Keep Your Card in This Pocket

Books will be issued only on presentation of proper library cards.

Unless labeled otherwise, books may be retained for four weeks. Borrowers finding books marked, defaced or mutilated are expected to report same at library desk; otherwise the last borrower will be held responsible for all imperfections discovered.

The card holder is responsible for all books drawn on this card.

Penalty for over-due books 2c a day plus cost of notices.

Lost cards and change of residence must be reported promptly.

THE SCHOOL DISTRICT OF KANSAS CITY, MISSOURI

Public Library
Kansas City, Mo.

Keep Your Card in This Pocket

BERKOWITZ ENVELOPE CO., K. C., MO.

DATE DUE

28 Oct 45	MAY 4 '45 28		
15 Feb 47	Spit Wash	NOV 30 '46	
11 Apr 9a	MT. WASHINGTON		
3 Jun 44	9 DEC '46 94		
24 Nov 5[illegible]	APR 6 '48 48		
18 Jan 27	DEC 18 '50 24		
10 Apr 36	MAY 12 '52 46		
3 De '37 50	JAN 19 '53 18		
14 Ja '38 50			
25 Mo '38 13			
MAR 7 1940 78			
NOV 16 '40 64			
[illegible] 40	64		
AUG 19 '41 49			
[illegible] 42	02		
FEB 28 42 79			
MAR 17 '44	East		

HARVARD CITY PLANNING STUDIES

VOLUME I

AIRPORTS

Their Location, Administration, and Legal Basis

BY

HENRY V. HUBBARD, MILLER MCCLINTOCK,
AND FRANK B. WILLIAMS

ASSISTED BY

PAUL MAHONEY AND HOWARD K. MENHINICK

VOLUME II

BUILDING HEIGHT, BULK, AND FORM

How Zoning Can Be Used as a Protection against
Uneconomic Types of Buildings on High-cost Land

BY

GEORGE B. FORD

ASSISTED BY

A. B. RANDALL AND LEONARD COX

VOLUME III

NEIGHBORHOODS OF SMALL HOMES

Economic Density of Low-cost Housing in America and England

BY

ROBERT WHITTEN AND THOMAS ADAMS

VOLUME IV

URBAN LAND USES

Amounts of Land Used and Needed for Various Purposes
by Typical American Cities
An Aid to Scientific Zoning Practice

BY

HARLAND BARTHOLOMEW

VOLUME V

TRANSITION ZONING

BY

ARTHUR C. COMEY

VOLUME VI

THE DESIGN OF RESIDENTIAL AREAS

Basic Considerations, Principles, and Methods

BY

THOMAS ADAMS

HARVARD CITY PLANNING STUDIES

VI

THE DESIGN OF RESIDENTIAL AREAS

LONDON: HUMPHREY MILFORD
OXFORD UNIVERSITY PRESS

Courtesy of City Housing Corporation.

PLATE I. AN INTERIOR GARDEN COURT AT RADBURN, NEW JERSEY.

(*See pages 245–249.*)

THE DESIGN OF RESIDENTIAL AREAS

BASIC CONSIDERATIONS, PRINCIPLES, AND METHODS

BY

THOMAS ADAMS

CAMBRIDGE
HARVARD UNIVERSITY PRESS
1934

PRINTED IN THE UNITED STATES OF AMERICA

PREFACE

The present concerted movement to provide proper dwellings for the citizens of this country finds our minds in very much the same unsettled and shifting state that is evident in our experiments in the regulation of business and industry, in the care of those who cannot earn a living, and, indeed, in democratic government itself.

Our belief and our boast have been, "There is opportunity for all, and any man who will work can take care of himself." At the same time we felt that a man's business was indeed "his own business." Whatever he could get legally, he was entitled to keep. So long as there was still room for expansion and for exploitation of natural riches, we could believe both of these things at the same time. Now that the frontier is gone, and opportunities are not unlimited, we see that the unrestricted seizing of opportunity by one man means the lack of even reasonable opportunity for another.

We now believe in regulation, just as we recently believed in individualism, and we are likely, just as we did with individualism, to trust it too far and to expect it to accomplish all things.

The answer to our problem lies at neither extreme. Rather it consists in preserving the driving forces of self-help, self-expression, even of self-seeking, but restraining some people, encouraging some, and guiding all, so that there shall be enough opportunity for decent living to go around. This simple aspiration is as old as history. It is highly probable that it will never be fully realized, but if we can use the intelligence which we have, we certainly can make a closer approximation to the ideal than we have done in the last few years.

This book by Mr. Adams is an application of intelligence to the above ends in one part of the field of residential planning, carrying further and applying more widely his contribution to the subject in a previous report, *Neighborhoods of Small Homes*. In the present volume, he considers fundamentally two things: first, what are reasonably good living conditions; then, what is their least cost, — in thought, in effort, and in relinquishment of conflicting objectives.

It is at once evident that these considerations are a part of the greater field of community planning, even of national planning, which is something as complicated as civilization itself. An answer cannot be arrived at by cold and mathematical logic: there are too many variable factors in the equation. Human factors — that is to say in many cases, illogical and emotional factors — play a large part. Experience of how people do in fact behave, not how they ought to behave, must be the start of the process. For this reason Mr. Adams is exceptionally qualified to have an opinion and to set down valuable suggestions, because for many years he has been engaged technically on problems of this kind, while never forgetting that basically they are human problems.

This book forms part of a series of reports, published and to be published by the Harvard School of City Planning, which deal with various phases of man's arrangement and use of his environment. We are well aware that no man or small group of men can claim to speak with authority on all sides of such a subject. We know also that all planning progress, though perhaps based on a general theory, is made one step at a time, — one specific, small, tentative step, and that not always in the same direction. We believe, however, that these various reports give, each in its own way, some illumination of the path.

Theodora Kimball Hubbard
Editor of Research

Henry Vincent Hubbard
Chairman

Harvard University
School of City Planning
June 26, 1934

CONTENTS

THE DESIGN OF RESIDENTIAL AREAS

PART ONE

BASIC CONSIDERATIONS

CHAPTER I

CHAPTER II

CHAPTER III

CHAPTER IV

CHAPTER V

CHAPTER VI

CHAPTER VII

PART II

PRINCIPLES AND METHODS

CHAPTER VIII

CHAPTER IX

CHAPTER X

CHAPTER XI

CHAPTER XII

CHAPTER XIII

CHAPTER XIV

APPENDIX 1

APPENDIX 2

APPENDIX 3

APPENDIX 4

APPENDIX 5

APPENDIX 6

LIST OF ILLUSTRATIONS

PLATES

FIGURES

ACKNOWLEDGMENTS

In an important sense this book is a work of collaboration and a product of the School of City Planning of Harvard University rather than of an individual. Mr. Walter Baumgarten, a student and graduate of the School, gave invaluable aid in making preliminary studies and in preparing drawings illustrating civic and neighborhood patterns. The entire labor of editing the material for publication and correcting the proofs has been carried out by the staff of the School. I am indebted for this indispensable help to Professor Henry V. Hubbard, its Chairman, to Mrs. Theodora Kimball Hubbard, its Editor of Research, and to other members of its staff, including Assistant Professors Arthur C. Comey and Howard K. Menhinick, Miss Alice Joyce, and Miss Edith Kepler. Valuable assistance has been received also from Miss Katherine McNamara, Librarian of the Harvard Schools of Landscape Architecture and City Planning, and from Mr. Carl Gardner. I am also indebted for some guidance in matters of detail to earlier studies made by Mr. Robert Whitten, Mr. Frederick Law Olmsted, Jr., and others.

Therefore, while I am responsible for drafting the report and for the opinions it expresses, others have shared very largely in its preparation and in supervision of its production.

T. A.

PART I

Basic Considerations

CHAPTER I

INTRODUCTION

OF all things that contribute to the welfare of society, none is more important than the good quality of the homes in which people live. This does not mean that welfare depends solely on houses being strong enough to provide shelter against the elements, but also that they shall be agreeable enough in their environment to give reasonable satisfaction to other human wants.

The design of homes, together with their location, approaches, and surroundings, in well-arranged groups and neighborhoods, is one of the most important branches of the art of city planning. What are the basic considerations underlying this art that apply to residential areas? What are the principles involved in its application? And what are the methods we should employ so as to obtain the highest degree of health, comfort, convenience, and beauty consistent with true economy? These are questions which I shall endeavor to answer in the following pages. The difficulties of discovering answers are the very reasons for making this investigation, assigned to me by the Harvard School of City Planning. True, it covers ground which has already been tilled and harrowed, but which needs much more cultivation in two directions. In the first place, the root causes of the weedy growth that commonly spoils the urban scene have not been fully unearthed. We need to plow deeper if we are to bring them to the surface. In the second place, the absence of any sure guidance in matters of principle and methods of design with specific reference to residential areas makes it desirable to try to see whether some such sure and definite guidance cannot be given.

THE TERM "HOME NEIGHBORHOOD"

In this report I have used the term "home neighborhood" to refer to the desirable residential area. We all know that a house is not necessarily a home, but that its home-like quality depends on the character and habits of its occupants. Indeed, there are some who consider that the bad slum dwelling is made what it is by those who live in it. The pig, it has been said, makes the pigsty. This half truth may be admitted, as well as its corollary, — that the most perfect physical conditions will

not produce perfect individuals. But there is plenty of evidence to justify the very common belief that the home makes the man as much as the man makes the home. It is this belief that lies behind the efforts that have been made in all ages to improve civic conditions as a means of promoting human welfare, although, to be sure, many of these efforts have failed to achieve their purpose because they were not based on intelligent planning. The possible alternative term, "neighborhood unit," has been rejected as tending to connote that a neighborhood is a unit by itself, instead of an integral part of a town or city. It is such a part that in this study will be denoted by the term "home neighborhood": a section of a community in which residential use and quality are the major considerations.

It is only when we think of the home as an element in the neighborhood that we realize the importance of city planning in making it a real home, considered now as a physical structure. City planning is primarily concerned with this physical structure of the home as part of the structure of the community. In so far as employment of the art of city planning may be expected to have the effect of improving human character, it can only be by betterment of physical conditions.

Even in its purely physical aspect, a home is more than a house; it is, in part, the creature of certain external qualities in its surroundings. It may, for example, be well designed, have solid walls and good sanitation, and yet be a most defective home because of the presence in its neighborhood of ugly structures, congested streets and yards, untidy open spaces, and noxious uses of buildings. At one extreme, a fine mansion may become valueless for its purpose by the proximity of a fertilizing plant; and at another, a small home may lose much of its value by the introduction of a store or a billboard on an adjoining lot. These commonplace illustrations are mentioned merely to emphasize the fact that a home is not a detached unit but a part of a neighborhood, which in turn is part of a town; and that the good quality of the home usually depends at least as much on its surroundings as on its design and construction. Hence the vital importance of ground planning and control of the development of neighborhoods.

BACKGROUNDS OF THIS STUDY

Necessarily the background of any study of principles and methods of design must be largely filled in with one's own experience. Not unduly relying on my own experience, however, I have tried to discover what

principles have actuated other city planners in the past, with special consideration of American conditions.

A preliminary study carried out by Mr. Robert Whitten and myself on behalf of the Harvard School of City Planning dealt with basic factors of cost of low-cost housing in America.[1] Since then the School has participated in studies of housing and neighborhood planning made on behalf of the President's Conference on Home Building and Home Ownership. A further study that has a more or less direct bearing on the design of residential areas was made for the School by Mr. Harland Bartholomew on the subject of the uses of urban land.[2]

The material of these earlier studies has been found to be of great value in preparing the following monograph on problems and methods in design. They have been useful in showing us the results of past and present methods, and also in giving some indication of what has proved to be sound or unsound under existing conditions. To the extent that they give a true picture of these conditions they provide the basis for obtaining an intelligent appraisal of trends. What the modern trends are and, as far as discovery is possible, where they are leading, must have an important influence on suggested solutions of problems.

Of course, in examining particular examples of city planning it is not possible to discover to what extent conscious reasoning or to what extent intuition has guided designs. And either is bound to be complicated by the influence of custom growing out of slowly accumulated experience. In practice every city planner has to rely to a large extent on intuition when faced with a peculiar problem. It follows that when he is confronted with the task of interpreting designs, even those of his own creation, it is difficult for him to show the nature and degree of influence of the rules that have guided him, and the extent to which their application has had to be qualified as a result of special conditions.

SCOPE OF REPORT

This monograph consists of two parts: the first, dealing with basic considerations which affect developments of land for housing in all urban areas; the second, dealing with broad principles and methods of design, and with a few practical examples of community and neighborhood planning.

[1] *Neighborhoods of Small Homes*, Cambridge, Harvard University Press, 1931. (Harvard City Planning Studies, III.)

[2] *Urban Land Uses*, Cambridge, Harvard University Press, 1932. (Harvard City Planning Studies, IV.)

Ideas and proposals are illustrated by sketches of civic, neighborhood, street, block, and lot patterns. A warning should perhaps be given that it is only in proportion as their limitations are understood that diagrammatic patterns are useful. Too often it is assumed that they are put forward as definite plans, whereas the purpose of their presentation is only to illustrate ideas.

It has been essential to attempt definitions of the minimum requirements for health, safety, and agreeable environment, and then of the maximum improvement on these minimum requirements that is desirable and can be obtained at reasonable cost. In connection with technique, consideration had to be given simultaneously to: (*a*) the arrangement and distribution of land uses; and (*b*) the form and structure of towns and neighborhoods, that is, the design of the buildings and their relations with each other and with the land.

The problem had to be viewed in terms of the region, the city, the neighborhood, and the individual dwelling. At one end of the scale, the wide field investigated in preparing the New York Regional Plan was taken into consideration as giving the broad picture of distribution of population, of land values, and of industries; of the relation of transportation, transit, and traffic to both regional and local developments; of the requirements of public recreation; of the ratios of open to built land and of standards of space about buildings; and of the functions of neighborhood units and building estates and the methods of developing them. At the other end of the scale, it has been necessary to consider the detailed problems of units of lot, and sections and cross sections of local street. Intermediate between these two extremes of regional and lot planning there are innumerable varieties of problems which had to be thought of, although not all were brought into the discussion.

The scope of the study has been made broad enough to bring into consideration the possibility of change in basic economic conditions, which involves, to some extent, change in public policies. The basic idea underlying suggestions for change in methods and policies has been that, when essentials are considered, the private and the public interest are indistinguishable.

CHAPTER II

A BIRD'S-EYE VIEW

HOME NEIGHBORHOODS IN CITIES

THERE are few more pleasing prospects in an urban scene than a home neighborhood made up of good houses set in spacious and well-kept gardens. Let me glance down from a height upon the roof and tree tops of such a suburb in an American city. I see a picture of houses set, as it were, in a park, and clustered about two graceful church spires. It is a pleasant picture of homes, each expressive of individuality but forming together a neighborhood community. Its elements are too varied, and its external associations too many and widespread to be thought of as a unit. The only unity to be observed in a bird's-eye view is that given to it by the lacework of foliage and branches of the trees that weave themselves through it. Amidst the trees is a varied mixture of roofs, chimneys, garden plots, and streets. These give expression to a wide diversity of habits, emotions, interests, and degrees of intelligence. Yet along with these diversities goes a certain cohesion in arrangement which conforms more or less to conscious design.

When, however, I come to walk through the suburb, I see an incongruity of use of land and building that impairs the quality of the scene. Here is a corner grocery built out on the front yard of a fine old house in an otherwise residential street. Its inappropriateness of location is offensive to artistic taste and lessens the values of surrounding property. In another part, the framework of a new apartment house is rising, and its ugly roof lines and superimposed tanks may already be seen in imagination as the dominating feature of the skyline of the future. This misplaced building, like others that will follow in its wake, will derive its light and high values from the open surroundings that are maintained by those whose property it destroys. On the edge of the neighborhood a gasoline station introduces an even more discordant note into what has hitherto been a uniformly agreeable picture. This is a typical suburb of the comparatively wealthy in an American city.

Returning to my high point of observation, I glance in another direction and see a very different picture. It is composed of the crude out-

lines of crowded apartment houses, and of a medley of tanks, chimneys, flat roofs, numerous well-filled clothes lines, and a few odd trees. This was once a spacious suburb of homes set in gardens, a few remnants of which remain hidden in the shadows of its high walls. That it has evolved from a state of comparative rusticity to a highly urbanized state is not in itself a matter to be deplored; the change may have been both inevitable and desirable. What is at fault is the overcrowding of buildings on the land and, even more, the disorder of their arrangement, the juxtaposition and mutual destructiveness of incongruous elements, and the general evidence which these things give that the building development has been inspired as little by sound business sense as by good taste.

