THE AUTOMOBILE AS A FACTOR IN
THE DESIGN OF RESIDENTIAL AREAS

A thesis submitted in partial
fulfillment of the requirements
for the degree
Master of Architecture, at the
Massachusetts Institute of Technology.

Submitted, August 2, 1955.

By:
Ivan Dale Owen

To:
Lawrence B. Anderson
Professor of Architecture,
and Head, Department of
Architecture, M.I.T.
THE AUTOMOBILE AS A FACTOR IN THE DESIGN OF RESIDENTIAL AREAS

ABSTRACT OF A THESIS - submitted by Ivan Dale Owen, for the degree, Master of Architecture in the Department of Architecture, M.I.T., on August 2, 1955.

The thesis of this study is that the automobile has not received sufficient attention in the United States as a factor in the design of residential areas. The typical residential area is unsatisfactory from the point of view of traffic circulation and could also be improved in a visual sense. The superblock as a general design principle in the layout of residential areas offers a means of providing a better solution to the problems of automobile and pedestrian circulation, and gives an opportunity for greater freedom in the visual control of the residential environment in an architectural and civic sense.

SECTION I

The effects of the automobile on city and suburban life are considered briefly as an introduction to the study; chronic traffic congestion in central areas of cities is slowly being appreciated, but development in the suburbs still receives comparatively little attention from designers. The automobile as a machine is becoming more difficult to handle physically, and there are trends of ever increasing use of the car in the United States.

SECTION II

Various forms of residential layout are examined - the gridiron, linear and curvilinear, and the factors determining the design of residential areas are studied. An example of a typical contemporary residential area - Weathersfield, Natick, Massachusetts - is found generally to be unsatisfactory from the point of view of traffic circulation, and lacking in desirable architectural and visual qualities.

SECTION III

Seven examples are studied of residential areas in which the automobile has been considered specifically as a factor in their design. The visual qualities and convenience of traffic circulation are examined in each - Radburn, N.J., Greenbelt, Md., Baldwin Hills Village, Calif., Park Forest, Ill., Kitimat, British Columbia, Levittown, Pa., and Broadacre City. It is found that all these use, in one form or another, the device of the superblock with some kind of traffic separation.

SECTION IV

A further analysis is made of five of these areas - Natick, Radburn, Park Forest, Baldwin Hills Village, and Kitimat. With reference to the relationship of the automobile to the house, it is found that the superblock, while offering many advantages, does not provide the optimum convenience of having the car on the house plot. The influence of the automobile on the Neighborhood Theory is to modify, but not to invalidate, it.
SECTION IV (continued)

The most suitable modification would be the adoption of the superblock as a component of the neighborhood structure.

SECTION V

It is found that the automobile as a factor in the design of residential areas has been very great in general terms, but small in a specific sense; it has not played a sufficiently important part in the detailed design and site layout.

The reasons for the limited use of the superblock are - the result of design inertia, the current methods of real estate developers, the problems of land maintenance and of large scale financial investments over a long term; of the influence of financing agencies and of Federal and State government and City Planning Commissions; of the relative indifference of the average citizen.

Recommendations are made for the design of residential areas, for the general use of the superblock wherever practicable, but modified by site and other conditions; for the use of a hierarchical road system; for the acceptance of the automobile as a potentially valuable element in the urban scene; and for the use of the precinct or court and the grouping of houses to obtain more desirable visual and architectural qualities.

Policies for real estate developers, Federal, State and City governments are recommended to encourage the general use of the superblock. Further research is proposed into the circulation, visual and social aspects of the design of residential areas.

In conclusion, architects and city planners are urged to make more conscious use of analytic techniques and follow-up surveys to determine the value of designs for residential areas in a more scientific way. The final responsibility for the visual aspects of urban design rests with the architect, and it is his duty to undertake this responsibility in a more active way.

APPENDICES

Drawings are included which illustrate the development of the relationship of automobile to house discussed in Section IV. Diagrammatic plans are made showing proposals for a superblock development using single houses with the car on the plot, and for a superblock development using row houses in precincts with grouped garages.
Cambridge, Massachusetts
August 2, 1955

Dean Pietro Belluschi
School of Architecture and Planning
Massachusetts Institute of Technology
Cambridge, Massachusetts

Dear Dean Belluschi:

In partial fulfillment of the requirements for the degree, Master of Architecture, I herewith submit the thesis entitled The Automobile as a Factor in the Design of Residential Areas.

Respectfully yours,

Ivan Dale Owen
For their advice and criticism in the preparation of this study, I would like to thank Dean Pietro Belluschi, Professor Lawrence B. Anderson, Professor Herbert L. Beckwith, and Professor William H. Brown, of the Department of Architecture, M.I.T.; and Professor Frederick J. Adams, Professor Roland B. Greely, Professor John T. Howard, Professor Burnham Kelly, Professor Lloyd Rodwin, and Professor Kevin Lynch, of the Department of City and Regional Planning, M.I.T.

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I am indebted to the following for their assistance in putting valuable material at my disposal during the earlier stages of the work:

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Mr. Robert B. Mitchell, Executive Director of the Urban Traffic and Transportation Board, Philadelphia.

Mr. Anthony Leach, Executive Secretary to Martin Cerel, Realtor, Natick, Massachusetts.

I am deeply grateful to Miss Lois Purrington for her help and comments on the manuscript and for her patience and care in the typing of the work.
# TABLE OF CONTENTS

Abstract of Thesis ................................................. ii
Letter of Submittal ................................................. iv
Acknowledgement ..................................................... v
Table of Contents ................................................... vi
Terms of Reference .................................................. viii

## Section I - General Introduction.
- The Automobile in the Urban Scene .................................... 1
- Rural Highways ......................................................... 5
- The Automobile in the Suburbs .......................................... 6
- The Automobile - Trends in Design ...................................... 9
- The Automobile and the Family - Travel .................................. 11
- The Automobile and the Family - Car Ownership .......................... 13

## Section II - The Typical Residential Area.
- The Gridiron Layout .................................................. 15
- The Linear Layout ..................................................... 18
- The Curvilinear Layout ................................................ 19
- Factors in the Design of Typical Residential Areas ....................... 26
- Weathersfield, Natick, Massachusetts .................................... 33

## Section III - The Residential Area Specifically Designed for the Automobile
- Radburn, New Jersey ................................................... 39
- Greenbelt, Maryland ................................................... 45
- Baldwin Hills Village, California ...................................... 53
- Park Forest Village, Illinois ........................................... 58
- Kitimat, British Columbia .............................................. 63
- Levittown, Pennsylvania ............................................... 74
- Broadacre City ......................................................... 77

## Section IV - Analyses.
- Summary Analyses of Residential Layouts ............................. 81
- Analysis of Relationship Between the Automobile and the House ........ 92
- The Automobile and the Neighborhood ................................... 98

## Section V - Conclusions and Recommendations.
- The Importance of the Automobile as a Determinant Factor of Residential Form ................................................. 103
- The Superblock, Reasons for Its Limited Use in the United States ................................................................. 107
- Recommendations for Design in Residential Areas ....................... 116
- Recommendations for Circulation ....................................... 116
- Recommendations for Visual Design ..................................... 121
- Recommendations for Policy ............................................ 127
- Recommendations for Further Research ................................ 131
<table>
<thead>
<tr>
<th>Appendix</th>
<th>Description</th>
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<tr>
<td>Appendix I</td>
<td>Diagrams Showing Relationship Between the Automobile and the House</td>
<td>137</td>
</tr>
<tr>
<td>Appendix II</td>
<td>Proposed Superblock Using Single Houses</td>
<td>138</td>
</tr>
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<td>Appendix III</td>
<td>Proposed Superblock Using Row Houses with Precincts</td>
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THE AUTOMOBILE AS A FACTOR IN THE DESIGN OF RESIDENTIAL AREAS

The thesis of this study is that the automobile has not received sufficient attention in the United States as a factor in the design of residential areas. The typical residential area is unsatisfactory from the point of view of traffic circulation and could also be improved in a visual sense. The superblock as a general design principle in the layout of residential areas offers a means of providing a better solution to the problems of automobile and pedestrian circulation, and gives an opportunity for greater freedom in the visual control of the residential environment in an architectural and civic sense.

The terms of reference for this study are as follows:

I to consider briefly the effects of the automobile on the city and suburban life as an introduction to the study.

II to examine in general the principal types of residential layout with reference to the importance of the automobile as a determining factor in their design.

III to examine in particular a typical American residential area and selected examples of residential areas where the automobile has been given special attention as a design factor with reference to
   (a) the main determining factors in their design,
   (b) the functional convenience for vehicular and pedestrian circulation,
   (c) the visual and architectural qualities of their design.

IV to determine briefly why the superblock principle has been so limited in use in the residential development of the United States.

V to make, on the basis of the study, recommendations for
   (a) vehicular and pedestrian circulation,
   (b) visual considerations,
   (c) future policies by bodies concerned with residential development,
   (d) further research.
SECTION I

GENERAL INTRODUCTION
THE AUTOMOBILE IN THE URBAN SCENE

In the United States there are more privately owned cars than in any other country in the world; in 1953, the number registered was over 46 million. If all motor vehicles, including trucks and busses, are taken into consideration, there is one vehicle for every 2.8 people in the United States. This figure compares with 4.3 in Canada, 13 in Britain and Sweden, 14 in France, 51 in Italy, 74 in U.S.S.R., and 1,269 in India. Approximately 76 percent of the world's automobiles are produced in the United States. The automobile has become an integral part of the whole pattern of American life in all its industrial, economic and social spheres. It is in America then that one would expect to find the influence of the automobile at its greatest, the results of its use most evident, and the attempts to utilize its maximum potential value most successful. This generally is so, but the price which has been paid is high and one might be excused if one found the results disappointing in some respects. When the various reasons and factors concerned are considered, however, it will be realized that in the United States there is the greatest opportunity to rationalize the use of the motor vehicle and to exploit fully its function as one of the most valuable tools technology has yet offered.

The most conspicuous benefit which the automobile has provided is a flexible form of transport which is extremely adaptable to all kinds of physical and topographical conditions. It was the railroad which helped to create the great concentrations of industry and population at the rail terminals. This comparative rigidity of route, grade and pattern was changed considerably by the automobile, which tended to decentralize the city. The automobile provided then a great gain in freedom of movement for people who could not live at some distance from their work, releasing
them from the hitherto binding physical relationship of the factory and office and also helping to give the worker and the industrialist a greater field of opportunity and a wider labor market, with the resulting flexibility of American industry. In pleasure as well as work, the automobile offers easier access to the mountains and the sea and to holiday and recreation areas at great distances. Such developments as the regional shopping center, the drive-in cinema and restaurant, church and bank are novelties only a motor age could produce. The community pattern too has been affected and the factor of time rather than distance is now the measure of convenient transport for social life. This shrinking of distance continues to take place as more highways are built and road patterns improved.

However, the blessings of the automobile have not been unmixed, since the use of this new device followed not its own ideal pattern but one laid down by previous economic structures.\(^1\) The "compact private locomotive" capable of speeds of 60 m.p.h. and a cruising range of well over 300 miles per day was set to run on old-fashioned roads, "a product of the age of the public stagecoach, the private carriage and the common cart."\(^2\) As Dean Sert has pointed out, "the whole scale in time and space of the automobile is one for which existing urban streets are almost useless; streets are too narrow, with too many intersections, traffic directions are unrationalized and the whole pattern succumbs to the chronic congestion which is now accepted as normal."\(^3\) The results of this congestion are as well known as they are universal in urban areas.

\(^1\) See The Culture of Cities, Lewis Mumford.

\(^2\) See The Sky Line, New Yorker, Lewis Mumford.

\(^3\) See Can Our Cities Survive, J.L. Sert.
The traffic snarls and slow-ups at peak periods are estimated to cost thousands of millions of dollars annually. Tedious travel to and from central urban areas as well as being very time consuming is a great strain on the general health of commuters and may often affect their productivity and personal happiness.\(^1\) Traffic accidents caused the deaths of 38,300 Americans in 1953 and maimed many thousands more—the equivalent population of a sizeable city. This is an enormous price to pay for transportation, and yet the following figures indicate that the circumstances of traffic increase were quite revolutionary in character:

<table>
<thead>
<tr>
<th>Year</th>
<th>Total No. Vehicles Produced in U.S.</th>
<th>Total No. Vehicles Registered in U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1900</td>
<td>4,192</td>
<td>8,000</td>
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<tr>
<td>1910</td>
<td>187,000</td>
<td>468,500</td>
</tr>
<tr>
<td>1920</td>
<td>2,227,349</td>
<td>9,239,161</td>
</tr>
<tr>
<td>1930</td>
<td>3,362,820</td>
<td>26,531,999</td>
</tr>
<tr>
<td>1940</td>
<td>4,472,286</td>
<td>32,035,424</td>
</tr>
<tr>
<td>1950</td>
<td>8,003,056</td>
<td>48,600,505</td>
</tr>
</tbody>
</table>

This truly fantastic increase in traffic on the roads makes the problem of traffic congestion seem almost impossible when the complex of factors involved are appreciated. In a recent series of articles appearing in the New Yorker magazine,\(^2\) Lewis Mumford, in examining the problem of congestion, observes that "The fact is that motor transportation is the sacred cow of the American religion of technology and in the service of this curious religion, no sacrifice in daily living, no extravagance of public expenditure is too great. Motor transportation is not merely an object of public worship; it has succeeded the railroad as the most powerful tool for either distributing or congesting the population — and it currently does both."

\(^1\)See The Journey to Work, Kate Liepman.

\(^2\)See The Sky Line, New Yorker, Lewis Mumford.
Attempts to deal with this congestion have produced the urban expressways which have and are being built in most American cities. More recently it has been realized that to provide high speed traffic exits and entries for central areas is not sufficient; there must be somewhere to store the additional cars while they are there. Existing streets already choked with parked vehicles offer no relief, so plans for providing a series of additional municipal parking garages are included in many current city planning programs. Most of these "relief" schemes have been based on the assumption that the answer to the traffic problem was to provide bigger and better roads, tunnels and bridges with the maximum accessibility and facilities for movement by wheeled vehicles. The relationship of traffic to the overall function of the city has hardly been dealt with or appreciated; as one planning commissioner put it, "the main purpose of traffic ...(surely)...is to enable a maximum number of citizens to derive all possible benefits from the use of automobiles as a means of transportation, for business convenience and pleasure." In contrast to this remarkably short-sighted view is the far more comprehensive idea expressed by Mitchell and Rapkin in their recent book entitled "Urban Traffic - A Function of Land Use." Traffic cannot be considered alone, it is one of the many activities of the community which must be dealt with in relation to the others if sound urban design is to be effected. Transportation is a means, not an end. There is a direct relationship between the density and the use to which urban land is put, and its traffic generating capacity. Emphasis should be placed not on the maximum use of traffic facilities, but the maximum advantages of urban life as a whole, traffic merely forming one of the parts of that life.

American city expressways are examples of the limited application of
the principle of traffic separation depending on traffic type and speed of movement. This principle has been carried further in an attempt at a rationalized urban traffic framework by LeCorbusier's theory of the Seven Routes, which has been applied in the new town of Chandigarh in the East Punjab, India, and in Bogota, Colombia, by Wiener and Sert.

It is emphasized by Mumford that a one-sided concentration can not be the solution for urban transport, "the corrective is to develop now despised modes of transport - public vehicles and private feet, which are essential in a city for mass movement." The walker, the private automobile, public surface and subway transport and the railroad are included. The complex circulation problems of the modern city can only be met when all these methods of transport are used in a planned and co-ordinated way.

RURAL HIGHWAYS

Compared with central area traffic problems, the inter-city systems of communication function with far greater efficiency. Railroads have taken second place to the rapidly increasing multi-lane highways. It is on these turnpikes and parkways that one can see the automobile in a more favorable light. With carefully designed routes, meticulously graded surfaces and limited access junctions with over- and under-pass connections to subsidiary roads, the true scale of automobile transport is being realized. American parkways probably provide the finest example of high speed road engineering in the world, and often have very high standards of landscape design. In spite of this, however, there still remain many thousands of miles of highways in rural areas in need of improvement, while good highway design has not eliminated traffic accidents and slow-ups, especially in the eastern states.
THE AUTOMOBILE IN THE SUBURBS

Between central areas of cities and the country proper are what are loosely called the suburbs, and it is here that an increasingly large number of Americans live. The suburbs vary greatly from high densities close to the central areas to low densities in semi-rural settlements, but on average consist of medium density single family dwellings in large subdivided areas - four to twelve families per residential acre. The suburbs are largely the result of motor transport and have spread star-wise from the centers of towns outwards with amazing speed. The process of development has been so rapid that it has been termed the "urban explosion" and yet these areas so utterly dependent upon motor transport for their existence have received the least attention from the traffic engineer.

The road pattern of the suburb has been left as far as traffic experts or planners are concerned largely to its own devices, and it is in the suburb that the real estate operator - and, on rare occasions, the architect - has been comparatively free to do what he pleased. There were usually, of course, municipal regulations concerning minimum standards of road widths, etc., also the required provision of utilities by the developer on subdivided land, though this requirement has been comparatively recent in the history of subdivision. Thus the automobile which was one of the chief of the raisons d'etre for the development of the typical American residential area has not received very detailed consideration in the final physical form the area has taken. Design of the residential area with specific consideration for the automobile does not seem to be a typical characteristic of the American suburb. Why is this in the country foremost in automobile development and production?
Why has not more attention been given to the problems of the automobile on literally the doorstep of the American home? It is true that some attempts have been made to "design for the motor age", which is the claim made by Wright and Stein in the Radburn plan. This and other examples do provide valuable instances of what might be done, but the attention they have received in practice in the building of residential areas seems to have been very scant. What are the reasons for this? Is it that the traffic problem in the suburb does not exist? Hardly so, for a large percentage of traffic accidents occur here. Again, parking and car storage also presents serious difficulty and traffic circulation is by no means always satisfactory. The traditional subdivision pattern then may not be so satisfactory as to merit continued use, and yet does the Radburn superblock or an adaptation of it provide a better answer? In America and the rest of the world, considerable doubts seem to exist on the value of the superblock as a design concept and on the architectural possibilities which it can provide. In Britain, for example, urban designers still pay comparatively little attention to the influence the automobile can have in residential areas. And yet, at the present rate of increase in car registration, the position is changing so rapidly that in a decade or two traffic volumes will exist like those in the United States at present. This aggravated by the higher urban densities and general land shortage, compared with America, is bound to have adverse effects. If, however, the lessons of American experience with traffic could be used, many of the worst of these effects of congestion might be avoided, and preparation for the future influence of the automobile in residential areas specifically could perhaps be made by more appropriate principles of design than are used now.
The purpose of this study will, therefore, be to try and answer some of the questions asked above; to determine to what extent the automobile has been a considered factor in the design of residential areas in the United States; to examine a typical residential area in this connection; to study various examples of the use of the superblock and to try and estimate why it has not been more widely used; to try and clarify the principles of design used in residential areas with particular reference to the ease of traffic circulation and the architectural implications of the various examples chosen. For the purpose of this study, the term residential area has been limited then to the suburban development of comparative low density. Neither central residential development of high density nor rural housing has been considered. It will be seen, however, that some of the results of the study might, with appropriate modification, be applied in these other areas too.
THE AUTOMOBILE - TRENDS IN DESIGN

In addition to the increase in automobile production and ownership in America, the size and power of the machine itself is becoming a disturbing factor. The steady trend toward longer, lower and more powerful cars is complicating life for the nation's traffic and highway authorities. The trend in increased size has had a number of effects, the most obvious being to "shrink" available areas for parking in streets, parking lots, public and private garages. In the streets it has become extremely difficult to maneuver cars into parking spaces, while the increased overhang of front and rear beyond wheel edges has provided a further limitation to sidewalk widths and another hazard to pedestrians. This may also be a potential source of expense to car owners, since vehicles can more easily be damaged.

In the greater New York area, it has been estimated that available parking space in commercial garages has been reduced by 15% over the last five years.¹ This reduction in space is passed on to the car owner in higher garaging charges, which are already regarded as exorbitant. Indeed, it has been jokingly said that in some downtown areas it is cheaper to hire a chauffeur to circle one's car around the block all night than pay the high garaging costs. Parking lots are often in need of re-design, not only for wider stalls but wider aisles. Drivers, particularly women, it is said, will not attempt to squeeze into an empty space if adjacent cars are not parked in the middle of stalls. Private garages are often too small for the new car, rear ends project without allowing garage doors to close, and it is often extremely difficult for the driver to get out because garages are too narrow to open car doors properly. The two-car garage is often only big enough for just one vehicle comfortably now.

¹Charles Moore, President of the Metropolitan Garage Board of Trade.
The reduction in overall car height which gives an appearance of even greater length to the silhouette has been from three to six inches. Frederick Clark, planning consultant, is of the opinion that this has cut motorists' vision sharply, making it difficult to see across intersections and cancelling out additional driving safety promised by the wider wrap-around windshield. The enormous increase in the power of American cars has been severely criticized by New York's Traffic Commissioner T.T. Wiley, who has accused motor manufacturers of going on a "big car-high horsepower jag" which will have "insidious effects". Most drivers, said the Commissioner, "are not sufficiently trained nor physically able to handle the horsepower placed at their disposal". He pointed out that most highways are not designed to accommodate such vehicles. Of those that are, it has been necessary to establish arbitrary speed limits below the designed speed because of drivers' inability to meet the driving problems they create with the powerful cars now available.

The motor industry has a greater responsibility than merely to provide bigger and more powerful cars to compete within itself. It should set limitations on size and performance geared to what the driver can do and what the economy can afford in terms of economical design of streets, highway and parking responsibilities. Continuation of the present trends in automobile design is irresponsible and, in a large measure, antisocial in its effects. Manufacturers should take a far more realistic approach to their task, with a much greater cognizance of their responsibilities to the society in which they operate.
DIMENSIONS OF COMPARABLE SERIES OF FOUR-DOOR SEDANS AS DESIGNATED BY MANUFACTURERS
THE AUTOMOBILE AND THE FAMILY - TRAVEL

A study is being conducted in White Plains, New York, by the Westchester Planning Department, the County Association and the State Labor and Commerce Department into the journey to work habits of 150,000 people in the area. Results so far indicate that 60% of men and 26% of women rely on automobile transport. Only 14% of men and 36% of women use the bus service. The most significant point brought out is the use of the Car Pool in modern suburbia. This device for economizing on fuel, tolls, car maintenance and shared responsibilities for chauffeuring to limit manpower was started during the depression, used during the wartime shortages and is now a major part of the suburban way of life in White Plains. It is probably not untypical of many of the suburban areas in the United States.

