60 %
Similar Living Room Orientation	60 %
Pocketed Rooms	3B; 43 %
Interior Stairs	0 %
Furniture Lay-out	O.K.
Room Loss on First Floor	0



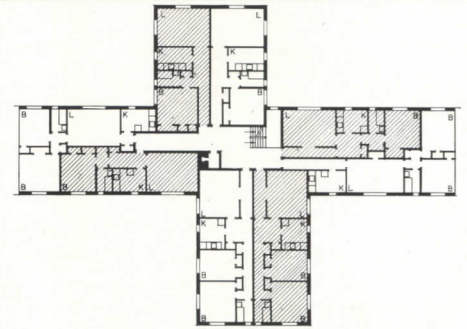
**6-X Type: Rent 102.95%**

Total Gross Area	5340 Sq. Ft.
Average Net Area per Room	149 Sq. Ft.
Percent Efficiency	59.2 %
Public Space per Room	Sq. Ft.
Closet Space	O.K.
Foyer Space	100 %
Kitchen Dining Space	100 %
Separate Dining Space	0 %
Cross Ventilation	33 %
Corner Ventilation	66 %
Privacy of Exit	66 %
Similar Living Room Orientation	50 %
Pocketed Rooms	2B; 2L
Interior Stairs	0 %
Furniture Lay-out	O.K.
Room Loss on First Floor	0



**7-X Type: Rent 103.10%**

Total Gross Area	6270 Sq. Ft.
Average Net Area per Room	148 Sq. Ft.
Percent Efficiency	59.2 %
Public Space per Room	Sq. Ft.
Closet Space	O.K.
Foyer Space	100 %
Kitchen Dining Space	100 %
Separate Dining Space	0 %
Cross Ventilation	28.6 %
Corner Ventilation	57 %
Privacy of Exit	71 %
Similar Living Room Orientation	57 %
Pocketed Rooms	2B; 2L
Interior Stairs	0 %
Furniture Lay-out	O.K.
Room Loss on First Floor	0



**8-X Type: Rent 102.06%**

Total Gross Area	6950 Sq. Ft.
Average Net Area per Room	144 Sq. Ft.
Percent Efficiency	58.2 %
Public Space per Room	Sq. Ft.
Closet Space	O.K.
Foyer Space	100 %
Kitchen Dining Space	100 %
Separate Dining Space	0 %
Cross Ventilation	25 %
Corner Ventilation	50 %
Privacy of Exit	75 %
Similar Living Room Orientation	50 %
Pocketed Rooms	2B; 2L
Interior Stairs	0 %
Furniture Lay-out	O.K.
Room Loss on First Floor	0

Note: With 3L, 3T, 5X and 7X types, another plan of each is averaged in to balance the room count and obtain comparable figures.



## 354 RENTAL UNITS (FHA)

MANHASSET VILLAGE  
ST. LOUIS, MISSOURI

PRESTON J. BRADSHAW, INC.

Architect

### COMPARATIVE ANALYSIS

#### Site

PROJECT OCCUPIES a partly wooded tract totaling 21.44 acres, of which structure coverage totals 11.1%. A superhighway is located nearby; other highways, leading to the city's commercial center, abut the property.

#### Accommodations

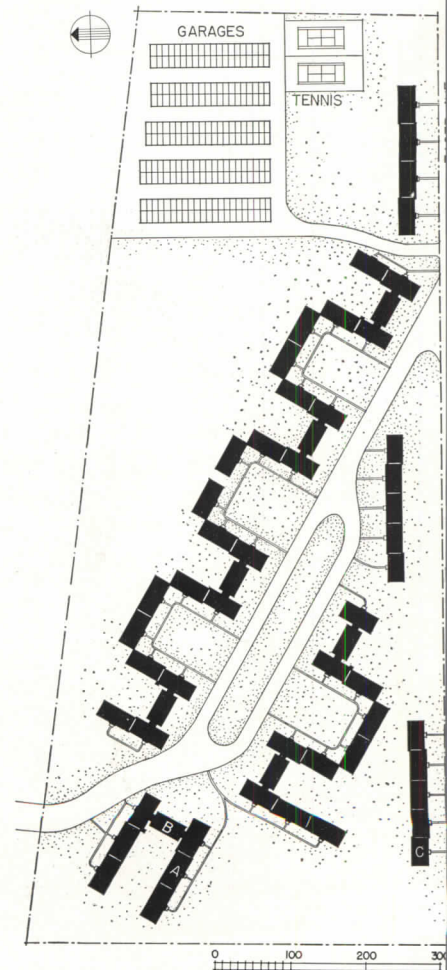
Seven buildings, each a three-story walk-up, include 60 three-room units, the remaining 294 units being four-room type, with two bedrooms. Dwelling rentals account for 94.5% of total income; average room rental is \$15; average rental per family is \$58.79.

#### Supplementary facilities

Numerous indoor play areas as well as fully equipped outdoor playgrounds are provided for children. Garages are grouped on the eastern part of the site with access through a private road. Tennis courts adjoin these units.

#### Cost

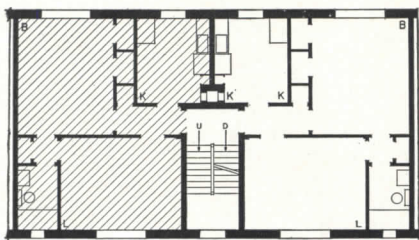
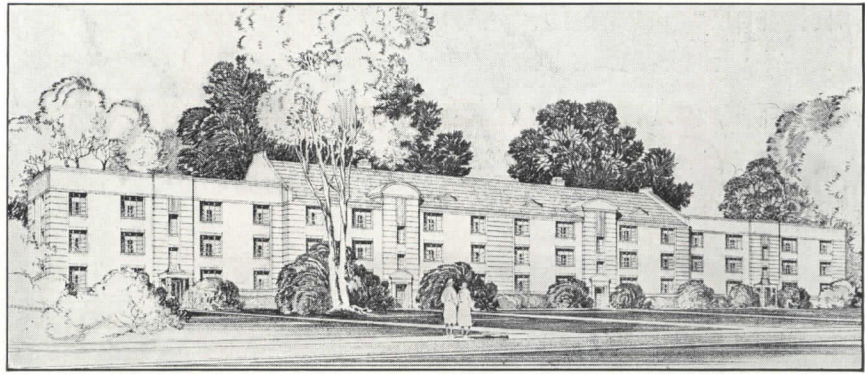
Total capitalization, \$2,016,000; mortgage, \$1,600,000; construction costs, approximately  $33\frac{1}{8}\phi$  per cu. ft.; cost per room, \$1,262; cost per unit, \$4,836.



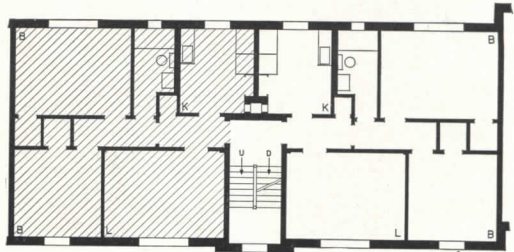
Site Plan

BUILDING  
TYPES

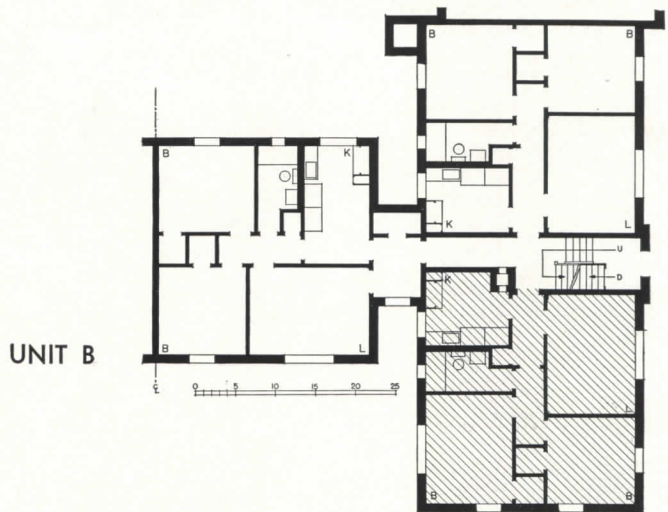




UNIT C



UNIT A



UNIT B

## SCHEDULE OF EQUIPMENT AND MATERIALS

### FOUNDATION

Foundations, concrete; walls, brick; waterproofing, Torch-Bros.

### STRUCTURE

Roofs: Walls, 13 in. (4 1/2-in. brick, 8 1/2-in. concrete); concrete; walls, brick; waterproofing with one coat of Torch-Bros. before plastering

Floors: Wood studs, steel columns and girders to support wood floors, roof and tile floors between apartments

Roofs: Metal pan with terrazzo fill from entry to floor and cement fill from first floor to roof

Roofs: Wood rafters and ceiling joists on steel columns throughout; flat roofs to be 5-ply waterproofing to pitch and gravel 20-year roof; gable roofs to be covered with asbestos

### METALWORK

Roofs, gutters, downspouts, and conductor-rod, 16-oz. copper

### INSULATION

Gable roofs, 4-in. bat-type rock wool insulation; flat roofs, 1-in. thick Celotex

### WINDOWS

Steel sash with screens, Detroit Steel Products Co.; glass, double strength labeled, Libbey-Owens-Ford Glass Co.

### FLOORS

Basement, cement finish, wood floors on concrete, E. L. Bruce Co. block flooring laid in mastic; wood floors on wood joists strip flooring red oak, 13/16 in.; heavy-gauge linoleum in bathrooms and kitchens

### WOODWORK

Trim and exterior doors, Clear Cypress; interior doors, single panel, birch; garage doors, Rol-Top, Kinnear Mfg. Co.

Hardware: Interior and exterior, brass

Painting: Interior, walls two coats of flat wall

paint; trim, three coats of white paint; strip floors waxed. Exterior, woodwork, three coats of white paint, by Vane-Calvert Paint Co.

### PLUMBING

Fixtures by Briggs Mfg. Co.; soil pipes, cast iron by Standard Sanitary Mfg. Co.; water, copper tubing, with soldered fittings; hot-water tank, submerged type with copper coils; laundry dryers

### HEATING

Two-pipe vacuum system; boiler, four low-pressure Pacific Boilers; oil burner; hot-water temperature regulators, Minneapolis-Honeywell Regulator Co.; radiators, American Radiator Co.

### ELECTRICAL

Fixtures, special design by Gross Chandelier Co.

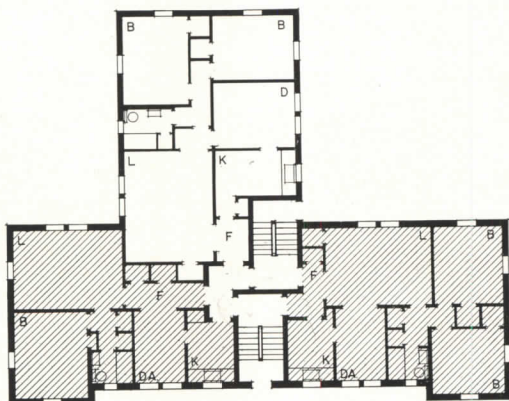
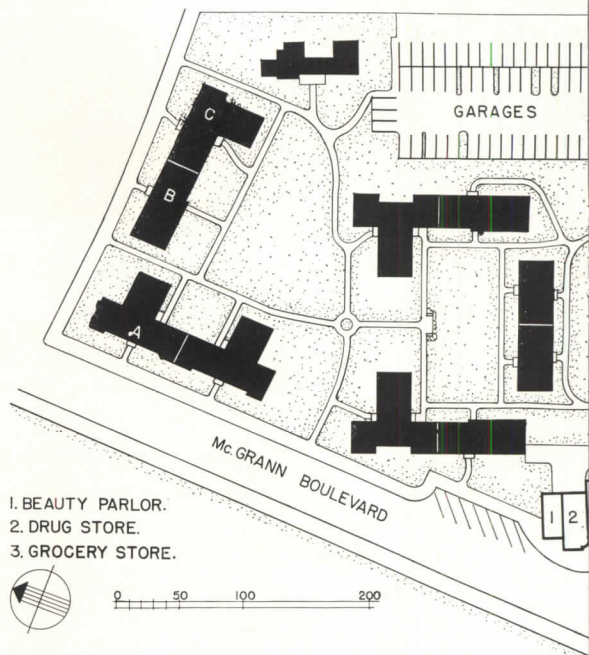
### INCINERATORS

Sargent Building Specialties Co.

