Towards an Imageable Structure for Residential Areas

by

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Dear Professor Howard,

This thesis is respectfully submitted in partial fulfillment of the requirements for the degree of Master of City Planning.

Sincerely yours,

Donald Appleyard

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CONTENTS

ABSTRACT

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submitted to the Department of City and Regional Planning on July 20, 1958, in partial fulfillment of the requirements for the degree of Master in City Planning at the Massachusetts Institute of Technology.

Problem:
The inability of residential areas to provide a recognizable image which will serve the needs of comprehensibility, orientation and identity, let alone aesthetic satisfaction, to the person who moves around and through them - the traveller or, in this context, the perceiver.

Objectives:
To discover the causes of such a failure and to formulate a conceptual framework for the design of residential areas that will constitute a step towards a more comprehensible structure.

Procedure:
A perceptual method of analysis is devised, which consists of a generalized perceptual examination of movement sequences along what are defined as the PRIMARY and SECONDARY MOVEMENT STRUCTURES of residential areas. The first are the paths travelled from the outside world into the residential area, arriving finally at a destination, i.e., the home; and the second are those internally focussed movements within the residential area from the home to various key facilities like the school, stores, etc.

The analytical method is then applied to three case studies:
1. LEVITTOWN, a large mass-produced postwar low-density development.
2. RADBURN, one of the most important layouts in residential planning.
3. BACK BAY, a 19th century residential development.

Each case is evaluated subjectively for its qualities of differentiation and imageability and is used as a source of ideas which begin to suggest the extent of an untapped field of imageable expression, later to be built into a conceptual framework for design.

This framework consists of a vertically differentiated hierarchy of levels. It is introduced by a distinction

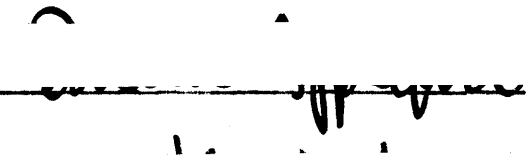
between the perceived images of the surveys and the creation of meaningful images out of the design process. Since a meaningful image is the expression of some idea, the levels of the hierarchy find their sources in various ideas or combinations of ideas from different fields.

The two basic components of the environmental structure, Accommodation and Circulation, give rise to the two perceived hierarchies, the RESIDENTIAL FORM and RESIDENTIAL PATH STRUCTURE, the first relating to types of social or functional groupings, the latter to orders of movement and transition.

They are related in different ways to the traveller or perceiver who is himself using and moving along the path system. The RESIDENTIAL FORM is perceived often in the distance or background, whilst the PATH STRUCTURE is invariably in the foreground or immediate surrounding of the perceiver. This relationship of distances can be used to produce an integrated and comprehensible perceived experience. The two hierarchies can be interrelated as can be the different levels within each hierarchy, and these sources of imageable expression are to some extent explored.

A further relationship can take place between the PRIMARY and SECONDARY MOVEMENT STRUCTURES.

The appendix explores the possible application of this framework to low-density U.S. residential areas.

Author 

Thesis advisor 

INTRODUCTION

The kind of residential neighborhood appearing on the fringes of U.S. cities today is an extreme manifestation of a phenomenon appearing outside London, Milan, Sau Paulo and other cities throughout the world. The demand of each family for a single isolated house is a symptom of the new managerial middle-class society. It is this one element that, repeated as it is hundreds and thousands of times, and multiplied into endless parallel or curving streets, spreading over the countryside without apparent order, forms the image of the American residential neighborhood. Socially and functionally it may work reasonably well, although grave doubts have been expressed on these points; but the provision of adequate hygiene, sufficient open space, good community services and all the other ideals of the planned neighborhood do not seem to be enough. The real failure is still to be faced, and it is a psychological one.

There has been a breakdown in communication between man and his own self-created environment, which has diminished drastically his psychological understanding of, and satisfaction in, his surroundings. The protracted repetition of standardized elements leads quickly to a deadly monotony and uniformity. Man can no longer achieve any

individuality either in his house, which is similar to all other houses, his street which is identical to all other streets, or his neighborhood. He is forced to rely on alphabetical and mathematical methods, on names and numbers, to solve the mystery of the maze with which he is presented. The elements of this structure - the houses, streets, community facilities, etc. - although perhaps clear in themselves, are unrelated beyond a strictly functional sense. Although there exists a structure of streets and buildings, it is only a functional structure; the lowest common denominator of relationships. It contains no extra quality that could impress it on the mind. Comprehension, orientation and identity in the physical environment depend not only on its ability to satisfy practical requirements but also on its ability to be identified by the common man as a recognizable image.

Imageability is necessary to him, firstly, for his security needs - to find his way around, to communicate this knowledge to others, and to find for himself and his family a 'place' in that environment; and, secondly, for the infinite aesthetic satisfaction that he could derive from an environment imaginatively conceived.

It is not surprising that a rapidly developing technological culture should find itself temporarily unable to grasp the nature of its products, and more particularly

of its constructed environment. But if true progress is to be made, this cannot be accepted as a permanent disability; and it is the task primarily of the planning profession to create from this environment recognizable form, an imageable structure.[1]

With these ideals in mind this thesis has been written. Its main objectives are:

1. To define the nature of the environmental image, and to establish the relationship between the environment and the perceiver.

2. To develop a perceptual method of analysis for residential neighborhoods.

3. To apply this to three case studies in order to develop criteria for the evaluation of neighborhood design.

4. To formulate an approach to the creation of imageability in residential neighborhoods.

5. To provide a conceptual framework for design, incorporating the method and results of the surveys.

6. To suggest ideas and ways of achieving imageability through physical manipulation.

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[1] "Town planning is an extension of architecture. It involves in its simplest form the combination of single dwelling units in a recognizable system. Although the quality of architecture may exist in each of a dozen buildings, the definition of town planning cannot be said to have been satisfied from the juxtaposition of units unless the idea of order and arrangement be included in their relationship." Martienssen, R.D., The Idea of Space in Greek Architecture, Johannesburg, Witwatersrand University Press, 1956, p. 11.

A. ENVIRONMENTAL IMAGE

Before examination of the case studies, an investigation into the nature of imageability is necessary, in order to formulate a framework of analysis. This involves the definition and evaluation of the relevant variables that make up a good environmental image, and the establishment of their interrelationships. It will then be possible to carry out a clearly oriented study on which some conceptual framework and practical recommendations may be based.

The quality of an image depends on the impression that an object makes on the mind of the perceiver. Consideration of imageability must therefore recognize that it rests on a relationship, and is not solely the quality of a physical reality. This relationship breaks up the environmental image into its two basic components, object and subject:

1. the imageable attributes of the perceived environment;
2. the people who will image it, the perceivers.

1. PERCEIVED ENVIRONMENT

The qualities of this imaged environment or mental representation would seem to consist of identifiable elements which are structured in such a way as to form a

total image. IDENTITY and STRUCTURE are therefore the interrelated components of this image.[1]

(a) Identity

The identification of an element, and its distinction from other elements, depends on certain formal and spatial qualities and relationships that make it memorable and unique. Not only may this impact affect the visual sense. It may include also the senses of touch, smell, and hearing as well as kinesthetic sensations, all of which can reinforce the strength of the image.

(b) Structure

Structure involves the establishment of relationships. It is a way of relating diverse elements to each other and to the whole.

The scale of contemporary residential development is so much larger and more diffuse than that of previous eras, and the problems of monotony and repetition have become so pronounced, that this organizational aspect of the image has become perhaps the most crucial factor in the formation of a residential environment. The amount of diversity required, and the scale or scales at which it might best operate, are some of the questions to be resolved, which may lead to the working out of new structural types.

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[1]For further explanation see Lynch, Kevin, Image of the City, unpublished draft report, M.I.T., Cambridge, Mass., 1958, Chapter I.

2. THE PERCEIVERS

The size of the neighborhood structure has now reached such proportions that it may be seen as a whole only from an aeroplane, and sometimes not even from that. It is not, therefore, to be perceived from any one point as a painting, nor even by a single sequence as in music, but by a series of sequences, taken backwards or forwards, or in parts. These sequences may include wide views over large parts of the area, and very confined views of small spaces. They may accumulate over time to form a comprehensive image, or they may only be experienced once. All these factors depend on where, by what means, and in which direction, the observer will move, how many times he will repeat his journey, and what sort of person he is.

The number of variables would seem to be infinite, so that any total coverage is impossible. Concentration on the main patterns of movement carried out by the perceivers is perhaps the best compromise, although even here the perceivers will range along a continuum of familiarity with the image from the one-time visitor to the daily commuter, whether going to work, to school, or to the shops. In this sense the environmental image will have to operate at different levels of complexity to be generally understood. It will have to avoid incomprehensibility on the

one hand and obviousness on the other, and, further, it will need to operate at both the pedestrian and vehicular scales.

The unanimity of the image will not be considered as important as it might be in the central area of the city. The users of any residential neighborhood are only a small fragment of the city's total population, and as one reaches the fringes of the city's movement structure - the minor residential streets - the number of people who need to recognize the image may be comparatively small. There may therefore be scales of importance also in this sense, and particular images may be created for certain groups of people, to be understood only by them, for example, 'children's ways.' The routes used by the majority of people may require more careful consideration than the culs-de-sac.

MEANING OF THE ENVIRONMENTAL IMAGE

The total meaning of the image will depend on a combination of its physical qualities, its functional purpose, and the way in which the perceiver interprets it. The meaning pattern that results becomes so large and complex as to be outside the scope of this discussion. In the same way that the meaning of any work of art may become understood and spread far beyond its original

audience, the opportunities of communication are unlimited. Suffice it to say here that a strong image is not only one that has striking physical qualities, but one that also, by its broader and deeper meaning pattern, achieves a contact with the observer that might be called aesthetic.

B. A PERCEPTUAL METHOD OF ANALYSIS FOR RESIDENTIAL NEIGHBORHOODS

The foregoing definitions and exploration of relationships indicate a strong correlation between the environmental image and the movement patterns of the perceivers. It is therefore suggested that interpretation of this image be made in terms of the circulation or movement structure.

The STRUCTURE is therefore conceived as being continuous and limb-like, each street, road, parkway, etc., joined up to others and acting as PATHS, whilst each building or space outside the paths acts as a formal or spatial ELEMENT. This is in accordance with the classic division of the city pattern into Accommodation and Circulation.[1]

This structure is differentiated vertically, in that it is hierarchical, and horizontally, in that elements and paths at the same scale are often different from each other. The strength of the image created, either by the total structure or by the paths or elements, that is their IDENTITY, can only be evaluated wholistically, a judgment whose value depends in this analysis solely on the faculties of a trained observer, and which therefore rests as

[1]Holford, Sir William G., Design in City Centres, H.M.S.O., London, 1953, p. 71.

a matter of opinion. Their components and their relationships will be analyzed and evaluated on the same basis.

The method of survey worked out is the result of an effort to visualize these neighborhoods as nearly as possible in the same way that they are perceived by the ordinary people who use them, that is, under 'real' conditions. Since, however, it is impossible to take the place of every person who may utilize a neighborhood; since even a trained observer cannot 'see' the same things as a long-established inhabitant; and since every inhabitant or visitor to these neighborhoods will possess a slightly different image, a schematic method of approach has been devised, which will take each case study through certain generalized sequences corresponding to the principal movement patterns.

According to Mitchell and Rapkin,[1] there has been little research into the detailed movements of people within the city, beyond origin-destination studies. It is therefore impossible to tell accurately which patterns of movement are the most used and, even were this possible, they would no doubt be subject to many variables. Faced with this situation, Mitchell and Rapkin have suggested a conceptual framework for movement within which future

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[1]Mitchell, Robert B., and Rapkin, Chester, Urban Traffic, New York, 1954.

research might be based. This framework has been a general influence on this paper, but it has been ultimately necessary to make certain assumptions about the primary movement patterns, which are based not only on hypothetical quantities of flowing people, but also on an idea about what ought to be considered the most important and imageable movements in the city today.

It is one of the assumptions of this thesis, then, that the PRIMARY MOVEMENT STRUCTURE is that which connects the organization of the neighborhood to the outside world. Increased mobility and the dependence of the residential areas on the rest of the metropolitan structure have brought about a fundamental change in scale from the structure of the small isolated town or village which is internally oriented.[1] The husband leaves daily to commute to work; the wife, if there is a second car, is no longer restricted to the neighborhood shops;[2] and the visitor has become an increasingly important figure. The emphasis here lies on communication rather than on social dominants. Even the Neighborhood Unit, a concept which aimed specifi-

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[1]Even a survey of an inner neighborhood of St. Louis showed that only one-third to one-half of the facilities used were 'local,' that is under one mile from the home of the user. For further details see Foley, D.L., "Use of Local Facilities in a Metropolis," unpublished dissertation, Washington University, St. Louis, Mo., 1948; also The American Journal of Sociology, Vol. LVI, No. 3, November, 1950.

[2]In Levittown the neighborhood units do not contain shops.

cally at trying to focus the structure of neighborhoods to make each an independent entity, was forced to place the commercial elements along the 'boundaries' of the Unit, acknowledging inevitable dependence on the outside world.

Of this PRIMARY MOVEMENT STRUCTURE, the most important sequence is considered that of entering the neighborhood from the outside. Analysis will therefore take place in three phases:

1. the ENTRY SEQUENCE, which will begin from the first sight and recognition of the neighborhood, to the actual transition point between 'outside' and 'inside;'

2. the DISTRIBUTION, which takes over from the entry point and will include the major path system of the neighborhood, until

3. the DESTINATIONS are arrived at. These are the circulation areas immediately adjoining the houses.

This journey will be considered as far as possible from all points of view: for amount of differentiation from both the regular commuter's and the searching visitor's position; and for scale, in relation to vehicular and pedestrian speeds. In the latter case a descent in scale throughout the sequence is to be expected, which will enable some estimate of vertical differentiation to be made. The focal or community elements in the neighborhood, apart from the houses, will be examined in relation to their position in this structure, at this point.

The reverse order of this sequence, commencing from the home, along the paths which now collect rather than distribute, to the exit which was the entry, could be considered almost as important. Finding the way out is as important as finding the way in. So relevant aspects of this return journey will be pointed out when they seem to be significant. But space limitations will force this sequence to be dealt with in a more cursory manner.

After this examination, the SECONDARY MOVEMENT STRUCTURES, or internally focussed patterns, will be evaluated. These will vary again with each district, although basically they are the generalized routes from HOME to SCHOOL and from HOME to the SHOPS. If other facilities also figure as focal points of some importance they will also be mentioned. It will be found that in many cases this Secondary Movement Structure coincides with, or is part of, the Primary Structure.

PROCEDURE

Three surveys were made with the purpose of finding distinctions and character in the various neighborhoods, streets and houses. Not until later was the material organized into its final form. The procedure ultimately adopted was therefore somewhat limited by the original surveys, in that, for instance, certain entries have not

been considered, and coverage of all items is not complete. These drawbacks are considered small, and not too detrimental to the final organization.

(a) Primary Movement Structure

Entry Sequence. Entries taken are selected ones which mark up certain points which it is wished to make. At this time, the question of total neighborhood form seems to be relevant, and is considered.

Distribution. A path can be perceived by a standing or a moving person. In the first case he sees the path statically, in perspective as a long receding space, and in the second he begins to see it in sequence, as a series of perspectives, passing sensations, vistas, etc., which are all of and more than the sum of the static points of view.

The path structure is therefore considered in PERSPECTIVE and then in SEQUENCE, the former being more or less systematically dealt with under the headings of:

1. The shape of the space.
2. Character of containing surfaces.
3. Objects in the space.
4. Vista.

The position and relation of community facilities to this structure is considered here.

Destinations vary so much in character that no

systematic approach could reasonably be adopted.

(b) Secondary Movement Structure

Since Radburn has the only coherent, secondary movement structure, this is the only one considered in detail as a complete sequence. Other sequences have been mentioned only when they seem to be relevant.

C. LEVITTOWN, PENNSYLVANIA

1. INTRODUCTORY HISTORY[1]

Levittown, Pennsylvania, is situated within six miles of the intersection between the New Jersey and Pennsylvania Turnpikes, on the banks of the Delaware in countryside that is almost flat, without many trees. Construction began on the town in 1951, and was completed in 1956, accommodating a population of 70,000 in approximately 16,000 houses.

2. REASONS FOR CHOICE

It has been chosen as an example because:

1. it has attempted to tackle the problem of the low-density residential area on a large scale, and is therefore very much a contemporary problem in American neighborhood planning;
2. it has used mass housing techniques, and was therefore faced with repetitive standardized elements;
3. it made conscious efforts to reduce monotony and uniformity, but has nevertheless been criticized for these characteristics;
4. it has become virtually a public image of what the American residential neighborhood is like.

The town has been divided up into several residential neighborhoods, each with its own school, swimming pool, and churches. All shopping is concentrated in the main

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[1]See fig. 2, p. 34.

shopping center. Each of these residential neighborhoods has its own separate street pattern in accordance with current planning practice. One of these neighborhoods, itself composed of two sub-neighborhoods, Pinewood and Lakeside, was studied in detail, and will be the main subject of this analysis, while others will be brought in for comparison when necessary. Examination will follow the procedure delineated.

3. PRIMARY MOVEMENT STRUCTURE

(a) Entry Sequence.[1]

A visitor coming from New York, to see a friend in a Levittown neighborhood, has a chance to experience, in sequence, a large range of contemporary American urban landscape, and it might be interesting to set the stage for considering the neighborhood entry by describing this sequence.

Six miles to the east of Levittown the great low bridge of the Pennsylvania Turnpike crosses over the New Jersey Turnpike, and maintaining the 65 miles-per-hour limit allowed all the way south from New York, the change-over is made on a smooth-rising curve of wide white concrete. The automobile heads West. This is the first

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[1]See fig. 1, 4, 5, p. 33.

transition. The turnpike is so wide that all sense of movement has disappeared, and, as countryside slips quietly by, the strange humped and foreshortened shape of the Delaware Bridge comes into sight. The scale of this bridge, compatible with the river and turnpike, is enormous. Through the toll gate and rising high over the river plain, Levittown, a grey sea of roofs, is seen for the first time, its endlessness and formlessness apparent even from this height, thwarting the massive scale of the bridge.

The slow descent on the other side involves a spiral negotiation of the exit turn-off, before the bridge is seen now from ground level. Then, suddenly, U.S. Highway #13 jogs the perceiver from the film-like, subjective world of the turnpike, back to the commercial realities of 'Roadtown.' Signs, used-car lots, drive-ins, all build up the familiar scene as the understructure of the bridge passes overhead.

Another mile and the entrance to Levittown, the name already appearing on real estate booths, cafes, etc., comes into view. The shopping center is now visible on the left-hand side, then stop-lights, and a few half-grown treelets symbolizing Nature, and a signpost marks the entrance. The third transition is made. Levittown Parkway, four lanes wide and flanked by concrete lamp-

posts, disappears over the hill to an unknown destination, which even when the crest is passed reveals no more than a hazy grey skyline.

Small houses now appear on either side of the road behind small trees. Some small boys, the first humans to be noticed, are trying to hitch a ride home. Telegraph poles and lamp standards perspective to the horizon, and there is a great deal of traffic on the road. This is the town.

At the second stop-light, the road widens out for those cars turning right for entry into the Pinewood and Lakeside neighborhood; and immediately after the turn, the Bible Presbyterian Church, an undistinguished but distinguishable building, confronts the visitor. As with many public buildings in Levittown, its name is written across the facade, and behind it can be seen the neighborhood recreation center, swimming pool and junior high school, all placed in a large grassed field, which is the neighborhood's public open space, its core. Here there is a sense of arrival, and later on, when he has parked his car at its destination, and returns to this center for some neighborhood activity, the descending spectator can look back over the roof-tops to the Delaware Bridge and see where he has come from. On each side of this open space passes a road with houses on one side, and

from the entry point it is possible to choose the right or left hand, on the right for the houses called Lakeside, behind which there is hidden a lake; or on the left for those called Pinewood, where pine trees have been planted to prepare for its appearance.

As a sequence, this experience has many exciting merits: the slow descent in scale from turnpike, through roadtown and parkway to neighborhood street, with its clear transition points, also in descending scale, marked by the turnpike junction, the clover-type turnpike exit, the shopping center at the Levittown entry-point, and the neighborhood facilities opposite: the neighborhood entrance, the last two providing a repeated experience at two scales. In addition, the cross-connections between different scales, the reciprocal views exchanged between the bridge and the neighborhood, act as strong unifying agents, and greatly help towards comprehension of the urban structure. The location of the neighborhood is made perfectly clear.

Differentiation from other Neighborhoods

The factors that distinguish this neighborhood from others are its location, within the town structure as well as outside of it, and the positioning and form of its community facilities.

Since it happens to be the first one after entry into

the town, it is easy to find and remember, and is therefore rather atypical for Levittown. For neighborhoods located deeper in the development, recognition depends on memorizing the distance or number of turnings from the shopping center, techniques often used in bad imageability.

The immediate confrontation by the community buildings at the point of entry - the Bible Presbyterian Church, the recreation center, and junior high school placed in linear formation - is the most striking quality of this neighborhood. The forms of community buildings throughout Levittown are not standardized, and therefore frequently act as good reference points, but few are placed so visibly adjacent to the main point of entry. Many, for instance, are located in the geometric center of their neighborhoods, which means that entry is made at insignificant points on the neighborhood ring roads, with all the consequent confusion. It must be said that even in Pinewood/Lakeside, there are entries of this nature, and only the best one has been chosen to demonstrate the advantages of a good entry for neighborhood recognition.

On these other entries, however, the value of the link street, which connects the inter-neighborhood parkways with the neighborhood distribution paths, is more clearly appreciated, since on the main entry its connection is confused. These link streets act as propylaea[1]

[1]Deep entrance buildings to Greek temple sites.

to the neighborhood, providing a short, straight, transitional pause before entry onto the path system. In Pinewood/Lakeside seven of these links serve a total of twenty-seven streets.

Imageability of Neighborhood as a Form

Pinewood/Lakeside cannot be perceived as a total form from any point on the ground, for it is too large and there is no large enough space around it from which to see its skyline. Strangely enough, the best over-all view is gathered from the very center of the neighborhood. Here, in the large open space, the best that Levittown can produce for a skyline is visible. The houses with their low-pitched roofs merge into a grey and choppy sea, leaving telegraph poles, lamp standards, and, in the distance, the city water tower and the whale-like Delaware Bridge, to dominate the seascape. Trees have not yet grown up, and the community buildings, low in themselves, are not sufficiently dominant to make an impression.

(b) Distribution[1]

After the entrance pause, the perceiver enters the distribution system, which constitutes the next phase of the sequence. He finds himself on either Pinewood or

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[1]See fig. 5, 6.

Lakeside Drives; two streets that look very similar to each other and to the rest of the streets in the neighborhood. They are flanked by similar houses, therefore acting also as destination areas, and appear to be of identical width; but large stretches of their length have open space on one side, either the central open space, or, in the case of Lakeside, the lake.

Travelling along the drives, the visitor will slowly realize, perhaps on the second time round, that they are ring roads. They contain long straight vistas and then have sharp bends, but they never exactly arrive anywhere. No streets cross them, and, of course, the link streets are all on one side, joining in at the bends, whilst the minor streets are all on the other side in repeated rhythms. Their importance is built up to some degree by the presence of community facilities in close relation to them. In some cases, as for example the church on the corner of Pinewood Drive, vistas of these facilities are created, which despite their small and rather insignificant forms, manage to stand out against the smaller and more insignificant houses.

Once, even the continuity of motion is broken. That is at the main entrance previously described, where the link street flows straight into Pinewood Drive, which joins itself in the form of a T-intersection.

(c) Destinations[1]

Arrival at the 'destination areas' is achieved by turning off from one of the ring roads onto a minor street. These streets are called 'Lanes' to distinguish them from the 'Drives'; Laurel Lane, Lilac Lane, Lavendar Lane, Little Lane and others in Lakeside; and Pond Lane, Pleasant Lane, Peachtree Lane, Pensive Lane and others in Pinewood.

They are also distinguished from the main streets by being the junior members of the T-intersection. These intersections are the points of entry and are always the same, marked by the parallel white lines of pedestrian crossings, the street name, perhaps a mail box, and a STOP sign on the minor street, elements which could be, but are not, integrated into an imageable unity to emphasize the nature of the 'joint' in the circulation structure. Past this point, there is, however, little to contrast the destination with the distribution streets.

On each side of these streets are placed parallel rows of houses. They are single-storey, with low-pitched roofs, each house placed at right angles to the next. Individually, they provoke no memorable image, for the form is broken up by open porches, carports, trellis-work and

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[1]See fig. 6.

other 'local' additions. Their form quality is further lightened by their flimsy wood construction. No colors are remembered, except slight changes in the roof shingles. Pavements, grass and sidewalks are all of apparently constant width and material throughout the neighborhood. Front yards are twenty-foot depth of lawns which slope gently down to the sidewalk, with sporadically planted bushes and small trees in them, further blurring the forms of the houses, which now appear to be in hiding. Brightly colored toy cars and trucks, statuettes of huntsmen or Negro jockeys, and live children are all scattered about these front lawns; whilst large cars, also strongly colored, butt up to the houses like big, quiet dogs. These transitory objects, through their bright color and clear forms, exert a visual effect similar to the advertisement signs downtown. They catch the eye more than do the houses, and often serve to identify the houses.

Thus the amorphous containing walls of the street space allow no concrete definition of that space, which becomes amorphous in itself, and their lack of height fails to achieve any sense of enclosure. Nor is this compensated for by a sense of openness, since the view is restricted by the continuous, low house forms.

The only other objects in the space are the widely spaced lamp-posts, which uniquely rise to over 15 feet in

height. Since a specific policy of forbidding telegraph-poles on the streets was carried out, these lamp-standards act as the sole vertical accents to the space.

Most of these streets curve to some extent, so that vistas are seldom very long, but these are not so markedly different in length from those on the distribution streets. Their character as connector streets, with a strong feeling of continuity, is very marked. As in a wide meandering river-bed, there is nothing that breaks the continuity, except where there are some sharper curves. Some of these succeed in enclosing small sections, but the space immediately leaks away again once they are entered.

Some confusion is caused in the cases where one minor street ends in another, as is the case where Post and Linden Lanes take the ends of other minor streets. Here the identity of the street is interfered with, for at one end it is a minor street and at the other end a minor minor street. And to turn out of one of these curving streets only to be confronted by another equally curving street of the same order, as happens in Levittown, gives rise to a momentary impression that escape is impossible.

Differentiation between Destinations[1]

These minor streets are not easily distinguished from each other, apart from their names. Orientation,

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[1]See fig. 6.

differences in connection to major or other minor streets, sharpness of curve, and varying vistas seem to be the sum total of differentiation. Of these, the varying vistas of the central open space might be mentioned, where down each street some different fragment of a public building is seen. This does help to position the street with respect to distance from neighborhood ingress. For instance, if the school is seen, it is known how far the school is from Levittown Parkway, provided that the central area has already been imaged. A comparative study of the three streets photographed, Pebble, Park and Peachtree Lanes, shows no one recognizably different from any other.