A typical example of the role of the automobile in suburban life is provided by a study of a family who are members of such a car pool. The Donaldsons live in a suburban house on a one-acre lot and own a Buick convertible. When Mrs. Donaldson's turn comes around, she will drive about 300 miles during the average week on a bus-like schedule of chauffeur service. After getting up at 6:30 a.m., the family, including husband, wife, two children and maid, get into the car at 8:15. This is the first stage of a twenty-one mile journey; the first call is to pick up Paul Mauer, a friend, a New York broker and his two children, at their home. The next is to drop the Mauer children and one Donaldson child at the Rye Country Day School. Returning through White Plains, another friend, William Luddy, is picked up; then Chris, a younger Donaldson child, is left at his nursery school; finally, to the railroad station, where the three men catch the commuters' train to the city.
THE HOUSEWIFE IN THE SUBURBS:

SERVING A TYPICAL WESTCHESTER CAR POOL
AVERAGE DISTANCE DRIVEN PER WEEK - 300 MILES
At noon, Mrs. Donaldson starts the second lap of the day. She first picks up Chris at his nursery school and takes him home. Then she drives to Rye School to get nine children, including her own and the Mauers', then returning them to their homes. At 6 p.m. she goes to the railroad station to pick up her husband and any neighbors on the same train, and at 8 p.m. she drives the maid home. The morning run to the train occurs five days a week, that to Rye three days one week and two the next, alternating with other mothers. Of course, changes occur frequently, depending upon circumstances, each of which must be specially arranged between members of the car pool.
THE AUTOMOBILE AND THE FAMILY - CAR OWNERSHIP

The number of cars per family in the United States increases with income and location - families in the West having more than one car more often than those in the East. In Los Angeles, the two- and three-car family is normal. In Burlingame, California, there is an ordinance that every new three-bedroom house must have a minimum of a two-car garage.

In America, 12% of car owners have more than one car, and the following table indicates the percentage of car owning families with more than one car:

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<td>$3,000 - $5,000</td>
<td>8</td>
<td>South</td>
<td>10</td>
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<td>$2,000 - $3,000</td>
<td>9</td>
<td>West</td>
<td>17</td>
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<td>Under $2,000</td>
<td>8</td>
<td>Total U.S.</td>
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Trends in Car Ownership and Multi-Car Ownership

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<td>4.8</td>
<td>*</td>
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<td>*</td>
<td>95.2</td>
</tr>
<tr>
<td>1949</td>
<td>6.2</td>
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<td>*</td>
<td>93.8</td>
</tr>
<tr>
<td>1950</td>
<td>11.1</td>
<td>10.0</td>
<td>0.9</td>
<td>0.2</td>
<td>88.9</td>
</tr>
<tr>
<td>1951</td>
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<td>0.1</td>
<td>88.0</td>
</tr>
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<td>10.6</td>
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</tr>
<tr>
<td>1953</td>
<td>11.9</td>
<td>10.9</td>
<td>0.9</td>
<td>0.1</td>
<td>88.1</td>
</tr>
</tbody>
</table>

* Not available; all figures based on sample surveys.

From the above data it is clear that the trends are towards a general increase in families owning more than one car. Thus all trends, of car ownership, car size and power, and car production are upward, with vary-
ing degrees of increase, but all sufficiently great to alarm the serious observer who can imagine the projections of such trends over the next twenty or thirty years.

Percentages of Families Owning Cars.
SECTION II

THE TYPICAL RESIDENTIAL AREA
THE TYPICAL RESIDENTIAL AREA

In the United States, it is possible to divide residential development into two broad categories. The first includes areas which have been designed without considering the automobile as a primary factor in their layout, and are, to a large extent, the result of the pre-automobile design tradition; the second type includes those where the automobile has been an important operative factor in designing them. The latter, although on a statistical basis extremely rare, has an importance out of all proportion to its use; Radburn, Baldwin Hills Village, Kitimat and others are examples of this type. The former, which represents the bulk of residential development, may be termed typical in this sense. There are, within this category, three main types which themselves shade into variations and combinations of each other; these are the gridiron layout, the linear type and the curvilinear, or romantic, layout.

THE GRIDIRON LAYOUT

The gridiron, or orthogonal, type offers the obvious advantages of simplicity of land survey and ease of subdivision, using only the right angle. Many of American city blocks have dimensions which are multiples of the twenty-two foot surveyors' chain, for example. The blocks so formed can easily be subdivided into smaller rectangles for building plots, so are eminently suitable for all situations demanding easy land sale and transfer. In addition, the gridiron does offer an easily appreciated system of order, with orientation a simple task with numbered streets and avenues. This characteristic of order, although it has obvious disadvantages, allows for easy expansion in a clear and straightforward way. Historically, the gridiron has been used traditionally by colonizing nations and traders, and became much used in business cities - in Rhodes, Miletus,
the Roman cities and colonial towns, the Hansa towns and, eventually, the new mercantile centers of colonial America. The enterprising merchant was usually aware of the speculative value of land and the grid characterized this idea.

The gridiron continues to be used in many American cities as a natural extension of the existing orthogonal plan, and is embodied in many of the current ordinances. For example, the Chicago Code requires that streets be plotted eight to the mile in one direction and sixteen to the mile in the other, allowing widths of 66 feet (and a 16-foot alley at the rear of every lot). This requirement, incidentally, results in the dedication of 32% of the land for street purposes, an enormous proportion representing a loss to the community and unnecessary expense to the home buyer and the subdivider. Thus, one of the first disadvantages of the gridiron is the inordinate amount of land which is taken up by the road pattern itself. A second serious difficulty is the lack of differentiation of the roads in width and relative importance. Each offers access to any traffic in the area, whether it be to light vehicles serving local needs or to heavy goods vehicles going through to another part of the town. This obviously increases traffic hazard for residents, every dwelling fronting onto a potentially dangerous through road. From the point of view of driving speed, the gridiron does not deter drivers from traveling at well over the accepted maximum safe speed of 25-30 m.p.h. in residential areas. Unless traffic lights do occur at each junction, and this is usually impracticable, there is a temptation for drivers to make the most of a straight run. With the present overpowered cars, rapid acceleration is easy, and speeds in excess of 45 m.p.h. are soon reached, with a consequent

1 The City of Man, Christopher Tunnard.
2 Traffic and Residential Real Estate, Isaacs and Bringe.
narrowing of the already meagre margins of safety. Again, every junction is a cross road with attendant potential for hazard and traffic congestion, a menace for the unwary pedestrian and to the children of the community. It is not much better for the driver in traffic who may find that progress in a congested area is reduced by a series of stop lights and frequent junctions where occur flagged crossings for school children. Also, the constant worry attendant to inadequate sight lines across junctions, limiting the driver's angle of vision and ability to anticipate traffic moving from other directions, is disturbing.

Visually, the gridiron if on a fairly flat site is essentially uninteresting, though with rising ground, as in San Francisco, some interesting effects can be observed - in spite of the fact that one may regard the superimposition of such a rigid pattern undesirable on undulating land. On flat sites the chief lack is that of closure of vistas. Street views of buildings are invariably from the side and secondary to the dominance of the road surface moving away in apparently endless line. There is often a lack of any visual rest, and even the local architectural tours de force may be secondary to the whole idea of movement. The opportunity to see buildings face to face occurs only across street widths, limiting greatly the possibility of achieving any real sense of civic enclosure. This is possible, in fact, when one or more blocks are left open for a park, or a well set back building of some kind occurs. These are comparatively rare occurrences in residential areas though, and at higher densities the corridor street becomes almost intolerable in its sameness. It is sometimes mentioned that the Hellenic Greeks used the gridiron for their residential areas (though not in Athens); it therefore cannot be too bad. It should be remembered, however, that, first, the houses of the Greeks were usually introvert - looking into internal courts or patios, and, secondly,
the place of the house in Greek life was not as important socially as it is in America. The agora and temple squares in Greece, and the piazzas in Italy, outdoor gathering places for the people, are not provided as a general feature of the American urban scene.

Attempts to humanize the checkerboard layout have been made by building set-backs of various depths, planting trees along streets with grass verges and with lawns in front of dwellings. These can be extremely successful, but do not overcome completely the inherent harshness of the pattern and the shortcomings mentioned in other respects.

THE LINEAR LAYOUT

This is usually typical of the smaller community only, as the consciously used residential layout. New England villages, for instance, which are built up on each side of the main through highway, may have one or more branches in addition, but the pattern is along the road. The appearance may be quite countrified, since the trees which line the sides of the street usually obscure the buildings. The houses themselves are set well back, with broad stretches of lawn in front of them, often with more trees or shrubs to give privacy. It is interesting to compare the method of obtaining privacy, by wide spaces interspersed with trees in the "English country manor style"; the attempt to carry this method down to the suburban scale, at densities of eight or more houses to the acre, is not always successful, since privacy itself cannot be obtained at this level without additional devices like screen walls, patios or partially enclosed porches. The tradition for trees in New England is to a large extent indigenous, since the original magnificent forest belt, which still stretches out to Ohio, ensures that trees will flourish even in the cities.

Provided the main street is not heavily trafficked, though many are
now, the informality and casual composition of church, large and small houses, shops and post office can be quite charming. However, the effect of very busy through traffic is to produce a dichotomy at once disruptive and dangerous. The linear village came in an age before the automobile; the "ribbon development" of today, which is the child of motor transport, is far less elegant and consists more often of an interminable string of hot dog stands, cafes, service stations, motels and motor courts and roadside stores of all kinds, regularly punctuated by a bewildering variety of colorful and garish signs. These can be regarded as being either delightfully interesting as an example of the folksy romantic vernacular of America or just plain ugly, depending on one's point of view. After many miles of such scenery, though, as on the route south to Florida, even the enthusiast with the former outlook might become a little jaded. However, this is hardly a residential layout.

THE CURVILINEAR LAYOUT

This type is probably the most typical of current American suburban layouts and it is, therefore, extremely important to understand its origin. Although used long before, it was in the late eighteenth century that it was supported with a theory by the lovers of the picturesque with their principle of studied irregularity in landscape gardening. The romantic "English" parks with their curving sinuous paths were introduced to the United States by Alexander Jackson Davis and Andrew Jackson Downing. The idea also had a social implication because cities were becoming so crowded that the community was in great need of recreation areas. Davis it was who designed the houses and much of the landscaping of the romantic suburb of Llewellyn Park, New Jersey. This was perhaps the first planned American romantic suburb, and, like its successors, was the creation of a business mind. The partner of Davis in this venture was
Llewellyn Haskell, head of a large chemical concern, who was interested in building this suburb for businessmen and intellectuals; it was begun in 1850.

A little later, in 1858, Downing's English partner, Calvert Vaux, and Frederick Law Olmsted together won the competition for the design of Central Park in New York. The importance of this design cannot be overestimated, for it influenced the development of nearly every large American city and was the basis of the work of Wright and Stein in their Radburn plan seventy years later.

Roads that followed the contours of the ground and a system of planning that brought "the country" into the heart of the town were inventions that could be applied to communities as well as parks. It became the ideal to make the community park-like. Paxton's Birkenhead Park in England had a strong influence on Olmsted and the firm of Olmsted and Vaux went on to build romantic villas with the occasional layout too, though the full development of the curvilinear street system could only come with the opportunities for building completely separate units, since the immediate extensions of towns were on the gridiron. The first real example of this was Riverside, "a suburban village"nine miles from the then business center of Chicago. Olmsted decided that the dull flat land of this site should be romanticized by a curvilinear street system, a central park along the Des Plaines River and thousands of planted trees to shade the prairie land. Vaux's architecture completed this as a unified suburban unit.

This, the first of the residential parks, may be regarded, according to Tunnard, as one of the most important American contributions to nineteenth century planning; large areas planned to one rule of taste which helped to break somewhat the strangle-hold of the gridiron, and also
"their interior parks avoided the still-ubiquitous overall planting of private lots."¹ Laster they clarified the principle of separating business and residential districts, and above all proved that, as at Riverside, suburbia need not be universal, but that a suburb could be planned as a unit, thereby promoting the idea of the self-contained neighborhood within the urban pattern.

The romantic mood of Riverside was eventually modified by the domestic suburb. Bedford Park and Port Sunlight in England had their effect in America, and later developed into the garden city movement. Thus the pure romantic movement was replaced by the more domestic curvilinear of the real estate subdividers, with their curving pleasure drives and hidden approaches. Roland Park in Baltimore demonstrated this change with its early use of the cul-de-sac. These early suburbs were remarkable for their concern with art in the shaping of the human environment, of integrating planning, architecture and landscape architecture. The later and present day suburbs clearly indicate the obvious differences. The preoccupation of the real estate developers with profit and the enormous increase in the development of the suburbs with the coming of the service industry city has left America with very large suburban areas, many of which are mere dormitories for the commuter. However, the curvilinear plan is still in vogue with the F.H.A. as well as the Urban Land Institute - the real estate operators' organization which publishes the Community Builders Handbook. This provides many recommended examples of subdivisions using the curvilinear layout. The new T.V.A. towns, Norris, for example, the atomic energy towns like Oak Ridge and Richland, Washington, and the British new towns, together with the Ministry of Housing and Local Government recommendations, all favor the curvilinear plan. The advantages of the plan

¹ The City of Man, Christopher Tunnard.
are that the curving roads are able to conform closely with the contours so that development can be physically related to the landscape, though this certainly does not occur in practice in every case. The curved streets, with their limiting view, tend to discourage the high automobile speeds which are possible in the gridiron layout. Road junctions are tending now to be at right angles and more often than not Tee junctions, with less possibility of hazard than cross roads. The curvilinear plan, though conceived before the motor age, can be adapted to the automobile circulation with comparative ease - it is "flexible", in the planners' jargon, that is, the form is adaptable to many different types of layout, topography, etc.

For the last few decades, realization of the dangers of undifferentiated road patterns has resulted in attempts to clarify the position by a classification of streets according to their function, as through traffic streets with heavy traffic, or as residential streets with limited access for local traffic only. An interesting example of the classification carried out in a rather crude way is provided by the new Levittown, in Pennsylvania, where the "master blocks" are defined by main peripheral traffic roads with feeder streets at selected points, leading to the three or four neighborhood layouts; these have gently curving streets in parallel groups, to make subdivision easy. Recommendations on sight lines in curvilinear streets suggest that a two hundred foot distance is adequate; rights of way should be fifty feet wide and a roadway of twenty-six feet for local traffic streets; a sixty foot right of way and thirty-six foot roadway is suitable for feeder streets, which should lead to one or more focal points of the development. The feeder street will usually have a large number of intersections with local streets, but junctions of feeders with the main traffic artery should be as infrequent as
possible while still providing adequate access to the residential area.

One of the drawbacks of the curvilinear layout is its very casual-
ness, the apparent lack of reason about the location of many of the streets,
and the difficulty which the visitor may have in orienting himself in the
area. To the stranger, the curvilinear plan must often seem like a maze,
with a surprising lack of reasoned planning. Some layouts have been so
designed that one is led naturally into culs-de-sac, for the planting
and curves are often such that one has arrived at the end before realiz-
ing it. This carries the idea of concealment of approach too far, of
course, and causes frustration to the visitor. Attempts to rationalize
this confusion, each residential street looking like the next, were made
in Levittown, to some extent, but at the expense of considerable monotony.

Visually, the curvilinear layout has far more diversity than the
gridiron. There is a relief for the eye, changing perspective with the
curving street, and closure of vista. There is a current notion that
curved streets are pleasanter than straight ones, but this almost cer-
tainly is the result of sentimental implications. However, this may be
understandable as a reaction to the nineteenth century industrial city
and the brutality of the gridiron plan which probably assumed its worst
urban appearance then. The whole visual scene in the curvilinear suburb
has suggested the idea of an escape world, a retreat from the chaos of
the great city. Mumford has condemned it as such, accusing the suburban
dwellers of unwillingness to assume the responsibilities of civic pride
in redeveloping and changing the city proper. Wright, on the other hand,
regards the suburb as a poor attempt to reach his own ideal of Broadacre
City. J. W. Richards, almost alone, has seen in the suburban residential
area, with its curving streets, a world which is a truly indigenous one,
the product of what people really want. The theorists, he says, "make
the mistake of assuming that what is significant must bear the hall-mark
of educated taste, but beneath the chaotic surface a common idiom of a
kind does lie hidden." He sees the curvilinear layout as a way of offer-
ing some of the romance, sentimental beauty and picturesque detail which
architects and planners have failed to provide in the city. That it appears
amateur to the sophisticated designer is quite irrelevant — the suburban
dweller is happy there.

Perhaps the most important aspect of the curvilinear layout in America
is the universal use of trees and grass areas, which are an integral part
of the whole conception of the curvilinear plan; the Romantic and the
garden city influences are responsible for dissolving the city in a green
sea. Tunnard suggests that this idea is based on the philosophy of the
contemporary ideal of harmony between man and nature — of "biological de-
cency" towards the forms of nature — and not on the principle of absolute
control of nature by man himself. This so-called partnership between man
and nature is subscribed to by LeCorbusier, who would have all urban
dwellers live in vast parks; by Hilbersimer, who delights in the idea
that "the city can be within the landscape and the landscape within the
city"; and by Lloyd Wright, whose "organic" architecture and identifying
of the horizontal building with nature and the earth looks forward to
the disappearance of the city completely. These, and most architects and
planners, do not seem to question this almost pathological desire for
green everywhere. It is a direct result of the cult of hatred of the city
and the pendulum has indeed swung far the other way — not thereby attain-
ing civic beauty, far from it, but merely escaping from the problems of
urban design by filling all spaces with trees and grass. Such neo-
romanticism and unbalanced "tree-worship" is characteristic of extreme
reaction to what is bad in our cities. The garden city and Howard's
ideal of "town-country" have served a valuable purpose in showing how very bad our nineteenth and twentieth century cities are. It is now time to re-examine the basis of the romantic curvilinear tradition, to evaluate our suburban jungles and see if they really are as good as they might be. Not only has the urban dweller escaped to the garden suburb, but the architect has lost his sense of responsibility in over-all design and is able to hide this lack behind as many trees as he may think convenient. The curvilinear layout then is characterized by the dominance of natural forms, by tree lined streets, and grass verges, by so-called small park areas - more often than not odd-shaped pieces of land at road junctions or elsewhere which are too small or unsuitable for subdividing; these may occur as "islands" surrounded by roads and eminently unsatisfactory for pedestrian access, but they impress the prospective house buyer whose ideals are conditioned by this impetuous desire for green, as much as the real estate operator and most architects.
FACTORS IN THE DESIGN OF TYPICAL RESIDENTIAL AREAS

The controlling factors in determining the ultimate form of American suburban development are represented by three groups; the initiator - that is, the real estate developer, the local planning commission of the area in which the development takes place, and the house or plot purchaser. Of these three, by far the greatest influence is wielded by the real estate developer, and it is he therefore, who must bear the main responsibility for the success or failure of a development. The land speculator's role "is of the greatest importance in the founding and developing of the American community", writes Tunnard. He goes on to point out the extraordinary lack of civic sense in city development here, even when developers happen to be rich and presumably enlightened. The Astors, for example, and the Church both failed to create desirable urban forms - their work in New York was to build tenements for the lower income groups, since this represented the best solution for money-making. One of the disadvantages and perhaps reasons for this in New York was the short term of the lease - twenty-five years or less - which did not encourage careful maintenance or large scale and unified development which the longer ninety-nine year lease offered in London. While the British speculative schemes were often in good taste and well designed, as in Bloomsbury and Mayfair, most of the American developers are, by contrast, without any civic coherence.

City development in the United States has proceeded by way of "the great American game of land gambling, which instead of being an innocent business venture or a speculation of concern only to private individuals who play the game ... is too often a public tragedy with most of the losses underwritten by the tax paying public".

1See Urban Planning and Land Policies, Vol.II.
Examples of the irresponsibility of land speculators are still in evidence in many American cities — land subdivided and never developed, although roads and services had been put in at the expense of the community. It has been estimated that during the Florida land boom the total land subdivided was sufficient to house the whole population of the United States.

The overiding consideration by real estate developers has then been the profit motive. This in itself is not unreasonable provided that there was a sense of responsibility of the importance of subdividing which is not merely land marketing but the building of communities..."the fleeting economic effect of the act of subdividing gives way to the permanent inexorable economic effect of the subdivision as a part of the form and life of the community."

More recently, as evidenced by the Community Builders' Handbook, the real estate developers' guide, a more responsible attitude seems to be taken and the importance of the subdividers' activities is recognized — "what the subdivider does to land and how he does it is of extreme importance to the general public as well as to the individual. Rarely does a community lay out its own streets; except in the case of main thoroughfares, most streets are located by the subdivider of the land."

The methods of subdivision by real estate operators also form a conditioning factor of the layout design. With a number of subdividers in an area, the existing pattern is merely added to without much thought for traffic circulation. Community facilities, school sites and playgrounds were also ignored until eventual congestion compelled authorities' attention. Improvements on this practice are notable mainly with the very large developer who has at last realized with growing official and public con-

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1 See Urban Planning and Land Policies, Vol. II.
2 See Subdivision Regulations, Harold Lautner.
cern that unless he provides sites for social and community activities he may not succeed in selling his land and speculative houses. In other words, a show of civic responsibility can be turned to good business. The Levitts are perhaps outstanding in realizing this and probably represent the most advanced stage in speculative development with their Pennsylvania scheme. Generally, the automobile is not accorded any special consideration in real estate developers' work. There is, after all, ample precedent for them to ignore accidents and the drawbacks of the gridiron or curvilinear layout from the traffic viewpoint. Again, the Levitts offer a trend in their adaptation of the superblock and attempts to rationalize traffic separation in this respect. Many existing suburban neighborhoods are just collections of several real estate developments, so that no "neighborhoods", as far as the theory is concerned, exist. But attention is drawn to realtors by the Community Builders' Handbook to the desirability of creating homogeneous living units, "even if cooperation with other... subdividers is necessary."

In his book Real Estate Subdivisions, Stanley McMichael, the well-known real estate agent, justifiably claims "subdividers are now the city builders. To their clear thinking, initiative, aggressive action and devotion to ideals, may be attributed the splendid residential areas of our modern cities." Mr. McMichael does not tell us what the "ideals" are to which the subdividers are devoted, and the euphemistic quality of his words might suggest that further inquiry on this point would not really be fruitful. However, the book is valuable in that it probably presents an interesting summary of realtors' contemporary ideas on the residential area. In the chapter called "Developing for a Hundred Years", written by the late J. C. Nichols, who was "perhaps the leading divider in America" and headed the Community Builders' Council of the Urban Land Institute,
there are a number of recommendations which presumably reflect the best real estate practice. The following are perhaps the most significant of these:

1. Curved streets greatly relieve monotony and give character to a neighborhood.

2. Most developers now retain control of the architectural design of homes within their subdivision. This has proved effective in creating more attractive, pleasing and harmonious neighborhoods. Many operators will only permit one story and storey and a half within certain areas, and one and a half and two story in others.

3. There is a wide difference of opinion of house setback required. Many prominent developers recommend nothing less than a twenty-five foot setback in areas of smaller homes.

4. Street widths should be 26 to 27 feet to curb backs.

5. In this automobile age and particularly in a neighborhood with a large number of children, restrictions should prevent the planting of high shrubbery at street intersections.

6. In order to help lower the cost of developing subdivisions, some developers omit sidewalks. Generally it is recommended that sidewalks be built on at least one side of a street in order to give a place for children to use their scooters, bicycles, tricycles, play wagons and so forth.