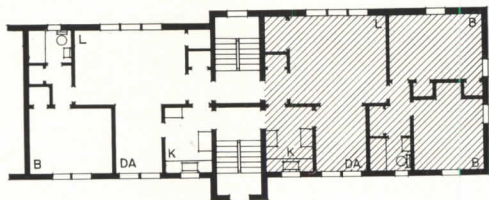
# 58 RENTAL UNITS (FHA)

GRANDVIEW APARTMENTS  
LANCASTER, PENNSYLVANIA

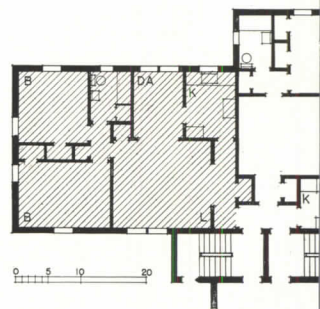
A. R. CLAS ASSOCIATES and FLOYD S. KLINE  
Architects



UNIT A



UNIT B



UNIT C

## COMPARATIVE ANALYSIS

### Site

PROJECT OCCUPIES a tract of 3.40 acres, of which structure coverage totals 17%. It is located in a residential district.

### Accommodations

The 6 apartment and 3 store buildings include 4 three-room units, 28 three-and-one-half-room units, 22 four-and-one-half-room units and 4 five-room units, with a total of 229 rooms. Average area per

room is 112 sq. ft. Dwelling rentals account for 60% of total income; average room rental is \$12.40; average rental per family is \$50.

### Supplementary facilities

Garages and stores.

### Costs

Estimated costs are: 28¢ per cu. ft.; \$830 per room; total contract cost not available; capital valuation, \$316,000; mortgage, \$250,000.

## SCHEDULE OF EQUIPMENT AND MATERIALS

### STRUCTURE

**Frame:** Masonry bearing

### EXTERIOR

**Walls:** Solid brick, furred on inside

**Roof:** Wood frame; slate finish, with copper flashings, gutters, and downspouts

**Windows:** Wood, double-hung, full-length screened

**Insulation:** Rock wool between ceiling rafters

**Calking:** All exterior doors and windows calked

**Waterproofing:** All exterior basement walls below grade to be waterproofed

### INTERIOR

**Floors:** Basement and garages, concrete; wood framing throughout, except for fireproof stair tower, which is metal or concrete; apartments, oak; kitchens, linoleum; store group, asphalt tile finish; bathrooms, ceramic tile, with tile wainscot 6 ft. high around tubs and 4 ft. high in other portions of the room

**Walls:** Gypsum plaster on wood lath or sound-deadening composition boards

**Ceilings:** Gypsum plaster on wood lath; under occupied areas, gypsum plaster on sound-deadening composition boards

**Doors:** Apartments and fireproof stairs, Kalamain

**Interior trim:** Combination steel buck trim

### EQUIPMENT

**Kitchen:** Electric stoves and refrigerator cabinets, work tables and shelves, combination sink and laundry tray

**Venetian Blinds:** For all apartment windows

**Heating:** Apartments and store group pressure steam from a central heating plant located in the basement of apartment A; plant to be mechanically fired, either oil or coal

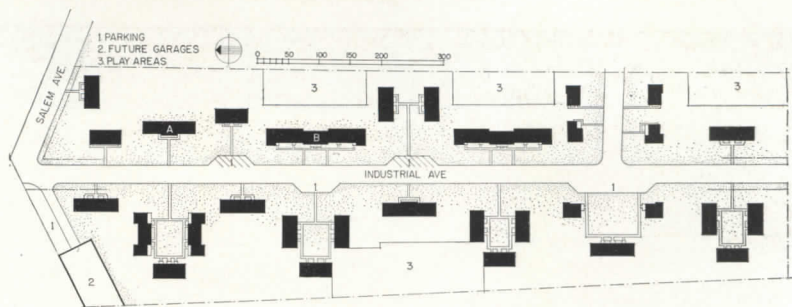
**Plumbing:** Fixtures, enameled iron, lead trays in all basements

BUILDING  
TYPES

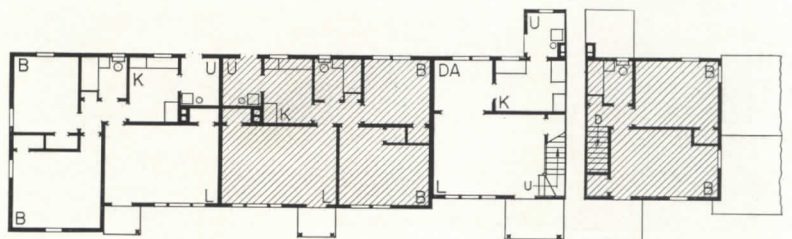
## 2 RENTAL UNITS (FHA)

ONT ROYAL GARDENS  
ONT ROYAL, VIRGINIA

R. CLAS ASSOCIATES  
hitects

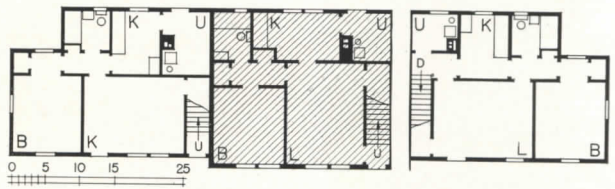


Site plan



UNIT B, part of first floor

Part of second floor



UNIT A, part of first floor

Part of second floor

### PARATIVE ANALYSIS

ECT OCCUPIES a tract of 12.04 acres, of which  
ure coverage totals 10%. It is located in an  
trial district.

#### Accommodations

31 buildings include 68 three-room units,  
ur-room units, 26 four-and-one-half-room units,  
2 five-room units, with a total of 395 rooms.  
age area per room is 116 sq. ft. Dwelling

rentals account for 100% of total income; average  
room rental is \$8.10; average rental per family  
is \$28.75.

#### Supplementary facilities

Garden plots and playgrounds.

#### Costs

Estimated costs are: 24¢ per cubic foot; \$530 per  
room; total contract cost not available. Capitalized  
valuation, \$334,000; mortgage, \$260,000.

### SCHEDULE OF MATERIALS AND EQUIPMENT

#### FOUNDATION

ate  
TURE

#### ROOF

Wood 2 x 4's covered with wood sub-  
paper and cedar grain asbestos siding

Frame construction, asbestos cedar  
shingles or wood shingles, copper flash-  
cutters, and downspouts

on: All spaces between ceiling rafters

are insulated with 3 5/8-in. rock wool, and all  
attic spaces are ventilated

**Doors:** Full-length screens; entrance doors  
weatherstripped

**Windows:** Full-length screens; glazed with  
single-strength "A" quality flat-drawn window  
glass

#### INTERIOR

**Floors:** Kitchens, linoleum; bathrooms, lino-  
leum; utility rooms, cement; all other floors,  
asphalt tile; first floor over 4-in. cinder con-  
crete fill

**Walls:** Sheet rock or other plasterboard

Painted; bathrooms, "Sanitas" wainscot 4 ft.  
high, with 2 1/2-in. molded wood strip at the  
top

#### EQUIPMENT

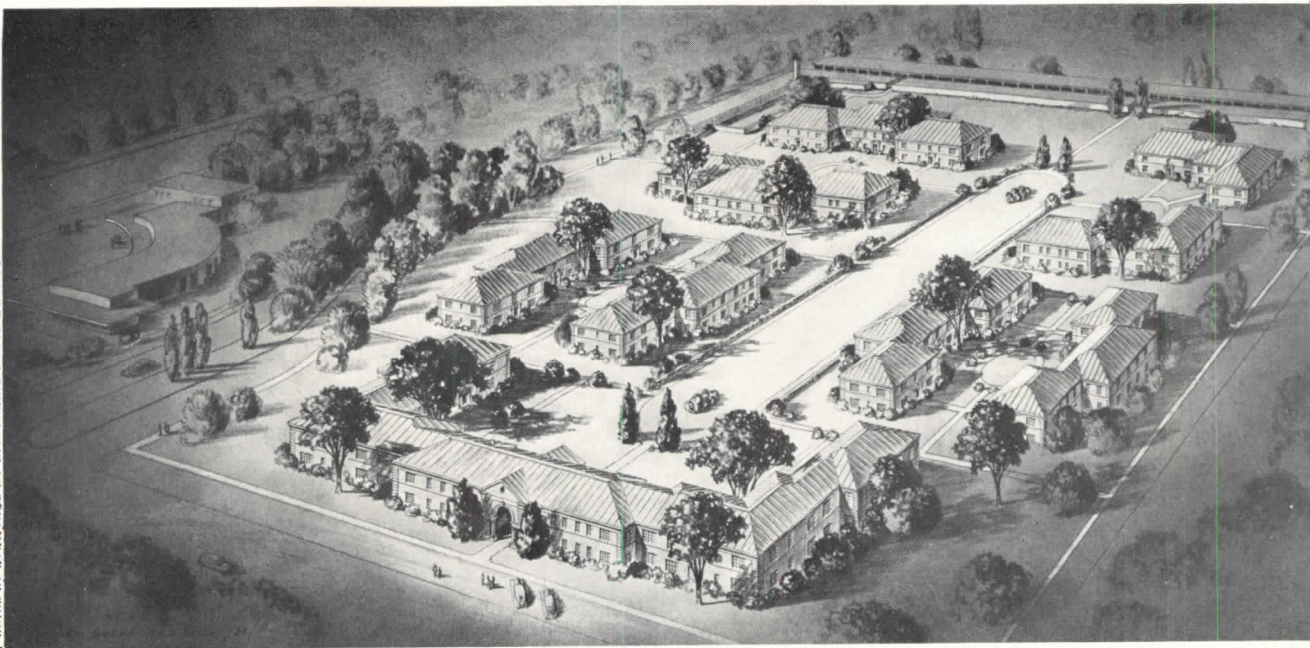
**Heating:** Hot-air heating systems, either oil-  
or coal-fired; hot-water heater

**Plumbing:** Fixtures, enameled iron; combina-  
tion sink and laundry trays; concrete septic  
tanks for each unit or group of units

**Piping:** Water piping, either copper tubing,  
genuine wrought iron, or red brass

**Kitchens:** Shelves, cabinets, and work tables

Photos of drawings by Merchants Photo Service



## 128 RENTAL UNITS (FHA)

RIVER OAKS GARDENS  
HOUSTON, TEXAS

FOOSHEE & CH  
Archit

### COMPARATIVE ANALYSIS

#### Site

PROJECT OCCUPIES a tract of 8.72 acres adjacent to preferred residential zones and about 3 miles from the city center.

#### Accommodations

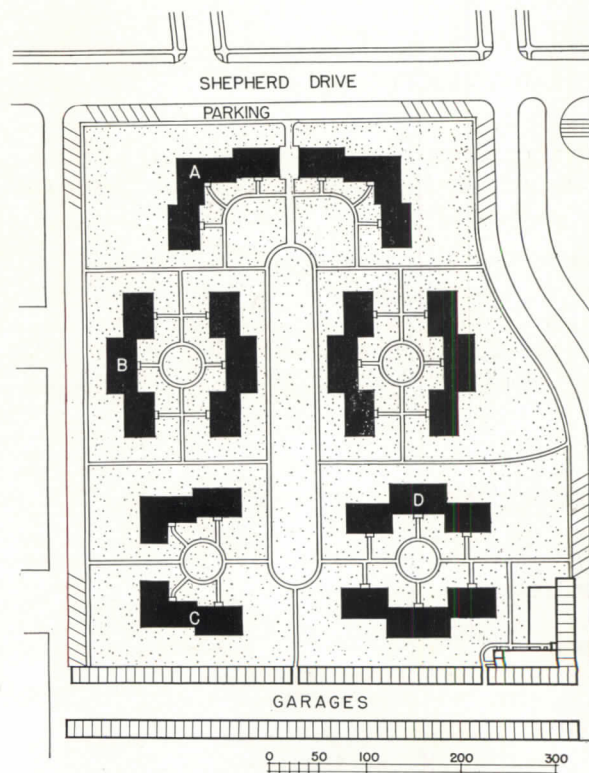
The 9 fireproof structures, each a 2-story walk-up, include 445 rooms, and units of from 2½ to 5 rooms. Dwelling rentals account for 92.7% of total income; average room rental is \$17; average rental per family is \$56.46.