This second-grade district is the home neighborhood of highly paid workers and not of the very poor. Perhaps their choice of it as a place of habitation has been dictated by preference for those conveniences that can most easily be provided in a compactly built neighborhood. Or perhaps the choice has been dictated by certain reasons of economy. Increase of population, with the consequent demand for houses and for improved facilities for movement into and out of the center of the city, has raised the prices of land, of building, and of public services. These higher prices have forced people to be content with smaller houses having less space about them than they desire or should have for reasons of health. In this neighborhood the land yields higher prices per acre to developers than in the more open suburb. More streets and public utilities have to be provided because of the greater intensity of building. On the whole, the cost per room of dwellings is as great as in the more spacious suburb, but the dwellings tend to have fewer rooms and use less land so that the cost per family accommodation is less. But, admitting at once the preferences and the economies, both could have been secured with less crowding of buildings and without the ugly disorder that characterizes their design and arrangement.

Out beyond the horizon there are still other home districts where there is spaciousness indeed, but in combination with such inadequate sanitation and related untidiness as to make them no more desirable than the crowded urban area. It is in these outer suburbs, and beyond in the open fields and forest land, that the first beginnings of disorderly development are taking place. Great stretches of open land, laid out with lines of streets and staked in lots, are weed-grown and unused except where, near the highways, they serve as final resting places of decayed automobiles.

Out further, beyond the areas that show the trail of the speculative subdivider, are the farms and residential estates. There exists here a problem of country planning, also needing attention to arrest social and economic evils; but this is another story.

The automobile, with the highways improved for its use, and the electric train in its various forms, have greatly widened the areas of buildable land around cities; while in recent years the stoppage of immigration and the falling birth rate have resulted in decreasing the number of people who desire to secure land for houses. The subdividers and the subdivisions have multiplied in inverse ratio to the demand for lots.[1] What has been chiefly wanting has been a wise public policy, having for its object the prevention of injurious and premature change in the use of land, and the intelligent planning of the land both for its original uses and to meet the needs of such changes as are desirable.

The feature that is common to both the good and bad developments in these suburban areas is lack of organization. The reason for the incongruous developments in or adjacent to the high-class residential neighborhood is that constructive methods were not applied in good time to serve all community needs in their proper places. The grocery store, the apartment house, and the gasoline station are ordinarily necessities for which provision must be made in any complete neighborhood. Not having proper and convenient sites provided for them according to plan, they tend to force themselves indiscriminately into places where, as likely as not, they do the maximum of harm.

In the suburbs of cheaper homes the disorderly mixture of uses coincides with the beginnings of development, owing to lack of those restrictions that usually prevail in the suburbs of the wealthy. But in both, sooner or later, the lack of planning and organization yields the same results of blight and decay. Some changes are inevitable in all growing cities, and in so far as they are incidents of growth or custom we cannot arrest them even when they create certain evils during stages of transition. But the greatest evils of change in the modern community are the result of the lack of care and foresight in making provision in advance for the full needs of the community and its constituent parts.

Each community and its neighborhoods need to be organized in parts that are urban, semi-urban, and rural to serve its different needs. To put the matter in the form of a specific illustration: the complete village or small town of the kind developed in early days in New England was a

[1] See pp. 26–29.

type of ideal home neighborhood. It contained the compact urban area with its shops and other buildings required for business use and its closely grouped dwellings for those who preferred the urban amenities of a central area. Its village green gave spaciousness in a form consistent with a high degree of urbanity. On the fringes of this central area were the houses in gardens that compare in location to the suburbs of a city; and where the residential area ended the farm land began. Thus the ideal village is complete in the three essential parts, each of which ministers to the other; and it also has fairly definite lines of demarcation between the parts.

The average modern city is a disorderly mixture of urban, suburban, and rural elements. In its central areas and inner suburbs we need more openness; in its spacious home neighborhoods we need some compact buildings arranged in a strategic situation to serve domestic needs; and on its extremities we need a more definite line of division between town and country. The suburb with its merging of town and country has its place in meeting the wants of man, but to be a satisfying place of residence it should have parts that are definitely urban and parts that are completely rural. To the extent and degree that we can organize the modern city in its three appropriate parts, we shall avoid the indiscriminate blending which commonly makes it so unsatisfactory as a place of residence.

So far I have been referring to conditions in comparatively good home neighborhoods. Let me now turn in imagination for a moment towards the center of the city. Here we see the crowded slums where once were spacious home neighborhoods. The most popular cry to-day in the field of social reform is "Down with the slum!" — which is so much easier to say than to do. What is more practical is to arrest the evils that produce the slum where there is still time and opportunity.

Most residential areas contain the germs of slum conditions. It is a curious phenomenon that civilized communities, while loudly condemning slums, continue to tolerate the establishment of the many avoidable conditions out of which they grow. Once slum conditions are created they have to be tolerated, to a large extent, for the difficulties of removal are almost insurmountable. This is less true, to be sure, when deteriorated areas are occupied by small houses, as the land values are comparatively lower than where the slums consist of tenements on dear land. In the former case it is practicable to acquire land and buildings at reasonable cost for redevelopment. When, however, slum areas are

occupied by high and overcrowded buildings, these give high values to the land, which, in turn, make the cost of their replacement almost prohibitive. For this reason, slum conditions in New York, Berlin, and Glasgow are even less curable than in London and Philadelphia because they are associated with higher densities of building.

The lesson is that, while no city can altogether prevent the poverty that is responsible for slum conditions, every city can prevent the disorderly beginnings and the high densities that make slums almost irremovable once they are established. The difficulties of clearing slums are not yet patent to the American people, although their evil influence is becoming widely realized. The most effective way to solve the slum problem is, first, to prevent the haphazard growth which is chiefly responsible for blighted conditions; and secondly, to attack slum conditions that exist, both directly by purchase of open space in slum areas, and indirectly, by providing better housing conditions on vacant land.

It is a calumny to say that slums have their root in human desire or that those who live in them do not want something better. For example, people are leaving, not seeking, the Lower East Side of Manhattan by choice; and of those who leave the slum areas of London for model cottages, though they may go through a period of natural discontent during adjustment, the majority show no desire to return. But even were it true that men, women, and children become so habituated to their slum environment that they prefer it to anything better, this would merely mean that they were victims of a social disease and required external aid to effect their cure.

Few communities have such low standards of taste and desire that they approve of the things that lead to slum conditions; but most communities seem to lack the courage and understanding needed to prevent the sowing of seeds that later are bound to bear fruit in the form of blighted areas.

The worst effects of the slum are not those concerned with direct loss of wealth, although the fact that it inevitably results in this loss to owners of property and the community is what makes it most difficult to understand why it is tolerated. But it is the social deterioration that is both a cause and an effect of the existence of the slum that constitutes the real tragedy of this common weakness in the civic structure.

We have to bear in mind that more than half of all land developed for building is required for the housing of people with comparatively small means. To secure proper conditions for the first residents on this land,

and to prevent the evils that tend to grow and accumulate with each change of use and each increase of density, are tasks of planning that must be based on high social purpose, on true economy, and in general on sound principles of design.

THE RELATION OF HOUSING TO CIVIC WELFARE

Why is this question of housing, and of planning the land so as to permit of healthful housing, so important to the welfare of communities? We may as well ask the related question, why is human health and efficiency the most vital consideration in promoting wealth? We cannot expect a high degree of health and efficiency of people in mean dwellings, mean streets, and mean neighborhoods; and the more, rather than the less, we develop machinery, the greater is the demand on the energy and skill of the worker. But, I hear the retort, what is the use of talking like this when so great a financial barrier stands in the way of securing the standards of housing and spacious home conditions for low-income groups that correspond to modern ideas of health and agreeable living conditions? The answer is not obvious, and there is plausibility in the claim that very many people have an earning power inadequate to meet the costs of proper shelter. That is one of the difficult problems that need investigation and that I shall discuss in the following pages.

Present methods of land development, whatever the excuse for them may be, are deplorably extravagant as well as socially injurious. They are partly the result of habits engendered when accessible land was scarce and population was increasing with exceptional rapidity. The economic blunders of overcrowded land areas are now being revealed in the demands made on governments for money to clear slums; to remodel the districts that have become blighted through erroneous conceptions of economic necessity; to carry roads, sewers, and water mains into sparsely developed suburbs; and to lessen the burdens of mortgages that speculative practices have made excessive. Moreover, there is the proof afforded by many generations of urban development that the average density of communities varies little whether they have congested districts or not. Every congested district has its counterpart in some sparsely developed or unused area, and both create excessive burdens for the community to bear.

The real answer to the question of why residential building is crowded, disorderly, and in many cases destructive of health and efficiency, is that a deliberate policy of drift rather than of intelligent planning has

been followed. It is certainly not because it is too expensive a matter to prevent these conditions.

Thus a satisfactory degree of healthfulness in homes is the first essential both of the economic stability and the social welfare of cities. A city may have the best physical arrangement for conducting its industries and commerce, and beauty in its public buildings and places, and yet be a failure as a civilized community because of the absence of wholesome living conditions for the majority of its inhabitants.

In proportion as the homes of the city enjoy advantages of reasonable spaciousness, the city as a whole will compare well in the scale of building to open area and be better able to meet demands for the space needed for movement. The agreeable quality of home neighborhoods involves, among other things, the diversion of the main streams of traffic from the streets and places required for local traffic and pedestrian use, the segregation of business districts from social and educational centers, the provision of well-distributed recreation areas, and some organization of local community life.

Given these primary requisites in the ground plan of a city, namely, ample and well-distributed space, public and private, and street systems arranged to encourage both freedom of movement and a reasonable degree of privacy in homes, we have the basis on which to build well.

NEIGHBORHOOD DEVELOPMENT AND CITY PLANNING

The aid of comprehensive city planning is essential to secure effective improvement of housing conditions. This improvement cannot be achieved solely by zoning and building regulations. It is the positive measures rather than those that are merely restrictive of wrongdoing that are most important. We must plan constructively and comprehend in the plan all elements of civic growth, including ways of communication, the physical requirements of industry, commerce, and business, and, above all, the character and surroundings of dwellings.

Three kinds of plan are needed, namely: the outline plan of the region or country; the master plan of the city, town, or village; and the plan of development of a section or neighborhood. It is enough to say of the advisory regional plan that it should be nothing more than a broad outline and should confine itself to the essentials of a regional framework, especially means of communication and land uses. The master city or town plan should enter into greater detail but avoid the subdivision of blocks and lots and layout of minor streets. Both the regional and the

city plan should be advisory, in a major degree, so as to permit of progressive adjustment to changed conditions. These general plans should be instruments of guidance rather than control, but should suggest the procedure involved where control is necessary and should be followed by statutory plans and ordinances to give effect to this control in definite areas. The sectional or neighborhood plan should be definite and sufficiently detailed to be a guide for actual development of blocks, lots, and minor streets. The adoption of these three divisions of planning is particularly appropriate in large urban regions and is least appropriate in small towns. As a rule, in planning new towns or small existing towns and villages, the city plan and the neighborhood plan should be combined.

Although the foregoing is the logical order in the process of planning an urban area, it is seldom that it can be followed in practice. This is primarily because most land is already subdivided before city plans are made, and there are too many difficulties in obtaining cancellation or replanning of subdivisions after the city plan is completed. Nevertheless, this should not deter us from keeping the proper order and divisions of the planning process in mind, from discouraging the practice of making subdivision plans before a city plan is made, and from avoiding the introduction of details of subdivision units into the city plan.

In the last connection, the city planner frequently has been guilty of the avoidable error of giving too much attention to detail. In making the plan of a metropolitan region or large city, he should confine himself to broad proposals for the improvement of means of communication, for the distribution and arrangement of land uses for different purposes, and for methods of control of building uses, densities, and heights. Nevertheless, of course, he must base these broad proposals to some extent on the study of the detailed requirements of residential and other areas if his general plan is to contribute to the most desirable types of local development.

EXTENT AND DIVERSITY OF RESIDENTIAL AREAS

The parts of a city that are used for residence usually amount to about three fourths of its total area. As a rule, they have a greater total value than all other parts together, and constitute the largest source of the income of the city from taxes. This is one reason why, apart from social considerations, the welfare of the city is so largely dependent on the economic stability of its residential districts.

In the average city, existing residential areas vary greatly in size and character. In the first paragraphs of this chapter I have tried to picture the character of two or three representative types. Many of these different areas have a high degree of homogeneity. Others are a heterogeneous mixture of large and small houses with many gradations from good to bad. Few such areas have either the elements of unity or are of a size that would justify their being called "neighborhood units" in the sense of being local communities, each with well-defined boundaries and a common center for civic life. Few, also, have been intelligently planned as related parts of larger urban communities.

The conception of a neighborhood unit involves the conception of a comparatively homogeneous group of families occupying an area sufficient to provide, among other things, a child population for an elementary school of efficient size. It is a conception which is highly desirable of attainment, but only realizable in practice in the rather rare instances where a completely new development on a large scale can be carried out. In general, the dominant characteristic of the neighborhood is individual expression in homes and yards, while the local community life tends to be merged in the life of the whole city.

Some social grouping occurs about a school, and a certain demarcation of the boundaries of residential districts is created by arterial highways. This grouping and demarcation do tend to create a certain degree of cellular formation of the sort Mr. Clarence Perry had in mind in developing his ideas for neighborhood units.[1] Any general system based on these ideas is not likely to be developed, but as ideas they are certain to have a wide influence in encouraging more coöperative action in many neighborhoods.

NEEDS AND OPPORTUNITIES FOR RESIDENTIAL PLANNING

Outside of the limited field of opportunity that lies in building complete new towns or villages, there is the vast field of normal residential development in existing cities. Opportunities for proper planning in this general field lie mainly in two categories. These are (1) the replanning of areas already subdivided within and about cities, and (2) the planning of new subdivisions in places where land is still in acreage. It is these two categories, and especially the second, that I have had in mind in making this study. Yet, because of the extent of existing subdivisions,

[1] Clarence A. Perry, "The Neighborhood Unit, a Scheme of Arrangement for the Family-Life Community," in *Regional Survey of New York and Its Environs*, Vol. VII, 1929, pp. 22–132.

the question that is most pressing in existing cities is how to improve the area that is already subdivided. The solution of this lies in the combination of replanning with zoning so as to obtain as many as possible of the advantages that would have accrued if the subdivisions had been properly planned at the beginning.

In all residential areas provision has to be made for such business use of buildings, and such public facilities for recreation, education, and social organization as are essential to satisfactory living conditions. Districts devoted to local business and educational institutions, being auxiliary to residence, have to be planned as parts of residential districts; whereas industrial districts, highly centralized business districts, and such institutions as great universities, are distinct units and require separate consideration in the design of local areas.

In zoning we distinguish the residential parts of cities under such names as single-family, two-family, and multiple-house districts. This classification, with the regulations made to give it effect, produces a certain degree of uniformity of character in neighborhoods. At its best it assists in stabilizing property values for a time, but in the usual form of restrictive legislation, divorced from constructive planning in advance, it is only a temporary palliative.

When all the benefits of residential zoning are considered in the light of what has been done during the last twenty years, one wonders whether it has achieved anything worth while except in those cases where it has been combined with city and neighborhood planning or has accidentally harmonized with an existing plan. Nearly always, for instance, we find that all three zones I have mentioned have the same street system. This means either that the single-family zone is burdened with streets of excessive cost, or that the multiple-house zone has inadequate street space.

As a means of imparting the quality that makes a true home neighborhood, other than in certain high-class residential suburbs, zoning has largely been ineffective. To make it more effective and permanent in result, it needs to be combined with constructive design of neighborhoods.

THE ATTITUDE OF THE CITIZEN

The popularity of zoning so commonly coexisting with a complete indifference to city planning and neighborhood design is a reflection of the tendency of the citizen to confine his efforts to the removal of effects. This is a natural tendency. Let us try to imagine what the average resident of the home neighborhood thinks of his situation and surround-

ings, for his conception of them has a distinct bearing on the question of what can be done to improve them. Perhaps in planning cities we think too much of the physical things and too little of human things, or certainly of the habits and thoughts of the mass of human beings, whose voice is not heard through the channels of the real estate board or the local newspaper.