From the above it should be clear that while there is an awareness that we live in an "automobile age", the naivete of suggesting that at least one sidewalk should be provided for children's play is almost laughable, were it not meant so seriously. Again, the idea of architectural control is good, but is the realtor the best person to ensure such control? Perhaps it is not his fault if he is alone in this task. It would seem, therefore, that although their past record is certainly not inspiring, the recommendations of the Urban Land Institute, if followed by realtors - and this is by no means certain - would result in an overall improvement in the layout design and general standards of suburban areas. It is realized that designers are needed, architects, planners and platting engineers, but the employment of these specialists presupposes a real estate organization of some size and a civic sense which
many realtors have yet to develop. Their prime consideration for private
profit and their lack of a general background and understanding of urban
design have been the twin factors in shaping the typical residential area.

A more enlightened developer, McMichael, recommends that special play
areas should be provided for children, that roads should be designed to
slow down traffic, with well-placed traffic junctions and good sight lines.
He even mentions the advantages which the Radburn plan offers for traffic
safety, and suggests its adaptation to real estate developers' plans. Un-
fortunately, elsewhere Nichols himself comes down heavily against the
Radburn type plan, which he rejects as "a favorite proposal of student
planners and others seeking to break with conventional patterns."

Thus among leading real estate developers there is at least some aware-
ness of the automobile as a design problem. It seems, however, to present
too complex a problem to justify the amendment of their current practices
so far. This attitude will probably continue until the fundamental re-
gard for land as just another saleable commodity changes to the recogni-
tion that it is something quite different, that from the point of view
of the community at large it has a value out of all proportion to the
subdividers' dollars and cents estimate. The residential area forms the
community and home environment, the importance of which is far greater
than many people are willing to admit, in making the background and cul-
tural framework of American life.

The influence of the controlling factors operated by the city or
local authority vary considerably, depending on the city, its size and
its location. Subdivision regulations and zoning laws are the basis of
control, and in the last decade or more these have been used with in-
creasing enlightenment. However, they share the disadvantage of being

1See Community Builders' Handbook, The Urban Land Institute.
permissive rather than initiating controls and are framed to prevent the worst rather than ensure the best. Standards vary a great deal, some cities requiring that new streets be a continuation of the existing pattern, as in Chicago, often forcing new developments into rigid patterns for the sake of uniformity. Subdivision regulations may, therefore, be as much to blame as the developer in some cases in producing a layout that is unsuitable for present day living and traffic. The cause of this is a lack of imagination on the part of the authority in drafting regulations. These are often based on the design of subdivisions actually submitted. Planning commissioners themselves, though usually responsible citizens, are often older men with a very conservative outlook on new development. The inflexibility of city regulations is one of the reasons that the superblock design is so infrequent, because it does not fit in with the pattern of local ordinances. Many improvements have been made on the old layouts in some cities, and to prevent wildcat speculation on land by realtors, utilities and roads are required to be put in at the developer's expense. Recommendations on traffic safety, as suggested by the National Committee for Traffic Safety, have been accepted by many cities, but these recommendations are generally concerned within the accepted framework of the curvilinear plan.

Government housing agencies like the F.H.A. are also very much responsible for the continuance of the curvilinear layout. Like the Community Builders' Handbook, the examples they recommend are all of this type. Since F.H.A. loans are only made on developments the layout of which must be approved, the importance of their policy is great in forming residential pattern. So city and federal government encourage the curvilinear plan as well as many of the speculative developers themselves.
The house purchaser, although as the consumer of housing a supposed important factor in the design process, is in practice concerned with his individual dwelling and plot and their immediate relationships rather than the overall layout plan. It would be unreasonable to expect the average house purchaser to go into matters which are to a large extent ignored by the realtor, architect and planner, business and professional men who themselves have in general and for various reasons paid precious little attention to the real problems of design in residential areas. The fact that neither the house purchaser nor those more directly concerned professionally care greatly for such matters indicates the general indifference felt about the architectural and civic environment in which Americans find themselves.
WEATHERSFIELD, NATICK, MASSACHUSETTS

Weathersfield was selected as a typical new residential area in the Greater Boston area. It is typical inasmuch as it represents a middle income group housing development which has been built as a speculative scheme by one of the largest New England real estate operators, Martin Cerel. Although part of the town of Natick, about a mile and a half away, Weathersfield is to the north side of the Worcester turnpike, about fifteen miles from the center of Boston - approximately thirty to forty minutes by bus or car. The first section of Weathersfield was started in 1951 with 10,000 square foot lots of 90 foot frontages; subsequent sections to the present have been developed with lots of 15,000 square feet and 100 foot frontages, making the average residential density between three and four houses per acre. All houses are built for sale and are detached single family dwellings. All are single floor with the garage forming part of the main block.

The road pattern of Weathersfield is curvilinear on a site which is flat on the south and slopes down to the north and northeast. In spite of the opportunity for fine views of woods and country to the north, the fall of the ground has not been utilized for this purpose, nor do the roads fit in particularly well with the contours. Generally, the layout plan seems to have no reasoned pattern; a road connecting the development with the Worcester turnpike runs into the maze of streets, the similar character of which provides no guide or differentiating features. This possesses the negative virtue of being so confusing that through traffic would probably be too discouraged to use it. The junction with the turnpike is a Tee, without any slowing down lanes or underpasses of any kind provided for access to the residential area. The turnpike is divided by
a central grass verge and the nearest through point is about a quarter of a mile from the Tee junction. This means that traffic from Weathersfield going into Boston must first turn right, away from the city, and cross the westward traffic lane to enter the east flowing lane. Most traffic on the turnpike travels at speeds in excess of 45 m.p.h., so that altogether this junction is extremely hazardous and badly designed. Further complications are provided by a newly located shopping center on one side of the access road with a car park which extends to the edge of the turnpike.

The roads within the Weathersfield layout are about 32 feet wide without curbs but having sloping grass verges between 3 feet and 4 feet 6 inches wide, dividing them from the foot paths 4 feet 6 inches wide. The only breaks in the grass verges are for the driveways to houses, none being provided at junctions where pedestrians cross the roads. Most road junctions are approximately at right angles and there are few cross roads. In one or two cases the insufficiently staggered branch streets almost produce a cross road - it would in fact be better if they did this, or alternatively were spaced apart at least 150 feet. Lack of differentiation in street width tends to give the impression that all streets are designed to take the same traffic volume. If in fact there were some rational circulation pattern there is little doubt that considerable saving could have been made in road surface; the 32 foot width would be excessive in the interior loop or cul-de-sac road of a superblock, for example. However, there is one advantage of the wide roads inasmuch as they offer parking space each side without needing any special provision of lay-byes or curb indents. The wide frontages of the house plots too enable up to four cars to park comfortably on the road outside as well as up to two in each driveway. Parking spaces should therefore be quite adequate.
Service to houses is simple and direct. Delivery vans stop at the roadside and deliveries are made to the front doors of houses. There is ample width for parked vans as already mentioned. Access to the rear of houses is also easy; there are no fences provided on the open lots which are indeed so open that one can see between houses, especially at corners, far across the rear lawns to the backs of houses in the distance. No specific play areas are provided for children who use both back and front lawns of the houses for play, as well as garage driveway and sidewalk. The latter areas are especially popular for wheeled toys and the open drives, sloping slightly down from the garages, invite the children to coast down into the road - which they frequently do. Sidewalks are favorite places for tricycles and scooters; again in the absence of a stepped curb the sloped grass verges allow easy and comfortable transition for wheeled toys from footpath to carriageway. The generous plot sizes allow plenty of space for children to play, but the parents' awareness of the dangers inherent in such a direct child-road relationship is reflected in notices posted around Weathersfield, which read "Please Drive Carefully - We Love Our Children". Pedestrian circulation is similarly directly related to the roads, but this is a residential area where most adults drive wherever they wish to go if it is away from the immediate vicinity. The two obvious journeys, to the school to the west of the site and the new shopping center adjoining the turnpike, are far enough from the majority of houses for a car to be taken in preference to walking. The footpaths do not offer very much visual stimulation anyway, so time becomes the controlling factor, and today this usually means the quicker the better - hence the automobile. There are no specific measures to ensure pedestrian safety at road crossings or anywhere else; the low density of the development makes this shortcoming less serious than it
would be in a higher urban density.

The social pattern of Weathersfield seems to be similar in some respects to the lease houses area in Park Forest Village, where there is a marked tendency for the road to act as a social barrier and for side and back neighbor relationships to develop more easily. This is particularly easy in Weathersfield with its absence of fences and, with one or two exceptions, of any private family areas outside or adjoining the house on the rear garden side. One or two residents have built their own enclosed patios or used fences, but these are rare exceptions. Opportunities for social contact are therefore quite easy, but privacy for family activities is only possible within the house itself.

The visual qualities of Weathersfield are dependent upon the extreme openness of the whole layout. The roads are wide, the lawns are broad and quite well tended, with a few small trees and shrubs - it is too early yet to see what the effect of mature trees will have, but there will probably always be a dominance by the grass lawns. Houses are long and low, of one storey, with a garage making the house extend an even wider front aspect. Houses are not important in the landscape, the chief feeling is one of wide spaces of either road or lawn to which the architecture is quite incidental. The only other strong elements beside the horizontal surfaces are the telephone poles - usually along one side of the street only - with a truly fantastic "wirescape". Cables and wires seem to go in all directions and are with the poles the only strong vertical elements, albeit unpleasant to look at and extremely untidy.

There is some feeling of order since the houses themselves are fairly evenly spaced and set back equally from the road. There has been no attempt to relate one house to the other apart from this, which is probably the result of the most limited interpretation of the planning ordnance.
All houses are of timber with asphalt tile roofs. There are slight variations in the front house facades, but these are not very marked or significant. Color is the main differentiating element, for seldom are adjoining houses painted in similar colors or roofed with similar colored tiles. Many colors are used without any particular one seeming to dominate, the result being pleasant perhaps for individual houses; as a whole, however, there is no related color element which helps to unite the houses at all. The variety of colors tends to confuse any related harmony which might otherwise have arisen. Both color and architectural details are aimed at showing each house to be a unit which is sufficiently different from its neighbors to be identifiable as such. Interesting individual touches have been added by some residents, like posts with name plates dangling from them and owners' monograms on window shutters (not designed to be closed, of course), and on canvas window awnings. These are indeed the American counterparts of J. M. Richards' "Castles on the Ground".

In spite of the different colors and slight whimsies of individual house decoration, there is an overall sameness about Weathersfield which makes each road look like the last. Orientation in the area is extremely difficult and it is easy to get lost without any outstanding or characteristic landmarks of any kind. Planting does not help this, for although some of the original trees have been preserved on the site, these are always within the rear gardens of the houses. Young shrubs and trees have been planted, but the area is remarkable for the dearth of flowers, the only ones being roses or other climbing plants; there are no flower beds as such. There is little variety of spacial pattern and there is nothing to make one feel that any effort has been made to provide any civic delight whatever. The roads are laid out in this arbitrary pattern and houses follow them, adhering slavishly to the uniform setback from the street.
This is the true subdivider's layout - neat packages of houses and plots, to be assembled, sold and forgotten. Not as boring visually as the grid-iron plan perhaps, but certainly presenting an exceedingly uninspired solution to the site layout which would have been possible in what was once a potentially delightful area. A product of the real estate operator, the platting engineer and the speculative house builder, Weathersfield is better than many subdivisions in providing generous plots and houses - prices ranging from $13,000 to $17,000. People who live there generally think that it is a very pleasant place to be. It is peaceful by day (women and children only) and, so far, a secluded retreat from the ever spreading suburban areas of metropolitan Boston. There is no reason to suppose that the woods and field nearby are going to survive as such for much longer. In a decade or two the whole area will probably be part of an even greater suburban sprawl if present trends continue uncontrolled and unenlightened by a more rational planned development.
WEATHERSFIELD IN RELATION TO NATICK
PLOT LAYOUT - FIRST SECTION OF WETHERSFIELD
WEATHERSFIELD, NATICK.

TYPICAL HOUSE
THE RESIDENTIAL AREA SPECIFICALLY DESIGNED FOR THE AUTOMOBILE

In contrast to the typical residential area in which the automobile was not a main factor in forming the plan, the residential area where the automobile has been a major consideration usually employs the device of the superblock together with a varying degree of traffic separation and rationalization.

The superblock is, literally, a block considerably larger than the average city block in size. Traffic circulation around the peripheral road which defines it has access into the block by cul-de-sac, alleys or driveways, none of which offer direct through ways, but merely provide local service points within the block as a whole. Vehicular access is, therefore, highly selective and subject to strict limitations; pedestrian access is, on the other hand, more free and circulation in and across the block on various different pathways is usual. Superblocks had been used by the Dutch before 1660 in Nieuwe Amsterdam (New York) where houses were built around the edge of very large blocks which had green interiors - gardens, lawns, etc. More recently they were used by Sir Raymond Unwin in Letchworth and Hampstead Garden Suburb, and by Louis de Soissons at Welwyn Garden City. Harvard Yard might be accurately described as a superblock in this sense. There are many others in Cambridge of a purely domestic character with culs-de-sac circulation which were laid out in the nineteenth century. In the curvilinear layouts of Olmsted at Riverside and Roland Park, some superblocks can be found so that it is to some extent the result of the curvilinear plan that the eventual use of the superblock as a conscious planning device came about.

The importance of the superblock, however, was realized fully by its association with the principle of traffic separation. This principle is
not new; it was in fact used in medieval Venice where water traffic and pedestrian traffic is quite separate and Leonardo da Vinci proposed a system of traffic separation to overcome congestion in Milan by setting apart wheeled traffic and pedestrian walks. It was the Olmsted and Vaux plan of Central Park which provided the best American example of traffic separation. Here, half a century before the automobile, there was a "system of independent ways, first for carriages, second for horsemen, third for footmen (pedestrians), fourth for common street traffic requiring to cross the Park. By this means it was made possible ... to go on foot to any district of the Park ... without crossing a line of wheels on the same level." Separation was effected by overpasses and underpasses, all grade crossings being eliminated, with a resulting freedom of each type of circulation to operate without hindrance from the others and in complete safety. This was especially beneficial to the safety of pedestrians, and in the late 'twenties, when the automobile in America was already posing serious problems in congestion, the system seemed a ready made solution these difficulties.

So it was that the superblock with this traffic separation was ingeniously combined by Henry Wright and Clarence Stein in their design for Radburn in New Jersey. They had already had experience of the superblock in Sunnyside Gardens, New York, but at Radburn on a virgin site the opportunity to develop this new design was unhindered by the existence of an adjacent street pattern. The superblocks at Radburn were large, 30 to 50 acres in area. They were circumscribed by peripheral roads off which ran a series of culs-de-sac, up to 350 feet in length, with a turning space at the ends. These served the detached houses which were built along the culs-de-sac, giving direct access to garages and to the service sides of the houses. Between the culs-de-sac and the house plots
run pedestrian paths with access to houses via the gardens and leading to the central park areas of each superblock, which formed "the backbone of the area." These green parks provided play areas for children, walks for pedestrians and sites for the school, community facilities, ball field and swimming pool. The footpath systems of the superblocks were connected by an underpass beneath the peripheral road so that maximum separation was obtained between the automobile and pedestrian. The plan was the answer, said the designers, to the problem 'How to live with the automobile.' This is extremely significant as being the first design consciously aimed at such a purpose. The importance of the automobile as a factor in designing the residential area was at last recognized.

The Radburn superblock has been the model from which developed those at Hillside Homes in 1932, later in the greenbelt towns of Greenbelt, Maryland; Green Hills, Ohio; and Greendale, Wisconsin. More recently, in 1941, an 80-acre superblock has been used in Baldwin Hills Village, near Los Angeles. Here, where the automobiles are more numerous than anywhere else in the United States, greater care has been taken to ensure that there is more adequate space in the culs-de-sac. There has been a tendency for the cul-de-sac to develop into more of a service court here to provide more parking space for guests as well as the residents' garages. The service court has since been used in the new town of Park Forest, Illinois. In the new town of Kitimat, in British Columbia, for which Stein was the Director of Planning, the short loop street has been used more frequently than the cul-de-sac for superblocks which are far larger than at Radburn. Actually, the Kitimat plan is more of a hybrid than its predecessors, since it is a mixture of the curvilinear plan and the superblock. This has been conditioned to some extent by the sloping and broken nature of the site.
From the point of view of vehicular circulation, the peripheral roads provide easy and efficient means of movement through the residential area. As feeder streets, the frequency of junctions with culs-de-sac, garage courts or loop streets is, therefore, expected. There are no houses facing the feeder streets and traffic access occurs only at the chosen points, unlike the undifferentiated curvilinear layout where each house would have a garage with driveway onto the street. The peripheral feeder streets would be connected to the main traffic highway at selected points so that the hierarchy of local, feeder and main traffic streets would be complete, thus eliminating through traffic and vehicles which have no business in the residential area.

The success of vehicular circulation within the superblock itself depends on the type of access used, whether cul-de-sac, garage court, loop street or a combination of these. In Radburn the chief disadvantage of the cul-de-sac is that it is by its very nature a bottleneck. This does not matter providing that traffic can go in, turn and move out easily. However, the increase in numbers and size of cars since Radburn was built in 1929 have made the width and turning areas too small for current use, and does not allow enough space for cars of guests and visitors as well as the residents. Again it is a debatable point whether the cul-de-sac is satisfactory for delivery and service vehicles with mail, milk, oil, etc. in the Radburn form. In respect of the last two points, at Baldwin Hills the garage courts and parking areas are far more satisfactory and generous in space for both residents' and visitors' cars. In Kitimat the loop street is used for service and provides through circulation for service vehicles though it is not improbable that the length of these loop streets and the number of houses they serve may be more than the optimum. Kitimat might be criticized as
being retrograde in this respect.

Safety for pedestrians is probably greater in the superblock than in any other layout form, in theory at least. In practice it was found at Radburn that the culs-de-sac were used as play areas by children who could not use their wheeled toys, cars and tricycles, and roller skates anywhere else, certainly not in the green park areas which were intended for play. This indicated the need for hard play surfaces for children which would be away from traffic hazards. Some of these were provided at Baldwin Hills for very young children in tot play areas which were fenced at the end of the garage courts. A further point was noticed at Baldwin Hills that if there were no doors to garages they were ideal hiding places for children and thus encouraged play there in spite of the fact that there were other play areas within the park. Doors have now been provided.

Apart from this shortcoming, pedestrian circulation in the superblock layout is excellent. Radburn has been fortunate enough to have a school within one of the superblock areas. Children can, therefore, go there directly via the underpass without crossing any traffic road. This has not been possible in Baldwin Hills, since the school is not located within the single superblock.

The visual appearance of the superblock development will again depend upon the exact form it takes. It is important to recognize how much of the curvilinear romantic layout is paralleled in the use of the superblock generally,—curving peripheral roads as at Radburn and Greenbelt, Maryland, tend to produce an appearance not greatly dissimilar to the curvilinear layout. Radburn, with its single family houses, is superficially, like a typical American suburb. Houses are of different designs and colors and there is an informal character which is only unified satisfactorily by the dominance of the green shrubs and trees.
in summer. Unity by dominance of greenery results as with the romantic layout at the expense of a considerable loss of architectural identity. From within the park areas this is, of course, to be expected. At Greenbelt, the rhythm of the gable ends of the row house blocks provide an interesting composition on the curving peripheral roads; but it has not been done carefully enough to prevent monotony. Only at Baldwin Hills Village are the blocks large enough and the architecture sufficiently satisfying to approach a good civic standard. The flat site and bold positioning of blocks gives a sense of order and purpose. There is composition in mass, pattern and color without too great a dominance of trees and shrubs. The garden courts are of a scale large enough to be appreciated as identifiable outdoor spaces and yet not too large to lose the intimacy of character which a domestic scheme should have. Architecture is beginning in Baldwin Hills to dominate Nature. In Kitimat this theme has unfortunately not been continued. Only in the shopping centers is there evidence yet of any potentially satisfactory civic character. The houses are single family units without any successful linkage. The long loop streets will probably be uninteresting and perhaps lost eventually in green planting. The opportunity to use the lessons of Baldwin Hills has not been taken and the result may therefore be disappointing.
RADBURN - TYPICAL CUI-DE-SAC
RADBURN, NEW JERSEY

Originally conceived as a new town, Radburn in New Jersey was never completed because the depression intervened. It failed in many ways, therefore, as a new town, and is today surrounded by the modified grid-iron residential development of Fairlawn. However, sufficient was built of Radburn to test the value of the superblock and the separate pedestrian circulation system. It was the intention of the designers, Clarence Stein and Henry Wright, not only to design successfully for life with the automobile but to use the principles of the neighborhood unit with populations of 7,500 to 10,000; although no neighborhoods were completed, the plans were drawn and had their influence on later schemes.

The main traffic route through the area, Fairlawn Avenue, came from the nearby town of Paterson, and was connected to the New Jersey state highway. From Fairlawn Avenue ran Radburn North Road which acted as a feeder street to the peripheral road around the superblocks. From these ran the culs-de-sac, penetrating to a maximum depth of 450 feet. Ease of access from the main traffic road is effective and the scaling down of speed can be achieved within this hierarchy of streets. The unfortunate crossroad junctions along Radburn North Road as intended on the original plan were not built, but the Y-junction of Howard Avenue and Abbot Road North and Owen Avenue with Plaza Road would be better as Tee junctions. Most other junctions, including the culs-de-sac with feeder roads, are at right angled Tee junctions, sight lines being reasonably satisfactory. Without a traffic count it would be difficult to estimate the average volume of daily traffic on the feeder streets. From personal observation on two visits the writer has seen very little traffic; however, the frequency of cul-de-sac junctions as well as the
short driveways between is high. This is not apparently objectionable and hardly any accidents have taken place as a result. It would seem, however, that this might form a detailed traffic study to check absolutely on this point, that peak traffic volumes at from 8 A.M. to 9:30 A.M. and 4:30 P.M. to 6 P.M. on weekdays do not produce any congestion. Lengths of straight road in Radburn itself are sufficiently short or curved to discourage excessive traffic speeds. This is not so in the adjoining areas, a gridiron pattern modified with curvilinear portions. Fairlawn Avenue, for example, is absolutely straight for 2 miles.

An interesting method of street naming has been used at Radburn as an aid to orientation in the area. The main green areas within the two superblocks completed are lettered A Park and B Park; all culs-de-sac entering each superblock begin with the letter A or B. For example, Audubon Place, Addison Place, Andover Place in A; and Beekman, Bedford, and Bristol Places in B. This system does not reflect its true value since Radburn's plan was not completed, but it has been used by the Levitts in their Pennsylvania scheme to greater advantage in this much larger development.

Most houses in Radburn are detached single family dwellings, though some are in blocks of two and three with one block of four built later. Ultimately, longer rows of single family houses were built on Randolph and Reading Terraces. Generally, all have garages with short drives directly off the culs-de-sac, garages being at the side or forming part of the house. This provides the great advantages which being able to drive to the front door offer, for bad weather, luggage and shopping, parcels, etc., etc. The widths of culs-de-sac are not, however, sufficient for the latest and longest models of American cars, average road widths being about 18 feet. The cul-de-sac is peculiar in that as a one entry
street all entering traffic must turn and go out the way it came. One or more parked cars on the carriageway itself can, therefore, produce a bad bottleneck. Turning areas at the ends of culs-de-sac are generally a modified tee shape which has not proved very satisfactory, cars and service vehicles having to reverse in order to turn and go out again. In one example, Burnham Place, a more satisfactory solution has been used with a circular turning area around a small planted island, diameter 150 feet. This is sufficient to provide a reasonably smooth turnaround.

