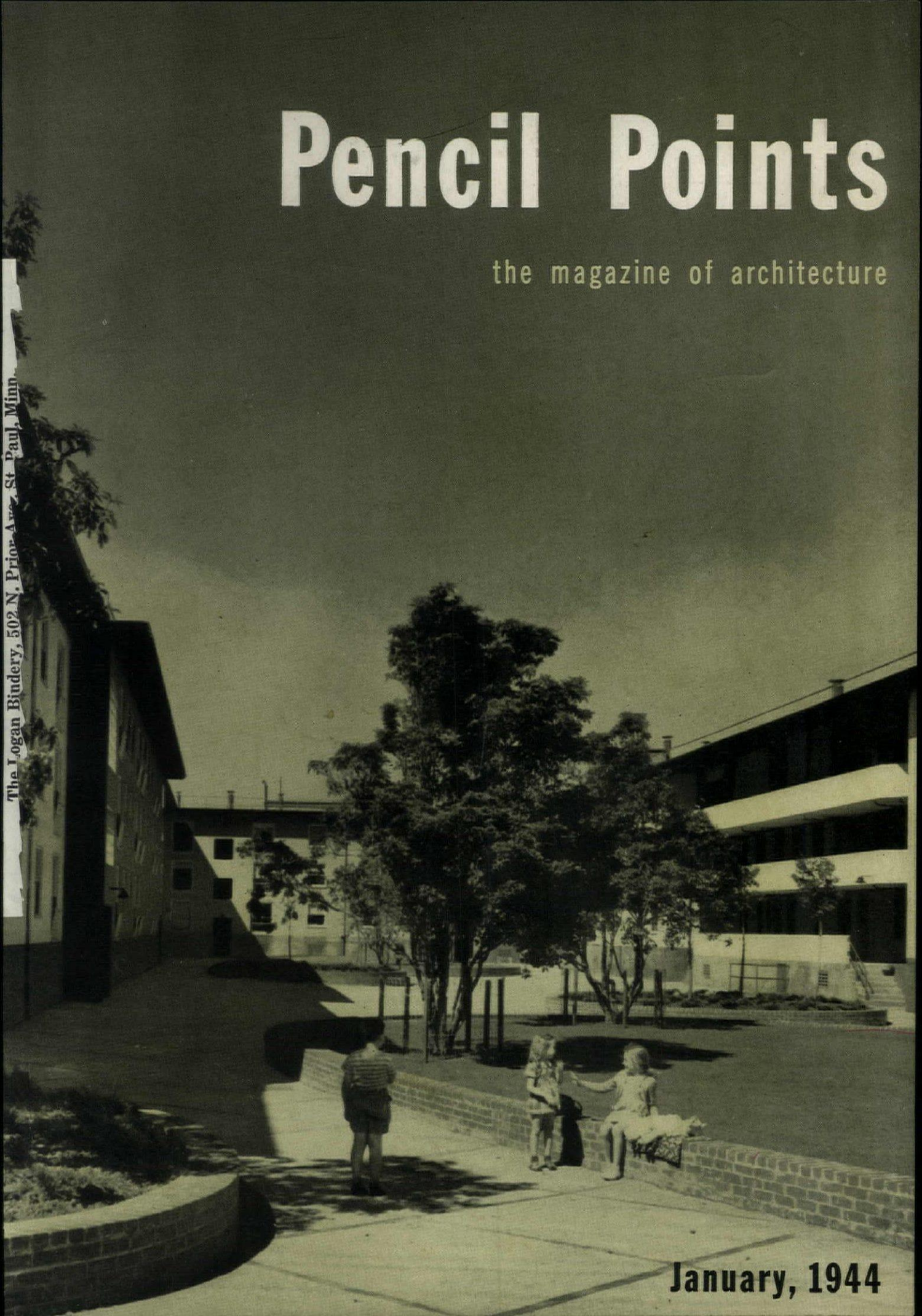
Pencil Points

the magazine of architecture



January, 1944

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with the WADE Wacor Water Hammer Arrester

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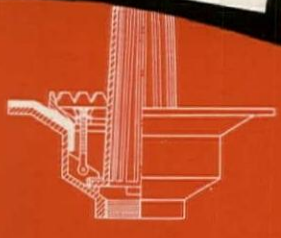

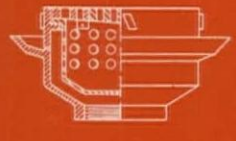

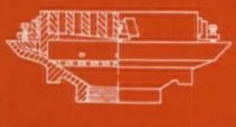

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Assignments for 1944

This year will be highly critical for all Americans, including architects. There are many problems to solve, many jobs to be done before we may confidently confront the sudden emergency of Victory.

Construction volume will be smaller this year than last and new war building projects will be few. To counteract this in part, more postwar projects are being initiated, though only a fraction of what will be needed has yet appeared in architects' drafting rooms. Somehow, the number must be stepped up. For the sake of national economic health, we must assemble a vast stockpile of designs for private as well as public projects, ready to put under construction as soon as men and materials are again available.

The urgency of the situation is independent of politics. The building industry must be ready to do its large share in reconversion, no matter who is elected. It can't do that share without plans, and plans take time to prepare. Every architect, therefore, should from now on promote in every legitimate way the advance planning this year of private construction projects. Even at the risk of seeming to engage in a selfish quest he may have to initiate ideas for needed postwar building and go after capital to sponsor it.

Closely related to this duty, and perhaps even taking precedence over it, is the obligation of the architect to fight for the acceptance of comprehensive planning as a basis for guiding the future of his own community, whether large or small. In many cities architects are already working with and for their Plan Commissions to this end. But many communities have not yet taken the first steps. To insure the kind of results we all want, every community not already prepared should now be carefully but rapidly developing a general scheme into which all individual projects will fit in proper relationship. The architect must help to get this work under way in his own city or town.

The problems of architectural education in the future may not seem quite as pressing, but we are sure the schools must be doing some worrying about them. The profession should be doing a little worrying too, for although the schools do the actual training, architects in practice bear some responsibility for determining how the schooling of young men should be modified to meet the conditions of tomorrow. How much city planning and how much engineering should be added to the curricula and can the emphasis on cultural background be safely reduced? With what philosophy should design be taught so that architectural graduates will fit into a changing world yet not be misfits in the world as it is? How will returning service men be handled? How far need the schools go in increasing adult education through extension courses to be taken by older architects who have fallen out of step with the times? Get in touch with your own school or with those in your vicinity and discuss the problems with the educators. Your counsel will be appreciated.

The organization of the profession itself still needs improvement. Unification is far short of its goal and the moves recently made toward strengthening the AIA need continued and increased support by the membership. There is every temptation to let these things slide while the war is going on. That temptation must be overcome, and each individual architect must help, during this very year, to weld the whole professional body into a strong unit, ready and able to fight for the advancement of architecture.

A profession evists to serve society, and upon how well and how much it serves will depend the esteem in which it is held. The architect may have to battle his way through opposition during coming months in order to achieve the things he knows he can do and that should be done to serve the public welfare. Performance, not clamor, will win him the recognition he needs and wants. Let's make 1944 a year of performance!

Kenneth Reid

Valencia Gardens

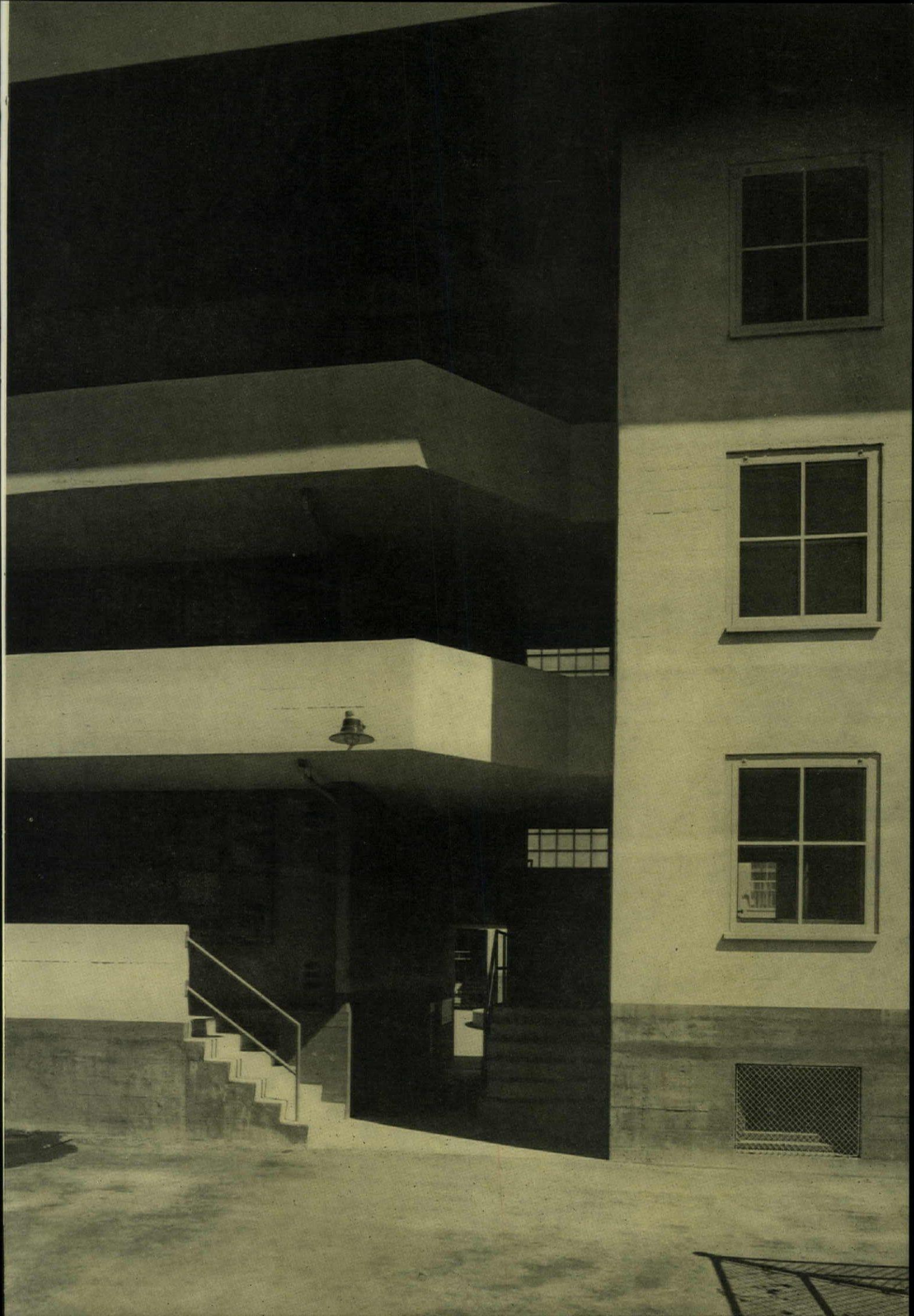
USHA Housing in San Francisco, Calif.

Harry A. Thomsen, Jr.; William Wilson Wurster, Associated Architects

This 246-unit project was conceived under the USHA slum clearance program. Preliminary planning started in 1939; construction proceeded before and during the war, with the usual priority trouble; and in late spring, 1943, it was completed. By this time, war-workers' housing had become the dominant question, and although there had long been a waiting list composed of the low-income families for whom it had originally been intended, only war workers could be admitted as tenants—and, as Wurster states, "probably only in-migrant workers at that."

This is, it seems, almost the only way in which Valencia Gardens does not fulfill expectations. But in thus changing purpose, it is helping to meet a problem of monumental proportions, one which is particularly acute on the West Coast. It would be interesting to compare Valencia with the mushroom defense and war housing developments, but the comparison would be unjust to both.

In discussing Valencia Gardens with the architects, the essential humanity of the basic scheme kept entering the conversation. This is something hard to convey in pictures, even though they be in color. It is the more difficult when the excellent landscape plan, the work of Thomas D. Church, is seen to be somewhat formal—a condition due



to certain requirements which will be more fully discussed later. The best way to make the point clear is probably to quote the architects:

"Early in the design we agreed to do all we could to stress the dignity of the individual. There would be *no* emphasis on the great axis which would only serve to show how small each family was in the sum total. There would be no emphasis on the office or community facilities as an architectural motif; they would just be available when wanted.

"Each apartment to be entered from a balcony has small wing walls which designate a portion of the balcony as belonging to that apartment. Each living room has a window with a low sill, and a railing for security, so that a mother may look down into the garden, or to see her children, rather than just look across at other apartments. For the same reason we painted portions of the buildings in different colors, so that the immensity might be reduced, and at the same time the whole might be lively and gay. We had hoped for individual space heaters; but for such a compact scheme central heat, run by time clock and exterior thermostat, proved cheaper considering the 20-year amortization period, so individual heaters lost out."

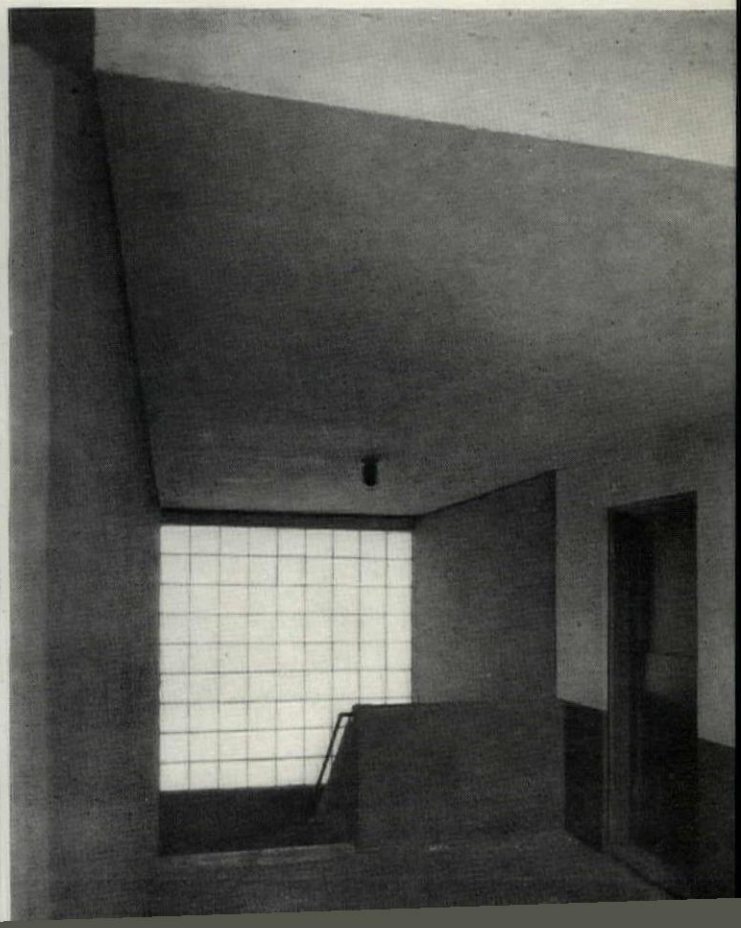
Too many times has it seemed that the designers of low-cost housing—and good housing at that—have forgotten the individual in trying to produce for the mass, to meet governmental requirements, to achieve what was theoretically the "best" result. None of this straining at restrictions is evident in the completed Valencia Gardens, although there undoubtedly were numerous struggles in the course of its design and construction. Here we have the work of competent, mature architects, who understood the intent of governmental standards, who turned what might have been obstacles into simple conditions of the problem.

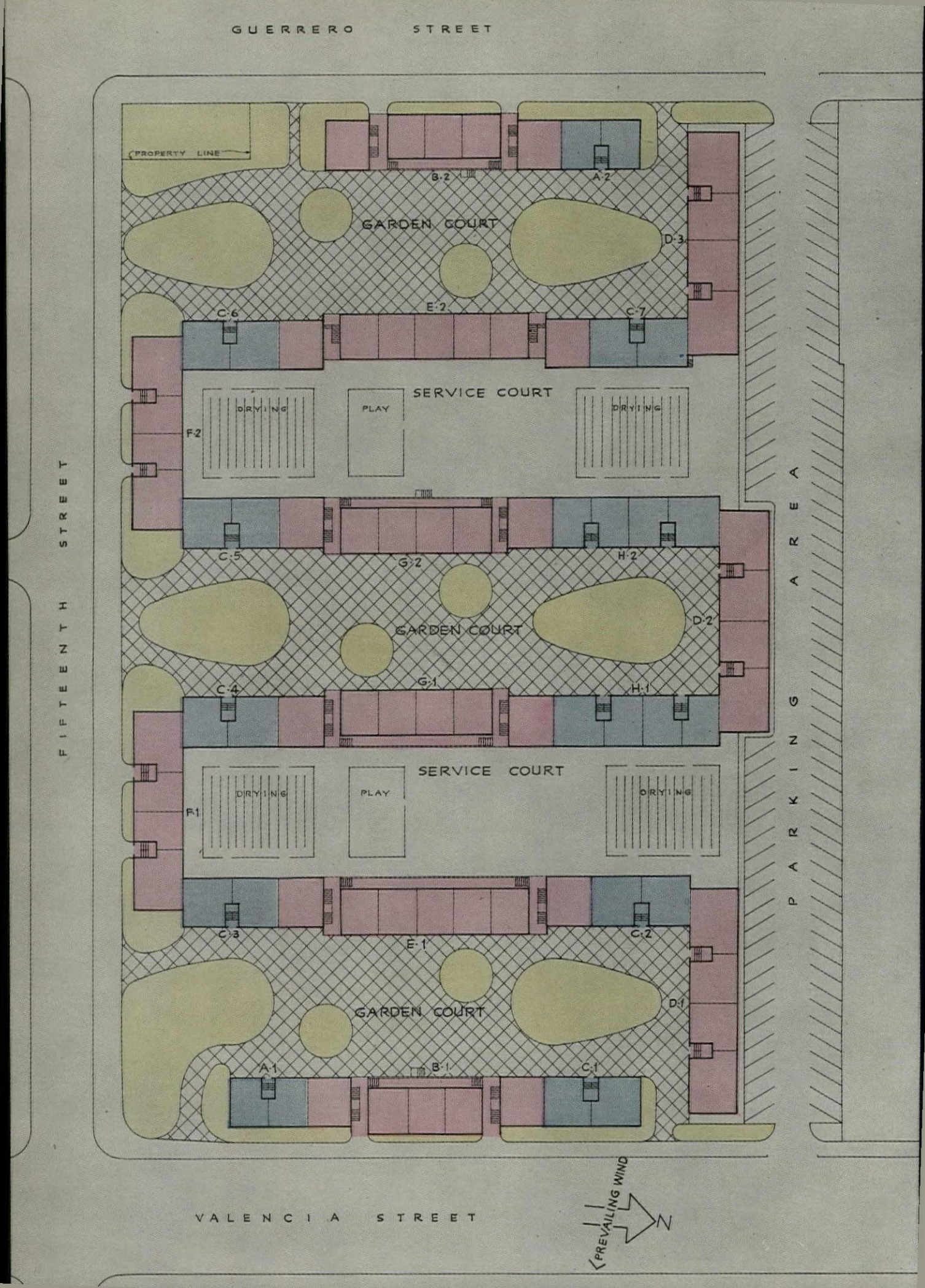
Site and Landscape Design

Valencia Gardens is an urban project in the heart of San Francisco's Mission District, an area which was settled in Spanish days when the Mission Dolores was founded. Its climate is the best in the city, being normally free from the summer wind and fog to which more exposed sections of the city are subject. Nearby are excellent stores, schools,

and parks. Good transportation is immediately available; a private automobile is less a necessity here than elsewhere in the city.

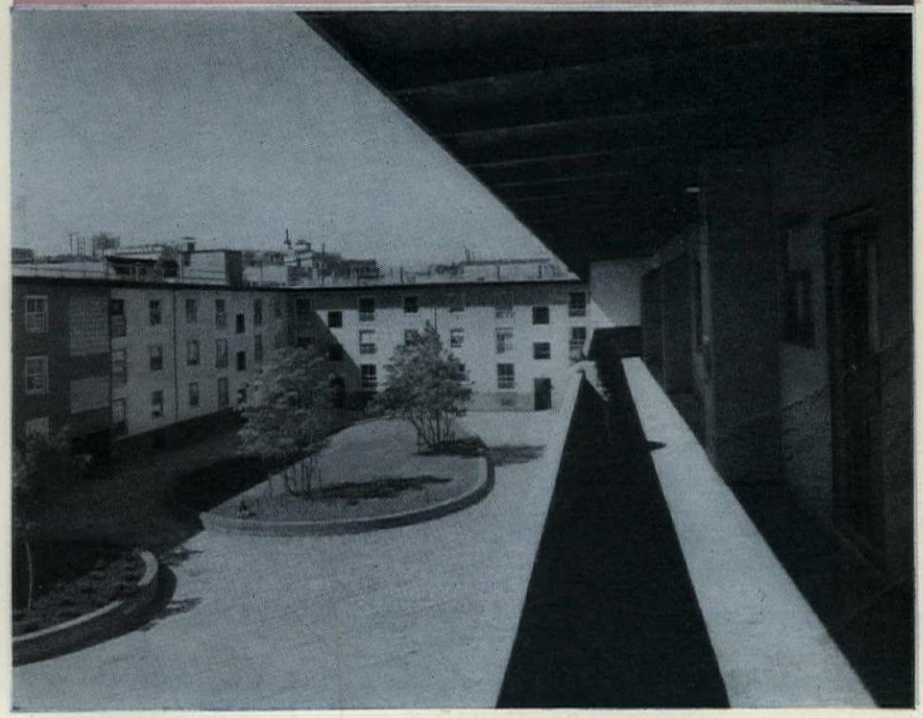
The site was an old ball park, except for a few lots at the west, which simplified its acquisition. In developing it, the decision was made to divide the area into courts so as to provide no great sweep through which the prevailing northwest summer and north winter winds could gather momentum. There was, at one time, a question as to whether to have three garden courts opening south, with two service courts, or two garden courts and three service courts. The Housing Authority




GUERRERO STREET
PROPERTY LINE
B-2
A-2
GARDEN COURT
D-3
E-2
C-6
C-7
SERVICE COURT
DRYING
PLAY
DRYING
F-2
C-5
G-2
H-2
GARDEN COURT
D-2
G-1
C-4
H-1
SERVICE COURT
DRYING
PLAY
DRYING
F-1
C-3
E-1
C-2
GARDEN COURT
D-1
A-1
B-1
C-1
FIFTEENTH STREET
PARKING AREA
VALENCIA STREET
PREVAILING WIND
N

favored three garden courts, a decision in which Wurster now concurs, although it places the two end wings away from service courts, so that tenants here must cross gardens to get to laundries.

The garden courts were intentionally developed somewhat formally. This is a city development, so landscaping is approached as something urbane, elegant—distinctly not with the idea of transforming a multi-family dwelling into a little cot in the country. The raised beds serve two main purposes, and in so doing resolve a very practical difficulty. Such gardens are also living and play spaces; and USHA has found that outdoor living space must be paved to prevent exhorbitant maintenance costs. The raised beds at Valencia are barriers to those who would otherwise cut across them, the brick walls form natural seats, and the fact that they are raised foreshortens what might have been drab stretches of pavement. From eye-level the courts seem filled with green, and anything but bleak. Yet the paved area is generous, and it is hoped that benches will soon be installed for use on sunny days.



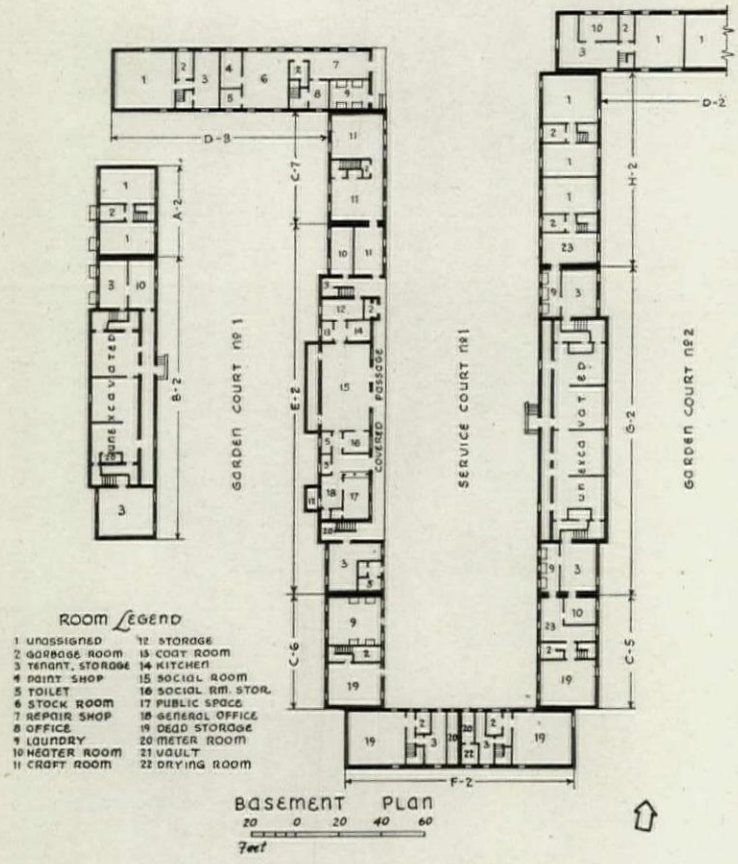
Dwelling Units and Interior Treatment

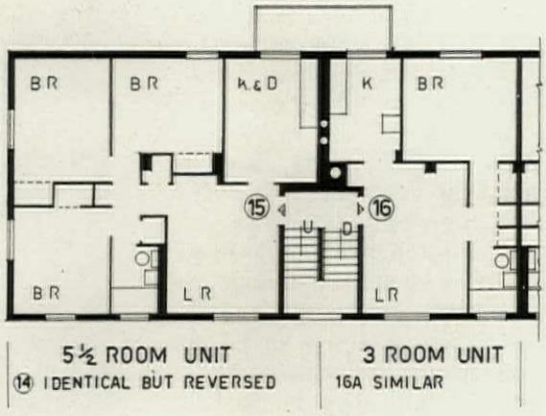
In Valencia Gardens there are at present 246 dwelling units; later, when a small apartment house on the corner is demolished, there will be 6 more, giving a total of 252. Units

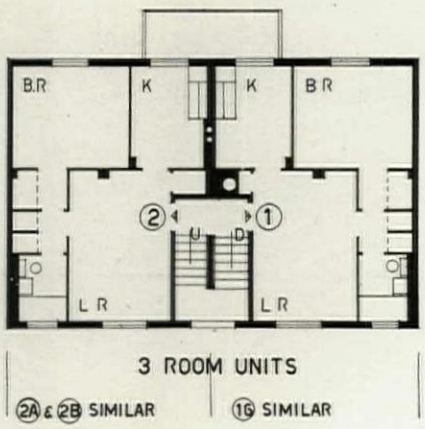
vary in size from 1 to 4 bedrooms, and are grouped in 22 buildings of 8 different types as shown on the plot plan.

Interiors of apartments are as individualized, and as carefully designed, as was possible. Indeed, the architects say that they "pulled no punches; we always designed each idea or phase as if we, personally, were to live there; or as if it were for our most tony client. We were careful to fix the curtain rods . . . so curtains could be pushed free of the windows to make the best of light and air." Living room walls are of plaster, integrally colored; each of the several apartments opening off one of the common stairs has a living room with a different color scheme than the others. The same color treatment is used on balconies. The remainder of the rooms, however, have linen-colored walls. Woodwork is all natural in color, bleached, not the conventional yellow varnish, but with a reasonable gloss finish which should make it relatively easy to keep clean. Each kitchen has a ventilated cupboard (extremely useful in California) and space for a mechanical refrigerator which can be installed after the war. Apartment entrance doors are located and hinged to screen living rooms for privacy, to eliminate drafts, and to permit service to kitchens to be as unobtrusive as possible.

Plans have been so arranged that there is a minimum of rooms with north exposure, a maximum with the desirable east-and-west exposures for both afternoon and morning sun. At one time it was proposed to make the roofs outdoor living areas, but in considering cost, probable use, and the fact that the project has three large garden courts, this idea was discarded. Social and service rooms are grouped together in the center of the basement.