Looking through the eyes of the average citizen, I see the city as a confusing aggregation of buildings, streets, and other physical structures. It varies in appearance from other cities only as its main functions are peculiar to it, depending on whether it is a center of manufacture, commerce, marketing, or education. Its chief interest to me as a citizen lies in the facilities it provides for obtaining the means of livelihood, and this determines my attitude towards it. I may dislike it as a place of residence but have to accept it. And yet I have a notion that it should provide both the means of existence and the means of enjoying living. I understand this much, as an ideal, even if I know little regarding how it may be achieved.

In an important sense, as an average citizen, I am a student of towns. I perceive distinctions between different towns that I have lived in or visited. I share in attitudes of approval or disapproval of various civic improvements. I see the connection between the forces of natural situation and the existence of transportation and of buildings, however vaguely or with however little appreciation of the complexities of cause and effect.

The average citizen's attitude towards the city colors his attitude towards city planning. He sees city planning as a method of improving street systems to benefit traffic, or of adding to public open spaces, or of regulating building uses and heights by zoning. These are the three compartments of city planning that are most commonly understood, but even these are usually understood only independently of each other. To analyze the town or neighborhood back to the origins of things; to understand the interplay of cause and effect in producing high, overcrowded, and incongruous building; to see the error of such assumptions as that there is not sufficient available land for any density that is generally desirable; all these approaches to the problem involve more study than can be undertaken by the average citizen.

Thus, what is easily perceived by most people is the actual condition produced, not the processes by which it came into being. Isolated examples of wrongdoing become the keys to public policies of restriction.

But these policies are likely to be applied to areas that do not have their street systems planned in economic relation to the zoning pattern that is imposed upon them. Much zoning, of course, has been coördinated with city planning, as it always should be, but the great need is to combine it with more detailed neighborhood planning.

In the period of rapid growth and change through which American cities have been passing, injury to many residential neighborhoods has been prevented or ameliorated by zoning; but in the more stable and slower growing period ahead, unless zoning is more extensively allied with planning of neighborhoods, its benefits will be more limited than hitherto.

Finally, in this perspective view of the problem of neighborhood development, the chief emphasis must be placed on the desirability of reserving sufficient space about buildings for health and convenience, of eliminating wasteful expenditures in land development due to speculation and extravagant forms of local improvement, and of establishing homes with agreeable environment within the means of the greatest number.

CHAPTER III

PRESENT URBAN CONDITIONS AND TRENDS

INCREASE AND CHANGING DISTRIBUTION OF URBAN POPULATION

IN the United States, as in other countries, urban communities may be broadly classified in three types in the matter of growth of population. These are:

(1) Communities that maintain a steady natural growth of population, that is, a growth approximately at a rate in proportion to the increase of births over deaths.

(2) Communities that grow both by increase of births over deaths and by accretion of new population, the latter sometimes greatly in excess of the former.

(3) Communities that are at a standstill or are backsliding in population.

The first is the most stable type of growth and usually results in the most desirable social and economic conditions. Its usual superiority over the standstill type and certainly over the backsliding town will be generally admitted, but perhaps most people will question that it has any superiority over the type that is presumed to enjoy benefits from rapid expansion due to immigration from outside places. Undoubtedly, however, a population that increases rapidly from outside sources is especially susceptible to evils of land speculation and excessive land prices with their consequences of waste and disorder in development. Moreover, the greater the rapidity of growth, the greater the difficulty in controlling the development of land and building.

In any event, whatever the respective merits of different degrees of rapidity in growth, it is likely that American communities will grow more slowly and more steadily in the future than in the recent past. It is time, therefore, to take stock of the effects of the stoppage of immigration and of the other factors that are lessening urban growth as more than temporary phenomena.

Immigration and natural increase of population may be considered as the two streams that feed the United States as a reservoir of popula-

tion. Not only has the first stream been dammed but the second has been reduced in volume. In addition, cities may need to decrease rather than increase their working populations. Their plants can produce as much with one man as they formerly did, say, with ten. With decrease of population growth there has been increase of unemployment in cities with consequent decrease of consumption and some drift back from the city to the country.

Up to 1930 urban areas grew very much as prophets thought they would grow. The population of the United States in 1930 living in towns of over 2500 inhabitants was 68,954,823, or over 56 per cent of the total. The total number of urban areas in the same census year was 3165, representing an increase of 1364 since 1900. Of this 3165, 1833 had populations of over 5000, and 96 cities had populations of over 100,000 in 1930.

Cities differ from one another not only in size, but also, and very greatly, in character. Naturally these differences involve consideration of a diversity of methods and patterns in designing and controlling residential developments. Every community needs its *own* plan. In the metropolitan regions, there is the special need of planning satellite communities around the main centers of economic activity; while in the smaller cities and villages the special need is to plan the entire community as one unit.

In the great majority of small cities and towns there are few complications in connection with suburban growth. The residential areas are closely integrated with one center, there is no necessity for rapid transit, land values are low, and problems of planning are comparatively simple. In discussions of land development and housing there is a tendency to overemphasize considerations that relate to the comparatively small number of large cities with their heavy costs of maintenance and high land values. The best opportunities for planning lie in the more numerous cities and towns that are self-contained communities of moderate size rather than groups of overlapping communities. But all urban areas are affected in some degree by the great changes that have recently taken place.

In earlier days all cities, towns, and villages had the high degree of centralization and cohesion in the structure of their community life which still characterizes many of the smallest cities and villages. But when cities began to grow to populations of over three or four hundred thousand inhabitants, a certain amount of disintegration of centers into subcenters and of dispersal of population into scattered suburbs became

inevitable. This was due partly to the absorption by growing cities of independent centers or village communities, partly to their inability to function as civic units on such a greatly extended scale, and partly to the increase in the number, variety, and speed of traveling facilities. The last of these causes operated in promoting both suburban expansion inside cities and the development of satellite communities outside them, with the effect either of reducing resident population in the centers or of slowing down its rate of increase. These things it was expected to do. But it was also expected to relieve business and traffic congestion in the centers, and this it has not done. On the contrary, it has stimulated rather than discouraged the aggregation of economic activities and daytime congestion in the centers, even while the city as a whole has been expanding outward.

SIMULTANEOUS OUTWARD AND UPWARD GROWTH

The question of why the very facilities that are provided to promote outward growth of large cities result at the same time in promoting upward growth presents an enigma that is baffling to most people. The reasons for it cannot be stated quite clearly because they are involved in such a vicious circle of cause and effect. The primary reason is that the rapid transit facilities which make it possible for people to live at considerable distances from the places in which they work also make it possible for the working places to remain and expand in central locations. In other words, the fact that a worker in a metropolitan area can live as much as 20 miles from the factory, workshop, or office in which he works also means that these working establishments can be located in centers the same distance away from their labor supply.

Without rapid transit facilities the largest cities could not have reached their present size or maintained their present high degree of concentration of economic activities. Cities would probably have been as congested but no more so than under present conditions. The number of "Mahomets" who could have camped in crowded apartments at the foot of the "mountains" of industry in central areas would have been larger, but there would have been greater attractions for the mountains to move with the Mahomets to new centers.

The factor of next importance to transit developments, as both a cause and an effect of overcentralization, has been the increasing heights of building which new inventions have made practicable. This factor is secondary because without rapid transit facilities it would not have paid

to erect groups of high buildings in centers, the considerable groups of skyscrapers in Manhattan, for example. While it is possible that had the skyscrapers not been built, there would have been less building of transit lines, this is by no means certain, as there could have been as much concentration of business in Manhattan without the skyscrapers as exists with them. Even if the buildings had been limited to a height of ten stories, it is probable that the present average of six stories would still have been attained. In other words, more low buildings would have been replaced by moderately high buildings than has been the case.

Another factor in this complicated problem is that the increased demand for land for business uses in the centers, involving the increase of opportunities for employment, has at once lessened the area available for residence in these centers, stimulated the demand for it, and so enormously increased its price. Thus centralization of business has to some extent forced the pace of the suburban trend of population and also, at the same time, forced the replacement of small houses by high apartment buildings in central areas. By itself this factor has influenced both the outward and upward spread of building.

However, amidst all the complications that exist, the factor that emerges as having the greatest influence on the spread of modern cities is the development of transit. This development might have been directed so as to encourage the dispersal of industry and population by the construction of more circumferential connecting lines and of fewer radiating lines converging on a common center. The methods that have been adopted appear in the balance to have relieved some forms of congestion only to create more congestion in other forms. One result has been that the means of travel themselves have become excessively congested. In the New York Region, particularly, rapid transit trains have become so crowded as to inflict intolerable discomfort on daily commuters.

DECENTRALIZATION

In recent years there have been some tendencies in the direction of combined decentralization of industry and population. The process in its best forms results in creating new sub-centers and may be more appropriately called recentralization. Its success in improving living and working conditions depends not only on industry and population moving together but also on the proper planning in advance of the areas

to which the movement occurs. When the dispersal is haphazard and sporadic, it results in straggling rows of houses occupying narrow ribbons of land along the edges of highways or railroads, and the relief it affords to the main centers is offset by the introduction of a disorderly form of expansion in the environs.

Thus the manner in which decentralization occurs may be more important than whether it occurs. To be an effective remedy of the evils of ill-balanced and congested growth, it should result in the development of comparatively independent towns with well-organized industrial, business, and residential neighborhoods. Many satellite towns that have grown up chiefly with "dormitory" populations have become highly self-sufficient in providing for their domestic needs for recreation, amusement, education, and shopping. They do this, however, most effectively in proportion as they are well planned with appropriate community centers.

COST OF TRAVEL AN INCIDENT IN COST OF SHELTER

In many cities a considerable part of the population cannot any longer consider their necessities of life as comprising only food, clothing, and shelter. To the majority in the larger cities, daily travel to and from their place of work has become a fourth necessity. This is one of the factors in making the cost of living higher in proportion as cities are larger. The extra cost of travel is partly met in these cities by higher wages than exist in smaller communities. It is partly met, also, by savings in the cost of shelter, but this means in too many cases that people live in smaller and less desirable houses than they would do if they did not have to spend such a large proportion of their wages on transportation.

In the village and small town, and in what are known as garden cities as well as in many suburban communities, we have the ideal condition in which the home of the worker can be both reasonably spacious in its environment and within walking distance of his place of employment. The situation is less ideal where the industries are few and thus limit the choice of opportunities for workers and the members of their families. Where, however, there is a sufficient number and variety of opportunities for employment, towns of small or moderate size undoubtedly offer the most desirable conditions for securing economy to both the employer and employee, as a result of the saving in time, energy, and money spent on travel.

Although part of the cost of travel is sometimes met by increased wages, it is proper to consider it part of the cost of shelter. In large cities houses are relatively dearer within walking distance of places of employment than at a greater distance. People who live in suburbs or in more distant satellite towns are able to get cheaper land, and out of the saving in the cost of a home are often able to meet the extra cost of travel.

In the final reckoning it is probable that a person who lives in the distant suburb pays as much for shelter and travel combined as he would have to pay for shelter alone in the central districts. His gain is therefore limited to any advantages that may accrue to him from having more desirable home conditions and surroundings. Even this may be offset by the discomforts of congested travel to and from the occupational centers.

FORMS OF SUBURBAN DISTRIBUTION

Suburban developments take different forms in cities of different size and character. Among the chief influences that operate in creating differences are:

(1) The prevailing local type of housing, *e.g.* detached single-family types, row or group types, or apartment types.

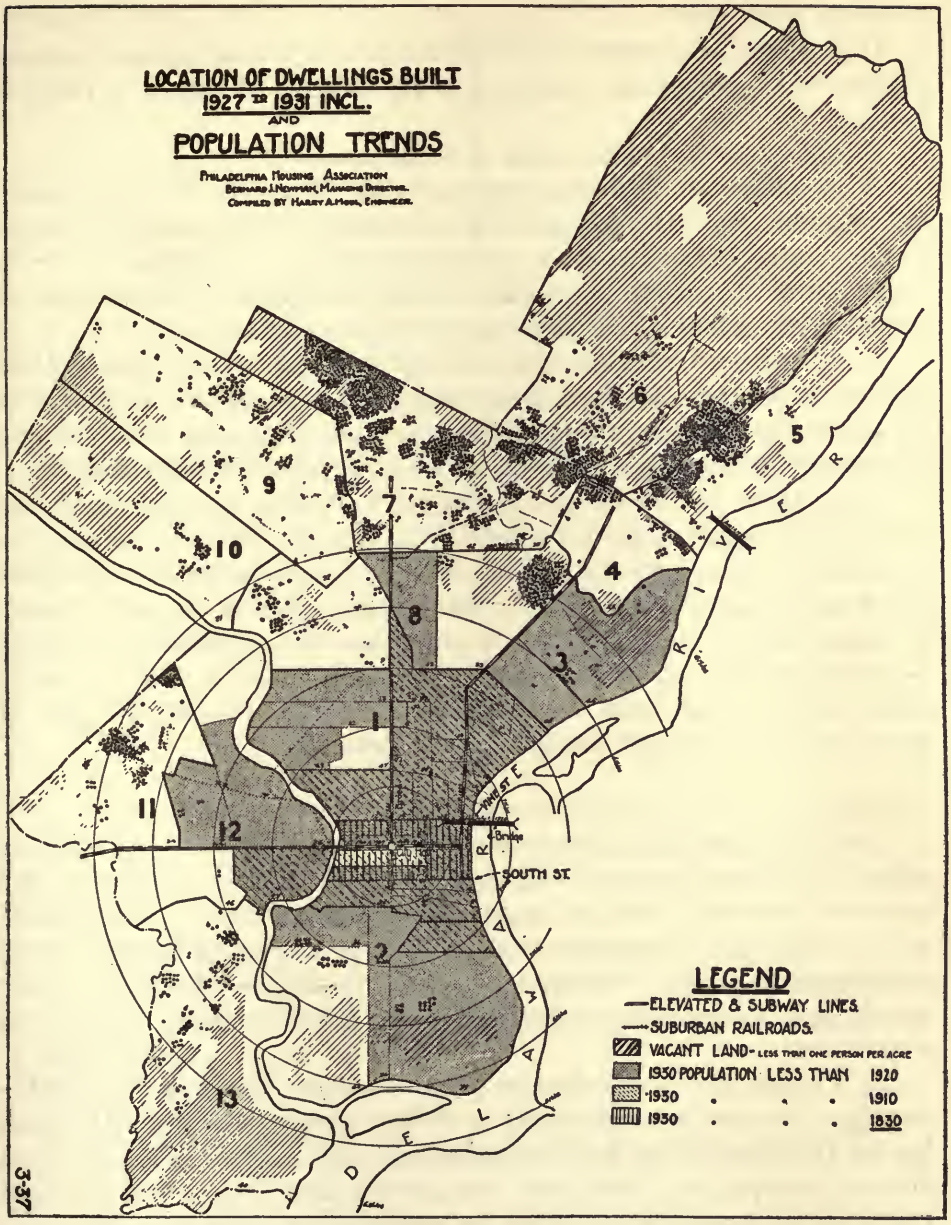
(2) The nature and the degree of predominance of different kinds of industries, or of other economic activities such as marketing, education in a college town, or government in a national or state capital.

(3) The methods and degree of enterprise in developing local facilities for transit.

(4) The presence or absence of master city and zoning plans to guide public action in regulating developments.

The general tendency in large metropolitan regions, including New York, is for the old parts of cities to remain stationary or decline in population, for the inner suburban areas to increase at a moderate rate, and for the outer environs to have a high rate of increase.

The accompanying map of Philadelphia, prepared by the Philadelphia Housing Association, shows the extent of suburban trend in a city of mixed industrial character in which small-house types are predominant. The locations of dwellings built between 1927 and 1931 inclusive are designated on the map by dots, each representing the construction of ten dwellings.



Courtesy of Philadelphia Housing Association

FIGURE 1

HOUSING DENSITIES

In most cities the current tendency is towards the reduction of persons per acre with little if any reduction of the number of houses or families per acre.

Complementary causes of this phenomenon are:

(1) Families are becoming smaller, with the result that a city may fall off in the rapidity of increase of its population without any diminution of the number of families who require housing accommodation.

(2) There is a widening demand for more expensive conveniences in houses, with smaller but better equipped accommodations.

(3) Concurrent with a greater demand for modern conveniences than has existed in the past, there is an increasing tendency for dwellings to become socially obsolete long before they are physically obsolete, and thus for old buildings in centers to have a large proportion of vacancies.