Another difficulty of the culs-de-sac is that they do not allow very much additional parking space for visitors. A party at a house, with perhaps a dozen guests arriving by car, would create an impossible situation if they all tried to park within the cul-de-sac; the feeder streets are the only alternative and the frequency of drives and cul-de-sac junctions make additional parking at intervening points somewhat hazardous for other traffic. Service vehicles too in the culs-de-sac have the difficulty of parking and turning around, and such occasional emergencies when fire fighting vehicles are required bring up the desirability of two approaches to the fire which is regarded by many fire authorities as a necessary requirement. Hose length and hydrant positioning are limiting factors, but if these are carefully placed immediate access by large vehicles is not always necessary in the case of one- and two-floor domestic buildings. Ambulances again may demand immediate and uninterrupted thoroughfare, which the cul-de-sac in this form is bound to limit.

The most hazard to circulation in these culs-de-sac is perhaps their use as play areas by children from the adjoining houses. There are two main reasons why these areas are popular for play. First, the houses are planned with their service sides facing the cul-de-sac, which in itself is reasonable; however, mothers in the kitchens for quite a lot of their time find that they can supervise their children better on the
service side rather than in the yards adjoining the pedestrian ways. Secondly, the hard surface of the road is eminently suitable for children's wheeled toys, tricycles, trucks and roller skates, and there is insufficient room on the pathways for these. The grass of the park is not such a good surface for wheeled toys, and there would be objection to private lawns being used for this purpose. Stein himself has suggested wider paved path areas for play as well as a house plan with a through living room or kitchen which would allow better supervision on each side for the mother. Unfortunately, the age of the children who play in these culs-de-sac and require supervision is usually six years or under, many being three or four years old. At this age, children are often unaware of the dangers of moving vehicles, so that parents may well feel worried about the situation.

Pedestrian circulation in the superblocks is good, with an integrated pathway system connecting through to the central park areas, and underpasses - actually only one has been built at Radburn - connecting parks beneath feeder roads. The Radburn underpass has been used quite a lot in practice since it leads to the school and recreation area. There is one shortcoming in its design, however, in that the approaches are by ramp only so that side access by ramp or steps is discouraged. For this reason, there is a tendency for people living near the feeder road to cross the road itself; fortunately, this road is not heavily trafficked. This brings up the question whether the pedestrian-automobile separation has been carried further than necessary at Radburn. In the writer's opinion it is not possible to estimate just how necessary the underpass at Radburn is, since the original plan was not completed, with the result that a different traffic pattern than that for which the underpass was designed has been developed. Had the original plan been carried out, there is
reason to suppose that increased traffic on Howard Avenue would deter people from using the road and encourage almost universal use of the underpass. In traffic separation generally it is probable that wherever possible the pedestrian way should go above and not below the wheeled traffic. This, for the psychological reason that many people dislike 'tunnels' underground with their hint of claustrophobia. There is too a greater feeling of safety for some people when they feel they are above any possible mishap which may occur in traffic on the road. It is significant that LeCorbusier, among others, has carried this principle into practice at Chandigarh and proposed it earlier at St. Die where the whole town square was raised with traffic and service at the lower level.

Apart from the hazard of children playing in the culs-de-sac, traffic safety is high at Radburn. Only two road deaths have taken place there so far, and these on the main highway. This seems to justify the designers' claim that Radburn was the solution to the problem of living with the automobile. Direct pedestrian access to school, the swimming and paddling pools and recreation areas are provided, but not to shops, though this has been done in later examples of the superblock elsewhere. The park areas are used by children and adults fully and are not just showpieces as some critics have suggested.

The architectural basis of the visual form of Radburn consists of three main elements: the houses, most of which are detached or in groups of two or three; the planting, of which there is a great deal; and the floor, apart from the actual vehicular circulation, which consists of paving or grass. Houses are of brick or timber, often of both, comparatively simple and unpretentious in size and design. They are informally grouped, for all the order which the plan implies, though rigidity and lack of freedom have been leveled accusingly by some designers at
Radburn. But the writer himself was extremely relieved and pleasantly surprised to see just how informally American in character the scheme was, more generous and casual in manner than many of the more recent counterparts in Europe.

Similarity of materials, the common brick and usually white painted boards, provide some overall sense of harmony, but individual houses and groups are not particularly well related otherwise. The romantic style is well in evidence and the influence of the garden city is everywhere. Houses are 'cozy' rather than of a civic appearance; the sense of the individual dwelling unit is dominant, and its relationship to its neighbors occurs more by accident than by design. The scheme as a whole could not hold together at all without the very generous and ubiquitous help of nature. Stein himself, an enthusiastic proponent of the 'green sea' delights in the fact that now that the trees are a quarter century old "the harsh lines are subdued and enveloped by the verdure" and "above all it is the natural green that dominates and controls the picture."

In winter, the culs-de-sac particularly are a little sad, with the most unfortunate placing of telephone and lighting poles introducing a jarring note along one side of the road. Again, the road surface of patched concrete drains to the center, leaving odd pools and cracks in the middle of the road along most of its length. Although the center drainage is cheaper, its appearance is certainly not encouraging. The culs-de-sac, with a mixture of hedges, open lots and occasional fencing, might be called pleasantly varied, but the effect in the writer's opinion at least is one of disorder rather than the romantic confusion which passes for civic delight in the minds of some architects.

The pedestrian ways seem generally to be far more ordered, on the "best" sides of the house. With extremely lush planting, they seem a little too narrow for comfort, but produce quite dramatic contrast in spa-
cial experience when one moves from their tunnel-like length into the wide space of the parks beyond. It is interesting to see a development along these pedestrian paths which was not at all intended by the designers.

The gardens facing the paths were to have been continuous open grass areas which were to have the open character of the parks to which they lead. Instead, the fence line between houses and along the sides of the foot paths have been heavily planted by tenants with hedges, shrubs and trees, to form in many cases veritable walls of greenery. These prevent passers-by looking in, and provide small enclosed gardens which are very private compared with the service sides of the houses. This spontaneous desire on the part of the Radburn people to make these gardens private patios for themselves is extremely significant. It indicates that when the barrier of distance usual in many generously spaced American residential layouts is limited to a comparatively small spot size, then a more positive means of securing privacy must be obtained, in this case by high hedges.

This has given Radburn an interest and quality which the designers had not looked for, and yet in contrast to the park is quite interesting.

The park areas, open and generous, do not have the bare and uninteresting quality which the plan alone might suggest, and their spaces seem far bigger to the eye than actual measured dimensions might indicate. The reason for this is probably the tree groups which act as space modulators, also the irregular shape of the spaces, undulations in the topography and the hiding of many houses by trees, so that the edges of the parks as such are not defined in a precise way. One is impressed by the apparent effect of such a small number of houses having such a large area for private recreation. This illusion brings out probably one of the further peculiarities of this superblock plan. Although it is claimed in theory that all houses have one side facing the park and the other the service
entry, what does in fact happen is that only a small percentage - less than 20% - face the park directly, those at the ends of the culs-de-sac. Others merely face one another - hence one more reason for the demand for privacy and high hedges. This relates to the question of house spacing, a point on which Radburn has been criticized as offering lots which are too small for the houses. This is probably so, since the side yards are too narrow in many cases for adequate provision for light and air, and windows are generally omitted here. The side yards can hardly be justified as passageways, since service and garage facilities are all on one side of the house; the garages too have been responsible for decreasing the width of the side yards. However, in defense of this position it can be argued that with ample provision of space in the park for children's play, large plots are not really needed. Also, the importance of the detached house psychologically is very great with most parents whose ideal is the single house on its own lot, the "castle on the ground." This side yard has too the merit of the elimination of any acoustic problems and noise transmission which in row houses requires special attention.

The importance of Radburn has been its frank attempt to organize in a comprehensive manner many diverse physical and social elements - not the least of which was the automobile - which in themselves were not new or unique, but which when combined into an articulated pattern promised an example of a better form of community life.
GREENBELT, MARYLAND

This was one of the towns built under the Resettlement Administration of Roosevelt's New Deal program. The two others were Greendale, near Milwaukee, and Greenhills, Ohio. Greenbelt was located about 13 miles from Washington, and designed as a dormitory for workers at the Capital. The site was part farmland and part woodland, and in beautiful wooded surroundings. Between 1935 and 1937 the main area was built, consisting of five superblocks laid out between the broad parallel curves of Ridge Road and Crescent Road. The population of this area was just under 3000. In 1941 this population was more than doubled - up to 7,500 - by the addition of the "Defense Homes" built as part of the early wartime preparation.

The design philosophy of Greenbelt was based on the Garden City principles of Ebenezer Howard. The Radburn plan, or superblock, was used and the idea of the neighborhood unit was employed too. Connection to Washington and nearby towns was provided by the extension of Crescent Road, Ridge Road and South Way. These are the main links with the Washington-Baltimore Boulevard. Since Greenbelt is a comparatively isolated community, problems of heavy through and industrial traffic do not arise. As far as the internal automobile circulation was concerned, the main pattern of peripheral roads was not unlike Radburn. There was, however, some variation within the superblocks. Instead of the cul-de-sac, in most cases the service forecourt was used. It is important to remember that the reason for this, as Stein himself admits, was primarily economy, for Greenbelt was built in the depression for the lower income group. The origin of the service court had occurred in the studies by Stein for
the proposed development for Valley Stream, a project which was not actually built. The purpose of the court was to carry further the separation of automobile and pedestrian and the living areas. The design is based on the assumption that tenants in apartment blocks are willing to walk some distance from their car and garage to their house if the resultant economy in low rentals are a sufficient inducement. Thus, it is the economic factor that comes first in consideration, the rationalization of this in practice resulting in a different relationship between car, garage and house. The automobile is the secondary and not the primary factor considered here.

The advantages of this system of service or motor courts are that, first, it protects the houses from the noises and odors of passing traffic by placing them 60 or more feet from the peripheral or feeder roads; and, second, the space between is used for garages, services and parking areas so that paved surfaces are concentrated, and the cost of long culs-de-sac are avoided. Access to houses is by foot path from the service court. In some cases, the garages form a barrier between the court and the service yards of the houses, helping to some extent to prevent children from rushing into them without warning and providing a certain privacy to the houses in these cases. Stein claims in a somewhat euphemistic way that the entrance and surroundings of the house are protected from the annoyance of automobiles.

It is debatable as to just how far this experimental scheme of Greenbelt towns can be taken as typically desirable for the American way of life. The circumstances of their construction and the fact that most of the houses are of the row type is interesting in a country where the individual house is regarded as so absolute an ideal. However, it can be argued that a row house in Greenbelt might provide far better living conditions than the tenement areas of many large American cities. The
economics of housing and all the related problems are involved by these questions. What Greenbelt does too is to provide further evidence of the successful function of the superblock from the point of view of pedestrian safety with the benefit of comparatively lower cost but at the price of less convenience for services and automobile-house convenience.

In practice, the safety resulting from the garage court arrangement has proved reasonably good, though the problem of children's using them as play areas is even worse than at Radburn. Economy, presumably, and the existence of wide grassed areas suitable for recreation on each side of the peripheral roads of the superblocks have resulted in rather less internal park spaces - that is, park space as well defined as at Radburn. No paved play areas are available here, so only the garage courts provide for this. Besides the worry of parents about their children playing there, with cars entering or backing out of the parking lots, there have been complaints from neighboring houses of the noise due to these concentrations of play. Car owners too have complained that their cars were scratched or dented by the play of children. Attempts to lure children away from these courts by placing pieces of play equipment in areas between buildings have not been particularly successful. Service to houses by bulk delivery of fuel, etc., and fire protection is of necessity sacrificed by this type of layout. Apparently no objections have been raised by delivery men, according to a brief, informal series of interviews carried out by Clarence Stein himself.

Pedestrian circulation in Greenbelt is good in the original first section of the town which was completed with underpasses to the central area where shops, community center and schools are located. The second section, in the Defense Homes area, the pedestrian system has not been completed, and the contrast between this and the original area is inter-
esting. The old problems of children crossing the feeder streets at dangerous points arises, and all the accidents which have occurred in Greenbelt have been in the Defense Homes area. Underpasses where used have proved satisfactory though the slopes of the ramped approached are a little too steep for heavily laden shoppers or mothers with baby carriages. An unlooked for hazard has developed on some of these approaches in that children have used them as speedways for their bicycles. Perhaps this indicates that a separate pathway system should be provided for cycles too as in some Dutch and English examples.

The visual appearance of Greenbelt, as a result of the automobile courts, is not particularly inspiring. Architecturally, little more than functional necessity has been the share of the houses, built of painted cinder block or timber. A certain pleasing rhythm of gable ends has been achieved in the placing of house blocks end on to the roads, but planting has to be relied upon as a saving grace. In the original areas, low hedges have been planted and closing the small gardens on the service side of the houses which are a little reminiscent of the traditional British back garden; though not affording as much privacy, the hedges define the individual plots and modify the otherwise undifferentiated spaces, giving them a pleasant domestic scale. The contrast in appearance with the Defense Homes section again indicates how unpleasant the service areas look without such planting.

It is in the shopping center, school and community center area that evidence of some civic design is provided. Although the grouping of the shops and theatre is somewhat forced, generous areas are provided for car parking which is significant. Many people in Greenbelt live too far from the shopping center to walk on every occasion. The validity of the "pedestrian neighborhood" theory here is then already questionable. The shopping center foreshadows later designs of regional shopping centers.
where the automobile parking areas have become completely dominant in the composition.
Baldwin Hills Village - Plan of Superblock
BALDWIN HILLS VILLAGE

Like the Greenbelt towns, Baldwin Hills Village was another result of the long depression. It was put forward by three Los Angeles architects who, after long negotiation, succeeded in obtaining the necessary loans and mortgage insurance from the F.H.A. and the Reconstruction Finance Corporation. The scheme was eventually approved and construction started in 1941. The site consisted of 80 acres of almost flat land on what was the edge of Los Angeles. Since 1941 the post-war housing boom has changed the area so much that Baldwin Hills Village is now near the population and geographic center of the Los Angeles metropolitan area. Particularly interesting is the fact that Los Angeles has more cars per person than any other city in the United States - in 1941 even it was one car to every 2.5 people. This certainly should have provided sufficient incentive for some planned rationalization of the relationship between the automobile and residential life. In fact, the 'typical residential area' of gridiron or curvilinear layout has nowhere produced more congestion than in Los Angeles and the dominance of the motor car and the lack of apparent reason in the design of residential areas is exemplary. In an area like this, Baldwin Hills Village provides an example of an area designed for the automobile where contrast with the surrounding districts emphasizes its merits or demerits.

After considerable friction with the city authorities, the City Engineer and the Planning Board eventually approved the proposed superblock layout. This came after repeated disapprovals because they wanted to extend the nearby existing gridiron pattern and did not want any "new-fangled ideas" to disturb the status quo. Such a reaction may be regarded as typical where many professional planners, engineers and city authorities are concerned, and where the past pattern of development has been domin-
ated by the unimaginative examples of speculative builders and subdividers. Traffic circulation around the single superblock is comparatively simple; Rodeo Road, the only heavily used thoroughfare was relieved of local traffic by a secondary road which parallels it on the Village property. This provides a safe approach to the parking areas and garage courts. The two functions of through flow and access to the superblock are thereby separated and channeled with entrances to Rodeo Road at limited points only. On the periphery of the other surrounding feeder streets there is off-street parking space with indented curbs.

Within the superblock there are no streets or culs-de-sac. The garage courts of Greenbelt have been refined and developed to a far more polished solution. Within the court is one garage for each of the dwellings surrounding it and in addition one parking space per family, for their own or a guest's car. Also within each court are the public group laundries with washing machines. Less than four dozen families are served by a garage court and the location is similar to some in Greenbelt. However, there is far more space for automobiles to turn and maneuver in than at Greenbelt. Here the automobile can arrive, be stored and depart without endangering people and uninterfered with by through circulation. Access to the garage courts is restricted to a few chosen points between the garages, preventing children rushing into the courts. Where the garages are not in a position to act as a check, high wire fences with planted vines and shrubs have been located. The whole garage court is, therefore, screened from view, from noise and from smell. The actual distance which a driver will have to walk from garage or parking place to his house does not usually exceed 100 feet and may be much less. The layout plan seems close, therefore, to the optimum provision of group ed garages to serve houses.
Service to houses by vehicles can be made from the garage courts or from the off-street parking areas opposite the garden courts via the foot paths, depending on which is most suitable for the particular purpose. Indicative of the increasing number of cars in California is the fact that with one parking space and one garage per family there is a considerable demand for more automobile accommodations.

The problem of garage courts being used as play areas for children has been largely solved. This has been done by providing adequate play areas on the other side of the houses in the garden courts, which seem to be the favorite areas for play rather than the larger central park spaces. A tendency for children to play in the garages which did not have doors has been eliminated by providing them and keeping the garages locked. Special playgrounds for very young children are provided at the end of the garage courts close to the houses separated from the courts by a fence.

The houses themselves are of three basic types: single floor bungalows (55), two-story houses (216), and two-floor apartment houses. It is therefore a mixed development rather than the single family houses of Radburn. Behind the garage courts each dwelling is provided with a patio – a private outdoor living room instead of the low hedged gardens of Greenbelt and the high hedged ones of Radburn. These allow for private dining, sun bathing and children's play secure from the circulation of the garage courts. Second floor tenants of the apartment houses have private balconies in lieu of patios. All houses are built for rent.

Pedestrian circulation is very carefully designed so that the separation is complete and yet access to garage courts well provided for. The garden courts are open and are planted with shrubs and trees. The paths in these courts lead into the central park area where are located the
community building, the administrative building with tennis courts, and a child center with play spaces and equipment.

The visual qualities of Baldwin Hills Village reflect the clarity and functional integrity of the design as a whole. The architects - Johnson, Wilson, Merill and Alexander, with Stein as consultant - have achieved an excellent example of what can be done on a domestic scale to provide a sense of civic beauty in a residential area. The overall effect is of long horizontal lines and planes; "long green courts formed between the low buildings with low pitched roofs and deep eaves overhang accentuating the horizontal effect." Building forms are simple with interest obtained by use of two main building materials, of brick and painted wood, and the positioning of entrance porches, doors, windows and balconies. Different finishing colors are used in places to vary the general white paint which acts as a unifying tone. The buildings conform to the flat site but are not dominated by planting. Architecture is not dependent for its charm by concealment behind a mass of foliage. Trees and shrubs have been planted to compliment but not to compete with or dominate the building. Some of the garden courts are reminiscent of the work of Sir Raymond Unwin at Hampstead Garden Suburb, one of the best British examples of domestic design which preserves a nice balance between the true urban scene and the romantic jungle of the garden city.

In conclusion, it might be said of Baldwin Hills Village that it has attained an ordered visual harmony as a result of a well conceived and successful circulation pattern. Its form could only have arisen as a result of careful examination of the function and place of the automobile in the life of a residential area. It would seem that its boldness - one 80-acre superblock - is well adjusted to the scale of the automobile, and yet it preserves the domestic intimacy which a residential area must have
if it is to provide a satisfactory human environment. Other factors entered into the design as well as a satisfactory solution for the automobile, house relationships and pedestrian safety. These, especially the economics of the project, have not detracted from its success in the main issue.

Of the shortcomings of Baldwin Hills Village, it is a pity that the shopping center could not have been within the superblock instead of across Sycamore Avenue. An underpass would have been an advantage to a 30-acre public playground beyond LaBrea Avenue and Rodeo Road. A well-equipped playground and a swimming pool which have proved so successful at Radburn and Greenbelt are even more desirable in California. It had been hoped to build another superblock south of the existing one, so that both would have had enough children to support a school within one or the other. This unfortunately did not happen. Instead, a typical subdivision was built with the usual wasteful street pattern, in this case quite unrelated to the topography of the adjoining Baldwin Hills.
PARK FOREST, ILLINOIS

Park Forest Village is located thirty miles south of Chicago, and with the excellent rail commuting service is only 40 minutes from the "Loop". The project was begun in 1917 as a "new town" development by American Community Builders, Inc. - two large scale operative builders, Manilow and Sweet - and Philip Klutznick who had been the wartime commissioner of the F.H.A. at Washington. The idea of a new town rather than just another housing subdivision was based on the promoters' realization in the profits inherent in the services of a town if they were developed as well as the houses. Electric power and utilities as well as shops and eventually a large central shopping center could provide a handsome investment if the initial loans could be obtained to finance them.

The ultimate population of the town was to be 30,000 and an industrial park was intended to be developed just north of the residential area. Elbert Peets, who had had experience with the Greenbelt towns, was appointed planner and landscape designer, and so it was that some of the lessons of Radburn were applied - though not all! The plan provided for three main areas of development: the rental homes - 3,010 in number, occupying 316 acres; the "homes for sale" on an area of approximately 950 acres; the central shopping area of 53 acres, including large car parks. Standards of the neighborhood unit theory were employed in locating schools, though there is little physical definition of the neighborhoods as such.

The traffic circulation framework is related to the two main roads of Western Avenue and Sauk Trail. These run directly through the main residential areas, and although they can carry considerable traffic volume,
no limitation of access or particular care has been taken with junctions onto them. Junctions are not always at right angles to these main roads, many being quite oblique - Victory Boulevard, for example - and some junctions form cross roads. Notwithstanding the fact that most travel to Chicago at present is by train, if the town is eventually completed to the proposed population level of 30,000, and the industrial area is developed, both automobile and industrial road traffic will have the usual unpleasant and dangerous effects. To this extent, then, the main traffic framework would seem to be ill-considered, providing little evidence of the wide experience already gained in the United States and Britain in large projects on a new town scale.

The secondary road pattern and housing layout falls into two clear categories, though both are based on the curvilinear form. For the rental homes, curved streets are used, delimiting superblocks within which culs-de-sac lead to garage courts. Most of the houses in the rental area are the row type, arranged around the courts onto which the service sides of the houses face. The "fronts" of these houses look onto grass walks with footpath access to entrances. The homes for sale are invariably on a typical curvilinear layout plan, unrelieved in most cases by any open spaces or contrast to the monotonous repetitive curved blocks. Traffic circulation as such has received little consideration, the traditional pattern confirmed by drives to garages off access roads, the multiplicity of cross road junctions and the large proportion of street area to the site as a whole. The circulation in this area is, therefore, subject to most of the adverse criticism and advantages which were mentioned in the section on the typical residential area.