Differentiation within the Destinations[1]

Within the length of the minor streets, an attempt to differentiate between houses was made through alternating the orientation of the houses to form an 'ababa' rhythm. Since the houses are not well defined, this rhythm is not easily apparent. Some owners have achieved 'identity' by placing small lamps, statuettes, or wagon wheels on their front lawns or by building pieces of trellis and by planting. Their cars also help identification considerably.

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[1]See fig. 6

4. SECONDARY MOVEMENT STRUCTURE

The secondary movements, those from the houses to community facilities, are incorporated as parts of the primary movement structure. Thus if the journey to school is made by automobile, this involves arriving on one of the distributor streets, if this is not already the origin, and travelling along it until the school is found. The route to the shopping center is coincidental with the primary movement structure. Thus the sequential experience has already been covered.

Community Facilities[1]

Consideration of the visual influence exerted by the community facilities is important. The two key factors in the visual influence of these buildings are location and form.

The locations in this particular neighborhood have tended to maximize their visual influence. The central group, comprising the junior high school, recreation center, and Bible Presbyterian Church, is surrounded by a large open space, and is visible from the main entry. The church on Pinewood Drive, as the other facility in the neighborhood, is seen in vistas on Pinewood Drive, and is also located near one of the secondary entrance points, and is visible from the Levittown Parkway.

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[1]See fig. 5, 6, 7.

Although their forms are architecturally unimpressive, these buildings are simple and easily recognizable. They are larger, taller and built of more solid materials than the low wooden houses, so that even a two-storey building breaks the skyline. The two churches are distinguishable by their steep-pitched roofs, crosses and names, whilst the school, a lower open-form building, contains a water tower, and mounted in front of it is a large white jet-fighter for children to play on: a most impressive sight in the center of the neighborhood, acting almost as a substitute for industry. The spaces around set them well apart from the other buildings, denying the possibility of any spatial relationships.

5. EVALUATION OF STRUCTURE AS AN IMAGE

Perceived from the ground, this neighborhood fails to present a clearly memorable image. The main reason for this appears to lie in the failure to conceive a well-ordered, two-dimensional plan in three dimensions, that would be understood and appreciated from eye-level. Nor has order been sacrificed for any desirable differentiation or vitality. The result is uniformly grey, lacking any vivid qualities, with little spatial configuration or relationship between buildings. Only the two-dimensional plan, through good location and fairly clear structure,

has managed to offset complete failure:

The main points taken in the order studied are:

1. The neighborhood lacks any over-all recognizable form, or much distinction from any other neighborhood.

2. The main entry, by its visual connection to the community facilities, repeating the connection between the main Levittown entry and the shopping center, provides one strong image. This is not the case for the other entries which are restricted and undifferentiated.

3. The idea of the link street which creates that necessary pause for comprehension, choice and appreciation, so generally lacking in the circulation structure, is one that is exploitable. Entry control is further strengthened by the corresponding reduction in the number of entries allowed by these link streets.

4. The distribution streets provide a very weak image. Since their orientation is constantly changing, strong visual continuity was especially necessary; yet their containing surfaces contain little related or thought-out character. Whole lengths of these streets could be confused with minor streets. Only through the plan and perhaps through constant use is their continuity realizable, and from the plan it seems the concept may have been a good one.

5. The fundamental weakness of the destination streets is that they fail to stop the movement. 'Arrival' at the destination is sacrificed to continuity, and for what the distribution streets lack in this respect, every destination street makes up. Nor have these streets succeeded in evoking any other sort of image, their weak spatial definition allowing neither openness nor enclosure.

6. It is particularly unfortunate that such a remarkable sequence as that described in the beginning should peter out into such oblivion, and never succeed in 'arriving at' a 'destination.' In the whole structure of primary movement this seems to be the most crucial failure.

7. The coincidence of the secondary movement structure with the primary allows little more to be said in this respect. The location and form of the community facilities can be termed adequate only on a low level. The location of a sectarian church, rather than a more widely representative building, at the main point of entry is, for instance, questionable. But if their general location is good, their detailed relationships with other buildings, with the circulation structure, and between themselves are non-existent. Public

buildings need more careful location than any other type of building, and public space is equally important. In Pinewood/Lakeside there has been little consideration of these factors.

8. The complete lack of horizontal differentiation between minor streets, major streets and, at a lower scale, between houses in the streets, is perhaps the one consistent cause for complaints of monotony and lack of identity in Levittown.

9. The natural features in Levittown[1] have been regarded rather as an obstacle than as an asset. Brooks and streams are fenced off behind barbed wire and littered with empty cans and garbage. It takes more than this to keep the children out, so they break through the fences and fish and play in the water.
The 'lake' is the nearest thing to a natural feature in this neighborhood. It is really an old flooded quarry. But no advantage has been taken of it in the structure. It could have been turned into a major part of the neighborhood's character, and instead it is found only after search, barely accommodated.

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[1]See fig. 3, 7.

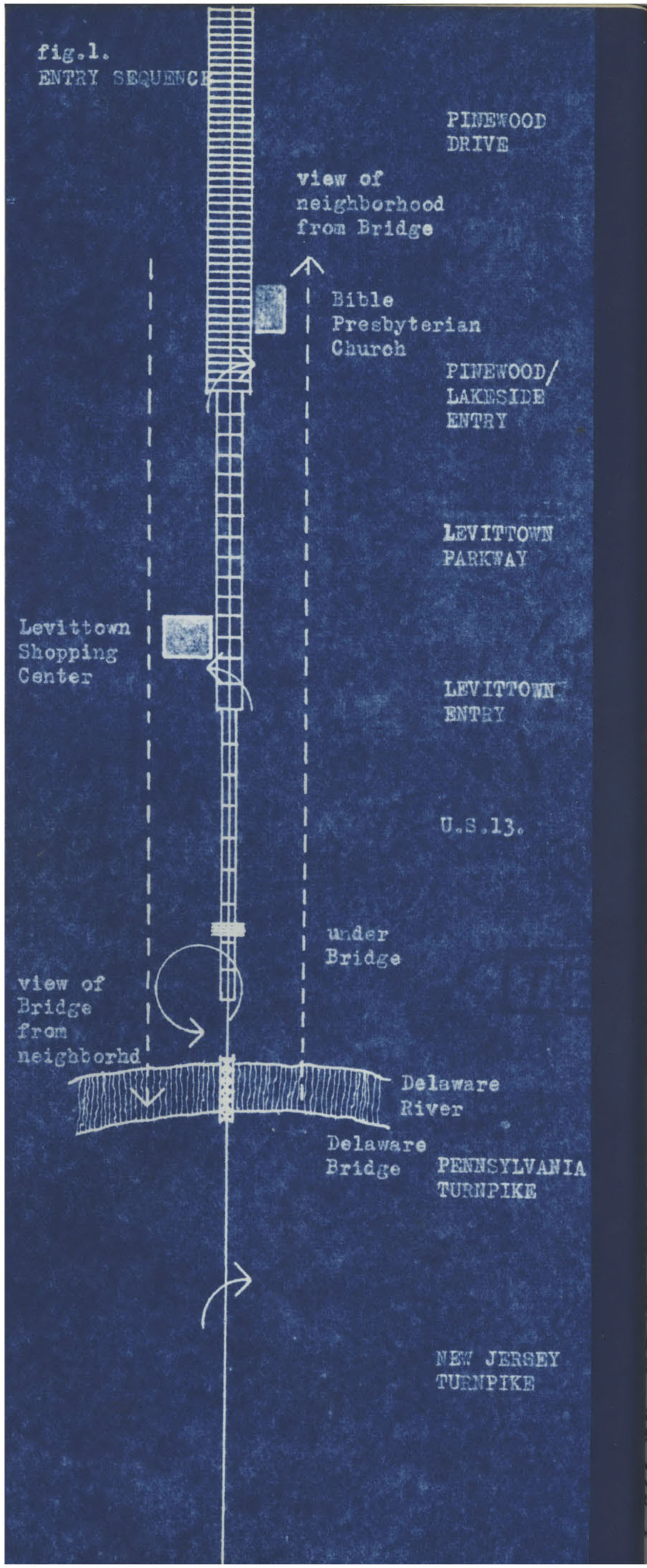


fig.1.
ENTRY SEQUENCE
PINEWOOD
DRIVE
view of
neighborhood
from Bridge
Bible
Presbyterian
Church
PINEWOOD/
LAKESIDE
ENTRY
LEVITTOWN
PARKWAY
Levittown
Shopping
Center
LEVITTOWN
ENTRY
U.S.13.
under
Bridge
view of
Bridge
from
neighborhd
Delaware
River
Delaware
Bridge
PENNSYLVANIA
TURNPIKE
NEW JERSEY
TURNPIKE

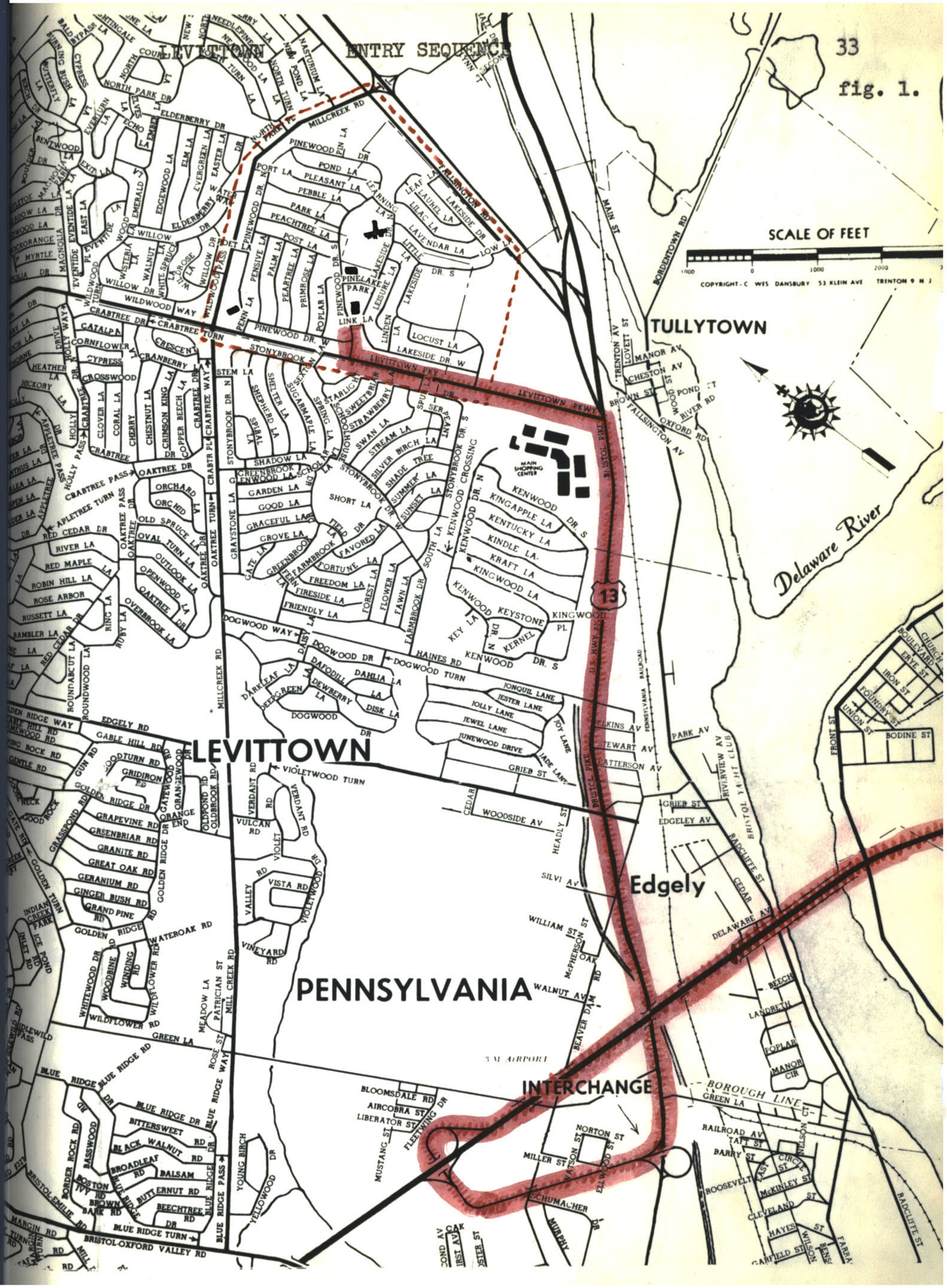
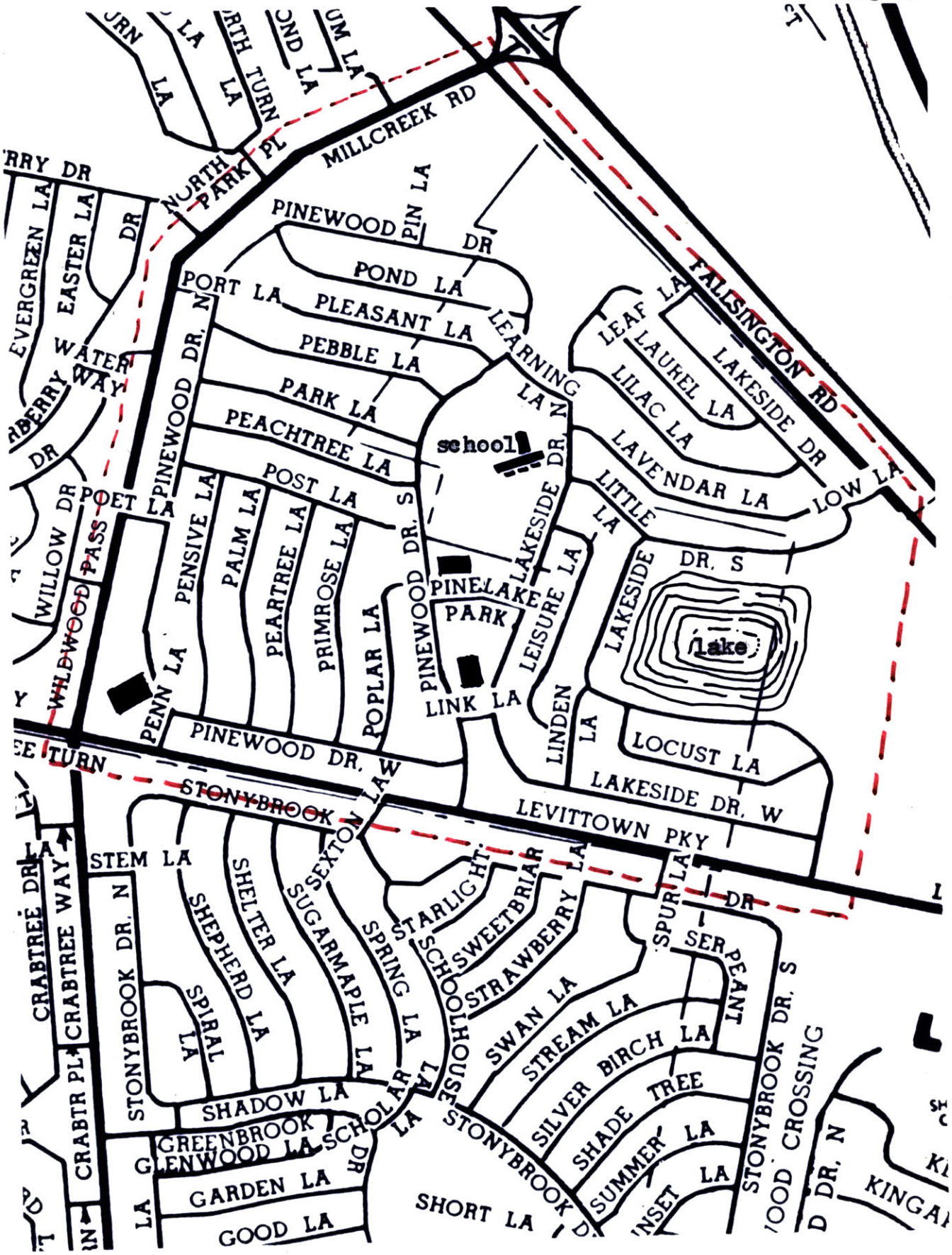

ENTRY SEQUENCE
fig. 1.
SCALE OF FEET
COPYRIGHT - C WES DANSBURY 53 KLEIN AVE TRENTON 9 N J
TULLYTOWN
Delaware River
LEVITTOWN
PENNSYLVANIA
Edgely
INTERCHANGE
MAIN SHOPPING CENTER
LEVITTOWN PKWY
BOROUGH LINE

fig. 2


MILLCREEK RD
NORTH PARK PL
PINEWOOD DR
PINE LA
POND LA
PORT LA
PLEASANT LA
PEBBLE LA
PARK LA
PEACHTREE LA
POST LA
LEARNING LA N
FALLSINGTON RD
LAKESIDE DR
LAUREL LA
LILAC LA
LAVENDAR LA
LOW LA
LITTLE LA
LAKESIDE DR. S
school
PINELAKE PARK
lake
LAKESIDE DR. N
LEISURE LA
LINK LA
LINDEN LA
LOCUST LA
LAKESIDE DR. W
LEVITTOWN PKY
PINEWOOD DR. W
PINEWOOD DR. S
PINEWOOD DR. N
POPLAR LA
PRIMROSE LA
PEARTREE LA
PALM LA
PENSIVE LA
PENN LA
WILLOW DR
WILDWOOD PASS
POET LA
EVERGREEN LA
EASTER LA
WATER WAY
STONYBROOK
STEM LA
CRABTREE WAY
CRABTREE PL
STONYBROOK DR. N
SPIRAL LA
SHEPHERD LA
SHELTER LA
SUGARMAPLE LA
SPRING LA
SEXTON LA
STARLIGHT
SWEETBRIAR
STRAWBERRY LA
SCHOOLHOUSE LA
SPUR LA
SERPENT DR
SWAN LA
STREAM LA
SILVER BIRCH LA
SHADE TREE
SUMMER LA
SUNSET LA
STONYBROOK DR. S
STONYBROOK CROSSING
SHADOW LA
GREENBROOK
GLENWOOD LA
SCHOLAR LA
GARDEN LA
GOOD LA
SHORT LA

LEVITTOWN - AERIAL PHOTOGRAPH

fig. 3

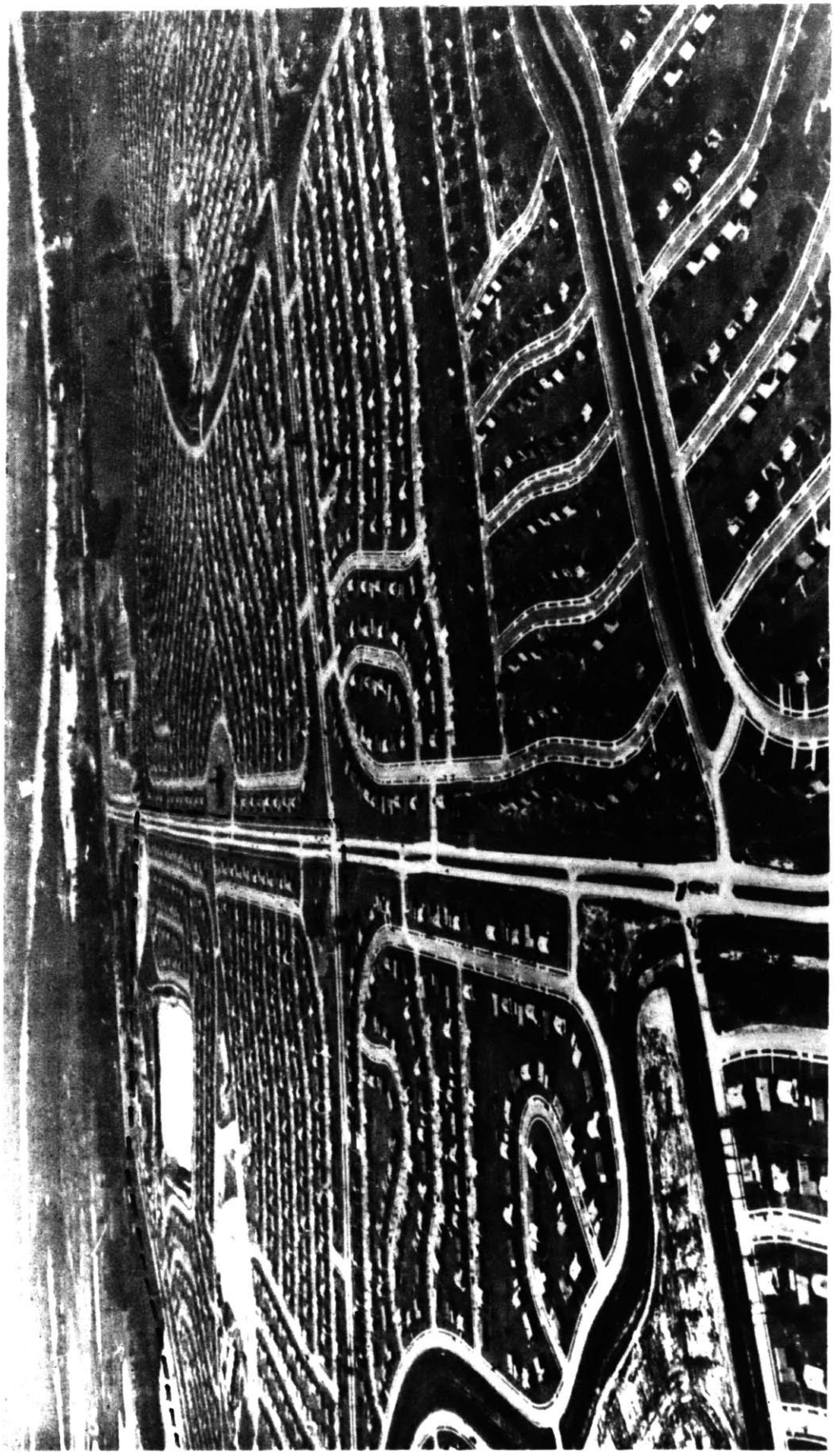


fig. 4

N.B. Please read photographs in sequence commencing from the bottom of each page, reading upwards.

5. LEVITTOWN PARKWAY

4. LEVITTOWN ENTRY. TURN-OFF U.S. 13 ONTO LEVITTOWN PARKWAY.
4L. looking left across shopping center parking lot to Delaware Bridge.

3. Backward view of Delaware Bridge from U.S. 13, after turning off Pennsylvania Turnpike.

2. CLOSE-UP OF BRIDGE STRUCTURE.

1. DELAWARE BRIDGE FROM PENNSYLVANIA TURNPIKE.

ENTRY SEQUENCE
Photos taken on
Easter Saturday
afternoon, 1958

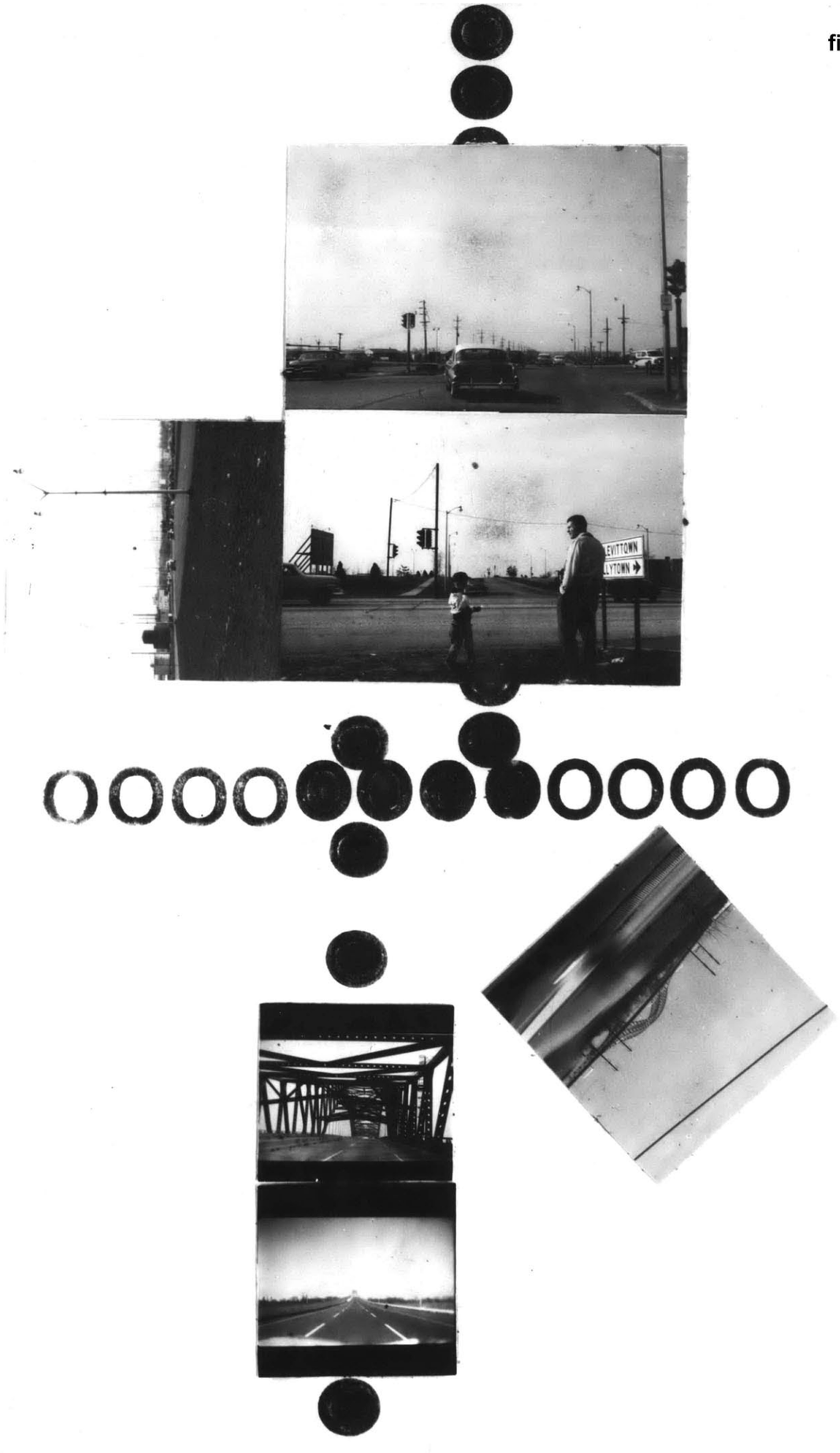


fig. 5

9. PINEWOOD DRIVE, approaching church.

8. LAKESIDE DRIVE. Intersection with minor street, and vista of church.
8R. Looking right up minor street from intersection.