#### Supplementary facilities

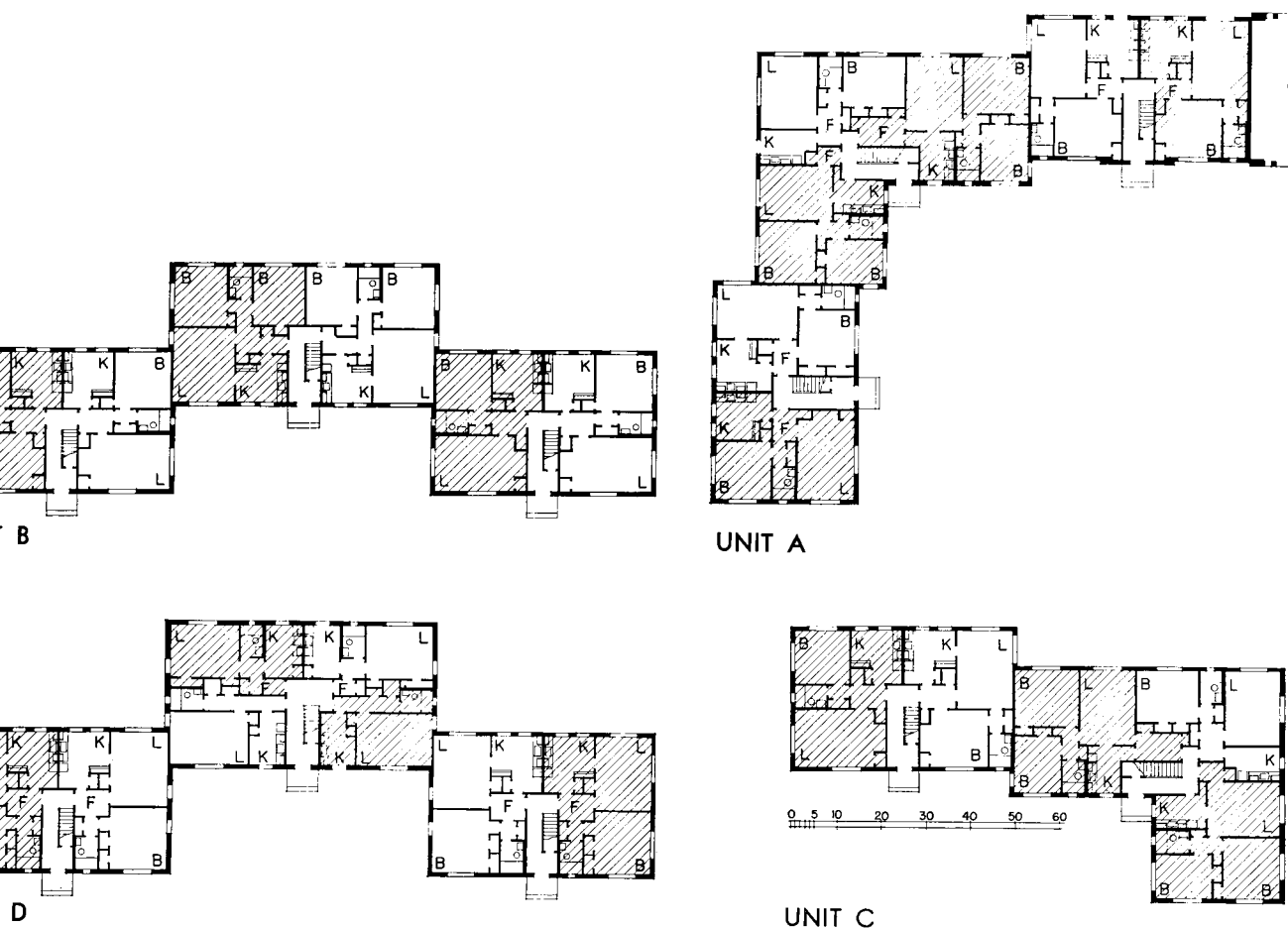
Transportation, recreational and school facilities are nearby. Laundry facilities are provided, including drying equipment for which the tenant pays a small fee. Garages as well as garage service is provided; in addition, there is a parking slab for day-time parking.

#### Costs

Total capitalization, \$800,000; amount of mortgage, \$585,000.



Site Plan

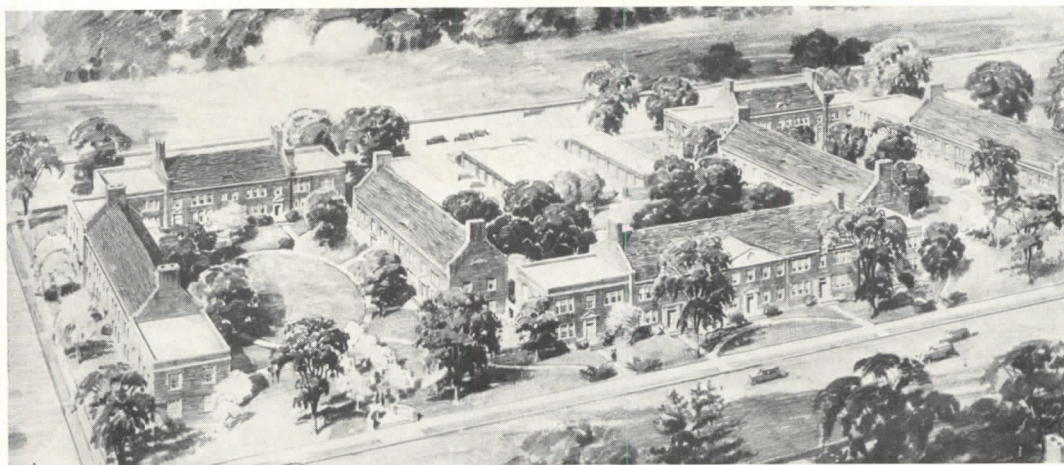


**SCHEDULE OF EQUIPMENT AND MATERIALS**

**FOUNDATION**  
 Concrete  
**STRUCTURE**  
 Steel frame, Great Lakes Steel Corp.  
**EXTERIOR**  
 Brick veneer; Bar-Z studs; Bar-X metal  
 Galvanized metal, painted  
 Casement, Fenestra steel; bronze screens

**INSULATION:** Rock wool insulation in attic, Johns-Manville  
**TRIM:** Metal  
**INTERIOR**  
**Walls:** Gypsum plaster; bathrooms, tile  
**Doors:** Huffig  
**Floors:** Beech, laid over concrete slabs and subfloor  
**Stairs:** Steel with concrete treads, rubber tile covering

**EQUIPMENT**  
**Plumbing:** Fixtures, Kohler Co.  
**Heating:** Floor heaters and consoles, Payne; day and night water heaters  
**Ventilation:** Attic ventilating fans; kitchen exhaust fans  
**Kitchens:** Cabinets, metal, Briggs Beauty Ware; refrigerators, Frigidaire; cooking ranges, gas, Detroit Jewel  
**Shades:** Venetian blinds



## 70 RENTAL UNITS (FHA)

WATERVIEW APARTMENTS  
PORTSMOUTH, VIRGINIA

A. MITCHELL WOOTEN  
Architect  
JOHN J. ROWLAND, Associate

### COMPARATIVE ANALYSIS

#### Site

2.98 acres, of which structure coverage is 19.8% of total; located in preferred residential zone near bus route to city center.

#### Accommodations

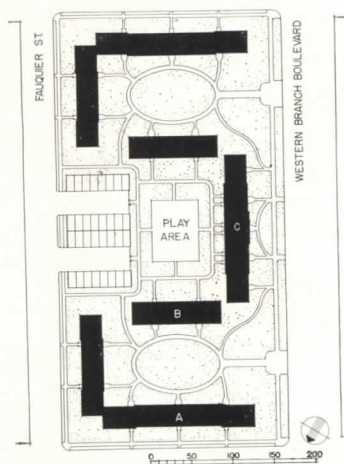
The seven 2-story walk-ups include 246 rooms, average rental unit being 3.5 rooms. The dwelling units represent 95.2% of property income; average room rental is \$13.02; average unit rental is \$45.75.

#### Supplementary facilities

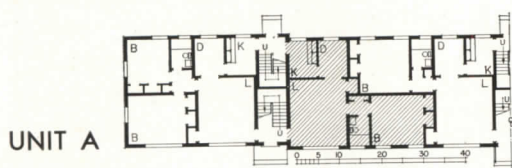
A reasonably inexpensive country club is nearby, a shopping center across the street. For autos there are 32 garages.

#### Cost

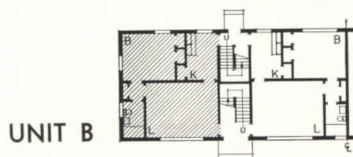
Construction cost, approximately 37¢ per cu. ft., including garages and landscaping; total cost, \$300,000; mortgage, \$240,000.



Site Plan

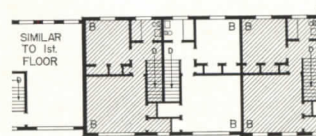


UNIT A

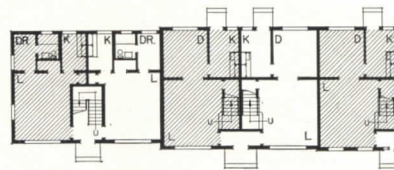


UNIT B

Second Floor  
UNIT C



First Floor  
UNIT C



### SCHEDULE OF EQUIPMENT AND MATERIALS

#### FOUNDATION

Concrete basement and footings, brick foundations and piers

#### STRUCTURE

Brick bearing walls, wood joists and studs

#### EXTERIOR

Selected common brick; cast-stone coping and chimney caps

Entrance details, cornices, etc., of cypress painted white, "Dutch Boy" lead and oil

**Windows:** Double-hung wood, and steel basement sash, Detroit Steel Products Co.

**Roof:** Asbestos shingles, American method Johns-Manville; decks, built-up composition, Barrett Specification AA; flashing, counter-flashing and downspouts, 16-oz. copper

#### INTERIOR

**Walls:** Hard-finished plaster painted or papered, U. S. Gypsum Co. "Texolite"

**Floors:** Oak; kitchen and bathroom floors and walls, Sealex linoleum

**Painting:** Woodwork, Moore's Dulopake coats; one coat Moore's Persian high

#### EQUIPMENT

**Plumbing:** Fixtures, Crane Co.

**Heating:** Boilers, American Radiator Co.

**Ventilating:** Ventilators, Kernchen Siph type

**Glazing:** Libbey-Owens-Ford

**Kitchen:** Ranges, Magic-Chef; refrige Electrolux; cabinets, sinks, etc., Whit Metal Products Co.



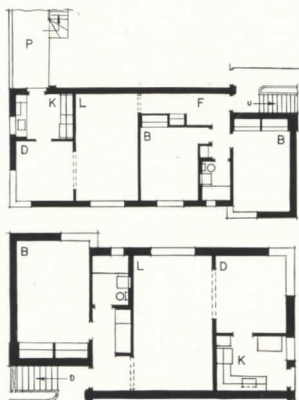
## 5-UNIT URBAN DEVELOPMENT (FHA)

TITUSVILLE GARDEN APARTMENTS  
CHICAGO, ILLINOIS

RISSMAN & HIRSCHFELD  
Architects



Plan



Buildings shown in the plot plan (left) cover 42% of the site's 137,808 sq. ft. of area. Each building contains 14 dwelling units, the total being divided into 6 three-room, 128 four-room, and 62 five-room apartments. Typical unit plans are also shown at left.

### SCHEDULE OF EQUIPMENT AND MATERIALS

#### FOUNDATION

12-in. concrete to grade; continuous

#### STRUCTURE

bearing masonry

#### FLOOR

Grade to first floor, face brick, com-  
brick backing; face brick, Howard Matz  
Co.; first floor to roof, face brick veneer,  
Haydite Co.

5-ply asphalt and gravel, Barrett Co.

**Metal:** Through-wall 16-oz. copper flash-  
"Anaconda"; skylights, 24-gauge gal-  
d iron, "Toncan"

**Insulation:** 4-in. mineral wool in ceiling joists,  
Ceci-Celadon Co.

**Windows:** Metal casements and screens, me-  
tal operators, Ceco Steel Products Corp.

**Trim:** Stone copings and entrances, Indiana  
limestone

#### INTERIOR

**Walls:** Wood studs, rock lath; Monarch gyp-  
sum lath plaster, Wasem Fibred and Tiger  
white rock finish

**Floors:** Wood joists, concrete slabs over vesti-  
bules and stairhall landings

**Doors:** Rezo, Paine Lumber Co., Ltd.

**Frames:** Coleman Fireproof Door Co.

**Stairs:** Metal-pan type, General Bronze Corp.;  
metal risers and stringers, terrazzo filled treads  
and landings for main stairs; cement for  
service stairs

#### HEATING

Central plant, force-flo hot-water type; boil-  
ers, Titusville Iron Works; fuel, coal; under-  
feed stokers, Link Belt Co.; radiators, con-  
cealed copper convectors, metal fronts, Trane  
Co.; coal conveyor, Chicago Tramrail Co.