Community Facilities

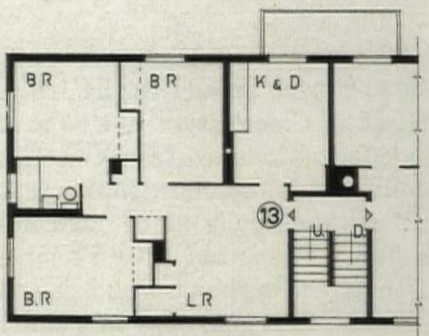
Laundries, store rooms, and drying rooms are in the basements of buildings facing on service courts. Garbage chutes lead to ventilated rooms in basements, adjacent to stair halls or in other locations convenient for garbage collection. Social and business facilities (social hall, hobby and craft rooms, offices, maintenance rooms) are grouped in one basement at a point where changes in grade bring them level with the adjoining court.

Construction

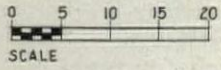
All the buildings are of concrete construction, 27 ft. wide overall, with an off-center row of interior columns which facilitates space utilization. The larger buildings, those with two stair wells, are divided into two units each by transverse concrete walls. Stairs are also enclosed in concrete walls, and serve to separate dwelling units. In the six buildings in which apartments are entered from balconies, each apartment is separated from the others by similar transverse walls. Some terra cotta tile partitions are used in basements. Partitions within dwelling units are 2 inch plaster. Floors are of concrete slab construction; roofs are built-up.

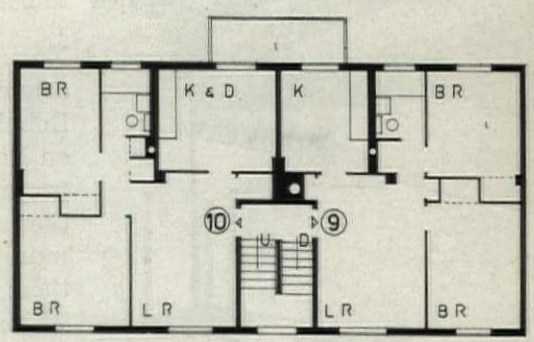
Dwelling Unit Count by Size of Unit

Building	3-Rm	4-Rm	4½-Rm	5½-Rm
A1	6			
A2	6			
B1	9	6		
B2	9	6		
C1	3		3	
C2	3		3	
C3	3		3	
C4	3		3	
C5	3		3	
C6	3		3	
C7	3		3	
D1			6	6
D2			6	6
D3			6	6
E1	15	6		
E2	15	6		
F1	6			6
F2	6			6
G1	12	6		
G2	12	6		
H1	9		3	
H2	9		3	
Totals	114	57	45	30
			GRAND TOTAL	246



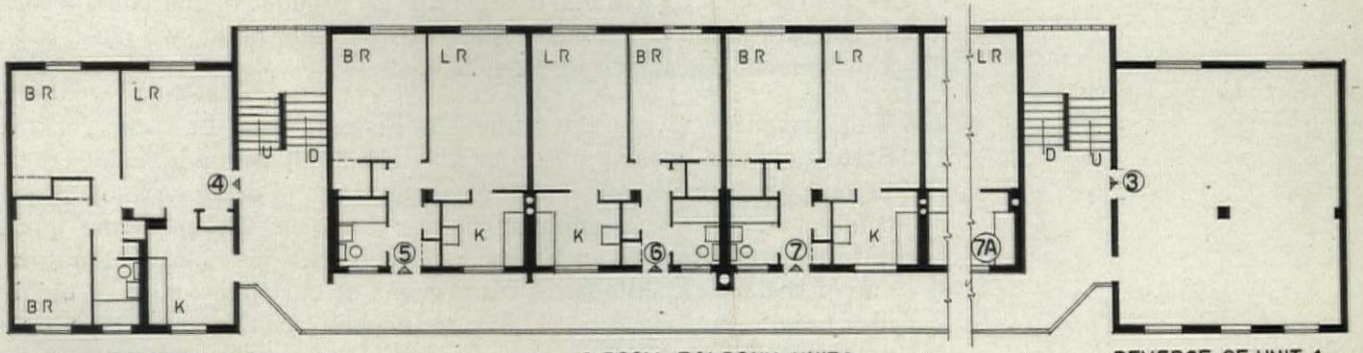
5½ ROOM UNITS
(12) IDENTICAL BUT REVERSED





4½ ROOM UNITS
(11) IDENTICAL BUT REVERSED
10A & 10B SIMILAR

4 ROOM UNITS



4 ROOM BALCONY UNIT

3 ROOM BALCONY UNITS
(8) SIMILAR TO (6)

REVERSE OF UNIT 4

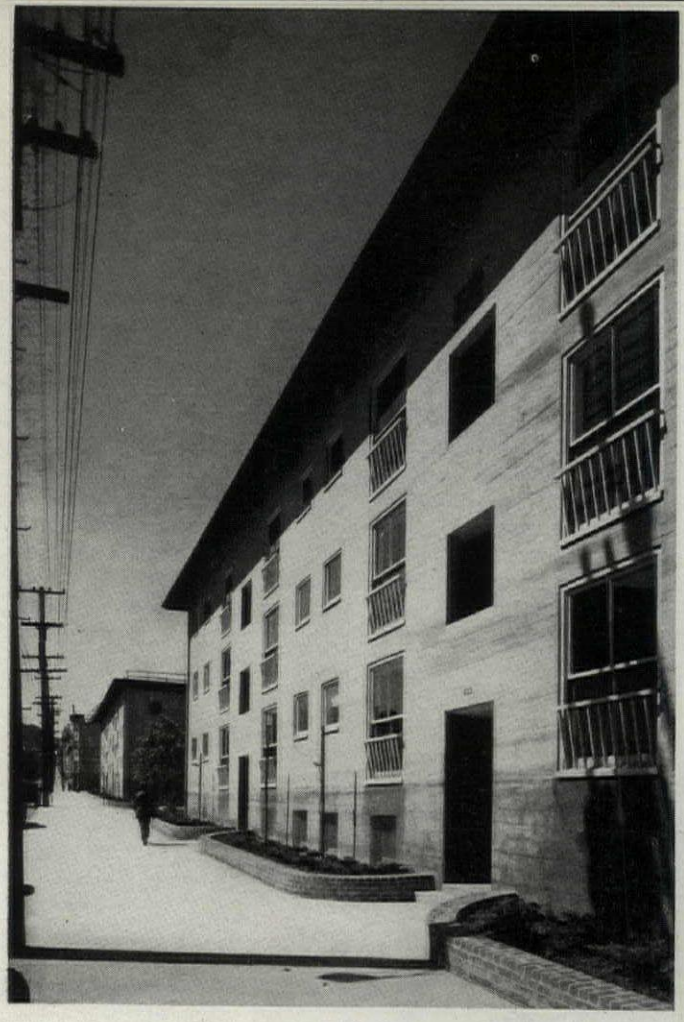
It is nearly impossible to present accurate cost figures on a housing project of this type, to which financial assistance is given by one or more levels of government, and to which government has certain responsibilities of management, maintenance, and social nature. The cost of such responsibilities is justly a part of the project cost, and may apparently increase unit cost sufficiently to seem disproportionate in comparison with "similar" private construction. But this question arises: Is there any similar private construction? There are relatively few large housing projects in which the original owner plans to retain management of the property in his own hands, and many speculative housing developments. The former, non-speculative, types are definitely not low-cost housing. The latter, speculative, type, whether of single or of multifamily houses, has a decided advantage as far as costs are concerned.

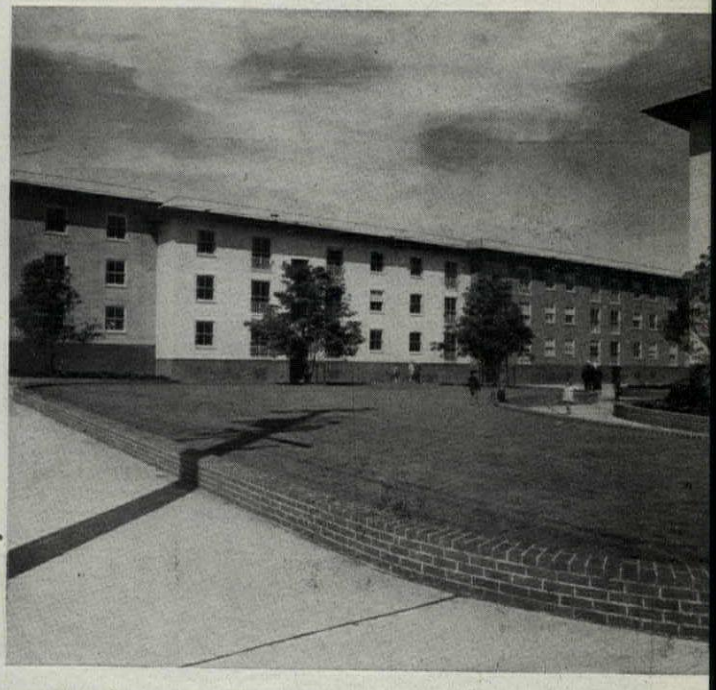
The usual speculative developer has to worry little about such things as grading, for instance. If a site is graded to look well, that is sufficient until the dwelling is sold; if, as often happens, "pretty" grading drains water into cellars, why, that's the buyer's worry. But a *Housing Authority* must make certain that grading is properly done—and costs are increased. Responsibilities of an Authority, some of which could not reasonably be allocated to the private developer, include such items as preconstruction housing surveys to determine need; relocation of existing occupants' families; condemnation and demolition; requirements for construction of a type which will at least equal in life the length of the amortization period; provisions for maintenance, project offices, recreational, service and other community facilities; and so on. The list could be made more extensive.

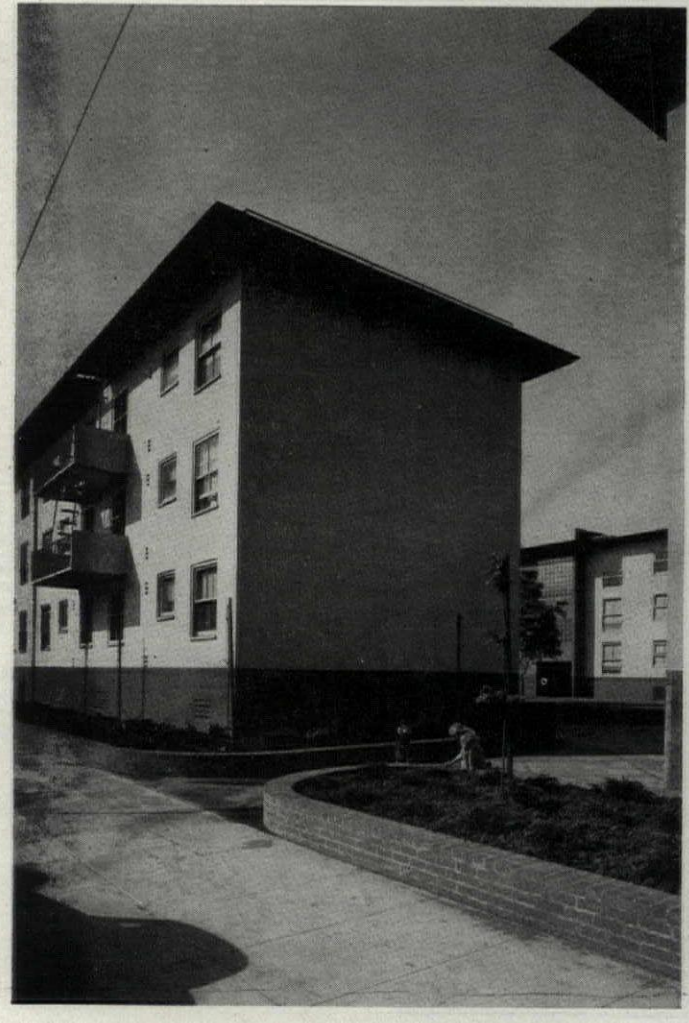
Valencia Gardens is Federal housing. Lately, an undercurrent of opposition to subsidized housing has come vociferously out into the open (see page 15, December, 1943 *New Pencil Points*.) The cry seems to boil down to: "Let private initiative do it!"

No one has stated the public housing—Federal or State—proponent's argument better than the following, quoted from an address by Ira S. Robbins, New York State's Acting Housing Commissioner, who said on Dec. 15, 1943: " . . . Consideration of facts, divorced from emotion, prejudice, or social, economic, and political philosophies, shows that there is a substantial number of families in virtually all of our communities which for many years has had incomes too low to enable them to obtain adequate housing. If that fact is shown in black and white—or perhaps I should say red—figures, then you know why there is a public housing program. . . . Public housing is not a sacred end in itself and we must not consider it so. Its sole function is to pick up the job of supplying adequate housing where private enterprise is forced by existing economic factors to leave off. Thus the first step that can and should be taken in the closest cooperation by private enterprise and government agencies is to determine just where the boundary line should be drawn; how far down the income scale private enterprise can go without cheapening its product to the point where it constitutes an economic waste. Beyond this point, we must have Government assistance in some form."

The present war has interrupted a Federal (and in New York, a State) low-cost housing program which had only begun to make a dent in our great mass of substandard housing. Perhaps, when peace comes, we will have another similar program, perhaps one quite different. Meanwhile, in Valencia Gardens, we have here in America one of the true architectural expressions of our time—a set of buildings humbly conceived in the idea that human beings are human, and deserve a dignified human environment in which to live. Yet Valencia is no monument. Monuments are for the dead, not the living.

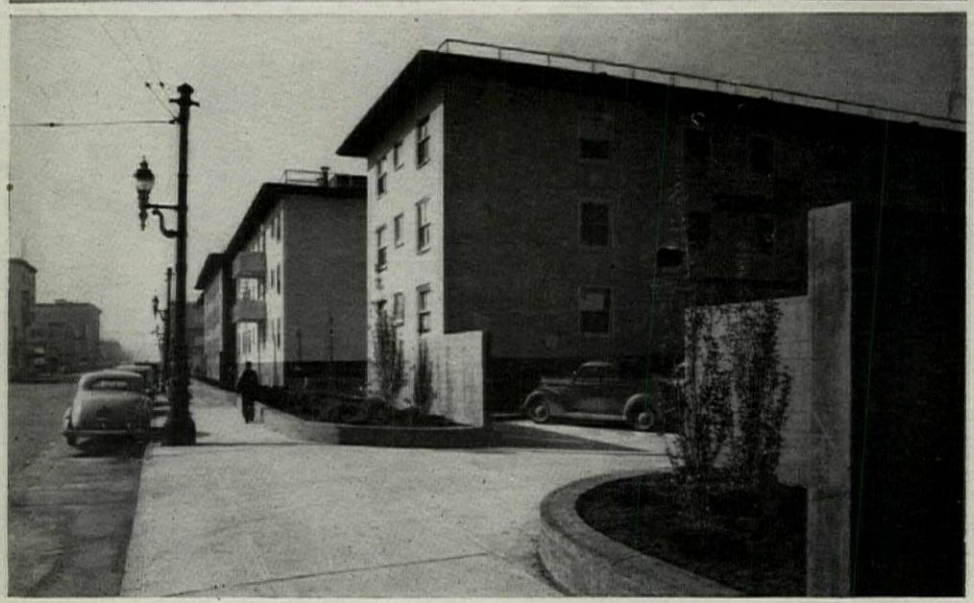






It has been estimated that the whole San Francisco Bay area has had its population increased by some 170,000 or so in-migrant war workers, of which a portion are new residents of the city itself, and, of course, only a fraction are provided with homes in Valencia Gardens. Since the war has caused abandonment of the low-income group as prospective tenants, it is only reasonable that, as a correspondent informs us, permanent public housing rents in general in the San Francisco area, currently based on about 25 percent of tenant income, should bring in returns high enough to reduce substantially the expected amortization period.

An ironic situation thus develops: Tenants are paying what once would have been fairly good rents for quarters designed, built, and subsidized to meet low-income minimum needs—with the well known USHA minimum room sizes and all the other minimums that tag along. Valencia's individual rooms are about as small as in other USHA projects, the editors have been assured; but this is not the result of poor design by the architects. It was a part of the USHA requirements, and had to be accepted as fundamental to the design. On the other hand, the ingenious use of balcony-corridors in certain buildings should add much to the comfort of those apartments lucky enough to open from them, even though their privacy may be somewhat nullified by the necessity of using them as public halls. If USHA had *known* war workers would pay higher rents, perhaps living rooms wider than 10 or 10½ feet, and really private balconies, could have been provided.



J. Floyd Yewell, del.

New York State Housing Authority Projects, Niagara Falls, N. Y.

Association of Licensed Architects

C. R. Phelps, C. F. Obenhack, W. A. Cannon, R. G. Larke, H. G. Mess, Sewall Smith, C. I. Thiele

Packard Court and Center Court

The New York State Division of Housing, a branch of the State's Executive Department, is the only state governmental agency in the country which performs all the functions of a housing authority, from making surveys to granting funds. It has to date aided 7 completed and occupied low-rent projects containing nearly 4,500 dwelling units; has 2 more (400 units) in progress; plus a postwar shelf (15 projects, approx. 11,250 units —see page 14, this issue). All are permanent housing although the 9 completed or under way are now serving another purpose: war housing.

For several years, a small body of citizens had been trying to get something done about the housing shortage in Niagara Falls. This group—the *Joint Committee on Housing*—included two social workers (one Negro and one white), two labor delegates, and two architects. A thorough survey showed that, entirely apart from war requirements, some thirty-three hundred homes were needed. The Federal government is supplying much temporary housing; the State government was willing to help to the extent of some seven hundred permanent dwelling units.

A local Housing Authority, composed of one labor delegate, one social worker (from the Joint Committee), a banker, an industrialist, and the City Counsellor, was appointed. The start was modest: a 300-family-unit project. (The State Division of Housing required that a large number of existing sub-standard slum dwellings be demolished immediately after the war.) In order to accommodate 300 homes on available property and meet the Division's exacting site requirements, the Niagara Falls Housing Authority decided to build the project on two tracts of land. Of these, the rendering above shows Packard Court; Center Court's plan appears on the following page.

The land purchase and the fact that about half the homes were intended for Negroes unfortunately fomented strong racial feeling. At this moment, the efforts of the above-mentioned groups were vigorously supplemented by a rapidly formed *Citizens' Committee for Adequate Housing;* the Four Freedoms were quoted at sessions in the City Hall, and made to stick; the City Council voted in favor of the project.

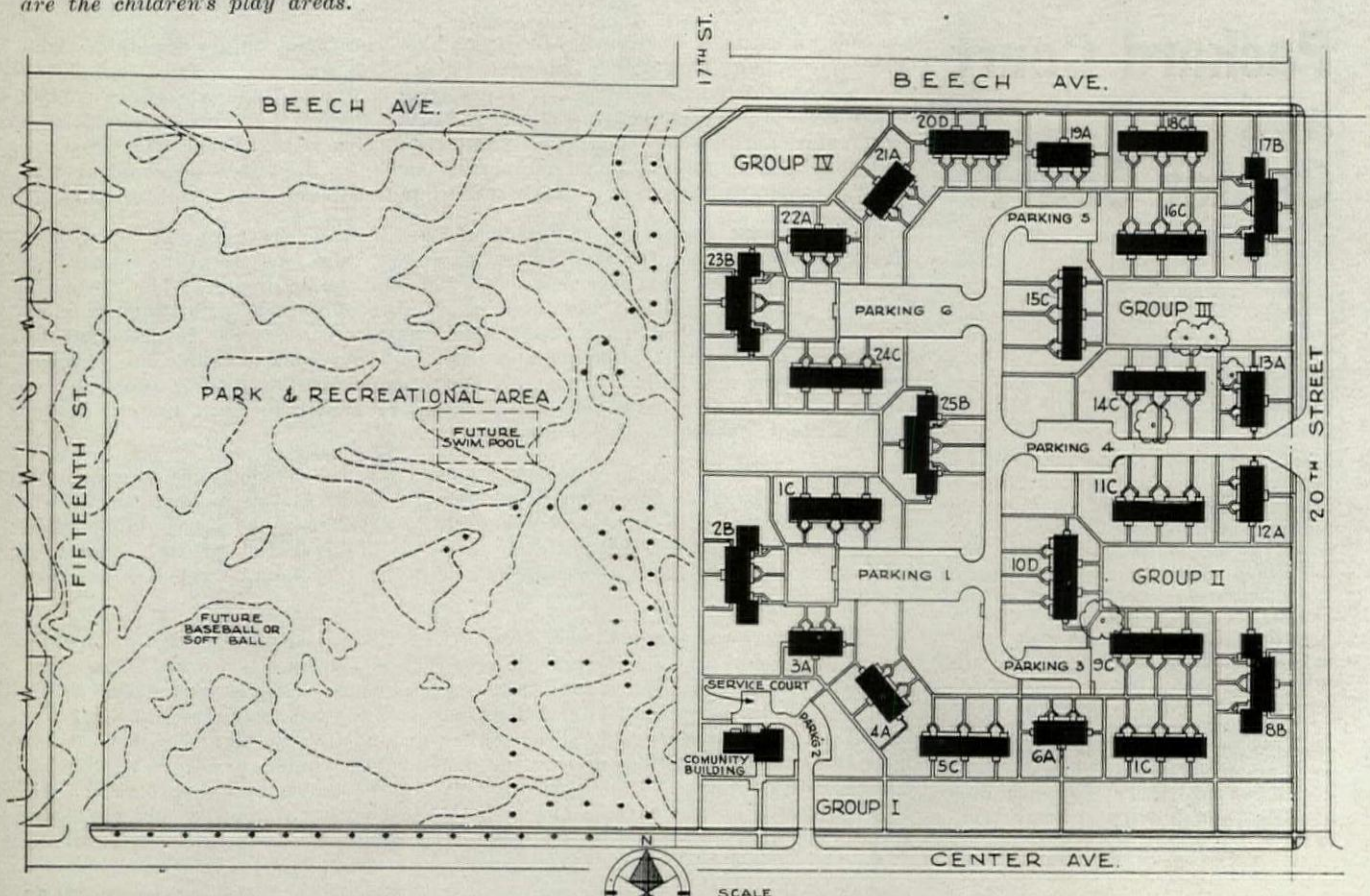
When contracts were signed, the *Association of Licensed Architects*—an organization of twenty-year standing in Niagara Falls—started to work. The Association is comprised of seven architects, each of whom runs his own office. While all its members participated in this project to some extent, the actual load was borne, as might be expected, by a smaller group. In the planning stage, three men from the Association, and in the construction stage, two, were responsible for the work. General administration was in the hands of a Coordinator. He had to oversee and be responsible, to both the Housing Authority and the Association, for the job. The Chief Project Architect was in charge of all drafting

Photos by Sewall Smith

and design. Later on he supervised construction. During the plan stage another Association architect acted as head draftsman, and also handled the devious details of WPB regulations. Close cooperation with the Division of Housing, for which the Association has expressed keen appreciation, was maintained from start to finish.

The two sites are both in residential sections, each near enough to industrial areas to serve them readily. Packard Court covers some twenty acres, has a short frontage on a thoroughfare, and accommodates 166 family units, with room for future expansion. Center Court accommodates 134 families and consists of 13 acres in the north central part of town. In both, parking areas and play spaces for pre-school age children, spotted to be within view of as many kitchens as

Above, Community Building at Center Court. Below, plot plan, Center Court. Adjoining parking areas, but separated from them, are the children's play areas.



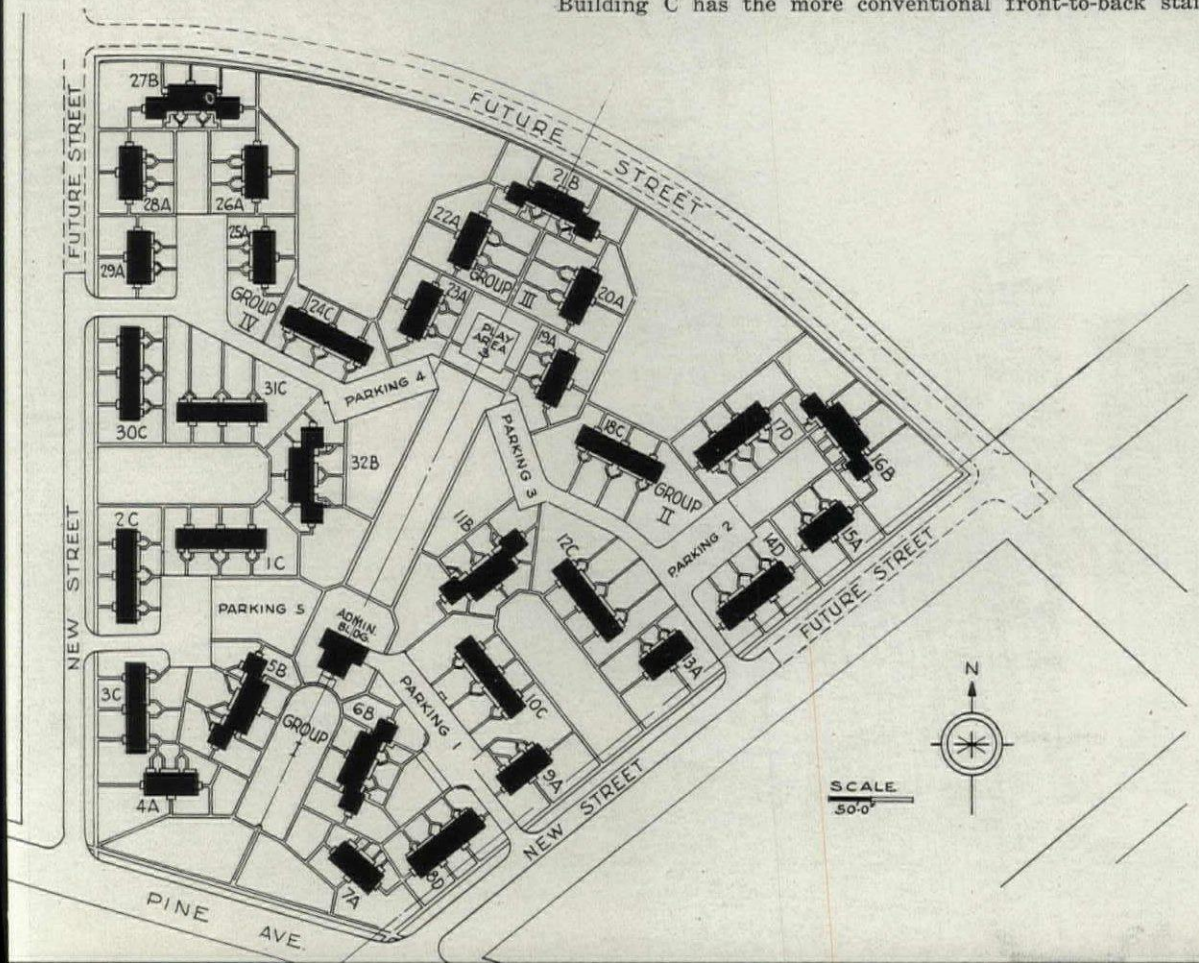
possible, are within the developed areas. Center Court has existing streets on three sides. Adjacent to its developed area is another the same size which was formerly a dump; it is unfit for building and will be developed as a recreational area.

Due to the shape of the tracts, the site plans seem different. However, the same principles governed the design of both. Sites are serviced entirely from the rear, or more accurately the interior. Buildings are arranged to screen parking areas, drying yards, vegetable gardens, and play areas. This type of site planning has become almost a standard recommendation of the Division of Housing. Buildings face streets, or each other across spacious lawns, forming U shaped courts. The only automobile traffic within the developed area of either site is that of occasional deliveries or of tenants.

Packard Court, near a large, well equipped city park, has for this reason no recreational area as part of the project, nor as many indoor recreational facilities as does Center Court. In both the Packard Court Administration Building and the Center Court Community Building, however, in addition to the usual peacetime requirements, there are rooms that now serve as child-care centers for the convenience of war worker mothers. After the war, and even now in evenings, these can also serve for social gatherings.

Above, Administration Building, Packard Court. Below, plot plan, Packard Court. In both plans, note grouping of service sides of buildings around courts convenient to service drives, parking spaces, and play areas. Individual gardens are also located here. This arrangement permits building "fronts" to face streets, or each other across pleasant lawns.