DISTRIBUTION

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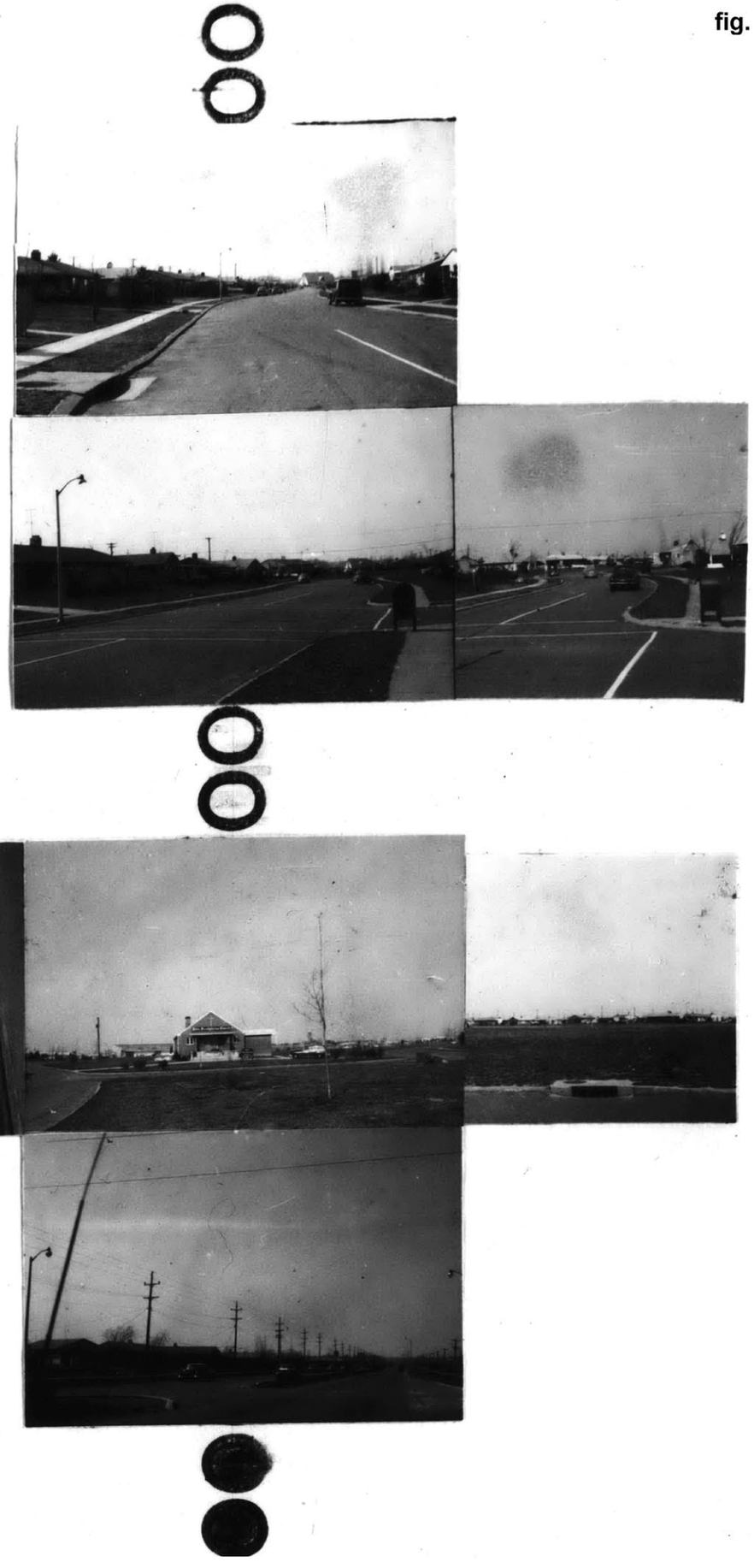
7. PINEWOOD-LAKESIDE NEIGHBORHOOD ENTRY. After right-hand turn off Levittown Parkway. Bible Presbyterian Church with recreation center and school behind. Pinewood Drive on left, Lakeside Drive on right.
7L. Looking back at entry link.
7R. CENTRAL OPEN SPACE with typical Levittown skyline.
6. LEVITTOWN PARKWAY.

ENTRY SEQUENCE continued



14. PEBBLE LANE, with view of school tower over rooftops.

13. PARK LANE
13R. Front yard attempts at
14R. individuality.

12. PEACHTREE LANE, one of three identical minor streets to be photographed.

DESTINATION

11. PINEWOOD DRIVE, with vista of different house types in another neighborhood.

10. PINEWOOD DRIVE, approaching church from other direction.

DISTRIBUTION continued

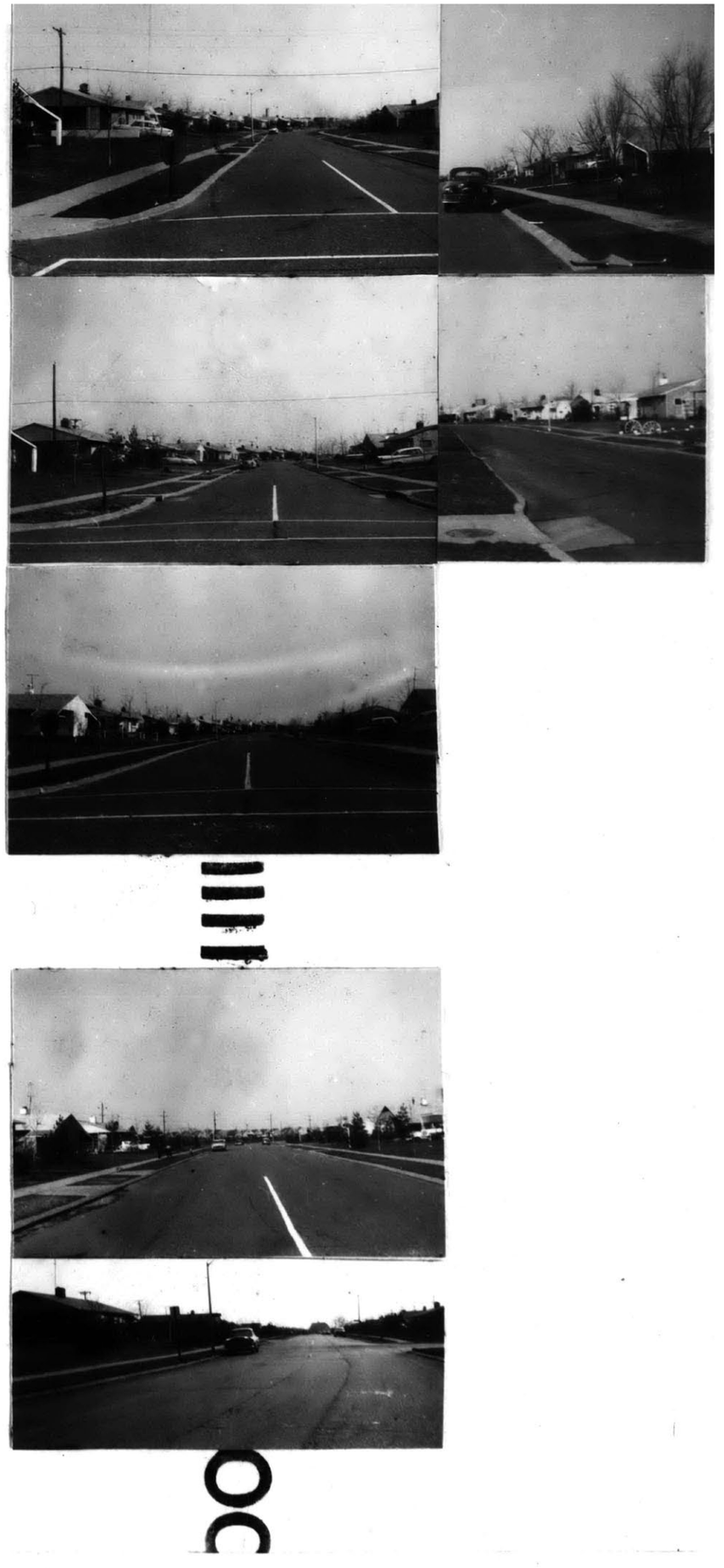


fig. 6

fig. 7

17. 'GREEN BELT' between neighborhoods, with intruding fisherman, and neighborhood 'edge.'

16. LITTLE LANE opening out into central open space. Note water tower on skyline.

15. LITTLE LANE. Vista of school continuing curve of road.

SECONDARY MOVEMENT STRUCTURE

D. RADBURN, NEW JERSEY

1. INTRODUCTORY HISTORY[1]

Inhabitants started moving into Radburn, New Jersey, in May, 1929. The town, originally conceived as a new type of Garden City, for 25,000 people, was badly hit by the depression, and was never completed. The fragment that was built included two superblocks, the school and the shopping center. The layout is basically that of two large 30-50 acre blocks with internally developed parks, "as a backbone to the neighborhood," and with culs-de-sac leading into them. The relationships between street pattern and community facilities can fortunately be studied since examples of all these elements were constructed. However, some blocks between the shopping center and the rest of the development were not carried out as originally intended, which creates a break that will be mentioned later.

2. REASONS FOR CHOICE

Radburn, conceived by Henry Wright and Clarence Stein, was the first of the "New Towns for America," and has perhaps exerted more influence over neighborhood planning than

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[1]See fig. 8, p. 57.

any other residential development in this country. Thus it was an obvious choice.

3. PRIMARY MOVEMENT STRUCTURE

Since only two superblocks were constructed, it has been necessary to supplement the site analysis with examination of the project drawings.[1] The intended image is clearly deducible from these drawings, so that the analysis should approximate closely the intended reality.

(a) Entry Sequence[2]

The original entries into Radburn were to be at both ends of each distribution street,[3] and were all to be marked by traffic circles. The traffic circle is a device which, by slowing and turning the perceiver through a small circle, creates a directionless but revolving pause in his progress, not unlike the circular Renaissance ante-room used as a turning-point between two more important spaces. This pause, despite the circular movement, does give him choice and prepares him for a possible change in scale. It is a negative element in his continuity, articulating different types of sequence.

None of these traffic circles was built, however, and

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[1] Information comes from Stein, Charence, Toward New Towns for America, New York, 1957.
[2] See fig. 8.
[3] See original 'Plan for Complete Town,' Stein, op.cit., p. 53.

the principal entry sequence today commences at the stop-light intersection between Fairlawn Avenue and Plaza Road. This intersection is marked by the original store and office building, constructed of red brick of similar character to the school and apartment-blocks located deeper in the neighborhood. Unfortunately, the sequence breaks here, since the next block was never developed as a commercial extension as originally intended, and is covered by houses of conventional layout. Thus a short block has to be passed before arriving onto Howard Avenue, the only 'pure' Radburn distribution street.

Differentiation from other neighborhoods

The differentiation that Radburn possesses from the surrounding neighborhoods is not very evident until deep penetration has been made into the neighborhood. This seems to be one of the weaker points of the development. The culs-de-sac, and to a greater extent the internally developed superblocks, have to be searched for and discovered. It seems that a chance has been lost here to exploit more fully a profoundly important idea.

Imageability of Neighborhood as a Form

That any sign of form is not in evidence is dependent mostly on incompleteness. Had the original design for the whole town been carried out, where a green belt was planned

to surround it, perception of form would still have been a dubious possibility. The presence of fully grown trees which go higher than the houses precludes the perception of form, unless they too are considered. The normal picturesque location of trees in residential neighborhoods, although an asset to informality, is generally, through their lack of formal definition, detrimental to imageability.

A neighborhood could look like a neatly clipped forest with low dark house forms, or clusters in clearings within it. It seems doubtful whether, in this case, the intended green belt would have been treeless, however.

(b) Distribution[1]

The major distribution system takes the form of a distorted or topological grid-iron, where the streets curve and bend slightly but intersect regularly at right angles. This kind of system can be clear enough as long as the curves are so disciplined that the perceiver does not lose his sense of their general orientation.

Since Howard Avenue contains culs-de-sac in each side, analysis concentrates on this as a typical example.

Since none of the minor streets acts in the capacity of a distributor, these distribution streets needed greater capacity and were therefore wider than normal residential, mixed-function streets. In perspective Howard

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[1]See fig. 10.

Avenue possesses a double containing surface, one of high and regularly spaced trees which form a transparent or netted continuous enclosure, of some grandeur in scale, and the other surface lower and behind, being that of the houses, closed in volume, varied in material, and also spaced widely apart. Thus the street contains two interpenetrating spaces. The trees, reinforced by the road edge, low hedges, and the elimination of the sidewalk, and climbing well above the houses, provide strong initial space definition, but the opaque houses set the final limits to the space. In earlier days, the trees/house relationship must have been very different, when the trees were merely objects within space defined by the houses.

The lack of sidewalks and considerable width of these streets gives an over-all impression of inactivity. Few cars are parked, and the pedestrians stay within the superblocks. This seems to act as another break between the center and the superblocks, a kind of depopulated no-man's land. Long vistas are due to the relative straightness of the streets, but the slight curve of Howard Avenue allows an oblique vista of the school. This very subtle and intelligent use of a curved street suggests certain imageable advantages over the straight grid-iron, where community facilities seldom exert much influence. The disciplined curves of these streets, however, preserves

the orientational advantages, through a topological order, of the grid-iron pattern.

The traffic circle entry onto these streets has already been described. A change in character from, say, Fairlawn Avenue is immediately evident through the presence of more trees and houses and in the diminution of activity.

Continuity is marked, for there is from one-quarter to one-half mile between intersections. The lengths in fact express the dimensions of the superblock, but since they are rather large the form of the block is not as apparent as it is in most grid-iron cities. The four-way central intersection constitutes a very important break in the continuity. Whether this was intended to have stop-lights cannot be surmized, but its importance is far more significantly emphasized by the adjacent presence of the neighborhood school. The integration of the community buildings with the entry and main intersections of the circulation structure is a good example of imageability, owing much to its simple interpretation of the Neighborhood Unit concept.[1] There rests a subtle difference in

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[1]The basic layout diagram of the Neighborhood Unit proposed by Charles Perry (Regional Survey of New York and its Environs, 1929) proposed the separation of the two neighborhood foci, school and shops, the former to be placed in the center of the neighborhood, where it could be safe from through traffic in peaceful surroundings, and the latter on the edges for service from the main inter-neighborhood streets.

their relationships to the street network. The shops face directly onto the street with a parallel service lane, whilst the school although seen from the intersection is definitely more related to the internal parks system and the secondary circulation.

At a lower scale, within the block length the main rhythms are set up by the houses, intersections and footpaths in an 'abacabacabac' rhythm, the houses being separated alternately by footpaths and by cul-de-sac turnoffs. This detachment of each house from its neighbors makes for a somewhat staccato impression of isolated forms, each different from the next, which are separated by cross vistas, alternately large and small. At the speed of the automobile, it must be admitted that cross vistas cannot very often be appreciated and then only sporadically, but the breaks in the curb line and disappearance of the road surface make an impact sufficient to set up a rhythm. The trees so blend together, and their trunks happen to be so inconspicuous, perhaps due to the hedges running in front of their roots, that the tree effect is not memorable as an important rhythm.

Differentiation between Distribution Paths

It appears that there was no conscious effort to make the main streets different from each other, and thus the

most important sources of identity lie in the entry, intersections and perhaps orientation. This is typical in identification of residential streets, which are indistinguishable in any other way. Thus the shopping center and different traffic circles vary the entries, and the presence of the school at the intersection, with its differing relationship to each intersecting street, enables the perceiver to establish his orientation quickly, where he would find it difficult otherwise to tell which street he was on.

(c) Destinations[1]

The culs-de-sac lead off the major streets on three sides of each superblock, and it must be said that they look like a destination, for their cul-de-sac character is immediately perceptible.

The strongest element in the design of these streets is the pavement surface, which is made of white concrete. The street itself is quite narrow (18 feet), and its whole length is visible from the entrance. The other containing surfaces of the street space, however, are remarkably chaotic. The houses are each different in form, materials, color and 'style,' and are not placed in any comprehensible lines. It is true that they succeed in enclosing the

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[1]See fig. 10.

space. To see through them is not possible from the entering position, although their separate forms allow cross vistas on further penetration. Front yards are formless, sometimes bordered by hedges, but very much disintegrated by garage entrance paving. Within this space, different types of trees are sporadically growing and cars park either parallel to the street or at right angles in the garage entrance, a change of direction which increases the confusion and congestion in such a small space.[1] The 'informality' is supplemented healthily by the children who play happily in the street, strewing their possessions about in what by now approximates a tidy junk heap.

The streets are unified amongst themselves by their similar relationship to the major streets, their parallelism, and type of entry. Their lengths are also approximately the same, so that the spatial dimensions resemble one another. The whole space can be seen immediately on arrival, with the exception in some cases of that which disappears at the far ends around the traffic turnabout. The vistas are as informal as the spatial enclosure and offer fragments of houses, which definitely do

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[1]Complaints about the small size of these culs-de-sac for the two-car family have been recorded by Stein in Toward New Towns for America, op.cit., p. 57.

not achieve axial composition though this may have been intended.

These streets could almost be described as 'linear destinations' for they do incorporate sequential characteristics, although most of the sequence can be seen on arrival. The turning circle and its disappearing space do invite the visitor to explore the space until all the far corners are understood. In most of the culs-de-sac, there is no way out for pedestrians at the end, a source of some frustration if it is known what lies beyond. However, there are others with footpaths leading out which are far more satisfying.

Differentiation between Destinations[1]

It cannot be said that there is much differentiation between the culs-de-sac, although the individual houses are each different. This is the type of variety that fails to help identify anything beyond distinguishing one house from another. Some attempt was made to vary the groupings of the houses, especially around the ends of the courts, but this has not succeeded in achieving very strong differentiation. However, Burnham and Brighton Places are examples of a different type of cul-de-sac.[2]

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[1]See fig. 10.

[2]"Later, with houses attached in twos or threes, as in Burnham Place, we achieved a greater sense of spaciousness." Stein, op.cit., p. 56.

This was more formally laid out with a much stronger sense of unity. The houses were all built of the same materials, finished with white stucco, possessing similar elements such as gables and small windows, with more formally hedged-in yards. The axial layout is strongly emphasized although not pompous, both end houses on either side of the axis providing a through view into the trees and suggesting the park behind. Though perhaps less American in character, they appear to be much more satisfying. It would be interesting to find out how the local inhabitants regard the two types.

4. SECONDARY MOVEMENT STRUCTURE[1]

One of the unique characteristics of Radburn is the secondary structure that begins, as it were, 'beyond' the destination. It is a pedestrian circulation structure with its own starting points, sequence and destinations, distinctly separated from those of the primary structure. Footpaths begin from the houses, but on the opposite side of the houses from the culs-de-sac, and from here they travel into the park areas to be found in the center of the superblocks, where they join the main paths travelling up and down each side of the park. At the

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[1]See fig. 11.

points of intersection are to be found play pens for the use of the children of that particular footpath, both practical and symbolic indications of their group. The main paths travel along the sides of the main park area through bushes, always with the open space on one side and the gardens of the end houses on the other, until the green widens out.

In the two superblocks constructed, one of the parks leads up to the school which can be seen through the trees like a country mansion at the end of the green space, and in the other the paths converge to drop under the road via the underpass, beneath a pleasantly quaint stone bridge, which marks the segregated crossing of the two circulation structures, and from there also approaches the school.

By implication, these footpaths are mainly for the purpose of providing a safe route for the children to go to school, and as such they are very much in keeping with the nature of the children's journey. There are places to play, bushes, large grass areas, the underpass, and, finally, the swimming pool. That the children use these paths is interestingly pointed out by Stein when he quotes some of them as identifying their homes as "through the underpass, and so many houses further."[1]

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[1]Stein, op.cit., p. 52.

The park areas are large open spaces of linear quality which succeed completely in increasing the illusion of an infinite extension of space into the natural landscape. Their end is never visible, always disappearing around the next corner. This is an achievement of a high order and of great significance to site-planning. The parks may be considered to extend the defined footpath structure into a fluid space structure, like wide green rivers, which converge on the school and recreation center.

Like Levittown, the secondary movement pattern from the home to shops coincides with the primary movement structure. There seems little attempt to continue the pedestrian circulation on to the shops. In fact, the lack of sidewalks on the distribution streets discourages this type of circulation.

Community Facilities[1]

The intelligent location of the school and shops in relation to the primary movement structure has already been discussed. Since the school also functions as a climax to the secondary circulation system, it acts in a dual role, providing a key linkage between the two systems. Its simple rectangular form provides an object easily imageable as an orientable reference point.

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[1]See fig. 11.

5. EVALUATION OF STRUCTURE AS AN IMAGE

The Radburn superblocks make an enormous impact on the mind of a visitor. Chiefly memorable, of course, are the internal parks, mainly for their uniqueness in residential development. Inevitable disappointment in the present lack of imageability outside these superblocks is due to its incompletion. A study of this kind points up how much has been lost. But the strength of Radburn is in its unity of concept. The Radburn Idea was not an abstract paper pattern, but a three-dimensional project which envisioned how people would use and perceive each outdoor space and component of the movement structure. It was the result of several different ideas, such as segregated circulation patterns, park-like environments, neighborhood units, that were combined and integrated into one idea-packed image.

A general evaluation suggests the following points in order. Many of the weaknesses were due to incompletion of the original project, whilst others have been acknowledged as such, and avoided in later projects:

1. The lack of recognizable form to the neighborhood is perhaps the most serious criticism. Had the park development around the school been completed as a green center to the neighborhood, and the commercial center and apartments built along Fairlawn Avenue, as an 'urban

wall,' form might have emerged. In this event the entry might also have been clearer.

2. The traffic circle entry suggests a well-defined method of ingress with many developable properties.

3. The clear vertical differentiation between distribution and destination and the vivid and 'pure' images of these two functions, constitute one of the great successes of Radburn, whether or not complete segregation is always necessary.

4. The successful establishment of a continuous and differentiated secondary movement structure between home and school, with defined beginnings, ends and clear sequences, classes Radburn as a masterpiece. As a pedestrian-only structure it clarified the different requirements of this type of circulation.
The scale and nature of the paths are quite different from those of streets. Slower speeds and more casual and unrestricted movement demand less space definition to the actual path, which may be subordinated to a fluid space around it. Movement for the pedestrian is not usually continuous. It starts and stops whilst the person looks around, espies details, admires a view, meets other people. The activity is a surprisingly variegated one which cannot be put into a

straitjacket all the time, even if on occasions confinement is exciting, and formality impressive. All this the pathways of Radburn seem to cater for. However, there are certain aspects about the presence of a secondary structure that Radburn does not wholly answer. The question of continuity of the system throughout the neighborhood is one of these. In Radburn the footpaths end abruptly at the major streets. Is one to assume that people passing this way are to risk being knocked down by motor vehicles, since there are no sidewalks on these streets? For the housewife walking to the shopping center there is no provision, so that outside the superblock the system is discontinuous.

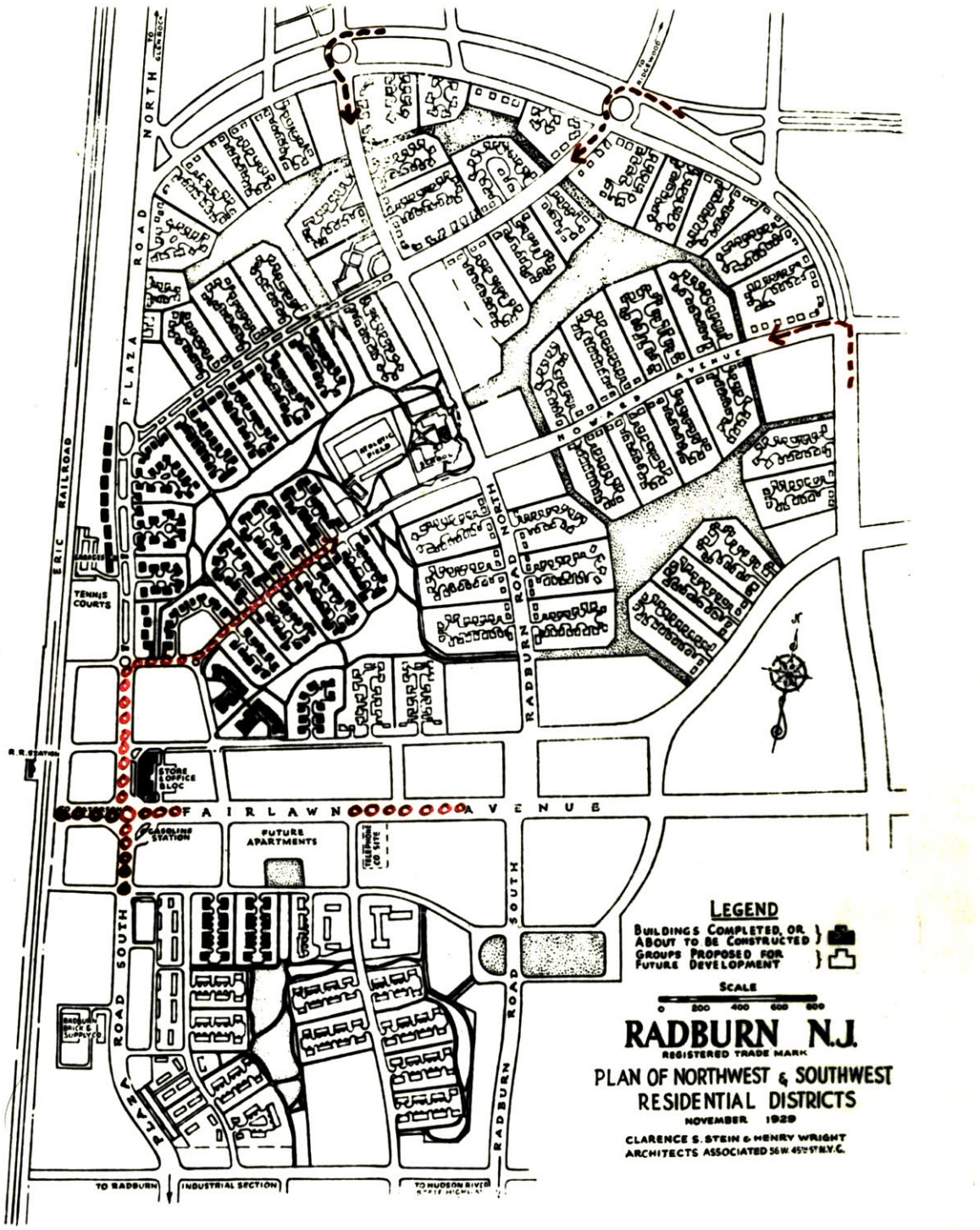
Secondly, the complete separation of the secondary from the primary structure seems to be unnecessary since it is also the cause of some frustration and confusion. The impossibility of passing out of the culs-de-sac into the footpath system, without going through somebody's house, is very unsatisfactory. There are some culs-de-sac which do have connecting footpaths, which are much more successful, although once this connection is made the back footpaths to the houses become much less used and therefore less meaningful. It seems that at this level of the street hierarchy, the traffic is going so

slowly that the separation of circulation becomes less important. The use of the culs-de-sac by children for play areas confirms this impression.