#### EQUIPMENT

**Hardware:** Segal Lock Co. and Earle Hard-  
ware Mfg. Co.

**Electrical:** Thin wall conduit, "Electrinite"  
metallic tubing; outlet boxes, flush toggle-  
type switches and rubber insulated wire,  
Pass & Seymour, Inc.; fixtures, porcelain direct  
and enclosed direct, Metropolitan Electrical  
Supply Co.

**Cabinets:** Kitchen, steel, St. Charles Mfg.  
Co.; bathroom, metal, American Enameled  
Products Co.

**Refrigerators:** Gas, Servel Electrolux

**Ranges:** Gas, Eaton Universal

**Sinks:** Crane Co.

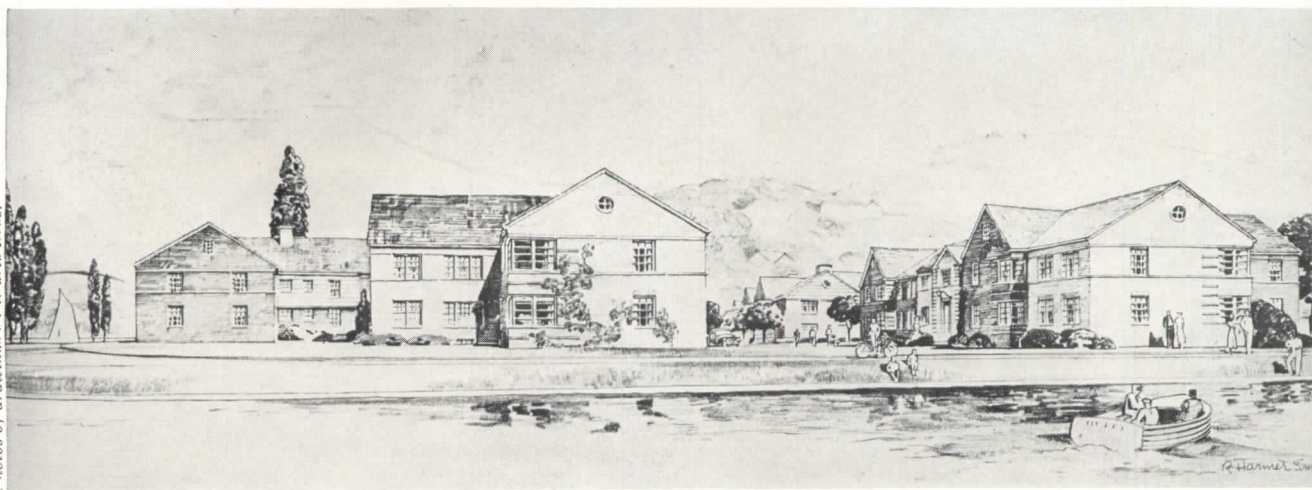
**Fixtures:** Bathroom, Crane Co.

**Incinerator:** Midwest Incinerator Co.

**Plumbing:** Cast-iron pipe, Alabama Pipe Co.;  
laundry trays, Crane Co.

**Mail Boxes:** S. H. Couch Co.

**Tile Wainscoting:** Architectural Tile Co.



## 304 RENTAL UNITS (FHA)

MADISON PARK HOUSING CORP.  
SEATTLE, WASHINGTON

GRAHAM & PAINE  
Architects

### COMPARATIVE ANALYSIS

#### Site

PROJECT OCCUPIES a lakefront of 11.68 acres of which structure coverage totals 24.67%. It is located in an established residential district approximately 20 minutes by street-car transportation from the city center.

#### Accommodations

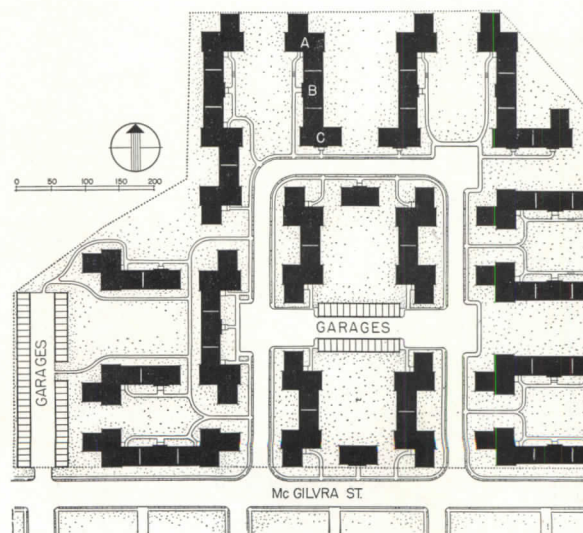
The 18 buildings, each a two-story walk-up, include 184 three-room units and 120 four-room units with a total of 1032 rooms. Average area per room is 249 sq. ft. Dwelling rentals account for 96.7% of total income; average room rental is \$14.50; average rental per family is \$49.22.

#### Supplementary facilities

Swimming and boating are provided by the 1,200 ft. of shore line boundary. Gardens and outdoor recreation areas are liberally included and 75 garages are also available to tenants.

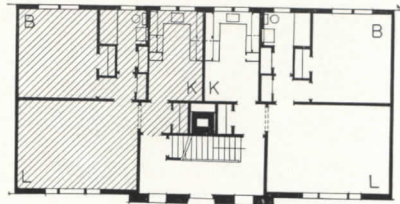
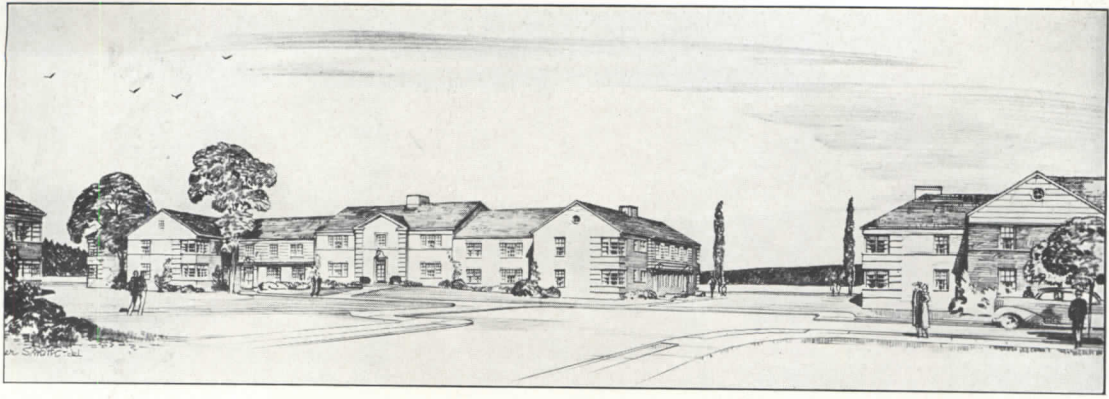
#### Costs

Contract costs are: 28½¢ per cubic foot; \$970 per room; total contract cost, \$1,050,000, including landscaping and utilities. Capitalized valuation \$1,360,000, mortgage \$1,080,000.



Site Plan

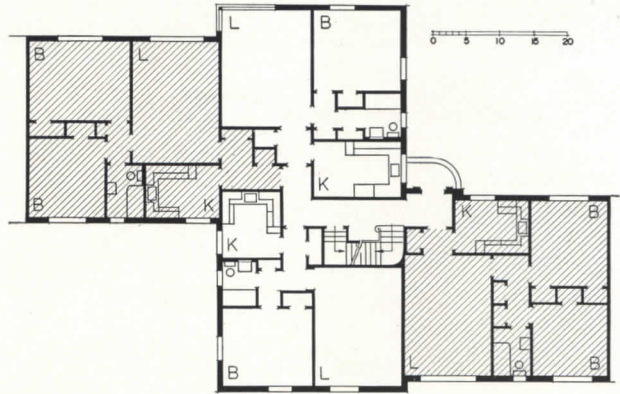




UNIT B



UNIT A



UNIT C

**SCHEDULE OF EQUIPMENT AND MATERIALS**

**FOUNDATION**  
 9-in. concrete, continuous spread foot-  
 ings, concrete slab on gravel fill;  
 waterproofing, A. C. Horn Co.

**STRUCTURE**  
 exterior walls, brick veneer on 3/4-in. sheathing  
 over 2-in. studs; brick, Seattle Brick & Tile  
 Co.; interior walls, plaster and shiplap  
 over 2-in. studs; floor construction, shiplap laid  
 diagonally over straight grained joists; all  
 lumber, Weyerhaeuser Timber Co.

**ROOFING**  
 rafters covered with 3/4-in. sheathing,  
 covered with pre-dipped cedar shingles; West  
 Stained Shingle Co.

**ROOF METALWORK**  
 gutters, and downspouts, 16-gauge  
 galvanized steel, Chase Brass & Copper Co., Inc.

**INSULATION**  
 between apartments—Balsam Wool, Wood  
 Conservation Co.; over boiler rooms—rock wool  
 insulation; Sash—mill-made; glass, double-

strength, Quality B; Libbey-Owens-Ford Glass  
 Co.

**FLOORS**  
 First-floor stair halls, asphalt tile, Thomas  
 Moulding Floor Manufacturing Co.; second-  
 floor stair halls, living rooms, bedrooms, and  
 halls—clear red oak, 13/16 in.; kitchens, fir  
 covered with linoleum; oak floors, E. L. Bruce  
 Co.; bathrooms, ceramic tile, Gladding Mc-  
 Bean Co.

**WALLS**  
 Living rooms, bedrooms, kitchens, and apart-  
 ment halls 1/2-in. gypsum wallboard, National  
 Gypsum Co.; bathrooms, Keene's cement,  
 Best Bros. Keene's Cement Co.; public halls  
 and stairways, plaster, on plasterboard, U. S.  
 Gypsum Co.

**Woodwork:** Trim, shelving, and doors—select  
 fir

**Hardware:** Russwin, Russell & Erwin Mfg. Co.

**PAINTING**  
 Exterior: Brickwork, brick paint; woodwork and  
 trim—lead and oil paint

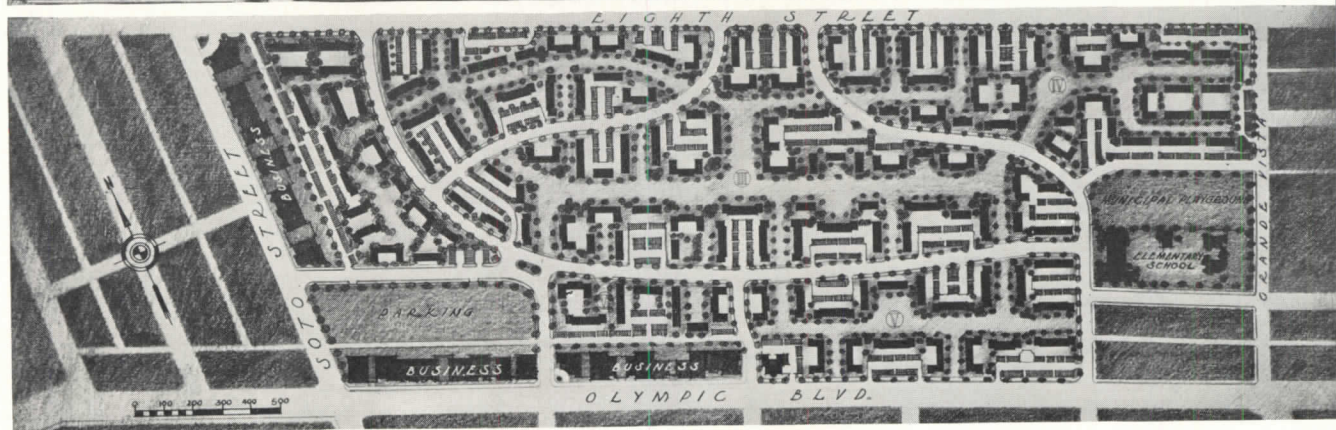
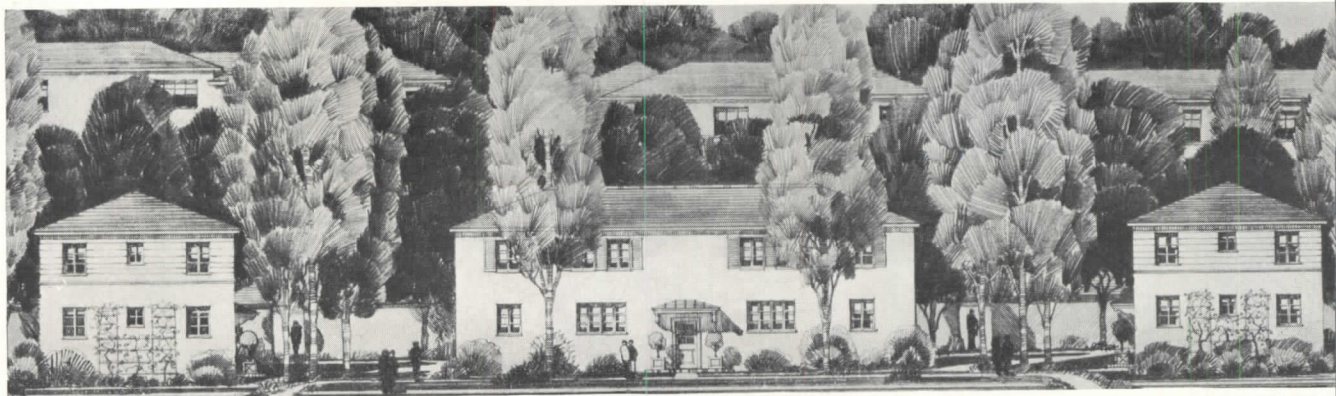
Interior (except kitchens and bathrooms):  
 Walls, casein paint; lead and oil paint; inter-  
 ior trim, kitchens and bathrooms, enamel;  
 walls, enamel

**ELECTRICAL**  
 Wiring system, knob and tube; wire, General  
 Cable Co.; door bells, Edwards Co.

**EQUIPMENT**  
 Ranges, electric, Westinghouse Electric &  
 Mfg. Co.; refrigerators, electric, Norge Divi-  
 sion, Borg-Warner Corp.; medicine cabinets,  
 Philip Carey Co.