The rental houses were built first because of the need for rental units for newly married veterans; F.H.A., Section 608, made the financ-
ing particularly attractive in this case; there was a need to get houses built quickly and 3000 units was the optimum number for the installation of major utilities. It is extremely interesting to try and follow the reasoning behind the selection of two distinctly different methods of circulation and housing layouts as represented by the rental and sale houses. The rental houses were built first in the program of development of Park Forest, for until these were proved a success no houses for sale would be built. As part of the speculative policy of the developers, therefore, the rental houses should not be too expensive - row houses have been used - and the layout for roads and utilities should be as economical as possible, to minimize initial capital expenditure. And yet unless the layout plan was distinctly successful functionally as well as visually it could not hope to attract tenants. The developers were presumably willing, therefore, to chance the employment of one of the best American layout designers they could get - Peets, in this case - and let good design provide appeal. It is important too to realize that transient tenants, people who are in the process of moving about rather than at that stage in their lives when they have decided to settle and buy a house, would not be as fussy about their "temporary" accommodations as a prospective purchaser would. They would, therefore, not be too upset by a non-traditional layout and surroundings. In actual fact, the tenants of these houses were exactly what the developers had hoped for - young families with one or two small children, a large proportion of the husbands being young executives or professional men working for some large national business corporation and expecting promotion. In consequence of this, the men expected to be moved to various positions in different parts of the country until they obtained a more senior post and could settle in a more permanent location. This would seem to point to the economic value of the superblock as a lay-
out method for residential development - one of the chief arguments in its favor which has been reiterated by Stein and others for many years. However, it further indicates that even the large scale - and enlightened - speculator is not inclined to use the superblock for other than rental projects. The typical speculative curvilinear layout is still felt to be the safest financial answer, at least to what the man in the street regards as his "ideal home". The importance of these findings as evidenced so clearly by Park Forest cannot be overestimated.

In the rental homes area, the superblock development fitted as it were into what was basically a curvilinear plan. This was not accidental, for Peets provided a layout framework which could serve equally well for eventual development in the typical subdivision pattern or for cul-de-sac access. It is important to remember that Peets was not in control of the final carrying out of the work. Loeb, Schlossman and Bennet, a Chicago firm of architects, did this. The service courts are simple and have not received the detailed attention like those of Baldwin Hills. They are merely wide areas of paving without garages, where cars can be left, allowing sufficient space for parking and circulation - they are in fact "minimal" service courts. Economy was no doubt the reason for this. Had it been intended to use these throughout the scheme, a far more detailed and sophisticated solution might have been expected. As they are, they offer the disadvantages of a lack of safety for playing children, though "tot yards" for the very young children are actually provided for each court. Cars are not protected and are, therefore, liable to damage by children. Some fences and trees have been provided in these courts, and, largely due to the high standards of tenants, most of the courts are well maintained. Pedestrian access is satisfactory, though in practice it has been found that the paths in the green "malls" are
very little used, almost all traffic, pedestrian as well as vehicular, using the rear entry from the service courts.

Visually, the rental housing area is quite refreshing. The general effect is not dissimilar to an architectural model where the base is always green to simulate grass and the gardens are forgotten, for there are no gardens in this area. Regulations prevent laundry being hung out too, so there is an almost artificial air of tidiness prevailing. There is considerable variety in the shapes of the house rows and the courts, and various architectural finishes have been introduced; the roofs, for instance, have different color asphalt shingles and the exterior treatment may vary from group to group within a court. One feels that a quieter scheme, or, at any rate, a single color scheme for units which face each other might have been more successful, but the variety is popular with the tenants in this rental development.

The park side of the houses, formed by the green malls, are little used and the results of the layout in practice have confirmed the pattern of Radburn to a degree, though not Baldwin Hills Village to the same extent. A compact and active social life has developed around the service courts. The flow of "wheeled juvenile traffic", says Whyte, has determined which is to be the functional door in the home. The influence of the children in the social life of the rental areas of Park Forest is very great. The back door is the "functional" access door to each home here and determines the line followed by the housewife when she visits neighbors, gravitating towards houses within sight and hearing of her children and the telephone. Outdoor social life has become a

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back door affair, a situation which could have been obviated by larger parking areas adjacent to the street, more play facilities on the park side of the houses and possibly private patios as at Baldwin Hills Village. In these respects - children's play, particularly - it is quite amazing how little transfer of experience there is from the design of residential areas, of using past knowledge to improve the latest work. To this extent then the rental areas of Park Forest even have failed to utilize proven design experience. Unfortunately, this particular phenomenon is not a rare one in the field of architecture and city planning.

The visual pattern of the areas where houses are for sale are again like the typical residential area, though a little more care has been taken on some of the wider streets which have been selected for special landscape treatment with central grassed dividing strips and trees planted each side to form avenues. These, with the open school sites, and occasional sites reserved for future development, provide some relief to an otherwise uninspired suburban landscape - though delightful for the "green sea" enthusiast, for in a few years' time the trees will all but obscure the architecture completely.

After some years of experience with Park Forest, it is interesting to find that the new rental development houses are to have a different layout from the first designed. An effort is to be made to provide parking and delivery bays on the street opposite the green malls so that the rear of the house becomes much more private and circulation, guests and service concentrate at the "front" door. In the rear there are to be small private gardens, 25 feet long, behind each house. In between these gardens, between property lines, will be an area which can be used as the community decides. A Cooperative framework for the control and responsibility of these rear areas by the tenants is to be tried.
KITIMAT - PLAN OF NEIGHBORHOOD "A".

Neighborhood Center adjoins School, K6.1.
Underpasses shown by arrows.
Small neighborhood stores marked S.
Kitimat is projected as a city of ten neighborhoods.

Bisected laterally by a strong slope, and cut vertically by another, the town lies on three levels of irregular shape to which neighborhoods and traffic had to be fitted. Where roads from the various levels meet to form the single road out to the west (which leads across the river to the industrial area) is the city center. Neighborhood "A," to the northeast of this center, will be the first developed. Cutout shows the area of municipal incorporation. Large black point in middle is city center; shaded area is the industrial development.

- Elementary school
- Junior high school
- High school
- Church site
- Neighborhood center
- Upper business center

KITIMAT, BRITISH COLUMBIA
KITIMAT, BRITISH COLUMBIA

In a remote part of the coast of British Columbia, the new town of Kitimat has been started. The Aluminium Company of Canada are locating here what will eventually be the largest aluminium smelter in the world, and the large quantities of electric power required for this are supplied by a hydro-electric scheme developed by the Company about fifty miles into the mountains of British Columbia. Power is carred to the town for the smelter which will be the chief industry, though it is hoped to develop others based on the local timber resources.

The significance of Kitimat lies in the fact that many eminent American architects, planners and other consultants were called in to produce a master plan. Clarence Stein, one of the joint architects of Radburn and later Baldwin Hills Village, was appointed Director of Planning. Mayer and Whittlesey of New York, architects and planners, prepared the master plan. The original intention of these designers was to plan the town so as to utilize experience gained in Radburn and the Greenbelt towns, and to use the superblock and the principles of traffic separation which had been proved valid there.

The site of Kitimat was very broken and sloped steeply in parts, as the result of glacial action. The main road framework is adapted for this and could be termed generally curvilinear in form. One of the additional reasons for the curves is that they will act as windbreaks in the harsh winter months. These roads form the peripheries of the superblocks, each of which contains a neighborhood of varying size. Actually, each of these superblocks is divided by a through road which runs approximately through the middle of the area, and on which is located the Neighborhood Center. The peripheral roads are intended as "greenways" without any
houses built directly onto them. In practice, this has been found difficult to enforce, since in one area particularly where the road runs along a ridge having magnificent views, sites have been sought by some of the Company executives. It is important to note that no houses are to be built for rent at Kitimat; all will be for sale, one of the reasons for this being to encourage the workers to stay in the town and to prevent transient labor. This is such a remote area and the weather is so inclement that many people might feel inclined to leave after a short time.

Road design generally is very much subject to terrain but most junctions with peripheral roads are Tees. In some cases, cross road junctions occur on these peripherals - where the roads which cross the middle of superblocks begin. This is bad road design and hardly to be expected in a new town; where points like this occur, two staggered tee junctions should be used instead. Where cross road junctions occur within the superblocks themselves, they should not present difficulties, since the volume of traffic here will not be great and little chance of hazard should arise.

Within the superblocks, the loop street and the cul-de-sac have been used separately or in combination. Also in certain positions, curvilinear roads have been used in order to cope with the broken nature of the site. Generally, the plans published so far do not seem to be as promising as might be expected. The repeated loop streets each having 40 or more individual house plots are reminiscent of the subdividers' approach. Although foot paths run between backs of plots, the majority of houses have little direct relationship to the internal parks and it is doubtful whether any economies will be effected by this type of layout, notwithstanding the fact that the internal roads are not required to take heavy traffic. The detailed plan of Neighborhood "A", for example, seems to present a comparatively disorderly appearance after the clarity of
Baldwin Hills Village. The influence and lessons of that scheme seem to have been ignored at Kitimat.

Service vehicles in loop streets will have the advantage of going straight through without having to turn or reverse. This advantage is offset by the fact that pedestrians have to cross and walk along the curved ends to reach the access paths into the central park areas. This may be satisfactory from the point of view of safety since it has been questionable as to just how much traffic separation is required in the superblock itself at the local level. The culs-de-sac are provided with circular turning spaces of their own. Generally, all houses will have garages attached to them on the same block, and directly accessible by drives from the loop streets. Although the designers have made proposals for grouped garages in connection with some proposed row house blocks, these have not been accepted as yet and it is probably that mainly single and semi-detached houses only will be built.

The pedestrian circulation, as already mentioned, will take place on the local streets as well as on the internal foot path system. This system links through to park areas connecting under the peripheral roads to other superblocks, so that circulation to the schools which occupy some of the park areas will be quite separate from main road traffic at least. Park areas, if they are reasonably level, are used jointly for recreation by both schools and the neighborhood generally. The other park areas are formed by broken ground which is virtually unbuildable. No specific play areas for children are provided apart from the central parks.

Neighborhood Centers are centrally located in the superblock and the roads crossing them provide for direct vehicular service to the centers. Parking areas are provided and foot paths from the park areas link directly to the shops. The grouping of these centers is arranged to provide
for all the neighborhood needs, a cinema and recreation rooms as well as offices and shops. In some cases, the schools have been so located as to form part of the Neighborhood Center; this is particularly desirable since the school accommodation would be used in the evenings and weekends for communal and social purposes for the neighborhood.

It is not yet possible to tell what the visual appearance of the residential areas of Kitimat will be like. Houses built so far have been designed by Canadian architects or approved by the town from local contractors. Photographs of these so far published do not give cause for enthusiasm. The layout plans too in their present form may or may not offer pleasant architectural experience. In some of the areas, the result is almost bound to be similar to a speculative subdivision. In others, attempts have been made to provide varying kinds of repetetive rhythms reminiscent of some of the British new towns. How successful these will prove only time will tell. Altogether, the detailed layouts of Kitimat so far available indicate a variety of layout types - from culs-de-sac in a semi-Radburn form to loop streets, curvilinear streets, and some variations of the garage court. Since the policy of the Aluminium Company is to allow as much freedom to builders as possible, the master plan is only a guide. It cannot, therefore, show what the final pattern will be. What is clear, is that the combination of this policy, the nature of the site and the work of the designers will result in something very different in many respects from Radburn, the Greenbelt towns or Baldwin Hills Village.

The shopping centers, schools and town center development, also in the drawing board stage, seem from sketches to be far more promising. The pedestrian plaza and mall characteristic of the regional shopping centers in the United States seem to be accepted as desirable forms. This is all to the good, and the Neighborhood Centers may provide some excellent examples
LEVITTOWN, PENNSYLVANIA

Levittown, in Bucks County, Pennsylvania, is the second large scheme tackled by the Levitts after their first development in Long Island. On a site of 5000 acres, which was purchased complete, is to be a community of up to 60,000 people. Unlike the Long Island scheme, which was a piece-meal development, the Pennsylvania scheme was planned completely before any building was started. Provision was made for residential areas to be laid out on a grouped neighborhood basis; a town shopping center, industrial area and railroad station were included in the new town.

The main circulation pattern was formed by main traffic roads which divide the town area into approximately eight "master blocks" of about one square mile each. These roads form the peripheral boundaries of the master blocks, and from each side of the rough squares of the block are two or three entry points leading to the inner neighborhood road systems. Each master block has three or four neighborhoods and a central area devoted to a school, recreation area, swimming pool and a few small neighborhood stores. The neighborhood road systems consist of a series of roughly parallel, slightly curved streets, terminated by roads at each end which lead directly to the center of the master block. The traffic circulation has, therefore, been designed to allow through traffic on the main roads; it has limited entry points into the residential areas and within these has used a rationalized curvilinear system which has utilized the Radburn device of road naming as an aid to orientation within the streets; e.g., in Stoneybrook neighborhood, streets all begin with the letter "S" - Stream, Sunset, Summer, etc. There is no further breakdown of circulation, garage drives being typical of the usual curvilinear layout directly off the street. Single family houses only are used, with-
out row or apartment blocks.

Conscious of the problems of monotony inherent in the use of standardized house types - three different types at the most - the Levitts have made some effort to overcome these difficulties. Limitation of available basic designs has enabled the Levitts to offer a house of good value based on standardized production on a large scale. The methods used to obtain variation in external appearance are interesting, though these apply to varying extents in other speculative works. First, the slightly curving street layout controls the view so that only a limited number of houses can be seen at any one time; the position of the standard house on the site is varied, showing different elevations to the street; additional individual variations like car ports and porch screens are available as extras to the house; color on the wood siding and trim is varied - seven standard colors are available. The main factor relied on for visual interest, however, is the planting of trees and grass in the true romantic landscape tradition. Considerable expenditure on fruit trees, shade trees, shrubs and creepers has been made, and the Levitts claim that the residential area will "present a garden-like appearance". Another lesson of Radburn has been used at Levittown to advantage, and that is the universal use of underground electric and telephone cable, eliminating overhead wires and unsightly poles.

Perhaps the most significant point about Levittown is that it really does attempt to produce a rational solution to the problem of automobile circulation. The master blocks are analogous with the superblock although the scale of the former is much greater. To some extent, Levittown could be regarded as a test piece in which the success of safety and efficient traffic circulation could be checked against the circulation in Baldwin Hills Village, for example. The claim that the type of superblock used
at Radburn is unnecessarily "separatist" at the final level of local streets has been suggested, but there is no conclusive evidence to support this. It would, therefore, be extremely valuable to make such a detailed check in the case of Levittown, to see exactly how well the circulation pattern works.

The other point of significance about Levittown is that the speculative builder is realizing that good design does pay, or that planning rather than no plan has a real value. This applies to the circulation pattern and also to the provision of community facilities like swimming pools, school sites, etc., as part of the provision of a Levittown development. Not only is good planning a good selling point but it reflects a heightened responsibility on the developer's behalf - a realization that he has a more significant role in life than merely making money. At Levittown, the speculative builder is in fact developing a new community in a far fuller sense than ever before.
BROADACRE CITY
BROADACRE CITY

This project, designed by Frank Lloyd Wright in the early '30's, is meant to provide an example of the ideal pattern for the future city; one which is not specifically urban or suburban but which would cover a continuing region with living places and industrial points varying in the relative concentration from place to place. The basis for Broadacre is "general decentralization" as an applied principle with a harmonious architectural reintegration of all units into one large fabric. Each person living in Broadacre would have "at least one acre of land" - farmers would have up to ten acres. The principle of decentralization would be based on

1. the use of the motor car, with the resultant automobility of people;

2. the use of the helicopter for air transport and of monorail cars - with speeds up to 200 M.P.H. for fast ground transport;

3. the use of radio and mass communication media and electricity for this and industry;

4. the acceptance of machine production and invention based on electricity.

The unit of land division for the whole city is an acre.

Wright's economic and land policy ideas are based on those of Henry George and Ralph Borsodi. Control of design and land use is in the hands of the architect, who becomes "the agent of the State in all matters of land allotment or improvement, or in matters affecting the harmony of the whole. All building, as landscape, is subject to his sense of architecture." This interesting and radical notion of absolute architectural control of all development can easily be criticized as technocratic, and it undoubtedly is; however, the need for some degree of architectural control is more than evident in cities. In Britain, the Town and Country
Planning Act of 1947 did in fact provide measures for the "control of architectural design" and "the preservation of amenity". It is probable that similar legislation will eventually be passed in the United States.

The model of Broadacre City shows four square miles of a typical countryside developed to accommodate 14,000 families. The houses are of various sizes and cost, the number of automobiles being the standard used - one-car, two-car, three-car or five-car houses. The traffic circulation of Broadacre is based on a hierarchy of ways. The monorail cars are the only ones fixed to the arterial; motor cars are on 12 lane highways, on a level below these are triple truck lanes for heavy industrial road traffic. There are no grade crossings or left turns on grade. For pedestrian safety an inlaid perfling is used instead of curbs or ditches, over which the car cannot go without damage to itself.

The superblock principle has been used within a large gridiron system. In one very large superblock, for example, a number of major culs-de-sac lead into the center of the block with smaller culs-de-sac leading off to the various houses; the smaller roads are almost private drives to the middle of the small estates. In the central area of this superblock are placed schools. In principle, there is, therefore, a great similarity between this and those in the Radburn and Baldwin Hills Village. The chief difference lies in the scale of Broadacre, where instead of eight houses to the acre, there is one house to three or four acres or more. This difference in density may have difficulties from the viewpoint of land economics, but in the Broadacre society, "there can be no land speculation". The essential services of water and electricity are bound to be more expensive at low density of course, though ultimately disposal of all waste could be dealt with by each individual house.
Visually, Broadacre would present little of the tight civic design which has characterized some of the finest cities in western civilization. The new scale and density eliminates this largely, though at specific points where schools and shops, etc., are grouped - at the "county seat", the administrative and local government center for the area, buildings would presumably be arranged in civic groups. Apart from this, the extremely low density would provide a landscape of park-like scenery with occasional houses and other buildings dotted about and an absolute disappearance of the contemporary urban scene. In its place would be a development of a low density suburban character that can only be paralleled at present by the semi-rural luxury residences of the highest income groups.

The final implications of Broadacre are not, of course, new. The possibilities in the use of our present technological advantages, including the automobile, have long been realized by physical planners. Wright's solution is to some extent a mixture of the garden city ideal and the regional planners' ideal - a comprehensive use of resources freed by swift transport and electrical power for industry. In theory, the resulting decentralization and new urban-rural pattern is feasible, but within our present framework of land tenure and social and political structure the advanced "creative artist's vision" is regarded as a socialist or communist pattern. The value of Broadacre, perhaps, is not in its detailed planning for the automobile in the residential areas, though it is significant that Wright uses the superblock; but his recognition of the place of the automobile in life at large, an efficient, swift transportation tool, which, while it must be planned for with care for pedestrian safety, implies far more in terms of residential living possibilities than are rea-
izable for most people today. Broadacre is then a philosophical design, "a conservative interpretation of our vast machine age resources", an idea of what the residential area could be like if man could overcome the difficulties attending the attainment of this apparent ideal.
SECTION IV

ANALYSIS
SUMMARY ANALYSES OF RESIDENTIAL LAYOUTS

The following analyses examine the layout of one typical residential area - Weathersfield - and four examples of the use of the superblock - Radburn, Baldwin Hills Village, Park Forest Village and Kitimat.

Weathersfield, Natick.

<table>
<thead>
<tr>
<th>Circulation</th>
<th>Assessment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General Circulation</td>
<td>Fair</td>
<td>Bad junction of entry road (Weathersfield Road) with Worcester Turnpike. There is need for an underpass for traffic coming in from the west and leaving Weathersfield for the east. Slowing down lanes are needed for entry from the east and exit west.</td>
</tr>
<tr>
<td>2. Local Circulation</td>
<td>Fair</td>
<td>Overall road pattern curvilinear but poorly related to contours of site. No differentiation of road width and importance; this quality and lack of any reasoned pattern produces a confusing layout which would discourage through traffic at least, but which is no help in orientation or for local circulation.</td>
</tr>
<tr>
<td>3. Service to Houses: garage and family use.</td>
<td>Good</td>
<td>Garages form part of houses and are directly accessible into houses. Drive from road to garage direct.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Direct from road side to front door or around to rear of house. Plenty of room for parking service vehicles without affecting through road circulation.</td>
</tr>
<tr>
<td>4. Parking</td>
<td>Fairly good</td>
<td>Sufficient room in drive for two vehicles and roads wide enough for parking both sides, still allowing through circulation. No indented curbs or specific parking areas provided.</td>
</tr>
<tr>
<td>5. Pedestrian Circulation and Safety</td>
<td>Fair</td>
<td>Sidewalks provided along roads with narrow grass verge between. No separation of function as in superblock. No provisions for crossings at road junctions, or hard surface across grass verges. Traditional footpath pattern.</td>
</tr>
<tr>
<td>6. Children's Circulation and Play Areas</td>
<td>Poor</td>
<td>Circulation on sidewalks as mentioned above is not particularly good for small children. No specific play areas provided. Driveways</td>
</tr>
</tbody>
</table>
6. (Cont.)

and sidewalks used for wheeled toys, also roads with accident hazard high. Lawns of houses large enough for play otherwise, and absence of plot boundary fences helps this.