Finally, the underpass acts as a very dramatic separator of the two structures, where it appears that so much drama is again unnecessary. Again the older children cut straight across the streets without using it. This may be attributed to the wish to shorten the length of the journey, but also could be the desire to see traffic on the street, with more signs of life or more chance of death.

5. Finally, the attempts at horizontal differentiation cannot be considered as very successful. Between houses there is too much variety, between culs-de-sac there is generally not enough. Much of the intended differentiation seems to have been blurred by the growth of trees. There also seems to have been no intended differentiation between distribution streets, which despite their very different functions look very similar to any normal residential street.

fig. 8.


NORTH PLAZA ROAD
ERIE RAILROAD
TENNIS COURTS
ATHLETIC FIELD
NORTH RADBURN ROAD
NORWOOD AVENUE
STORE & OFFICE BLDG
FAIRLAWN AVENUE
GASOLINE STATION
FUTURE APARTMENTS
SOUTH PLAZA ROAD
SOUTH RADBURN ROAD
TO RADBURN
INDUSTRIAL SECTION
TO HUDSON RIVER
LEGEND
BUILDINGS COMPLETED, OR ABOUT TO BE CONSTRUCTED
GROUPS PROPOSED FOR FUTURE DEVELOPMENT
SCALE
0 200 400 600 800
RADBURN N.J.
REGISTERED TRADE MARK
PLAN OF NORTHWEST & SOUTHWEST RESIDENTIAL DISTRICTS
NOVEMBER 1929
CLARENCE S. STEIN & HENRY WRIGHT
ARCHITECTS ASSOCIATED 56 W. 45TH ST. N.Y.C.

RADBURN - AERIAL PHOTOGRAPH

fig. 9

4. BURNHAM PLACE, a different kind of cul-de-sac.

3. TWO CULS-DE-SAC off Howard
2. Avenue.

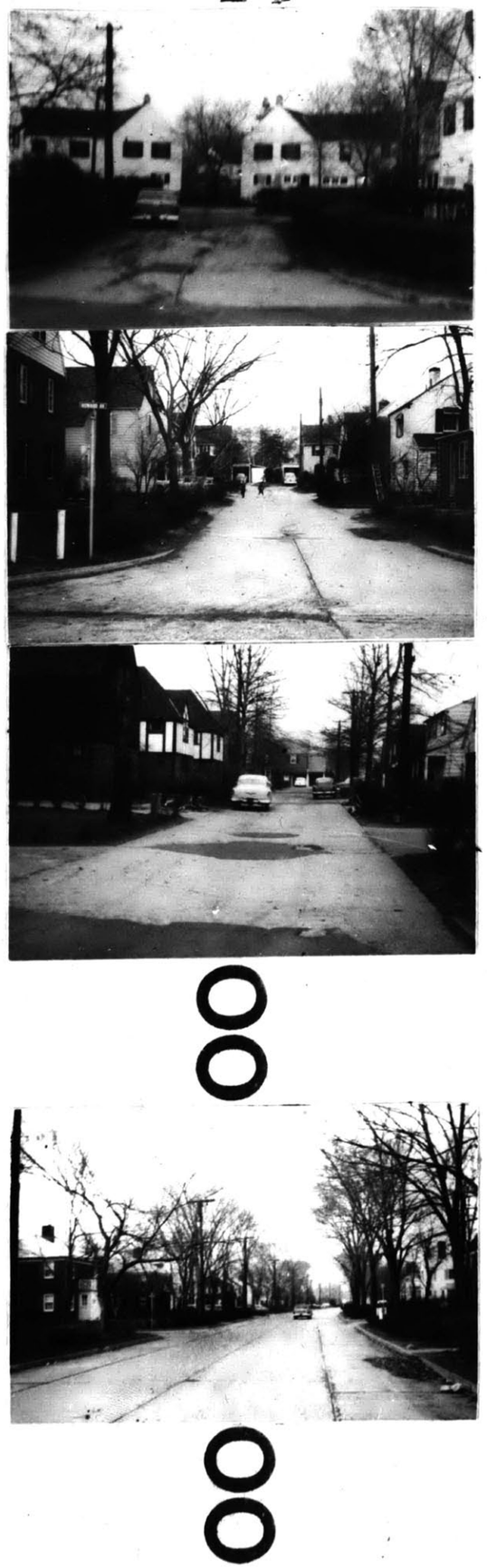
DESTINATION

1. HOWARD AVENUE with vista of the school, no sidewalks.

DISTRIBUTION

Photos taken on an
April evening, 1958

fig. 10



9. THE SCHOOL seen through the trees at the end of the park.

8. INTERNAL PARK AREA.
8R. Looking to the right towards the underpass connecting with the other superblock.

7. CURVED COLLECTOR FOOTPATH by the side of the park, flanked by houses and bushes.
7R. Children's playpen at intersection of minor and collector paths.

6. STRAIGHT MINOR FOOTPATHS from the
5. houses leading into the internal parks.

SECONDARY MOVEMENT STRUCTURE

fig. 11

E. BACK BAY, BOSTON

1. INTRODUCTORY HISTORY[1]

In 1864 a comprehensive plan for the layout of the Back Bay residential area was made. The site which had been a swamp for thousands of years had been filled in, and finally a developer was prepared to take the risk of building high-class housing on a site that at that time suffered from its unpleasant past. The lots along Arlington Street were immediately sold, but it was not until a group of well-known society 'gentlemen' grouped together and purchased sites along Commonwealth that the rest of society was attracted there. From then on it became one of the most coveted residential districts in Boston, a characteristic that to some extent remains even today.

In addition to residences many institutions have found their homes in this area or adjacent to it, schools, churches, lodges and the like which serve a much wider population than that found in the area, so that it is by no means a self-contained neighborhood.

2. REASONS FOR CHOICE

Although the Back Bay would seem to be an example of residential design too far removed from present-day proh-

[1]See fig. 12, p. 89.

lems, in fact this is not so. It is true that the type of house, with its more ample accommodation and lack of outdoor play-space, is not typical of contemporary house-design, and also that the area has suffered from commercial encroachment, especially along Newbury Street. And it is true that the automobile has brought about enormous changes both in demands for parking space and in street widths, as well as changing the perceptual viewpoint of the ordinary person. But in spite of this the Back Bay possesses defined architectural qualities that are seldom if ever to be found in today's residential developments. Its clarity and strength have been confirmed in recent studies which showed it up as one of the more easily imaged and memorable areas in central Boston.[1]

3. PRIMARY MOVEMENT STRUCTURE

(a) Entry Sequence[2]

By nature of the grid-iron street pattern, entry into the Back Bay area is distributed and diffused. Its 27 entries seem to deny the possibility of generalization, and the grid-iron plan would seem to indicate complete uniformity of entry, but this is not the case. There are

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[1]Lynch, Image of City, op.cit., p. 62.
[2]See fig. 13, 14.

certain entrances which were regarded as the most important in the original design, and, although some have become less used, their lessons and impact can still be appreciated. New entries and modes of entry have to some extent taken their place as key entry points, some good and some not so good, whilst others are clearly secondary and less important.

The two dominant streets in each direction are Commonwealth and Dartmouth, so the entries onto these streets may be considered the most important of the principal entries originally conceived.

Dartmouth Street from Copley Square

Copley Square itself, with the Public Library and Trinity Church forms a distinguished space, despite the diagonal traffic movement, and it acts as an ante-space, a sort of ante-room previous to entry into the Back Bay. The Old South Church, on the corner of Boylston and Dartmouth, is an important landmark, whilst the vista down Dartmouth affords a good cross-sectional view of the area, extending right through to the other side so that the depth is appreciated even before entering. The Square, the landmark, the vista, and the location of Dartmouth near the geometric center of the district, together combine to form a very distinguished and fine gateway, a perfect orientation-point from which the whole neighborhood may be comprehended.

Commonwealth Avenue from Kenmore Square and the West

The entry into Commonwealth is more obviously a piece of axial planning. The entry sequence begins some way from the district, at least as far west as Kenmore Square. After Kenmore Square, the trees of Commonwealth begin to occupy the center strip, the road has split into two, and a realization of something ahead is sensed. Inhabitants would know that these trees lead into the Boston Garden. From here on the intensity begins to increase, clearly marked by key points at the Fenway where the road crosses the Fenway Park, and then at Massachusetts Avenue, a dominant cross-street with intensive commercial development along it. At this latter point the avenue also breaks alignment, an important visual detail, for the facades on the right-hand side of Commonwealth are seen at an angle very impressively; then the direction changes to alignment with the long vista down to the Common and its air of finality. This would have been a fine entrance and climax to a good sequence, had Massachusetts Avenue not become so crowded that an underpass had to be built. In consequence a most exciting swoop down under Massachusetts Avenue is now provided, which deposits the automobile driver in the middle of Back Bay before he can appreciate where he is. This is more in scale with a freeway design, and serves to speed up traffic that should

be slowing down to enter a residential area. It may be argued, of course, that in this case Commonwealth's function is now more important as a through street than as a residential street, but this can be considered rather as an unfortunate compromise than a successful solution.

Commonwealth from the Harvard Bridge

This entry is a more typical kind of entry into a residential neighborhood with the great exception of the bridge crossing, which allows a panoramic view of the whole Charles River facade and skyline. It lasts for long enough that even a fast-moving motorist can realize it in detail. From this view one gathers the orientation and approximate length of the area, while the depth is partly defined by the tower of John Hancock Building which rises from behind the domestic skyline. Clearly the district does not extend indefinitely.

Once over the bridge, there lies the choice of streets, now limited by the one-way traffic-system to Marlborough and Commonwealth as entry points, but Long views can be had down all of the main streets. Of these Commonwealth makes the greatest impression by virtue of the trees which cross on either side of Massachusetts Avenue. This choice of turn-off from a major street lying parallel to the edge of the district seems to be a

a much happier mode of entry than that at right angles such as Commonwealth. Much depends on detailed working out.

Beacon Street from Storrow Drive

This entry attempts to deal with a sequence coming off a limited-access highway onto a residential street in the space of a few hundred yards, and although it manages to answer the functional demand, it fails sadly to help comprehension. The bewildered motorist curves off Storrow Drive straight into a stop-light at a T-intersection where his is the minor street. This traumatic reduction in status certainly drives home the realization that a residential neighborhood is being entered, but it is possible to work out more continuity of sequence when scale of travel has to be dropped. In this case a traffic circle slowing down movement gradually, and some sort of vista such as that down Arlington Street, would have carried down the scale in a more even descent.

Other entries are also worthy of study, especially Beacon Street from Beacon Hill which is a continuously aligned sequence broken on entry by the leveling off of the road after Beacon Hill, and the passing of the Garden on the left. Arlington Street and Boylston Street provide similar turn-off choices to those on Massachusetts Avenue.

Pedestrian Entry

For pedestrians the Dartmouth entry is perhaps more satisfactory than for motorists, since there is more time to appreciate Copley Square. The length of Dartmouth is also in scale with pedestrian distance whereas the main streets (nearly one mile) are too long. For a pedestrian it can be said that the entries off Boylston are all the more satisfying for this reason. The pedestrian feels he can reach more easily any part of the area. This different character of the main and cross streets seems to indicate how streets might be differentiated for predominantly pedestrian or predominantly vehicular traffic without complete segregation.

Differentiation from other neighborhoods

The Back Bay can be distinguished from other neighborhoods partly because of its unique location and partly because there are contrasted areas around it. The Charles River Basin, the Boston Common and the Back Bay railroad yards border three sides of the area. All of these are open spaces, each well differentiated from the others. Differentiation could be considered easy because these areas are not residential neighborhoods and therefore Back Bay is not faced with the normal predicament of a residential neighborhood which is surrounded by other similar ones.

Of the two places where it borders residential neighborhoods, one, Beacon Hill, is not easily separable when looking from the Charles River, although separation is clear from all other points, and the other beyond Massachusetts Avenue is separated by Massachusetts Avenue and the Harvard Bridge. In addition the whole street grid bends at Massachusetts Avenue, successfully breaking up continuity.

Imageability of Neighborhood as a Form

As already mentioned in the description of the Harvard Bridge approach, from this position the Back Bay can almost be visualized as a total form. It possesses a clear facade, although this merges into Beacon Hill at the east end, and a characteristic skyline. The buildings are unified by the red brick and regular widths despite their different heights.

The other facades are less memorable for different reasons. That of the Garden, which is the finest, cannot be seen as a whole because of the trees in the Garden. The buildings also are not typical of the area and so would tend to suggest a wrong image as do the commercial facades of Boylston Street and Massachusetts Avenue.

The long street vistas of the main streets constitute a further unique quality, the details of which will be considered later.

(b) Distribution and Destination[1]

The functions of distribution and destination are not segregated in Back Bay as they are in Levittown and Radburn, since the four main streets, Beacon, Marlborough, Commonwealth and Newbury, also contain the houses. This duality of purpose leads to some confusion on the one hand, with certain practical disadvantages of noise, danger, and traffic congestion; but on the other hand there are gains in vitality, through the close juxtaposition of passing traffic and domestic activity. The total image created by these streets is a composite of its double character, which happens rather to increase than to lessen its overall impact on the perceiver. There is an immediacy about the direct transition from the outside to confrontation with the houses, which begin at the entrance to the neighborhood.

The distinction of all these streets depends primarily on their clear and strong spatial definition. The walls are continuous, built up typically with from three to six storey houses mostly in red brick, sometimes in stone, but always in a solid material rather than wood or other light materials. The solidity and continuity of these walls defines the street-space as a rectangular

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[1]See fig. 15-19.

channel, the containing surfaces of which are further strengthened by the flights of steps from the houses down to the street, which splay the junction between wall and floor to mold the space in a powerfully sculptural manner. This cross-sectional form remains constant throughout most of the length of the main streets, although the width of the streets varies slightly, and very much on Commonwealth.

The proportions of all except Commonwealth are slightly wider than a square, which allows an amount and quality of light on each street which, despite the walled enclosure, is not oppressive in normal weather.

The orientation is always east-west, and the alignment straight, so that parallel vistas may be appreciated in sequence from any cross-street. The streets are not directed at any particular vista, however, and their full length cannot always be appreciated so that they are memorable more in themselves than as spaces leading up to some more important object, as they might be in rond point layout.

The strength of the space is supported by the strongly carried-out detail of the containing surfaces. The sensuously curved bow windows, the heavy stone balustrades, the stone curbs surrounding and defining the front yards, and the iron railings are all designed with vigor and robustness that is distinctive and unifying.

The sidewalks, no longer in the original red brick, are nevertheless ennobled by the large and widespreading trees which are planted along them. Although the tree formation and type of tree changes with each street, the presence in every case of these amorphous elements succeeds in softening and modifying the channel-like spaces. Their color impact in the summer months, greenish yellow seen against brick red, is part of Bostonian character rather than a phenomenon of the Back Bay.

The channel spaces are further modulated in cross-section by the presence of parked cars on both sides of every street. These act like grooves in the space, defining and separating the pavement way from the sidewalks on either side, in such a way that the motorist's vision of the front yards and the lower part of the houses is cut off and his own separate channel is more closely tightened; whereas the pedestrian, whilst securing practical protection from passing cars, also finds his perception directed more to the space of the sidewalk and front yards, steps and houses, than to the pavement. In this way two worlds exist within the total space, and these are the distribution and destination worlds, Their segregation within the channel is dissolved at street intersections where sidewalks stop, at hydrants where cars cannot be parked, and by the trees which arch over both,

joining one to the other. Were the partial spaces not so reduced and constricted by this division they might well form a satisfying relationship. The amount of traffic on any street also has an important visual effect on the space and in the Back Bay this movement clearly reduces the apparent width of the streets, whilst forming a longitudinal barrier between each side of the street.[1]

Perceived in sequence these streets retain many similar characteristics, although the present one-way system tends to disrupt this. Entry is by turn-off from Arlington or Massachusetts Avenue with the exception of direct entry across Massachusetts Avenue for Commonwealth and Marlborough. It is therefore clearly marked by change of direction.

From the automobile driver's point of view, the length of the streets (5000 feet) is not unreasonable. The straight alignment and long vistas are perhaps more in scale with vehicular than with walking distance, although what vistas there are seek out buildings well beyond the Common - the Custom House Tower and Parker House for instance. Within the length of each street rhythms take place at two different scales, the block and the house.

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[1]An M.I.T. thesis correlated traffic volumes with the longitudinal social barrier they created in certain streets. Robert S. Bryan, The Street - A Social Barrier? M.I.T. Thesis, 1951.

The block rhythms are all slightly different in length, a not very noticeable fact since the presence of more sporadic landmarks distracts attention from them. Thus they appear more or less regular. The varying importance of the intersections, however, makes a strong impression. Some have stop-lights, some STOP signs; alternate streets are one-way to the left or to the right, so that traffic flows come in from different directions, and their names descend in alphabetical order. These clusters of variants make every intersection different in character, but unfortunately their impact is not made architecturally. The directing signs are standardized elements, forgotten as soon as they have been registered and used. Consequently there is perpetual confusion in attempting to identify one's position in the length of the street.

Orientation is helped much more by the existence of Dartmouth Street which is wider than all other cross-streets and therefore creates a strong reference point whose influence extends over two to three later streets in the sequence. Other reference points are created by churches such as the First Unitarian, and First Lutheran on Marlborough, which emphasizes the turn-off to Storrow Drive.

In addition to these points within the length of the streets, in one or two cases landmarks on the vista change

in relation to each other, like the spire of the First Unitarian Church and the Custom House Tower on Marlborough, or John Hancock and New England Mutual on Newbury; or they grow in size like the State House on Beacon. These are interesting chance phenomena which, however, seem to do little to help accurate positioning. For the pedestrian the cross-vistas at intersections, particularly of the M.I.T. skyline across the Charles River Basin, are much more telling.

Differentiation between Destinations

The rhythms set up by the houses, though mostly of an arbitrary character, are nevertheless wholly successful in differentiating one home from the next within the block lengths. The identifying features are not generally the total form of the house which often is suppressed in deference to the unity of the terrace, but certain predominant parts, chiefly the bow windows and the flights of steps up to the front doors. These features are discernible by the searching car driver, whilst from the sidewalk the front yards are the key identifying feature. One important lesson that these houses seem to demonstrate is that the use of rhythms or rows of repeated elements is perfectly adequate for the purposes of identity. It is unnecessary for every house to be different, or even

for alternate houses to be different. Short rhythms form groups of similar elements, each of which begins to gain identity as a small group within which it is easy to position oneself, so that the normal block length of, say, thirty houses instead of being read as one group may be broken down into groups of six to ten houses, as is the case on many Back Bay streets.

The role of the front yards appears to be different and more precise, so that general identification of groups can be made and then particular articulation between dwellings can be made through the front yards. It is interesting to note that these houses, built for the best families and therefore most demanding of individuality, nevertheless submitted to a communal order.

Differentiation between Distribution Paths

Within the framework which relates each main street there is sufficient differentiation to establish clearly the identity of each. To do this it is necessary to regard each street in toto as an image, commencing with the most easily distinguishable.

Commonwealth

This street contains many unique elements, which include, on the horizontal plane, its great width (200 feet), the central park strip, intense two-way traffic. The containing walls are higher and of more monumental character,

including many hotels and clubs in addition to houses.

Within the space the four rows of trees in the central strip articulate it into three parts: the center, under the trees where people may sit and stroll and where seats and sculpture are placed, and that on each side between the arching trees and the buildings.

Sequentially, the underpass entry is its most memorable feature, with the gateway to the Common as a pleasant climax. The Custom House Tower can be seen from one side but makes little impression.

Marlborough

Opposite characteristics appear to distinguish Marlborough. Its narrowness (60 feet, equal to Newbury) and the quietness of its one-way traffic, but most of all its huge and sporadically placed trees, which in summer entirely fill the street space, are its recognizable qualities. This combination results in a visual barrier, and affects the quality of light. The darker atmosphere of Marlborough Street is an impressive characteristic. In winter when the trees are sparse, the vista of the Custom House Tower with the spire of the First Unitarian Church in front is most memorable.

Whilst the previous two streets exhibit extremes in character, the remaining pair represent the means and are thus less easily distinguished.

Beacon

Beacon may be recognized only perhaps by its negative characteristics. However, its pavement width is greater than any other single lane in Back Bay, a fact which is remembered by motorists; its traffic flows only from west to east; and its trees are regularly spaced down the sidewalks. Sequentially, Beacon fails to end visually at Massachusetts Avenue since, unlike the other streets, it does not bend there. It gives an impression of infinite length, with the sky descending to street level.

Unfortunately, its proximity to the Charles River is not an obvious characteristic, since the latter's presence is all but denied. The short cross-vistas are too brief to be appreciated from an automobile.

Newbury

Newbury could, of course, be distinguished just by not containing any of the other streets' characteristics. In fact, its use changes have affected its character a great deal. The domestic quality has nearly disappeared. Some houses have been replaced or pulled down for parking lots; shop fronts have been installed; and the sculptured quality of the space has been further weakened by the elimination of the flights of steps to the houses, and made naked by the disappearance of trees.

(c) Minor Distribution[1]

The cross-streets are seven in number: Hereford, Gloucester, Fairfield, Exeter, Dartmouth, Clarendon, and Berkeley, with Arlington as the end street before the Garden. These cross-streets, with the exception of Dartmouth and Berkeley, act as minor connectors between the main distribution streets.

Their widths (60 feet; Dartmouth is 100 feet) are identical to Marlborough and Newbury, but here the relationship ends. Their walls are discontinuous, since most of their houses face onto the main streets right up to the corners, a proof of their inferiority. Interestingly, in Marlborough and Newbury the houses on the cross-street often lead up to the intersection, indicating a certain equality of importance. Generally, however, the impression created is one of a cross-sectional street cutting through to serve the main streets. Even where houses are continuous they have small front yards, lacking the grandeur of those on the main streets. Trees occur only at intersections with the major streets. Their unity is maintained by the straight vistas and limited length. Some of the vistas extend right across the Charles River Basin to hit M.I.T., but these, like most grid-iron vistas, are unconscious and vary in quality.

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[1]See fig. 20.

At the Massachusetts Avenue end the height of Boylston Street creates a concave basin-like quality in the length of these streets, which is most pleasant. The Boylston Street vista rises up to the sky, and the length of the street is contained as a unity. The grand and hanging concave spaces of San Francisco streets are hinted at and recalled.

The whole street length is gathered on entry, and initially the straight vista suggests that there will be high continuity. This impression is immediately destroyed by the short length of the blocks, the presence of the aforementioned clusters of signs and directions at each intersection, slow traffic and dramatic, wide and varied cross-vistas. Crossing Back Bay is a staccato experience of high quality.

Differentiation between Minor Distribution Paths

From all these streets, Dartmouth stands out clearly, by its greater width, its large corner buildings, two-way traffic, and its fine entry from Copley Square. Unfortunately, the opposite vista, which could have magnificently exploited the Charles River Basin, has been destroyed by the narrowing of the street. The other streets have to rely on smaller differentiations. Although vista is important, the presence of prominent buildings, such as

the Exeter Theater, or First Lutheran Church, are the prime factors of identity.

4. SECONDARY MOVEMENT STRUCTURE[1]

Since Back Bay is near the center of Boston, many of the facilities found within its boundaries are the servants not merely of Back Bay, but of the whole metropolitan area. The functions of secondary movement are therefore confused. Two cases of secondary movement by pedestrians might well be mentioned, however.

1. The central green park-strip of Commonwealth Avenue still functions as a place for people to stroll and sit. Further, its connection with the Boston Garden at one end defines its destination. People gather onto it from the other Back Bay streets; and hence it becomes a main pedestrian circulation channel, a concept developed in Philadelphia more fully as the 'Greenway' system.

   The present turmoil caused by fast-moving traffic which has virtually destroyed its original function, must contrast strongly with its probable atmosphere fifty years ago, when carriages and strollers related more closely to each other as forms of movement.

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[1]See fig. 21.

The outlet of Commonwealth into Boston Garden seems to be a case where the 'exit' direction seems to be the more successful. This may be explained by the presence of accessible open space adjacent to a dense neighborhood, but the key feature here seems to be the strip of trees which runs down Commonwealth and expands into the scattered trees of the Garden. It is as if the space were being sucked out of Commonwealth Avenue in such a way that a person standing there would feel this attraction. The interpenetration of areas suggested by this phenomenon and the possibilities of attraction and repulsion, pressure on space, could help greatly in achieving more clearly pathed structures.

2. The service alleys in the centers of the blocks, which parallel the main streets, form a secondary movement structure in embryo. Originally intended only for the more lowly functions of life, they have under modern conditions begun to take on some of the characteristics of a Radburn cul-de-sac.
Their narrowness (about 8 feet of pavement) prevents any but the slowest of traffic movements, so that children can safely play without much disturbance. Many children also use them for circulation about the area. They seem to find much more of interest in these streets than in the main ones. The informality of

differentiated back yards, trash barrels and parked cars all contrast greatly with the main street formality. Many owners are converting their back yards, which are three feet lower than the alley, into private parking lots, so that there is much elementary building activity, with ample quantities of sand, bricks and concrete blocks for divertimento. The children's attitude to these streets seems to be markedly different from the almost comical abhorrence registered by a group of adults who were taken through one of these alleys to record their impressions,[1] and it is true that only a few eccentrics, and people going to their cars, are to be seen there.

Potentially, then, these streets might suggest the formation of an informal secondary pedestrian circulation structure in the center-city areas, as contrasted with the formality, definition and dynamics of the primary circulation structure, as are the pedestrian parks of Radburn to its main streets and culs-de-sac: a system which is urban yet open-ended.

Community Facilities

The visual influence of community facilities in a grid-iron plan such as Back Bay merits examination. It

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[1]Lynch, Kevin, Go Take A Walk Around The Block, M.I.T., unpublished report, 1957, pp. 12-14.

can be well illustrated by a comparison between the location and form of the First Unitarian Church and that of the new First Lutheran Church, on opposite corners of the Marlborough/Berkeley intersection.

First Unitarian Church, Gothic in style, has a spire which can be seen on the skyline, and for some distance down Marlborough Street. However, on approach down Marlborough its influence actually diminishes, for there is little space around it to set it off. On the other hand the First Lutheran Church, which is a low isolated form and cannot be seen more than two blocks away in any direction, exerts a strong influence over its immediate environment, since it has a space, one of the few vacant lots in the Back Bay, next door to it on Commonwealth.

An important factor on Marlborough is the one-way flow of the traffic which makes it difficult to see buildings on the near corners at the ends of blocks, which emphasizes the buildings on the beginning of the blocks.