**PLUMBING**  
 Pipes, cast iron, Walworth Co.; wrought iron  
 and steel, Wheeling Steel Corp.; valves, Wal-  
 worth Co.; fixtures by Kohler Co.

**HEATING**  
 Hot-water system, boiler, Birchfield Boiler Co.;  
 fuel, oil, rotating cup burner; automatic com-  
 bination control, Lawler Automatic Controls  
 Inc.; radiators, convector-type, Trane Co.;  
 radiator valves, Detroit Lubricator Co.



## 1,102 RENTAL UNITS (FHA)

WYVERNWOOD  
LOS ANGELES, CALIFORNIA

DAVID J. WITMER, FA  
LOYALL F. WATSON, A  
Archite

### COMPARATIVE ANALYSIS

#### Site

THE PROJECT occupies a rolling tract of approximately 72.7 acres, of which structure coverage, including garages, totals 20.4%. It is located in a residential district.

#### Accommodations

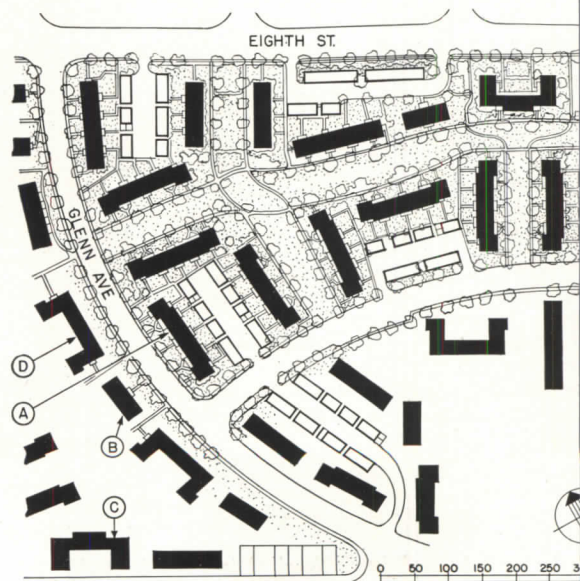
The 35 buildings include 420 three-room units; 512 four-and-a-half and five-room units in 6- and 8-family buildings; 96 four-and-a-half-room units in 4-family buildings; 74 six-room units in 6- and 8-family buildings; total of habitable rooms is 4,440. The average estimated room rental is: for three-room units, \$9.83; for four- to five-room units, \$7.79; for six-room units, \$7.66; average family rental is \$29.50, \$37, or \$46, depending on unit size.

#### Supplementary facilities

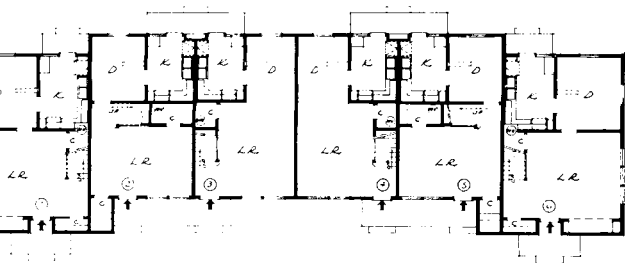
The development will contain shops and markets located on peripheral thoroughfares; play areas; and 114 garages so disposed in compounds that each car space is within 50 ft. of the dwelling unit it serves.

#### Cost

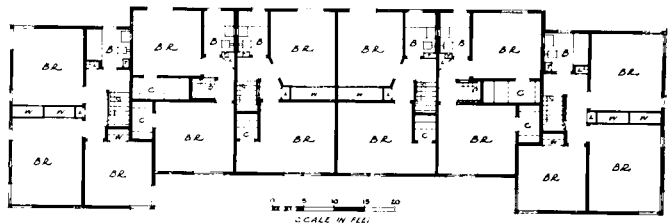
Estimated costs are: \$620 per room; total contract cost, exclusive of land and adjoining commercial improvements, \$2,960,500.



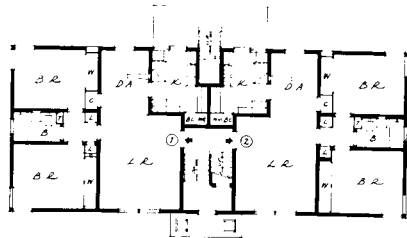
Site Plan: Part of Block II as shown above



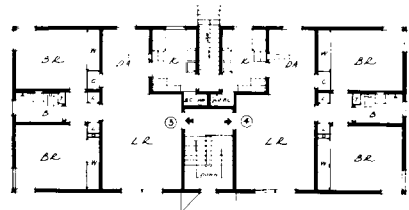
UNIT A, First Floor



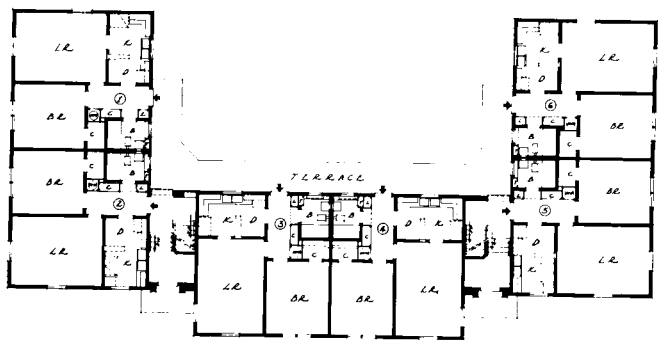
Second Floor



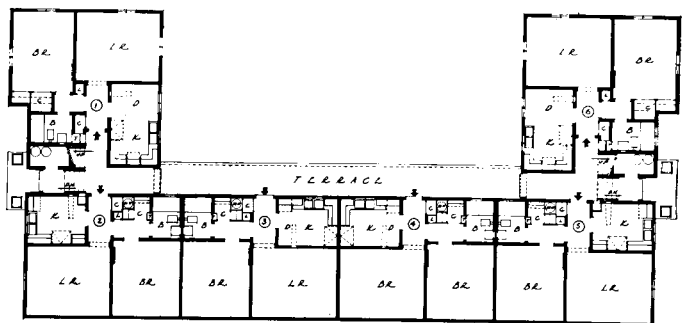
UNIT B, First Floor



Second Floor



UNIT C



UNIT D

**SCHEDULE OF EQUIPMENT AND MATERIALS**

**FOUNDATION**  
 Concrete  
**STRUCTURE**  
 Douglas fir; sills, redwood and oak  
**INTERIOR**  
 Cement plaster, colored stucco finish  
 Sisalkraft or Brownskin Hexmesh, hog-  
 or Weldweave stucco netting; some red-  
 siding  
 "Perfect" red cedar shingles or San  
 shingle tile  
**Work:** Valleys, gutters, downspouts, flash-  
 galvanized iron, Armco or Toncan  
 Sugar pine; frame, vertical grain  
 Douglas fir  
**Windows:** Sash, sugar pine; frames, vertical  
 Douglas fir  
**Steps and terraces:** Cement

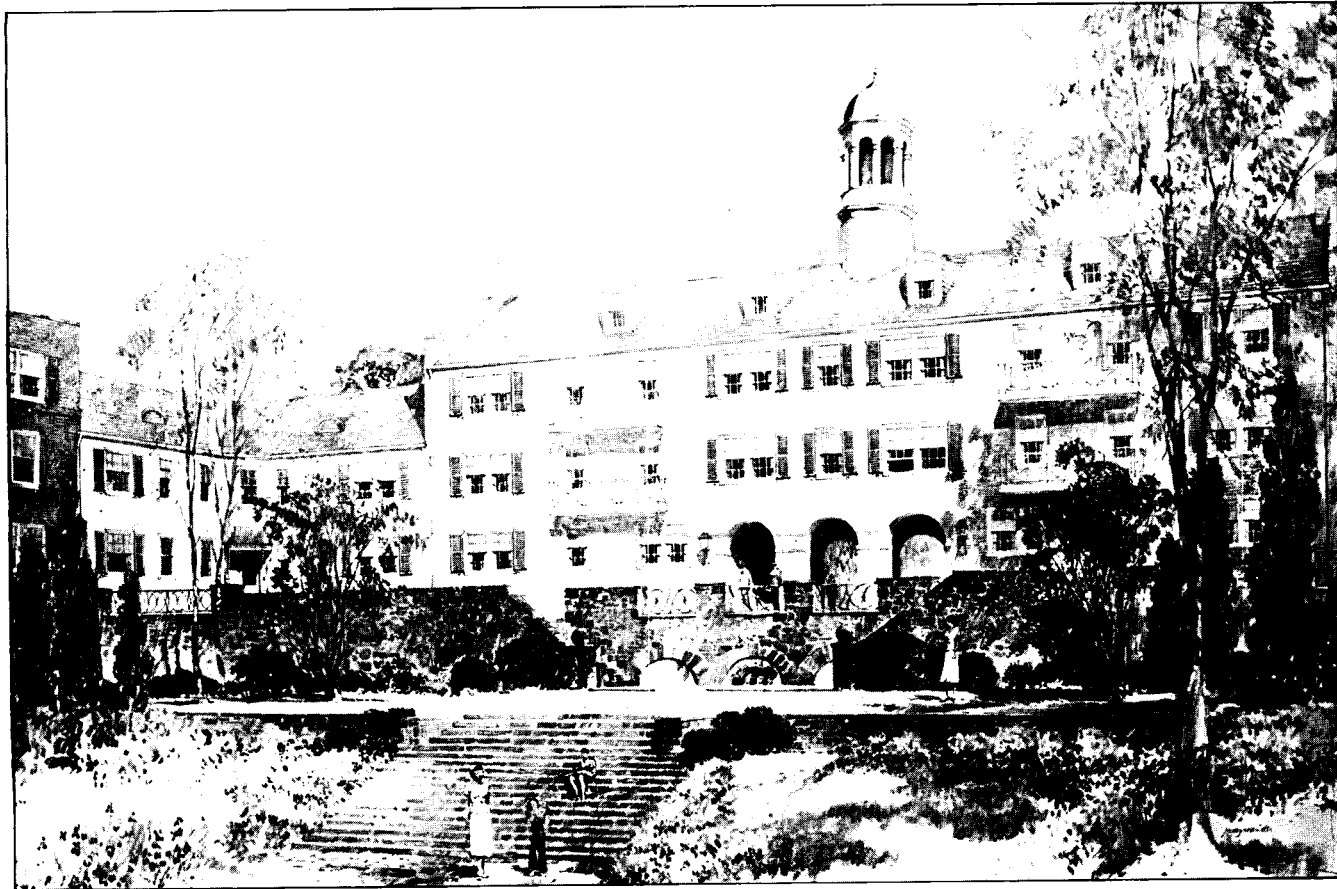
**Insulation:** Ceilings, Palcowool, Zonolite, or  
 rock wool; floors, Celotex or Insulite; walls,  
 Celotex or Insulite  
**Paint:** Shingles, Cabot's or Creodipt; siding,  
 trim and sash, lead, oil and zinc paint, or  
 Cabot's double white