Before starting design the Association studied two exhaustive surveys which covered well over a hundred housing projects. They were particularly impressed with the pet peeves of housing project tenants. This bit of social research was found to be worth far more than the time it took. The unit plans finally developed were of necessity hampered by stringent WPB requirements. Perhaps their most unusual feature (aside from that of combining two- and three-bedroom apartments in one building) derived from this study of tenant reactions, is the use of a stair parallel to the length of the building. This can be seen in building types A, B and D, and was done to minimize steps taken by the housewife to bedrooms and baths on the second floor, and to reduce traffic in living rooms. Building C has the more conventional front-to-back stair arrangement, which

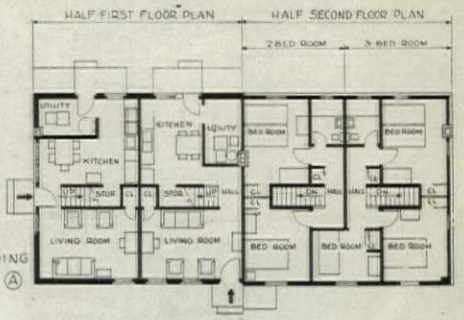


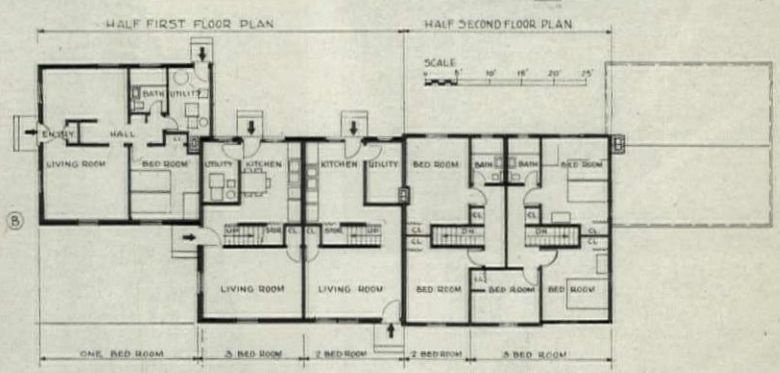
thanks to its basic economy and to USHA, has become almost a stock row-house solution. This plan-type turned out to be slightly less expensive. The Association anticipated a greater differential in cost and consequently sprinkled in C buildings generously in an effort to keep down total costs.

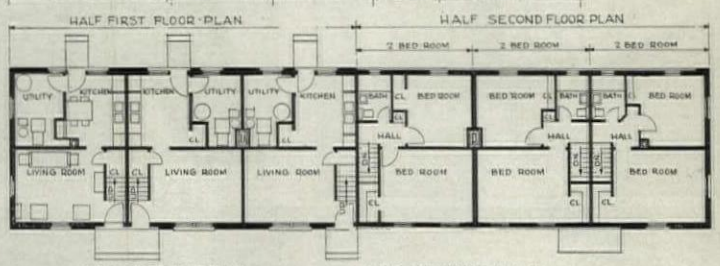
Not only are one-, two- and three-bedroom dwelling units combined in one building, but also these have been carried out in such a way that the three-bedroom units are favored. Presumably the three-bedroom apartments will ordinarily be

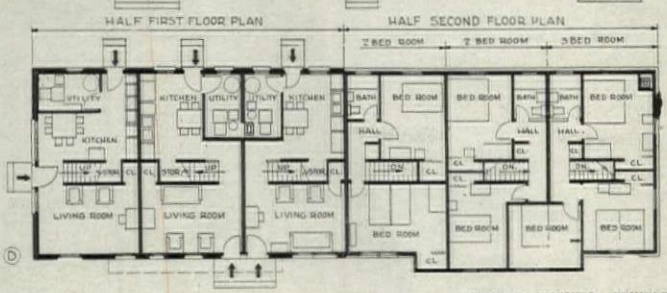
Photo below by P. A. Dearborn

occupied by families with children. For this reason throughout this project they get the end entrances. In this way, the living room can be secluded, an answer to one frequent complaint of housing dwellers. Another related criticism, often heard, is lack of a hall, and while the little entries at the ends of A, B, and D buildings are hardly full-fledged halls, they do in function serve that purpose. From the front door one can go upstairs, to the dining area, or to the kitchen,









On facing page, top, Type A building; bottom, looking from service court into a group of Type C buildings, Type D in background. On this page, top, Type C building; center, Type B.

UNIT AND BUILDING COUNT

Type Bldg.	A	B	C	D	Totals
No. Bldgs.	21	12	19	5	57
D. U. Each	4	6	6	6	
1 BR	0	24	0	0	24
2 BR	42	24	114	20	200
3 BR (5 persons)	42	24	0	0	66
3 BR (6 persons)	0	0	0	10	10
Total Units	84	72	114	30	300
Total Rms.	378	288	456	130	1252

Room sizes are slightly larger than in USHA projects; living rooms, for instance, average about 11 by 15 ft.

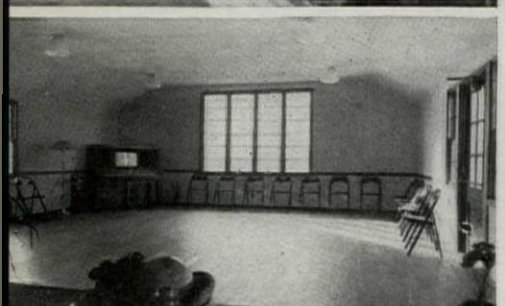
without stepping into the living room. Plans have been worked out to give a separated eating area wherever possible.

For reasons of economy and design, single-bedroom dwelling units were used as low wings on buildings containing larger units. Building type C, familiar enough in plan, has been given a different exterior handling by the use of a band of second-floor windows and by the roof treatment. When it became necessary to cut costs somewhat, seven C buildings were substituted for seven D's. This suggested a further variation. Nineteen C buildings, all alike except perhaps for color, were considered too many, even on two sites. Thus emerged the variation of the C building with board-and-batten ends, in place of brick.

Though similar to A buildings, the D accommodates more families, and in addition has units with larger third bedrooms than any of the other types. This, a requirement of the Division of Housing, accounts for the second-floor overhangs, which are also a result of designing to standard joist lengths.

Perhaps the most frequent comment on this project concerns its homelike quality. It *has* little institutional character. The architects worked consciously to achieve this end. They were most careful in matters of scale to minimize rather than accentuate apparent size of buildings, by such means as using double-coursed shingles with 14-in. exposures and using larger windows (though slightly fewer than might have been the case). Buildings are studiedly diversified, and varied in color treatment: shingles are soft green, pearl gray, or warm tan; accents of color occur in the tile-red entrance platforms and at red or green doors; boarding is natural color or a parchment shade, the color of all trim except window sills, which are tile-red. Exterior wall materials are consciously varied also, a practice which probably will remind many readers of typical speculative houses. In considering the individual buildings as architectural designs, it would seem as if, at about this point, achieving homey-ness became too much of a struggle. Yet the architects were honestly trying to avoid, on the one hand, cold, mathematical modernism; and on the other, stylistic electicism.

Surprisingly much of the equipment is above the quality ordinarily installed in low-rent housing. It was bought early, but even so, war conditions limited choice pretty much to baths, lavatories, refrigerators, and ranges that would grace any home. Though plans were finished in November 1942, construction did not really start until late spring, 1943. On October 1, 1943, the first ten buildings were turned over to the Housing Authority; the rest followed shortly. Photographs below show (left column) typical dining corner; community hall, Center Court; typical kitchen; (upper right) entrance, C building; (below, left) typical living room; (right) lobby, Community Building, Center Court.

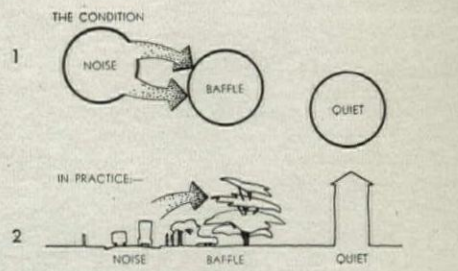


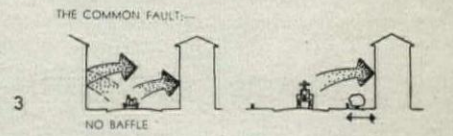
Planning Against Noise

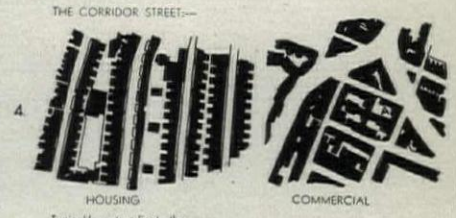
Layout of Structures to Minimize Sound Transmission

by Donald Dex Harrison, A. R. I. B. A.

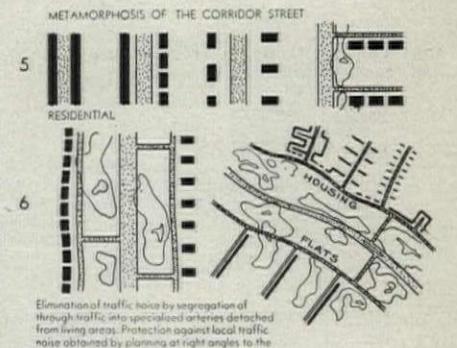
Donald Dex Harrison, A.R.I.B.A., British architect and town planning consultant, prepared the following technical discussion of methods of protecting residential dwellings, particularly multifamily structures, against noise. Though originally written for the English public, the data and suggestions included are equally applicable in this country. They were prepared to supplement work done by the British Building Research Station on the structural aspects of sound transmission. The article has been published in Great Britain in The Architects' Journal, *but this is the first time such a complete study of the subject has been made available in this country. (Copyright, British Ministry of Works.)*



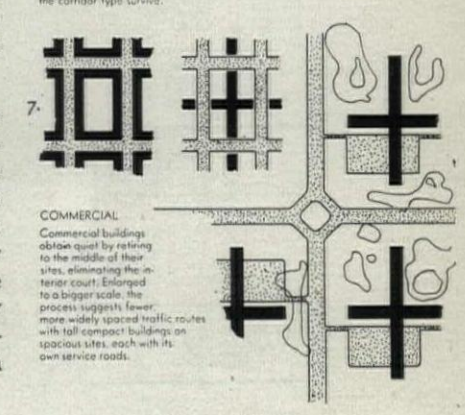




Typical layouts indicate the absence of the requisite baffle between noise source and living or working space. The corridor type of street acts as a reverberator for the sound and is a bad form of planning from this point of view.



Elimination of traffic noise by segregation of through traffic into specialized arteries detached from living areas. Protection against local traffic noise obtained by planning at right angles to the street. Only in the case of the small cul-de-sac or backwater street, where the traffic noise is negligible, does the corridor type survive.



The purpose of these notes is to indicate, diagrammatically, the general principles to be observed in planning against noise in buildings, and they are intended to supplement the volume dealing with the structural and theoretical aspects of sound transmission issued by the Department of Scientific and Industrial Research,* under the title: *Sound Transmission in Buildings, Practical Notes for Architects and Builders, R. Fitzmaurice and W. Allen, H.M.S.O., 1939.**

There is no hard and fast demarcation line between the two considerations, structure and planning, and, in fact, the basic principles of planning against noise were sketched out in the D.S.I.R. volume. These notes are an amplification of the principles therein enunciated and are intended to be read with that volume. It has not been felt necessary to recapitulate the structural groundwork, but this groundwork is implied and the diagrams should be read in each case with the accepted structural context. When, for instance, in Diagram 22 reference is made to a discontinuous party wall, this implies a party wall built in the manner recommended in the D.S.I.R. volume. Similarly, in Diagram 29, the "floating" room is intended to be a room constructed by a method similar to that of a "floated" room in the D.S.I.R. volume and so on.

Even the best planning may be rendered abortive by defective structure. This is particularly true in monolithic and framed structures through which sound can travel great distances from its source to cause annoyance in remote parts of the building. Conversely, elaborate structural precautions against sound transmission are of little value if the planning is inherently bad. Some of the plans illustrated are so defective from the standpoint of noise that only a prohibitive expenditure on the structure could hope to make them tolerable. Diagram 37 is a case in point. The two elements, structure and planning, support each other and the best results in noise prevention will only be attained when careful attention is given to both aspects of the problem.

The first general principle to be observed is that of *zoning or grouping the respective elements.* Appropriate zones will be *(a)* quiet zones, to include all rooms, such as bedrooms, where quiet is the main consideration, *(b)* noisy zones, where would be grouped all the noise emitters in the dwelling, such as the service rooms, access corridors, and *(c)* zones which are alternately emitters of noise and quiet zones, according to special circumstances, the living room being in this category since it is required on the one hand for reading and on the other for the radio or piano.

The second principle is: *to provide for adequate bufferage or baffle between the different zones.* The baffle might be structural, consisting of an insulated wall, or it might be a planned buffer, a series of closets or rooms, or, again, it might combine both elements. Diagrams 80-81 show how an elevator shaft might be baffled, first structurally and then by a planned buffer of service rooms.

* Agencies and publications referred to in this article are British.

THE INDIVIDUAL BUILDING
THE HOUSE
COMBATING NOISE BETWEEN HOUSE & HOUSE

Noise passes through the party wall and along the external walls or any wall common to both houses, along floors, roofs, and through window openings. Airborne noise generated in one row of houses will disturb other rows if planning is too congested (see sheet 1. This type of tunnel back congested housing is now, fortunately, obsolete.)

DIFFERENT WAYS OF PLACING THE BUILDING ON THE SITE

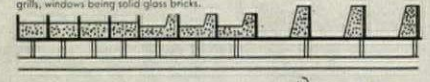
8

Simple use of baffle wall showing various methods of staggering to increase the baffling effect.

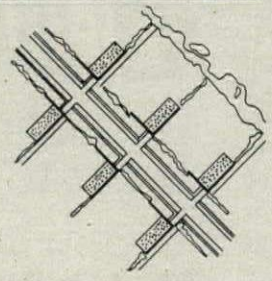
9

The use of an additional baffle on the road frontage to cut out street noise. This type of baffle would consist of a blank wall, only pierced for ventilation grills, windows being solid glass bricks.

10

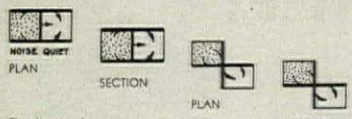


11



SOME COMMON FAULTS IN DETAIL PLANNING AND SUGGESTIONS FOR THEIR REMEDY

12

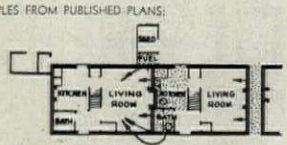


The planning of a noise source adjoining or diagonally opposite to a quiet room, in either plan or section, is faulty since noise will be transmitted along any continuous wall, ceiling, or floor. Rooms which in practice are thus faultily juxtaposed are as follows:

13

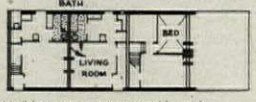
EXAMPLES FROM PUBLISHED PLANS:

14



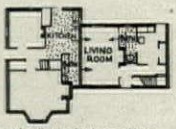
An example where all the noisy elements in the house are concentrated against the wall of an adjoining living room. The sink, bath and w.c. will cause particular annoyance. In vertical section these noises will disturb the adjoining bedrooms by vibration of the party wall. Improvement could be affected by alternating the plans, as is more usual.

15



Bathrooms next to living rooms on narrow site with a path for sound along the party wall to living room and adjoining bedroom over. A common type of plan.

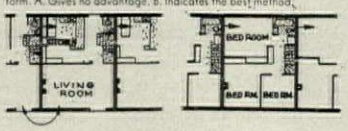
16



Living room with adjoining kitchen and bath and with its own bathroom. This type of planning is common where the end house in a row is placed at right angles to secure artistic effect.

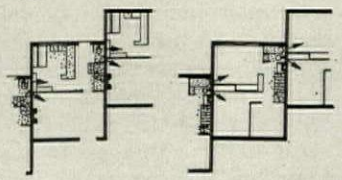
The following diagram shows the advantages to be gained by suitably staggering a terrace type plan which would have objectionable features in terrace form. A. Gives no advantage. B. Indicates the best method.

17



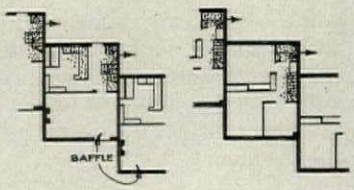
A.

18



B.

19



20

BRITISH TYPE
UNIVERSAL PLAN

The speculator's "universal" plan. Fairly safe from the noise point of view in semi-detached form, but it has the drawback of a large party wall area.

The American type of "universal" plan places the noisy elements next to the party wall forming a baffle for the quiet rooms. This is a theoretically sound semi-detached type:

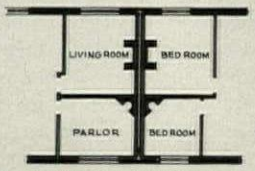
21

AMERICAN TYPE
UNIVERSAL PLAN

THE USE OF STRUCTURAL BAFFLES

Baffle by use of discontinuous party wall between two houses, the wall formed of 2 completely discontinuous 4½" leaves. This is an improvement on the 9" solid wall.

22



Addition of extended baffle wall against airborne sound

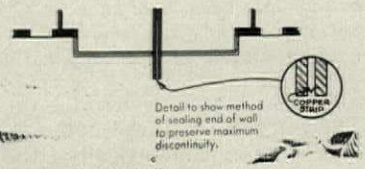
23

ay windows are frequently a weak element in the ansmission of airborne noises:

24

The use of an extending baffle wall is a better treatment:

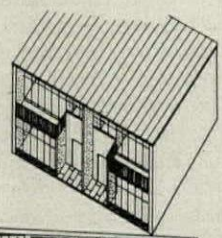
25



Detail to show method of sealing end of wall to preserve maximum discontinuity.

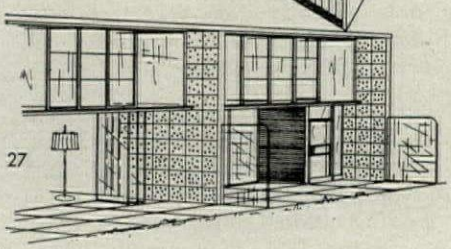
An advance is to treat the structural baffle as an integral part of the design as in the American plan illustrated on Diagram 21. A few examples:

26



In contemporary design with its large window areas, the structural baffle wall is especially necessary to give the feeling and reality of privacy.

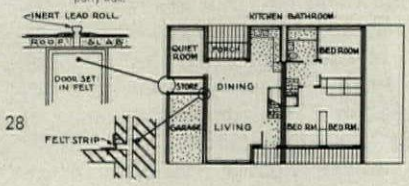
27



PROVISION OF QUIET ROOMS WITHIN THE INDIVIDUAL HOUSE

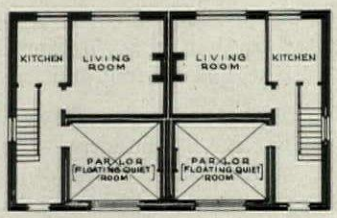
The American plan on Diagram 21 can be elaborated to provide for a garage and quiet room. This is an example of the planned quiet room segregated as much as possible from the main building. The garage should also have the maximum segregation and should never adjoin the party wall.

28



Note. Where hollow walls are shown in these diagrams, they are intended to represent the discontinuous baffle walls indicated at the foot of Diagram 21.

29



Typical British type universal plan showing the parlor treated as a fully floated quiet room. This is the minimum plan form suitable for such a measure which would add appreciably to the cost of the house. It would seem that the quiet room properly segregated on plan, as in the first of these two examples, is to be preferred on account of both amenity and cost.

THE INDIVIDUAL BUILDING
THE APARTMENT

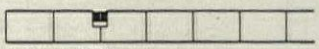
The basic principles are the same as for the house. In the case of apartments difficulties are intensified since each apartment is surrounded on four sides by other apartments instead of one or two sides as is common with the house.

30

The principle of zoning into noisy and quiet zones will apply with equal insistence.

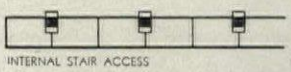
THE PRINCIPAL PLANNING TYPES

31



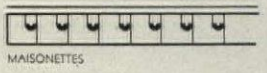
CORRIDOR ACCESS

32



INTERNAL STAIR ACCESS

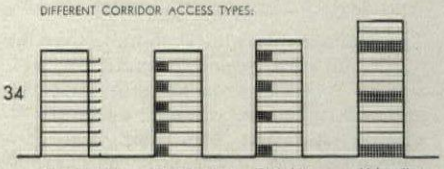
33



MAISONETTES

DIFFERENT CORRIDOR ACCESS TYPES:

34



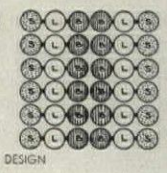
Normal corridor access. Corridor to each floor.

Normal maisonettes access corridor to each alternate floor.

'Duplex' type, maisonettes. Corridor to every third floor.

Maisonettes. Special type with corridor occupying the complete width of every fifth floor.

The condition Noise – Baffle Quiet — becomes, in this case – – Service – – Living — Bedroom. This in turn can be accumulated into larger zones of noise and quiet by utilizing more than one apartment.

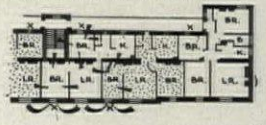


The value of the different plan types (Diagrams 31-34), in producing various zone patterns, will become apparent as the analysis unfolds.

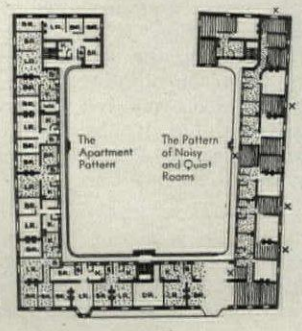
ANALYSIS OF CONTEMPORARY DESIGN

Working class apartment design has followed a definite trend in recent years and a more or less standard type of plan has been produced using brick structure, four or five floors in height, with corridor access to the apartments. The detailed design of the apartments is controlled within narrow limits. The two following examples are typical of this class of work.

36



A.



37

B.

It should also be noted that the diagrams and criticisms are made with the single aspect of noise transmission in mind and no other criticism of the plans is implied. It may be that plans shown to be defective from the noise standpoint are excellent in other ways and, conversely, plans held up as good examples might have serious faults in other directions.

In practice the relative gain of reduced sound transmission will often have to be set against loss in some other way and the planner will have to strike an appropriate balance between the many conflicting aspects of his problem.

It will be convenient to divide the problem of sound disturbances into two broad categories:

1) Those noises produced by some source outside the building.

2) Those produced within the building.

I. Noise from Outside

Consideration of the first heading, noises produced by an outside source, is a major problem in itself and can only be touched on here. It will be clear that the layout and siting of the building will come under review and, ultimately, the zoning of buildings away from the sources of noise. These are matters of Town and Regional Planning, which will seek to segregate noisy industries away from residential zones, and so forth, but the particular problem of traffic noise, which is by far the most insistent cause of trouble, cannot be ignored in treating with the individual building.

Diagrams 1 to 7 are an attempt to show, very briefly, the nature and possible remedies for this problem. They are axiomatic, but serve as an approach to the main problems discussed in the notes and they serve to reinforce, from the particular angle of noise disturbances, the arguments in favor of an overhaul in our present conception of site planning and street frontages.

The two tracings, Diagram 4, are typical of a great proportion of our urban layout and illustrate most of the more glaring noise-planning deficiencies. The prime source of trouble, apart from gross overcrowding, is the so-called corridor or tunnel street. Both examples illustrate this type of planning, which is more or less universal in this country,* except perhaps in wealthy suburban neighborhoods, and, although the residential pattern shown is now obsolete, the corridor street persists in most new developments. This is a case of a form of planning which has outlived its function. Before the advent of motor traffic, there was, no doubt, much to be said in favor of the building facing on to the street; and where the street remains a quiet by-road or cul-de-sac this is still one of the pleasantest forms of planning. There is, however, no justification for facing buildings on the modern traffic artery with its noise and fumes, and Diagrams 5 to 7 sketch alternative methods. These are, briefly, to plan at right angles to the street, to interpose service ways between the traffic streets and the buildings and, in non-residential areas, to utilize plans built on a central spine. The use of additional height, too, can often give relief where it is not accompanied by additional density.

* And in the United States.—Editor.

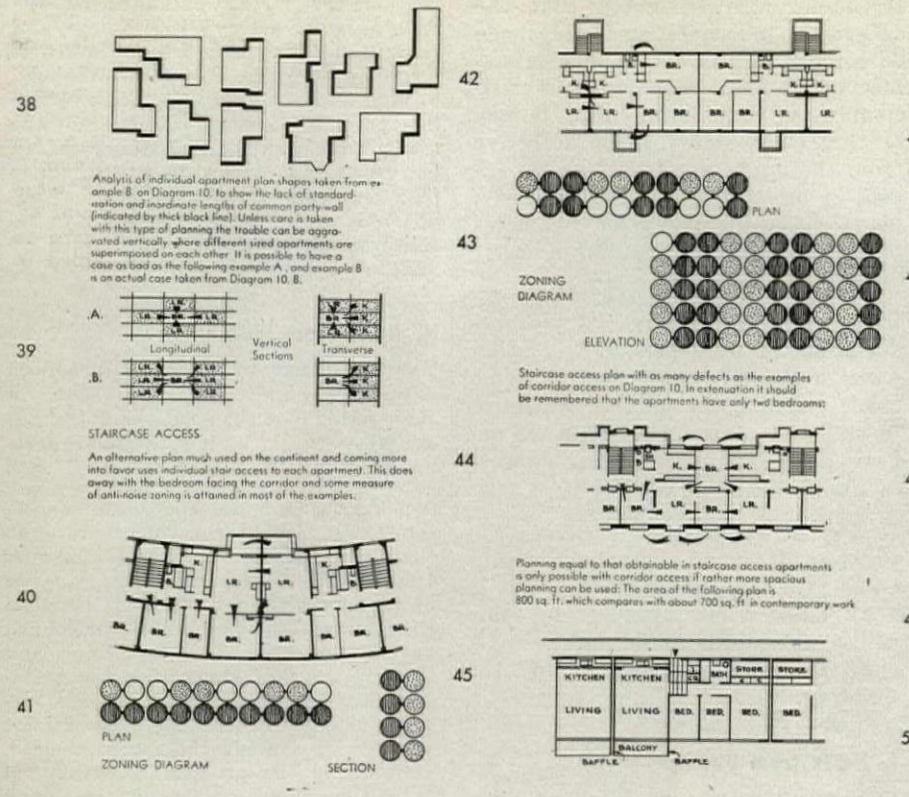
II. Noise from Within

The consideration of noise produced within the building will be limited in these notes to residential examples, under two headings, houses and apartments.

Noise between house and house can often be reduced by careful attention to the placing of the buildings on the site. Diagrams 8-11 illustrate. Use is made of sound resisting baffle walls between the houses. The simple baffle prolonged beyond the faces of the buildings, and various ways of staggering the buildings, are indicated, giving different degrees of baffle effect. The area of joint party wall can also be much reduced, simplifying the problem of structural insulation. The object of the blank baffle wall is to increase the length of the path of air borne sound, which tends, thereby, to be dissipated, and by continuing a blank wall along the street front, as in diagrams 10-11, most of the traffic noise can be eliminated. This is a return to a very old system of house planning, when the house was literally a castle and faced inward to its garden courts. Under present conditions of congestion and noise in towns this might well prove a satisfying solution, offering quietude and grace to the house.

Irritation from an adjoining house is much more difficult to bear than irritation produced by one's own family; it is important to avoid placing noisy rooms against the quiet rooms of an adjoining row house. Diagrams 14-17, taken from published plans, as indeed are all these diagrams, indicate that this principle is not always observed. The noise of a flushing toilet is particularly objectionable in a living room, especially if it is a neighbor's toilet, but it occurs in two of the examples given. Diagram 15 illustrates disturbance obliquely from bath to living room by vibration of the common walls. This effect can act when the bathroom is upstairs in the same relative position since the entire party wall will be set into vibration.