These three factors must be considered in making calculations of densities and in adapting plans for residential areas to prevailing customs in any locality. They indicate that information regarding densities should be based on the number of families or houses rather than of persons per acre. In large metropolitan areas the average number of families or houses per gross acre will usually be found to range from 6 to 8. This occurs in urban regions that show such variation in their prevailing types of houses as New York, Philadelphia, and Cleveland.

INCREASE OF SUPPLY OF BUILDABLE LAND FOR RESIDENCE

Buildable land for residence in cities may be defined as land which is suitable for living purposes and is near enough to industrial plants and centers of economic activity to permit residents to reach their place of employment in a reasonable time. What is a reasonable time varies with habit and local circumstances, but it may be considered as not exceeding forty-five minutes for each of two daily journeys under normal conditions.

As a result of improvement in transit facilities, the area of buildable land has increased so enormously in the last twenty years that the market for dwelling sites has been completely glutted. Witness the enormous areas of unused land that have been subdivided about every city and the extent of foreclosure by cities for nonpayment of taxes.

The accompanying diagram (Fig. 2) shows a town area comprising 9 square miles with a population in 1900 of 20,000 to the square mile, or 180,000, all living within 2.12 miles from the center. Outside of this

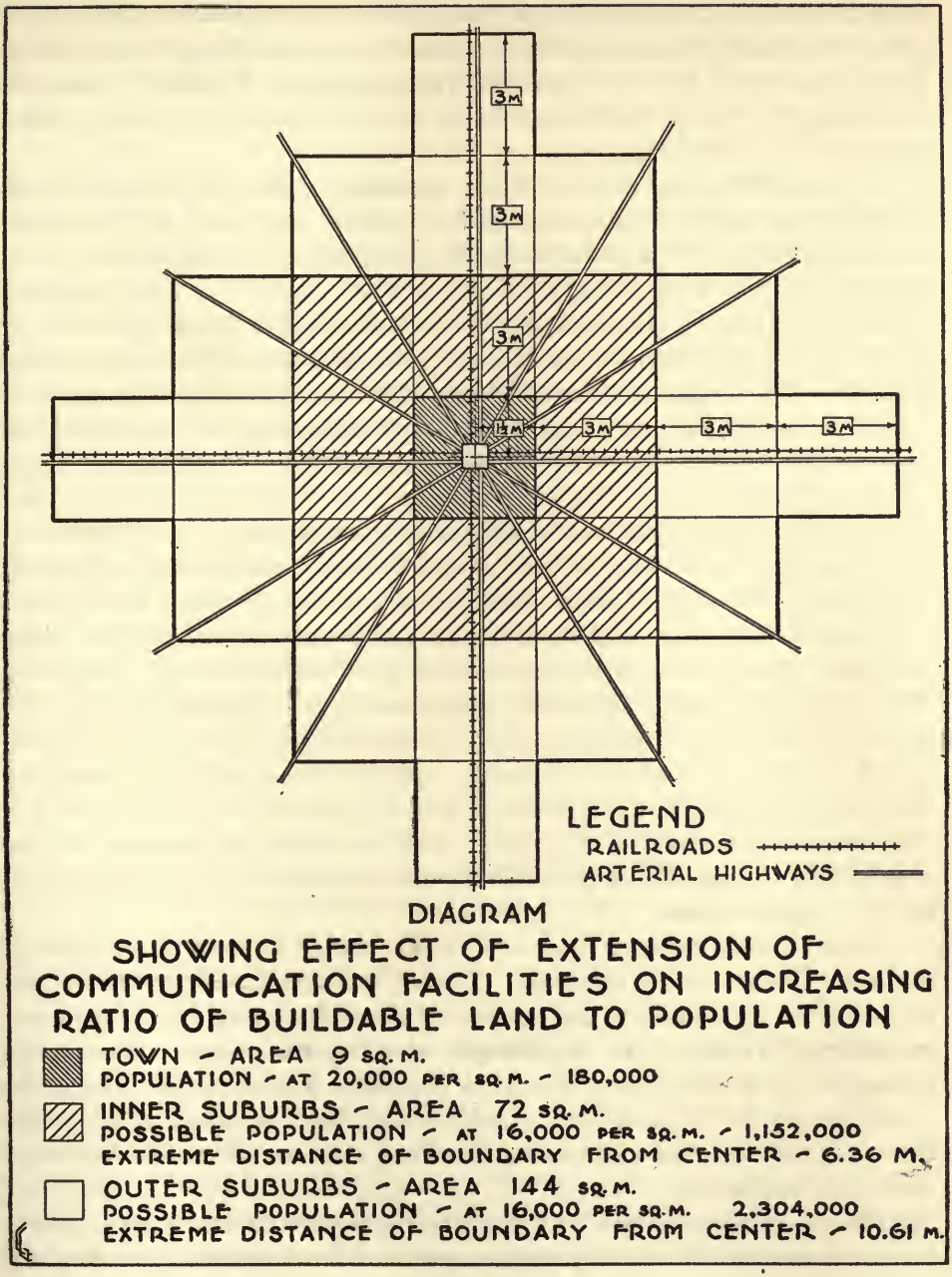

3M
3M
3M
½M
3M
3M
3M
LEGEND
RAILROADS
ARTERIAL HIGHWAYS
DIAGRAM
SHOWING EFFECT OF EXTENSION OF COMMUNICATION FACILITIES ON INCREASING RATIO OF BUILDABLE LAND TO POPULATION
TOWN - AREA 9 SQ. M.
POPULATION - AT 20,000 PER SQ. M. - 180,000
INNER SUBURBS - AREA 72 SQ. M.
POSSIBLE POPULATION - AT 16,000 PER SQ. M. - 1,152,000
EXTREME DISTANCE OF BOUNDARY FROM CENTER - 6.36 M.
OUTER SUBURBS - AREA 144 SQ. M.
POSSIBLE POPULATION - AT 16,000 PER SQ. M. 2,304,000
EXTREME DISTANCE OF BOUNDARY FROM CENTER - 10.61 M.

FIGURE 2

area there are 72 square miles of inner suburbs, assumed in 1900 to have been within easy commuting distance and to have had 50,000 inhabitants. This area could now conveniently accommodate 1,152,000, and the greater part of it is within 4.5 miles of the center, with the extreme distance but 6.36 miles.

If, since 1900, the town area has remained stationary in population but the inner suburbs have increased by 200 per cent, and 50,000 people have emigrated to the outer suburbs along the principal lines of communication, the total population has become 380,000. The land now occupied in the two suburban areas at an average of 16,000 persons per square mile would be only 12.5 square miles, leaving over 200 square miles unused. Yet the greater part of this unused land is within 7.5 miles of the center and the greatest distance is 10.5 miles along the theoretical line indicating the principal lines of communications, — railroads or highways.

The point of this diagram need not be elaborated. It will suffice to say that the development of electric trains and trolleys, the building of a great network of good roads about cities, the use of motor busses, and the general family use of the private automobile, have combined to bring enormous areas into the market as potential building land. However, although these greatly extended areas are ripe for building from the point of view of accessibility, they comprise large parts that are not ripe from the point of view of water supply and other public utilities. This is a qualifying consideration in any calculation of buildable land in the environs of a city. Yet it is not one that affects the estimate of the availability of land which the land speculator considers to be marketable for building purposes.

Indeed, the increased land that is accessible is even more than it looks on the face of the diagram. To-day it is practicable to travel four or five times as quickly as in the days of horse-drawn vehicles. It is not extravagant to say that inhabitants of cities have now conveniently accessible from five to ten times the area that was accessible under the conditions of forty years ago. Incidentally, the diagram illustrates the folly of crowding more houses on the land than are desirable for social and esthetic reasons.

The significance of the fact that improvements in traveling facilities have opened up enormously greater areas of land about cities than are required for building has not come home to municipal governments or to buyers and sellers of land. Even were the population to continue

to increase as rapidly as heretofore, the available building land about cities would be much more than is required. Simultaneous with the increase of buildable land has been the falling off in the demand in recent years. Now the situation is that less land is wanted for building although vastly greater areas are available on which to build. Meanwhile, municipalities have borrowed heavily on the basis of expected income to be derived from land values, and have made enormous commitments for expenditures on public improvements based on expectations of development of land that is not likely to take place in the near future. In the absence of planning, moreover, neither public authorities nor owners of property are able to obtain adequate information as to the order of importance of essential improvements, although the first rule in seeking economy is to study that order.

The whole question of land development needs to be considered in the light of the new conditions. Real estate should be the best security for investment, but, like labor, it has to be employed so as to give security to those who invest in it and also to be an instrument in creating wealth. Its security has been undermined partly by wrong methods and partly as a consequence of the vital changes which I have been discussing. The real estate subdivider still speculates as if no change had occurred; he still demands, for instance, zoning of business frontage along main highways far in excess of any possibility of business use.

Many things have to be done to solve the problem of unused land in the environs of cities, but the first things are to plan the city and its environs, selecting the areas that are most accessible and otherwise most appropriate for development; and then to formulate a public policy to prevent improper use and wasteful expenditures.

BLIGHTED AREAS

Another matter that is affecting land values and is having serious consequences on social conditions in cities is the existence of what are called blighted areas, of which there are four main kinds. One is the slum area near the occupational center of a city. It is occupied by old and usually overcrowded buildings of deteriorated character. Its blighted condition may be caused by the lack of interest of the owner in improving or replacing the dwellings because he expects their replacement by business, though too often there is no ground for this expectation and the deterioration continues over long periods. However, the existence of slum buildings is largely incident to the poverty of their occupants.

A second kind of blighted area is the business district which has deteriorated from a high-class to a second-class business use. This change of use affects land of high values in the centers of cities and is part of a process of recentralization. A third kind is the deteriorated residential district that has not reached the obsolescent stage of the slum. It includes many suburban areas that have ceased to be desirable for single-family dwellings and, because of lack of zoning, have depreciated through improper mixture of uses. These blighted suburban tracts are often as deficient in healthful qualities and as depressing in appearance as the slum areas, and may cover even more territory. The fourth kind is the premature subdivision in the environs of cities, with scattered shacks and billboards, with no local roads, water mains, or sewerage facilities. There is amplitude of space about the buildings, but open space alone does not produce healthful conditions.

The persistence and extension of deteriorated areas in cities is a great social evil, one of the most difficult to remedy. Probably there has never been a time in any country when this evil was wholly absent in the central parts of cities. It presents problems that democratic communities have been no better able to solve than autocratic communities. While the form, character, and social effects of blighted areas have varied in different periods of civilization, and now vary in different countries, every city appears to have had them in some more or less aggravated form.

The fact is that a certain amount of deterioration is inevitable in cities. Whether working together or separately, poverty, depreciation of buildings over long periods, social obsolescence of buildings due to changing demands and habits, and the transitional processes that affect building uses, everywhere produce conditions of blight.

Naturally, the areas that suffer from deterioration are largest in the largest cities, and the deleterious effects of changes are present in greatest degree where growth is most rapid. But what may be called the natural or inescapable causes are not the sole causes of deterioration. One of the chief reasons for the blighting of city areas is overcrowding of buildings on land with consequent darkness of rooms and absence of space for recreation. As this goes back for its cause to the original layout and regulation of land development, it can be prevented and is the most inexcusable blunder in development.

On occasion it may be excusable and even proper to erect buildings of perishable materials or cheap construction, and also to provide temporary roads and temporary services for drainage. These things can be cor-

NOT ALWAYS IS OPEN SPACE AN ASSET TO A RESIDENTIAL NEIGHBORHOOD.

Photographs by courtesy of the Gorham Company.

NOR IS AN INDUSTRIAL PLANT NECESSARILY A LIABILITY.

PLATE II. NEIGHBORING DEVELOPMENTS IN PROVIDENCE, R. I.

rected if and when the land becomes ripe for more durable forms of development, although all forms of temporary buildings need to be specially controlled. However, as indicated in the previous chapter, it is when an area is overcrowded with buildings of a permanent character and, as a corollary, land values and assessments are based on this overcrowded condition, that the difficulties of reducing the density are almost insuperable. Hence the vital importance of preventing overbuilding on the land in laying out new residential areas and in subsequent redevelopments.

It is generally admitted that a blighted area is a liability to a community. It is not so widely recognized that overbuilding is both a major cause of blight and the chief impediment to the removal of blighted conditions. One of the fundamental difficulties in improving blighted areas has been that of obtaining the land for rebuilding at a reasonable price. The price has had to include the cost of the dilapidated and uninhabitable buildings, even though these are a liability rather than an asset to the authority or person who purchases with a view to improvement. Land in large cities may be assessed as worth about $5 per square foot, but another $10 may have to be allowed for old buildings of less than no value. Until areas on which the buildings are condemned as unsuitable for habitation by the Public Health Department of a city can be acquired at the value of the land without buildings, rehabilitation will be economically impracticable.

In any event, improvement of such areas involves a high degree of coöperation between public authorities and owners of property. So long as it remains impracticable to condemn the uninhabitable buildings as valueless, any improvement scheme can only be carried out if a public contribution is made towards the cost. The best form in which to give this aid is by public purchase of parts of the blighted area for dedication as public open space.

THE FUNDAMENTAL QUESTION OF LAND PRICES

The question of the relation of land prices or values to land uses is of fundamental importance in considering the design of urban land areas and problems of municipal finance. It must be independently and thoroughly investigated in order to ascertain the proper steps that should be taken to relate land values to proper social uses, to prevent premature subdivision, to restrict injurious forms of speculation, to solve problems of blighted areas, to secure reservation of desirable private open areas,

to stabilize residential neighborhoods, to facilitate condemnation and excess condemnation for public purposes, and to secure equitable methods of municipal taxation. In this brief discussion of basic considerations I can only allude to a few of the relationships of land values to uses in order to indicate the issues involved and their bearings on the design of residential areas.

Since it seems to be clear that there is a surplus of supply of buildable land to meet any existing or prospective demand, no real necessity exists for continuing to overcrowd land with buildings merely to enable a certain price level to be maintained. Yet nothing is more common in discussions of housing schemes and of zoning proposals than the assumption that the type of development or zone proposed is preconditioned by existing prices of land. For example, one finds the constantly recurring assertion that apartments of high density must be erected in a certain district because the land prices are so high that no other type of residential development would pay.

All this represents a case of arguing backwards from prices (or values) to uses, instead of arguing forward from uses to prices. It is true that there is an essential interrelation of cause and effect between the two factors, and that once a given use has determined a price, then that price becomes an important factor in determining use. But fundamentally it is demand for a given use that creates prices or values.

Relation of Land Prices or Values to Uses. One of the most serious handicaps in securing good residential development and stability in real estate finance is the fact that the price of land — and this reflects itself also in assessed values — has so little relation to net rental values. Land may have a high speculative value given to it by reason of special location, *e.g.* its proximity to facilities for communication and other public or semi-public conveniences, but its real value will be in proportion to the extent to which these conveniences add to the *rent* or *income* that can be extracted for its use.

In view of the fact that the word "rent" is not commonly used in the United States in connection with land as distinct from buildings, it is desirable to define its implications. Rent is income, or the amount in dollars that the occupier of land is prepared to pay for its use. Mr. Richard M. Hurd says, "Value in urban land . . . is the resultant of economic or ground rent capitalized." [1] Usually in cities, however,

[1] *Principles of City Land Values*, N. Y., The Record and Guide, 1924, p. 1.

land is not regarded as producing rent apart from buildings, except where it is leased at a ground rent.

Adam Smith divided rent into two parts, to wit: (1) *building* rent, being the amount of the interest on the capital employed in building, plus profits, and (2) *ground* rent, being the balance of the total economic rent over and above the building rent.[1] Local improvements, *e.g.* sewers and pavements, logically would be part of the investment which produced building rent. In practice, these improvements are assumed as being part of the land rather than of the building, especially where they are carried out prior to the land's being purchased for building.

A clearer division of rent would be building rent, local improvement rent, and ground rent. Under this division the building rent would be the interest and profit on building, the local improvement rent the interest and profit on local improvement, and the ground rent the balance for the bare land. One reason for separating the capital cost and rental value of local improvements from both the building and the land costs and rental values is that the improvements are often constructed by the public authority and not by the builder of the house or the owner of the land. The consequent overlapping of public and private expenditures introduces complexities in arriving at different rental and capital values. It means that no clear dividing line can be arrived at between the values that do or should accrue to owners of property and those which accrue to the community, although, of course, the public expenditures are passed on, and more or less equitably distributed, as taxes levied upon owners.