In this sort of continuously built-up city-structure, space around a building becomes extremely important. Most of the great historic spaces were formed to set off buildings, rather than as squares in themselves, a fact which has not been forgotten on Park Avenue today.

The projection of any object into the street of a grid-iron plan makes a very strong impact since it breaks the extreme continuity.

5. EVALUATION OF STRUCTURE AS AN IMAGE

The Back Bay is the most strongly imageable of the three neighborhoods considered. Orientation within the district is easy and clear, but there is more than this. Its unity and grandeur has been little affected over the course of eighty years. They still demonstrate a belief in urban living and man-made artefacts that is not evident in today's suburban developments. Even Radburn seems tentative in comparison with this assurance. Back Bay was not the result of any particularly new concept, like that of Radburn. Rather it was a masterly interpretation of a strong tradition in domestic architecture and layout. As with the Greeks, the functional problems were so well understood that they were "grasped as an idea."

The following points may be made.

1. The clarity of over-all <u>form</u> is unique for a residential neighborhood. Its own compactness and unity, with the presence of the Charles River as a kind of forecourt, have through facade and skyline made it as visible as any public building with a forecourt. The grouping of tall buildings behind it like John Hancock and the future Prudential complex will, by defining its depth, allow a further imaging of its three-dimensional form. Differentiation on all other facades with the strong dividing line of Massachusetts Avenue completes the isolation.

2. The main entries into Back Bay, those down Commonwealth and Dartmouth, have to some extent suffered from the automobile. The kinked entry along Commonwealth still exhibits the subtle character of such an entry despite the underpass, whilst Copley Square antespace, although not appreciable beyond a cursory impression from an automobile, still heightens the approach into Dartmouth. This latter entry nowadays is more for pedestrians, despite the narrow sidewalks of Dartmouth. Of the later and more uncontrolled entries the long broadside view of the river facade and skyline is easily the most successful. This is truly an automobile entry, contrasted violently by that from Storrow Drive into Beacon Street.

3. The image created by the longitudinal distribution streets is one of the strongest individual features of Back Bay. Their high continuity depends on a channel-like spatial definition, with vigorously sculptured containing surfaces in solid materials, their lines of parked cars, and their straight parallel alignment. Long vistas can be appreciated, or at least sensed, down each one, whilst the presence of large trees softens and differentiates their spaces. The long blocks allow some large scale to the sequence, but not enough to avoid a certain compromise in continuity.

As destinations they gain much from the parked cars, which define and separate destination area from distribution, whilst the forcefully molded facades, front steps and differentiated front yards 'slow down' the space to pedestrian scale, and help horizontal differentiation. Location within the length is secured by certain non-residential buildings which act as landmarks or reference points. Their influence is spread in sequence by the steady rhythms of intersections.

4. Horizontal differentiation between these streets within the unified framework described is especially remarkable. Commonwealth stands out clearly as the main axis, by virtue of its central location, width, park strip, tree lines, grand facades and high-class strollers. Marlborough is distinguished more for its quietness, the large arching trees placed about in the space, and its small scale; Beacon for its end-location, and continuity from Beacon Hill, double line of trees and high facades; and Newbury for its commercial uses, and lack of trees. Each street has a theme about which the characteristics cluster. It was once said that "According to Boston lore, Beacon Street has been occupied by people who have both 'family' and money; Marlborough occupied by people with 'family' but no money; and Commonwealth Avenue has been the choice of

people with money but no 'family.'[1] This can be seen in each street today despite changes in social character.

5. The minor distribution streets are clearly distinguishable from the main distribution streets by their cross-sectional character. They are perpendicularly oriented, with most of their walls formed by the end houses and gardens of the main streets, and no trees. Their intermittent sequences are characterized by short block-lengths, dramatic cross-vistas, and staccato rhythm climaxing in the center, and their unity almost entirely formed by their straight alignment (and lack of trees) which allows the whole length of each to be appreciated from any point along it.
   Dartmouth is the unique exception by virtue of its impressive entrance from Copley Square, its width (100 feet) and impressive corner buildings, and two-way traffic. The rest of the streets are differentiated only by name and in some cases by the landmarks of non-residential buildings, or vistas across the Charles River, in that order of priority.

6. The two secondary movement structures examined represent, in one case, an original intention built into the

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[1]Firey, Walter, Land Use in Central Boston, Harvard University Press, Cambridge, Mass., 1947, p. 263.

plan, and in the other a spontaneous activity by the occupants. The first, comprising the Commonwealth center strip and exit into the garden, was a perfectly resolved and highly imageable solution now compromised by the automobile. The second, almost a result of the automobile, points up a demand and suggests some characteristics of a new movement structure.

7. The scatteration of <u>community facilities</u> about the neighborhood is due to its unique location and so is outside the context of criticism. The only conscious formulation of facilities can be considered to be Copley Square and the Garden. The location of these 'outside' but adjacent to entries into the neighborhood shows dependence on the outside world, similar to the shopping centers of Levittown and Radburn. Copley Square is a fine example of how these public buildings and spaces can help to make the movement structure imageable.

   To show the effect of a grid-iron plan on location of community facilities, the location and form of the two churches demonstrates the limited influence of these or any buildings on a grid-iron plan, where the circulation structure predominates, and vistas are matters of luck.

BACK BAY

fig.12

5. View of central park strip.

4. Extreme confinement and restriction of view to the underpass, trees, and John Hancock Building beyond Back Bay.

3. Oblique view of Back Bay facades as underpass hovers into sight.

COMMONWEALTH AVENUE FROM KENMORE SQUARE

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2. DARTMOUTH STREET VISTA with Boston
1. Public Library and the tower of the Old South Church on the left.
2L. Boylston Street with the Old South Church marking the Dartmouth Street entrance.
1R. Looking to the right at Trinity Church in Copley Square, and the New England Mutual building.

DARTMOUTH STREET FROM COPLEY SQUARE

ENTRY SEQUENCES

Photos taken in March and July, 1958.

fig. 13

13R. STOP.

12R. Turning to the left of high building and facing Beacon Street facade.

11R. Pedestrian bridge begins to dominate.

10R. Storrow Drive with vista of corner building on Beacon Street, and John Hancock.

RIGHT: BEACON STREET FROM STORROW DRIVE

9L. MASSACHUSETTS AVENUE with out-of-character 'edge' to Back Bay on the left.

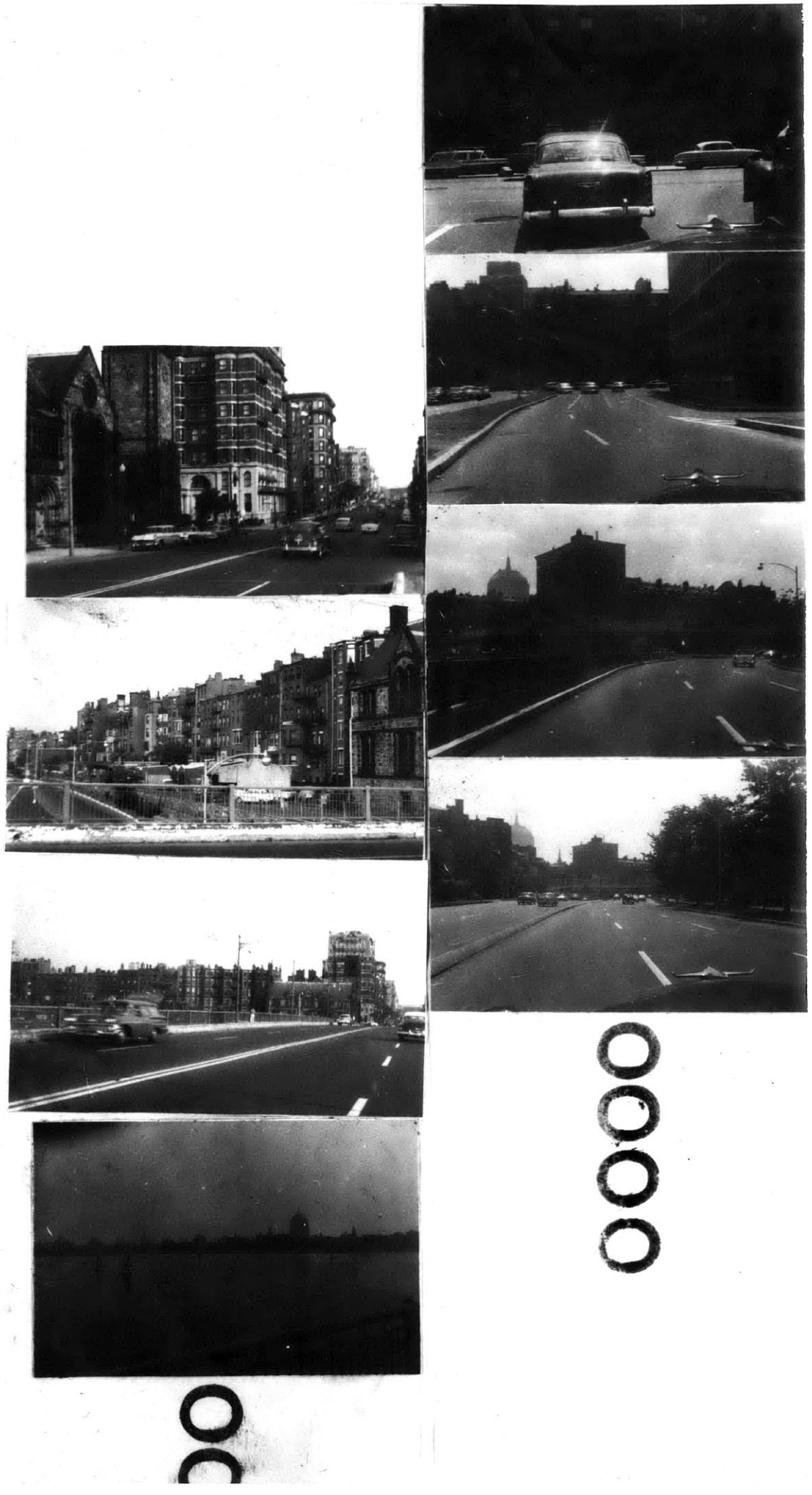
8L. Edge of Back Bay showing broken line
7L. of Beacon Street backs.

6L. Skyline of Back Bay dominated by John Hancock Building rising behind.

LEFT: COMMONWEALTH FROM HARVARD BRIDGE

ENTRY SEQUENCES continued

fig. 14



17. BEACON STREET in summer, looking towards Kenmore Square.
17R. In winter, towards State House.

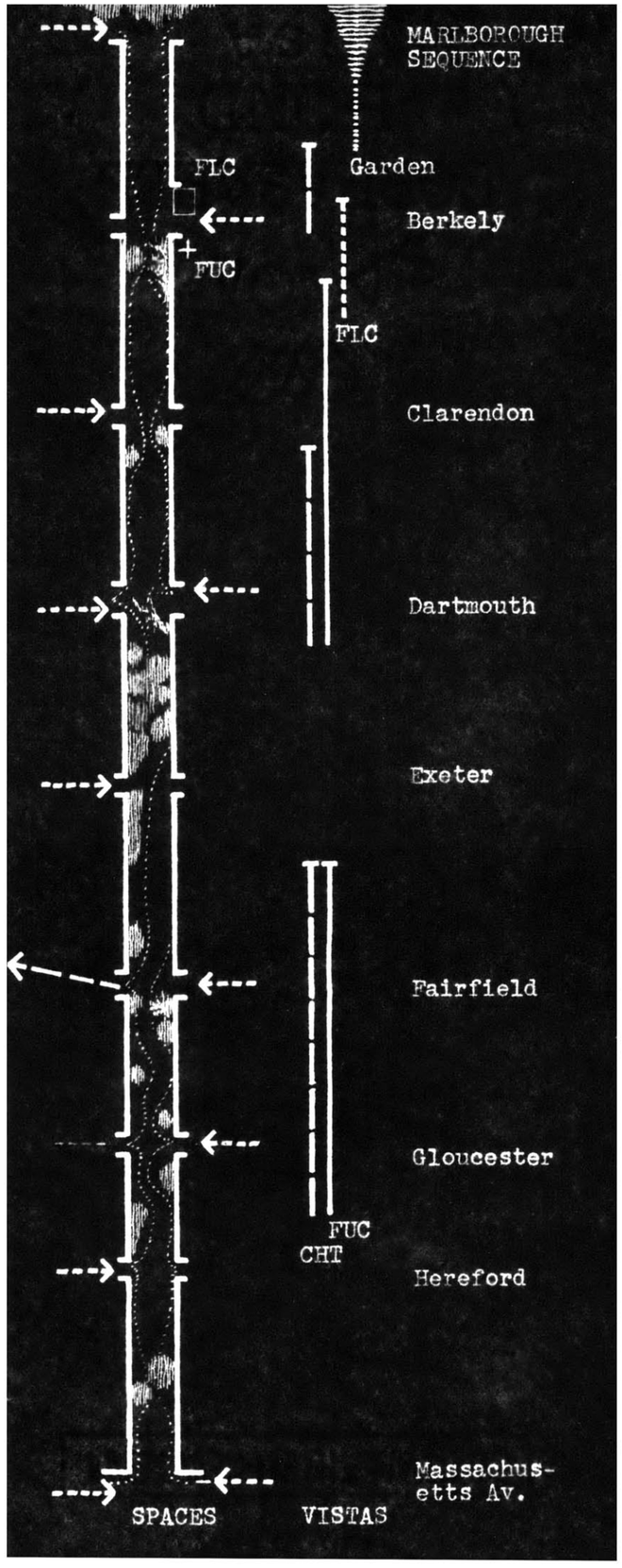
16. MARLBOROUGH STREET in winter looking towards the Custom House Tower. Note change wrought by summer trees in later photos.

15. COMMONWEALTH AVENUE CENTRAL PARK STRIP.
15L. sidewalks each side
15R. of Commonwealth Avenue.

14. NEWBURY STREET in summer, looking towards New England Mutual.

DISTRIBUTION

fig. 15



22. First Unitarian Church and Custom House Tower still coincide. Trees push space over towards the right.

21.

20. GLOUCESTER STREET. From this point the spire of the First Unitarian Church can be seen directly silhouetted against the Custom House Tower, through a hole in the trees.

19. Passing under tree into another space.

18. HEREFORD STREET. Large tree acting as a landmark and pocketing the space.

SEQUENCE DOWN MARLBOROUGH STREET

DISTRIBUTION continued

27. First Unitarian Church spire begins to separate from and dominate Custom House Tower as the latter fades in importance.

26. DARTMOUTH.
Space opens out completely, and wildly diagonal tree briefly catches the eye, before the wide cross space of Dartmouth is experienced.

25. Renewed vista of First Unitarian Church and Custom House Tower.

24. Space begins to be closed in by many trees. Restricted view.

23. FAIRFIELD.

23L. Cross vista across the Charles River to Eastgate Apartments visible due to vacant lot on Beacon Street.

MARLBOROUGH continued

DISTRIBUTION continued

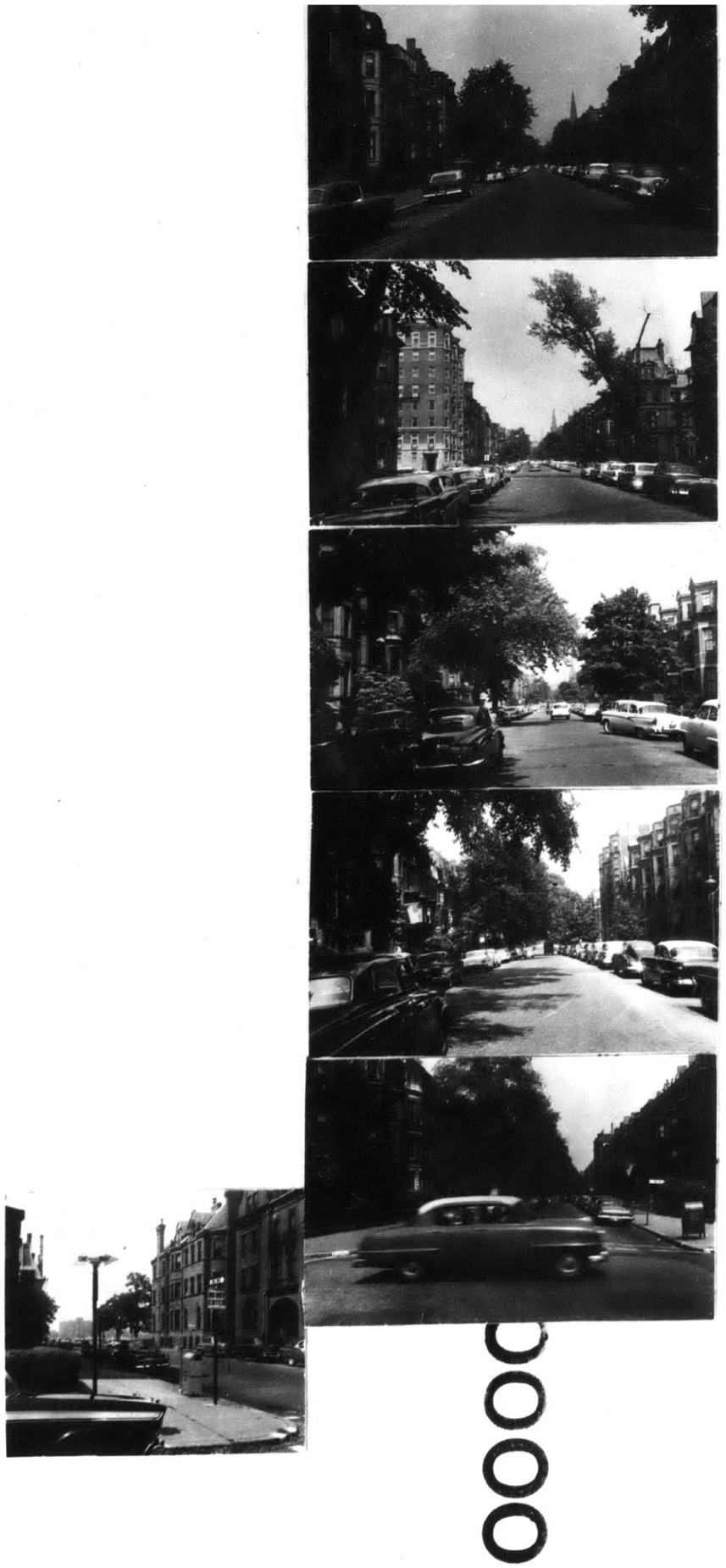


fig. 17

fig. 18

30. The newly built red brick First Lutheran Church now appears for the first time, taking attention away from the First Unitarian Church. The Custom House Tower disappears as the trees in the Garden begin to stop the continuity of the street.

29. Spire of First Unitarian Church rises over the scene, but the rest of the building is still hidden by trees.

28. CLARENDON. Concentrated traffic from Storrow Drive crosses path from left to right.

MARLBOROUGH

DISTRIBUTION continued

fig. 19

34. CARS defining sidewalk space.

33. BOW WINDOWS forming strong vertical rhythms, slowing down continuity.

32. FRONT YARDS and STEPS on Marlborough. Each yard has different treatment. BOW WINDOWS form re-entrant spaces between.

31. SIDEWALK on Newbury. Tree on sidewalk turning it into a tunnel.

DESTINATIONS

39. DARTMOUTH STREET, wider, with half-blocked vista at end.

38. EXETER STREET, with Exeter Theater on the right. Trees on Commonwealth crossing can be clearly seen.

37. FAIRFIELD.

36. GLOUCESTER STREET.

35. HEREFORD STREET with vista of M.I.T. Dome. Note longitudinal concavity.

fig. 20

MINOR DISTRIBUTION

47R. Pavement drawings in perspective.

46R. Sitting on the steps.

45R. Pavement drawings with bicycles.

44R. Pavement drawings with car.

RIGHT: NARROW STREETS IN PHILADELPHIA

43L. Children playing baseball between the towers and cars.

42L. Trash barrels.

41L. Girl roller-skating.

40L. 'Informal art.' Individual expression.

LEFT: SERVICE ALLEYS

SECONDARY MOVEMENT

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fig. 21

F. SUMMARY OF CASE STUDY FINDINGS

1. PRIMARY MOVEMENT STRUCTURE

(a) Entry Sequences

The entry sequences have suggested several possible ways of revealing the form and identity of neighborhoods:

1. Where the neighborhood can be seen from some distance away across an open space, such as the Charles River, the skyline and sometimes the near edge of the neighborhood can be perceived. In the case of the Back Bay, the contrasted district immediately behind adds a third dimension to the image, which can very nearly be appreciated as a form.

   The view of Levittown from the Delaware Bridge puts the perceiver in an even better relationship with the neighborhood, since he looks down on it obliquely, a view which might have been exploited in a similar way to Back Bay. Instead, Levittown possesses neither a strong skyline nor a perceivable edge, let alone a comprehensible total form.

2. The edge of a neighborhood may well help to identify it, although only the Charles River view of the Beacon Street backs can here be cited as successful. But edges are normally atypical, and not indicative of

the inner character of neighborhoods. Thus, Boylston Street is commercial, and Arlington Street presents a facade of large hotels and apartments. The apartments along the Fairlawn Avenue edge of the Radburn neighborhoods would have presented the same problem, so that even when these edges are strongly defined they often relate rather tenuously to the rest of the neighborhood. The outer edge of the Pinewood/Lakeside and also the greenbelt edges of the Radburn neighborhoods are truer expressions of the neighborhood character, but lack any sharp definition.

3. An abrupt change in the path sequence may also help identify a neighborhood. This may be a change in character of the path, for instance the pedestrian entry from the Common into any of the Back Bay streets, but it is more usually accompanied by a change in direction. Even the slight bend of Commonwealth at Massachusetts Avenue succeeds in breaking the continuity, and thus separating the neighborhood from the previous one; but more forceful is a right-angle change, such as any off Massachusetts Avenue, or those off Fairlawn or the Levittown Parkway.

4. Emphasis of the actual point of entry is a common experience, but one not always related particularly to

the neighborhood being entered.

The modest and under-exploited link streets of Levittown and the traffic circles of Radburn could, and in some cases do, provide in different ways a sort of pause, directly related to the next stage in the sequence, which allows the entering person to look into the neighborhood either by a view of the neighborhood public buildings, or by a vista down one of the main distribution streets.

Copley Square, a space which includes many public buildings, is not quite so well related to the Back Bay as these, perhaps because Boylston Street and the John Hancock Building have now attracted attention away from the Dartmouth Street entrance, despite the presence of the Old South Church. Nevertheless, this entry, once experienced, is a memorable one, and in earlier days must have been very successful. In Radburn, the use of community buildings, the shops and offices, at the entrance is successful since they relate to other public buildings inside the area, and also exhibit the name of the neighborhood on their facade.

Imageability of Neighborhoods

Of the three neighborhoods, the Back Bay is the only one that can be considered strongly imageable, and this

depends on three characteristics: first, its distinction as a form through its own compactness and definition; secondly, its differentiation from surrounding neighborhoods; and thirdly its strongly defined paths and path structure.

In Levittown and Radburn, with their lower densities, isolation and comprehension of the neighborhood as a total form would anyway have been extremely difficult. The presence of a skyline in Levittown, and of an edge along Levittown Parkway, could have been exploited, whilst in Radburn, although the skyline was never considered, an attempt was made in the over-all plan to build an apartment wall along Fairlawn Avenue and a green belt around the rest of the neighborhood. Since these edges could only have been perceived in short lengths at a time (there would have been no over-all views), they could not have stood by themselves as strong neighborhood definers. Coordination with the path structure, perhaps through their coincidence with the points of entry, was necessary.

(b) Distribution

Several ways in which the distribution function can be imaged have been suggested:

1. The width, proportion and scale of the Back Bay streets, and in particular Commonwealth and Beacon, exhibit the

sort of residential grandeur to which a distribution street might aspire. The space formed by the trees along Howard Avenue in Radburn is not dissimilar in nature. The success of these streets would suggest that proportions of space approximating to a square on section so channelize it as to produce a sense of high continuity.[1] The lack of such a feeling in the wide and low Levittown streets, on the one hand, where continuity is weak (although too strong for destination functions), and the constricted slowness of the Back Bay service alleys on the other, both seem to confirm this. From personal observations made on expressways, it would appear that very high speeds find even the square proportion too constrictive.

2. The character of the containing surfaces of Back Bay and Radburn indicates the range of possibilities here. Back Bay streets with their solid, heavily modulated

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[1]It is interesting to note that in an article on the means towards achievement of 'urbanity' in British New Towns, street density rather than area density was proposed. This was to take two forms, longitudinal and transverse. The former measured the ratio of building frontage to total road length, whilst the latter, more relevant here, was the ratio of height of buildings in the street to the distance between them. Here a density of 3/4 to 1 was considered to be a good average. Architectural Review, Vol. CXXL, No. 722, March 1957, p. 199, Ander Gomme, "Failure of the New Analysis."

and continuous walls contrast strongly with the light, transparent, staccato rhythms of the trees on Howard Avenue.

The sculpturing of the respective spaces by the splayed angles of the steps in the lower corners of Back Bay streets, and through the arching of trees in the upper corners of Howard Avenue, further encloses them as channels.

3. The subtle differentiation of the street space by the presence of objects, either in continuous line or isolated, is pointed up a number of times. Repeated lines of objects define and articulate the space in section. Thus the trees on Commonwealth articulate the street into three corridors, by their dense and thick roof over the central park strip, which defines the pedestrian area (actually the secondary movement path), while the parked cars differentiate the destination areas next to the houses from the distribution space. Thus in the whole street space, several functions are taking place within their respective sub-spaces. On Howard Avenue, the transparency of these objects gives the effect of two interpenetrating spaces, the total space limited by the houses, and the pavement space within that defined by the trees.

Isolated objects, on the other hand, tend to define the

space longitudinally rather than latitudinally. The trees on Marlborough, large and expansive as they are, form pockets of space in the length of the street. The presence of these objects also affects the 'emptiness' of the space. Thus, rather obviously, the lack of cars and pedestrians on the Radburn distributors gives this impression; but even Beacon Street, which has many cars and trees, looks very empty when there is no traffic because the objects are placed in lines, a phenomenon which never occurs on Marlborough, where the trees are scattered and in fact congest the space.

4. Vistas depend primarily on straightness of alignment, and secondarily on an unobstructed view. The 'momentum' of a strongly aligned space can in visual terms 'pass through' objects. Thus on Marlborough Street the vista is implied and felt, even if it is not always literally seen.

The relationship of the spectator to a formally laid-out street of the Back Bay type is well described by D.B. Thornley:[1]

> The setting may take the form of an image in the spectator's mind and it may, on this level, have its <u>own existence in space</u>,

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[1]D.B. Thornley, "Space and Form in Civic Design," pp. 156-7, from <u>York Studies in Architectural History</u>, St. Anthony's Press, London and York, 1954. (italics mine)

> independent of and remote from the spectator, and be extended in time and in space far beyond the range of his immediate experience.