The terrace house in diagrams 17-19 was expressly designed to be set in stepped formation on the site and illustrates advantages to be gained by intelligent use of such planning devices. In ordinary terrace form this plan has objectionable features, inasmuch as both toilets are on the party wall, in one case opposite a bedroom, in the other case opposite the adjoining owner's dining table—a particularly bad piece of siting. In addition, the bathroom and staircase, both noise emitters, are on the party wall. In diagram 18 the houses have been stepped and this



was the form in which the plan was published, but beyond reducing the area of party wall common to both houses, which will require insulating, and achieving lengths of baffle wall against airborne sound, no advantage has accrued. In fact, the toilets are likely to prove even more objectionable as they will directly affect two bedrooms and the living room.

Diagram 19 gives the better way of staggering this plan, so that the noise sources face the open air. For best results the part of the wall common to both houses would be insulated against sound and insulated from the projecting baffle walls so that vibrations produced in these walls are not transmitted to the common party wall.

In the examples so far discussed it has been assumed that the living room requires quiet conditions. While this is true, the living room by virtue of its radio, piano and general use, is also the chief noise emitter of the house. It is better therefore if the living rooms can be separate from each other and, all things considered, a plan which places the noisy service rooms together on the party wall, with living rooms well separated, will give the best results. In small housing development this is only possible in semi-detached houses or in staggered units. Diagrams 20-21 illustrate the point. The British type, the so-called Universal plan adopted as standard for small parlor houses, segregates all the noisy service rooms away from the party wall. The rather deep plan form adopted gives a very large area of common party walling, with the living rooms opposite each other. This is a great source of annoyance. Noises in the opposing living rooms can always be heard. In the American pattern of the Universal plan, the position of the noisy rooms is reversed and they are strung along the common party wall, thus forming a buffer between the two living rooms. The zoning principle is here fairly well developed and this seems to be the ideal treatment of the semi-detached type.

The arguments for acclaiming this a good plan are as follows:

1) The service rooms will receive noise from the opposing service rooms, but being noisy rooms themselves, they will not be inconvenienced, since their own threshold of noise is unlikely to be exceeded.

2) The service rooms serve to baffle the noise produced in the opposing living rooms, so that one can function as a quiet room, whilst the other is acting as a noisy room.

3) One set of service rooms serves to baffle the noise produced in the opposing set, from its own living room.

4) The bedrooms are kept, as far as possible from the common party wall, only one bedroom in each house being planned along it, as against two in the British type Universal plan.

Investigation at the British Research Station and elsewhere has established the fact that the best method of soundproofing a wall is to provide for complete structural discontinuity. Diagrams 22-27 illustrate the use and value of the discontinuous party wall, together with its extension as a baffle on either side of the house. As the demand for greater openness of plan arises, so the dividing walls between buildings must be extended outwards, to take the place of the solid external wall of the traditional plan. The use of these baffles is supplementary to good planning arrangements, but it must be explained that the screening effect against airborne sound is only slight. The main advantage lies in the effect of privacy which they induce and which is more psychological than real.

III. Noise in the Individual House

So far consideration has been given mainly to noise between house and house. It is necessary to examine noise irritation within the individual house.

The individual family should have living conditions which provide, in addition to freedom from outside irritation and disturbance, rooms adequate in sound insulation for their respective functions, and any family of three or more will require one room for study in which absolute quiet can be assured. This is particularly the case with growing children, who must have a room apart for their lessons and the development of their mind, away from the family caucus, with its radio, piano, and conversation.

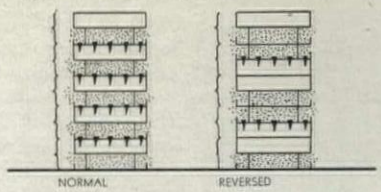
Pre-war housing has not made any provision for this need. The parlor or the bedrooms, inadequately insulated, have had to serve as best they may.

A more desirable solution is to isolate one room in the house completely from its fellows and there are two ways of doing this. The planning method, which can be adopted when insistence is not on minimum cost, is illustrated in diagram 28. A small quiet room, so placed that it can be isolated readily from the building, is planned in a quiet corner of the house and provided with structural insulation of the discontinuous pattern, along the walls which connect it to the main building. Special attention would be required for the door to this room, but it acquires its special characteristics of quietude mainly on account of its position in the plan.

The alternative method is to use the structurally separate "floating" room construction, similar to that elaborated by the B.R.S. This method is applicable to any plan; a parlor, or even a bed-

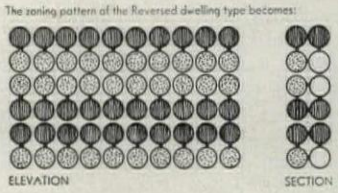
By reversing alternate tiers of maisonettes, impact noises from noisy rooms above bedrooms can be reduced by 50%. This expedient serves also to increase the size of the different zones by a like amount

51



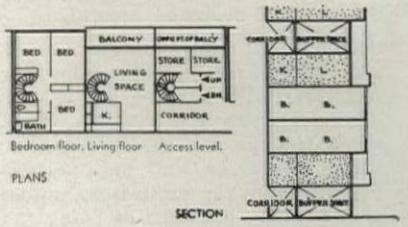
The zoning pattern of the Reversed dwelling type becomes:

52



A development of the reversed maisonette type, eliminating the corridor over the bedroom and giving bufferage between living space, places one access corridor every 5th floor.

53



room, could be chosen for treatment. The idea is illustrated on diagram 29, which shows the parlor so treated. For a small house it will involve a considerable additional outlay in structural cost, as the provision of an independent floating box of this nature is an expensive matter. Consideration might be given to combining the functions and structure of this type of quiet room with the provision of an air raid shelter, more especially as both functions would probably benefit by the use of an independent floating portal frame.

Where conditions permit there can be little doubt that the "planned" quiet room is to be preferred to the "structural" quiet room and is likely to give the greater amenity for the additional outlay involved.

IV. Noise in Apartments

Sources of noise irritation are the same as in houses but are aggravated by the very much more concentrated conditions of living. It was seen that the essence of good anti-noise planning lay in the grouping of various parts of the dwelling into zones and in the use of various methods of baffle. There were three zones:

a) Noisy zone: service rooms (kitchen, toilet, bathroom, corridors), stairs, elevators, access ways.

b) Living zone: alternately noisy and quiet.

c) Quiet zone: bedrooms and study or special quiet rooms.

In the design of apartments the opportunity arises of expanding the zonal treatment, which in the case of houses cannot usually embrace more than two units, to embrace several units or dwellings, thereby creating larger and more efficient zones. Diagram 35 illustrates The process can be used in some measure to compensate for the additional congestion of the apartment as a type over the house. Further analysis will show how different zonal patterns can be built up on commonly accepted plan types. Diagrams 31-34 illustrate the principal types of plans to be considered, each with its special uses but each producing very different problems from the standpoint of sound transmission.

Generally speaking, the best results from the sound transmission point of view are obtained from plan patterns that are simple and strictly standardized in their parts. The crossword puzzle type of plan, when each room is fitted into a preconceived and sometimes tortuous plan shape, rarely gives good results.

Apartments for Lower Income Groups

The most acute noise problems arise in this class of apartment owing to the stringency of plan and construction.

Diagrams 36-37, illustrate two examples of this class of work, the planning and construction of which are quite typical and, indeed, little variation is to be found throughout the country. Access is by external corridor, the apartments are intermixed, two and three bedrooms, and the construction is solid load-bearing brick walling. The most noticeable noise-planning defect arises from the lack of standardization in the plans, which has resulted in peculiar individual apartment plan shapes. For easy reference the plan shapes of individual apartments have been extracted and laid out side by side in diagram 38. The dog-leg party walls of inordinate length will be noticed. Such walls are very difficult and expensive to insulate. In many cases they are built merely of 4½" brickwork, no attempt apparently being made to reduce the passage of sound between apartment and apartment. It would of course be almost out of the question to attempt completely discontinuous party walls on such a plan pattern.

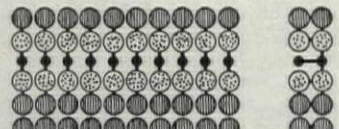
A recognized weakness in corridor-access apartments of normal design is that, with two- and three-bedroom apartments, some bedrooms must face into the access corridor, which is little better than having them face directly on the sidewalk of a public street. It is partly to mitigate this defect that the blocks are planned round external angles and lose some of their simplicity of plan; but it will be seen that there are still a few bedrooms facing the corridor. As standards rise and three-bedroom apartments become more the rule, this defect will be aggravated. It is doubtful whether the normal corridor-access plan could survive such conditions.

Only a perfunctory attempt has been made to segregate noise zones and quiet zones. The analysis on the right hand side of 37 shows how the different elements are interwoven. Living rooms adjoin bedrooms, bedrooms adjoin kitchens, baths and stairs. Only the central 9-in. spine wall gives a suggestion of tolerance to the plans. A common fault is to place a bedroom next to an adjoining apartment's living room or kitchen; this occurs no less than 9 times in plan 37. Certain of these bedrooms adjoin their own living room and a neighbor's living room and kitchen, one is between two bathrooms and the access corridor, yet another between a living room, the access corridor, a toilet and the main stair! The rooms marked *X* are the worst examples.

This analysis has considered only the horizontal plane. In diagram 39 it has been elaborated to include the vertical, and it is seen that the faults are repeated vertically. Looked at in the solid, some of the bedrooms on plan 37 have to contend with the noise from six adjacent and obliquely adjacent liv-

Zoning diagram of plan example 53 indicating value of bufferage:

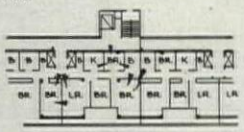
54



ZONING DIAGRAM

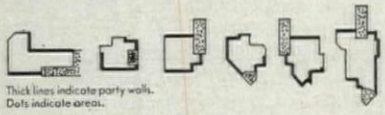
Apartments for the higher income groups respond to the same kind of analysis and suffer from the same kind of defect. In some cases the defects are actually aggravated by more congested conditions of planning. The following examples illustrate:

55



Luxury apartments. Corridor access supplemented by elevators. Note bedrooms facing corridor and sandwiched between noisy rooms. Also bedroom adjoining living room. Compare with working class apartments (36)

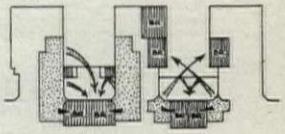
56



Thick lines indicate party walls.
Dots indicate areas.

Plan shapes taken from a block of high rental but congested luxury apartments. Compare with 38 and note the similar excessive lengths of party walling.
Note also the small service areas, peculiar to congested luxury apartments, which act as reverberators for the noises produced by rooms facing on them.

57



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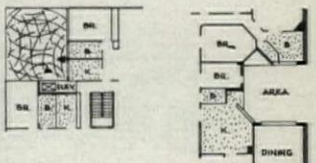
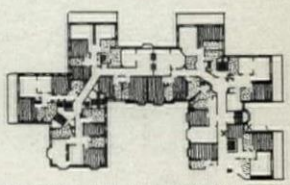


Three examples of luxury apartments planned round narrow deep areas on which face bathrooms, kitchens and toilets, and bedrooms and living rooms. In each case the buildings are at least five stories high and the densities range up to over 300 apartments per acre. It must be remembered that the chief defect is vertical — each 'quiet' room is affected by the accumulated noise from all the rooms facing the area from top to bottom of the building.

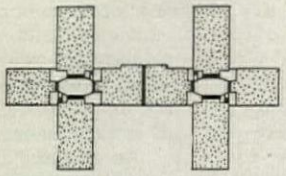
59



Example illustrating most of the common defects of this type of apartment. Lack of adequate zoning, lack of baffles, planning round interior courts, haphazard & confused shapes.

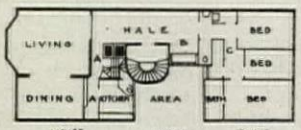
METHODS OF BUFFERAGE BY PLANNING

60



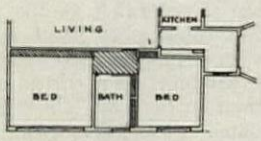
Example showing complete apartments isolated from each other by air or space buffer and connected only at the common staircase and by one party wall among eight flats. Compare the party wall length with example 56. Compare also with example 7 for elimination of traffic noises.

61



Luxury apartments, one apartment per floor, obtaining extreme degree of isolation by luxurious space planning. Note the three zones of bufferage A, B, C. Once planning has reached this degree of spaciousness problems of noise have ceased to be serious. For a more modest example refer to 46.

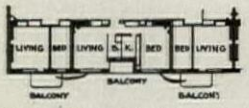
62



Use of continuous closets and ducts as baffles. The value is in the continuity. The lobby acts in a similar way and completes the chain. Other examples 28, 48, 53.

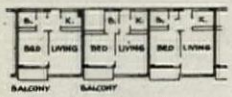
Baffles against external air borne sounds follow housing principles. The important thing is to obtain the feeling of privacy, the actual noise reduction is not great. The old type of protruding balcony can be considered obsolete: See also example 42.

63



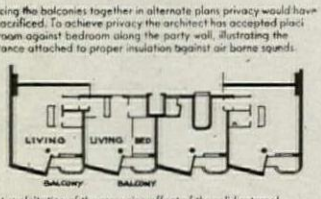
Note the difference in privacy between the protruding and inset bal conies. The inset balcony uses the main wall for baffle purposes.

64



By placing the balconies together in alternate plans privacy would have been sacrificed. To achieve privacy the architect has accepted placi living room against bedroom along the party wall, illustrating the importance attached to proper insulation against air borne sounds.

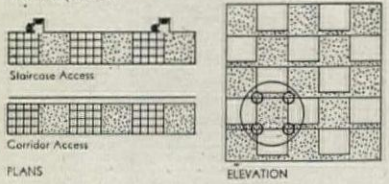
65



Brilliant exploitation of the screening effect of the solid external wall, an extension of the principle illustrated in Diag. 64, giving even better privacy.

Beyond a certain point vertical disturbance vitiates further improvement in the horizontal plane. The cellular plan of Le Corbusier provides equal vertical and horizontal bufferage. This is the final step forward.

66



ing rooms and three kitchens! This is the measure of the noise problem in apartments.

A type of plan coming more and more into favor, largely because it produces better plans from the point of view of noise, is the staircase-access type. Two examples of well designed apartments of this type are given and the zoning diagrams 41 and 43 indicate the substantial improvement over the plans previously discussed. In these two plans every effort has been made to obtain zonal segregation and they are representative of the two methods of zone treatment possible with this plan pattern. In the one case the quiet rooms are grouped together about the party wall; and the service rooms are grouped about the staircase, in the other example the quiet rooms are grouped on one face of the building and the noisy rooms on the opposite face, an arrangement that cuts out disturbance by airborne sound in the quiet rooms. There would seem to be little to choose between these zonal patterns.

It must not be supposed that staircase-access types are necessarily superior to corridor-access types. Diagram 44 illustrates an example which has all the defects of diagram 37, dog-leg party walls, bedrooms surrounded by living rooms and kitchens. The plan is a two-bedroom type, however, and comparison is a little unfair, since the addition of two further bedrooms along the party wall would greatly improve it.

On the other hand, 45 shows a three-bedroom corridor-access type which avoids most of the defects of 37, although admittedly the plan has had to be drawn more spaciously to accomplish this. It is not put forward as an economical design, and has the disadvantage of a long length of corridor per apartment.

This plan, with its relaxation from strict economic standards, should be compared with 46, a plan of a staircase-access type with a comparable relaxation of existing economic standards. It must be confessed that, comparatively, the staircase-access type always scores. Plan 46, basically the same as plan 42, has had neutral buffer zones interposed between its principal zones. The common stair separates the two living rooms; the sun balcony, instead of being planted on the face of the building, has been incorporated so as to buffer the living room from the bedrooms. The plan area is 900 sq. ft., and the zoning pattern illustrates the extent of the improvement on previously considered types.

Corridor-access plans, despite their deficiencies in detail planning, have certain advantages over staircase-access types, the most notable being that economical elevator services can be arranged from a common central hall. Elevators are, unfortunately, not economically possible for lower income apartments unless they can be made to serve many apartments on each floor and this limits the use of staircase-access types of buildings of a height of not more than 4 or 5 stories.

The maisonette has been put forward as a means of overcoming the chief defects of corridor access. This type of plan has both advantages and disadvantages from the noise point of view. Diagram 48 illustrates a well planned example. It will be seen that only the kitchen faces the corridor. Horizontally the zoning pattern is good, since one floor is devoted entirely to noisy rooms and the alternate floor to bedrooms. This means that, vertically, the bedrooms are sandwiched between two noisy floors, and the weakness of horizontal zoning is that impact noises on the floor are most difficult to counteract. The bedrooms of the maisonette are bound to be affected by impact noises from the floor above. Consider the plight of the bedroom marked *X* in vertical cross section, diagram 50. For these reasons the simple maisonette cannot be considered as satisfactory as the well designed apartment.

Various planning expedients are available to minimize impact noises on the bedrooms. By turning alternate rows of maisonettes upside down, two floors of bedrooms are made to come one above the other and two noisy floors are similarly brought together, giving the zoning pattern of diagram 52. This is a demonstrable improvement on 49. Impact noises from bedroom to bedroom below are not likely to be severe and the impact noises from living room to bedroom below are reduced by 50 percent as against the previous plan. Furthermore, the living room is part of the same apartment as the bedrooms it inconveniences, and noise disturbance will be more amenable to control. Corridor impact noises have been reduced 50 percent, a most important contribution.

Throughout the criticism it has been implied that the corridor is a major source of noise disturbance, being really an elevated public causeway. The next logical step in designing good noise-resisting buildings is to eliminate as much corridor length as possible. Diagram 53 is a development of diagrams 51-52 with corridor at every 5th floor interval, serving apartments both up and down. In this plan the length of corridor access per apartment is only 9 ft., and it is partly baffled by noisy rooms (kitchens) above and below. There is a small impact area above the dining recess in the living space but no rooms of any sort actually abut on the corridor, and the bedrooms are completely segregated. With such a small area of corridor to treat, it becomes feasible to provide it with a floated floor to complete the segregation initiated in the planning arrangements and the corridor as a source of noise irritation may then be considered to be eliminated.

The use of a complete buffer story at corridor level to separate the two living room zones is a further refinement and places this type of plan in the same category as plan 46, by eliminating impact noises between living room and living room.

These two types 46, 53, represent the best possible practice, in stair access and corridor access respectively, with apartments for the lower income groups, but whereas 46 is limited in height to 4 or 5 stories, 53 is only prac-

ticable in big schemes, with elevator access and buildings of eight stories or over.

The analysis has indicated that normal corridor access types are generally inferior to corresponding staircase access types and that vertical zoning of rooms is better than horizontal zoning, owing to the great difficulty of masking impact noises on the floor. Nevertheless, the specialized corridor access type 53 is equal to the best staircase access types and illustrates the point that each has its special advantages. The diagrams further illustrate the advantages to be gained by zoning and baffling as well as indicating the remarkable deficiencies in both these respects prevalent in some contemporary work. It remains only to point out that the external baffle against airborne sound is just as necessary in apartments as in houses (diagrams 24-27). Diagram 42 illustrates the wrong method of designing apartment balconies, planted on to the face of the building, and diagrams 45, 46, 48 and 53 better ways of treating the problem. Further attention is given to this point in diagrams 60-69.

Apartments for the Higher Income Groups

There is no fundamental difference between the so called "luxury" apartments and working class apartments, except that plan types become more varied with increasing size of apartments and provision of bufferage within the more spacious layouts is easier. Rather surprisingly the anti-noise planning of many "luxury" apartments is no whit better than that encountered in working class apartments despite the great increase in cost. In most such cases the extra cost of the building is absorbed in high site values and, frequently, these expensive sites are placed in the noisiest positions on main traffic arteries. The remaining extra costs can be accounted for by structural embellishments of a superficial kind and by better provision for services. The noise value of many of these expensive apartments is, consequently, often very low. Some examples of ill planned apartments of this nature are illustrated in diagrams 55-59 and they should be compared to the corresponding examples of working class apartments, 36 and 37, over which they show no improvement. Compare the selected apartment plan shapes 38 and 56, one working class, one luxury.

Two sources of noise irritation occur in this type of apartment which are not met with in working class apartments; the elevator and, strangely enough, air borne sounds due to congested planning around interior courts. Elevators are treated separately. Diagrams 56 - 58 illustrate the dangers of interior court planning. These are, for the most part, well planned apartments in detail and there is no cure for this particular evil except reduced density on the site. The working class apartments built recently, from which interior courts have been virtually eliminated, are at a density of not more than 60-70 to the acre whereas these "luxury" apartments range up to densities of 300 to the acre.

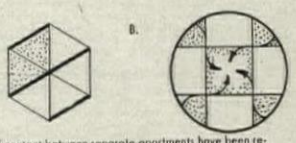
Diagram 59, a combination of staircase access and corridor, with elevators, illustrates in greater or less degree all the faults to which these types of apartments are prone. There is the same absence of defined zoning as in 37, bedrooms being commonly placed between noisy rooms. Note particularly the bedroom marked *X*, situated between staircase, elevator, bathroom and placed within the internal angle of a narrow well. This plan illustrates, together with 56, the method of jigsaw planning to a preconceived mould, referred to in the preamble to the section dealing with apartments and it is easy to see how the general principles of organized zoning are lost sight of in the effort to fit in the various niggling elements. There are no interior courts, except the central large one, but a good many interior angles with noisy rooms and quiet rooms juxtaposed. The bay windows in the main court should be noticed as they aggravate the conditions in the interior angles and are likely to be a source of noise irritation themselves. If broken down, the apartment plans would exhibit some weak party walls. A certain amount of bufferage is provided in the centre of plan in the form of closets, etc., and this point is taken up in the following diagrams.

Buffers and Baffles

Diagram 60 shows the simplest form of baffle, using space to dissipate the sound between apartment and apartment. Notice the almost complete segregation of each apartment. This is the simplest and the best method of obtaining quiet and private conditions in the apartment. In the more sumptuous plans now under review the usual method of obtaining quiet conditions within the apartment is to segregate the zones by wide halls, corridors, store rooms, and so on. This is illustrated in 61 and 62. Simpler examples of the same method were 46, 48 and 53. A stage is reached where increase in horizontal bufferage is vitiated by weakness in the vertical bufferage and any additional horizontal buffer is valueless. The point has been reached in diagram 61, where no appreciable disturbance is to be expected from within the apartment and additional spaciousness would be waste. Disturbance from adjoining rooms up and down is, nevertheless, just as likely as in any other apartment of good zoning characteristics.

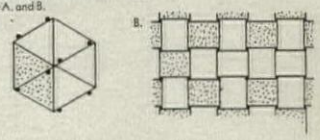
Treatment by vertical baffle has been considered previously, notably in connection with maisonette, 48-54, when it was seen that a complete buffer floor could be interposed between every pair of maisonettes. Where planning can be more spacious, other expedients are available, the most important being Le Corbusiers' principle of the cellular plan, indicated diagrammatically in diagram 66. Reduction in noise transmission was only one of many reasons for the production of this plan and it has the disadvantage of additional cost and excessive heat loss, but against this, it achieves a degree of amenity and privacy equal to that of a detached house. The principle is simply that of introducing space bufferage on all four sides of the apartment which normally abut on other apartments. The only

67



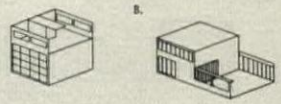
Points of contact between separate apartments have been reduced to the four angles (66 inset circles) indicated by thick black lines—67 A. Sound may still pass from apartment to apartment via the continuous walls and floors, 67 B. The next step is to reduce the points of contact to the stanchion lines only, resulting in eight points of contact for each apartment. And the final stage is to introduce some form of damping into these eight joints so that each apartment is an independent 'floating' box. 68 A. and B.

68



The following basic dwelling units are possible on the cellular pattern: A. with roof garden, B. with garden at living room level.

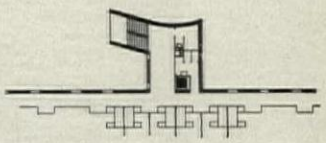
69



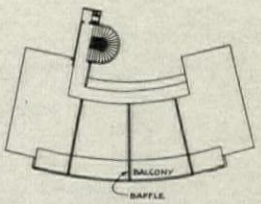
ELEVATORS

The special problem of elevator noises can be avoided by segregating elevator access from the main structure. This is the most important planning contribution to the problem. Examples.

70

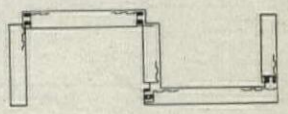


71



In both examples the stair and elevator access are separate from the main body of the structure. Note also the baffles to the balconies in 71 giving privacy to the living space. In the next example only partial segregation has been obtained:

72



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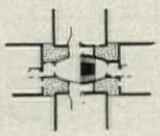

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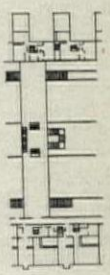
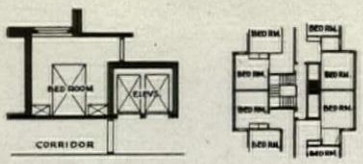


73 shows the possibility of segregation with staircase access types. The shaded portion is open to the air. Tee arrangement can be applied to any scale of building, from small (71) to large (74).

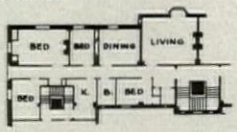
Common faults in cases where the elevator is built integrally with the structure are illustrated in the following examples:

75
76

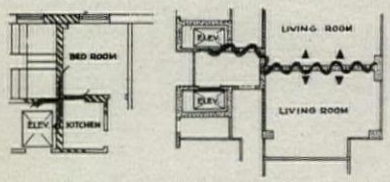


Bedrooms immediately adjoining elevator shafts. In 76 a whole cluster of bedrooms is planned around the noisy access stair and shaft. 77 shows stair wells abutting bedroom and living room, the elevator placed in the open stair well.

77

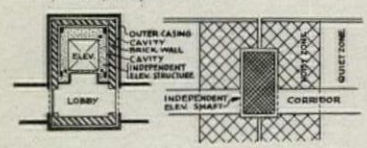


78
79



Two examples of passage of sound along a continuous wall to a quiet room from the elevator. The problem has become structural, failure to provide structural discontinuity for the noise source will nullify the best planning measures.

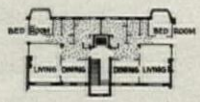
80
81



Example 80 indicates the method of structural segregation of the elevator. Independent framing prevents dispersion of conducted sound, and the equally independent brick enclosure absorbs air borne sound. Segregation by planning a wad of noisy rooms around the elevator completes the process (81).

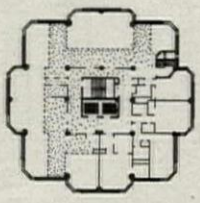
Examples of good planning of interior elevators:

82



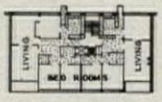
82 — compare with 81. A substantial wad of noisy rooms to baffle the elevator noises. In this example the dining room must be bracketed with the noisy rooms.

83



American example: Elevator and staircase are enclosed within a solid containing wall and segregated by a corridor. There is no connecting wall to transmit the sound but the floors would prove a weakness. An additional baffle of service rooms completes the insulation.

84



Swiss example: Similar in general characteristics to 82 but with rather more complete bufferage.

points of contact between one apartment and another are along the four external angles shown in diagram 67. There are no party walls. If the structures were built rigidly nevertheless, there would still be an oblique path for sound along the connected walls and floors, as shown in B 67 and to avoid this the expedients indicated in 68 could be used. In the first place, the building being framed, the points of contact could conveniently be reduced to about 8 or 12 per apartment, 68 A and B and the final refinement would be to interpose a damping joint at each of these points of juncture, to prevent the passage of sound along the structural members. The building would then take the form of a series of structurally self-contained boxes placed one above the other on floating joints and, of course, involves some novel structural problems.

This is the totally floating structure, as elaborated by the British Research Station, developed to embrace a complete house, and so far as apartments are concerned is the most complete solution to the problem of noise transmission. Some of the additional structural costs would be recouped by avoiding the necessity of large outlay in sound proofing the building. Diagram 69 illustrates the unit maisonette, A, with a garden space at roof level, avoiding impact noises from the garden on the bedrooms of an adjoining unit, B, with a garden at living floor level which gives the better amenity and is to be preferred as a unit.

Elevators and Access Stairs

When elevators are used, an additional noise load is added to the plan. Elevator noises are, of their nature, extremely irritating, consisting mainly of (a) motor hum (and vibration) and (b) crashing of the gates. Motor hum can be considerably reduced if the motor is put in the basement, a procedure which however decreases the working efficiency of the elevator and is not always otherwise practicable. There is a certain amount of mechanical noise due to the travelling of the elevator in addition to the noise of the motor.