Let us assume a simple case free from the complications of local taxes. In a given district there is a demand for a house which must not exceed a gross cost of $6000, and on which a rent of $45 per month or $540 per annum would provide a return of 9 per cent, apart from taxes. It is assumed that lots have to be 40 by 100 feet. It is found that the house required must cost $4800 and that local improvements on and off the lot must cost $800, or a total of $5600. At 9 per cent the building rent amounts to $432 and the local-improvement rent $72, or a total of $504. This leaves $36 for the ground rent of the land, or a return of 9 per cent on a capital value of $400, which, in this form of calculation, becomes the value of the lot. At such a value the lot is worth $10 per foot of frontage, 10 cents per square foot, or $4356 per acre. Considering that the ground rent is based on the return of 9 per cent, it is fair to assume that a price

[1] *An Inquiry into the Nature and Causes of the Wealth of Nations,* London, J. M. Dent & Sons, 1910, Vol. II, pp. 321 ff.

of $4356 per net acre in lots would provide a satisfactory profit on land costing $1750 per acre in gross acreage, *i.e.* about two fifths of the lot price per acre.

The point of this illustration is not the actual figures or ratios, which may be taken as capable of considerable variation, but the procedure by which the capital and rental value of the land is arrived at after the other factors are disposed of. Any increase in the cost of the land in such a case would reduce the sum available for construction of the building and improvements, and this is precisely what happens in the majority of cases.

Differences in value of raw land will arise as a result of differences in the elements that make it more or less desirable. Among the chief elements that enter into the value of an area of land being considered for subdivision are:

(1) The suitability of its location to serve an existing economic demand, taking into account the earning power of prospective purchasers or tenants.

(2) The topographical conditions and cost of development for building depending thereon.

(3) Its relation to existing and projected means of communication.

(4) The available facilities for water supply, lighting, sewage disposal, access by road, etc.

(5) The social character of the neighborhood.

(6) The amount of local taxes and the character of local government.

In laying out the land for building purposes, the design must be based on consideration of these elements, and furthermore must conform to requirements of city plans, zoning, and building ordinances.

I return to the suggestion that, on broad principles, the real value of land is the capital value of the rent it can command for the use that is most appropriate to meet public and legal requirements. Thus, if apartment houses which go to the limit allowed by law in the matter of density are in public demand in a given area, the land value in this area will be the capital value of the income obtainable from the land for its use as a site for such apartment houses. But if the public demand in an area is for single-family dwellings and the law restricts these to a density equal to ten houses to the acre, obviously the land value in this area will be determined by the lower income obtainable with the lower density.

The reverse of what is theoretically true is made to apply under conditions that prevail in most cities, and development schemes and zoning regulations are prepared on the assumption that the governing

consideration in fixing the density and character of building is the price placed on the land by the owners and not the propriety of a particular use. The owner's price is the price he hopes to get, and it is to his interest to make the public demand conform to that price if he can. His self-interest in this matter is not always enlightened, for frequently the public demand does not conform to his ideas of how the land can be used and he fails to dispose of his property.

Methods of Valuing Land. In the United States, rental or *income value* is not accepted by real estate appraisers as the sole value. Undoubtedly there are other values which have to be taken into account, but it remains true that income value is the only safe value for an investor. Moreover, income value is the only value that can be determined on a sure basis of fact, while other values are more or less matters of opinion. If value be a matter of opinion only, as is claimed by some authorities on valuation, it is subject to all the uncertainties that go with guesswork. Of course a well-informed and experienced guesser may arrive at an approximation of true value. But the valuer, however competent, should make the income value the *basis* of his valuation, and clearly set forth his estimates of other values. Particularly in all appraisals for purposes of mortgage loans and taxation, the capital value should be based on income value.

Mr. Stanley McMichael says that there have been no less than thirty-five designations of value, ranging from market value to cost value.[1] This indicates both the difficulty and the danger of valuation by opinion alone. Although there must always be particular cases to which general data cannot apply, appraisers should use tables based on practical experience and scientific analysis in all cases and not rely on mere guesswork. The inflation of values by speculation combined with erroneous valuations based on guesswork has been an important factor in destroying the confidence of investors in real estate, and has done much to ruin banks that have lent money on such values. A system based on the solid foundations of income value makes real estate investment a first-class security in good or bad times. In average circumstances the income value of dwellings that are owned can be determined with the same precision as the income value of those that are rented. The basis of the former is the interest on the cost of purchase of the home qualified by its market value for rental to a willing tenant.

[1] *McMichael's Appraising Manual*, N. Y., Prentice-Hall, Inc., 1931, p. 1.

Speculative value is based on expectations of rising prices. It may be inflated by booms, high-pressure selling, rapid growth of a city, entrance of large new business enterprises into a community, construction of a new railroad, discovery of oil or minerals, or various other factors.

The rapid growth of American cities in the past has given some plausibility to the erroneous idea that urban land always increases in value. This idea has almost become a point of dogma, and has remained fixed in the minds of real estate operators in spite of the recent oversupply of buildable land. It is now being seriously questioned by those who once regarded it as gospel; but it has never had a sound foundation in fact in the case of most residential areas, although it has been true for considerable periods in many business areas. It takes on a semblance of fact in periods and places of boom, and has been supported by examples of great increase in values as a result of rapid conversion of low-density occupation of land to high-density occupation, *e.g.* the building of apartment houses on lots previously occupied by single-family houses. On the average, however, the sites of dwellings do not appreciate so long as their use remains unchanged, which, normally, should be until the buildings deteriorate to the point that makes rebuilding desirable. The forcing of change by speculative developers in order to satisfy their own greed is one of the causes of destroying investment values in urban areas.

Extensive purchase of lots to be held for speculation and not for use both inflates prices of land for use and encourages wrong use. Its influence in inflating values for use is obvious, for if the demand for land were restricted to those who want it for use, the price level of all land would be lower. Its influence in encouraging wrong use is less obvious. Yet it is fairly evident that when a person acquires property for purely profit-making purposes, he will usually be compelled by economic pressure to do something with it, and if there is not a demand for proper use, he will sell it or develop it for an improper use. This is a widely prevailing practice. If 7 per cent is the return desired on an investment, then the price must be doubled in ten years and, in addition, the investor must recoup himself for all taxes paid while holding the land out of use.

Expansion of industries, construction of new railroads, and other improvements due to private and public enterprise may lead to legitimate increases of value which can hardly be described as speculative. But usually the opportunity is taken by speculators to inflate these legitimate

increases of value, with results that are highly injurious to both industries and population.

It is admitted by appraisers that business properties are best valued on an earning basis. Why should it be different with other types of property? The idea seems to be that business properties are "investment" and that residential properties occupied by owners are "non-investment" properties.[1]

It is assumed that business properties should be valued on their capacity to produce income, while residential properties should be valued by what is known as the "comparison method," that is, on the basis of the comparative value of similarly located land, plus the reproduction value of the building, less allowance for depreciation, etc. But residential property is as much an investment as business property even where it is intended for personal occupation by the purchaser. If it is to be made a secure investment, for the owner as well as the mortgagee, its capacity to produce income should be considered as the basic factor in determining its value, even though the comparison method be invoked as a check. Of course, income value will take into account the probabilities of future increases of earnings as well as existing earnings. But in calculating future earnings, too little attention is usually paid to the necessity of discounting the present capital value of the future increase. What this may amount to is indicated by the fact that a value of $20,000 realizable ten years ahead is now worth only $12,200 at the low interest rate of 5 per cent.

In actual practice, there are many complications involved in methods of determining values and prices which have to be considered. These include the possible elements of depreciation or social obsolescence of buildings, and the inevitably varying degrees of willingness of owners to sell and purchasers to buy. In one sense the market price of a property may be defined as a price based on an equal degree of willingness of the owner to sell and the purchaser to buy. Variations between general market values and actual prices in individual transactions are as much due to this factor as any other.

The basic considerations affecting land prices and values may be summarized as follows:

(1) The value of land is its value for the purpose of meeting legitimate human wants; in a civilized country this means its value for a use that is healthful, safe, and not inconsistent with general welfare. This

[1] See, for example, McMichael, *op. cit.*, p. 255.

may be defined as proper use. It follows that before real land values can be determined, the conditions of proper use of land must be determined.

(2) The scope and limits of proper use should be determined by governments and given effect by plans and regulations; and the value of land for proper use will be the purchase price of the net rent it can command for such use. The net rent is the income which the land will produce after deduction of all taxes, costs of maintenance of property, and other essential outlays.

PROPER AND IMPROPER USES OF LAND

If it be accepted that land values should be based on proper land uses, the question arises as to what proper land uses are. In general terms, as related to residence, they are the uses which provide healthful and convenient living conditions according to principles of true economy, and may be best illustrated by suggesting specific examples of improper use. These include the following anti-social uses:

(1) Overcrowding of land with buildings to an extent that prevents the inhabitants from obtaining adequate light and air for healthful living and that causes traffic congestion on streets.

(2) The excessive private utilization of land for building with resulting inadequate provision for public open spaces.

(3) Erection of buildings in urban areas that lack properly paved streets, water supply, or adequate drainage facilities.

The first of the foregoing matters raises the questions: what is a proper maximum density of building for purposes of health, and what are the limitations on bulk of building necessary to enable streets to function properly? The second requires the determination of what is adequate public and private open space to provide essential or desirable facilities under different conditions.

In most cities these anti-social uses are permitted and much profit is derived from them. There are, on the other hand, some uses that are desirable from an esthetic point of view but are economically unsound. For example, local custom and social demand may require a much higher quality of development, in respect to spaciousness and preservation of natural features, than can be provided at a cost which is reasonable in proportion to the earning power of prospective home owners or tenants.

In many cases land has had its price determined by some improper use, has been mortgaged and taxed on that use, and neither the owner

of the property, the mortgagee, nor the municipality favors the lowering of its price to one that can be paid for a proper use. For example, an owner of a block of land occupied by "old-law" tenements in New York wants the price which has accrued to this land from an overcrowded and unhealthful use; and, as already indicated, this is the greatest financial stumbling block in carrying out slum clearance schemes that seek to introduce reasonably spacious and otherwise healthful conditions.

Where such land can be used for business or for expensive residence, cheap houses should not be erected; but, on the other hand, if the land cannot be used for anything but low-cost houses, the price of the land should be lowered to permit their being provided under healthful conditions. Once the density of a district has been established, land prices adjust themselves in rough proportion to the ability of the land to produce income, having regard to the permitted density and other local restrictions. The land prices largely determine the type of development, and where local regulations permit an intensive use of the land, the land costs, together with the taxes, rise to a point where comparatively high density is necessary to make development profitable. On the other hand, were an area zoned so that the density of buildings is restricted in such a way as to insure plenty of public and private open space without unnecessarily penalizing the land owners, land values would adjust themselves and become stabilized, while speculation based on anti-social use would be prevented.

It is a fallacy to think that an increase in the permitted density of a district brings about a lowering of rents. This rarely has produced such an effect. Rental scales are not unaffected by the law of supply and demand, and are generally more of a reflection of what the people in any locality are able to pay than of the initial cheapness or dearness of the land.

Too often the problem of dealing with blighted areas by means of reconstruction schemes is approached from the point of view of how to obtain sufficient volume or density of new buildings to maintain land prices that are based on past overcrowded uses; whereas the approach should be how to obtain the reduction in land prices that is necessary to make a desirable density of building financially practicable.

SECURITY OF INVESTMENT IN HOMES

One of the most important reasons for basing land prices on income values and adjusting prices to proper uses is that only by this means can

land and building offer a satisfactory security for investment. There is no private investment that should be more secure than land occupied by homes. Yet it has come to be the case that insurance companies give as a reason for their stability the small amount of investment they have in real estate of all kinds. The attraction of capital for building and land development depends less on obtaining high returns in interest during periods of "boom" than on assuring security to the capital during all periods. Generally the increase of home ownership requires the aid of borrowed capital, and both the amount and cost of the capital that will be made available in the future for building homes will depend to a large extent on the employment of sound economic principles in connection with the planning and development of residential property.

Among the reasons assigned by authorities for loss of homes through foreclosure in the United States are: (1) the inability of the owner to pay special assessment and increased taxation, (2) the general decline of home property values, and (3) changes in the character of neighborhoods.[1] High costs of special assessment and much heavy taxation are due to present methods of land development and valuation, while many of the original causes of decline in property values and depreciation due to changes in neighborhood can be traced to defective design of areas in advance of building.

To show how to obtain economy in construction of local improvements, how to stabilize property values by preserving an agreeable environment, and how to prevent undesirable changes in residential neighborhoods, is to show how to overcome certain root causes of the financial instability of home ownership.

The bases for security of investment are: first, supplying types of houses to meet the prevailing demand; second, providing the spaces and surroundings that satisfy the needs of health and safety; and, third, effecting economy in construction and maintenance of the property. These three bases can be established only by combined planning and zoning, by means of which we relate the type of house to the spaces about it and to the character of the local improvements, keep down construction costs of local improvements, and lessen the maintenance cost by making the development less subject to change.

The discouragement of change of use will mean that the economic duration of life of both buildings and local improvements will be ex-

[1] See, for example, President's Conference on Home Building and Home Ownership, Vol. II, Report of Committee on Finance, Washington, 1932, p. 3.

tended. Rapid and indiscriminate changes of use and density cause the premature depreciation of property that lessens security of investment and creates blighted conditions. When land is not planned and zoned to suit the density and character of the buildings first erected, the tendency is to increase the density and change the character of the development long before the buildings, streets, sewers, etc., would have required reconstruction if maintained for their original uses. And it should be remarked that the need of combining planning and zoning is greatest in the areas where the smallest houses are erected because such houses show the smallest margin of profit and are least able to bear the losses due to depreciative changes.

RELATION OF MUNICIPAL FINANCE TO LAND DEVELOPMENT

The development of land for building is affected in many ways by municipal expenditures and taxation. Well-conceived public expenditures increase land values both directly and indirectly. Values are created directly by construction of highways, main sewers, water-supply undertakings, parks, and, in many cases, by advancing money for local improvements. More indirectly, land benefits from public investment in transport and transit services, schools, libraries, police control, garbage removal, etc. On the other hand, municipal governments derive the greater part of their income — 70 per cent in some cities — from taxes levied on property in land and buildings. In a sense, taxes on property may be regarded as payment by an owner of property to the municipal authority for services rendered to the property.

Therefore, it is of the greatest importance that in the future there should be as full an understanding as possible of the relations between municipal finance and land development on the part of owners of property and those interested in the proper planning of land. Probably, however, no city at present maintains records of sufficient accuracy to provide the information that would be necessary for such an understanding.

In the average city it will probably be found easy to establish a case for condemning, on grounds of municipal finance alone, the wastefulness of excessive subdivision of land. At a time like the present when municipal credit is in many places inadequate to provide essential public services, it is particularly appropriate that this wasteful practice should be arrested, for until it is arrested there can be no hope of securing a proper solution of the housing problem either in new areas or in connection with slum clearance. The financial disabilities which a community

has to suffer from excessive and highly speculative subdivisions in its suburban areas thus have a definite, if indirect, influence on the problem of remodeling blighted districts in its central areas.

Until quite recently it has been practicable for communities to carry the losses due to wasteful methods owing to abnormal increases of population and accretion of wealth. Now that the per capita income of cities from real estate is likely to become less or, at least, increase more slowly than hitherto, it is essential not only to prevent increases of premature subdivision but to cancel the excess that has been undertaken in the past as fundamental methods of eliminating wasteful expenditures. It is also essential that efforts be made to discover every possible form of the economy that can be obtained by planning.

Property Values and Municipal Taxation. In general, the relation of property values to municipal taxation has become of serious import in cities of the United States. Present practice is leading in the direction of converting private ownership into public ownership of land, not by purchase but by policies that tend too much toward confiscation and that are injuriously affecting the foundations of municipal income. Equities in land that have been created by private expenditure have been confiscated to a considerable extent in the past few years as a result of tax sales in urban and rural areas. So long as private ownership is legalized and the values which accrue to the private owner are a subject for taxation, these values should not be confiscated.