The vista of Beacon Street especially seems very much like this, where the spectator feels little sense of involvement in the space. He is located or stopped latitudinally, but not very strongly longitudinally, a perfect setting for linear progression (and therefore distribution).

As the street alignment begins to curve involvement increases, until in the informal mediaeval-type street with broken walls, where "as the spectator moves the whole pattern of relationships changes,"

> .../he/ cannot, except within strict limits, regard the setting from a detached viewpoint. It has no independent existence and each 'view' must be regarded as something both external to and related to the spectator.[1]

This begins to describe the character of a pedestrian or destination space rather than that of a distributor street, and it may be mentioned that in the Back Bay streets the formal experience gives place more to the informal, when the spectator moves to the sidewalk and experiences in close proximity the overlapping and changing relationships of trees, cars, front yards, bow

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[1] Ibid., p. 157. (italics mine)

windows, etc., rather than the uninterrupted vista. The actual length of a vista will in any case affect the longitudinal scale of a street, and consequently affect its continuity.

The use of curves to promote vistas of public buildings can be witnessed both in Radburn, where they are rather oblique and in informal, and in Levittown, where they are direct and more formalized.

5. Sequentially, the entry, as the first and most important means of identifying a street as well as a neighborhood, has been demonstrated, and various types of entry have already been suggested.

Within the lengths of distribution streets the principal rhythms are set up by intersections, either four-way between equal-value streets as in Radburn, or across minor streets as in Back Bay. These intersections demand heightened concentration from the driver and constitute key reference-points, especially if emphasized by a landmark as in Radburn. The Back Bay intersections create more of an even rhythm, whilst the occasional presence of a landmark serves to identify position longitudinally. The constant rhythm of intersections in this case extends the influence of each landmark by being "the third street past the First

Unitarian Church," or "the street before the Exeter Theater." T-intersections like the culs-de-sac in Radburn or the minor and link streets in Levittown, are much less powerful, and their rhythms are often barely discernible.

The rhythms created by continuous objects have already been considered in perspective, and experience of them is very similar in sequence. Suffice to say that longer rhythms increase scale and 'speed up' continuity, shorter ones 'slow it down.' The type of object, 'heavy' or 'light,' will, of course, affect the significance of this. In the streets considered there has been little or no change in intensity of rhythm, a factor which could help to articulate a street pattern.

6. Of the street networks, the Back Bay grid is by far the most easily imageable. The basic layout, clearly comprehensible in itself, is further differentiated by the varying character of the distribution and cross-streets. The topological grid-iron of Radburn, with its surrounding ring road, might have been quite clear, but in the absence of strong differentiation between the streets, doubts can be expressed on this point. Were the two central neighborhood intersections very strongly framed, differentiation within the lengths of streets might not

have been so important. The presence of the school may have achieved such differentiation in one case. Thus street-layout clarity seems to depend very much on differentiation of paths and/or connections.
The Levittown ring layout, although similarly failing through weaknesses in path design, seems nevertheless to possess a high potential of imageability.

(c) Destination

The destination function is most clearly imaged in the Radburn culs-de-sac, since it is isolated and the space is devoted solely to destination requirements. These seem to be connected with the slowing down and stopping of the circulation movement. In some way it must look like an 'end.' The following different ways have been suggested:

1. By the literal stopping of the pavement surface as in Radburn, together with the grouping of houses around the end of the space. Here the space begins in a linear manner and often ends with a widening-out into a circular, octagonal or amorphous but directionless area.

2. The Back Bay sidewalks show that a destination can be imaged within a distribution space. The destination here is linear and continuous, but the motion is slowed

down as before described by strong and closely spaced rhythms and vigorous differentiation in front yards, steps, and bow-windows. Further, the trees of Marlborough seem to extend the destination spirit over the whole street space.

3. The extreme narrowing of the service streets on Back Bay suggests another destination method. Since cars park in the back yards or houses on these streets, and children play in them, they could be described also as destinations.[1] They also suggest that houses need not necessarily face onto the destinations, although close connections between the two is desirable.

4. Burnham Place, in Radburn, and the main Back Bay streets showed how formal and well defined these places might be in contrast to the informality of other culs-de-sac, and to the service alleys.

2. SECONDARY MOVEMENT STRUCTURES

1. It was discovered that most of the internally focussed secondary movement structure was coincidental with that

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[1] A survey of streets in Philadelphia made in connection with this paper showed how the narrowness even of ordinary grid-iron streets increased their destination possibilities. In one case cars were forced to stop and wait while children finished a drawing on the pavement surface, see fig. 21, p. 98.

of the primary structure, as long as it was vehicular. Either it covered fragments of the entry sequence, such as the journey to the shops in Radburn, or where the facilities were outside the neighborhood, as in Levittown, it coincided with the entire sequence.

2. Segregated secondary movement was in these cases found to be pedestrian, the most developed and successful of which was that of Radburn. The successful points in the Radburn structure seem to be:

   (a) the completeness of the sequence, with its clear beginning, hierarchical structure, and end.

   (b) the successful shaping and scaling of this structure to the demands of the pedestrian and especially the children.

   (c) the complete contrast of this to the main structure, providing a dramatically double-edged environment.

   On the other hand, the interlocking and overlapping of primary and secondary structures suggested the need for more connection between the two, either by direct continuity through destinations, or intersections, or by visual linkage, as demonstrated by the location of the school.

3. The service alleys of Back Bay suggest a more urban, but similarly informal, type of secondary structure which might contrast with the formality of a primary structure.

4. The central strip on Commonwealth shows how secondary structure can be separate but still within the same path space as the primary.

5. Comparative visual influence of community facilities seems to depend very much on the nature of the distribution paths and their layout. Thus those within a grid system might have only limited areas of influence since they do not lie on any other vista. This depends very much on their form and surrounding space. Of course, once they are placed on the lines of path in the manner of rond point schemes, they become extremely visible.

   The location of community facilities in a curved street layout is less easily imageable. If the streets are arbitrarily curved as in Radburn, the vistas become arbitrary and less impressionable, although in Radburn the subtlety of execution to some extent offsets this. The straight stretches and sharp curves of the Levittown ring-roads allow vistas almost as powerful as a rond point plan, and the location of the central community facilities opposite the main entrance to the neighborhood is stronger still. In both cases the build-up of the location is counteracted by the modest form of the buildings, a balance which may, in symbolic terms be quite correct.

Horizontal Differentiation

Horizontal differentiation is strongly evident only in the Back Bay. Here, from the neighborhood as a whole, down through the path structure of major and minor distribution streets, to the houses, there is clear differentiation between parts. Moreover, this differentiation still allows an over-all unity. Between the four major streets there is individual articulation, but between the minor streets, and between the houses, differentiation is grouped. In this way there is not excessive variety at the lower scales, since identity is established at the higher level. The failure of differentiation at higher level is the chief cause of monotony in Levittown, and the continuation of similar culs-de-sac in Radburn might well have approached the same sort of monotony, despite the clear statement of street hierarchy. In the latter case, differentiation at the superblock level, for example along the distribution streets, might have been a solution.

3. GENERAL CONCLUSION

The method of analysis, which was formed out of contemporary needs for imageability, has, by implication, stated the need for some kind of vertical and horizontal differentiation within a unified residential structure. The relevance and relative success of each case study has

therefore been assessed on these particular terms. Briefly, then:

1. Levittown has pointed out the contemporary imageability problem through its failure to differentiate vertically in strong enough manner, and horizontally at the right scale. Its characteristic quality therefore remains one of a monotonous uniformity.

2. Radburn began to establish clear vertical differentiation in terms of the current circulation requirements of neighborhoods. This differentiation was carried out in a very pure way, each path being dedicated strictly to one function, and in this sense it can be judged a most important contribution to the field. But even Radburn failed to achieve very much in the sense of horizontal differentiation.

3. Back Bay, admittedly facing less difficult problems, managed to achieve in high degree both horizontal and vertical differentiation, the latter at all levels of the path system, and even at the neighborhood level. It therefore possesses characteristics particularly relevant to the current problem of imageability.

The two major conclusions brought out by the surveys seem to be:

1. That the path character and structure is a key factor in the creation of imageable residential structure.
2. That the unity and strength of an image derive from some theme or idea, from its having some meaning.

1. These case studies seem to indicate that imageability of neighborhoods can be achieved either through the total form, its skyline and edges, or through the paths and path structures. It can be further confirmed that the latter method, which would seem a simpler proposition in practical terms, is the one that is the more neglected in the two modern neighborhoods. Levittown contained the germ of clear structure in plan which failed in execution. Radburn's primary path structure on completion might also have been clear on plan, but the main streets are not well differentiated from those of any other neighborhood, so that ultimate imageability of the Radburn path structure depends on the destination culs-de-sac and the secondary system, both unseen until penetration has been made.

   The form and location of the building elements, the houses and community facilities, are of course the main character-forming factors in the paths and path

structures, but, conversely, unless they are well related to the path and therefore the movement structure, any vivid image they may create in themselves may be greatly diminished. Thus the school in Radburn, a well-defined building but situated far from the neighborhood points of entry, is less memorable than the more broken-form Pinewood/Lakeside School, which is placed directly on the main entry vista.

2. Although an image may come about by chance, such as the vista of the Custom House Tower down Marlborough Street, or the differentiation of space by the lined cars on the Back Bay main streets, a truly strong image is one which is meaningful; one which is an intelligent, imaginative, and three-dimensional execution of some unifying idea.
   Thus the main streets of Back Bay are memorable because they were constructed with an idea of what a residential street at that time should be like. The subsequent differentiation of the spaces by the parked cars is only an interesting chance phenomenon, which incidentally demonstrates the durability of the original image through a period of dramatic change. Similarly, the strength of Radburn lies in the conceived nature of each path and its place in the movement system.

Creation of an imageable structure depends, then, on something more than the sum of identifiable parts. The parts require some basis for meaningful relationship.

G. CONCEPTUAL FRAMEWORK FOR DESIGN

The method of survey and the results of the three case studies suggest that a common order may be discovered in the residential structure. This chapter attempts to clarify and build up that order into a framework for design.

The principal means of creating an imageable residential structure lie in the vertical and horizontal differentiation of that structure, so that any person moving along the path systems will be able to identify his position and locate himself at any time.

Perception of the environment from the ordinary movement channel ranges from views of relatively large areas of the city down to confinement within the immediate surroundings of the path. Thus the methods of differentiating such an environment lie on a continuum between:

1. that of creating an imageable and differentiated environmental FORM for whole areas of the city, that will be perceived from a distance, from the '<u>outside</u>,' so to speak, and

2. that of achieving differentiation within the PATH STRUCTURE perceived whilst moving along it, from the '<u>inside</u>.'

Traditionally, the former method has predominated in planning. Vertically differentiated hierarchies of forms within forms, sub-neighborhoods within neighborhoods,

housing groups within sub-neighborhoods have been created. But the difficulties of imaging such forms from ground level are, on the whole, much more complex than those of imaging the path structure, which in any case provides a more continuous and coordinated image. This is a fact which is still frequently ignored in much site planning. Thus, although the imaging of residential areas in terms of FORM will be examined, the formulation of an imageable hierarchy for the PATH-STRUCTURE is considered the really crucial area for action, and the former method will be subsequently integrated into this hierarchy.

The formulation of these hierarchical levels ideally requires a synthesis of all the relevant factors which affect the form of the residential structure. Such a synthesis, an idea rather than an image, would satisfy both functional requirements and social as well as other aspirations. However, though this must remain the ultimate goal of planning as a functional art, compromises have reluctantly to be made. Thus the limited goals and scope of this paper, confined as they are to the imageable aspects or the psychological impact of the residential structure on the perceiver, make it necessary to select and assume as valid certain levels already formulated in the fields of architecture, planning and traffic research.

The function of vertical differentiation, then, is to create a hierarchy, which could be established in general terms as a source of unity. The Neighborhood Unit at a similar level of generality proposed a physical form at only one scale. The conceptual framework proposed suggests levels, which are not necessarily fixed, but which seem to represent more significant points on a continuum of scale from large to small from the whole city down to the individual's home.

The function of horizontal differentiation is quite separate in that this is related to the particular rather than to the general. The necessity for it is equally as great, but for one neighborhood to differ from another, or one street from another, depends and should depend primarily on local form-giving characteristics, the genus loci. Thus it may be possible to make suggestions, but not a generalized framework. There are scales in the hierarchy at which horizontal differentiation is more effective, however, and these will be discussed.

The conceptual framework now proposed will be considered at each level:

1. by defining the nature of each level. (IDEA)
2. by exploring its imageable expression. (IMAGE)

I VERTICAL DIFFERENTIATION

When towns were small, surrounded by walls, or perched on hills or islands, like Assissi or early Boston, they could often be appreciated as three-dimensional objects. But in the city today, and in the urban region tomorrow, this appreciation of the whole, or even of the parts, becomes increasingly difficult.

Nevertheless, the desire to grasp the whole city as a coherent image is as strong, for both planners and the general public, as is the desire to divide it up into NEIGHBORHOODS or DISTRICTS. Apart from the social reasons this seems the result of some psychological necessity. It has been suggested that without the Neighborhood Idea "architecture would either go out of scale altogether, or lose itself in the byways of style and decoration,"[1] and this need is further supported by the way in which ordinary people perceive the city by 'districts.'[2]

A. RESIDENTIAL FORM

IDEA

Until now most attempts in the planning field have been directed towards constructing the NEIGHBORHOOD as an

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[1]Sir William Holford, quoted by Hans Blumenfeld in "Scale in Civic Design," Town Planning Review, Vol.XXIV, No. 1, April 1953, p. 35.

[2]Lynch, Kevin, Image of the City, unpublished report, M.I.T., 1958, p. 138.

isolated form. The Neighborhood Unit as originally conceived had as one of its main goals the establishment of physical definition within the city. It was Clarence Perry[1] who complained that the neighborhoods of New York had no definite boundaries. Raymond Unwin[2] at his most romantic tried to build a 'mediaeval' wall around Hampstead Garden Suburb. Today, the demands for diversity of function and housing-type have indicated the new problems posed by such neighborhoods, and qualifying support of the isolation idea from a social point of view.[3] Nevertheless, the formation of areas of the city, which express the unity of certain groups of the population, remains popular, even though local ties are frequently less important than those of specialized groups within the whole city.

IMAGE

The perception of neighborhood form seems to be very much limited by the range of vision allowed the perceiver, but if such imageability were possible, the rewards in terms of identity would be very high. The prerequisite

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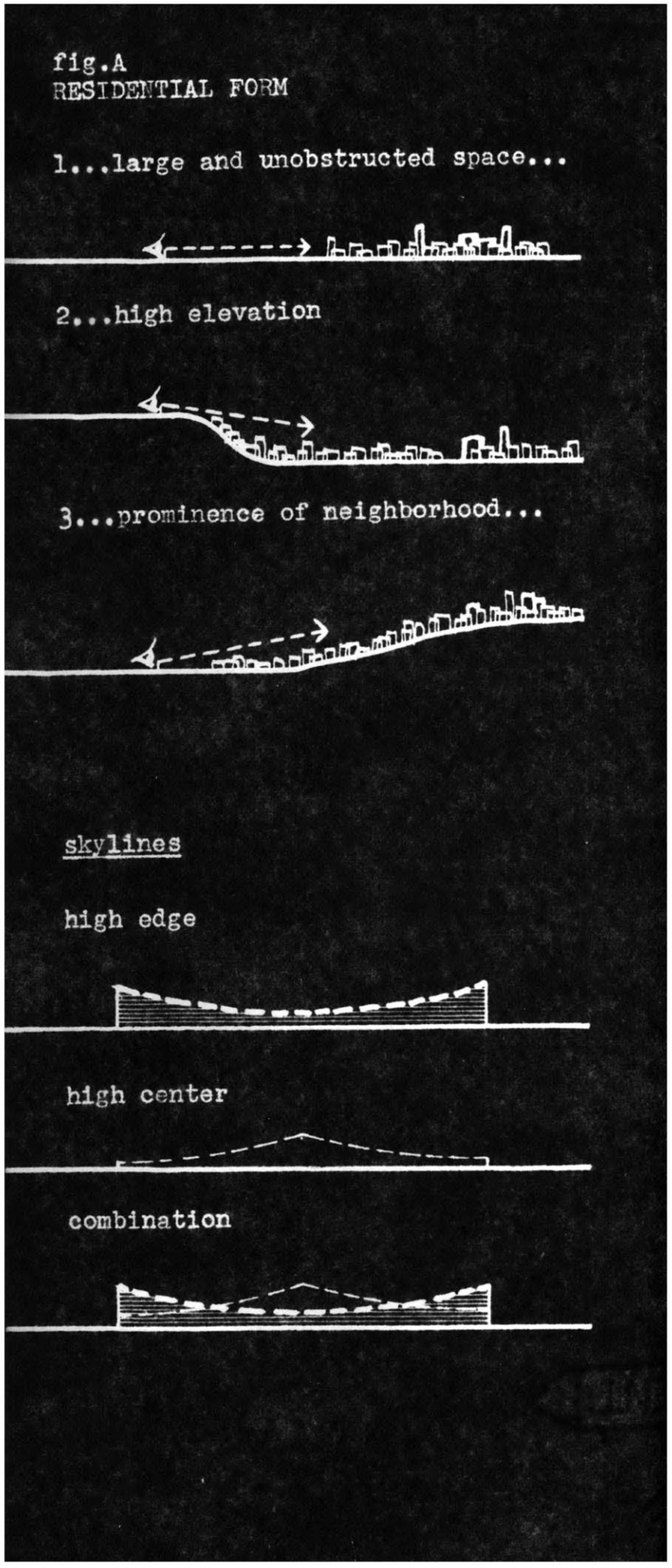
[1]Perry, Clarence, op.cit.

[2]Unwin, Sir Raymond, Town Planning in Practice

[3]Bauer, Catherine, "Good Neighborhoods," Annals of American Academy of Political and Social Sciences, Vol. 242, November 1945, pp. 104-115.



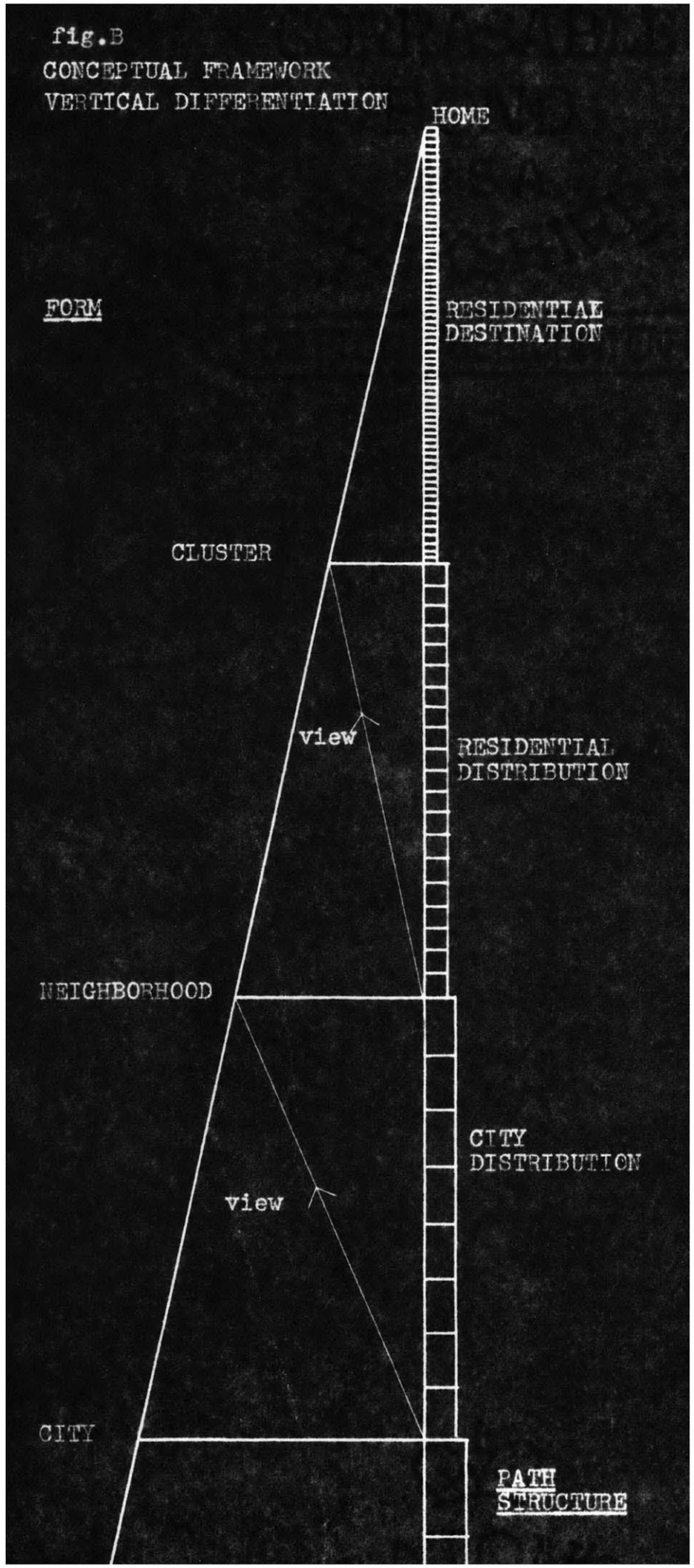
for such a panoramic view would be the fulfillment of at least one of the following conditions:

1. the presence of a large and unobstructed space between the observer and the neighborhood;
2. a position of high elevation from which the observer may look down upon and distinguish it;
3. the prominence of the neighborhood, by its own elevation, skyline or facade.

In terms of automotive movement, any of these views should also be of some duration, to allow the motorist time to identify and comprehend the image.

Ultimately, imageability will depend on the compactness and clarity of the neighborhood itself, a factor which tends to make it easier in higher than in lower densities, the extreme example being a large apartment block, the dimensions of a Unite d'Habitation, for instance, set in an open space. Under normal circumstances, then, it is still doubtful whether many neighborhoods could be perceived as a whole. However, form can be perceived through an imageable skyline or edge.

Visibility of the skyline depends on its own height and sharpness, and the distance from which it is viewed. Thus a low skyline can be appreciated from near vicinity, a high one only from farther away. The most imageable skyline has its landmarks coordinated with its internal



structure, has latitudinal limits, defined either by breaks in character or by landmarks, and possesses recognizable depth, depending again on either its own landmarks or a contrasting background.

On approach the importance of skyline is supplanted by that of edge. Facade detail becomes important, and gradually over-all form is lost. The edge can be an important factor in the image. The edges of Chinese cities, for instance, told much about their character.[1] An edge can also suggest three-dimensional depth by its broken, transparent or netted quality.

B. RESIDENTIAL PATH STRUCTURE

Within the more immediate environment of the paths building up the path structure of the city, the kinds of movement taking place along the paths play an increasingly important role, for they determine the character of the perceived foreground.

So it is that a hierarchy of movement is proposed.

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[1] Gutkind, E.A., Revolution of Environment, Kegan Paul, London, 1946, p. 313. "The Chinese city is conceived from the very beginning as a coherent organism within the wall. It develops from without inwards. Thus the description of the gates is of special significance, because from it the system of the main streets connecting the gates can be deduced. If we read that there is such and such a number of gates in each of the walls - except in big cities there is only one gate in the middle of each of the four walls - this indicates directly the number and layout of the main streets."

The character of such movements is closely related to their function of serving the multi-faceted needs of residential areas. Thus, while at the expressway level the traffic demands alone may predominate, at the very lowest level in the residential movement hierarchy, the demands of the residential environment, namely, the home, begin to dominate the requirements of traffic movement. These movements are not therefore characterized strictly by optimum traffic speeds, but more by the total needs of different users at each level.

1. PRIMARY MOVEMENT

Three orders of movement are suggested:

(a) CITY DISTRIBUTION, the major circulation about the city or urban region.

(b) RESIDENTIAL DISTRIBUTION, that within the residential areas concerned with distribution and collection to and from residences.

(c) RESIDENTIAL DESTINATION, that connected with arrival at the residences, slowing down and stopping.

The clear distinction between these characteristically different scales of movement, together with their transitions, suggests a generally integrated structure which is nevertheless capable of infinite variation.

These types of movement may often take place within the same path.[1] Thus a street may have through-city

[1]See Distribution-Destination Paths, p. 140.

traffic, and be flanked by residences so long as each function is imageably separate. These movements are experienced separately, however, and in sequence by the perceiver who moves along the primary movement structure, down through the hierarchy. In this sense, they are distinguishable as separate functions of the circulation system and can be imaged as such. The secondary orders of movement, which form the internally focussed structures between the houses and community facilities, principally school and shops, will be analyzed separately[1] whilst their close relationship to the primary movement order, interlocking or overlapping, will be acknowledged. The integration of defined neighborhoods, i.e., RESIDENTIAL FORM, with this framework could easily be achieved. Thus neighborhood boundaries could coincide, as they often do, with the transition between city and residential movement. The form of an area could then be perceived before its path structure was entered, and the impact would therefore be extended over a longer period of time, during which the transition from the form image to that of the path structure could be clearly negotiated.

However, to distinguish areas of the residential structure, this is not the sole method available. The distinction

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[1]See Secondary Movement, p. 142

between 'districts' in existing cities is, in fact, generally due to certain thematic continuities,[1] rather than a distinction of the over-all form. Thus if the residential paths or transition points exhibit certain common characteristics, the identity of areas can be established. The transition point between city and residential distribution is therefore an extremely important one. For this reason an additional section will be devoted to it. This will be Section (a-b).

(a-b) CITY-RESIDENTIAL TRANSITION, or Residential Entry.

The imageable characteristics of the orders of movement with their accompanying transitions will now be analyzed.

(a) City Distribution

The nature of the CITY DISTRIBUTION is one of fast communication, mixed traffic, and non-residential activity. The transition from this scale of movement into the residential scale constitutes the first imageable point related to the residential structure, the point of entry.