**INTERIOR**  
**Floors:** No. 1 common oak; painted surfaces,  
 vertical grain Douglas fir; bathroom and  
 kitchen floors, Armstrong or Sealex linoleum  
**Walls:** Plaster board lath, Arden or Empire  
 plaster; finish, California Mission; bathrooms  
 and kitchens, painted  
**Ceilings:** Bathrooms and kitchens, painted  
**Trim:** Doors, sash, enamel finish with Vitralite

**EQUIPMENT**  
**Glass:** Libbey-Owens-Ford or Pittsburgh Plate  
 Glass Co.

**Electric wiring:** "Steeltube" or galvanized flex-  
 ible metal conduit  
**Switches:** Westinghouse, Bryant, or H. & H.  
**Electric fixtures:** To be selected; lighting,  
 direct  
**Plumbing:** Crane or Standard fixtures; piping,  
 cast-iron, steel, Durolite, Crane Co., National  
 Tube Co.  
**Ranges and refrigerators:** To be selected  
**Heating:** Gas, vented floor furnaces or vented  
 wall furnaces, Payne, Ward, or Pacific  
**Hot-water heater:** Electric; to be selected  
**Hardware:** Interior and exterior: Sargent, Cor-  
 bin, Yale  
**Screens:** Wood frames, galvanized wire mesh  
**Weatherstripping:** Chamberlain, Majestic

**Note:** Final contracts for selection of some  
 equipment and materials not yet approved



## 380 RENTAL UNITS (FHA)

RAYMOND C. SNOOK  
Architect

OLENTANGY VILLAGE  
COLUMBUS, OHIO

### COMPARATIVE ANALYSIS

#### Site

PROJECT OCCUPIES a riverfront tract of 28.7 acres, of which structure coverage is only 9.5% of the total area.

#### Accommodations

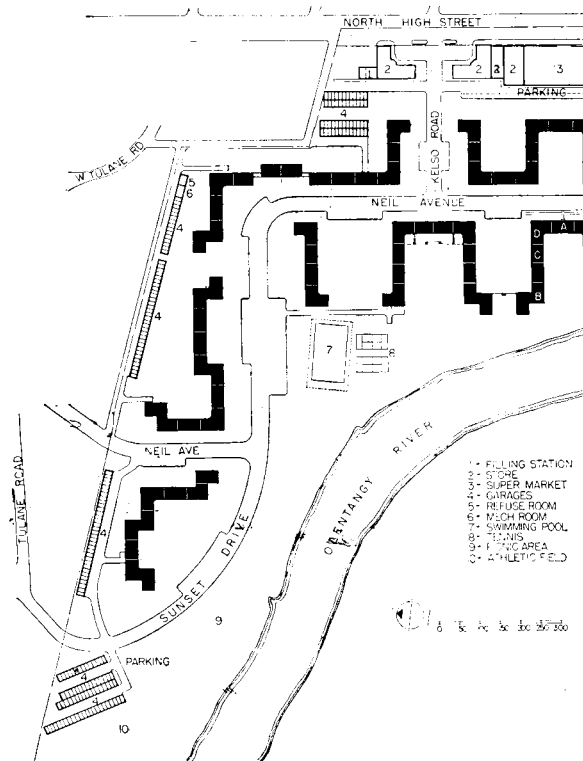
The 58 buildings, combinations of 2- and 3-story walk-ups, include a total of 1,374 rooms. Dwelling rentals account for 91.3% of total income; average room rental is \$14.50; average rental per family unit is \$50.98.

#### Supplementary facilities

In addition to usual gardens and playgrounds, recreational areas include tennis courts, athletic field, and a pool. The river bank is developed for swimming and boating. Tenants have available 198 garages located conveniently to the various units and approaches. A portion of the plot is utilized for commercial occupancy. This area, of about 39,000 sq. ft., contains a gasoline and service station as well as a variety of shops and a supermarket.

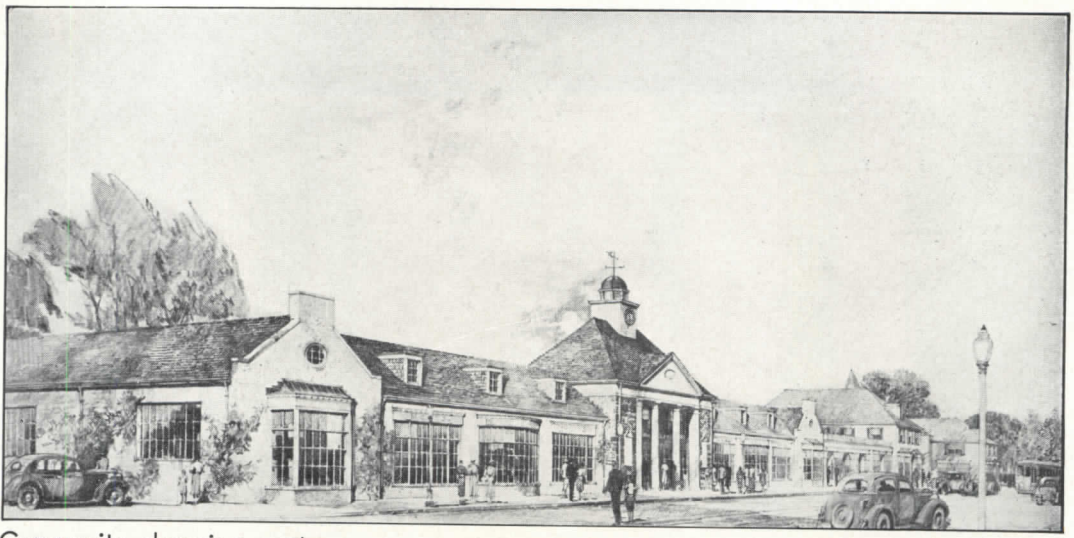
#### Costs

Total capitalization. \$2,027,000; mortgage, \$1,600,000.

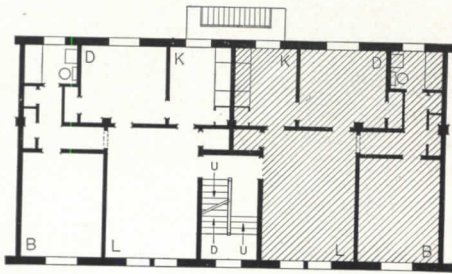


Site Plan

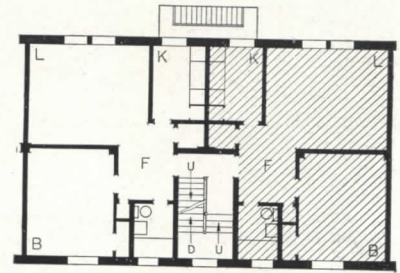
BUILDING  
TYPES



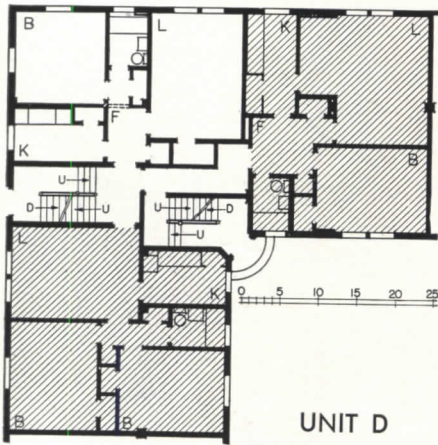
Community shopping center



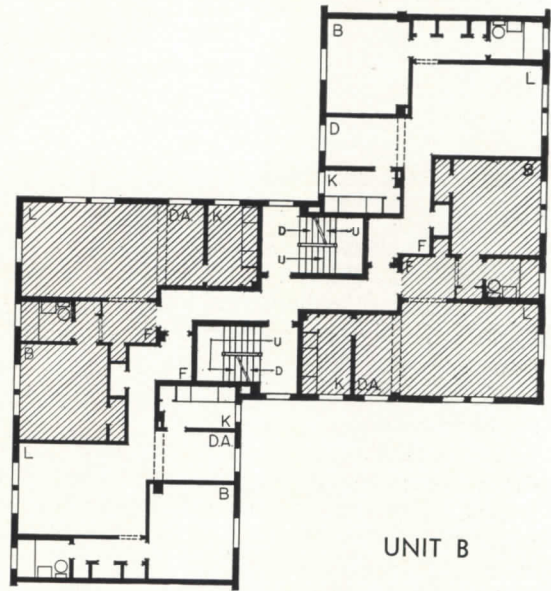
UNIT A



UNIT C



UNIT D



UNIT B

**SCHEDULE OF EQUIPMENT AND MATERIALS**

**FOUNDATION**  
 brick walls

**STRUCTURE**  
 reinforced concrete columns and floors

**EXTERIOR**  
 Brick face, soft red color in some por-  
 white painted in others; Indiana lime-  
 trim; brick back-up

**FLOORING**  
 Ludowici tile, Williamsburg pattern

**WINDOWS:** Wood frames and sash, limestone  
 sills

**INTERIOR**  
**Walls:** 3-in. tile interior partitions, 6-in. tile  
 around all stair enclosures, all plastered  
**Floors:** Bruce oak flooring, 6 x 6 in., "Ara-  
 besque" pattern  
**Doors:** 6-panel pine doors with Aetna steel  
 bucks throughout  
**Ceilings:** Rough slab, plastic oil paint

**EQUIPMENT**  
**Heating:** 2-pipe steam; 5 separate boiler  
 plants, Brownell Co. coal stokers; Trane con-  
 vectors  
**Plumbing:** Brass water lines; Jenkins valves;  
 traps and heavy-duty pumps, Webster Co.;  
 fixtures, Crane Co.; hose cabinets, Allen  
 Mfg. Co.  
**Kitchens:** Westinghouse refrigerator and elec-  
 tric stove; Whitehead Metal Products cabinets  
 and monel sink; linoleum floors



## 86 RENTAL UNITS (FHA)

COUNTRY CLUB APARTMENTS  
GREENSBORO, NORTH CAROLINA

CHARLES C. HARTMAN

Architect

### COMPARATIVE ANALYSIS

#### Site

PROJECT OCCUPIES 3.7 acres, of which structure coverage totals 22.6%. Center of city is about two miles distant on a direct bus line. Property retains slightly rolling contours and original trees and growth; walks conform to these.

#### Accommodations

The 3 buildings, each a 2-story walk-up, include 416 rooms; the average rental unit consists of 3.7 rooms. These dwelling units represent 100% of the property income. Average room rental is \$16, units renting from \$37.50 to \$70.

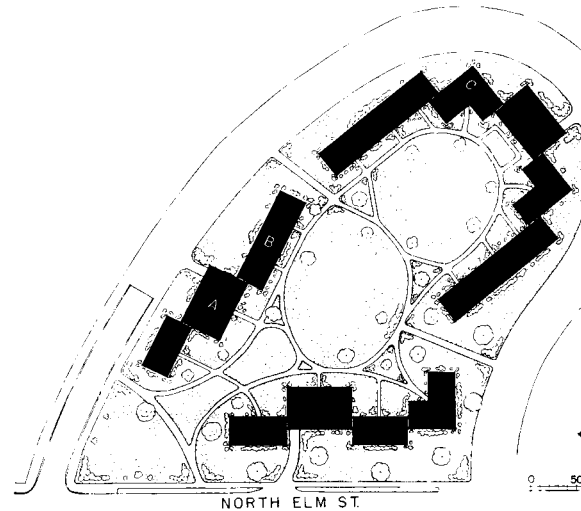
#### Supplementary facilities

A community center containing garages, shops, etc., is being considered for future addition, these facilities being non-existent now.

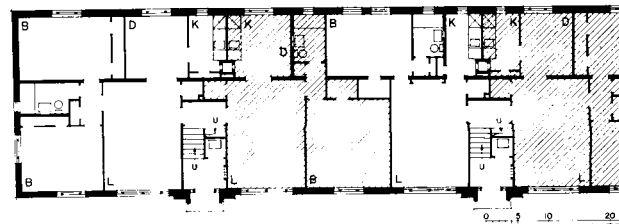
The drive circling the development permits parking for easy accessibility to units.