7. Opportunity for Social Contact

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>Good</td>
<td>Mainly along same side of street and via rear gardens. No fences.</td>
</tr>
</tbody>
</table>

8. Opportunity for Family Privacy

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>No patios or screened or walled areas in gardens provided. Privacy obtainable within house only.</td>
</tr>
</tbody>
</table>

9. Visitors

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fairly good</td>
<td>Initial difficulty with orientation inevitable, otherwise quite satisfactory. Adequate parking space; entry direct from street to front door.</td>
</tr>
</tbody>
</table>

---

**Visual Qualities**

1. Order and General Harmony

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fair</td>
<td>The order is the result of repetition of plots and houses of approximately the same size over the whole residential area. The topography provides the only general variety, with changes in ground level; otherwise the layout is extremely dull, without any interesting landscape or architectural features to provide contrast or relief. General effect of being well kept and tidy, if uninspired.</td>
</tr>
</tbody>
</table>

2. House Relationships

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor</td>
<td>The only relationships physically are similar sizes of houses and relative positions on the site. No attempt at any group relationships or architectural compositions of any kind. Each house treated as a separate unit, with color and decoration to emphasize individuality; however, the effect achieved is strictly superficial, since basic forms and house plans do not vary greatly. The lawns which run through provide a unifying floor element, which, with the roads, dominate the scene.</td>
</tr>
</tbody>
</table>

3. Materials, Color and House Types

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Fair</td>
<td>All houses are of timber, with asphalt tile roofs. Both roofs and walls vary in color from one house to the next, some houses looking quite pleasant architecturally in a simple and unassuming way. Most houses of same basic plan and approximately similar in size and shape. No three-dimensional variety in houses.</td>
</tr>
<tr>
<td><strong>4. Spatial Pattern</strong></td>
<td>Poor</td>
</tr>
<tr>
<td>------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Limited spatial experience possible, little effect of street rhythm, although houses are repeated. This because they are not important elements in the general landscape. Effect of everything being &quot;wide open&quot;—prairie planning. No contrast in spaces, no surprise, no private spaces; an overall sameness which is visually boring.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>5. Landscaping and Civic Qualities</strong></th>
<th>Fair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lawns and gardens are all well tended and maintained, especially front lawns. Most planting consists of young trees and shrubs which are too immature yet to judge final effect. They will probably not be sufficient to change the very open feeling of the layout even when full grown. Telephone poles and wires are very prominent in the landscape. Although untidy and ugly they do provide the only vertical elements in the horizontal and open character of the whole scheme, and are in this sense something of a relief. There are no buildings other than houses in the layout, so no architectural contrast is available. There is no hope of civic delight in this scheme which by its very nature is quite unable to provide anything of the civic qualities of architectural or building composition. It is a layout of medium priced modern &quot;ranch type&quot; houses, which are individual homes. No expression of civic harmony is evident and it is doubtful whether any of the residents would have it otherwise. To this extent then, Weathersfield is a true reflection and a good example of the typical American's lack of interest in his physical surroundings, beyond the immediate satisfaction of the individual home on its own site.</td>
<td></td>
</tr>
</tbody>
</table>
### Radburn, New Jersey

<table>
<thead>
<tr>
<th>Circulation</th>
<th>Assessment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General Circulation</td>
<td>Fairly good</td>
<td>A few junctions poor; study needed to determine peak hour effects of traffic at entries to culs-de-sac.</td>
</tr>
<tr>
<td>2. Local Circulation</td>
<td>Fair</td>
<td>Turning space at ends of culs-de-sac inadequate; road widths insufficient for passing parked cars; bottleneck at entry possible due to this. Single entry only for fire-fighting or ambulance, again with limitation of width.</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>Adjoins house.</td>
</tr>
<tr>
<td>4. Parking</td>
<td>Poor</td>
<td>Insufficient and limited maneuvering space for additional cars - guests and service vehicles. No indented curb parking on peripheral road.</td>
</tr>
<tr>
<td>5. Pedestrian Circulation and Safety</td>
<td>Good</td>
<td>Near optimum conditions of safety due to traffic separation - except children (see below). Value of underpasses not determined fully, since original scheme not completed.</td>
</tr>
<tr>
<td>6. Children Circulation and Play Areas</td>
<td>Fairly good</td>
<td>Circulation within parks and area generally excellent, especially school route. Play areas poor - no specific hard surface areas provided. Result - play in culs-de-sac, with consequent risk and danger.</td>
</tr>
<tr>
<td>7. Opportunities for Social Contact</td>
<td>Fairly good</td>
<td>Within cul-de-sac only though. Little socializing across the pedestrian paths. As a total community, Radburn has an active social pattern.</td>
</tr>
<tr>
<td>8. Opportunity for Family Privacy</td>
<td>Good</td>
<td>Areas adjacent to pedestrian walks have been planted with hedge screens giving fairly good private outdoor dining space and garden.</td>
</tr>
<tr>
<td>9. Visitors, Orientation</td>
<td>Fairly good</td>
<td>System of naming culs-de-sac with same letter as park.</td>
</tr>
</tbody>
</table>

### Visual Qualities

<p>| 1. Order and General Harmony     | Fairly good | Generally good, especially from peripheral roads and internal parks. Spoiled by culs-de-sac, which seem somewhat service yard like and untidy. |</p>
<table>
<thead>
<tr>
<th>2. House Relationships</th>
<th>Fairly good</th>
<th>Single houses satisfactory block relationships, except at ends of culs-de-sac. Spoiled in latter by poor details - odd pieces of fencing and poles and overhead wires which are unsightly.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3. Materials, Color and House Style</td>
<td>Good</td>
<td>Red brick, white paint, simple variations using these materials produce overall harmony.</td>
</tr>
<tr>
<td>4. Spatial Pattern</td>
<td>Good</td>
<td>Considerable variety of spatial experience from the wide peripheral road, the narrowing cul-de-sac. The very narrow pedestrian walks leading to the wide generous spaces of the internal parks. Considerable interest, no monotony.</td>
</tr>
<tr>
<td>5. Landscaping and Civic Qualities</td>
<td>Fairly good</td>
<td>General dominance of planting, tendency of green areas and trees to hide architecture. Designers have relied on this device, which is characteristic of the garden city ideal. Lost in this green sea, architectural qualities cannot be seen sufficiently to hope for success.</td>
</tr>
</tbody>
</table>
### Baldwin Hills Village

<table>
<thead>
<tr>
<th>Circulation</th>
<th>Assessment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. General Circulation</td>
<td>Good</td>
<td>Only one superblock is involved, but along the one main traffic road a secondary road is provided parallel to it, from which access into the superblock is possible.</td>
</tr>
<tr>
<td>2. Local Circulation</td>
<td>Good</td>
<td>The garage courts are based on the Radburn cul-de-sac and Greenbelt service court, with considerable improvement. Excellent vehicular circulation; garages provided and turning areas adequate; access points to houses limited.</td>
</tr>
<tr>
<td>3. Service to Houses: Family use, and garages.</td>
<td>Fairly good</td>
<td>Maximum walking distance, garage to house, about 100 feet. Even so, not so convenient as houses with adjoining garage. Delivery service is convenient from chosen access points in the garage/service courts.</td>
</tr>
<tr>
<td>Deliveries.</td>
<td>Good</td>
<td>Adequate space for guests' and visitors' cars - some within court, some off street parking with indented curbs.</td>
</tr>
<tr>
<td>4. Parking</td>
<td>Good</td>
<td>Adequate space for guests' and visitors' cars - some within court, some off street parking with indented curbs.</td>
</tr>
<tr>
<td>5. Pedestrian Circulation and Safety</td>
<td>Good</td>
<td>Within the single superblock. No underpasses to adjoining development which is of different type. Pedestrian footpath system in garden courts and park areas well used.</td>
</tr>
<tr>
<td>6. Children's Circulation and Play</td>
<td>Good</td>
<td>Problem of conflict of use, garage courts and children's play, is largely overcome. Tot yard fenced at the end of garage court. Limited access points into court; hard paved areas for wheeled toys provided in garden courts and park.</td>
</tr>
<tr>
<td>7. Opportunities for Social Contact</td>
<td>Good</td>
<td>In garage courts and adjoining rear gardens, and in garden courts where children play.</td>
</tr>
<tr>
<td>8. Opportunity for Family Privacy</td>
<td>Good</td>
<td>Patios provided on rear side of houses for outdoor dining and relaxing.</td>
</tr>
<tr>
<td>9. Visitors</td>
<td>Fairly good</td>
<td>Parking for cars adequate. Entry to houses can be via garage court or garden court, depending on where car is left. Entry side not so obvious or clear as in typical residential layout. Orientation with only one superblock is not difficult. Information on street names not available and there may be some difficulty visually, due to similarity of some of garage and garden courts.</td>
</tr>
</tbody>
</table>
### Visual Qualities

<table>
<thead>
<tr>
<th>1. Order and General Harmony:</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>garage court.</td>
<td></td>
</tr>
<tr>
<td>garden court.</td>
<td>Good</td>
</tr>
<tr>
<td>park.</td>
<td>Good</td>
</tr>
</tbody>
</table>

- These courts are screened from peripheral road by positioning of first garage block. Inside they are tidy and present well ordered appearance.
- Fine sense of enclosure; good domestic scale without any forced effect.
- Delineated by house blocks rather than dense foliage as at Radburn. Need for additional focal points like swimming pool, to encourage maximum use.

<table>
<thead>
<tr>
<th>2. House Relationships</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
</tbody>
</table>

- Problem simplified by use of row houses, but positioning of blocks and general massing is excellent. The claim that each house has a view of the park made at Radburn (but not true there) is true here.

<table>
<thead>
<tr>
<th>3. Materials, Color and House Types</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Brick and timber used with shallow pitched roofs and deep overhanging eaves. Most timber is white, but various other colors are used in different courts to provide additional variety.

<table>
<thead>
<tr>
<th>4. Spatial Pattern</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Considerable variety of spatial experience, as at Radburn, but in a more controlled architectural sense. The garden courts are of different shapes and sizes, sometimes enclosed, sometimes with open ends, and provide excellent examples of a pleasing human scale within what is a very large superblock. The green park areas do not dominate as at Radburn, but each house does have a generous view of part of garden court as well as its own private patio space.

<table>
<thead>
<tr>
<th>5. Landscaping and Civic Qualities</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- The green areas, while forming the main background at Baldwin Hills Village, do not dominate the scene as completely as at Radburn. Planting of trees and shrubs has been done in a restrained way to enhance and complement the architecture rather than dominate it or cause its disappearance. This indicates that man is still in control of nature and that the architecture, which is worth seeing, can indeed be seen. Wild romantic naturalism is not in command, and a pleasing, simple civic dignity characterizes the layout.
### Circulation Assessment Remarks

<table>
<thead>
<tr>
<th>1. General Circulation</th>
<th>Poor</th>
<th>Little differentiation in overall traffic framework. Many junctions on main traffic streets, also houses fronting onto them. Junction design poor, many cross roads.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Local Circulation</td>
<td>Fairly good</td>
<td>Superblock used is a development of the Greenbelt type, but without the careful detail of Baldwin Hills Village. Short lengths of approach road (50 – 120 feet) link service courts to street.</td>
</tr>
<tr>
<td>3. Service to Houses: family use.</td>
<td>Fairly good</td>
<td>Distance from court to houses not more than 100 feet, often less. None provided; problem of children playing about them.</td>
</tr>
<tr>
<td>4. Parking</td>
<td>Fair</td>
<td>A little more room desirable for parking and turning of service vehicles.</td>
</tr>
<tr>
<td>5. Pedestrian Circulation and Safety</td>
<td>Fair</td>
<td>Insufficient area for guest parking in courts. No provision for indented curb parking on streets.</td>
</tr>
<tr>
<td>6. Children's Circulation and Play Areas</td>
<td>Fair</td>
<td>Adequate green malls for front access to houses, but these do not always lead to a park area. Malls used very little in practice. No underpasses linking superblocks.</td>
</tr>
<tr>
<td>7. Opportunity for Social Contact</td>
<td>Good</td>
<td>Circulation within superblocks satisfactory for small children, apart from service courts which are not separated from the adjoining lawns of houses. Potential accident hazard in that respect. Tot yards provided for very young children, but otherwise no specific play areas. No underpasses for school routes.</td>
</tr>
<tr>
<td>8. Opportunity for Family Privacy</td>
<td>Poor</td>
<td>Within service courts a very strong social pattern has developed; active community spirit which tends to embrace everyone willy-nilly. Results in extremely active social life with many clubs, meetings, etc.</td>
</tr>
<tr>
<td>9. Visitors</td>
<td>Fair</td>
<td>Privacy virtually impossible in courts, except for social outcast or recluse. This is the &quot;other directed&quot; society at its most active. Great difficulty to obtain a balanced family life, in sense of some private and some public activities. Tendency to all public or nothing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>After first visit, all visitors use service court and enter through kitchen. Green malls not used.</td>
</tr>
</tbody>
</table>
### Visual Qualities

<table>
<thead>
<tr>
<th>1. Order and General Harmony</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of row house blocks with careful variation in the design of the courts. Restrictions on flower gardens and hanging out washing have produced a slightly artificially ordered appearance, that of a well-kept model village, in the service courts as well as the green malls.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. House Relationships</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Row house blocks are more casually related than the slightly formal arrangement of Baldwin Hills, but the designer has obtained pleasing compositions with the simple elements.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Materials, Color and House Types</th>
<th>Fairly good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Houses are built of brick and timber, with asphalt shingle roofs. Walls and roofs are colored with variations in the same court. Such contrasts are enjoyed by the tenants, but tend to disrupt the architectural coherence of courts.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Spatial Pattern</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>The size and shapes of courts vary, as do the green malls. The variety of spatial experience is not so great as at Radburn or Baldwin Hills, largely due to lack of differentiation of treatment - green lawns everywhere. The repetition of courts becomes a little monotonous perhaps, and welcome relief is provided by the surrounding woods of Sauk Forest and the central shopping area.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Landscape and Civic Qualities</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Although considerable planting has been done, some restraint has been employed, allowing the house blocks to dominate the composition with a pleasant domestic quality. The courts and malls are well-kept and the tenants' own standards are generally high, resulting in a sense of civic pride which is an interesting contrast to the other area of homes for sale, where the typical subdividers' layout is used.</td>
<td></td>
</tr>
<tr>
<td>Circulation</td>
<td>Assessment</td>
</tr>
<tr>
<td>-------------</td>
<td>------------</td>
</tr>
<tr>
<td>1. General Circulation</td>
<td>Good</td>
</tr>
<tr>
<td>2. Local Circulation</td>
<td>Fairly good</td>
</tr>
<tr>
<td>3. Service to Houses: family use and garages. deliveries.</td>
<td>Good</td>
</tr>
<tr>
<td>4. Parking</td>
<td>Fair</td>
</tr>
<tr>
<td>5. Pedestrian Circulation and Safety</td>
<td>Fairly good</td>
</tr>
<tr>
<td>6. Children's Circulation and Play Areas</td>
<td>Fair</td>
</tr>
<tr>
<td>7. Opportunity for Social Contact</td>
<td>Fairly good</td>
</tr>
<tr>
<td>8. Opportunity for Family Privacy</td>
<td>Good</td>
</tr>
</tbody>
</table>

*Since this new town has only just been started, criticism can only be made from plans available at present. It is probable that changes will be made in many respects before the town has been completed.
9. Visitors

Neighborhoods are well defined physically, so general orientation should be satisfactory. Information on street naming, etc., not available.

Visual qualities in Kitimat are not assessable yet, since so little has been built. Generally, they should provide a compromise between the typical residential development and the Radburn single house super-block layout. House types so far proposed are not very interesting, but sketch designs for neighborhood shopping centers and schools seem very promising. The shopping centers particularly, using the enclosed pedestrian mall of the regional shopping center type (as at Detroit), have great potential qualities of civic delight.
The relationship between the residence automobile and home is the ultimate stage in considering the automobile as a factor in the design of residential areas. The important question is whether one can have the convenience of the car on one's own lot with all the advantages this offers in terms of family convenience, or whether these advantages should be sacrificed to safety for the children, and pedestrians generally, treating the automobile as a rather dangerous animal. Automobiles are becoming larger, more powerful, faster and more numerous, so that unless the house is in an area of very low density, safety is becoming an increasingly urgent need. The ideal solution would be to provide both the advantages of having the car on the lot, together with the advantages of safety which traffic separation and the superblock seem to offer.

The advantages of having the car on the lot are many; first, there is the convenience of exit and entry in bad weather - the driver and his family can be protected completely from exposure, either by direct access from garage to house, or by a covered way connecting the two; the short physical distance too is a great advantage, if any goods, shopping parcels or luggage are to be brought from car to house; babies and young children who have to be carried, the old and infirm and invalids also benefit from a garage and drive on the house plot. The garage can also provide additional space for activities besides mere storage of the car; a workshop for the husband, storage space for garden tools and garden furniture, for children's wheeled toys, and a dry play area for the children on wet days, etc., etc. To remove the garage into a group in the service court - where for safety it is locked - for the sole purpose of car storage can therefore be considered something of a waste of potentially useful space.
Against this argument can be set the contention that the walking distance from a service court in, for example, Baldwin Hills Village, is not more than thirty or forty yards, which is certainly not as much as the average distance most people carry their shopping parcels in the shopping center, or the distance walked from their car park to office in the city. Again, the apartment dweller, particularly if it is a high-rise block, will take far longer to get from his car to the door of his flat than the Baldwin Hills resident. It can also be claimed that the automobile is designed for the outdoors and does not in fact need a garage at all — or at the most limited protection from the most severe weather in a car port. This last point is probably strongest in its economic aspect, for a family with two or even three cars may not wish to go to the expense of putting them all under cover, lock and key. However, whether it be garage, car port or just a parking space, the car on the lot is still considered an essential of life by many Americans. Though the planner may wish to educate the layman into leaving his car somewhere else, the answer will always be a request to have one's cake and eat it too — the car on the lot as well as optimum safety conditions.

One final argument is used by the supporter of the typical residential area subdivision; this is the one which claims that it is extremely unwise to try any separation of car and pedestrian really, because, since the car is such an important factor in American life, the sooner people get used to living with it the better. This hardy advocate would have adults and children conditioned to the automobile on their doorsteps and expose infants to the wheels of moving vehicles, in the pious hope that they would be so conditioned that they would develop immunity from accidents. This argument has been taken further to accuse the superblock dwellers of so cloistering their children from the wicked automobile that immediately
they get into the auto-ridden city they are killed. There is, of course, a grain of truth in this plea, but the idea has obviously been carried to an extreme. The fallacy of the argument is proved every day when citizens and children in areas ideally designed to provide maximum contact and "automobile conditioning" are killed or injured by moving vehicles. Eventually, when wisdom takes the place of expediency and the greed of land speculation, the auto-ridden city will no longer exist and the pedestrians will once again be able to enjoy the civic pleasures of a town without risking their lives so often.

One further important point in considering the relation of the garage on the plot is that of entry for both resident and visitor. The importance of entry for them both has been well described by R. W. Kennedy. Entry to a house through the kitchen, for example, is not ideal for resident or guest. It may be tolerable in certain situations, but is to be avoided if possible. This is an important factor in considering the position of the garage and the side of the house from which access from the car is obtained. Guests sometimes arrive with the resident of the house, in which case they will use the same entrance as he will. In the superblock this will usually be the service side of the house. If they arrive independently, it will depend on where they park their cars, in the garage court or elsewhere. Again, ideally the site plan of the house should be such that whether arriving with their host or on their own, guests should be able to arrive naturally at the main entrance of the house. The present superblock plans do not allow for this, and further development in their design is required if this problem is to be solved.

In considering the possibilities of reaching an ideal solution, it is convenient to analyze the stages and types of solution already current:

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1 See The House and the Art of Its Design, R. W. Kennedy.
1. The typical subdivision with single family house - optimum car to house convenience, but all the traffic dangers already mentioned.

2. The group garage solution - this has been advocated in schemes for various reasons, the chief being that garages are difficult elements to harmonize architecturally in a street facade; this is particularly so if the row house is being used and economy of frontage is sought. This idea has been used extensively in the British new towns, also in Kitimat, B.C. It is not, however, particularly relevant to the average American residential area, except in the case of apartment buildings and special circumstances.

3. The service lane or mews has been used with considerable success in the past. In the horse carriage days, fashionable houses were often provided with stables at the back of the property, as in many of the Georgian areas of central London and elsewhere. Visitors and the residents used the front entrance, and the coachmen took the carriage around the service lane to the back, sometimes living over the stables themselves. The adaptation of this type of circulation to the automobile standards and smaller less expensive houses has not proved very satisfactory, due to the expense involved in building two roads to serve both sides of the house, though functionally it has much to recommend it.

4. A variation on 3. above is the small cul-de-sac garage court which offers similar convenience of having the automobile on the house plot, with a way from the lane through the garage and garden to the house. In both 3. and 4., however, the old problem of traffic danger on the street is not overcome.

5. The Radburn plan provides a satisfactory solution in many ways for traffic safety and garage-house convenience, but the "back alley" entry character of the cul-de-sac is not particularly pleasant, and the problem of children
playing there is a hazard.

6. The simple service court of the Park Forest type merely reverses the access of resident and visitor; the service court becomes a social gathering place for everything and the green malls are unused. Guests enter through the service area of the house and family privacy hardly exists.

7. The garage court of Baldwin Hills Village gets very close to the ideal of convenience and safety, but physical separation of garages by grouping them around the court still necessitates the walk to the house. In Californian climate, this is seldom a hardship as far as the weather is concerned, but other advantages mentioned earlier are lost. However, the position of the guests' parking on the periphery of the superblock is quite satisfactory, for their access to houses is via the garden court.

8. The cul-de-sac with garages attached to houses is proposed by the C.I.A.M. group of Philadelphia, and is based on the assumption that "the automobile is a member of the family." This system provides admirable opportunities for convenience for the family use of the car, but the play area is located on an island in the center of the cul-de-sac, with the road around it. This is too close to the idea of auto conditioning really to site a playground on the island, also there is no room for car parking for guests. However, the superblock is used, and with some adjustment for guest parking adjoining the peripheral road, the scheme could be improved.

9. The parking court entry proposed by the Boston group of the C.I.A.M. assumes that all movement into and out of the residential area will be by automobile. Entry and exit points are therefore in the parking area of the garage court. The court provides covered ports or garages for residents' cars, with parking spaces for guests and service vehicles at the peripheral road adjoining the entry, which is through the court. Beyond the court is a common service area for pedestrians, which is partially

1Congres Internationaux d'Architecture Moderne.
covered for protection from rain and sun, and contains service boxes for mail and grocery delivery, automatic dispensing machines for milk, soft drinks, candy, cigarettes, etc. In addition, there is a public telephone, a maintenance room for the estate, fire hoses, a common TV aerial for all houses in the group served, and an electric Dolly for heavy deliveries and garbage collection.

The houses are grouped in the superblock in clusters of about thirty-two dwelling units served by each service court. Paved pedestrian ways lead to entrances and are planted with occasional shade trees. Here, children may play in safety. Each house has a high walled garden, which allows complete privacy for the family. The central park area of the superblock provides play spaces for older children and sites for a school or nursery school. Connection to other superblocks is effected by overhead bridges which cross the peripheral roads.

This scheme is quite interesting and offers considerable benefit in safety and quietness for family living. Although requiring more attention at the entry points, which may not be particularly pleasant visually, since these are the main places of access to homes, this scheme gives ample evidence of the importance given to the pedestrian and of the acceptance of the superblock as a desirable basis for residential design.
Although the wider implications in urban design are many, this study has had to limit them to residential areas only and those in the so-called suburban part of the town. There is one important related consideration though, which must be mentioned, and that concerns the design structure of the residential area. At present the usual criteria used to judge the success of the new residential area are based on the neighborhood theory. To what extent does the area conform to this? Is the area identifiable as a separate physical unit of population? Is it provided with a primary school and shopping center? And does it have appropriate buildings for social and religious functions - community center and churches? Is the layout plan so designed that people are able to walk from any part of the neighborhood to the Center in fifteen minutes or less? If these questions can be answered in the affirmative, it is probable that the area examined is satisfactory from the point of view of the neighborhood theory. It is accepted that this theory is at best a convenient way of assessing standards of provision for urban living in terms of shops, schools, social facilities, open space and recreation areas; its sociological basis, always a little doubtful, is not upheld here.

The neighborhood has hitherto been characterized by this standard of walking distance. In fifteen minutes it is reasonable to expect most people to be able to walk half a mile. This would be the maximum distance; the optimum required of mothers with baby carriages, for instance, has been said to be a quarter mile. It will be seen that when these distances are translated into a layout plan for a population say of three to five thousand, the density of the neighborhood will obviously be fixed within certain limits - roughly eight to twelve families to the acre. Two factors
now seem to contradict this; first, the tendency to low density development of two to four families per acre, as at Weathersfield, and second, the fact that the universal use of the automobile has made the pedestrian scale questionable as an appropriate design standard. In an automobile it is possible to travel — at an average speed of 25 m.p.h. — about five or six miles. Superficially, then, it would seem that the automobile more than compensates for the tendency toward lower density and the different time-distance scale the low density neighborhood introduces.