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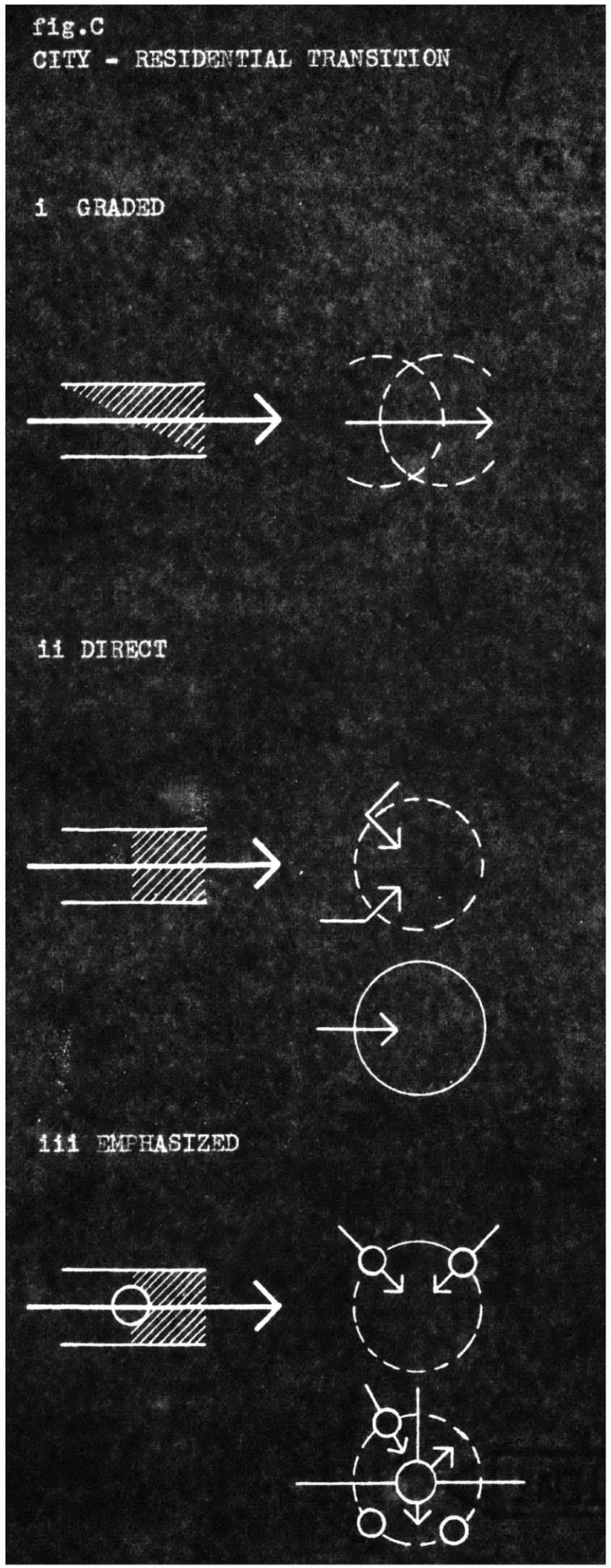
[1] Lynch, Kevin, Image of the City, op.cit., p. 140. "The characteristics that determine districts are thematic continuities, which may consist of an endless variety of components: texture, space, form, detail, symbol, building type, use, activity, inhabitants, maintenance, topography."



(a-b) City-Residential Transition

IMAGE

The transition from the outside world into the residential area is conceived here primarily as an entrance despite its opposite use as an exit, since its visual function is directed more towards the incoming perceiver, who needs to identify and orient himself within the area. The type of entry where the neighborhood is recognized as a form has already been considered under 'Residential Form.' There are, however, three types of transition related more directly to the path structure, whereby entry into a residential neighborhood can be perceived. These transitions may begin to take place along the city distribution paths or not until the actual transition from city to residential or local movement. They are:

i GRADED

ii DIRECT

iii EMPHASIZED.

i Graded Entry

A graded entry denotes slow transition into an area. This may be through gradual change of character, from one area to another, or perhaps through an increase or decrease in intensity. This graded transition can be experienced

along the city distribution paths, before actual entry onto the local path structure, and is frequently found in existing cities where neighborhoods seldom have edges.

ii Direct Entry

Where a definite and clear change of character is experienced in a short space of time, the entry may be termed direct. Transition into a defined neighborhood, where an edge can be perceived, would constitute such an entry. It may be accompanied by, or may be solely, a change in character of the path, a change in its direction, either by a bend in the path or perhaps through an intersection.

iii Emphasized Entry

The imageable qualities of a direct entry may be emphasized by heightening the importance of the transition point. Link streets, traffic circles, landmarks and vistas are some ways of achieving this. An entry of this sort may also act in a negative sense, by creating a pause in between scales of movement. Analogies can be found in the approach to St. Peter's which is halted by the widening of Bernini's colonnade, or in the atria of mosques or early Christian churches. These all serve to break a sequence, allowing precious time for orientation and appreciation of the preceding and succeeding phases in the experience.

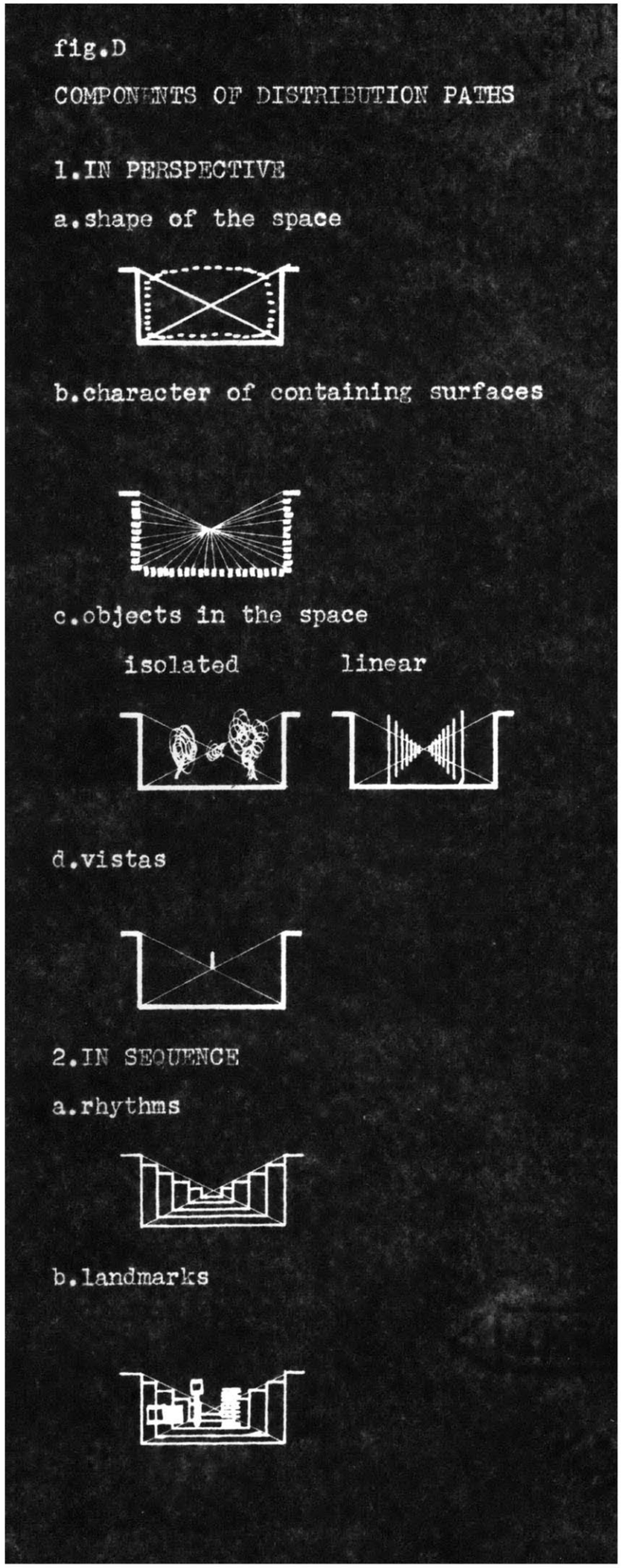
It is possible to so emphasize an entry as to turn it into a major nodal point. For instance, if two or more city distributor paths crossed or entered such a node. In this case it might become perceivable as a center for the surrounding area. Then entry would take place through the center rather than through the edge. This might then be considered a major entry, which may be supported by minor entries along defined edges (see fig. C).

From this analysis, it can be seen that these different modes of transition can be used separately, in sequence or in combination. It may also be seen that the graded entry is generally the least distinguishable, and the emphasized entry the most clear, but much depends on how they are worked out. There may further be major and minor entries incorporating different characteristics, the imageability impact of each entry varying inversely with the total number of entries.

(b) Residential Distribution

IDEA

The demands of residential distribution movement are determined primarily by the needs of the automobile driver, who is either searching for his particular destination which he is nearing, or is intent on finding his way out of the area if he is leaving. In either case he wishes to



move quickly (say, up to 25 miles per hour), within the limits of safety and comprehension. As a residential street, with lack of heavy traffic, this function will almost inevitably be compromised by or combined with that of the destination function, but the latter will be considered separately, for the sake of clarity. Thus the demand is for a reasonable continuity at high residential speed. This definition suggests, if not a clear differentiation from other scales, at least a central region of uniqueness. Inter-neighborhood or major city movement generally has faster speeds, mixed uses and usually higher intensity of activity, whilst the destination function is more subordinated to the demands of the home environment.

IMAGE

(i) Distribution Paths

The components of the path which may contain such an order of movement have already been delineated in the Introduction (page). It is necessary here only briefly to describe their relative effects and importance for the imaging of such a function.

1. In Perspective

   a. The shape of the space, its proportion and scale, is basic to the street image, and even small variations in this can easily differentiate streets. Ratios

in the region of 1:1 between height and width of the space seem to suggest high continuity.

b. The impact of the shape can be strongly affected by the character of the containing surfaces. If they are opaque rather than transparent, there is more sense of enclosure and confinement. The 'weight' of their materials, and articulation and modulation of the surface both reinforce their sculptural qualities and strengthen definition.

c. Continuous lines of objects in the space, for example lines of parked cars or rows of telegraph poles, narrow and intensify the perspective, which is, on the other hand, broadened and halted by isolated objects such as sporadically placed trees or cars.

d. The length of vista, depending on the straightness and unobstructed quality of the street, increases the longitudinal scale.

2. In Sequence

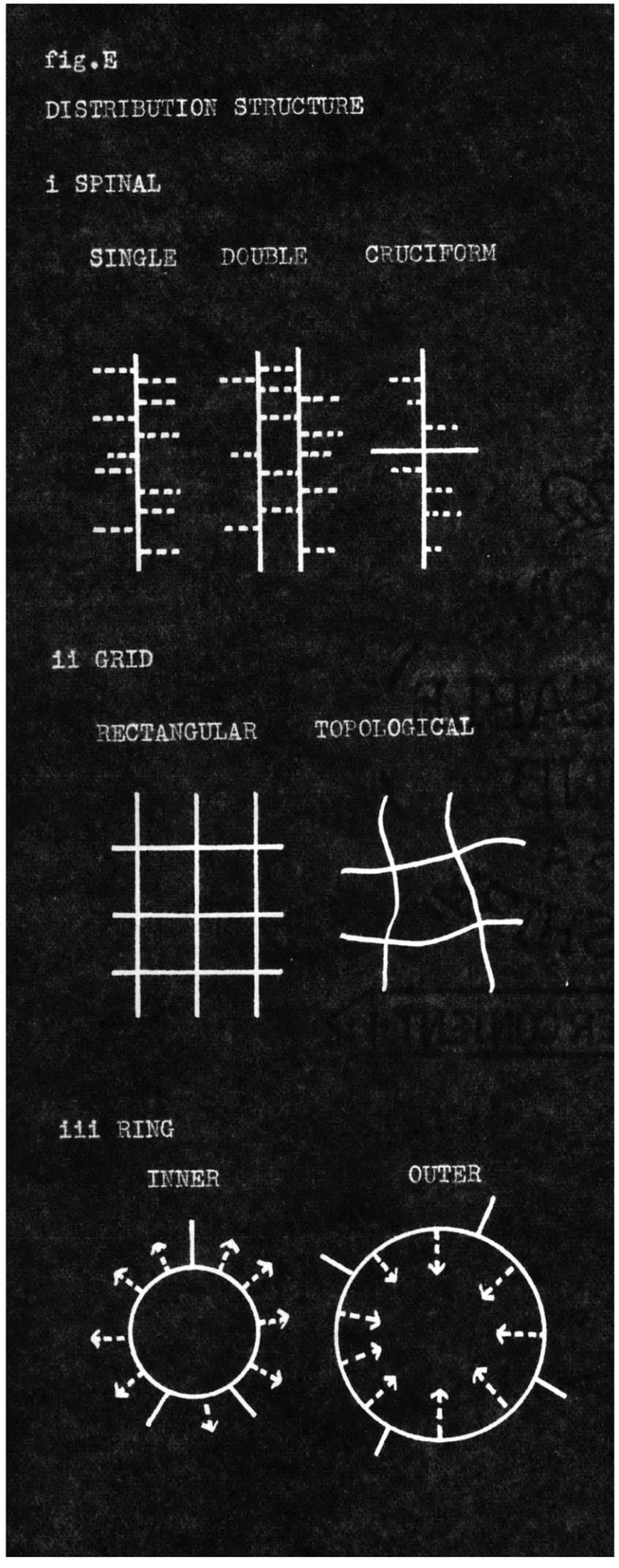
a. The entry characteristics are the initial means of identifying a street, and often cannot depend on the perceiver's previously appreciating it in perspective. The types of entry onto distribution streets have already been described.

b. The main rhythm-forming elements in the movement sequence are the intersections or block lengths, and secondarily, articulation of the containing surfaces, continuous objects, and successive vistas construct lesser rhythms. Generally speaking, the longer the rhythms the higher the continuity.

c. Landmarks are invaluable as reference points for creating identity within the length of a street. In residential areas the most effective landmarks are the community facilities, which can be placed in the length of the streets, on vistas, or at intersections to heighten transition points or to break up the length of a path. These buildings also enhance the importance of the streets on which they are located.

(ii) Distribution Structure

The distribution structure is experienced through sequence, and cannot easily be visualized as a whole. It is thus revealed slowly, at most by passing along its paths in the course of normal activities. The important thing therefore is not so much the overall layout on plan, as the working out of clearly identifiable paths and connections. Whether, for instance, paths are curved or straight, does not, within limits, make very much difference to



imaging the structure, as long as it has clear sequences and differentiation. The perceived geometry is therefore topological[1] rather than Euclidean, it is one of paths and connections, of movement and sequence, rather than of straight lines and right angles, and the fixed bird's-eye viewpoint.

Three basic types of path structure can be suggested for a distribution network.

i spinal

ii grid

iii ring.

i Spinal System

Beginning with one simple spine, this system can be built up with cross-connectors and parallel spines until ultimately a grid-iron is formed. The spine streets as the principal paths generally give clear orientation, but sometimes tend to be 'through streets,' that is, city rather than residential distributors.

ii Grid System

When the spines travel in both directions, and tend to be more nearly equal in importance, then the system is

[1] For a simple explanation of topology, and its relation to street layout, see, le Ricolais, Robert, Topology and Architecture, Student Publication of the School of Design, North Carolina State College, Raleigh, N.C., Vol.5, No. 2, Spring 1955.

called a grid-iron. The grid-iron system in its strictly rectangular form gains from increased choice and number of vistas, but often loses necessary street differentiation because of similar character and through the large number of them.

iii Ring System

The ring system is generally a type of circular or continuous spine. It is a closed system which can be fed into from either side. Its size may vary greatly, so that it may act as an inner ring, outer ring, or boundary, to the neighborhood. Its repeated sequences and possible vistas of the same objects from all sides, as it revolves around them, can be a high source of neighborhood definition, but the changing orientation tends to destroy its continuity.

(c) Residential Destination

IDEA

Destination, as the word implies, is the point of arrival at the goal, the end of the journey, the climax of a sequence which is the slowing down from movement to stillness. Destination is the place where man gets out of his car and begins to walk; where the automobile and the pedestrian meet on equal terms; and where finally the pedestrian begins to dominate. It may also be an extension

of the house, a place for people to sit, and children to play.

Each home is a destination for some individual; but circulation problems make it necessary to pass several other destinations before reaching this particular one. Thus, although each destination is a place of ultimate repose, each one cannot be at the 'end' of the circulation system. Destination in terms of movement can in many cases, then, aspire only to slowing down rather than stopping. The spaces may range from slow moving to static.

IMAGE

(i) Destination Spaces

The components of the destination image are not different from those of any other paths; it is only that continuity is diminished, and 'path' tends to become 'place:'

i In Perspective

a. Either very wide or very narrow proportions for the shape of the space, tend to reduce continuity. Both of these tend more to the shape and scale of pedestrain spaces like squares or closes on the one hand, and narrow alleyways or walkways on the other. In both cases the automobile begins to compromise its dynamic, and feels uncomfortable, an appropriate quality for a destination.

b. Strong modulation of the containing surfaces can reinforce such an image, and slow it down.

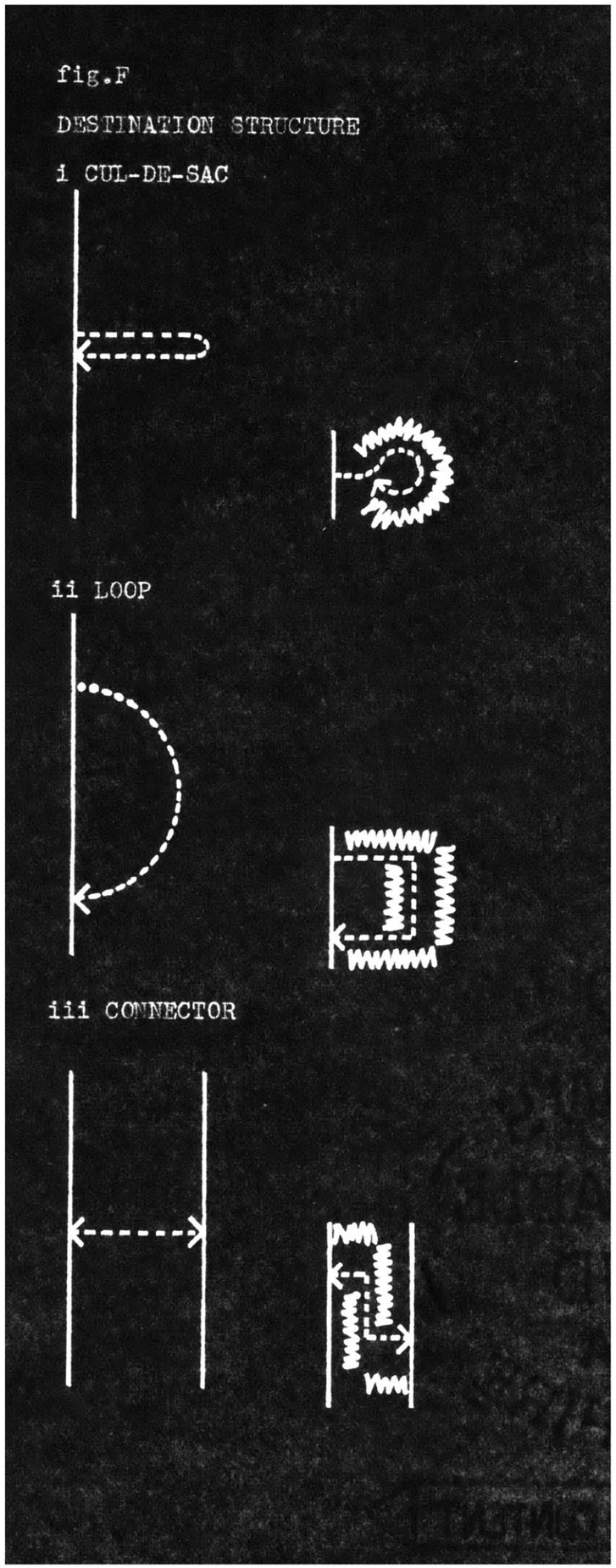
c. Isolated rather than continuous objects are the more effective in this situation. These objects can also cluster into larger forms, or surround static or slow-moving spaces.

d. The emphasis of long perspectives or vistas would be out of character in such a place. This is not intended to preclude long views, but on the other hand some closure of vista or longitudinal limitation of the space is necessary.

ii In Sequence

a. Entry is as important as it is for the transition onto any new path. A sharp break in movement may well be necessary, to diminish continuity. Extreme narrowing or bending of the path, a traffic island or some other such emphasis is possible.

b. Rhythms may be used to slow down movement by more intensive emphasis, or diminution in their spacing. If it is realized that each house or element related to the path is a small destination in itself, the nature and importance of the rhythms formed by the elements may be understood.



c. The end of movement can be easily managed by merely stopping the pavement surface. However, an imageable end can be more subtly insinuating than this. Longitudinal blockage to movement can be reinforced by a traffic turn-about circle, by continuing the path walls around the end, or focussing the path on some climactic landmark. That the end can be perceived immediately on entering such a destination seems also important, for then the tension created by the possibility of continuity is taken away.

(ii) Destination Structure

The three main kinds of residential destination seem to be:

i. cul-de-sac

ii Loop

iii connector

i Cul-de-sac

The cul-de-sac is a dead-end street and thus by its very nature images well the function of destination. It is literally necessary to turn around and come back.

ii Loop

The loop can describe any street which returns to the path from which it came. Thus so-called loops which

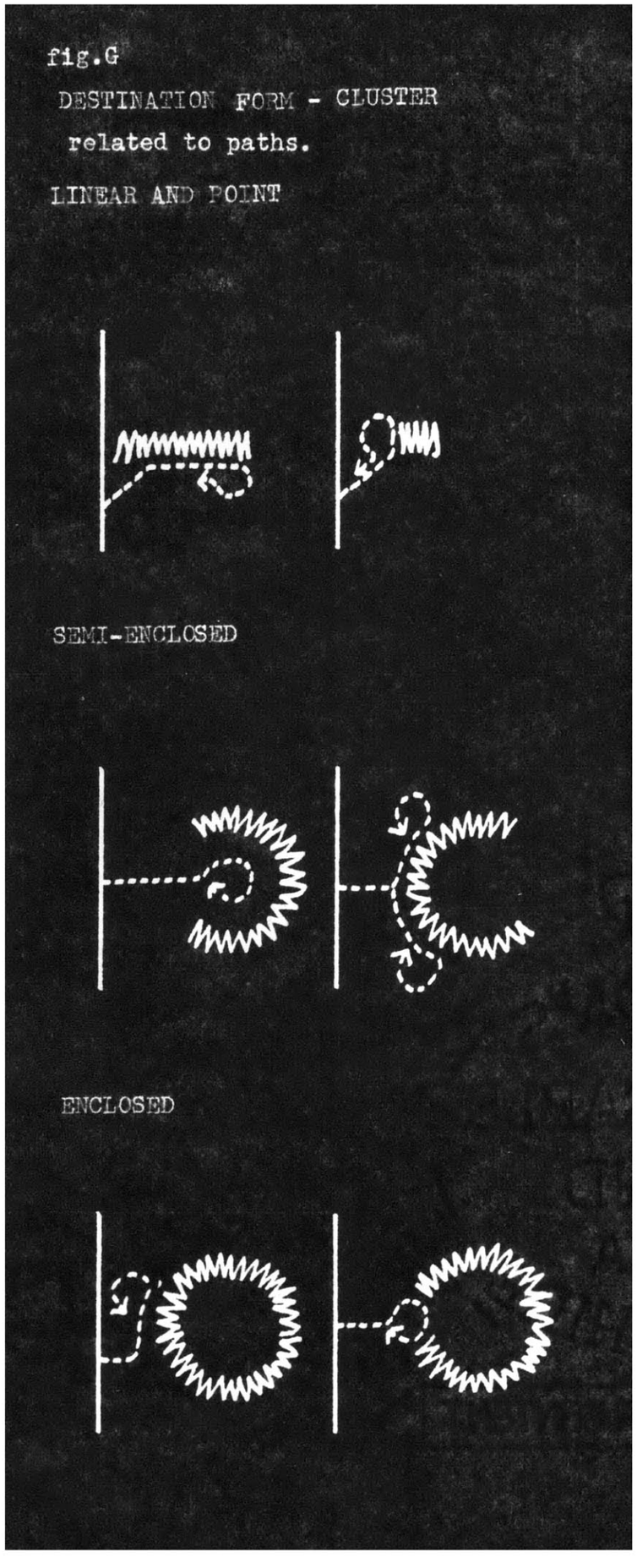


fig.G
DESTINATION FORM - CLUSTER
related to paths.

cut across corners between two major paths are not loops but connectors. The loop does not encourage through traffic, for it will not be the shortest means of reaching anywhere, and thus it has some inherently static quality, similar to the cul-de-sac, although it cannot, as in the cul-de-sac, be so easily imaged at one glance.

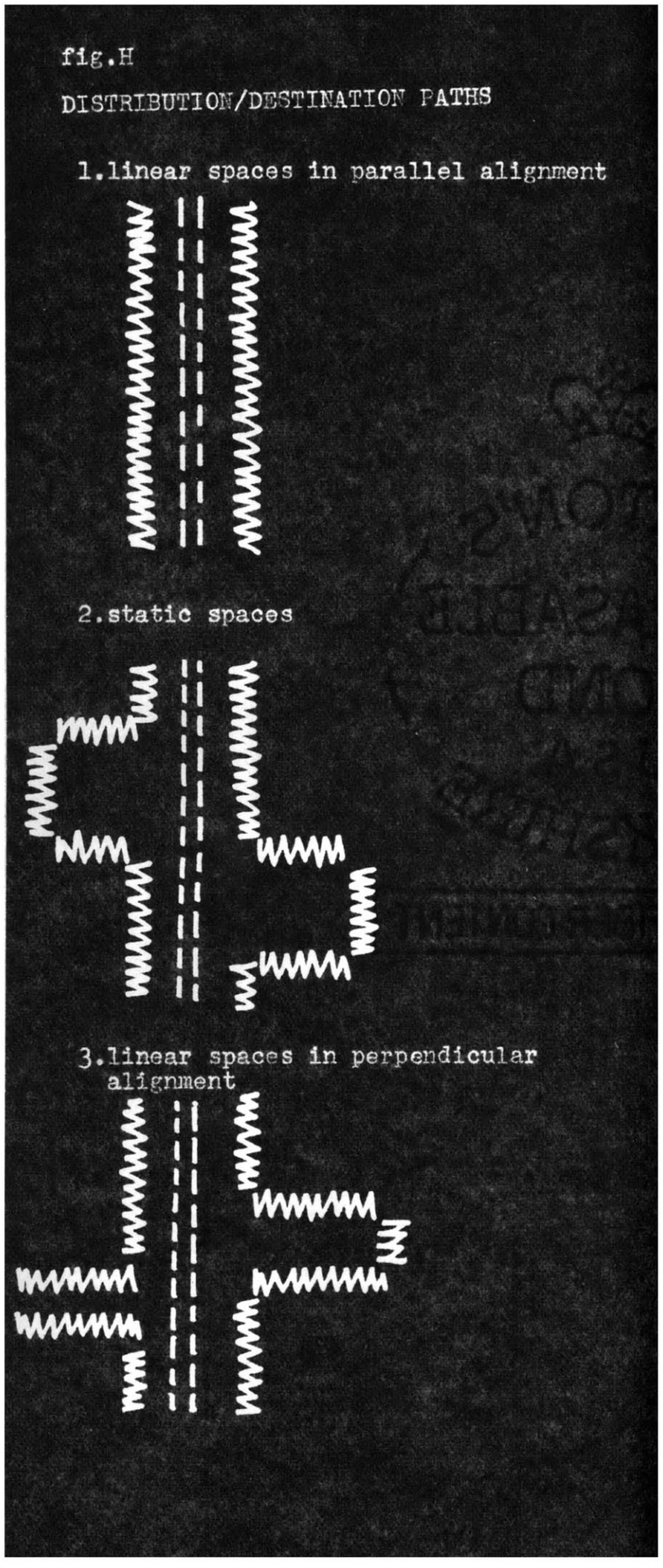
iii Connector

The connector street appears to contradict the idea of destination. A street which connects up other streets can be imaged and used as a through street for distribution. This is a common feature of residential streets where the functions of distribution and destination overlap and merge to the physical danger and psychological confusion of the inhabitants. Here again the importance of path character in preference to path structure is emphasized as a source of environmental differentiation. Manipulation of such character, as the distribution image has shown, has the greater impact on the perceiver.