As with all other mechanical contrivances, care in design can go far towards eliminating noise, locks, electric light switches, plumbing fittings are all capable of being improved in this respect, but when the practical limit has been reached some noise remains, and with wear and tear quiet contrivances tend to get noisier again.

Where possible, therefore, the elevator should be entirely separated from the main body of the building and where this is not possible careful precautions are necessary both in planning and design.

Structural tenets are: The complete elevator mechanism to be structurally independent from the rest of the structure. The independent elevator structure to be enclosed within a 9 in. solid wall and if possible this, too, to be structurally independent.

Planning tenets are: No elevator to be placed next to a quiet room. No continuous wall to connect the elevator obliquely to a quiet room. Maximum buffer space to be arranged between elevator and quiet zone.

Diagrams 70-74 show how planned segregation of the elevator and stair can be obtained in buildings of different size and shape. This is simply a matter of basic approach and is the best planning contribution that can be made to this particular problem.

Placing the elevator within the building gives rise to many troubles, briefly illustrated in diagrams 75-79. In the three cases 75-77 the elevators are adjoined by bedrooms and living rooms. This is weak planning not to be condoned by the presence of 9 in. brick walls round the elevators. In the third example there is not even a solid substantial wall round the open stair wells. In this case, the elevators being unenclosed, the outer wall of the stairwell becomes the elevator enclosure. Diagram 78 shows the effect in a bedroom planned diagonally opposite an elevator shaft but connected to it by solid walling. Vibration of the wall of the elevator shaft will be transmitted to the bedroom along these walls. An even more remote effect is illustrated in diagram 79, a reinforced concrete structure. Sound will travel along the monolithic cross wall from the elevator shaft, across the corridor, ultimately to emerge as vibration of the panel between the two living rooms. Remote effects of this kind have been dealt with very thoroughly in the B.R.S. book and depend very much on the type of structure and degree of continuity in the members. The first remedy is to break these sound paths by interposing a resilient or damping joint.

The two diagrams 80 and 81 show how an elevator should be treated if it is planned within the building. The actual mechanism, motor, etc., are structurally independent and the whole enclosure, including the cut off lobby, is enclosed within a 9 in. brick wall equally independent both of the main structure and of the elevator structure. This wall will take care of air borne sounds and the noise of the elevator doors. The whole is then enclosed in partitioning as in the rest of the building. Special attention will be required to seal the two exit doors from the lobby to the corridor.

These are structural measures. A buffer of service of noisy rooms is placed completely round the elevator, and segregation is complete.

Diagrams 82-84 show practical examples of well planned elevators. It is not known whether the structural segregation is adequate but the buffer zones of service and non-quiet rooms is in each case very ample. The American example, 83, is particularly well padded and it will be seen that the elevator enclosure walling does not carry through to the rest of the structure.

In the ideal examples given, 80, 81, it will be observed that, in addition to the walling, the elevator well has been made discontinuous with the floor slabs. This is a point to watch, as vibration could equally well be transmitted along these slabs.

Three Privately Developed Apartment Houses

Unusual and Highly Successful Apartments in Los Angeles, Calif.

Richard J. Neutra, Architect

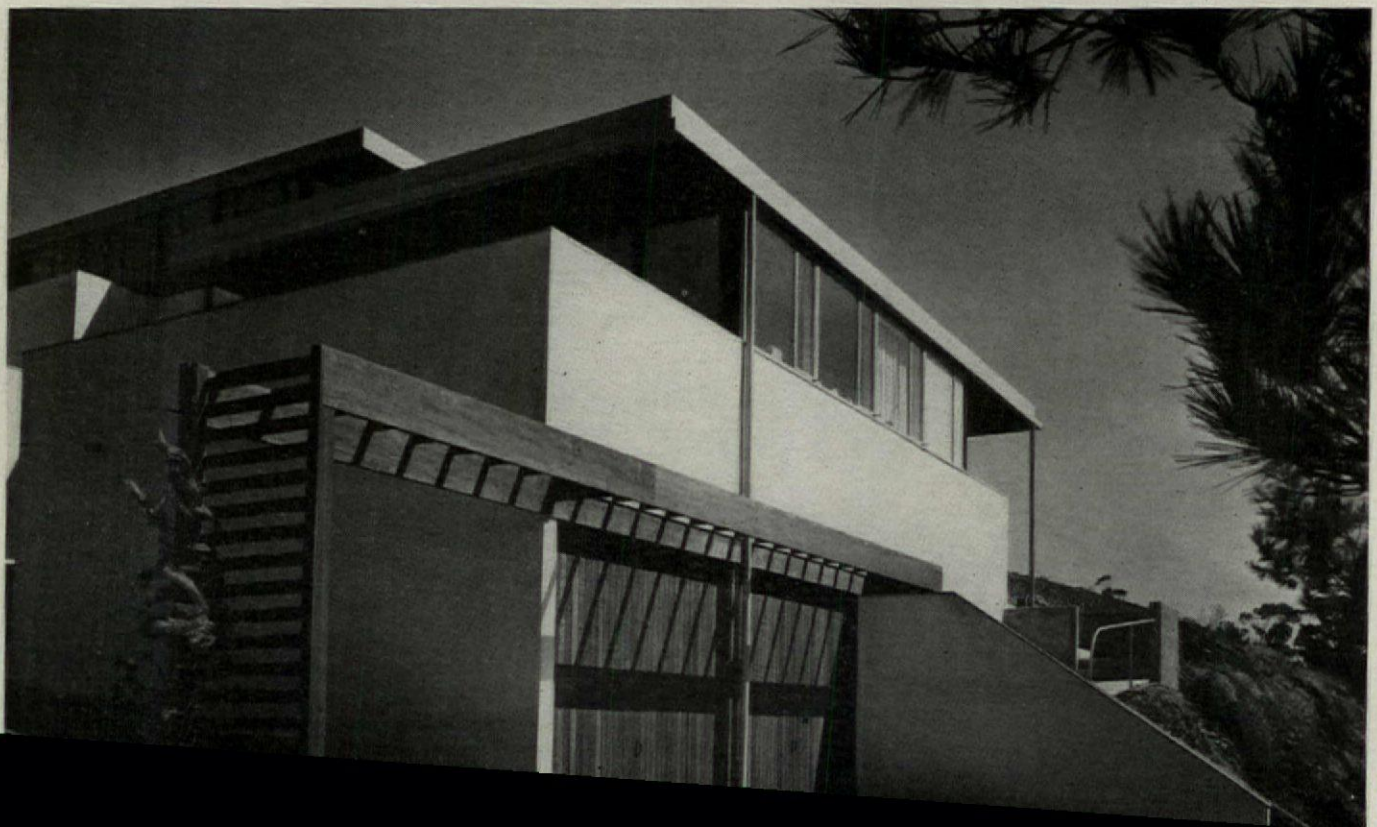
The designer of an apartment house for private ownership and operation has a two-fold job: to provide homes for people and to design them so that the building which houses them can be operated at a profit. Oftentimes the first has been taken for granted, and the second has caused too much work and worry. The average apartment house throughout the country—not the Park Avenue giant of New York City, but the smaller 6, 8, 10, or 12-family building common to our suburbs and lesser cities—have a number of characteristics in common: More or less strict economy of space; a display of iron grillwork, marble, or fancy terra cotta and brick where it shows, with common brick for rear walls; a few eye-catchers such as spun candy hardware to help sell prospective tenants.

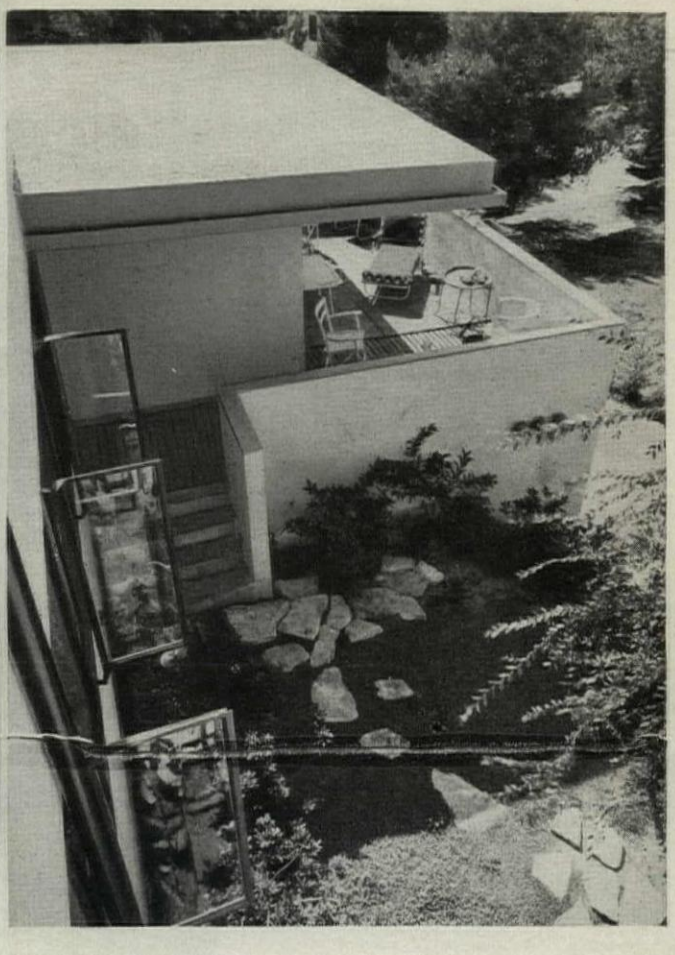
Neutra proceeded differently in designing these three apartment houses. He must have reasoned about as follows: If apartments are really homes, they ought to be as comfortable, as easy to keep up, as livable as any private house. And if they must show a profit, is it better to squeeze every inch of rentable space out of the plan, to try to make up for structural economies by dolling up the entrance hall—or to plan and build so soundly that the owner, too, has a simple maintenance problem, and can reasonably expect, not a great profit quickly, but a substantial (and eventually larger total) profit over a long period of years?

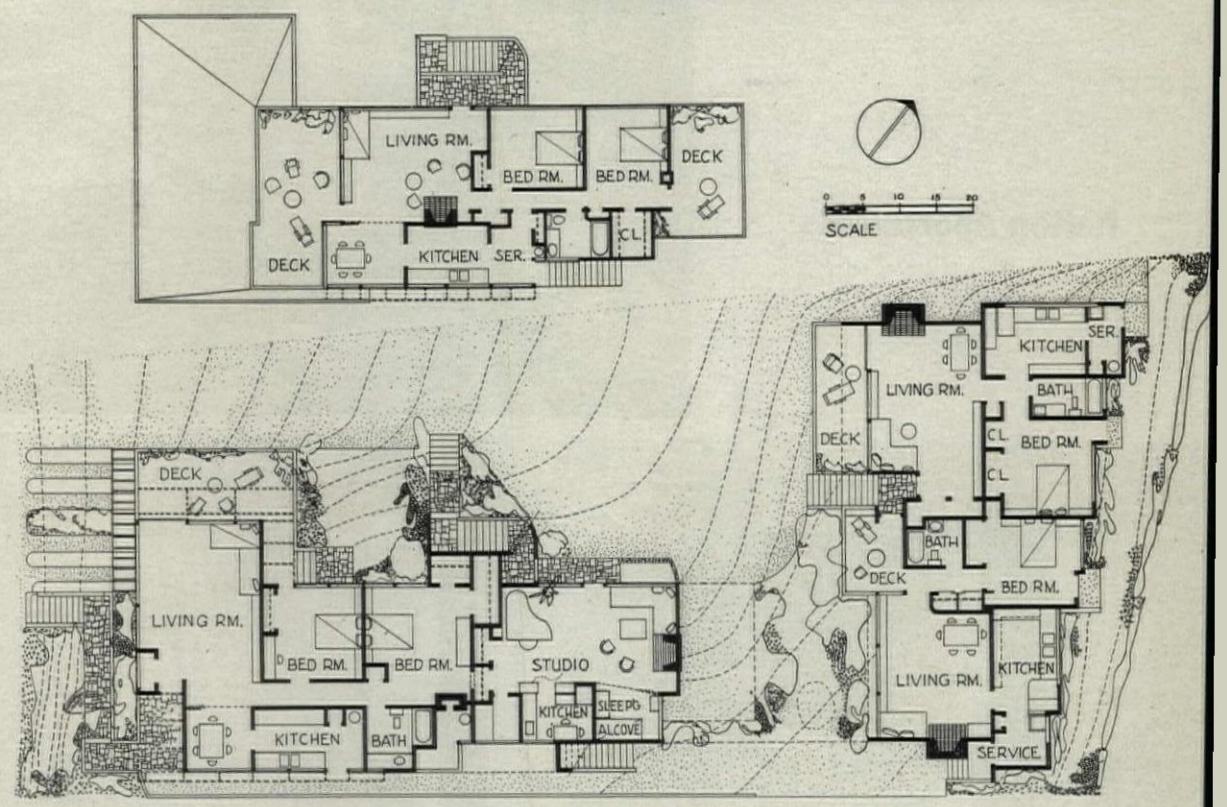
This may not have been conscious reasoning, but Neutra has to his credit a similar, much earlier, building than any of these three: a Los Angeles apartment house in which, during the several years since it was built, there has seldom been a vacancy, which has continuously been financially profitable; and it considerably antedates the current war housing emergency. The three buildings presented here (Kelton, Strathmore, and Landfair Apartments) are improvements on that earlier example. All achieve a remarkable degree of privacy, yet are liberally opened up to the ocean breeze and the magnificant view of the mountains. Each apartment has its individual entrance; most have outdoor living area that is at least semi-private. All have good-sized rooms, conveniently laid out, with many closets, built-in furniture, and other necessities for comfortable living—and no gadgety embossed lighting fixtures. What fixtures are needed are forthright yet unobtrusive.

Kelton Apartments

Kelton Apartments are built into a hilly site which might have been impossible to utilize profitably for the conventional apartment house. However, advantage has been taken of the steep slope to build in receding steps, providing each apartment with its own entrance, its garden, and its outdoor deck protected by an extensive roof overhang. Living here is more like living in one's own home than occupying a flat.

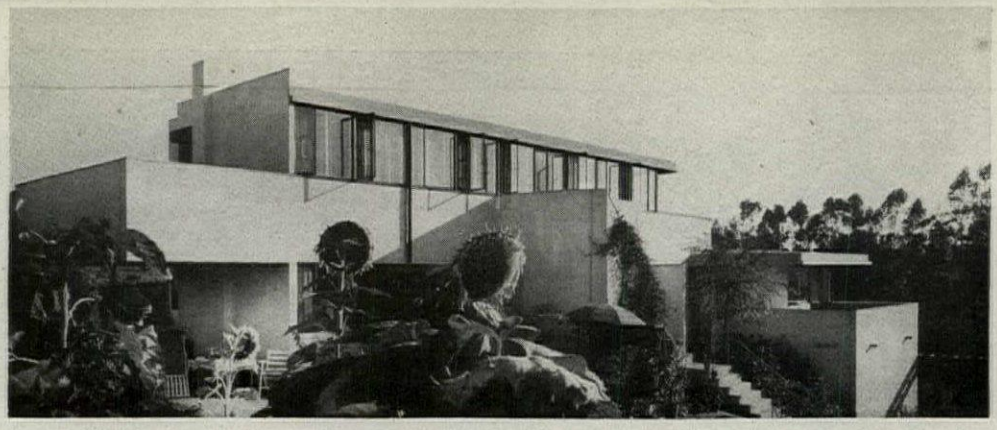






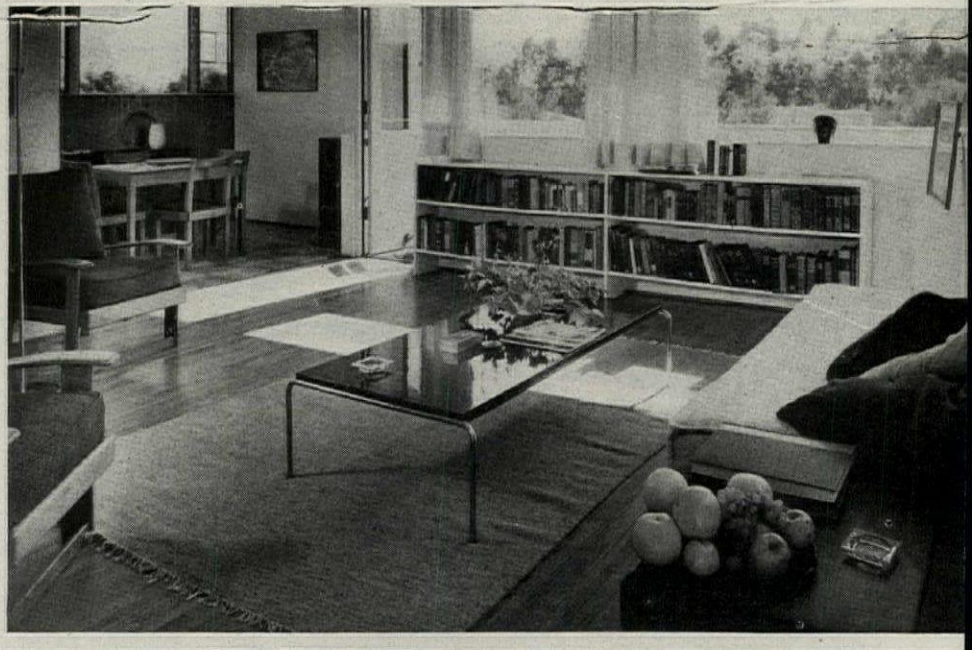
Kelton Apartments

Plans show that Kelton Apartments are really two buildings, of which the one toward the street has two floors. Note in the first-floor plan of this building that a door can be closed between the rear bedroom and the studio, making two apartments out of one large unit. All apartments are spacious, an effect which is enhanced by the broad expanses of windows, which are steel sash with rolling copper screens. Bedrooms have closets with full-width sliding doors.



Above is a view across a garden; below, interiors showing typical living room, sleeping alcove off the first-floor studio, and a typical kitchen. Doors are flush throughout, free of antiquated, hard-to-clean trim; hardware is plain, chromium finished. In addition to recessed and indirect lighting fixtures, numerous convenience outlets are provided. The kitchens have a smooth, clean appearance; equipment includes stainless steel trimmed drainboards, ventilated cupboard, built-in vented refuse receptacle, mechanical refrigerator, abundant cupboard space. Floors in kitchens are linoleum; in living and bedrooms, hardwood.

Kelton Apartments

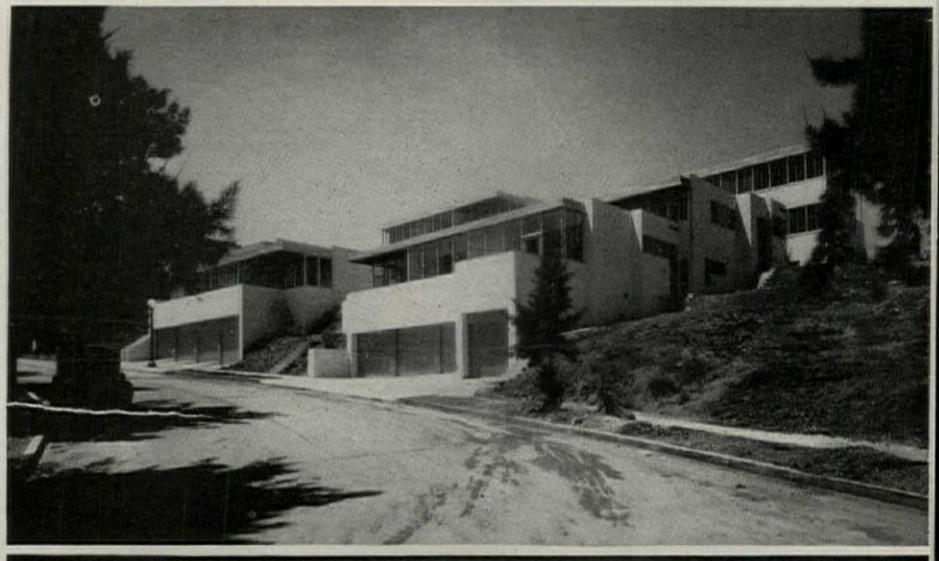


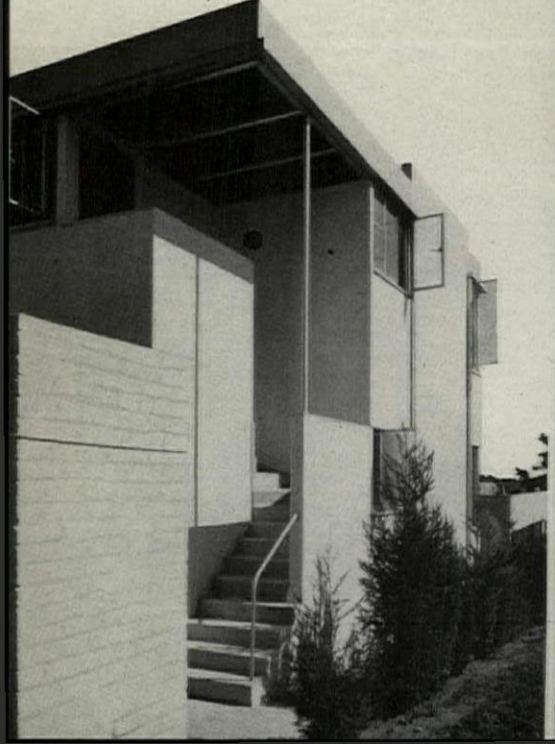
Strathmore Apartments

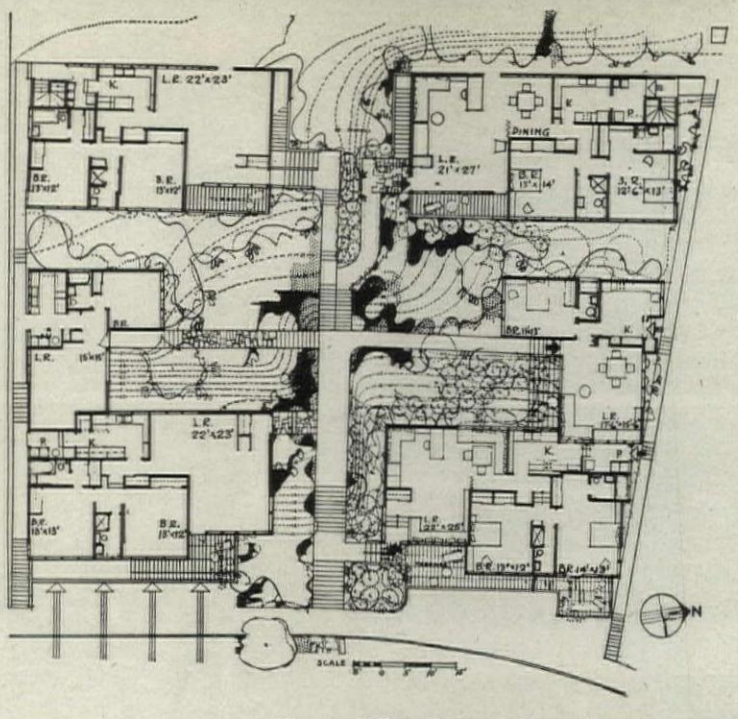
Strathmore Apartments consists of four buildings around a central garden. This may offer slightly less privacy for outdoor living areas than is the case in the Kelton Apartments, but the degree is negligible. Here, again, the apartments have been planned as homes. The development is north of Los Angeles' Wilshire Boulevard on a hillside from which there is a view of the mountains. Buildings are laid out to catch the morning and evening sun; the familiar generous windows admit the outdoors and are shaded at living room balconies (mostly to the west and south) by wide overhangs. Individual entrances are provided for each apartment, and each has a service porch, opening from the kitchen, for deliveries. A garage, equipped with lift type door, is available for each apartment.

Strathmore Apartments are located sufficiently far from boulevard traffic for comfort, yet are only five minutes' walk from Westwood Village's shops and bus lines. Below are views (top to bottom) of the street front, showing garage entrances; garden court; and typical living room interior. Bedrooms, not shown, are friendly in proportions, and have built-in wardrobes with sliding flush doors, dressing tables, sets of drawers, and full-length mirrors. Baths have both tubs and showers, soiled linen compartments, fixtures of good quality, and chromium fittings.

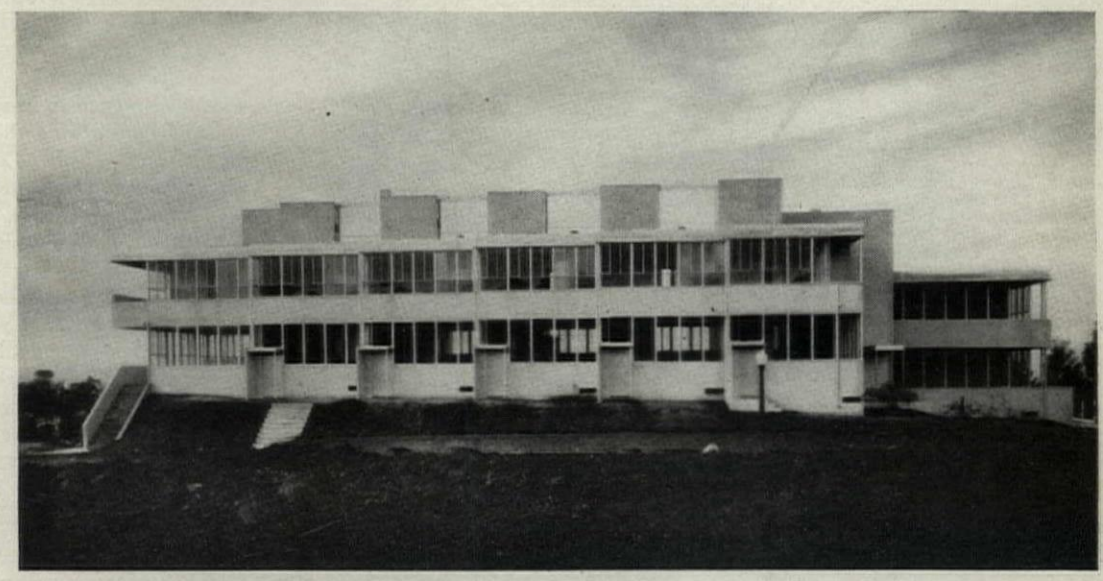
Strathmore Apartments







Plans of Strathmore show size and arrangement of rooms, which are laid out and equipped for gracious—though not overly expensive—living. Kitchen and other equipment is similar to that in the Kelton Apartments. Heat is supplied by forced warm air heaters, with provisions for use as ventilating units. Automatic heaters provide hot water. Other conveniences include fold-up ironing boards, lockable delivery cabinets, laundry trays, and access to an incinerator.