However, the automobile pattern of living characterized by the White Plains example earlier can hardly be regarded as an ideal when domestic life consists of a continuing series of automobile journeys. The novelty of driving great distances daily and weekly does not seem to have worn off in America yet, as in Los Angeles for instance, but the amount of time spent in travel in such areas is tremendous. Can this driving time be equated to the conclusions reached by Dr. Liepman in her book "The Journey to Work"? Only a similar research project can determine this finally, but in the writer's opinion long periods of a person's life spent in local travel are undesirable. One may not object to driving for ten minutes to the shopping center, as at Levittown, Pennsylvania, for example, but certain facilities are held to be desirable in a residential area within walking distance of the home. There are some activities which people should be able to carry out without having to get into a car and drive for miles to obtain — the pleasure of walking in larger open park areas than the individual house plots for example. Children need play areas near their homes, which offer something more than a quarter acre of tarmacadam with steel play equipment. There are obvious advantages too if young children can be left to themselves to go to school in safety without long tedious automobile trips by the mother. There is also the need
for shopping facilities of a general kind locally for occasional small needs which are at present far too varied for vending machines to supply. The round-the-corner store still has a place in the neighborhood. If these various facilities are accepted as desirable in the neighborhood, then the present theory may not be so far from the ideal. The automobile is a modifying factor in the neighborhood theory but it does not invalidate it; walking as a means of getting about locally is still the most convenient and flexible method of circulation. The case for an even greater concentration of shopping facilities at a central location as in Levittown, Pennsylvania, however, is probably a reasonable solution since it is only a few minutes from most homes by car and does offer considerable advantages in the variety of goods. In addition, now that there is much more leisure time, the housewife can often afford to spend an hour a day making her purchases there, meeting her friends and having a cup of coffee. With the probability of the thirty and even twenty-four hour working week approaching, the problem of leisure time becomes more important. Shopping centers with a variety of facilities for leisure activities too will become a more important need in the future in addition to local neighborhood provision.

One purely architectural advantage about shops, community hall and school in one group for a neighborhood is the possibility of providing something on a civic scale for residents as a contrast to the typical single family house development. This has been done in some of the British new towns already as well as in Greenbelt, and has been proposed for Kitimat in British Columbia. These are used both by pedestrians and auto-borne shoppers and one of the visual advantages is that by providing for a smaller number of parked cars they are able to avoid what is the chief visual problem of the regional shopping center, acres of barren
or car covered parking areas, within which is a small island of pedestrian shopping activity.

The regional shopping center based on the automobile has recently produced some of the best civic design related to pedestrian needs which has been built in America. This instance of circulation of automobile and pedestrian provides what many architects feel is a necessity for architectural enjoyment, that is, the ability to walk or stand about freely and in safety from wheeled traffic. It seems paradoxical that the auto-inspired shopping center should lead to the now accepted principle of separation of pedestrian and automobile while downtown shops still suffer the inconvenience of through traffic of all kinds. Many of the more recent re-development proposals for central areas use the very pedestrian malls which regional shopping centers have proved economically as well as visually successful. The regional shopping center, a product of the motor age in its most concentrated form, has therefore produced a rational architecturally satisfying example of civic design apart from the vast parking areas just mentioned. These centers on a smaller scale could add great richness of architectural variety to the residential area on a neighborhood scale. The shopping center has focussed people's attention on the need for traffic separation and the benefits which result from this separation; although it is an extreme case, it confirms the advantages which have already been proved in the very limited use of the super-block. The superblock can, like the new shopping centers, give back to the pedestrian the freedom lost in the city through traffic invasion. It can provide with a small neighborhood center a desirable piece of civic architecture in the residential area difficult to attain with houses alone; it can provide access to the school for the youngest children and play areas for them in complete safety from vehicular traffic; it can provide
in the central park area special variety and opportunity for a walk or relaxation for adults in the community.

The superblock in groups of two or three or more depending upon its size could form a neighborhood inasmuch as it would be a suitable service unit for the community. The sociological groups which develop would form within the individual superblocks themselves. The optimum size of these seems uncertain, but twenty-four to thirty families has often been mentioned as the number in which persons could find a few others in their own age group - both children and adults. In Park Forest the group relates to the court and also to the number of people who can be accommodated in the living room of a house at a party gathering - about two dozen. As far as the neighborhood theory is concerned, the superblock carefully designed would be able to help towards a more desirable social pattern, though details of this would have to be obtained from further research into the part that physical location of dwellings plays in the formation of such a pattern.
SECTION V

CONCLUSIONS AND RECOMMENDATIONS
THE IMPORTANCE OF THE AUTOMOBILE AS A DETERMINING FACTOR OF RESIDENTIAL FORM

The importance of the automobile as a factor in determining the form of residential development in the United States has been very great in general terms, but small in a specific sense. The automobile has been one of the chief factors in the development of the suburbs - in serving as a tool for the trend of urban decentralization. Thus its influence in this respect has been in a geographic and broadly locational sense. It has not played an important part as a determinant of the detailed form which suburban development has taken; the automobile has provided part of the means of decentralization without modifying the form of the end result in a significant way - significantly different, that is, from the form of residential layouts which were developed before the automobile was used. Almost all residential development, as far as the circulation pattern is concerned, is based on the gridiron or curvilinear pattern which was developed during the horse and carriage era.

The reason for this design inertia, the tendency for old forms to perpetuate themselves, was largely due to those directly responsible for the building of the suburbs, the real estate operator and the speculative subdivider. In these parties and the suburban dweller, there was little felt need for a different form based on the optimum use of the automobile. In many cases, the suburban form was so different and such an improvement on the older central city areas that no questions were asked. The suburb in the forms it took was often so much better by contrast that the great majority of people considered it the ultimately desirable living environment - and there are many excellent reasons to support this.¹

¹See Castles on the Ground, J. M. Richards.
Notwithstanding the automobile's lack of influence on the form of most residential development, there is ample evidence of an awareness of the need to cope with the car on a strictly local level. The road engineer was able to offer many refinements of detail in design for the gridiron and curvilinear forms. These related to actual road construction and alignment, intersection design with criteria for desirable sight lines and curb radii, road widths and turning circles, sidewalk widths and crossing points, curb design, parking areas, street lighting and a host of other important details. Besides standards of engineering efficiency in these details, there was always the factor of traffic safety to be considered, which, as a result of the increasing road casualties, was an urgent problem.

Despite the urgency of the need for safety in residential areas, little attention was given to a real solution to the layout framework until the principle of traffic separation was seen to be clearly necessary. This was used increasingly for the developing inter-city main highway network with limitation of access and a developing hierarchy of roads became accepted for the residential area - with main traffic roads, feeder streets and local streets, etc. It was this principle, together with the use of the superblock, which resulted in the Radburn plan by Stein and Wright. Architects and not traffic engineers, they realized the fundamental need for traffic circulation and the creation of a residential pattern which would offer the motorist and the pedestrian far greater physical safety and would provide an environment with the additional advantages of open green parks and adequate play areas recommended by the neighborhood theory. Other examples of the use of the superblock mentioned earlier appeared, some of which were compromises with the curvilinear plan, like Levittown,

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1 See Building Traffic Safety into Residential Development.
Pennsylvania, and others like Baldwin Hills Village and Kitimat, which were further developments on the Radburn theme. Small though these schemes were in number, and infinitesimal as a proportion of the residential development which has taken place in the motor age, their significance is great and they are, unlike previous patterns, the result of considering the automobile as a primary determining factor in their design.

Because the superblock does present advantages for the automobile age it should not be assumed to be an absolute solution to the problem of residential development, not necessarily in its present form, at least. If it is to become acceptable to the real estate developers and the public at large, then it be shown to be satisfactory by a clear demonstration of its adaptability for various house types and densities. Most superblock developments have been for houses in medium and low price ranges with the exception of Wright's Broadacre City project. It should not prove impossible to adapt the superblock principles to medium and higher price range single family houses and low densities.

For the future, there is one particularly valuable potential factor which the superblock can offer in its central park area, that is, the reservation of open space which could if necessary be used for other purposes eventually. Accurate prediction of what the ideal residential area should be like say in 1980 to 2000 are not possible. However, a series of broad open spaces within each superblock, as well as providing the present advantages of a private park, offer an element of flexibility in the plan. Such spaces left in cities in the past, by accident or design, have proved extremely useful as amenity areas, stabilizing land values in the vicinity, and of great help for modification or redevelopment of the area later. The automobile has called for far greater space requirements for living than hitherto and has helped to spread the wide areas of low
density suburbs over many square miles of country. It is therefore not unreasonable to suppose that the helicopter will have a similar effect on an even wider scale. The city region of the future may well be measured in tens of thousands of square miles, providing as great a physical contrast to our present conurbations as these do to the towns of the early nineteenth century. Future residential areas will almost certainly have to provide for some measure of helicopter service in addition to the ground service pattern for automobiles. The green parks within the super-block may well be the answer to the problem of the domestic heliport. If so, a great deal of difficulty will have been avoided by providing these spaces; if not, then they are still good for their original purpose.
THE SUPERBLOCK - REASONS FOR ITS LIMITED USE IN THE UNITED STATES

The superblock seems to offer a number of real advantages over the traditional typical subdivision layout in traffic circulation, social pattern and visual qualities. Why then has it been used so little? Why has this method of layout been given so little attention by developers, architects, city planning commissions and federal and state governments? The responsibility lies with all of these bodies and, in theory, and albeit indirectly, at least in a democracy, with the community at large, with the consumer. The most obvious answer is perhaps that the superblock is a "new" idea and, despite the cult of newness in many fields, newness in building and building design has always been regarded with great suspicion by the people responsible for construction. In the words of Buckminster Fuller, the building industry, particularly house building, has been used to secondhand materials, make-do methods and improvisation for a long time. There are very good reasons for the prevailing inefficiency and apathetic attitudes in the industry at large, and the body of inertia and conservatism in most aspects of it is almost unbelievable, were it not in fact. Although architects of the most advanced school may like to think otherwise, the entrenchment of ideas on what a house should look like and how a residential area should be built appear little short of moronic, when compared with progress in other fields. Nevertheless, most of the developers, designers, financial backers and platt approvals are filled with these idées fixes. The current feeling among these various agencies is therefore automatically against something which is different, new or "radical". However, there is more than mere prejudice involved; each of these bodies can provide further reasons why superblocks are not taking the place of the typical subdivision. Many of the reasons are
good in themselves, but many are little more than rationalizations of the desire to preserve the status quo.

THE DEVELOPERS' VIEWS ON THE SUPERBLOCK

1. Financial Undertaking Usually Too Great.

The developer, usually a real estate operator or a builder, has on average neither a very large organization nor a great deal of capital, and wishes to risk as little as possible of his own money. The superblock is physically far too large-scale a project for many developers to tackle, even if they were sure of a market - and the housing market is notoriously fickle in the long term especially. One of the chief features of the housing market is its extreme unpredictability. This results in a tendency of developers to play safe at all costs because of the financial risk involved and in an unwillingness to embark easily on large projects. Even in the biggest metropolitan areas, actual home building in two consecutive years may vary greatly. For this reason it is very much more satisfactory for builders to have a piecemeal method of approach which the subdivision system allows and the superblock discourages.

The current practice of selling houses in addition to the plot on which they stand has made real estate development a more complex and expensive enterprise, with greater investments necessary and greater possible profits but greater risk involved. The gradual development along a road made out in the usual subdivided plots is, by comparison with the superblock, a slow but safer bet financially. The whole framework of development at the drawing board level and at the site is much greater for the superblock as far as the small developer is concerned, and the superblock must by its very nature be designed and developed as a whole, if it is to be completed at all. The capital expenditure involved in site works, the provision of
roads, sewers, grading, etc. is usually more than most developers can bear, and those that can are willing to bear. The whole practice of subdividing is based on gradual development of an area in small pieces. Although this may ultimately produce a large housing estate, there have not usually been many large areas of land developed as part of the same operation.

2. Problems of Land Maintenance.

The superblock as developed in the best known examples has usually had considerable areas of land which are open parks for communal use, unfenced and the responsibility of the developers or a special tenants' or other organization to maintain - with grass to be mown, shrubs and trees tended and paths to be looked after. The park and garden court areas would therefore not only involve initial cost in seeding, planting and paving, but would remain the responsibility of the developer, who would have to exercise overall control at least until the whole development was complete, and it could be handed over to another organization. This would, of course, involve some period of time. Real estate operators are in business for profit, not primarily for the good of the community; they do therefore object to being saddled with such responsibilities over a long period. Ideally, the subdivider prefers to develop land, "milk it" of all possible profit and then have nothing more to do with it; continuance of responsibility accompanied necessarily by financial, legal or other obligations, does not fit in with this simple profit pattern and is therefore undesirable. The tendency of a few large builders to regard community facilities as a sales feature and incorporate these in their development provides evidence of an increasingly responsible attitude. A further point in land maintenance is that developers regard clearly defined ownership lines separating private and public land as essential; many of the examples of the superblock have not perhaps done this well enough.
3. Long Term Financial Problem - Sale Versus Rent.

A further characteristic of the superblock as used hitherto is that it has been developed as a scheme with rental houses rather than with houses for sale. There are a number of reasons for this, the chief being that superblock schemes have usually been built for income groups who could not afford to buy a house or did not wish to yet, e.g., young families who might be moving after a year or two. The other obvious reason is that a rental project lends itself better to maintenance control by the developer who can assure the continuance of a high standard of estate management. Eventually, as in the case of Radburn, the houses have been sold to the tenants. There it was fairly easy, since the houses were detached or semi-detached single family dwellings. However, this is not so easy with a row house development like Baldwin Hills Village or Park Forest, for example; there are, of course, obvious initial economies and advantages in capital expenditure for row rather than single houses. Real estate subdividers are completely in favor of selling houses with the advantage of closing the transaction quickly - a quick return over a short period. Long term investment in suburban house property has usually been carried out by large insurance firms and banks, or by special corporations set up for the purpose, who were prepared to make a large investment with a slow return over a long period.

4. Economy of Layout Design.

The economies claimed for the superblock development in road surface areas, utility runs, etc., over the typical residential area are refuted by the Urban Land Institute. The Community Builders Handbook suggests that "the economies are not borne out by comparison". This is probably so on the piecemeal development basis by which most subdividers' work is carried out, but hardly so when a large development of each type is com-
pared and consideration is given to the advantages of community facilities, parks, etc., which the superblock offers.

5. Risk of Vandalism.

It is further claimed by the Community Builders Handbook that the pedestrian ways through from peripheral roads to park in the superblock are objected to by residents, and that unplanted they offer encouragement to thieves and to the possibility of vandalism. Privacy can be spoiled in gardens adjoining the pedestrian ways by people walking through them, and the reaction to this, as shown at Radburn, was to plant a wall of greenery to prevent people looking in.

6. The Urban Land Institute.

To sum up the attitude of the estate subdividers or "Community Builders" as they are idealistically referred to in their Handbook, the "so-called superblock... has not proved satisfactory in experimental projects in this country. This planning pattern... is a favorite proposal with student planners and others seeking to break with conventional patterns... They are not recommended by the Council (of the Urban Land Institute) for use in residential land areas where lots are individually owned". So, with a sweep of the hand, bigger and better subdivisions are advocated, with close adherence to the conventional pattern which has proved so profitable to the developer in the past, but which has left us with the universal suburbia so unimaginative in character in most American cities. These are largely unrelated to the automobile and contemporary possibilities for a richer and more appropriate civic form in residential areas.

THE ATTITUDE OF THE FINANCIERS OF DEVELOPMENT

There are two main sources of finance for residential development apart from the developer's own capital. These are by loan from the Federal
government via the F.H.A. or other housing loan system, or from private
sources, namely banks and insurance companies. The latter or well known
for their general attitude to anything which smacks at all of novelty and
which is not strictly in a conservative vein. "Bankers' architecture" is
the usual result, a building representing safe investment primarily, to
which architectural integrity is quite a secondary consideration. The
Federal government, while condemning the typical residential development
in the strongest terms - see Urban Planning and Land Policies, Vol. II -
do not seem to have helped in solving the dilemma to any great extent.
Although paying ardent lip service to the need for better design for traf-
fic, more open spaces and play areas for children in safety, and more in-
spiring architectural qualities, the practice has been to make government
loans to the very subdividers whose design is condemned. There are, of
course, many conditions to these loans which relate to minimum structural
and sanitary standards, etc., but there seems to be little evidence of
encouragement to improve layout design. Most recommendations on F.H.A.
standards, published by the Federal government itself, show the typical
curvilinear subdividers' pattern. It is not the place of this study to
inquire why this is so, but one is led to suspect political and bureau-
cratic policies, which concern themselves again with the soundness of the
investment to the extent of giving small attention to the design qualities
of the scheme. Buildings as characterized by the enormous blocks of New
York's housing projects are designed primarily to last as structural en-
tities - reflecting the institutional character of American public hous-
ing - rather than provide the civic delight and warmth of human scale
which more enlightened design would have. Now
CITY PLANNING COMMISSIONS

Before any residential development can be built, approval must be obtained from the local city planning board or commission. For approval, schemes submitted must satisfy the various official regulations on zoning and subdivision layout. These are the controls exercised which ensure a certain standard of development. For example, control of density is related to size of plots to be used in an area - 10,000 or 15,000 square feet as in Natick - and also frontage of each plot. Again, the road pattern may be rigidly controlled as in the example of Chicago mentioned earlier, where it is obligatory to develop new work on the existing gridiron pattern. Objections to such controls are not always successful and often involve conflict with the planning board or local engineer. Baldwin Hills Village was built as designed after many previous and repeated disapprovals were eventually crowned by successful approval.

Many subdivision and zoning regulations are therefore based on the comparatively crude method of the subdivider, sometimes on the gridiron and sometimes on the curvilinear plan, since these are current methods of building residential areas. The difficulty with this is that an alternative method of development, like the superblock, although it may produce a better community pattern, is not catered for in the regulations and does not therefore qualify for straightforward approval. Special approval is needed here, which may or may not be obtained. To this extent therefore many city planning boards are guilty of a passive attitude to new forms of residential development. Until they are able to initiate or encourage improvements in overall design instead of mere details, the fight necessary to get new residential forms accepted must go on.
The average American is reckoned to be "sold" on the idea of owning his own home. The real estate operators have succeeded in doing this with the assistance of insurance companies, banks and of the federal government. "Home ownership" has been painted as a national idea; therefore the new rental houses in a superblock are by their very nature unpopular. The advantage of selling rather than renting, as far as the speculator is concerned, is great, for his direct responsibility ends with the sale. And yet in practice most home owners are tenants to the organization that holds their mortgage; they do not "own" their house and plot in the absolute sense at all. Again, it has been pointed out by housing experts that the average American moves at least three times during the average mortgage period, and it might save a great deal of financial worry and difficulty if he could obtain the same property at a rental instead.

Notwithstanding these arguments, the emotional unreason in connection with the word "home" - which is peculiarly American in context, being used in preference to the word "house" - and the desire to own one, is a social phenomenon so strong that it cannot be disregarded. The superblock must therefore be able to function satisfactorily with single family dwellings for sale as well as rental houses. The other important factor in the general acceptance of the typical residential area is the lack of critical awareness of their environment which Americans share with other English speaking nations. This lack of awareness results in a somewhat apathetic attitude toward architecture and civic design generally, and in a tolerance of the average suburb, which prevents any strong reaction to the typical surroundings even though they may not be at all inspiring. As Tunnard says in his article in the Architectural Review, "The American people...easy, friendly and highly democratic, have never developed a sensi-
tivity to surroundings in the visual sense." Any popularizing of the super-block, therefore, cannot depend on the purely visual advantages which may be gained. Perhaps the way lies through the awareness of the world via the automobile, its advantages and disadvantages, and how it can be used safely but still with maximum convenience in the residential area. And yet in the typical subdivision one can observe a certain civic sense in the high standard of maintenance of the open front lawns as at Weathersfield. Here children and neighbors can wander about over the grass at will, but strangers are not expected or allowed to do this. There is then, in the face to face group, evidence of a civic sense which, if it could be extended, could form the basis of a wider sphere of concern for the visual aspects of the residential area.
RECOMMENDATIONS FOR DESIGN IN RESIDENTIAL AREAS

It is recommended that in the overall design of residential areas the general principle of traffic separation with the superblock should be used wherever practicable and with any modifications in detail which may be necessary to adjust to the topography, the type of dwelling units and any other particularly relevant considerations which may apply.

RECOMMENDATIONS FOR CIRCULATION

1. Road Circulation.

Streets should be classified according to their function in a hierarchical pattern which will act as a filter, automobiles having to pass through each successive stage before arriving at the house; there should be no opportunity to jump stages, e.g., to pass from a main traffic artery directly to a local street. The following are the main categories of roads within the residential area:

(a) the main highway - this will be a through traffic street linked to the main traffic arteries of turnpikes, parkways, etc., with cloverleaf connections and slowing lanes. The main highways will provide a framework connecting neighborhoods with each other and with the city center, and they will often form the boundaries to the neighborhood. Access from main highways to secondary streets will be at rotaries or Tee junctions at selected points. No development should take place with direct access onto the main highway - no houses, for example, unless a secondary service road is provided, as at Baldwin Hills Village. Main highways should preferably be insulated from residential areas by grass verges and shrub and tree planting, which will act as screens against noise, dust and exhaust fumes. Widths of highway will depend on the lo-
cal conditions, but generally four lanes should be the minimum, with more as required.

(b) the secondary roads - these will act as feeder roads within the neighborhood to various parts of the residential area. In superblock development, where they will form peripheral roads, they will have little development directly onto them, houses being set back some distance from the curbs. Maximum allowable traffic speed on these roads should not exceed 25 m.p.h. and the layout plan should be designed so that long straight lengths of street are avoided to discourage higher speeds. The secondary streets will provide access to the loop streets, culs-de-sac, garage or service courts. Junctions with these should preferably be at right angles so that there is at least 75 feet clear on each side of the center line of the local street to provide clear sight distances for drivers at the junctions. Cross roads should be avoided where possible, for although they are not very dangerous within the local street pattern they are never as safe as Tee junctions at 90 degrees. As far as vertical alignment is concerned, all junctions should preferably have a flat section from 50 to 100 feet each way from the intersection. The width of secondary roads should allow for a carriage way of at least 36 feet, exclusive of parking widths. Parking on secondary streets is quite permissible if properly designed parking bays are provided. Depending on the estimated volume of traffic, simple curb indentations or harbor parking areas should be used.

(c) the local street - this will provide the final access to houses and will, in a superblock, take the form of a loop street, cul-de-sac, garage or service court. Speeds in these should not exceed 15 m.p.h. and their length and shape should discourage anything greater. Lengths of loop streets will depend on the number of dwellings fronting them.
Lengths should be controlled by the number of dwelling units, bearing in mind the increase in garage drives with the increase in housing; however, 1200 feet as a maximum length is suggested. Cul-de-sac and garage courts should not exceed 500 feet in length. Widths of local streets should usually be 32 feet; 26 feet may be sufficient depending on the method of parking and garaging, house types and density. In order to discourage high speeds and prevent fast cornering, the use of broad strips of paved or cobbled areas from 20 to 40 feet long is suggested at the entrances of local streets where they join the feeder roads. Little use has been made of this method of communicating directly from road to driver, but a change of surface can act as a warning that he should take care.