#### Cost

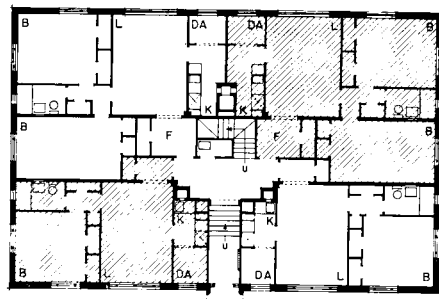
Total contract cost was \$365,000 at approximately 40c per cu. ft. Cost per rental unit was \$4,244.18, per room \$877.40. Project capitalization \$471,000, mortgage \$365,000.



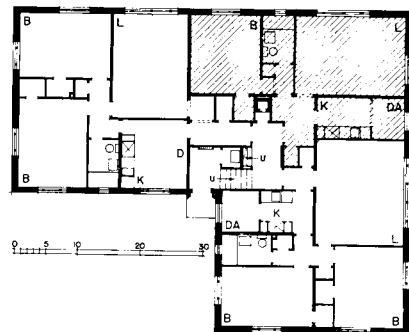
Site plan



UNIT B: First floor (second floor similar)



UNIT A



UNIT C

**SCHEDULE OF EQUIPMENT AND MATERIALS**

**FOUNDATION**  
 and reinforced concrete

**STRUCTURE**  
 bearing, bar joists, 2-in. concrete slab

**ROOFING**  
 Brick, cinder concrete tile backing and  
 joists; Laclede Steel Co. bar joists; Gray  
 Concrete Co. cinder blocks; Greensboro  
 Roofing Co., "Ironite" system of  
 roofing

**EXTERIOR FINISH**  
 Cast-stone, limestone texture, manufac-  
 tured by the Arnold Stone Co.

**ROOFING**  
 Flat roofs built of asphalt and gravel;  
 roofs, shaded green asbestos shingles,  
 Philip Carey Co., laid by Brooks Roof-  
 ing Co.

**WINDOWS**  
 Residence-type steel casement sash,

bronze hardware and copper screens, Camp-  
 bell Metal Window Corp.

**INTERIOR**  
**Floors:** Bathrooms, tile, Atlantic Marble and  
 Tile Co.  
**Walls:** Plaster  
**Doors:** Selected pine, painted doors, Colonial  
 six-panel, Oettinger Lumber Co.; Steel  
 molded bucks, Atlantic Metal Products Co.  
**Stairs:** Steel strings, risers, and rails, J. D.  
 Wilkins Co.; terrazzo treads and platforms,  
 Atlantic Marble Co.  
**Stair Halls:** Lined with "Superrock" Concrete  
 Ashlar, Arnold Stone Co.; and painted a deep  
 cream  
**Glass:** Pittsburgh Plate Glass Co.

**EQUIPMENT**  
**Kitchens:** Kitchen cabinet units, steel baked-

enamel finish, Excel Metal Cabinet Co., Inc.  
**Refrigerators:** Frigidaire—5 cu. ft. boxes.  
**Incinerators:** All apartments, Kerner Inciner-  
 ator Co.  
**Electric ranges:** Three burners, two ovens,  
 Norge Electric Co.  
**Electric wiring:** All conduit work, apartments  
 separately metered; radio outlets and tele-  
 phones, Starr Electric Co.  
**Plumbing:** Wrought iron, Reading Iron Works,  
 Copper tubing water lines; Kohler fixtures  
**Heating:** Vapor system, two-pipe; convector-  
 type recessed radiators, Crane Co.  
**Hardware:** Colonial brass, Sargent Co.  
**Painting:** Exterior walls, white; metal work,  
 dark green; interior, ivory for plaster and  
 trim, Brewer Paint Co.

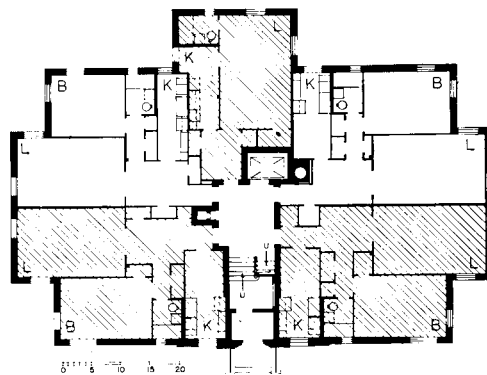


## 30 RENTAL UNITS

DONGAN TERRACE APARTMENTS  
ELMHURST, L. I., N. Y.

T. H. ENGELHARDT  
Architect

DIVIDED INTO 24 three-room and 6 two-room units, each apartment includes, additionally, a foyer, dinette, and bath. Each major room has cross ventilation and fair present exposure, lot coverage being less than 50%. Total cost, \$85,000.



Typical Floor

### SCHEDULE OF EQUIPMENT AND MATERIALS

#### FOUNDATION

Concrete

#### STRUCTURE

Masonry-bearing, structural steel at first tier

**Waterproofing:** Asphaltic on exterior walls below grade, The Barrett Co.

#### EXTERIOR

**Walls:** Light-brown solid brick

**Windows:** Wood double-hung sash and steel casement with bronze screens and Venetian blinds

**Roof:** Five-ply built-up asphaltic, slag surface

**Insulation:** 4-in. rock wool mats in roof

#### INTERIOR

**Walls:** Plaster on metal lath with triple-ply rock wool quilt separating partitions, Samuel Cabot, Inc.

**Floors:** Oak strip, tile in bathrooms

**Doors:** Flush-type, Weisberg-Baer

#### EQUIPMENT

**Heating:** Steam, Titusville Scotch Marine boiler; Ray oil burner; Arco concealed copper convectors, American Radiator Co.

**Plumbing:** Crane Co. fixtures

**Incinerator:** Sarquet

**Kitchen equipment:** General Electric refrigerators; American Stove Co. ranges

**Hardware:** Bronze finish, Lockwood Manufacturing Co.

**Electrical:** Semi-indirect lighting in areas, direct in apartments; DeVeau phones

**Painting:** Enamel trim, walnut doors, st finish walls; Benjamin Moore & Co Barrett Co.'s Sunlight Enamel

**Elevators:** Push-button control, fully matic, Otis Elevator Co.





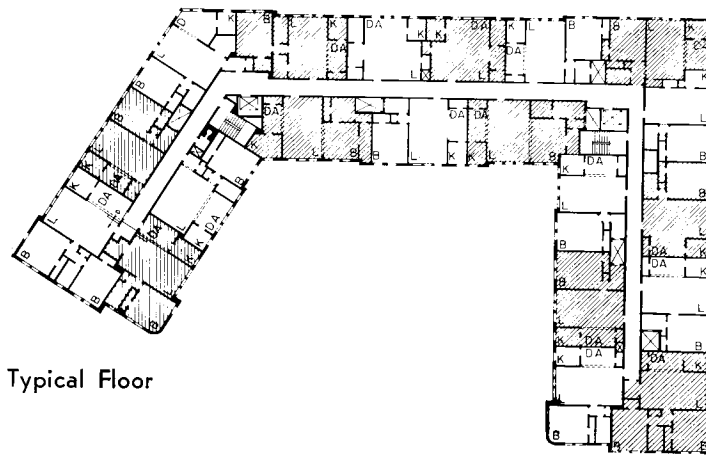
## RENTAL UNITS

LYN APARTMENTS  
WASHINGTON, D. C.

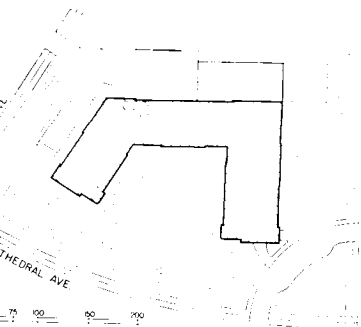
HARVEY WARWICK  
Architect

LYN APARTMENTS are noteworthy as one of the first apartment houses to provide complete year-round air conditioning. System supplies outside air in the ratio of 1 part to 4 parts of room air, which is recirculated by individual units installed in each room. Dehumidification and cooling are effected in the units, and refrigeration being supplied from 3 centrifugal refrigerating machines of 50 tons capacity each. These cool water, which is pumped to the room units, distribution being effected from the top floor downward. Moisture condensed in the humidifying process is piped back to a evaporative condenser in the machine

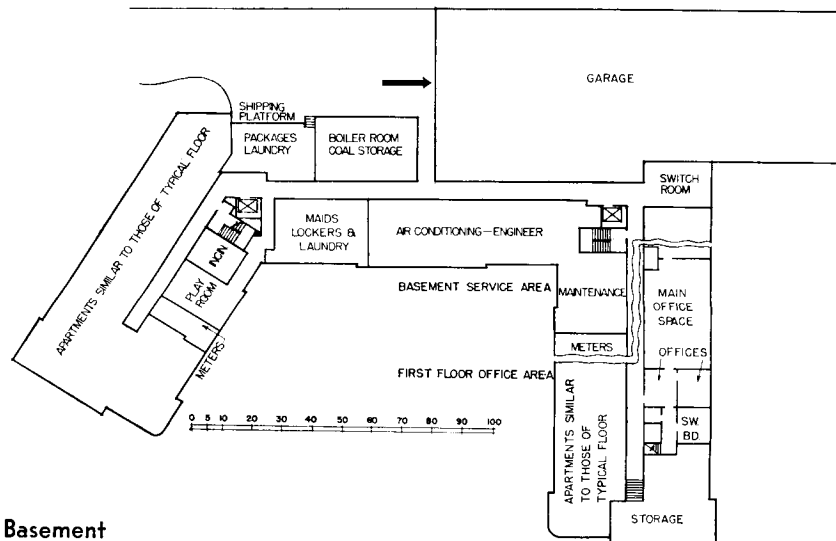
Water heat is furnished by the same system, through pre-heated air and hot water supplied each unit.



Typical Floor

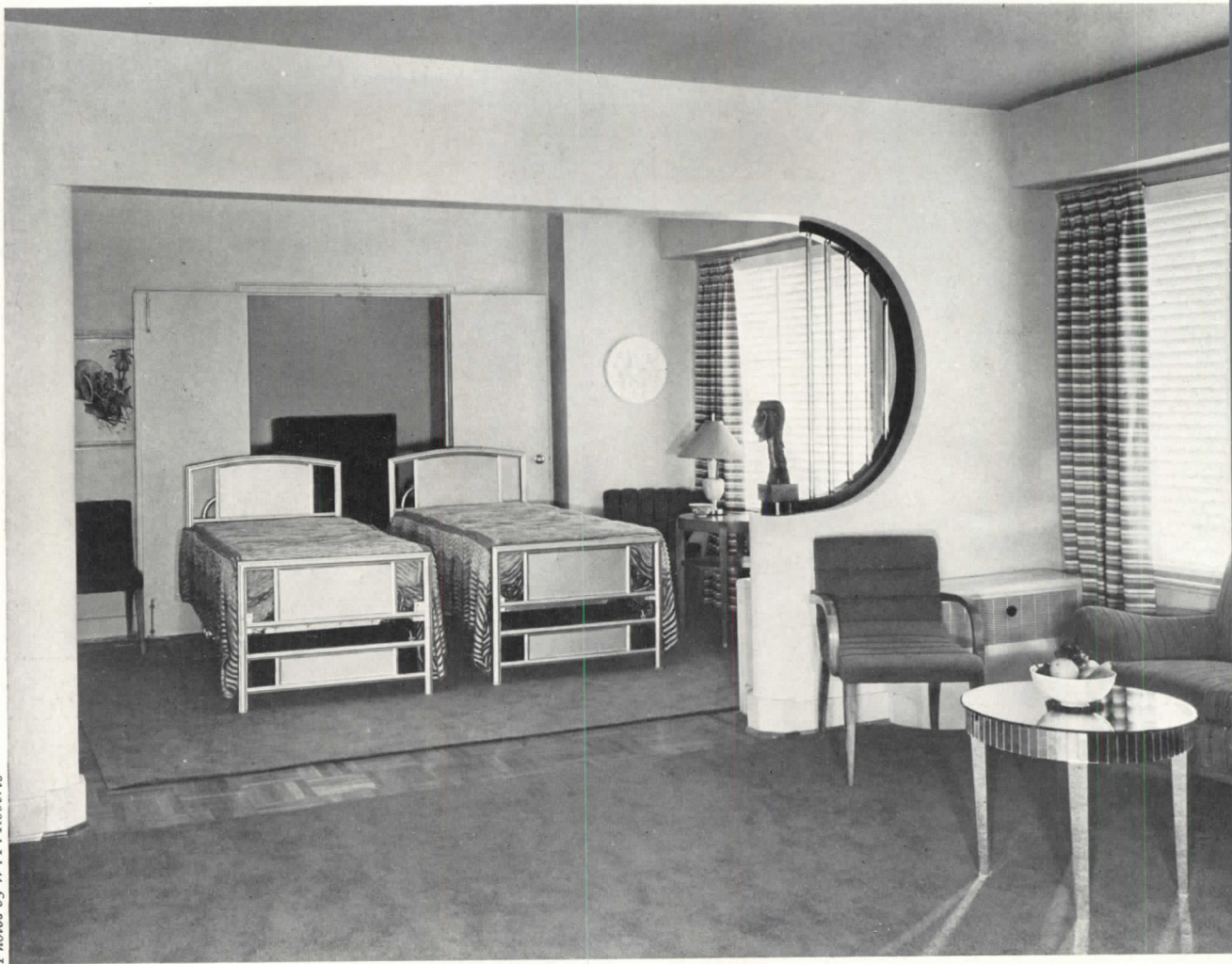


an



Basement

Photos by W. F. Roberts



**RENTAL UNITS**

**BROOKLYN APARTMENTS**  
**WASHINGTON, D. C.**



Left: exterior entrance and interior  
 apartments on ground level with  
 street entry from street



Right: typical living room and ad-  
 joining area with in-a-door beds (air-  
 conditioning units on both sides of  
 living wall); bathroom and kitchen

**SCHEDULE OF EQUIPMENT AND MATERIALS**

**FOUNDATION**

Reinforced concrete

**STRUCTURE**

Reinforced concrete, tile and concrete-joist  
 system

**FLOOR**

Face brick, buff to brown  
 Black structural slate; porcelain enamel  
 tiles, Structural Porcelain Co.; precast  
 concrete insets; limestone sills and coping  
 6-ply built-up asphaltic, gravel surface,  
 Barrett Co.; encaustic tile surface in ter-  
 races

Windows: Double-hung wood sash; steel sash,  
 Steel Products Co.