(iii) Destination Form

More recent than the Neighborhood Unit, as a means for conceiving the city in parts, is the Cluster.[1] As

[1] Smithson, A. and P., "Cluster City - A New Shape for the Community," Architectural Review, November 1957, pp.333-6. "The Cluster - a close knit, complicated, often moving aggregation, but an aggregation with a distinct structure. This is perhaps as close as one can get to a description of the new ideal..." This, indeed, is not very close, but it indicates again the need for some imageable entity. The idea is illustrated at different scales by single house additions to a village, and clusters of close and multi-level row houses.



described here it is applied to the form of destinations. The relatively small size of such areas would provide far fewer imageability problems than the Neighborhood. At the same time it might express well the small group of families in face-to-face contact with each other.

These Clusters might relate and enclose the destination areas, or they may be conceived separately as grouped around their own outdoor space. Even in the latter extreme, the connection with the destination area would remain a key link, since entry into the housing group would be made through it. The actual form of such clusters could vary from a continuous or open housing group to small blocks of apartments.

(b) Distribution/Destination Paths

The combination of distribution and destination in a single path or even city residential and destination in the same path, can be achieved if their respective influences are differentiated. If not, they will become as unsatisfactory as most residential streets today.

The relationship between the two functions is determined firstly by the need of the distribution channel to be of high continuity. The destination spaces being of a more flexible nature can relate in varying ways to this distribution spine. Thus they may be:

1. Linear spaces in parallel alignment to the main path, perhaps defined and separated by objects in the space, on one or both sides of it, as the boulevards of Paris or the main streets of Peking, where through traffic is segregated in such a manner from the slow pedestrian activities of sitting out, buying and selling in the open air.

2. Static spaces aligned rhythmically along the route, in the form of open courtyards, like the Regency terraces along the front at Brighton, or the closes of Hampstead Garden Suburb.[1]

3. Linear spaces in perpendicular alignment to the main path, which when deep enough to require a separate street to penetrate them, become the conventional culs-de-sac.

Since the sequence of movement remains unchanged, the transition point between one movement and the other is still important. It may be that the area or point of transition could form the defining boundary between the two types of movement.

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[1]See Appendix, p. 154.

2. SECONDARY MOVEMENT

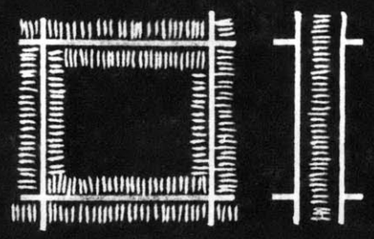
The secondary structure is normally coincidental with that of the primary structure. Community facilities are usually to be found on the distribution network or near to one of the neighborhood entries; thus movement, whether on foot or by vehicles, often takes place within the same paths.

But the physical extent of the urban and suburban environment has led to an oppressive situation of endlessness. Close contact with Nature, and its implications of infinity and freedom from control, an escape from the man-made environment, has been lost. At the same time pedestrian ways, which have traditionally been placed alongside the streets, have become progressively more intolerable and unsafe. So that, given the main reason of public safety, many planning schemes have attempted to build another more segregated structure into the city which was ideally <u>beyond</u> the existing primary structure. This double-edged image is fascinating to the city-dweller. It provides a contrast that is both dramatic and relaxing. And a secondary path structure, whether it employs rural as opposed to urban overtones, or informal in contrast to formal, provides exactly this image. In Amsterdam or Venice, canals form the secondary path structure, and many

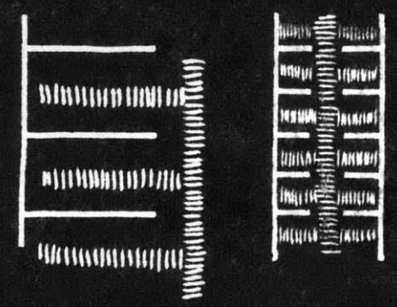
fig.I

SECONDARY MOVEMENT STRUCTURE related to Primary Movement Structure.

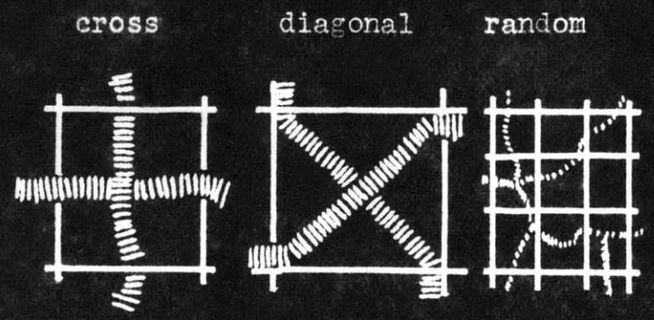
1. parallel



2. interlock



3. overlap



subdivisions on the East Coast of the United States have built waterways in this manner.

There seem to be three ways in which this structure can relate to the primary path structure:

1. It can be parallel to it within the same paths. This can be much more clearly segregated from other movements than it often is, by definition within its own space.

2. It may interlock with the primary structure, a situation which, however, implies the use of culs-de-sac and a lack of continuity in the two systems.

3. It can overlap the main structure. Eventually, this is forced upon any secondary system if it wishes to be continuous. The crossings of such structures can become key points in the environment, and evoke dramatic and beautiful images. In Delft, a twin-system city of this sort, the streets swing in continuous hanging curves from one canal bridge to the next, whilst in the same context the high arched Venetian footbridges cannot be forgotten. The practical necessity for many crossings at grade, however, remains, and it poses a problem of image-forming as yet unresolved, despite its importance.

The possibility of one system becoming detached from the other is not to be precluded. It would seem necessary, therefore, to make the order of one visible from the other, and vice versa. Thus the crossing-points become crucial, so the fewer they are in number the better. In this sense, were they to cross at the transition points in each system, the coincidence of such points might be very successful. The presence of community facilities as landmarks perceivable from both structures would further tie them together, as would a firm connection with the destinations. Simplicity and concentration of segregated secondary movement in a few channels seems also necessary since the intensity of traffic in residential neighborhoods is not high.

II HORIZONTAL DIFFERENTIATION

The primary element in the neighborhood structure is naturally the house. It is the house that generally, though not always, forms the character or image of the neighborhood. Whether it be a three-storey wooden house of the colonial era, a modern split-level, or an aluminum trailer, it is the traditional form of dwelling-place in this country. It serves the needs of the family and symbolizes its status in society.

How similar or different houses should be from each other has been the subject of much controversy. On the side of similarity and order the economics of construction suggests repetition of elements, standardized parts, and uniformity. Historical precedent points out that people in the past have always lived in similar houses. Men are physically similar to one another, families are of similar size, and, in residential neighborhoods, usually of similar economic means. Their functional demands are similar. Finally, our environment is already chaotic; it requires order, and order is the highest aspiration of man.

On the side of differentiation the argument pursued is as follows. In a rich and open society each person has the right to a unique house which he can identify as his own. Society has become so out-of-scale that the individual needs reassurance of his independence. He has his own personal tastes to satisfy. In the same way that his car is slightly varied from all other cars, so he wishes his house to be some expression of his 'personality.'

It may only be possible in a generalization such as this to state both sides of the case, for, as already pointed out, horizontal differentiation, especially, is not to be too much generalized. If it is, discussion leads to the topic of 'variety,' which seems properly the place of

the particular.[1]

Discussion about the scale at which horizontal differentiation seems to be most effective, is, however, necessary. The house seems to be too small a scale for the needs of imageability, and although its differentiation is important, it may, if possible, be left to the decision of individual owners.

Differentiation at the higher levels already discussed is far more necessary, whether it be between neighborhoods, or between different distribution paths. Differentiation at key points, for instance, the points of entry, may allow a much greater uniformity over other parts of the residential structure.

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[1]The exploitation of the particular characteristics of any residential area design, whether they be the natural site, the problem, the client or the designer, is implied here, and will not be further discussed.

GENERAL CONCLUSION

The difficulty of constructing any framework for design is in striking that level of generality that is neither so imprecise as to be meaningless, nor too specific to be confining. The orders of movement have been only cursorily defined. Further research into the nature and motives of such movement will provide a clearer knowledge of their meaning. Their imageable expression in terms of a path structure can be also worked out in many more ways than merely those suggested (some further possibilities are explored in Appendix A). But the level of generality, and the area of concentration, that is the path structure, appear to be a sound and fruitful beginning.

That this area is the one that can be the more easily manipulated by the planner in residential areas reinforces its importance. For, since this path structure is either publicly constructed or at least publicly[1] maintained, control over private building and individual architects becomes less necessary.

The path structure is one of the chief physical means

[1] In the U.S. subdivision regulations or new types of street zoning for different movements might enforce control over this structure.

of communication in the modern world. It has a social function. It breaks down isolation and keeps people in contact. From this concept its nature and function can be developed into a whole range of possible meanings and ideas. The street can become human architecture, despite its apparent subordination to the machine and the engineer, and, if our lives are not to become intolerable, we must try to conquer it as an art form.[1]

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[1]Perhaps Louis Kahn's human staccato preludes the new era.

> A street wants to be a building.
> The new spaces that want to be will emerge from the designs drawn from an order of movement.
> An order of movement that distinguishes staccato from go movement and includes the concept of stopping
> The zoning of streets for characteristic movement must precede the zoning of the land they serve.
> Expressways are rivers that need harbors.
> Streets are canals that need docks.
> The architecture of stopping is equal in importance to the great walls that surround the mediaeval cities.
>
> Louis Kahn. Perspecta 4, p. 61.
> Yale Architectural Journal, 1957.

APPENDIX A LOW DENSITY RESIDENTIAL AREAS

In the course of writing this paper several disparate ideas about its application to the particular problem of designing low density residential areas, such as Levittown, came to mind. These have been considered within the general context of such development, from the point of view of a site-planner with little control over the form of the houses. They are listed in the usual order.

A. RESIDENTIAL FORM

i Isolation of the Levittown neighborhoods would be very difficult to achieve although emphasis of neighborhood form would be simple enough by means of skyline and edge. The difficulty in Levittown is to find viewing points, since the only large open spaces are in the centers of the neighborhoods. These suggest one possibility, that of designing the skyline to be seen from these points, but this does not help pre-entry recognition.

ii The height advantage of the Delaware Bridge might have been maintained, allowing entry into the town from a high level. This might have afforded a magnificent view of the town as a whole. At a smaller

scale, the placing of neighborhoods in relation to high points on the major city paths with reciprocal emphasis of these high points by landmarks, would have been possible. Some open spaces, too, along these roads could have allowed much better over-all views of neighborhoods. Skylines could then have been designed.

iii The objects that do appear above the grey sea of rooftops are not used as landmarks to mark up significant points in the development. The huge water tower, for instance, could have been placed at a major intersection point or by the shopping center. If other water towers could be used as look-out towers where children and visitors could look over the town from a high level, a third dimension, which is sadly needed, might be created. The need for verticals and height is at least as great as it was for those Babylonians who built ziggurats, and it seems only a matter of time before the collective unconscious will break out. It is not impossible also that the spatial potentialities of wirescape will be exploited by some new constructivists, and keyed in to the path structure. Trees take time to grow, but when they do they can exert a strong effect on such a low skyline. If they

were only clustered together around the central open space so that at least the center part of the neighborhood skyline were visible, they could identify the neighborhood. Thus key-points might be chosen to make skyline impacts, rather than attempts to gain complete control over the form.

From the central open space, the skyline could be conceived as a surrounding ring. Its concave enclosing quality would be important to unify the enclosure. Smaller destination clusters might build up such a ring, each with its own landmark.

iv The edges of neighborhoods lie along the city distribution streets, like Levittown Parkway, so at this point there occurs a coincidence of visual function, city path and neighborhood edge. These functions could be realized separately, since no buildings actually face onto the Parkway. In fact, only stronger formal definition is needed for the edge to become clear. Garden walls or trees might achieve this. If, for instance, a narrow, but dense belt of trees surrounded each neighborhood, its own low and spacious form would become rather like that of a clearing in the woods, paradoxically turning it into a space. This may be a far simpler way than trying to build it up

into a powerful form. These trees might continue along the city path only where it was flanked by a neighborhood, and could be broken at the openings.

v When the total neighborhood form is considered, the visual need for differentiated housing types becomes acute. Taller buildings could build up an edge, could mark up entrances, or enclose the central open space. Nor need they be exceptionally high. A three-storey building in Levittown could be seen on the horizon.

B. RESIDENTIAL PATH STRUCTURE

1. PRIMARY MOVEMENT

(a) Residential Entry

i The number of entries into the neighborhood should be kept at a minimum, and they could be differentiated. The more positive definition and careful location of community facilities might make different aspects of them visible from all entry points. There seems no end to the variety of objects, both functional, like playgrounds, shops, apartment blocks, and tree planting, and useless like stone pillars, monuments, flags and other welcoming signs, that have been and could be used, but resort to picturesque detail should not be necessary.

(b) Residential Distribution

i If the neighborhood ring road used throughout Levittown is taken as a fixed point, the most important thing is to improve its sense of continuity.

a. The pavement surface might be differentiated from that of the lesser streets. If of concrete, the rhythms set up by the rectangular bays might, for instance, be longer.

b. Continuous objects, like telephone poles or lamp standards, might substitute for trees until the latter grow up. Or continuous parking may be encouraged only on these streets.

c. Vistas of community facilities, and perhaps of city landmarks, like the Delaware Bridge, could be focussed onto.

d. Intersections could be emphasized and defined by certain clusterings of signs, mailboxes, etc., or changes in the pavement surface.

ii If it is, practically speaking, necessary to flank some of the distribution paths with houses, such destination areas might be clearly articulated in the street space. The relationship between house and

distribution path is much more tenuous than if the path were solely used as access to the houses. Thus the houses might not face directly onto the street.[1] The kind of groupings they might form are discussed under destination.

(c) Destinations

i The spatial definition of destination areas depends very much on the type of elements available with which to manipulate the space. From this point of view the low density suburb suffers from severe limitations. Its elements can be classified as:

a. HOUSES

b. OTHER OBJECTS.

a. Before the automobile, the house dominated the street space, but now in many cases the house has become the weaker partner, partly through its own diminution

[1]Some of the finest experiments in grouping houses about the distribution streets were carried out by Sir Raymond Unwin, founder of the English site-planning tradition, whose work has influenced both English New Towns and U.S. Radburn-type developments. In Hampstead Garden Suburb, for instance, Unwin went through the whole range of possibilities: slight expansions of the street space by breaking the building lines; semi-enclosed court yards opening onto the streets; and culs-de-sac, some of which lead into completely enclosed inner courts. Here illustrated was a continuum of relationships between house and street, from the rather weak facade set-backs, to the deep enclosure almost entirely separate from the street. Sir Raymond Unwin, Town Planning in Practice, London, 1932.

as a form. The American house form, to be discussed in detail later,[1] ranges from the low-spreading formless type of Levittown shack to the two-storey emphasized box. The first type forms a low continuous broken enclosure, which suffers from severe height limitation and is thus properly neither openness nor enclosure, whilst the second forms a higher but netted enclosure, which is perceived rather as a world of separate objects than as a coherent space. Their relative merits and demerits vary with the peculiarities of the situation.

The qualities of the first have been well discussed already. Of the second, it seems that unless this isolated form of house is well designed it cannot be too successful, however good the site plan might be, for it is 'visible' in all its mediocrity. In one sense it is unfortunate that much of site planning is influenced by layouts of high quality buildings which can 'take' complete exposure. The normal house cannot, and has seldom been able to even in the past. Therefore, if less formal elements are used, there seems a better chance of success for the site planner.

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[1]See Appendix B, p. 162.

If isolation is inevitable, ways can be found to subordinate individual impact to that of the group. Overlapping the forms, so that one will always be seen against the other, could be one way, a technique used with consummate success and in the IIT campus development at Chicago, where several pure form elements slide past each other in close juxtaposition. This seems preferable to following the classical Greek method of placing each building to be seen separately. Of course, if the houses achieve the architectural qualities of the Greek temples, this would be justified.

Neither of these house types can achieve quite the same kind of high and continuous enclosure formed by the row housing used in England and other countries. The adoption of similar plan layouts will not necessarily produce similar results. New solutions must be sought.

b. Of the other objects usable in forming the destination spaces, trees come first to mind. They are the next best long-term space-definers after houses, but unless they are already on the site Levittown experience shows that something else is needed for a very long time, and this will have to be, like it or not, man-made.

The need for higher space definition suggests groupings of lamp standards, communication masts, look-out posts-cum-play structures for children, or water towers. Objects like these could be grouped around the spaces, perhaps in formal circles (a space-age stonehenge?) or used individually as landmarks. Among the lower objects, cars could be grouped in mode similar to the garage courts of Baldwin Hills. By sinking slightly the parking lots, the forms would become more unified and less obtrusive, whilst the space allotted would sustain definition even when it was not filled.

At the lowest height of all enclosure, the edge of the pavement can be considered. This performs a surprisingly strong defining function, and here it is most crucial for weakening continuity. Such an edge is the only continuous enclosing surface, admittedly an 'implied' enclosure, to be found on Levittown streets. If this were widened out to form a more generous space, or if the curb line were merged into the grass in contrast to the stronger edge of the major paths, a sense of the lessening difference between the road function and the pedestrian space might be perceivable. The 'old street may never die, but simply fade away.'[1]

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[1]Lauder, Sir Harry, Scottish music-hall song.

ii The sequence of slowing down and stopping may suggest that at the entrance may be placed the more mechanical and automotive aspects of the destination area. Garages could be grouped at this point and could be incorporated with some kind of forecourt-cum-play space from which the footpaths would radiate to the houses. Contemporary developments in various countries have developed small groups of dwellings which even completely turn their backs on the street, to face internally developed pedestrian spaces and walkways. This denial of the street and the wish for isolation implied in this idea seem to deny a fact of life, that communication is necessary and valuable in the modern city. No one is in fact self-sufficient. Therefore some imageable 'joint' between the house group and the street would seem more appropriate if this sort of layout were desired, for the social image conjured up by complete enclosure and isolation is also rather unpleasant, both for those on the 'inside' and for those on the 'outside.'

2. SECONDARY MOVEMENT

i. Inside the gate is a footpath and the footpath must be winding. At the turn of the footpath there is an outdoor screen and the screen must be small. Behind the screen

> there is a terrace and the terrace must be level. On the banks of the terrace there are flowers and the flowers must be fresh. Beyond the flowers is a wall and the wall must be low. By the side of the wall there is a pine tree and the pine tree must be old. At the foot of the pine tree there are rocks and the rocks must be quaint. On the rocks there is a pavilion and the pavilion must be simple. Behind the pavilion there are bamboos and the bamboos must be thin and sparse. At the end of the bamboos there is a house and the house must be secluded. . .[1]

This beautiful and sophisticated example of pedestrian sequence, with its rhythm of movement and subsequent evaluation, suggests the height towards which a pedestrian pathway might aspire.

More thought and studies about the nature of such movement could be the source of quite new path-structures. The children's journey to school has been a favorite theme of Lewis Mumford's.[2] An awe-inspiring study was also made of a complete day's activity in a boy's life.[3] This kind of thinking, similar to that related to the latest playground design, is badly needed.

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[1]Li Li-Wen, The Importance of Living, a Ming scholar on the ideal house, quoted by C.Z. Chen, "Chinese Architectural Theory," Architectural Review, July 1947.

[2]Mumford, Lewis, "Planning for the Phases of Life," Town Planning Review, Volume XX, No. 1, April 1949, p.5.

[3]Bates, Herbert, One Boy's Day, University of Iowa Press, 1947.

ii The spatial relationship of community facilities to either primary or secondary path system has been until now almost unconsidered.

The way that in Levittown these buildings are 'dumped' on sites which are well located, is due either to carelessness or to incapacity. In low-density development it is certainly difficult to relate public buildings to the housing; it is even difficult to locate one building near to any other.[1] The Levittown neighborhood is like an Italian village exploded on plan. Each house is now separated from the other houses. The small enclosed piazza, which acted as a forecourt to the public buildings, is now an enormous open space. But the buildings have not correspondingly expanded. They have, in fact, got smaller. They are now like little ships sailing on a green sea.

If this sort of space wastage is necessary, and this is doubtful, it seems that the predicament of the public building must be solved in a new way. This may be to relate it to the circulation system rather than directly to the houses. The architectural potential of the

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[1]The 'Counter-Attack' issue of the Architectural Review, December 1956, presented a telling comparison between a similar waste of space between buildings in English New Towns and the continuous spatial enclosure of traditional cities.

parking lot, considered as the forecourt to and part of the building, has yet to be understood. The parking lot is in scale with the new expanded space structure and could provide the necessary transition from this scale down to that of the building. This addition would simultaneously increase the size of the building complex. Thus, perhaps the spatial enclosure of the parking lot could act like the walled temenos of the Greek temple complexes. The buildings could begin to embrace the spaces, in the same way that Wright's buildings embrace nature, surely more satisfying than the little cramped objects which seem to have been transplanted from some small and densely built European city?

APPENDIX B THE AMERICAN HOUSE

The form of the typical contemporary American home has come a long way since the New England balloon frame houses with their thin membranes of siding and grand volumes. Although the materials may often be the same, the over-all size of the house has been reduced enormously. Servants' quarters are no longer necessary, and the living area has amalgamated the dining-room and reception-rooms. In addition, the single storey house has become widely popular, so that roofs have lowered and the plan has tended to spread.

Although the materials have remained predominantly the same, larger areas of glass, and deep roof overhangs have broken up the volume which was formerly so strong. The addition of 'features,' trellis work and other appurtenances, has also arrived at the point where each house is no longer seen as a separate volume. Only parts of the houses become distinguishable, and these parts play against one another, or relate to similar parts of other houses, in a fragmented and cubistic manner in the better developments, like a tidy junk heap in the poorer ones.

This disintegrating influence on the house form has come down through the open-planned, no-elevation houses of Frank Lloyd Wright, and the cubist compositions of the

International Style. They answer well the functional demands of informal living. The outdoor spaces, previously formalized in the 'porch,' are now informalized in little spaces all around the broken plan, but they are difficult to grasp as an image.

Simultaneously with this disintegration of the total volume, there has been a corresponding diminution in scale. The common desire for a single-storey or, at most, a split-level house has brought the roof practically down to eye level. Houses have become almost like dolls' houses, somehow almost less than human scale, and very few architects seem to have been able to make of these buildings anything more impressive than a simple box or shack. Were these buildings more ground-hugging and of heavier materials, they might appear stronger, but they are not. They follow the wooden house tradition in deteriorated way with false shingles and other skimped details, and are erected on the site with every appearance that the wind will blow them away.

This diminution in scale has made the house form comparable in size to that of the automobile. Were the car itself not so low, it might provide serious visual competition to the house, for the car is a much more integrated sculptural form. Indeed, there must be many people already who know the form of their car better than that

of their house. But even if the car is still, if only just, subordinated to the house as a strong image, the problem of the garage or carport is much more formidable. The normal two-car family allots a large area of its floor space to shelter its mechanical children, and the gaping holes of the garage doors dominate many a house facade, as the carport becomes a major element in the composition. Further it is an element that changes when the owner is away; the presence or absence of the cars affecting and changing the form-space complex of house-cum-garage.

Thus the new American type of home images 'togetherness' rather than individuality;[1] mobility and change rather than stability and statics. Complete dissolution of the individual house-form into that of the group can perhaps be saved only by the emphasis on elements rather than total form, if identity of each home is to remain possible. Bow windows as in Back Bay, or garages, front yards, roofs, can all be considered in this way. The

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[1]Exceptions to this tendency are worth mentioning. In particular the Techbuilt House, which is classically simple in form, relying on only one roof. The visual separation of this roof from the volume of the house, by means of the overhang and contrasting materials in the paneled walls, allows the roof to hover and act as a formal element, while the walls are treated in an open manner, so that the volume is not closed as in traditional houses. An image is therefore created of classic informality, a dignified modern house.

garages or parking place, especially, may well be developed as new and separate elements, with their own architecture relating to the house. A defined location for the parking of cars, on a kind of podium, for instance, as the family's objets d'art, is not unimaginable.

APPENDIX C IMAGEABILITY THROUGH THE SENSUOUS QUALITY OF SPACE

Spatial contrast makes perhaps the greatest impact on the senses. From confinement to openness, narrowness to wideness, up to down, in to out, all these sensations are strong and impressionable. Yet spatial uniformity, the constant width of streets, building lines, distances between houses in the residential suburbs such as Levittown, is one of their most characteristic features.

For the pedestrian this is a somewhat serious matter, although he can hide inside his house for enclosure and maneuver inside that space. But for the motorist who moves around already in one constantly sized enclosure, despite its transparency, the quantity of sensations coming in from the outside is drastically reduced. His only variety consists of stopping and starting and turning, perpetually faced with the same spatial configuration.

Whilst this lack of spatial change is a generally acknowledged problem, the lack of tactile qualities in the new environmental forms seems less understood. The child possesses a tactile relationship with the environment. He climbs trees, plays in puddles, etc., until he reached an age when his attentions are more directed to social contacts, when this activity is transformed or

suppressed. This is a natural development, but this loss needs substitutes. Participation through automobile-driving, walking and other activities answers the need in physical terms, but not completely. The cellophane-packaged, hygienic, sterilized, smooth and complete environment beginning to appear in this country is not one to be touched or felt with hand or heart, so man flies to nature for his sensuous satisfaction. This missing quality in the new man-made environment is perhaps fundamentally due to a lack of faith in city building, but it seems more particularly due to the 'abstract''space concepts' of the contemporary architect and site planner. It has been forgotten that the quality of space depends on the enclosing form. The spaces needed are the sort of spaces Wright could create,[1] and that we can still witness in the Back Bay, but this means to have a strong desire to build and mold space into a man-made (imageable) structure.

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[1]One "is in a space that represents all space, oneself oriented to the matter within which the house stands and out of which it is built. Every part of the house seems in balance with the physical equilibrium of man." Joseph Samona, "Man, Matter and Space," Architects' Year Book, No. 5, London, 1953.

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