Turning areas at the ends of culs-de-sac or garage courts should be at least 4½ feet in radius, with additional space if parking is to be allowed. Larger rectangular turning areas are recommended as being more satisfactory visually.

2. Service to Houses.

Generally, in developments using detached single family houses, it is preferable for each family to be able to garage one or two cars on his own plot. With semi-detached, row houses or apartments using grouped garages, walking distances should not exceed 120 feet and should preferably be less. In high-rise apartments, it is often possible to provide parking space at basement or ground floor level directly under the building.

In garage courts, all garages should be provided with lockable doors. For goods delivery and service vehicles, two types of access are reasonable - vehicular entry into the garage or service courts for oil and heavy deliveries, and delivery by foot from vehicles parked at the ends of the garage courts or on the special areas provided on the peripheral
roads.

3. Parking.

Generally, sufficient off-street parking facilities should be provided throughout the residential areas so that curb parking is used in exceptional circumstances. The provision for parking should be at least one space per family in addition to actual house site or garage court space for the residents' own car or cars. In practice, there is usually room for this on the driveway of single family houses, but garage courts should also provide areas for guest parking. Additional parking for guests and service vehicles should be provided on the peripheral roads of the superblock, preferably in harbor bays, i.e., bays physically divided from the roadway. In certain circumstances, when the traffic on peripheral roads is quite limited, parking areas adjoining the roadway are permissible.

4. Pedestrian Circulation.

When a large residential area is being designed, it will be possible to use a number of related superblocks. In favorable circumstances, a separate system of pedestrian circulation should be provided in culs-de-sac or garden courts, also in central green areas if these are included in the design. Further research is needed to assess the absolute functional value of pedestrian underpasses; it is thought that these should be provided between blocks in any case. Approaches to them should include steps at each side as well as the front approach ramp. Sidewalk widths should not be less than four feet anywhere, and main paths to schools, shopping centers, etc., should be at least six feet.

5. Children's Circulation and Play Areas.

Separation of function is desirable as in 4. above. It is essential that access from garage courts when provided should be at as few points as practicable, to prevent children's running into them without warning.
Specific paved areas for play with wheeled toys should be provided at convenient locations in the garden courts and central park areas. If they must be provided on the service court sides of houses, then they should be carefully fenced and screened from vehicular areas. Paved play areas should always be located reasonably close to houses so that they are convenient for wheeled toys which are stored in the home, and so that they are close enough for easy supervision by mothers. Grassed areas are needed for older children and can usually form part of the central park. Small enclosed sand piles and "tot lots" are needed for very young children.
The quality of order is a basic necessity for good architecture, but, as Geoffrey Scott has clearly pointed out, order can be the basis of bad design too. Order in itself, the presence of correspondence and identifiable relationships between the parts of a work, cannot provide beauty. The academic tradition which Scott criticized, held the platonic idea of mathematical beauty as an ideal, and also as being a sufficient basis on which to fix the relationships of the Classic Orders forever. And yet there are many examples of buildings employing the Orders — and the quality of order in a high degree — which are in fact quite ugly. In order to obtain beauty the quality of order must be allied with "a judicious mixture of variety". Only when the order and the variety are themselves both beautiful is the architectural quality of beauty evident.

Scott's Humanist theory that "we transcribe ourselves into terms of architecture" is accepted here as basically sound. Giedion has followed Scott to some extent in the recognition of space in architecture as the supreme value. Accepting this, together with Scott's qualities of Mass, Line and Coherence, it is not difficult to realize why so many residential areas fail to satisfy our desire for beauty. The photographs of Weathersfield, for example, show that there is virtually no architectural control of space at all. In Baldwin Hills Village, there is evidence not only that space has been controlled but that its quality and character has been carefully considered to provide a satisfying environment on a harmonious domestic scale. Through order or coherence the beauty of the Baldwin Hills scheme is made evident. So coherence is the means by which we are able to perceive beauty more readily when it exists.

Any residential development must therefore offer evidence of ordered
thought and a consciously designed spacial pattern, if it is to succeed in providing the quality of civic delight. To do this with row or apartment houses is difficult enough, for the scale of the units is already small. When, however, the single family house is the unit, the problem seems almost intractable. It is at this point that many designers have decided to abandon an architectural solution and instead produce a landscape design in which the houses are partially or completely hidden and are subsidiary elements in the "park". While this approach can be supported by many arguments and historical precedents, the writer is of the opinion that it cannot lead to a satisfactory urban quality, or indeed a more desirable suburban character than we see around us in most cities at present. Excepting the very low density development where, by its physical nature, an urban character is quite impossible, it is felt that a rationalization of the present unsatisfactory traffic circulation pattern can be made by using superblocks. These, with their inner park areas for open space and recreation, can provide a feasible framework for architecture. In such a design, architecture is the dominant factor, the trees, shrubs, paving and grass being the subsidiary elements which enrich, but do not drown, the houses in a romantic sea of vegetation.

The key to the attainment of some satisfactory spacial pattern is by grouping the blocks or single houses in such a way that their relationship is recognizable and a larger space is formed within their connected and enclosing plan. The precinct, court, square or quadrangle in its innumerable forms is the most satisfactory solution for making a number of small, and, in themselves, insignificant units in a civic sense, unite to form a greater whole. The character of this space can be determined by the architectural design of the enclosing house or apartment units; its floor can be paved, grassed, or any combination of these two, with or with-
out trees and shrubs. The regional shopping centers have provided a number of excellent examples of the precinct in a contemporary architectural style which has a true urban flavor. It should not be too difficult to do this with houses. The value of the superblock in this respect is that it offers comparatively low overall density, when central park areas are provided, but by grouping the houses around courts does allow a sufficiently high "local density" to obtain an urban character and a satisfying sense of enclosure.

The parallel between shopping center design and the superblock is not therefore accidental. In both, the recognition of a satisfactory solution to the problem posed by the automobile has led to separation of the car and the pedestrian. In the case of the shopping center, while good architectural solutions have been obtained for the pedestrian areas, a more satisfactory visual solution of the enormous parking areas remains to be found. In the superblock, both parking and pedestrian areas have been reasonably well designed, in some cases; but the tendency to overplant has been evident and in few has the parking accommodation and circulation been completely satisfactory. In addition, no examples of the superblock using single family houses have been designed to give a completely satisfactory civic quality.

Of the automobile itself, as a unit in the visual scene, the great majority of architects and city planners regard it as a necessary evil, an object which is satisfying in motion and unsatisfying at rest; a machine which is almost tolerable singly but when associated with dozens of others for some reason becomes unpleasant. The popular attitude of many architects is summed up in the words of the Architectural Review, which regards the American car as a degenerate monster, a hybrid of "borax" design and pseudo-styling for sales appeal. So much has been
said against the appearance of the American car, often with quite excellent reasons, that it has become fashionable to treat it with disdain when design is discussed.

Notwithstanding the sweeping broadsides of aesthetic denigration of automobiles, the writer is inclined to take a more optimistic view of the car as an element in the urban and suburban landscape. There are certain interesting visual qualities which the car possesses and which could be exploited. The variety of bright reflecting colors, for example, need not be regarded as vulgar, but as an opportunity to use the cars, when at rest, as additional and exciting color elements in the landscape. In both large and small parking areas it would be possible to provide a plan which would have a less regular and more consciously designed layout than is usually used. Such a layout could relate the grouped rows of parked cars in a more interesting way, when the car park is full, and could, by using different hard surfacing materials like colored macadam, concrete, stone sets and flags with broad linear patterns and slight changes in level, make the area visually interesting, when only a few cars are parked. In addition, the application of the simplest devices for shade and a visual change of scene can be provided by judicious planting of suitable trees, by timber and metal frames having vertical shade louvers and by the occasional use of small areas of shrubs and flowers. Separating bollards between parking areas and pedestrian ways can also be valuable punctuating elements in the scene.

It is interesting to observe in one of the most lavish architectural developments in the United States, the Technical Center for General Motors at Detroit, how the automobile has been treated. It is an object lesson by the manufacturers of the automobile - and their architect - on just how not to treat the car. Instead of providing some kind of theme
for the design of this large complex of buildings, the product of this concern is kept safely out of sight. The cars which must be outside—those belonging to the employees—are carefully relegated to the far sides of the buildings, away from the outsize reflecting pool which is supposed to be the central focus of the scene. At the backs of building blocks, large parking areas are carefully screened from view as being undesirable visual elements—and in the form used here, they are indeed undesirable. This is a classic example of the present outlook of architects and designers on the visual problem of the automobile.

In general, the design of parking areas is perhaps one of the most neglected fields of landscape design in the United States as well as Europe. The unimaginative dumping of vehicles in tedious curbside strings or en masse, crammed as many as can be into open areas which may be parking lots or city squares, has clearly produced a dismal visual effect. It is, however, idle to criticize the appearance of the automobile itself for this result. Those to blame are the cities themselves and all those responsible for the design and appearance of cities in not having the wit to appreciate the problems of the automobile realistically in the visual sense.

The automobile in its general appearance is, in the writer's opinion, if not a masterpiece of beauty certainly, apart from occasional details, not unpleasing. It is far more attractive than many people will admit and has received more attention in its design than many houses and buildings. It is high time that urban designers stopped carping at the sales appeal superficialities and realized that the automobile deserves attention in a more mature frame of reference. Attention should be given not only to the problems of circulation and transport but to matters of visual relationships. The automobile is an important element in the urban landscape
which we must learn to handle in a conscious and sensitive way. It is
one of the most ubiquitous and urgent visual problems in our cities, and,
in the scope of total architecture, which is civic design, to omit con-
sideration of the automobile is to fail to appreciate the total problem.
The automobile should therefore be accepted as a potentially valuable
element for the visual enrichment of the urban scene. It is an element
which, if imaginatively used, can instead of calling forth gloomy comments
as at present, enhance our sense of civic delight in the variety and beauty
of the urban environment in the future.
RECOMMENDATIONS FOR POLICY

Wider use of the superblock in the United States, as proposed here, can only be implemented first by its general acceptance as being a desirable method for the layout of residential areas and second by the provision of arrangements which overcome the present difficulties already referred to. These two factors are interdependent and reciprocal, so that they both will operate more easily after the initial period of trial and error. To initiate the idea of the superblock to all agencies interested in housing development, as much information about the superblock and its advantages as possible should be made available. The chief agencies for the dissemination of design criteria are the appropriate departments of Federal and State governments, the city planning boards, various real estate bodies like the Urban Land Institute, and the universities through their departments of architecture, city planning, civil engineering, estate development, etc., etc.

The following arrangements will be required to overcome existing difficulties in the development of superblocks:

The City Planning Boards.

1. In addition to the subdivision and zoning controls which are negative in character, planning boards require authority to initiate plans and housing development for public use.

2. To do this, they will need increased powers of land purchase, which can be done by agreement or compulsorily, the latter based on existing precedent for public housing.

3. Planning boards should be required to prepare detailed comprehensive development plans for residential areas, which should include major roads and the location of peripheral roads forming the superblocks.
All new development should be required to accord generally with these plans.

4. They will require technical advice on design, purchase and maintenance techniques from Federal or State authorities or from outside consultants or experts.

5. They should be prepared to adopt the roads and footways within superblocks, and to take over the responsibilities of maintenance of central park areas if necessary.

The Real Estate Developers.

1. They should be encouraged to adopt superblock design, and would require help initially from federal, state or local technical advisors on the most suitable methods of plot and road layout.

2. Small subdividers and builders should be encouraged to cooperate to form groups which would be large enough to develop whole superblocks; help and coordination of roads and utility services should be provided by local authorities in these cases.

3. Large developers should be encouraged to develop whole superblocks and be assured of early adoption of roads, parks, etc. for maintenance by local authorities or other appropriate bodies.

4. It should also be possible for superblocks to be completed by subdividers and handed over to cooperative organizations of owners or tenants, who would themselves assume the responsibilities for the care and maintenance of pedestrian ways and park areas.

5. The problem of vandalism in superblocks where cooperatives or local authorities control the maintenance should be no greater than in any other type of development. The design itself should be such that as much privacy as desirable is provided for families and homes by patios, walled gardens, screens and planting.
6. Layout of superblocks should be such that boundaries of private and public land are well defined and easily recognizable, from the point of view of privacy and maintenance.

Federal Government.

1. The present financial aid via F.H.A., the Veterans Administration and other schemes is an excellent way of enabling people to have their own homes. In addition to structural and sanitary standards required at present, the layout design should require approval too, either directly or through the local authority in whose area the development is taking place.

2. Preference should be given to developments employing superblocks in the granting of financial aid.

3. Information on the design of residential areas, advisory handbooks, notes and pamphlets, etc. should be distributed to encourage the use of superblocks. These should provide good examples of superblock designs which would be suitable for single family, apartment or row house developments of various kinds.

4. A research agency should be set up, using Federal funds to study planning and design techniques and to carry out research into appropriate methods of housing layout in all its aspects, physical, economic and aesthetic.

Automobile Manufacturers.

It is imperative that the large motor manufacturing corporations should be made aware of the public and social responsibilities inherent in their position as producers of such an important consumer item. It is in the national interest that some method of restraint be employed to limit the development of motor design trends which threaten to make the automobile a less safe and handleable machine.
than it is. Some attention should therefore be given to this matter by both State and Federal authorities, for it is a function of government to guard the physical safety of the citizen - and, if necessary, to impose such restraints and controls by law which will ensure this.
RECOMMENDATIONS FOR FURTHER RESEARCH

This brief study of the automobile as a factor in residential design is necessarily limited and, to some extent, superficial. A definitive study was not of course possible in the circumstances, but the following suggestions are made for subjects in which it is thought further research would yield valuable additional information:

Circulation.

1. Efficiency and use of underpasses - how necessary are they in residential areas of different densities? For example, are they necessary at the density of Radburn and unnecessary at that of Weathersfield? Design of underpasses - what designs would be suitable to ensure that optimum access is obtained? A check is necessary on the feasibility and preference for overpasses instead of underpasses - the clearance height of the latter would be a problem in catering for high vehicles, since underpasses need only deal with persons' heights.

2. A follow-up survey on the performance of the circulation of Levittown, Pennsylvania, is necessary, with subsequent comparison with other known examples of the superblock.

3. Comparative cost analyses of superblock development versus the typical curvilinear and gridiron plan are needed at various densities of development and for different topographical conditions. This is proposed also to check the claims of Stein and of the Urban Land Institute on the superblock and typical layout respectively.

Visual Aspects.

1. Further work on the possibilities of treating the motor vehicle is needed in studying its potential value as a landscape factor - as
already mentioned.

2. Studies of the superblock should be made using single family houses with attention to clear definition of plot boundaries and public areas.

3. A cost analysis of 2. above and a comparison with the traditional subdivision layout is needed.

Social Aspects.

How important is the physical location of the individual dwelling within the community? What effects do locations have on social activities and participation by various residents of house groups? This could be a more thorough extension of the work of Whyte in Park Forest, and would also extend the work done recently at Birmingham and Liverpool Universities, England.

General.

The design research organization proposed as a function of Federal government should be developed to study the problems above and many other selected and related aspects of residential development.

* * * *

In conclusion, it is not inappropriate to make an important general observation on the work of architects and urban designers. Most of them, while used to research techniques in the limited way required for various building problems, are not usually very keen on a thorough, scientific assessment of their work after a particular scheme has been built. General observations based on past experience are of course made, and, in many cases, are sufficient. However, the complex of factors involved in many urban development schemes is such that more than superficial examination is needed if a really accurate assessment of the good and
bad qualities of a scheme, as proved in practice, are to be made. Such analyses cannot often be made by many architectural firms because they are not set up as research organizations, and could not generally afford the time and expense involved in a lengthy process of study. And yet if such work is not done, much of value may be lost and mistakes repeated in later schemes. As Charles Ascher pointed out in the A.S.P.C.O. conference in 1954, the objection to the fact that the Radburn culs-de-sac would be used as play areas was made in 1929, when it was built, but the transfer of experience was so poor that even now schemes are going ahead making this same mistake.

Architects and urban designers cannot make laboratory experiments that will give an accurate prediction of how successfully a particular development plan will work in practice. Such experiments would be so expensive as to be impracticable. The only opportunity then to check the value of a scheme is after it has been built. The amount of money necessary to make follow-up surveys and a careful series of studies is infinitesimal, compared with the total cost of most schemes. The British New Towns, for example, are estimated to cost at least £350,000,000 by the time they are all complete, but much of the opportunity they present for design, social and economic study, is being lost through the lack of a coordinated method of analysis and study of the many interesting new techniques being employed. It is true that the British Ministry of Housing and Local Government have a New Towns section and a Planning Techniques department, both of which are responsible for some research and study of current problems. The results of this work are published in pamphlets and books and have proved invaluable to architects concerned with urban development and housing throughout the country. They do not
however represent the best which can be done, and enormous gaps exist in their observations which may never be filled. Perhaps it is unrealistic to expect more when the bodies concerned are not big enough organizations to do any more. If, at each new town, for example, a research assistant were employed to collate information and make the follow-up surveys necessary, and these may be needed for some years after the scheme has been complete, the additional small expenditure would be more than justified in the availability of an accurate record of the aims of particular projects and how they succeeded in practice. Architects must overcome this reluctance to apply consciously employed scientific method - as far as this is possible - in the extremely important work of designing and building communities. Few large industrial concerns today are without their research departments, but it is an unusual architectural firm or planning board which has well organized groups or programs for such study.

A lead in this field has already been given, to some extent, by various departments of Federal government, though more work needs to be done, as already mentioned. A large responsibility for design research in architecture and city planning rests with the universities, and many are doing valuable work in this respect. Funds are limited, however, and it is usually true in most universities that compared with medicine and the applied sciences little money is available for the work in urban design. More research grants and scholarships are needed, but individual donors should not be the main source of funds. Urban design is concerned with the shaping of the physical environment for the community at large. As such, it should be a major concern and responsibility of Federal, State and city governments. It is from these sources that financial aid should come to help universities in urban design research. The Federal govern-
ment especially could do far worse than invest a few million dollars annually in such a way. This would be a very small amount compared with the enormous sums used for weapons, armaments and defense, and the results would certainly, dollar for dollar, be of a far greater and more lasting value. It is not unreasonable to suggest that the fortunes spent on defense should be balanced to some extent by more generous expenditure on the homes and cities they are intended to defend.

In the last resort, however, neither money nor research alone can be successful in encouraging the use of the superblock in the United States in such a way that the quality of urban beauty, as well as better circulation efficiency, is obtained in the residential areas of American cities. In a democracy, a change in the physical environment cannot be brought about by law and statute alone. One cannot legislate for good design, only for the conditions by which it is possible for it to be produced. And before it can be produced to a significant extent the citizens at large must want an improvement themselves, they must have a sense of "form-will" that enables architects and city planners to translate into building forms desires which express a civic sense in the fullest way. For such a sense to develop in America, a general realization of the importance of visual beauty as a major need in cities is required. This will not come until the current notion of cities as agglomerations of places to sell, rent and speculate in is replaced by the idea that the prime function of a city is a place in which to live, where the intellectual and emotional stimulus of a community is accompanied by visual serenity which only civic art can give. In the surging contemporary urban scene, the need for beauty is great. City planners are gradually introducing some sense of order and rational land use patterns into it, but it remains for the architect to see that the expression of this
pattern into three dimensions is beautiful. Only the architect has the appropriate education and professional training to do this; on him, therefore, rests the ultimate responsibility of making the need for civic beauty felt among the people, for only when it is felt will he have the opportunity of designing more worthy urban surroundings than we have at present.
APPENDIX I

Diagrams Showing Relationship between the Automobile and the House.

The following diagrams illustrate the types of relationship between the house and the automobile, as analyzed in Section IV. The advantages and disadvantages mentioned there, point to the need for a superblock development which will provide for single houses, where the car can be on the plot but where the pedestrian freedom and safety which has characterized superblock development in the past is retained.
1 TYPICAL SUBDIVISION - GARAGE ON PLOT

2 GROUPED GARAGES - WITH DETACHED OR ROW HOUSES
3  THE  SERVICE  LANE  OR  MEWS

4  THE  GARAGE  CUL-DE-SAC
5 THE SERVICE CUL DE SAC
- SEE RADDURN, NEW JERSEY -
C.I.A.M PROJECT
PHILADELPHIA GROUP - 1955

PERIPHERAL ROAD

SERVICE COURT

PLAY & SOCIAL AREA

GUEST PARKING

PERIPHERAL ROAD

DIAGRAM OF SUPERBLOCK
PLAN OF SUPERBLOCK
C.I.A.M. PROJECT
BOSTON GROUP 1955
9 - C.I.A.M. PROJECT
BOSTON GROUP 1955
APPENDIX II

Proposed Superblock Using Single Houses.

The following diagrams illustrate the proposal for single house development where optimum pedestrian freedom and safety is obtained. Service cul-de-sac provide access for automobiles and service vehicles — each house having a garage for two cars, with room on its plot for further extension if necessary. A covered way connects the garage with the house through an enclosed private patio garden to the main entrance, placed on the side of the house. This entrance can also be approached from the garden court by guests who would leave their cars in the parking area adjoining the peripheral road; so, whichever way the residents or guests come, the entry would be through the 'front door' and entrance hall. The somewhat rigid and formalized plan shown in the drawings is diagrammatic only; considerable variation of plan, depending upon topography, house types and the particular site, are obviously as possible as they would be desirable.
DETAIL OF GARDEN COURT IN SUPERBLOCK

PERIPHERAL ROAD
SERVICE CUL-DE-SAC
PLAY
GARDEN COURT
PATIO GARDEN

CENTRAL PARK
PERIPHERAL ROAD
CENTRAL PARK
PEDESTRIAN UNDERPASS

DIAGRAM OF SUPERBLOCK
PROPOSED SUPERBLOCK - SINGLE HOUSES
WITH GARDEN COURTS
APPENDIX III

Proposed Superblock Using Row Houses with Precincts.

These three drawings illustrate the use of the precinct within the superblock. Groups of twenty-five houses around small pedestrian courts are served at points on the peripheral road, where are located grouped garages and parking areas. The blocks, of two to five row houses, enclose the small precincts which offer a civic flavor and intimate architectural scale characteristic of domestic buildings. Each precinct can have its own particular design of planted lawn or patterned paving with flower boxes, selected trees and the occasional piece of sculpture to give variety. House gardens would be high-walled and private for family use. These and the precincts would both contrast with the wide grass areas of the central park. These three areas, each of a different character, would offer the residents a variety of spatial experience.

In the central park, there is ample opportunity for the landscape designer to model the ground and provide a variety of planting. The garage groups would present blank wall surfaces to precincts and street, and could be patterned with brick or stone or painted timber, with shrubs and various vines and creepers planted against them. The precincts themselves, however, would be essentially small squares where the architecture would be dominant, but where children could play within easy distance of the house. Connecting paths through the central green area link the grouped precincts to larger play spaces and the nursery or other school within the park. Again, these drawings are diagrammatic, and considerable variation on actual sites could be expected.
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