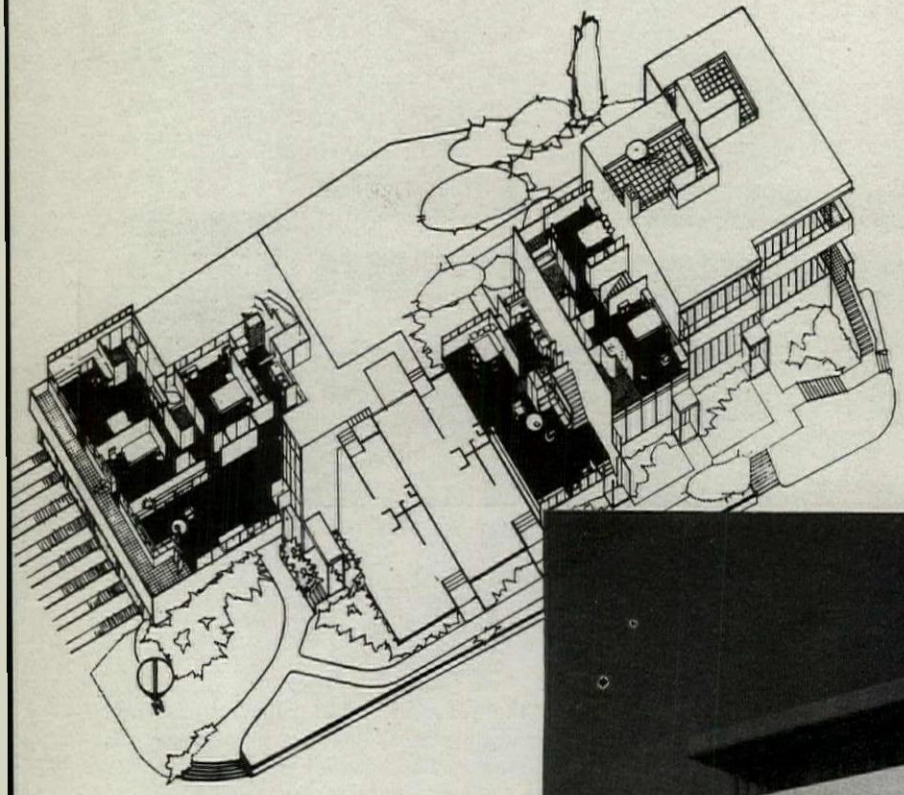
Landfair Apartments

This building stands near Strathmore Apartments, on the ridge of a hill running east and west. The greater apparent severity of Landfair's appearance is due partly to photographs taken before planting was complete—in fact, before apartments had been occupied—and partly to the fact that lot size and site did not permit the type of garden development used at Kelton and Strathmore. This latter fact makes Landfair somewhat different than the other two; Neutra tried to remedy the lack by providing roof gardens. However, tenants won't go *up* to enjoy the outdoors; they want to go *down* to get out. Disregard of this habit led to a minor, though honest, mistake in planning—tenants don't use the roofs—but added only slightly to costs. In addition, each apartment does have its own balcony.

Landfair is essentially a row house, with kitchens, and living-dining space running through from wall to wall on the ground floors, and bedrooms and baths above; over the garages are

two flats, one above the other. As in the two previous examples, rooms are spacious, with similar equipment and fittings. Exteriors of buildings have a light, waterproof finish over the cement surfaces, and a heat-reflective aluminum coating on all metal work.

In all three examples—Kelton, Strathmore, and Landfair—there is evident Neutra's desire to apply to multifamily dwellings the same standards of design he uses in single family residences. After all, granting the differences in basic concept, lack of such a desire on the part of those responsible for our usual apartments is all that has caused them to be less successful as habitations than the typical American one-family house. The even-more-motorized postwar future may bring us many families who would prefer a sort of suburban urban life, but who won't want to give up the simplicity of a city apartment. Maybe such small units as these are an answer to such a problem.



Detroit and the Detroit Area: Parts 2, 3, 4

by J. Davidson Stephen

The studies of Detroit and the Detroit Area carried out at Cranbrook are divided into the following parts:

1. *DETROIT; A Preliminary Study of the City, 1942.*
2. ***THE REGION; Studies for "The Detroit Sphere of Influence, 1990."***
3. ***LIVING AREAS; The Development of the "Area Scale."***
4. ***INDUSTRIAL AREAS; Relation to Living Areas.***
5. *COMMUNITY PLANNING; Plymouth, Michigan, 1990.*
6. *NEIGHBORHOOD PLANNING; The New Center of Plymouth, 1990.*
7. *DETROIT; A "Master Plan" for Community Development, 1990.*

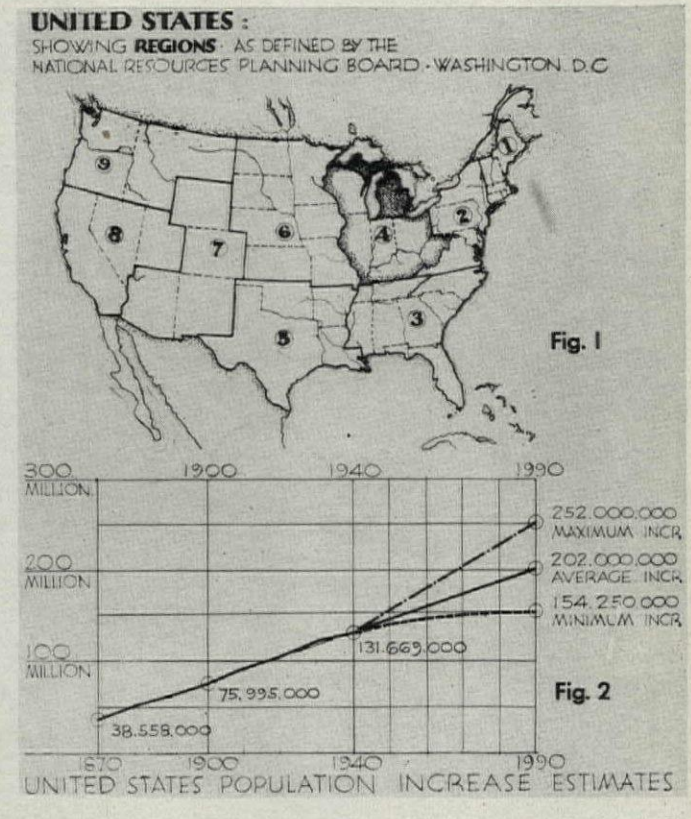
Part 1 was published in the December, 1943 issue. Parts 2, 3 and 4 are presented below. Parts 5, 6 and 7 will appear in a future issue.

PART 2; THE REGION: Studies for The Detroit Sphere of Influence, 1990

This is a study of the region, in accordance with a principle which Saarinen outlined in *THE CITY*—namely that the planning of a city involves an area considerably larger than the legal city limits.

The reader may ask why 1990 was chosen. The answer lies in Part 1 of this study (see December, 1943, NEW PENCIL POINTS) where, under the heading of *Blighted Areas*, it is noted that lack of planning has permitted decayed areas to reach their present extent in about thirty years. Saarinen assumes that rehabilitation of the city will take fifty years.

It was necessary to evaluate Detroit's relation to the United States; to Region 4, as established by the National Resources Planning Board; and to Michigan (See Fig. 1). Detroit's position in the automotive industry was also considered. Economic factors can—and do—change. Factories making automobiles today may manufacture prefabricated houses or helicopters in fifty years, revising labor needs, and re-locating plants.



These studies do not prophesy population growth, nor fix the size of future communities. But the plan does *indicate the region's possibilities and shows how communities can be organized.*

Figure 2 shows population from 1870 to 1940. The Census Bureau shows about 131,669,000 for 1940, and estimates future growth. The *Minimum* increase up to 1970 is the Census Bureau's own estimate; it is then carried forward to about 154,250,000 in 1990; the *Average* and *Maximum* increases reach 202,000,000 and 252,000,000 respectively. The *Average* increase is a continuation of the line showing the past increase in the nation's population.

Saarinen used a similar procedure in his studies for Helsinki, and for Reval, Esthonia. Comparisons with other European cities were made at the same time.

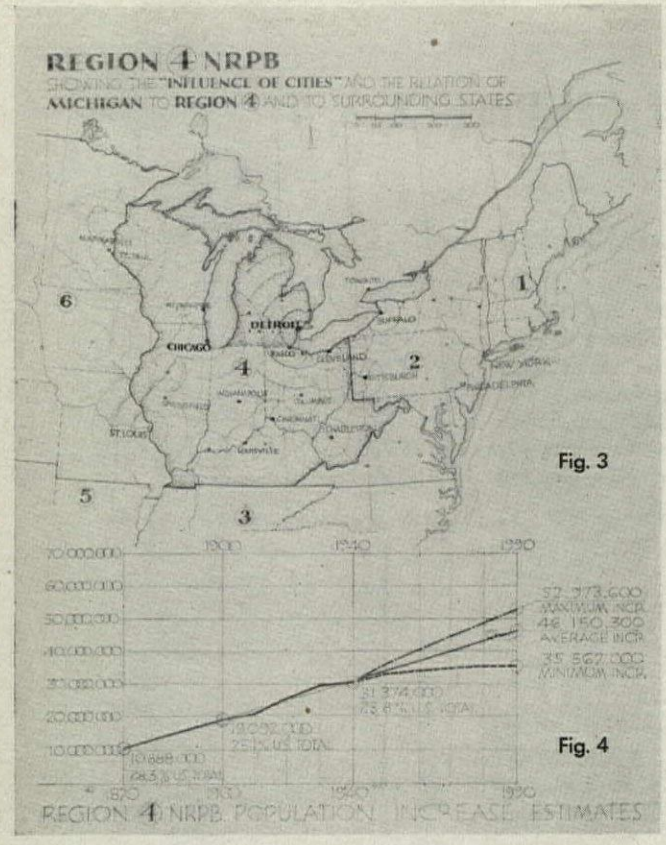


Fig. 3

Fig. 4

Figure 3 shows the various NRPB regions in the Eastern United States. Michigan is shaded to show its relation to Region 4. State lines are subordinate to the influence of cities, shown by concentric circles of 50, 100, and 150-mile radius. The Detroit influence extends 100 miles across Michigan and comes in contact with the Chicago influence. Cities in western Michigan, e.g., Grand Rapids, Battle Creek, and Kalamazoo, are more related to Chicago than to Detroit.

The eastern shore of Lake Michigan, western Michigan, is frequented by Chicago vacationists. Also, on leaving St. Louis and entering Illinois, one notices a large sale of Chicago newspapers, indicating the influence of Chicago; the influence of Springfield and Peoria are secondary at this spot. The Louisville influence comes into contact with that of Indianapolis and Cincinnati, and so on.

Figure 4 shows NRPB population data. In 1870 the population of Region 4 was 10,888,000 or 28.3% of the U. S. total; in 1900, 19,092,000 or 25.1% of the total; in 1940, 31,374,000 or 23.8% of the total. From 1940 the minimum, average, and maximum increases are projected to 1990; such increases being proportioned by means of a "percentage increase over each preceding decade" for the entire United States to a corresponding period for Region 4. For 1990 the minimum increase is 35,562,000, average—46,150,300; and maximum—52,973,600.

Figure 5 shows geographical features and the relation of Michigan to the rest of Region 4, and to the Eastern United States.

Figure 6 shows relative population among the seven states comprising Region 4 from 1870 to 1940. Michigan came from fifth place in 1870 to third in 1940, and the industrial states of Illinois, Ohio, and Michigan moved up rapidly from 1910 to 1930.

Figure 7 shows Michigan population from 1870 to 1940 (U. S. Census Bureau) 1870, 1,184,000 or 3.07% of U. S. total; 1900, 2,421,000 or 3.19% of total; and 1940, 5,256,000 or 4% of total. In other words, while the region's proportionate share of the nation's population has been reduced from 1870 to 1940, Michigan's has increased, particularly from 1900 to 1940, which includes the rapid increase in population (Figure 6) in 1910 to 1930, the period of industrialization in Detroit. Figure 7 shows estimates of future growth based on minimum, average, and maximum increases carried to 1990, proportioned by a "percentage increase over each preceding decade" for Region 4 to a corresponding period for Michigan. For 1990, the minimum increase total is 6,293,000; the average increase total, a continuation of the line of past performance of population data, 9,938,000; and the maximum, 11,081,000.

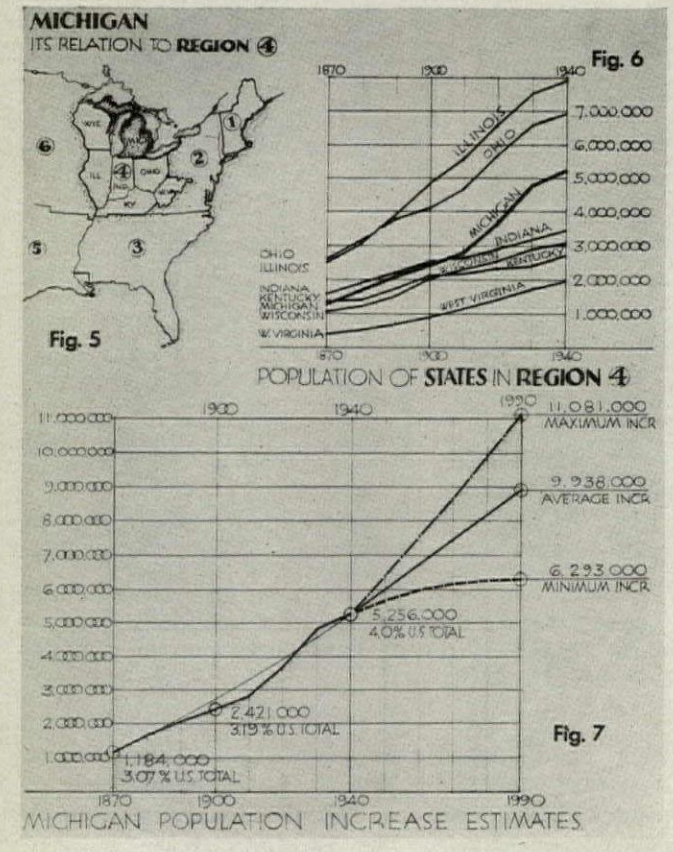


Fig. 5

Fig. 6

Fig. 7

Figure 8 shows the influence of Detroit and Chicago and the division of Michigan into five sections. Section A, Southeastern Michigan, includes the part falling into the Detroit influence and includes the cities of Lansing, Flint, Saginaw, Bay City, and Port Huron—the automotive industry region. Section C falls within the Chicago influence and includes Grand Rapids, Kalamazoo, etc.; the dotted lines indicate the division of Michigan according to the Chicago Plan Commission as shown in the March, 1943 issue of NEW PENCIL POINTS (illustration showing Retail and Wholesale Trade Areas). Sections B and D could be parts of either the Detroit or the Chicago influence without affecting this study as these areas are thinly populated and largely agricultural or cut-over timber land. Section E is a mining area and also has much cut-over timber land.

Figure 9 shows the area in square miles; 1940 population; percent of 1940 population in each section; 1940 population per square mile; 1930 population; percent increase of 1940 population over 1930 population for each section and for all of Michigan. Section A, about 27.0% of the total area of Michigan, includes 69.0% of the 1940 population. Percent increase 1930-1940 for Section A is 9.3% as contrasted with the increase 1930-1940 for Michigan of 8.5%. It is noteworthy that the increase 1930-1940 for Section C, falling into the Chicago influence, is only 7.2%.

Figure 10 shows the urban-rural division in the Michigan population from 1870 to 1940. In 1870, urban population of 237,985 represented about 20% of the 1,184,000. In 1940, a category called "Rural Non-Farm" is also shown. It includes population in towns of between 1,000 and 2,500. The 1940 rural population is 860,202 not including the rural non-farm, which is less than the rural population in 1870 and only 16% of the total; the rural non-farm is 17% of the total, and the urban 3,454,867, or 67%. In other words, the positions of the urban and rural groups have been reversed between 1870 and 1940. Some of the better agricultural land has been subdivided into building lots, and it might be assumed that the rest cannot support more people than in 1940. With the Rural Non-Farm Group increasing at the rate of about 30 to 40% every ten years, the growth of urban population seems inevitable.

The two maps in Figure 11 compare the area of Detroit in 1910 and in 1940; charts below the maps give a picture of its population from 1820 to 1940. In 1910 the area of Detroit was 41.67 square miles and the population 1,623,452; a density of 11,771 per square mile or 18.4 per gross acre. Detroit was largely a one-family house town in 1910 and is much the same today. This low density per gross acre and the large total area of Detroit today give some idea of the public utilities that are required for the population. Highland Park and Hamtramck maintain their identity. Detroit now surrounds two separate cities.

Figure 12 shows how the population and area increases have maintained their relationship from 1910 to 1940 (there was little population increase 1930 to 1940).

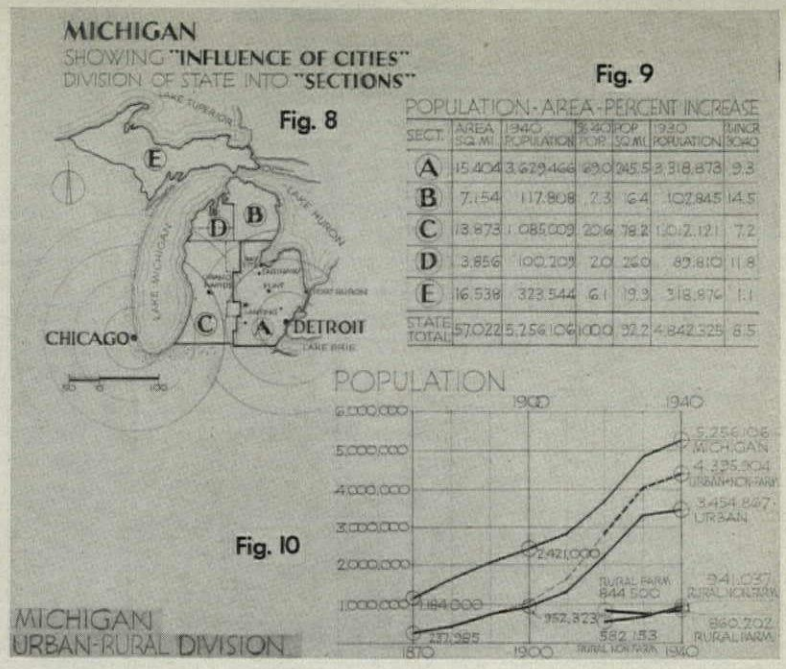


Fig. 10

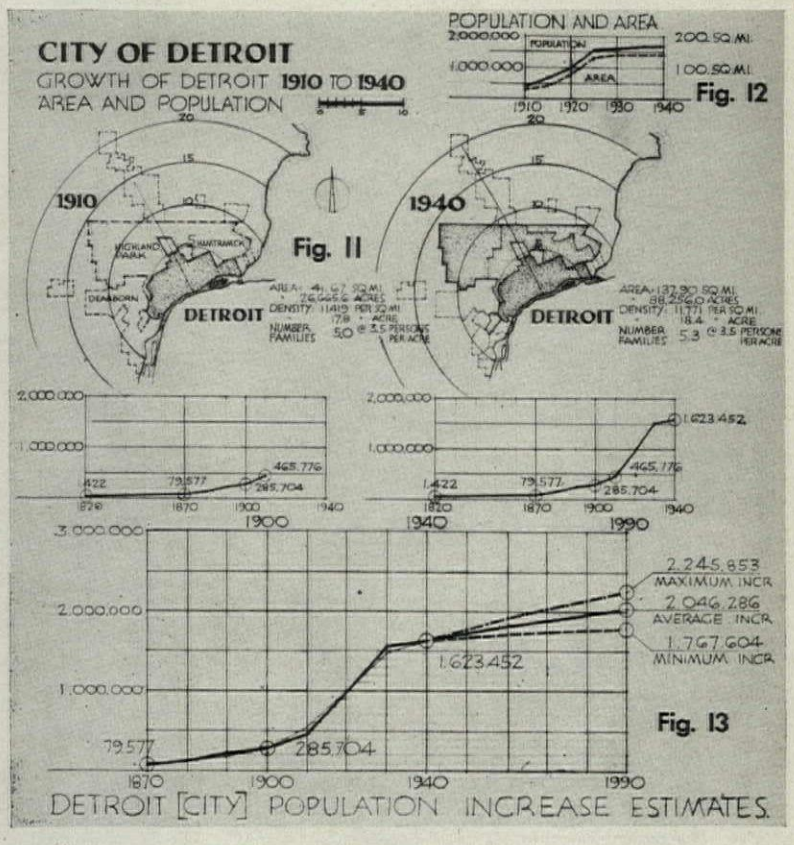


Fig. 13

Figure 13 includes estimates of future growth to 1990. The figures are not completely valid as they are carried forward on the basis of past performance.

Figure 14. The incorporated places are shown in outline and shaded, unincorporated by a solid square or dot, townships by dotted lines, the county lines by heavy dotted lines, and the metropolitan district by a solid line shaded at the edges.

Figures 15, 16. Significant is the increase for the entire metropolitan district, 9.1%—more than that for Detroit—3.5%—but much less than for the area outside of Detroit where the increase is 25.4%.

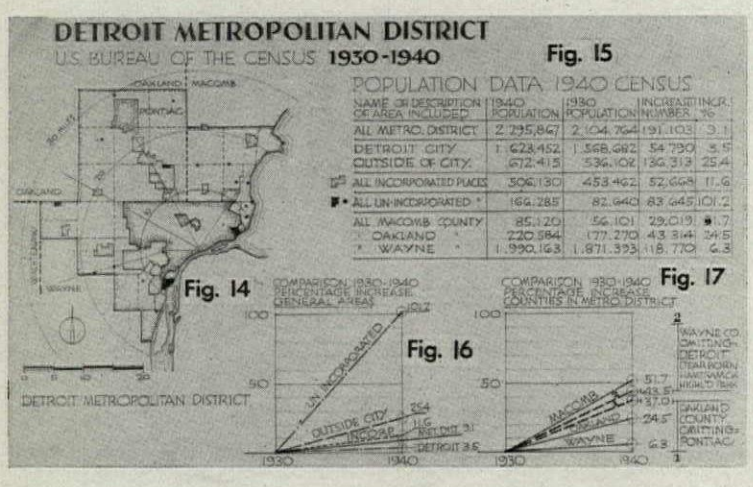
Figure 17 indicates percentage increases for the Counties of Macomb, Oakland and Wayne. The Macomb increase is 51.7%; Wayne (omitting the larger centers such as Detroit, Dearborn, Hamtramck and Highland Park) is 43.5%; and Oakland County (omitting Pontiac) 37.0%. Compare these figures with Detroit's 3.5%.

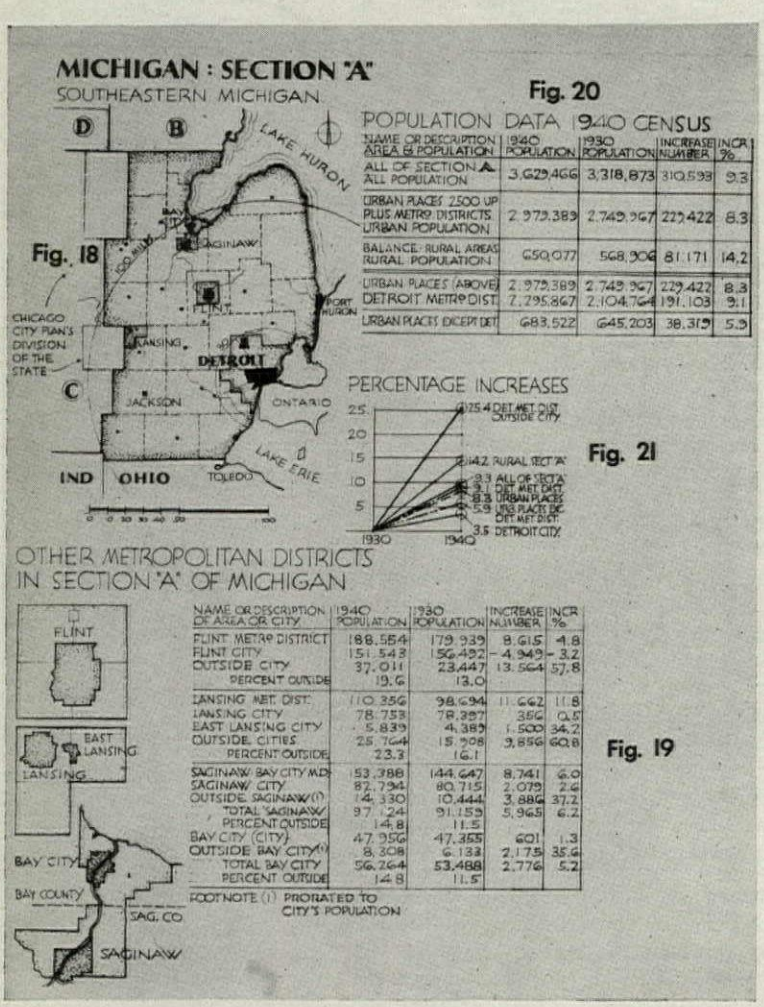
Figure 18 shows Section A of Michigan—Southeastern Michigan and the metropolitan districts of Detroit, Lansing, Flint, and Saginaw and Bay City; together with the larger cities of Detroit, Jackson, Lansing (the capital shown with a star); Flint, Saginaw, Bay City, and Port Huron; and Pontiac adjacent to Detroit. Population centers of 2,500 or more are shown with a solid black dot.

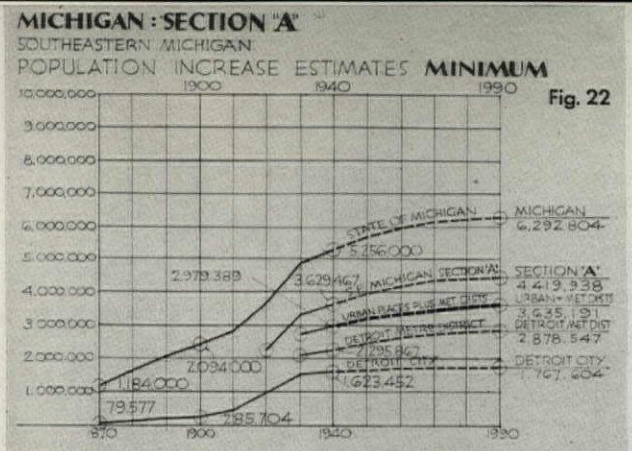
Figure 19. Percentage for metropolitan districts outside cities has increased considerably from 1930 to 1940. The increase for the area outside these cities varies from 35.6% to 60.8%; the increase 1930-40 for the cities proper varies from —3.2% (Flint) to 2.6% estimated for Saginaw. The increases occur outside the city limits.

Figure 20 shows population for 1930-1940, numerical increase 1930-1940, and percentage increase 1930-1940. Based on studies of the Section A counties, the population Section A was separated into urban population, (of all urban places over 2,500 not included in the various metropolitan districts) and the populations of the metropolitan districts of Detroit, Flint, Lansing, and Saginaw-Bay City. The balance is rural population and includes towns of 1,000 to 2,500 in the rural non-farm category. It is the urban population that is the concern of these studies and later charts for the minimum, average, and maximum population increase estimates are of great importance at this point. Note that the greatest numerical and percentage increase 1930-1940 is that of the Detroit metropolitan district—191, 103 and 9.1%. The balance of the urban population amounts to only 38,-319 or 5.9% over the 1930 population.

Figure 21 is a study of percentage increases 1930-1940, more or less a recapitulation of the studies to this point. The importance of the Detroit metropolitan district to section A is clearly indicated. The establishment of the population of Section A shown in Figure 9 and the urban population of Section A in Figure 20 are necessary steps leading to the projection of this population data to 1990.







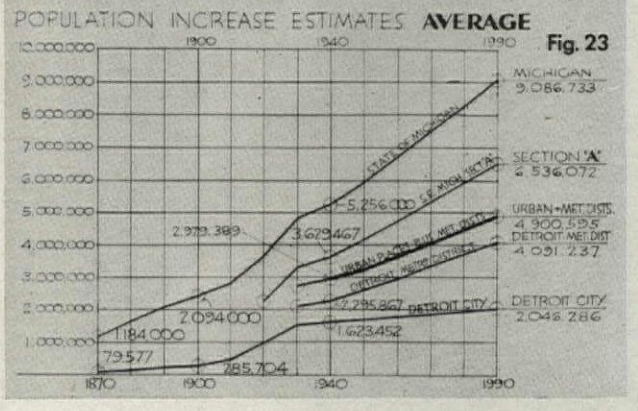
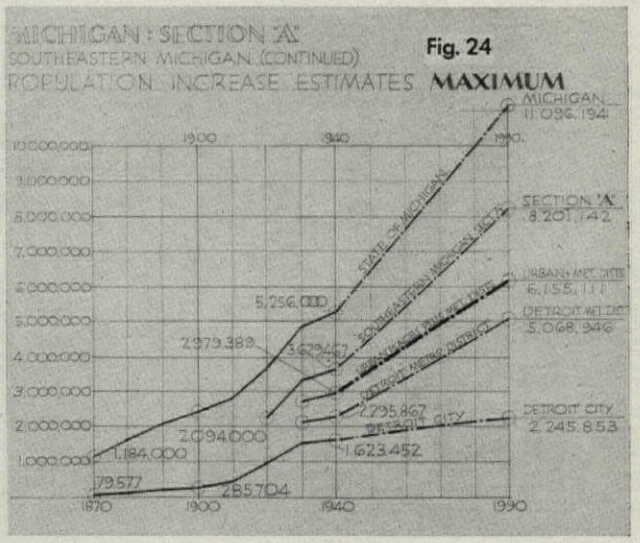


Figure 22 shows the population of Michigan and Detroit from 1870 to 1940; also the Minimum estimate of future growth carried forward to 1990 for Detroit, for the Detroit Metropolitan district, for the population of urban places of 2,500 or more and the three metropolitan districts in Section A, all of Section A, and the state of Michigan.