There are billions of dollars of unpaid taxes on the books of American cities. For example, Mr. Tracy B. Augur estimates "that cities in the Detroit area will be unable to collect property taxes from a large proportion of their platted area, ranging from ten per cent of the total platted area in the more built-up communities to fifty per cent or more in the communities that suffered most from real estate exploitation, and that these delinquent lands will revert to the various municipalities for public use." [1]

There can be no objection to taxation of land in proportion to the benefits it receives and its ability to yield enough revenue to pay the tax. Municipal taxes are collected for the purpose of meeting local expenditures on improvements, and for the maintenance of streets, sewage-disposal

[1] In a letter to the writer dated Dec. 11, 1933. See also "The Tax-Abandonment of Urban Lands, a Planning Opportunity," paper prepared by Mr. Augur for the annual meeting of The American City Planning Institute, Pittsburgh, 1932.

systems, parks and playgrounds, education, fire protection, policing, garbage removal, etc. None of these services or utilities — in contrast to those shortly to be discussed — are ordinarily self-supporting, and consequently they have to be met by general taxation. Each member of the community gets benefits from them, and to a large extent real estate values are created by them. It is appropriate that the greater proportion of these costs be met by taxation on real estate, which derives its values in part from the expenditure of tax money and in part from human organization applied to industry and transportation.

The justice or injustice of taxation of real estate for the above purposes may depend on the proportion it bears to the taxation of other forms of wealth, but that it should bear a relatively large proportion seems to be obvious because of the direct benefits it receives from public expenditures. Injustice may be done to some taxpayers as a result of extravagance or of other improprieties in making public expenditures; and where this is the case, it will result in causing excessive taxation. But these improprieties should be controlled; their existence does not constitute a reason for changing the incidence of taxation.

Other forms of public expenditure for which special charges are collected, such as construction of water-supply services, lighting services, transit lines, and local streets and sewers, should not be confused with those municipal services that are essentially not self-supporting. Water, light, and transit services should be paid for in full by their users. The fact that in many cases they are not so paid for causes great confusion in municipal finance and makes municipal costs higher than they need or should be. In New York and other large cities where so much expense is incurred on services that should be directly paid for by those who use them, the taxation borne by the community at large is excessive and unfairly distributed. Where, for example, transit facilities that could be self-supporting are subsidized from general taxation, the effects are that people who use them get them at less than cost and the deficiency has to be made up by others.

Public expenditures should increase the rental value of property in proportion to the increase in taxes levied on property. With regard to the rental value of land as distinct from buildings we may again recall the doctrine of Adam Smith, who said: "Ground-rents, so far as they exceed the ordinary rent of land, are altogether owing to . . . good government." [1] In so far as these rents are created by the community

[1] *Op. cit.*, p. 326.

nothing is more reasonable than that they should be taxed peculiarly. However, as already stated, taxes on ground rents or ground values are excessive if they tend to destroy the equity of the owner. Apart from the injustice involved in this destruction, its effect is to react on the taxing authority by destroying the ability of the owner to pay the tax. The result is that taxes become uncollectable because the equity on the land is destroyed and it is no longer in the interest of the owner to hold it.

BASIC ECONOMIC FACTORS IN CITY PLANNING

For purposes of comprehensive and effective city planning the basic economic factors in each city need to be thoroughly studied and analyzed. This is necessary in order that plans may be based on adequate knowledge of the forces that operate in promoting growth and distribution of population and industry, in causing structural and economic changes including deterioration of districts, in preventing the adjustment of prices to proper social uses, and in creating excessive financial burdens on communities.

Perhaps it is because economic problems have not been squarely faced in city planning in the past that the public does not adequately realize that it is only by city planning that satisfactory solutions can be obtained for the economic problems that underlie the defects of modern city building. Until these problems in their specific aspects are considered and courageously dealt with in each city as a foundation for preparing city plans, the practical and permanent benefits that can be obtained from city planning and zoning will not be adequately realized.

CHAPTER IV

THE CONTROL OF LAND SUBDIVISION

REFERENCE has been made in the previous chapter to the present speculative methods of subdividing and developing land as a primary cause of the social defects and financial difficulties of modern communities. Every city affords ample evidence of the losses in material welfare that result from the haphazard way in which land has generally been laid out and used. As might be expected, it is easier to demonstrate the unfortunate results of not planning than to prove the beneficial effects of planning; and it is the second and more difficult of these tasks with which I am confronted in this discussion of the planning of residential areas.

In all city planning we have first to consider how far we can guide or persuade those interested in property to do what we conceive to be right and proper, and next at what point our persuasive measures have to be supplemented by legislative control. The need of effecting control of land subdivision by state laws and municipal regulations is especially important, for many obvious reasons. Among others are the facts that land for building homes is a necessity of life, that gambling in this necessity is one of the most common of practices, and that restraint of the evils caused by this gambling is one of the first duties of a civilized state. In this chapter I shall refer very briefly to certain past methods of control.

ORIGINS AND EFFECTS OF PAST POLICIES

Outside of certain places, mostly on the eastern seaboard of the United States, where *town* settlements were established in virgin areas, land in this country has been subdivided and planned at first for *rural* settlement. The land survey ordinance passed by Congress in 1785 and based on suggestions of Thomas Jefferson,[1] imposed a rigid checkerboard pattern on the vast and then undeveloped area lying north and west of the Ohio River and had a considerable influence in determining the plans

[1] See Charles Mulford Robinson's *City Planning with Special Reference to the Planning of Streets and Lots*, N. Y., The Knickerbocker Press, 1916, pp. 20–21.

of the towns and cities that later grew up there. The scheme, completely disregarding natural conditions, divided the whole region into "townships" each exactly six miles square. This primary method of dividing the land was intelligent enough from the single point of view of ease of measurement. But it was not intelligently related to rural purposes, and still less to urban purposes. Nevertheless it was the framework within which further subdivision was made before the land was included within the boundaries of cities or towns.

This mode of growth also means that the original subdivision of land in urban areas was largely determined while the land was still under the jurisdiction of rural authories. Normally these authorities have no proper conception of urban needs, and such regulations as they have imposed have been based on rural standards and requirements. Thus many of the defects of land subdivision can be traced to the unsatisfactory foundations provided in rural areas for the needs of urban communities. Thus, also, so far as the future is concerned, it is in country or township areas that subdivision control is most important and most difficult to obtain. Without adequate and proper control in these areas, cities will continue to be hampered in making city plans effective whenever they extend their boundaries. It is not suggested, of course, that all the responsibility for defective planning and lack of coördination of subdivisions rests with rural communities. Urban communities often fail to make use of the opportunities they have to exercise proper control.

Whatever the origin of deficiencies in the layout of the land, they result in heavy financial losses to urban communities. Low swampy areas that have been partly developed have subsequently to be drained and sewered at exorbitant cost; buildings are found to have been erected in places where they prevent proper direction being given to important highways; and many disorderly conditions have to be tolerated because of the prohibitive cost of correcting evils that might have been prevented by the exercise of intelligent foresight in the planning of the land.

The need of effective public control is all the greater because of the power which is concentrated in the hands of the speculative developer. He often is the owner, planner, and developer in one, and he may reënforce the power inherent in this combination by acquiring special influence with the public authorities. Probably there is no other operation affecting a necessity of human existence that can be so dominated by the person who desires profit from it as the layout and development of land for building homes.

There has been a popular belief that all land is potential building land. This, in itself, has been a cause of many evils in land development. Among other things it has prevented the reserving of desirable public and private open spaces, and the restricting of buildings to those areas on which they can be economically constructed.

When the proper time arrives for subdividing land, two primary questions have to be considered: first, what are the social (including artistic) objectives in developing the land; and second, what is the most economical plan that will best achieve these objectives? As a rule these questions are now subordinated to the question of how the land can be developed by certain individuals to make the most money in the least time. Present methods result, for example, in areas being laid out in small residence lots when they are in fact suitable only for industries or businesses requiring large sites. Such areas, indeed, are often so cut up as to impose the maximum of difficulty in attracting industries to them. Factories, transportation terminals, and large institutions of various kinds provide means of livelihood and are a major force in creating community development. To discourage their location in appropriate areas is, in the long run, to reduce profits from real estate.

Speculative methods also result in subdivision excessive in relation to existing and even to prospective requirements. Much of the subdivided land would have retained its value for agriculture had it remained in acreage, but this value is destroyed by the process of subdivision. As prospective building land, it may have no value at all; or it may stand at a loss in an owner's books if he has spent money on local improvements and taxes, and cannot find a market for the lots. On the other hand, if the land is sold at a price profitable to the speculator, then all the expenses due to wasteful speculation have to be charged against the prospective user. Enormous financial losses to communities and owners are final consequences of these methods.

At one time in the United States, owners of land were required to use the land they owned. For example, in Brooklyn, N. Y., it was ordained in 1659 that "every one of what condition or quality soever he may be should cultivate, build, and live on the lot he had obtained, or cause the same to be cultivated and dwelt upon, within the period of six weeks, on penalty of forfeiture of his lot: . . ." [1] If some such provision could

[1] See E. B. O'Callaghan's *The Documentary History of the State of New York*, Albany, Weed, Parsons & Co., 1850, Vol. I, p. 415.

now be applied and enforced, it would prevent owners from holding land without any intention of using it but solely with the intention of extracting the maximum price from those who want it for use.

Street Widths. As a result of ordinary subdivision practices, many streets that have no other reason for their existence and location than to provide for the immediate needs of the buildings fronting on them are given the character and paved to a width requisite only for through traffic streets. The construction of these not only imposes an excessive burden of cost on the community, but attracts unnecessary traffic and takes up open space that is needed for other uses. On the other hand, regional and local traffic arteries are often made no wider than those not used for through traffic; and this results in congestion on the highways and, subsequently, in costly widening to relieve congestion.

Official street maps prepared and enforced by cities are too often based on existing subdivision plans and not on master city plans. They share with the subdivision plans the responsibility for much extravagance in street construction. Plans of city street systems should be confined to main highways and parkways, leaving all secondary streets to be properly designed in detailed subdivision plans.

Block and Lot Sizes. The methods of land subdivision that have been followed in the past have produced a certain uniformity in the arrangement, sizes, and shapes of blocks and lots. These sizes and shapes, and the degree of uniformity they possess, have been dictated to a large extent by the financial interest of the subdividers as a primary consideration, although qualified in varying degree in different communities by such general economic and social considerations as the needs of traffic and the requirements of health and public welfare.

It is not desirable to seek uniformity of blocks and lots, or in other words, to standardize their sizes and shapes, even with the best social objects in mind. Every subdivision should be planned in blocks and lots to suit the topography and character of the site, and also to suit the types of building appropriate to the locality, together with their approaches, drainage, etc. This means that these sizes and shapes should not be determined merely in conformity with any theoretical geometrical pattern. It means also that they should not be determined merely to suit the financial interests of speculative developers.

Investigations made by members of the National City Planning Conference, the results of which were published in 1915,[1] showed that lot sizes, particularly in the matter of width, were not infrequently subject to alterations according to choice of purchaser or to variations in use. Thus even when comparatively good subdivision plans are made, they may be altered with injurious results when development takes place. On the other hand, alterations are often necessary because of defects in the original layout or unforeseen changes in circumstances.

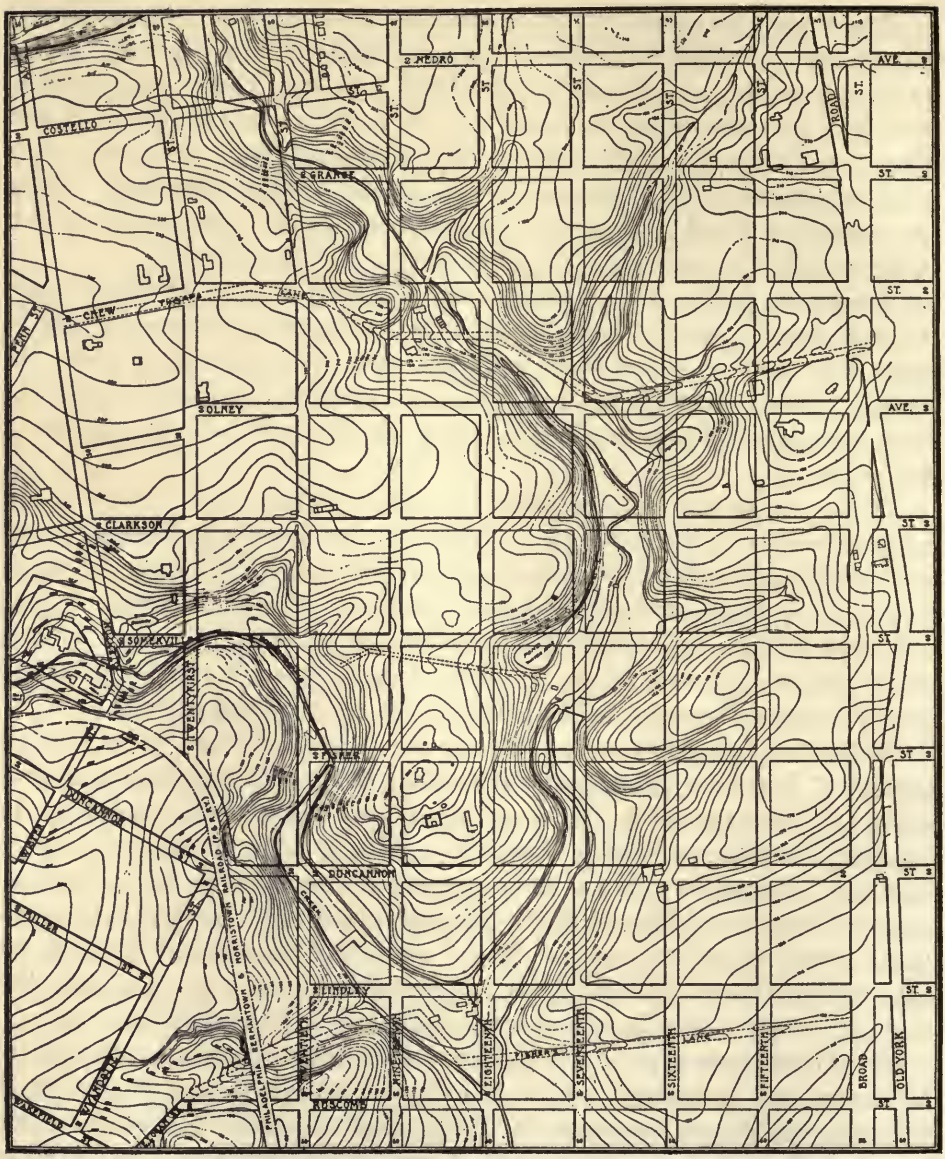
Berkeley, Calif., for example, was originally divided into blocks 319 feet deep by 600 feet wide, and subdivided into lots 50 feet by 159.45 feet; but these standard sizes were not adhered to in selling land. In Boston, Mass., old original lots 50 to 80 feet wide and 250 to 300 feet deep were later cut up into lots as small as 15 to 25 feet wide and 50 to 65 feet deep.

Where large lots have existed in original platting, the tendency has been towards reduction of sizes. This may occasionally be necessary and not undesirable, but it is usually the result of resorting to a more intensive form of development for purely profit-making purposes without regard to social welfare. Intelligent replanning of areas is necessary among other things to insure that any reduction in sizes of lots is made for sound economic reasons and is not injurious to social well-being.

When a given type of use should be permanent, as far as can be predicted, it is best to restrict sizes of lots to lengths and depths appropriate to the type of building to be erected upon them, and thus to prevent changes to higher densities. Where later change of use is inevitable, or where there is little present use and future use cannot be foreseen, land should be subdivided in such a way as to facilitate convertibility. But while it is part of the art of skillful planning to provide for this convertibility, the chief aim in planning should be to secure the stability which comes from permanent occupation of land for one use.