Doors: Richard Wilson sliding garage doors

Roof: Copper flashing and downspouts

**INTERIOR**

**Walls:** Gypsum block partitions, U. S. Gyp-  
 sum Co.; plastered and painted throughout  
 except: bronze tile wainscot in baths, por-  
 celain glazed tile block in service corridors;  
 cement finish in garage and service rooms

**Floors:** Oak parquet in apartments, Bruce  
 Co.; linoleum base and border in corridors  
 and in kitchens, Armstrong Cork Products  
 Co.; tile in baths and stair platforms, car-  
 peted corridors, Bigelow-Sanford Carpet Co.  
**Doors:** Flush-panel wood; metal bucks

**Hardware:** Brushed chromium finish, Schlage  
 Lock Co.; Sargent door checks

**AIR CONDITIONING**

Complete year-round, Carrier Co.; Detroit  
 stokers; Pacific boilers

**PLUMBING**

Colored fixtures, Standard Sanitary Mfg. Co.

**ELECTRICAL**

Westinghouse circuit breakers; secretarial  
 switchboard telephone system

**ELEVATORS**

Push-button automatic control, dial position  
 indicators, Otis Elevator Co.

**EQUIPMENT**

Frigidaire refrigerators; Oxford kitchen cabi-  
 nets; Westinghouse electric stoves; Murphy  
 In-A-Dor beds; Chicago dryers; Maytag  
 washers and Standard Sanitary Mfg. Co. trays  
 in laundry; Durabilt metal lockers in maid's  
 room; Cutler mail chutes; Stearns incinerator

**INSULATION**

Thermax on walls and ceiling of air-condition-  
 ing machine room for sound control, Celotex  
 Corp.; supply ducts lined with acoustic sheets  
 near machine room, Johns-Manville

**BUILDER**

Ring Construction Co.

Photos by W. F. Roberts

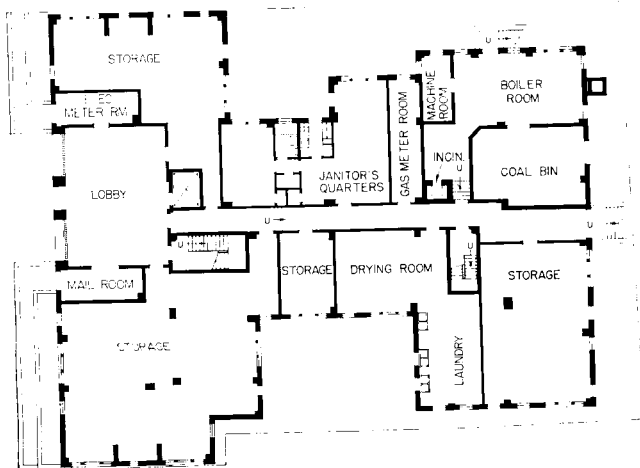


## 95 RENTAL UNITS

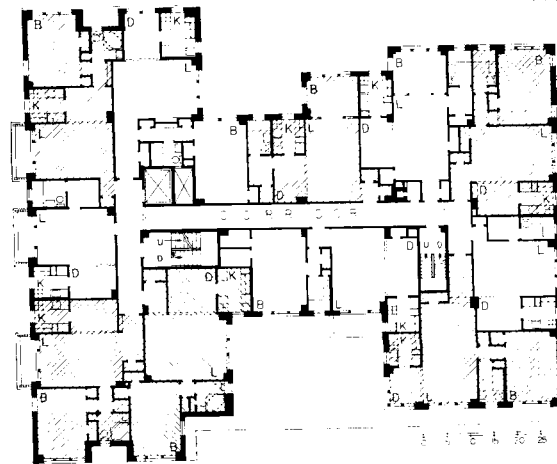
2407 15TH STREET  
WASHINGTON, D. C.

CHARLES E. DILL  
JOSEPH H. ABEL  
Archit

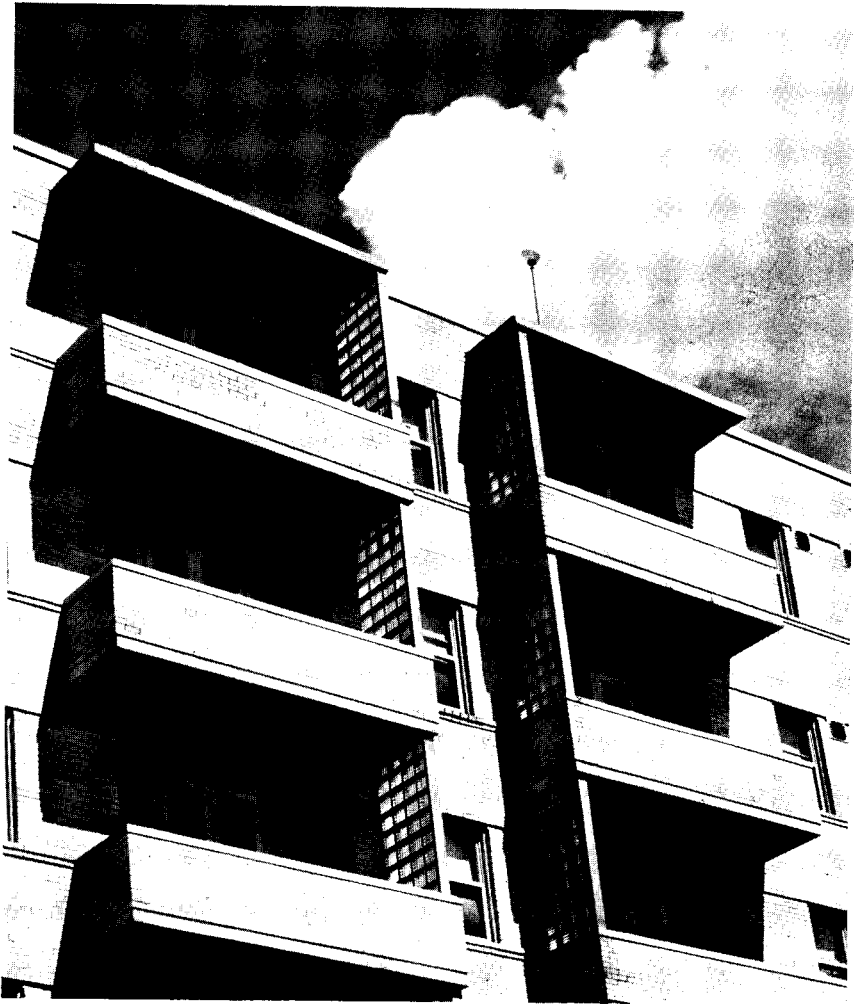
THIS SIX-STORY fireproof apartment house provides two types of dwelling units consisting of one room, kitchen, dinette, and bath, or two rooms with similar kitchen, dinette, and bath. The structure occupies an area of 8,957 sq. ft.



Basement



Typical Floor



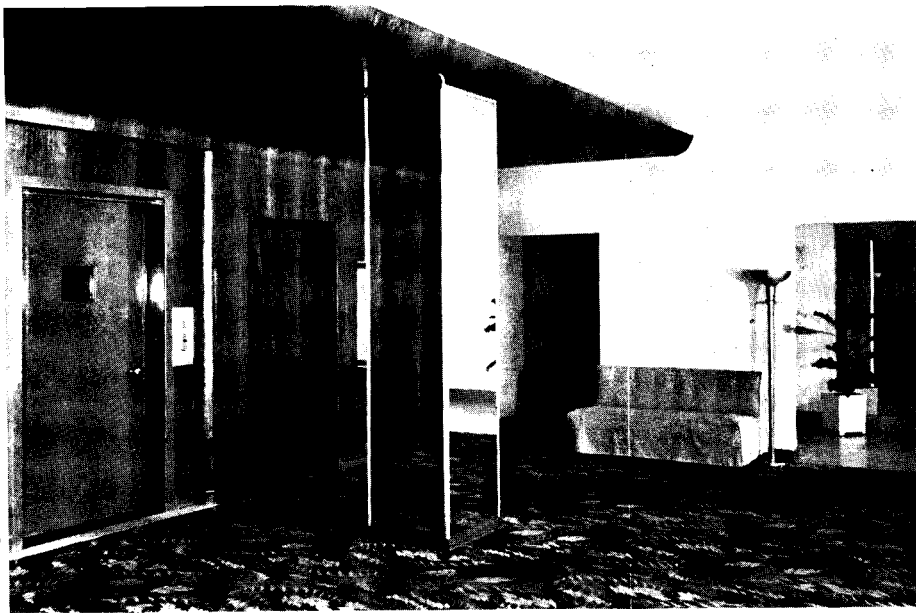
Roof recreation area; note use of wire frames for plants and exposed vent pipes.

Glass-block screens give desired privacy to balconies which open into living rooms and overlook park.

## 95 RENTAL UNITS

2407 15TH STREET  
WASHINGTON, D. C.

Photos by W. F. Roberts



Above: Lobby walls and ceiling finishes combine Maca-wood and white plaster. The columns are faced with peach-colored mirrors and carpet is burnt orange, buff, black. Below: A typical interior

### SCHEDULE OF EQUIPMENT AND MATERIALS

#### FOUNDATION

Plain and reinforced concrete

#### STRUCTURE

Reinforced concrete skeleton

#### EXTERIOR

**Walls:** Buff face brick, hollow tile back-up, United Clay Products Co.; trim, cement, cast in place; glass block, Owens-Illinois Glass Co.

**Sash:** Stock wood double-hung

**Marquis:** Stock aluminum shapes, Pittsburgh Plate Glass Co.

**Roof:** Built-up; roof garden floor, wood slats

**Exterior Doors:** Aluminum, William S. Graham

#### INTERIOR

**Floors:** Oak parquet, Bruce Flooring Co.;

lobby and corridor carpets, A. & M. Karageusian, Inc.; kitchen, linoleum; baths, tile

**Walls:** Gypsum block and hollow tile partitions; lobby, painted plaster and Bubinga Flexwood, U. S. Plywood; apartments, stippled plaster painted; elevator walls, Maca-Wood

**Ceilings:** Lobby, part Maca-Wood, part off-white, painted plaster; apartments, painted plaster

**Interior Doors:** Rezo flush doors, steel buck and trim

#### INSULATION

4" of Rockwool in roof

#### HEATING

Dunham differential vacuum-heating system; Dunham copper convectors; International Steel boilers; Petro-Nokol oil burners

#### VENTILATING

ILG fans with slat doors on all apartments; complete air change in entire building every five minutes

#### PLUMBING

Fixtures by Standard Sanitary Mfg.; copper hot- and cold-water supply lines

#### INCINERATOR

Kerner Incinerator Co.

#### EQUIPMENT

Electric refrigerators and ranges, General Electric Co.; Napanee kitchen cabinets; ILG kitchen exhaust fans in each kitchen

#### ELEVATORS

Fully automatic push-button control; Elevator Co.