Figure 23 shows similar data for the Average estimate of Detroit growth.

Figure 24 contains similar data for the Maximum estimate of future growth.

The urban population varies from a Minimum increase estimate for 1990 of 3,635,191; Average of 4,900,595; and Maximum of 6,155,111. The distribution of this population is the next stage of the study, and leads to the development of the area scale.



Part 3; LIVING AREAS: The Development of the "Area Scale"

This analysis of the elements in a community of 38,000 persons, Figure 25, is based on studies made for a defense housing community by Eliel Saarinen, assisted by John Howard, now with the Cleveland Regional Planning Council. The average estimate of 4,900,595 or an urban population of 5,000,000 in 1990 is used.

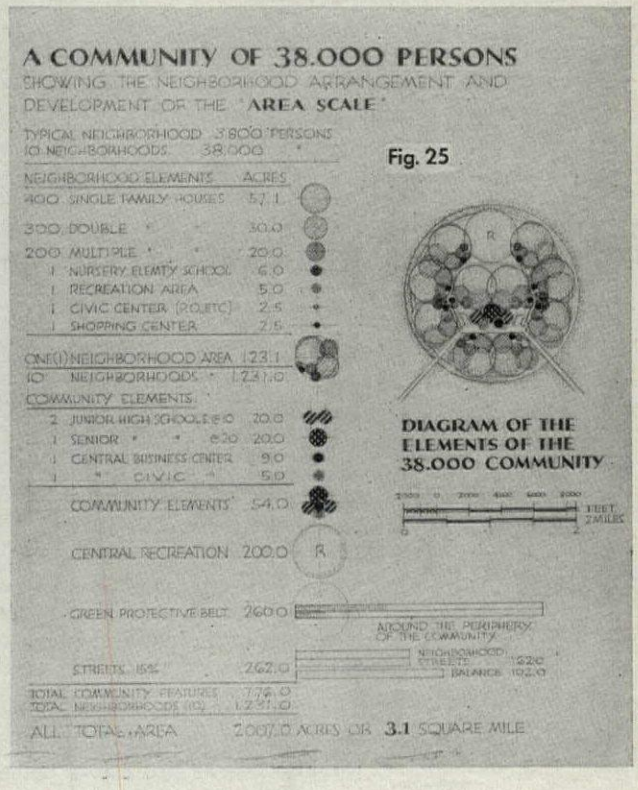
The community consists of ten neighborhoods averaging 3,800 persons each. Each has 400 single-family houses, space for an elementary school, a recreation center, a civic center, and a shopping center, requiring a total of 123.1 acres. Ten neighborhoods would need 1,231 acres.

Certain other community facilities are required: two junior high schools, a senior high school, a business center, and a civic center—requiring about 54 acres; to which might be added a recreation area of approximately 200 acres, a 260-acre green protective belt around the community, making a total area requirement of 776 acres.

The neighborhood requirements of 1,231.0 acres and the community facility requirement of 776 acres, make a total area of 2,007 acres or 3.1 square miles. This is a density of approximately 19.1 persons per gross acre of living area but does not include land required for industry. It is assumed that the residents are employed in an adjacent industry.

The arrangement of the elements shows a typical grouping of communities around the community center (shown near the middle of the diagram close to the parking facilities).

In guiding future studies it was considered that an area of 3.1 square miles would provide housing and other community facilities for a population of 40,000.



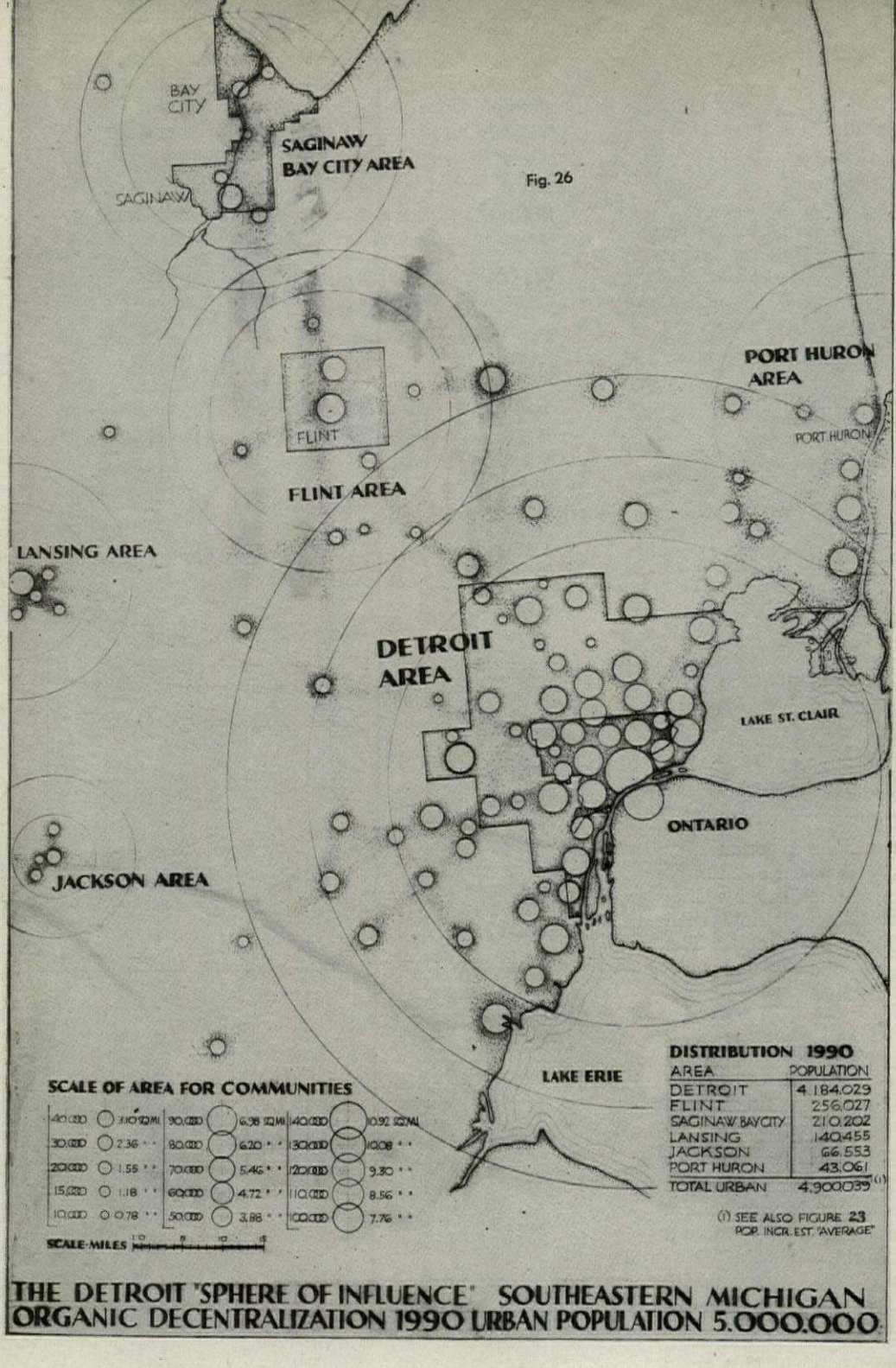


Figure 26 shows the distribution of the Average urban population of approximately 5,000,000 (determined in Part 2 of this study) in accordance with the area scale (developed in Figure 25).

Using the area scale of 3.1 square miles for 40,000, a scale of area for different sized communities was developed. This is shown at the lower left hand side of the map in Figure 26. The next step was to distribute the various communities on the map, keeping in mind the present population and location and the possibility that each community will expand and develop in the next fifty years. This required study of new locations of industries, plans for new highways and super-highways, need for new railroads, etc.

The smaller white circles indicate the living area required for each community and its approximate population in 1990 (size of circle). The spaces between the small circles would serve as protective belts and provide space for highways, airports, and industry.

The urban population includes 1990 residents of the Detroit, Jackson, Lansing, Flint, Port Huron, and the Saginaw-Bay City areas, (indicated on the map by the large concentric circles). The expanded 1990 area of these cities is also shown.

The distribution in 1990 indicates the urban population allocated to the Detroit, Flint, etc., areas, based on average population increase estimates.

The design pattern in Figure 26 is intended to indicate a method of planning whereby the individuality of each community can be retained or restored. If this could be achieved these communities might be better able to meet difficulties ahead. In the event of future aerial bombardment, such planning would provide for dispersion.

Plymouth, Michigan, indicated by a strongly marked circle just west of the city limits of Detroit, is studied separately as part of the Detroit sphere of influence.

Figure 27 compares the 1940 population of Detroit and the Detroit metropolitan district to the 1990 population of Detroit and the Detroit area. The 1990 population of the communities or parts of communities within the Detroit city limits is about 1,070,000, which is less than the 1940 population. But Figure 26 indicates that the people would be able to live in thoroughly desirable communities in the Detroit of 1990.

In 1940, 74.5% of the population lived within city limits; in 1990 only 25% will be in the city proper. In this connection, it might be interesting to refer to Figure 10, where it was noted that the relative proportions of the urban and rural populations in the State of Michigan had been reversed between 1870 and 1940.

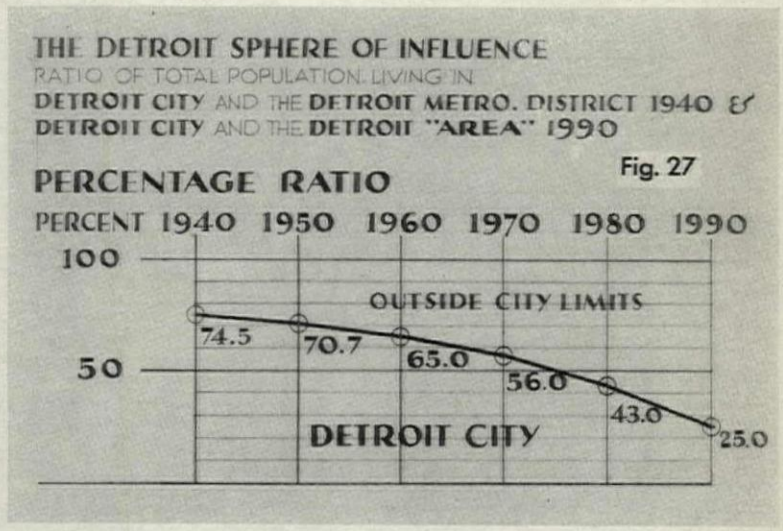
Part 4; INDUSTRIAL AREAS: Relation to Living Areas

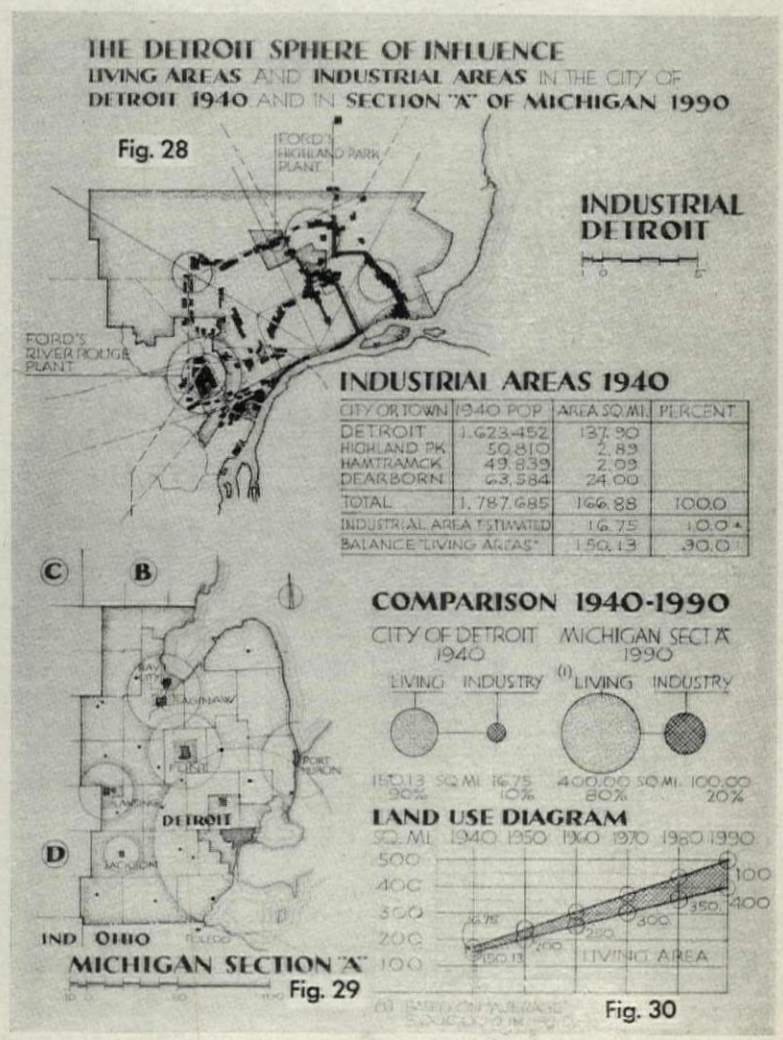
Figure 28. Here again, as in Figure 4, Location of Industry, Detroit, 1942, (Part 1, December, 1943) reference is made to the Ford Highland Park Plant and to the Ford River Rouge Plant. The need for a greater land area for industrial plants is emphasized here again, because industrial plants will very likely be located in more open areas.

The total industrial area of Detroit shown is about 16.75 square miles, and includes industrial areas in Highland Park, Hamtramck and Dearborn. Industrial areas are about 10% of the total, leaving 90%, or roughly 150 sq. mi., for living area.

Figure 29 is included to emphasize the inter-relationship among various manufacturers of automobiles and automotive equipment located in this part of Michigan.

Figure 30 shows a 1940 allotment of 10% of the Detroit area for industry, 90% for living, in 1940. This is compared to 20% for industry and 80% for living in 1990. The living area is calculated from an estimate of 5,000,000 people at a density of 19.1 per acre. Thus a population of 5,000,000 would need a living area of 400 square miles and an industrial area of 100 square miles (80% and 20%)—a total of 500 square miles, but a small portion of the 15,404 square miles comprising Section A (Figure 9, December issue.)





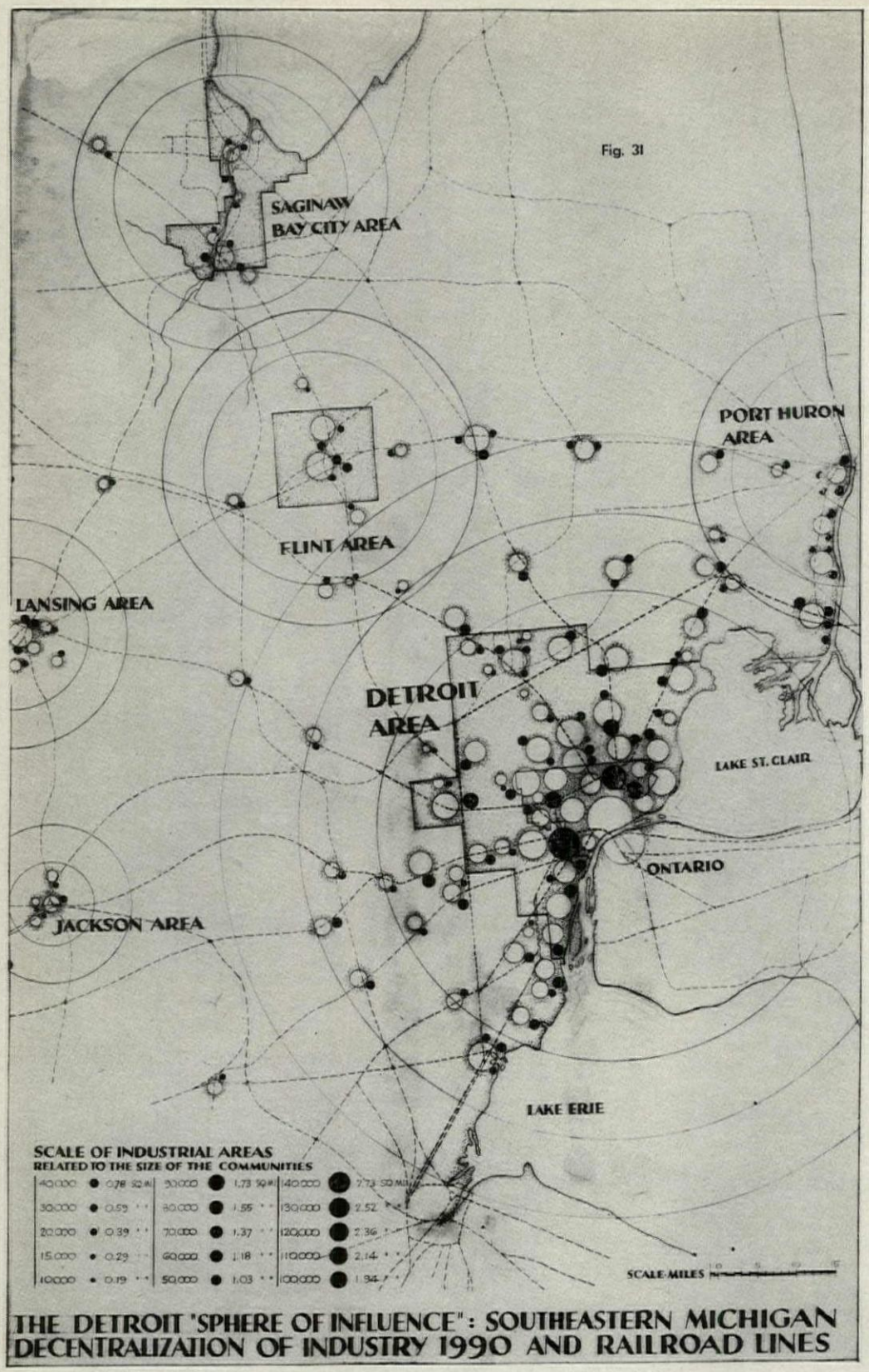
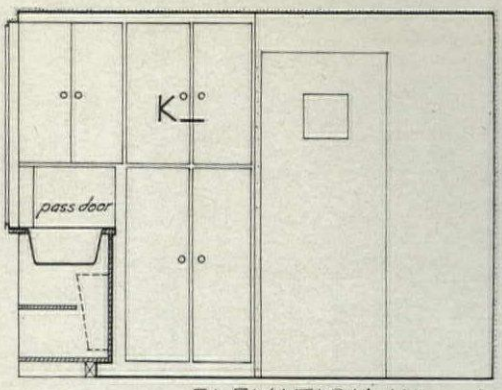


Figure 31. A community of 40,000 persons requiring 3.1 square miles for living area would need about 0.78 square miles for industry (80% and 20%). The various communities have been allocated a certain amount of industrial area indicated on the map by the solid circles. It is understood that some communities will have no industry, for example, Bloomfield Hills. Detroit has three major industrial areas: River Rouge, Milwaukee Junction, and Connor's Creek. These are shown by large solid circles. A fourth industrial area is shown in the northwestern part of Detroit where there are several new industrial plants, and another industrial community is shown near Warren. Note the industrial area near Plymouth. Plymouth is indicated by a strongly accented circle just west of Detroit. The railroad lines are also shown in Figure 31, including a proposed belt-line along the western boundary of the Detroit metropolitan district and Port Huron, thence into Canada. In general, new locations of industrial areas follow locations that are being selected by industries for their newer plants. Here again, such planning would provide dispersion in case of bombardment.



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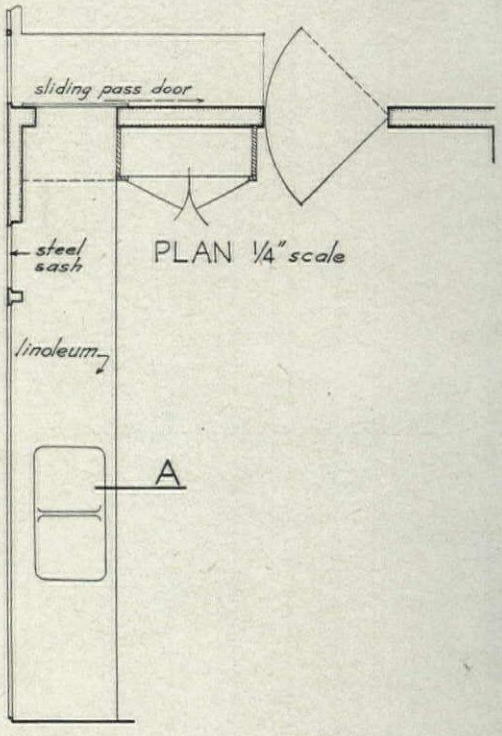

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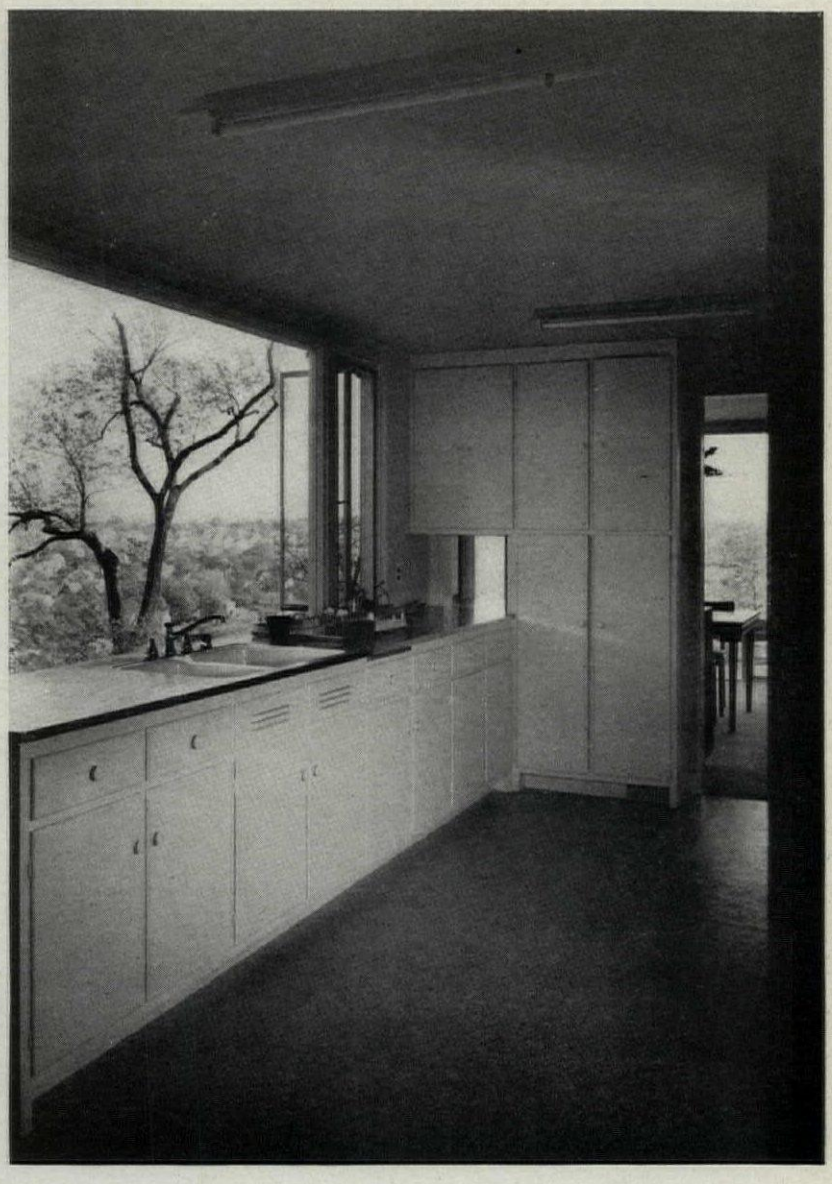

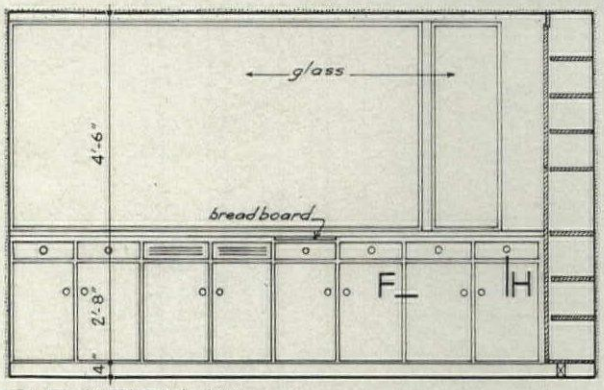

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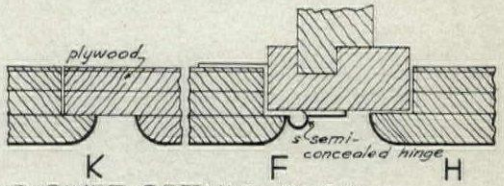

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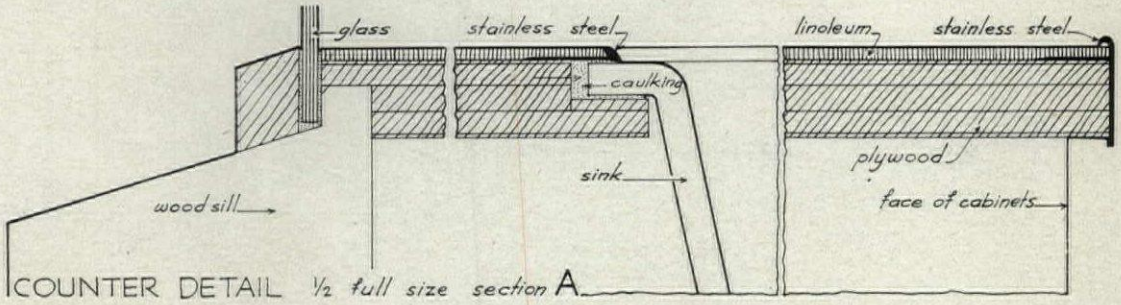

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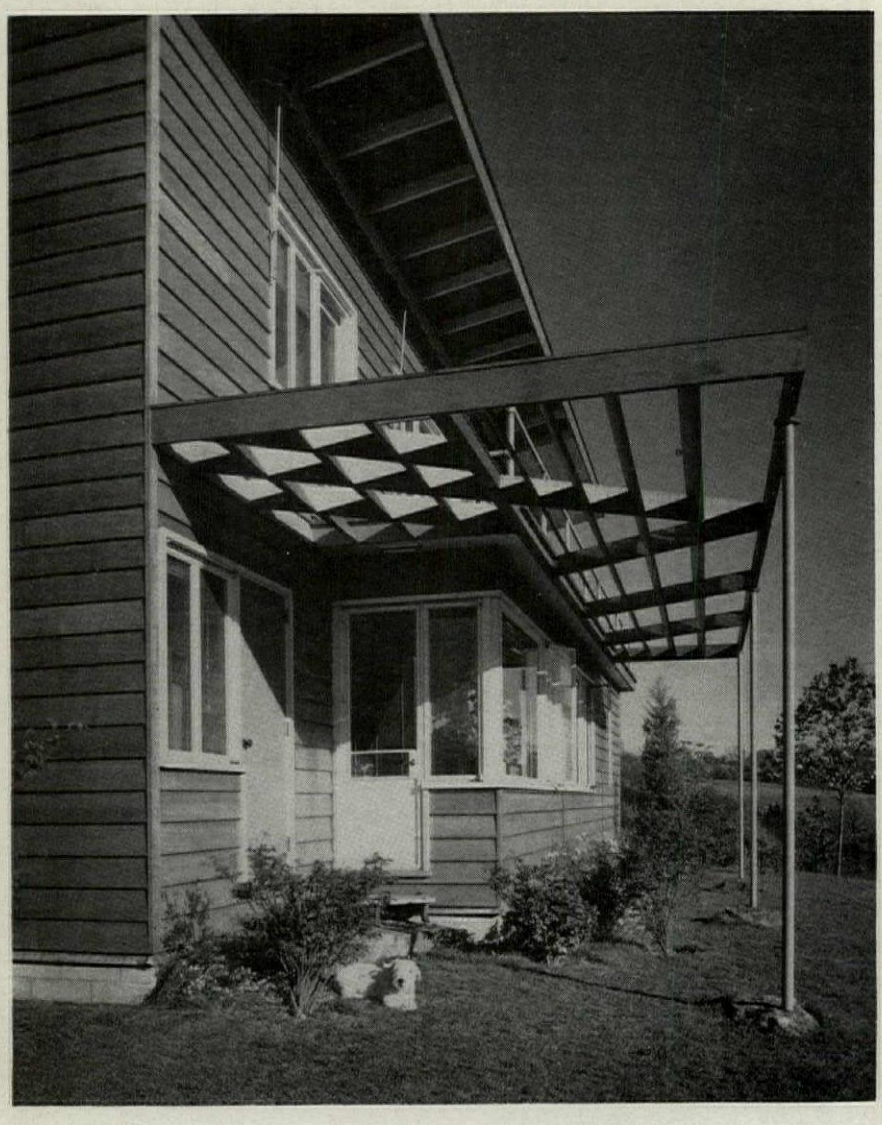