In the ordinary type of subdivision, the widths of blocks in the original layout of land are determined by the depth of two lots, and the length of blocks by public requirements in the interest of traffic circulation. One harmful effect of changing the sizes of lots, and incidentally the character of the building development anticipated in the original layout, is that this change is not accompanied, as a rule, by any readjustment of block sizes or rearrangement of the street system. Thus, if the block sizes and

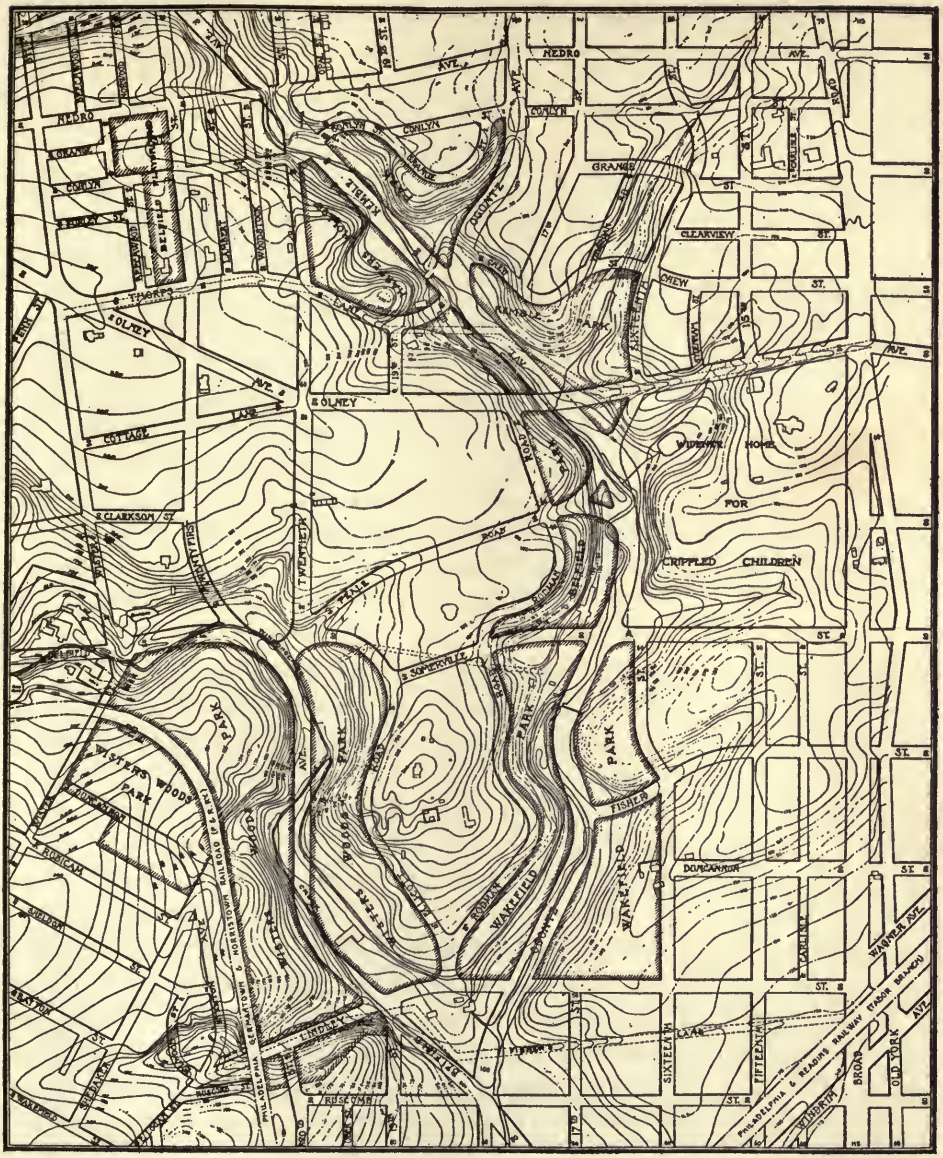
[1] In *Proceedings of the Seventh National Conference on City Planning*, N. Y., 1915, pp. 45–51, and Appendix A.



Courtesy Philadelphiu Bureau of Surveys

PART OF THE ORIGINAL PLAN FOR PHILADELPHIA ESTABLISHED BY CONFIRMATION IN 1871.

FIGURE 3



THE SAME SECTION OF PHILADELPHIA AS IT ACTUALLY DEVELOPED UP TO 1926.

FIGURE 4

the street plan were adapted to the original use of the land, they are not likely to be adapted to the converted use.

IMPROVEMENTS IN METHODS AND POLICIES

In recent decades there have been important improvements both in private methods and public policies relating to the making of subdivisions. Public opinion and the law have both advanced towards realization of the defects of past methods and of the benefits to be obtained from careful planning.

In the sphere of private action, a number of projects have been carried out in the United States that afford good object lessons of the value of trained and experienced designers in securing economy and artistic arrangement in connection with the layout of streets, blocks, and lots. The more important of these developments will be discussed in some detail in a later chapter.[1] They include Riverside, near Chicago; Forest Hills, N. Y.; certain War Housing villages; Radburn, N. J.; and various other residential subdivisions, more or less well-planned, in all parts of the country. In important respects many of these subdivisions reach a higher standard than could reasonably be enforced upon owners by legal requirements. Nevertheless, they indicate the directions in which public policies might be improved.

It is true that these "model" developments have been planned either for people of large means, or with the aid of funds provided by philanthropic agencies, or by the government for specific public ends, or by private businesses for their own employees. They, therefore, enjoy advantages which are not available under normal conditions. Their main distinction from other subdivisions, however, is that they have been planned by experts, and that the skill of the planning has resulted in securing economy and intelligent arrangement in matters of adjustment to topography, layout and detailed design of streets, blocks, and lots, well-organized distribution of open spaces, and artistic grouping of buildings. It is the quality of this planning and its beneficial results that make these subdivisions good object lessons for all subdivisions.

The same results could be obtained, with differences in detail, in private small-house developments handled as normal "subdivisions" if skilled city planners were employed to plan them. It is natural and proper that in planning areas for comparatively wealthy residents, the

[1] See Chapter XIII.

THE COMMON IS REMINISCENT OF NEW ENGLAND.

Photographs by Howard K. Menhinick.

A TYPICAL CURVING, PARK-LIKE STREET.

PLATE III. RIVERSIDE, ILLINOIS.

(*See pages 237–240.*)

plans should be made to comply with the needs of such residents and therefore would be inappropriate, in some features at least, for areas to be developed for poorer residents. But skillful planning is the means to best results in the second case no less than in the first.

It has to be admitted, however, that less incentive exists for employing city planners to plan ordinary commercial subdivisions for small houses than for large houses. The economic benefit from good planning may be equal in the two cases, but the *salable* esthetic benefit is more readily made an item in the rich man's budget.

Many developers have instituted and enforced private covenants in order to obtain some control of the building in their subdivisions, but in so far as these covenants relate to requirements as to *cost of dwellings*, they do not afford much guidance as to the matters which should be publicly controlled.

Great improvements have been made in the laws relating to city planning, and coincidently to subdivision control as well as zoning in most states. State enabling acts, and subdivision regulations based upon them, have been much strengthened in the last thirty years, and are still being improved. It is obvious, however, that satisfactory results cannot be obtained merely by giving municipalities power to control. The most perfect system of regulation may not result in improving subdivision plans unless expert supervision is employed to advise on technical problems. Indeed, where a municipality retains proper advice, it may be able to secure better results by persuasion than by mandatory legislation without this advice.

PERSUASION AND CONTROL

It is well to have in mind the distinctions between the matters that should be dealt with by persuasion and those that involve public control. For example, it does not appear to be either practicable or desirable to make it mandatory for subdivisions to be planned by persons having a certain standard of training and competence in planning. Yet this competence is so essential to good results that every effort should be made by public and private agencies to persuade developers to employ such persons. It is only by their employment that proper consideration can be given to the combined economic, social, and esthetic phases that need to be dealt with. In the absence of skilled advisers to direct the planning, there does not appear to be any method by which proper emphasis can be given to esthetic values. Everything that is possible

should be done to improve public taste as a means of raising esthetic standards, but one of the essentials to this improvement is the creation of object lessons by experts in city planning.

Although the employment of city planners and the development of artistic qualities in plans cannot be made the subject of compulsory regulations, there are matters that can be regulated and which have the effect of securing these objects. Fortunately modern requirements for health, convenience, safety, and general welfare are also requirements for securing, by indirect means, desirable esthetic qualities in community development. This is most true of those requirements that relate to the provision of spaces about buildings, adequate space for recreation, short local streets closed to through traffic, proper design of curves, connections, and approaches in streets, and conformity of local streets and building lots to the levels of the land. These matters are dealt with primarily in the interest of health, safety, convenience, and sanitation, but they will indirectly do much to provide for orderly and pleasing appearance.

It is desirable at this point to summarize the main essentials of the procedure that should be followed in subdivision control. In stating these it is assumed that a municipality has a master city plan and a zoning ordinance in existence, and by a state enabling act is given power to make and enforce subdivision regulations.

The requisite procedure is:

(1) To require all subdividers to submit plans for approval of the city planning board or commission.

(2) To employ skilled advisers, first, to prepare a code of principles governing the design of subdivisions; and second, to examine and report on plans that are proposed.

Such a code, if sound, will be of real value in guiding developers in preparing their designs, and will reduce the conflict of ideas and the amount of work involved in carrying out the second duty. It is obvious that little will be gained by routine approval of plans unless the city planning board has its own program of what is desirable, and has competent advice on the designs submitted.

What should constitute a program or code of principles will not be discussed here, because it is so largely a matter for determination to suit local conditions, and one on which each municipality should be separately advised. As far as general principles can be suggested, they will be discussed in subsequent chapters.

What we can achieve by control must always depend on the reasonableness behind it, which means that planning regulation must always be supported by understanding of problems and technique in design. Moreover, not only must control be limited to matters that are outside the scope of persuasive measures, but all control must be leavened with persuasion. Perhaps in city planning we give too much emphasis to the need of control, especially in relation to esthetic features, and too little to the need of more persuasiveness. A little achieved by the persuasive influence of constructive object lessons will be more fruitful in final result than much more achieved by compulsory measures. However, persuasiveness and control will be found in good practice to go together.

Alfred North Whitehead says:

> Civilization is the maintenance of social order, by its own inherent persuasiveness as embodying the nobler alternative. The recourse to force, however unavoidable, is a disclosure of the failure of civilization, either in the general society or in a remnant of individuals.[1]

City planners have to offer the "nobler alternative" and to rely more on the intelligence of men to adopt it than on laws to enforce it. We have to recognize that whatever condemnation we may mete out to the speculator and his collaborators in wrongdoing, the city is the people and a subdivision is an act of the people. We cannot make the people more worthy although we may limit the scope of their unworthiness by control. In practice, such control should be limited to what is clearly necessary and then unhesitatingly enforced.

DEGREES OF CONTROL

Broadly speaking, there are three existing degrees of control, any one of which may be adopted in regulating subdivisions. It is difficult to give names that exactly define them, but they may be referred to as minimum control, medium control, and maximum control.

Generally, public authorities require that subdivisions conform with the official street map or with the skeleton framework of the master city plan, where either of these exists. This most frequently applies to securing the reservation of the sites for main thoroughfares. Also most municipalities have in their local ordinances specific requirements as to details of streets and sewer connections which have to be complied with by developers. This is the minimum degree of control that is usually exercised, and beyond it many municipalities do not go. As a result,

[1] *Adventures of Ideas*, N. Y., The Macmillan Co., 1933, p. 105.

there is no interference with developers in laying out minor streets, continuing or blocking street connections, fitting or ignoring the topography, and planning block and lot sizes. The designs are not subject to approval or disapproval by a city planning commission, and no city planning experts are employed by either the municipal council or the developers.

A more adequate system of regulation has been adopted and is enforced under enabling acts in some states. I will limit myself to citing one of the most recent and complete examples, — that of a California county which is working toward a master plan.

San Mateo County in California established its Planning Commission under the provisions of the California Planning Act of 1931. The Commission prepared regulations for subdivision control and these were adopted by the Board of Supervisors in the form of an ordinance.[1] Several subdivision maps have been considered under the regulations and the whole system of subdivision in the county is being related to the general development of the means of communication and to zoning.

The ordinance came into effect in February, 1932. One of its requirements is that a map of any subdivision of land in the county shall be filed with the County Planning Commission. The Commission specifies the form and contents of the map, and the procedure that has to be followed in filing it for consideration.

A tentative map has to be prepared by a registered civil engineer or licensed surveyor showing clearly the details of the subdivision. On the filing of the tentative map the Commission has to determine whether it is in conformity with the provisions of the law, and may approve or disapprove the proposals shown in the map. In the event of disapproval of the proposals, the Commission has to state its reasons and indicate what changes would render the plan acceptable.

Subsequently a final subdivision map has to be drawn and presented to the Commission. The data specified to be shown on this final map must include the designation of lots, alignment and width of streets, public utilities, and the location of parcels offered for dedication for any purpose.

It is required that all streets, highways, and other ways in the subdivision shall be offered for dedication to public use, and *shall be improved by the subdivider*, including construction of pavements and provision of adequate water supply and other sanitary facilities.

[1] San Mateo County Planning Commission, *The Subdivision of Land in San Mateo County, California*, 1932.

The subdivision has not only to be satisfactory in itself, but must conform to requirements relating to the general street and highway layout, and show consideration for intersections and curves. Regulations affect the planning of alleys, blocks, lots, watercourses, grade crossings, the location of easements, and the relationship of the subdivision to the master plan. A series of typical sections of highways showing the adaptation of such highways to hillside development and to areas occupied by trees has been issued. It is obvious that in carrying out such extensive procedure the municipality must have available expert city planning advice, which is the main requisite in effective subdivision control.

What may be considered as the maximum degree of desirable control would involve more drastic restriction of the use of land for building and greater participation of public authorities in the constructive development of urban areas than has generally been practiced in cities of the United States. In addition to the requirements that all subdivisions conform to a master city plan and be subject to approval of a planning commission according to the procedure followed in California and other states, this maximum degree of control would require that:

(1) No new subdivision could be made of land, for purposes of sale as sites for building, without a license granted by the municipality after proof of the need and general desirability of the subdivision and appropriateness of the area to be subdivided. (Although the effect of this requirement might be secured by the method referred to in the following paragraph, it is important that actual subdivision should be prevented if possible in the initial stages where the process is likely to lead to injurious social results.)

(2) Prior to or concurrent with the erection of buildings, there should be provided local improvements necessary to furnish access, proper sanitation, and recreation space for the inhabitants in accordance with specifications of the engineer of the municipal authority, and the streets should be dedicated to the public. The developer should be required not only to set aside streets and open spaces necessary for proper living conditions, but to carry out adequate local improvements in accordance with standards specified by the municipality. Thereby road access, water mains, and main drainage would, in urban areas, be provided in advance of the use of the land for building purposes; and lots could not be built upon without permits obtained from the building inspector, who would have to be satisfied that the local improvements were pro-

vided. (These conditions are already enforced in part in the cities of some states. It might not be reasonable to require that the local improvements be completely constructed at one time, but the policy of preventing the erection and occupation of any building before the site is properly equipped for healthful use, now followed in a few places, should be generally followed.)

(3) Where the developer is unable to provide capital for local improvements, or where, in the public interest, the municipality considers it necessary itself to construct street pavements and sewers, then in either case the owner should dedicate the streets in advance of construction and the municipality should carry out the necessary works, recoupment for the expenditures of the municipality to be obtained in the usual manner by levies based on special assessments.

(4) In developments for low-cost housing carried out for the benefit of the lowest-income groups on land of an approved situation and price, minimum standards of street width and of construction are all that can be expected; but where the abutters will afford better and wider paving, appropriately better facilities should be striven for. (For the purpose of insuring good sanitary conditions in connection with the cheapest houses, the municipality might properly construct the local improvements and assess them on the property over a sufficiently long period and at a low enough rate of interest on the cost to keep the levy from being an excessive burden. Cases might arise where it would be justifiable for the community at large to bear the whole cost of the local improvements. This form of subsidy to cheap housing would be less objectionable than others that have been adopted by municipalities. It would indirectly contribute to the building of low-cost houses in a more desirable way than by subsidy of building or tax exemption. Moreover, public expenditures of this kind would not be very different from those now incurred for improving the construction of main highways and parkways, which in effect are in the nature of contributions to the value of adjacent real estate without any advantage of public control over its development.)

Such a program of full control would not be wholly practicable under present conditions. It would interfere with the rights of property ownership to an extent that hitherto has been regarded as unconstitutional in America, although it would not interfere with the utilization of land already improved or partly improved, or with the right to build for particular uses, or with the continuance of any existing uses.

PUBLIC PURCHASE OF LAND FOR HOUSING

An alternative to more drastic control of private enterprise is the public purchase and development of land for housing as practiced in several European countries. In German cities particularly, the difficulty of controlling subdivisions of land and the inflation of land prices caused by speculation have led, over a long period of time, to extensive public purchase of land for building small houses. This method has not been favored in the United States. It could only be successfully applied to areas still in acreage or reverting to the municipality by tax sales. However, most land within municipal areas is "ripe" for building and could not be obtained at a reasonable price. Nevertheless, whatever the difficulties in application, the only alternative to effective control and partial subsidy of land development for low-cost housing is public purchase of land before it is subdivided.