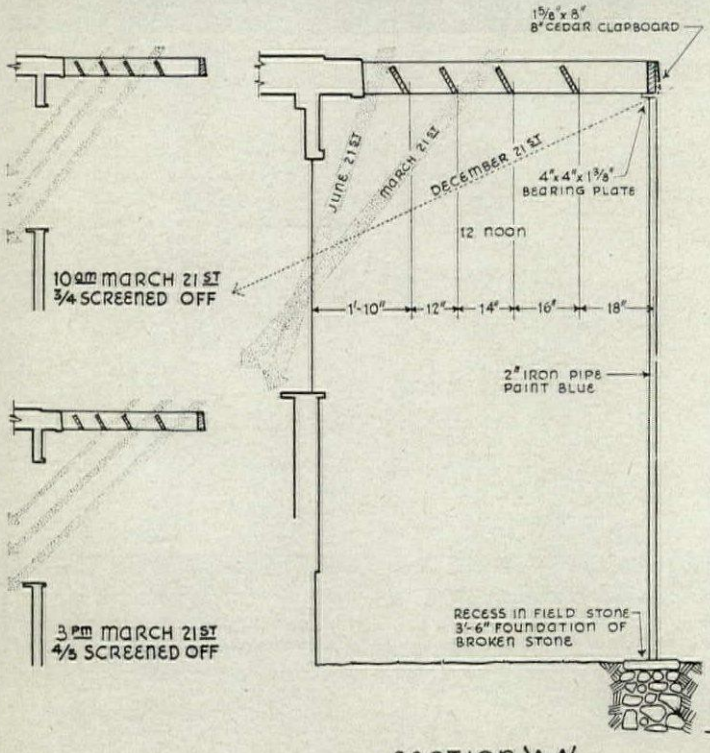

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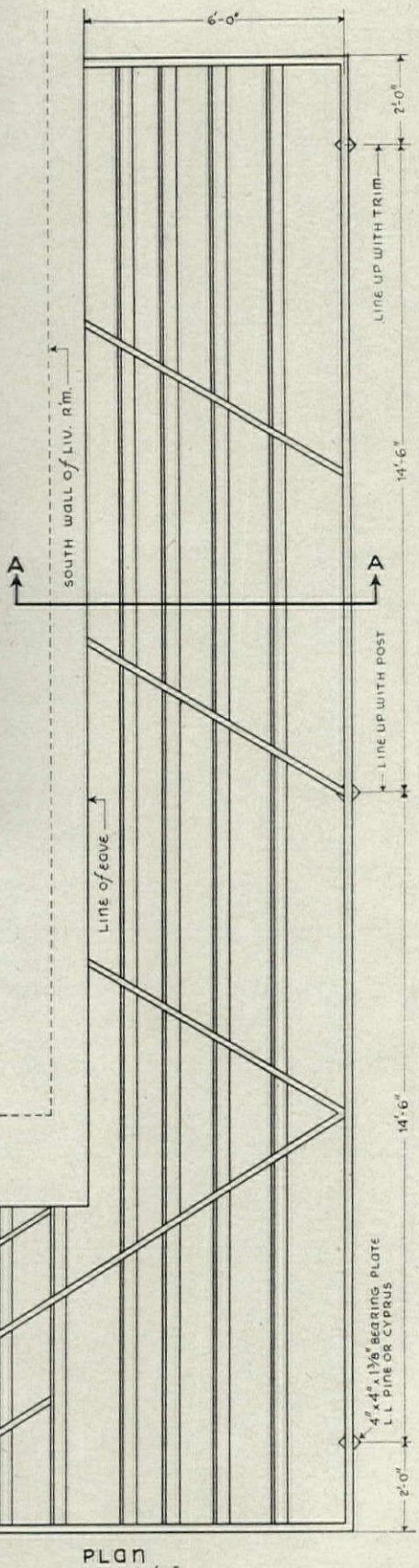

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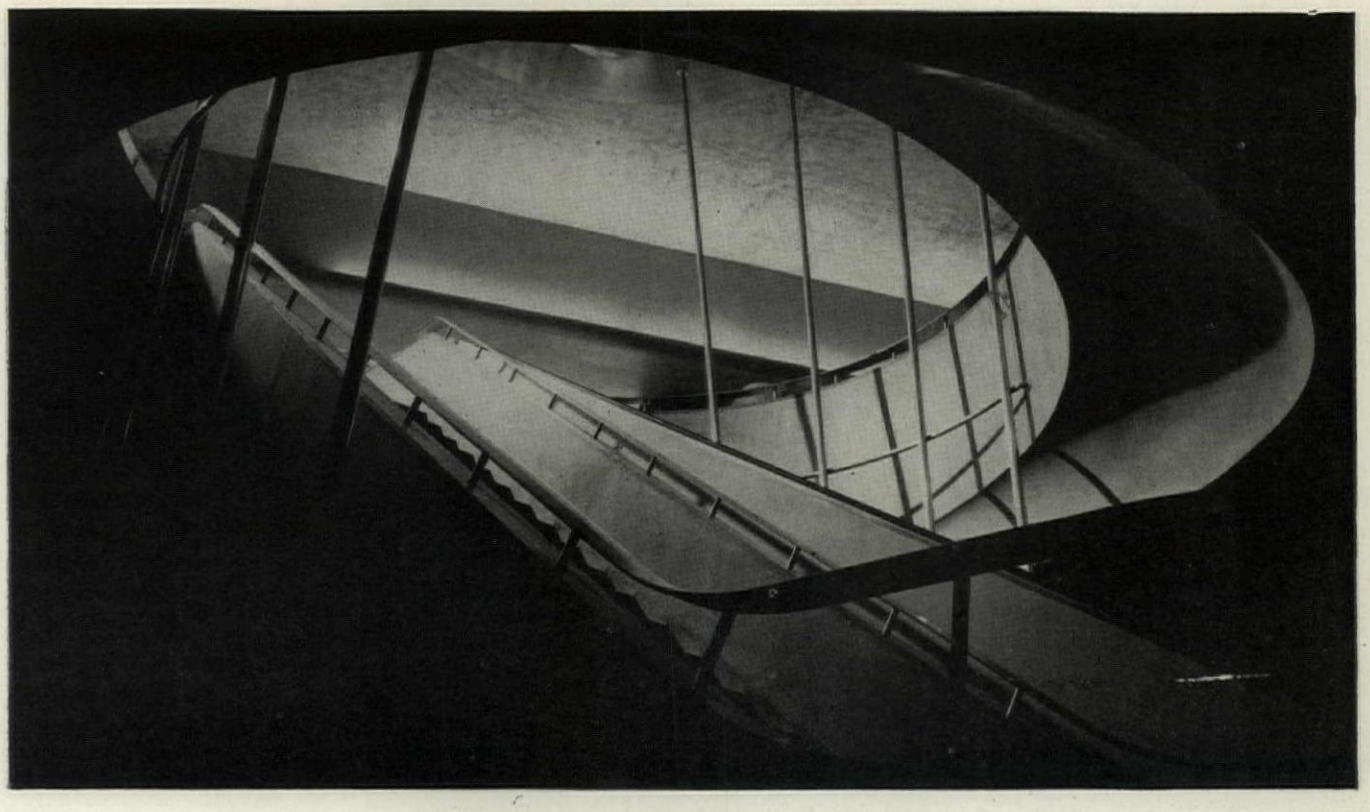

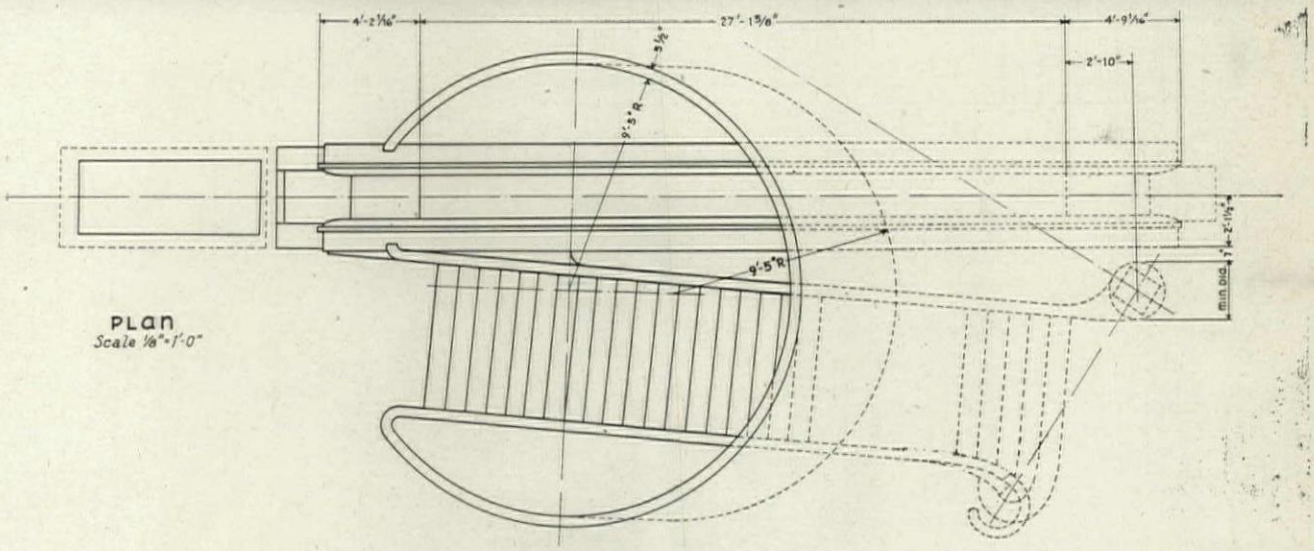

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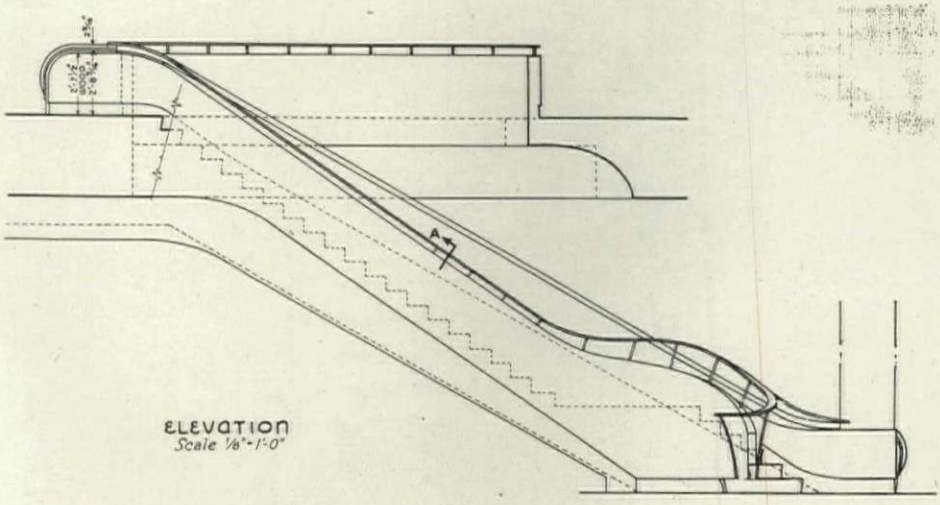

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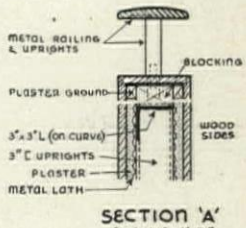

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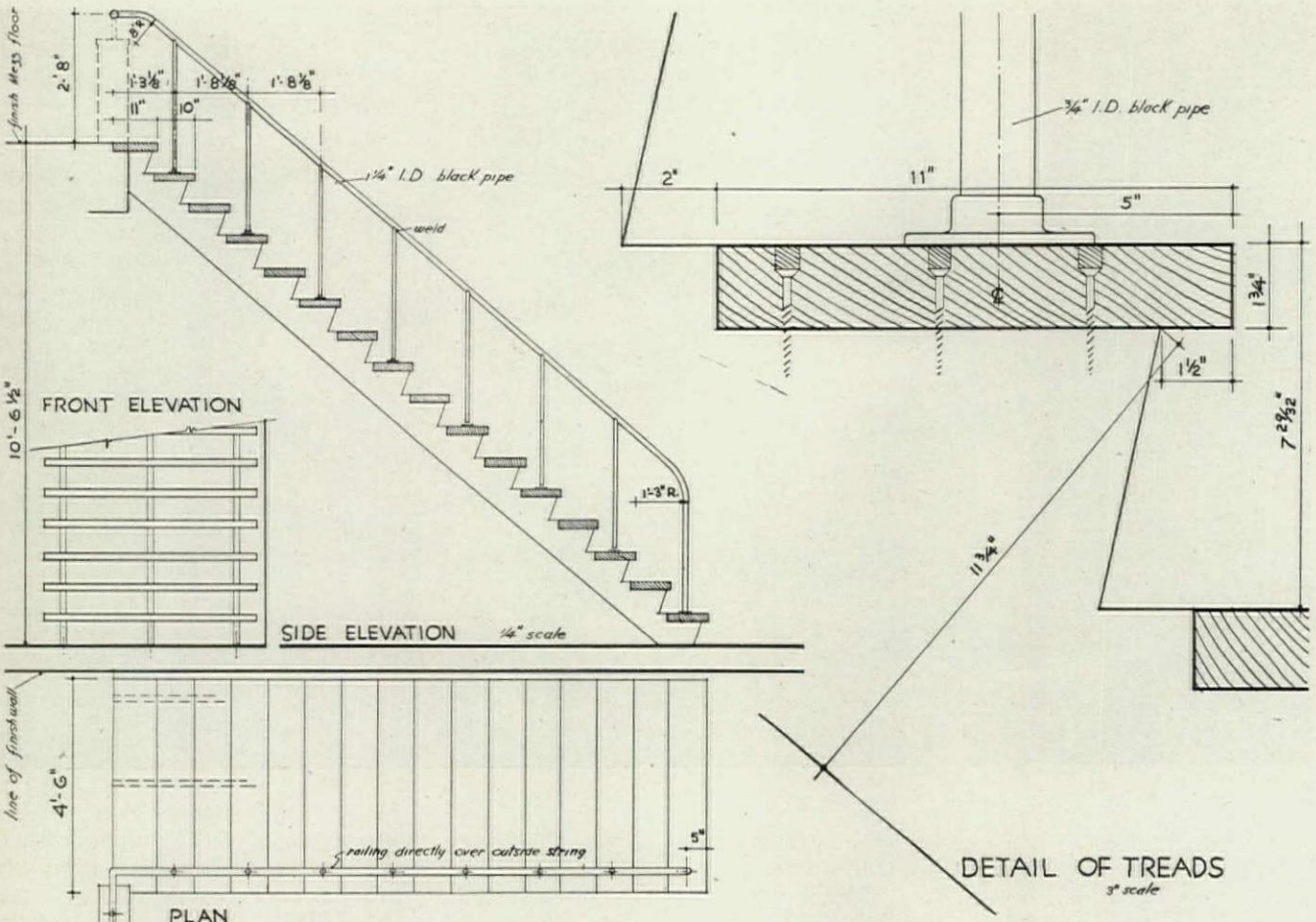
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8½"
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FRONT ELEVATION
1'-3" R.
SIDE ELEVATION
¼" scale
line of finish wall
4'-6"
railing directly over cutside string
5"
PLAN
¼" scale
finish wall
¾" I.D. black pipe
2"
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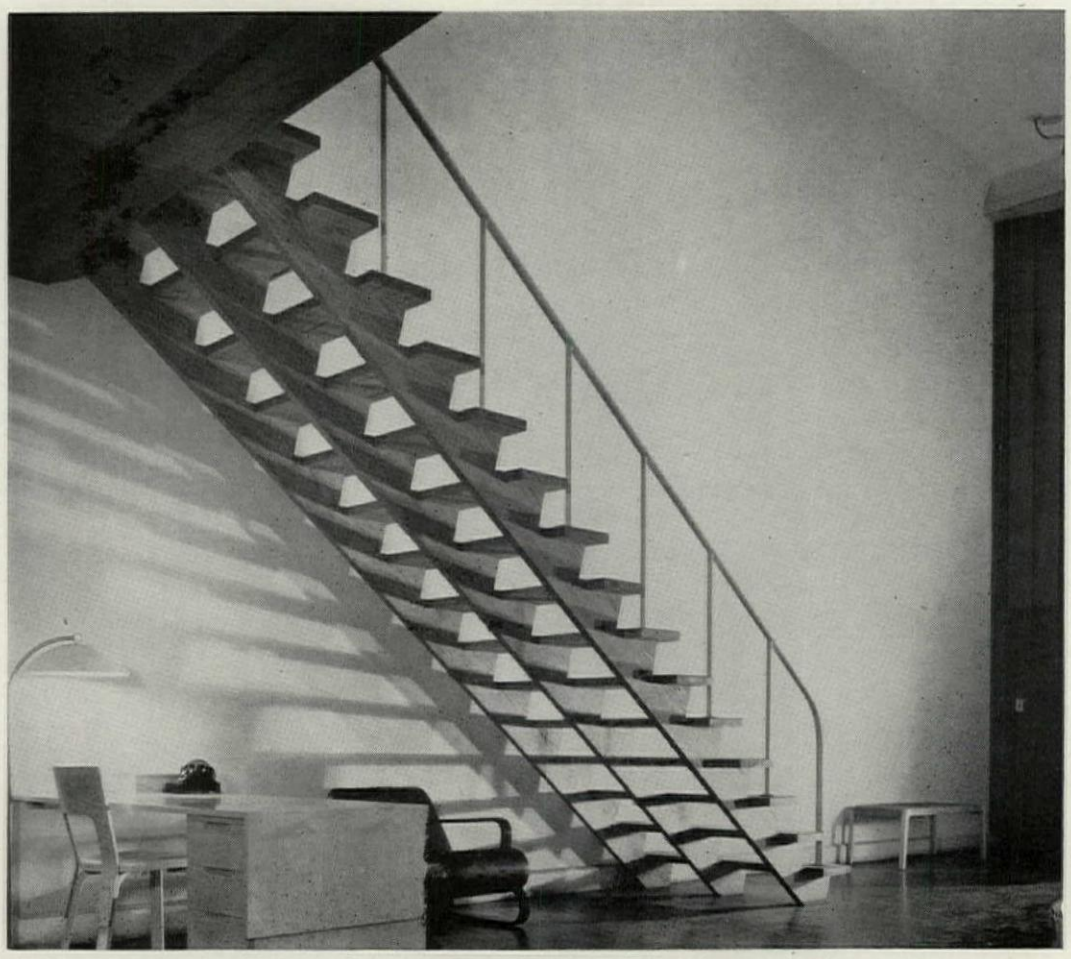
DETAIL OF TREADS
3" scale



The Architecture of the Future: Part IV

Conclusion of a Series by Talbot F. Hamlin

The Future of the A. I. A.

The A. I. A. can play a major role in the future development of American architecture. It can also play a minor role, or no role at all. Its official actions during the next two years are likely to determine which of these three alternatives will be true. Obviously, even at the lowest estimate of its function—that is, as the mere official representative of architects—the Institute in the past has left much to be desired. To be sure, the service performed by its Washington representative, D. K. E. Fisher, Jr., has been superb, and the information he furnishes is valuable, timely, and helpful. But he has been a reporter primarily, a fact finder; and it seems as though the Institute should furnish more.

If the Institute wishes to play a larger role—a role commensurate, shall we say, with its past history and its membership—it must do much more. There was, and is, a great field for further and more forceful action. Take the whole matter of freedom for the architect to make his service to the public as valuable as he might. In public housing, for instance, it is obvious that many projects are not as good as they might be, not as attractive and human and livable as they should be. Some of this failure has come from over-standardization, from too much centralized governmental dictation. In the laudable effort to achieve adequate, inexpensive housing, the USHA had worked out minimum standards (which in practice were allowed to develop into maximum limits) the slavish following of which frequently hampered, where it did not prevent, better solutions. Yet nowhere to my knowledge has the Institute taken a strong position directed toward protecting the ability and the right of the architect to present the best he can to the public in public housing matters. Almost the only official Institute acts with regard to public housing were in connection with architects' fees, and I believe this is a shameful fact. What was necessary, instead, was a definite effort on the part of the Institute to make sure that government bodies, local and national, *hampered as little as possible the architects' ability and freedom to design within the demands of the problem.* If that had been done, architects' prestige would have been increased and the fee matter would have taken care of itself.

A really vital A. I. A. in the years following the war should be much more than a mere legal representative of its members in Washington. As the oldest architectural association and the one with the highest standing, it must serve not only the profession but the nation. It must see that the profession of architecture in the broadest sense is allowed to operate to the greatest good of society. It must show the government and the people at large that the architects are a body of men whose skill and imagination is specifically directed toward the purpose of making the nation's homes, its working places, and its communities more beautiful and more livable. It must do everything to make this contribution possible, not waiting for orders, not standing around with cap in hand to beg more fees, but to be seen always in the vanguard of any controversy which has a bearing upon the quality of the architects' contribution.

II

To play this larger, more forward-looking role, the Institute must represent the architectural profession as a whole, and as a representative of the entire profession, it must consider the distinct possibility of major changes in set-up, in order to make sure that its representation is complete. If the profession in the future is going to contain greater numbers of salaried employees—in corporation employ, in large offices, or in national, state, and local boards and commissions—the representation of these important architects must somehow be made more effective.

Above all, some kind of active co-operation with architectural draftsmen must be brought about. If the industrialization of the profession has gone so far as to make inevitable large offices in which tenure is precarious, the development of draftsmen's organizations—such as the F.A.E.C.T. and the Architects' Guild—is not only necessary but desirable. Under such situations, it seems to me, the last thing the Institute should do is to adopt in any way the attitude of an employers' organization as opposed to the labor unions. Professionally we are all—architects and draftsmen, civil service employees, or what not—devoted to one aim, the designing of better buildings and better communities. As a professional organization, the A. I. A. stands for that aim and therefore should and must work in the closest co-operation with all individuals so engaged.

Just how this co-operation is to be brought about is a difficult problem, but one not impossible of solution. Perhaps every chapter should have certain standing committees on which representatives of the Civil Service Employees' Association, The F.A.E.C.T., and the Architects' Guild should sit as guest members, or even as active voting members with opportunities to bring in, should they desire it, minority reports whenever the occasion warranted. Perhaps representatives of building labor could be invited to certain meetings, either of committees or of the chapters, or even to conventions of the Institute.

The greatest help to this welding of the profession into one powerful unit would probably be obtained by a drastic reorganization of the whole system of associate membership in the Institute and a vast increase in this type of membership. The associate membership was founded to act as a guarantee of continuity between the young and the fully mature, and to serve as a sort of feeder to the Institute, in which promotion from associateship to full membership should be almost automatic. This system was designed for the days of many small individual offices, where most draftsmen planned to become architects themselves, and where the salaried official architect was a rare phenomenon.

Today this condition is no longer true. The body of those who contribute to the design of buildings on a salary basis has vastly increased; relatively the number of individual offices has diminished. Tomorrow, with the probable development of more governmental designing offices like the TVA, the possible great increase in the amount of corporation design of houses or house parts, and the equally possible growth of large architect-engineer corporations, the position of the salaried architect will be of evergrowing importance. The sharp differentiation between draftsman — partly apprentice — and professionally practicing architect is tending to die out. Even the fact of being a registered architect, or not being a registered architect, is in many fields losing its importance. Yet the old system of associate membership continues in its traditional form, as though the Institute were unaware of the change.

The Institute must then either revise its requirements for full membership, or else drastically reorganize and revalue the entire position of associate membership. Today apparently the only advantage the associate member has is that of paying dues and going to meetings, many of which could hardly be called exciting. This, I think, accounts for the small number of associate members. If some way could be found of making associate membership a real, active participation, seeing to it that associates were represented on all important committees, and perhaps giving them a vote in such matters as chapter officers and many other questions, associateship would become really valuable. Furthermore, the Institute might gain enormously by thus bringing into its midst younger minds unfettered by tradition, as yet undefeated or uncowed by experience. Out of their enthusiasm and their dreams magnificent things might come.

III

The postwar Institute, it seems to me, has two other responsibilities both to the profession and to the public. The first is in the matter of building materials—a point I have already mentioned in earlier articles. Almost all architects of any extensive practice have had occasional unfortunate experiences with highly touted and widely advertised products. Today the architect is often completely at the mercy of the integrity and the experience of manufacturers, their advertising writers, and their salesmen. The wonder is, under such a system, that generally speaking so little has been foisted upon the people; yet that little is too much. With the coming of peace, the pressure toward the production and sale of any number of new materials is going to be terrific. Many of these will have had the advantage of but few rigorous tests, save perhaps the carefully selected tests which their makers may give them. Yet the qualities of these materials, their performance under difficult situations, and their permanence, as well as their appearance, are going to do much to determine the value of postwar buildings and the quality of the service which architects can render.

Surely there is need here for Institute action. The A.I.A. should stimulate careful and critical thinking about new materials. It could, through some committee or co-operating body of impartial scientists, acquaint its members with the basic physical qualities of the various types of materials, and their resultant capacities and limitations, so that optimistic salesmen and wishful advertising might meet with a true scientific skepticism as well as a scientific freedom from prejudice. The Institute could serve, too, as some kind of a liaison between architects and the U. S. Bureau of Standards, and should urge a loosening of the extremely restrictive rules under which the Bureau works, in order to make the results of its tests more widely known and more socially useful. It might even set up an impartial professional committee which would do for the architects what the committee on drugs of the A.M.A. does for the medical profession. A Producers' Research Council is not enough. If the law prevents the National Bureau of Standards from broadcasting information about its tests, it would seem incumbent upon the profession, both as a self-protective measure and a service to the public, to initiate and support some impartial body of its own through which the architect could obtain the real information he needs about products he wishes to use. If no more scientific means can be found, it should at least be feasible to set up a file of information in each A.I.A. Chapter where members could record their favorable or unfavorable experiences with materials and equipment and in turn consult the recorded experience of their fellow architects. Over a period of time such a group fund of empirical information would become broad enough to be reasonably accepted as reliable. Incidentally, access to it would constitute an additional incentive to institute membership.

The second of these additional responsibilities of the Institute lies in the general field of making the public aware of what architects are, what they can contribute to the world, and of what their service consists. Public and governmental apathy to the architects and to architecture is nine-tenths ignorance. Public objection to the amount of architects' fees is nine-tenths ignorance. That ignorance can and must be overcome. This is not the place to go into the exact methods by which it might be overcome; radio, newspaper and periodical publicity, and so forth all suggest themselves at once. Perhaps one of the greatest aids to the defeat of this ignorance could be the newly resurrected *Journal of the A.I.A.*

The postwar period will bring the greatest challenge which the architects of America have ever made. A world stands ready to be remade. The war effort has shown us what united action devoted to a great ideal can accomplish. How well the architects of America answer this challenge, how much they are allowed to answer it, will depend in no small measure upon the A.I.A., their major association. Let us hope that this challenge will bring from the Institute the leadership necessary to take advantage of this supreme opportunity.