No matter what methods are used to control the subdivision of private land, there will always be difficulties in making sure that the areas required for small houses are planned in the manner best adapted for such houses. Control over prices or profits and over speculative methods can only be indirect and partial, and speculative methods inevitably involve heavy costs of development which must continue to be passed on to the purchasers of sites for homes.

Public purchase of land for housing should only be undertaken for the class of house that is not provided under normal conditions by private enterprise. When it is resorted to, public action should be restricted to acquiring areas of suburban land, and, after planning and zoning it for small houses, to providing means of access and local improvements. Thereafter, land should be turned over to limited dividend companies, or lots may be disposed of to persons of small income, and the building of the houses left to private enterprise. Such developments should be planned in well-defined neighborhoods with reservation of open spaces for recreation and sites for community buildings.

REPLANNING OF EXISTING SUBDIVISIONS

The enormous amount of land that has been prematurely subdivided in the environs of large cities, much of it derelict from the point of view of its immediate use either for building or for agriculture, proves not only that it is desirable to restrict unnecessary subdivision in the future but also that existing subdivisions that are undeveloped or only sparsely occupied with buildings should be replanned. Such replanning should

aim to secure the economic layout of the parts that are needed for future extensions of building and the reservation of other parts for open spaces and cultivation.

The aid of replanning and re-zoning is also needed to provide a basis for relieving owners from the burden of taxation on speculative values. In a study of valuation of land in the suburban areas of Chicago it was found that some groups of taxpayers paid approximately $27,000,000 of taxes more than they should have paid, and that other groups paid $27,000,000 less than they should have paid.[1] In part, no doubt, such inequalities are the result of unfair or unintelligent methods of assessment. These, however, are not the only reasons for the excessive taxation of some land as compared with other land. When, for example, land is subdivided long before it is wanted for building, owners have to pay taxes on an assessed value that is far above the real value.

Assessors consider that they are justified in assessing land on the basis of the market price that is asked for the purposes the owners have in view, however remote and uncertain it may be that the owners can dispose of it for these purposes. There can be no proper equality of assessment where land is prematurely subdivided, and where all is valued for the highest possible use to which any part of it might be put, without scientific appraisal of the potentialities of the market for building land, and without control of densities and uses by means of planning and zoning. It is almost certain that the time will come when it will be found necessary to restrict the use of certain areas to agriculture and other private open uses, and to determine an equitable tax basis for such open use.

While, in the interests of agriculture, it may be claimed that less land should be cultivated, the last areas that should be abandoned for cultivation are the fertile lands in proximity to great cities. In Cook County, Ill., part of which lies within the city of Chicago, there are now vacant about 331,000 acres of land some of which is farm land and can be nothing else.[2] There are in the county 335,260 vacant lots, only 30 per cent of which lie outside the city limits of Chicago.[3]

There are 1,600,000 vacant lots in Michigan that are tax delinquent, and banks in that state failed largely owing to the extent of their frozen

[1] Herbert D. Simpson and John E. Burton, *The Valuation of Vacant Land in Suburban Areas, Chicago Area*, Chicago, The Institute for Economic Research, 1931, p. 1.

[2] *Ibid.*, p. 2.

[3] *Ibid.*, p. 12.

assets in real estate. These are penalties that have to be paid for uncontrolled subdivision.

Wherever a land boom and collapse have taken place, it is advisable to replan some of the subdivisions and cancel the rest as a means of reducing to a minimum the inevitable economic loss to both the community and the owners. Cancellation, however, involves great difficulties. Lots in most subdivisions have been sold in scattered locations. To force the owners of these scattered lots to conform to a new plan or to sell their lots is beyond the power of municipalities. The only way this difficulty could be overcome would be by some new law like the *Lex Adickes* in Germany under which owners are compelled to assign their lots temporarily to the governing body and accept an area of equivalent value after the subdivision is replanned. The presence of these difficulties affords additional evidence of the importance of controlling the platting of new subdivisions. The aggregate effects of present subdivision policies lead to enormous waste of money, and the major part of this waste is reflected in added costs of homes.

CHAPTER V

ZONING OF RESIDENTIAL AREAS

IN a legal sense all zoning may be classified as restrictive. It has been defined by Mr. Edward M. Bassett as "the creation by law of districts in which regulations differing in different districts prohibit injurious or unsuitable structures and uses of structures and land." [1] It is obvious, however, that although based on prohibitory regulations it is more or less constructive in its results and that these results are the measure of its success. If, for example, it prevents the erection of a factory in a residential district, it not only stabilizes the existing character of the district but, by the security it gives to home owners, provides incentives towards further improvement. The same consideration applies where the restrictions have the effect of preventing the erection of an apartment house in a single-family district or a store at the corner of a residential street. Therefore, in a planning sense, zoning might be described as prohibitory regulations the success of which depends on the constructive results they produce.

Broadly speaking, there are two kinds of area to which zoning may be applied and which require quite different approaches in the matter of what may be called zoning design. One of these is the area that is already planned and occupied by buildings, and the other the undeveloped area in which it is still possible to combine the zoning with the planning.

Zoning in American cities has been most commonly applied to areas that are already built up and that have, therefore, been planned independently of zoning. The main objective of this zoning has been to stabilize and protect the best existing conditions in the face of dangers incidental to changes in these conditions. The type of zoning plan that is prepared for such an area must necessarily be influenced by the established character of the layout and uses of structures.

The popularity of zoning in areas already built upon is due to the fact that the average citizen can clearly see the effects of haphazard

[1] *The Principles of Zoning*, Washington, American Civic Association, 1920, p. 8.

growth after it has occurrred; and, seeing them, he wants to ameliorate them and prevent their recurrence. It may be that the average citizen is less impressed by the bad civic consequences of an extraneous use than by the fact that it will cause depreciation of his property. Such depreciation usually occurs as the result of haphazard change of use from residence to business. But whatever the incentive, he turns to zoning based on the police power as his remedy.

No branch of planning is more influenced by precedent than zoning. What is done in one city is often copied for application to different conditions in another city. What is suggested for regulation of changes in built-upon areas is erroneously regarded as suitable for areas not built upon.

There is greater scope both for making zoning effective in securing conditions of health, safety, and general welfare and for giving more stability to zones in undeveloped than in developed areas. Neither zoning ordinances that originate in built-up districts nor past experience of the effects of rapid growth are safe or proper guides for zoning in undeveloped districts, in which the highest degree of permanency in the establishment of zones is practicable and most desirable in the interest of economy.

CLASSIFICATION OF USES AND DENSITIES IN RESIDENTIAL AREAS

One of the chief objectives of zoning is to obtain a proper distribution and apportionment of all land uses, including the proper proportioning of open to building uses. Primarily this involves the selection, classification, and restriction of areas most appropriate for building uses. Classification means preparing a plan of districts that conforms to an intelligent estimate of the public demand for land and of the best economic use of property. This classification should be made in advance of subdivision and detailed zoning plans.

In a paper on the "Economic Importance of Real Estate Classification" Mr. Albert G. Hinman said:

> . . . planning which involves classification, based on a thorough understanding of economic considerations, must precede zoning. A zoning ordinance must be understood to be only the necessary instrument for putting planning into effect.[1]

Mr. Hinman, a professor of real estate and land economics, thus puts the

[1] In *Annals of the American Academy of Political and Social Science*, Mar., 1930, Vol. CXLVIII, Part I, p. 12.

order of planning operations in more logical sequence than is done by many city planners. This order is:

(1) Broad classification of uses (and of ways of communication) in the master city plan.

(2) The planning of zones and streets in the form of subdivision or neighborhood plans.

(3) The preparation of zoning ordinances to give effect to the plans.

In considering designs for residential areas we have first to be satisfied that these areas are properly classified as residential. We have then to proceed to a more specific classification of kinds of uses in a residential area and to a determination of the densities of buildings appropriate to these uses. This secondary classification resolves itself into deciding what parts of the area are to be assigned to different types of dwelling, to open spaces in the form of streets, parks, and playgrounds, to public and semi-public buildings, and to business, including commercial amusement. Local classification and design will go together and should provide the basis for a high degree of permanence in development.

URBAN LAND USE RATIOS

Studies of the existing distribution of land uses and degrees of density in cities have to be made for the purpose of affording guidance in new developments.

United States. The most comprehensive study of this kind that has been made was that completed by Mr. Harland Bartholomew in 1932 for the School of City Planning of Harvard University.[1] The report of this study contains valuable data regarding conditions in sixteen self-contained and six satellite cities. These data show densities and ratios of areas occupied by: (1) single-family detached houses; (2) two-family houses, comprising all pairs whether vertically or horizontally attached; and (3) multi-family houses, including group, row, or apartment houses which are occupied by three or more families. The above division of types corresponds to the zoning classifications that are in use in many cities, and includes groups or rows of single-family dwellings in the multi-family-house classification. I give the following brief summary of data in the report because of its bearing on the design of residential areas:

[1] *Urban Land Uses*, Cambridge, Harvard University Press, 1932. (Harvard City Planning Studies, IV.)

Mean Average Lot Area. The mean average lot area for single-family dwellings was 6679, and for two-family dwellings 5519 square feet. For one family in a multi-family dwelling, including small houses in groups of three or more, the mean average was 1350 square feet. The average height of the multi-family houses in ten cities was only 2.35 stories.

Mean Average Density. The mean average density in the three types as defined was: for single-family areas, 28.8 persons per acre; two-family areas, 68.7 persons per acre; and for multi-family house areas, 105.9 persons per acre.

Ratios of Land Used for Different Purposes. The percentages of developed area used for different purposes are indicated as approximately 39.33 for residential use, 13.94 for parks, playgrounds, and public and semi-public property, 13.17 for commercial, industrial, and railroad property, and 33.61 for streets. It is to be noted that the commercial and public areas include baseball parks, amusement parks, private athletic fields, private nurseries, and race tracks, municipal athletic fields, aviation fields, cemeteries, golf courses, and municipal nurseries.

Stores. The data show a mean average ratio of 2.29 stores per 100 persons.

Variation in Street Areas. The mean average ratio of space devoted to streets is 20.2 per cent of the total city area and 33.6 per cent of the total developed area.

England. In a number of English town-planning schemes that have been examined it is found that approximately 40 per cent of the developed area in industrial towns and 60 per cent in residential towns is devoted to residence. When analyzed, these figures are found to be fairly similar to those given in *Urban Land Uses.* Similarly, English cities correspond to American cities in regard to the amount of area that appears to be required for residential use in relation to population. The mean average in the sixteen self-contained cities investigated by Mr. Bartholomew was 3.154 acres per 100 persons. The standard in mixed communities in England is almost identical. Studies I have made in English towns show that provision needs to be made for 2.5 acres of residential area per 100 persons in industrial towns, and 5 acres in residential towns, which tend to have larger houses. The average density is from 5 to 10 houses per gross acre, with 8712 down to 4356 square feet gross per family. Averages in suburban areas in either country do not appear to go below 4000 square feet of gross area per family. The gross area, as distinguished from the net lot area, includes all open space abutting on lots, such as streets and parks.

The actual extent of area used for business in both countries also appears to be about the same. The area required may be expressed as one tenth to one sixth of a net acre of business area per 100 persons. Assuming an average lot depth of 120 feet, this gives a frontage of 36 to

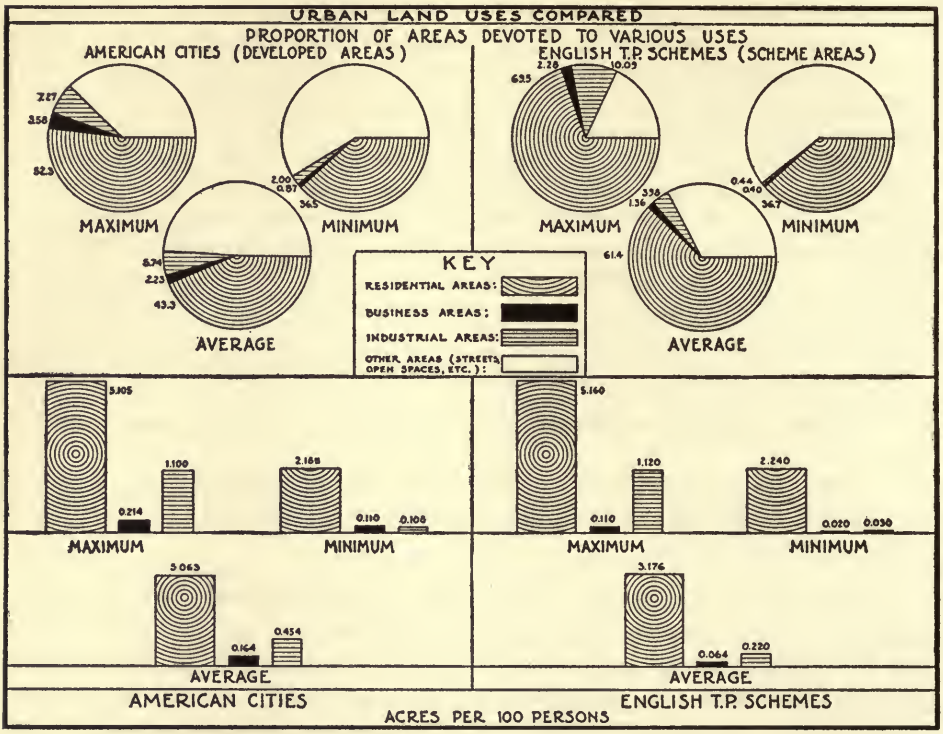


FIGURE 5

61 feet per 100 persons, which approximately represents existing conditions in both countries. I find that approximately 7000 square feet of business area per 100 persons is required in self-contained cities and 4500 in small communities whose inhabitants do not rely entirely on local shopping facilities.

Although areas required for industrial use in cities cannot be expected to be proportionate to the population, it is of interest to note that American and English statistics show about the same results, namely, one and one-tenth acres of net industrial area per 100 persons.

The accompanying diagram (Fig. 5) has been prepared to indicate, roughly, comparisons between cities in the United States and England in regard to areas devoted to different uses.

Germany. The chief feature to be noted in the town extension plans of German cities is the provision for combining zoning with requirements for streets and other open spaces.

In accordance with the street law of the State of Baden, land for open and recreational use (inclusive of streets) is reserved by building-line plans, and a commentary to Section 2 of this law states:

> Especially in regard to the relation of open spaces (streets and public greens) to total building area, principles of modern hygiene require 30 to 35 per cent of the total building area be set aside as open spaces.[1]

Again, under the *Lex Adickes* in Frankfurt, 35 per cent of the total area is "taken" as public open spaces. These requirements are definitely related to the zoning and do not include spaces for public parks. In the outlying districts (agricultural areas) of Frankfurt the lot coverage permitted is in some instances as low as 10 per cent with height limits of two stories, and rises to 40 per cent coverage and height limits of four stories for new building areas in the suburban district. The application of these German standards under the *Lex Adickes* means that the subdivider is limited to the use of 65 per cent of any private area as salable land for building.

CLASSIFICATION OF LAND FOR DIFFERENT TYPES OF HOUSES

One of the essentials in planning and zoning is to determine the different types of houses most appropriate for any particular area and then for different sizes and shapes of lots. In this connection it is important to distinguish between superficially similar types that have quite different requirements in regard to the layout of the land. For example, to include a row house in the same class with an apartment house is not only confusing but leads to errors in planning. Each requires quite different sizes and shapes of lots and a different street system. Yet these two types often are combined in zoning practice as "multiple" houses, and consequently classified as belonging to one type in preparing data regarding existing conditions. According to one definition that has been used, Philadelphia is predominantly a city of multiple houses, whereas according to another it is predominantly a city of single-family houses.

Figure 6 shows the classification of dwelling types adopted (with slight variation from those formulated by the United States Housing Corpora-

[1] From information supplied by the city planning authorities of Mannheim.

tion in 1918) by the Committee on Types of Dwellings of the President's Conference on Home Building and Home Ownership.[1]

In new subdivisions the area to be allotted to each type must depend on local conditions and popular demand and custom in each case, and on whether the policy of the developer is to sell or to rent the houses. These factors appear to have been responsible for differences that occurred in the war-housing developments of the United States Housing Corporation and the Emergency Fleet Corporation. Statistics in *Industrial Housing* by Morris Knowles show that in the former the percentage of detached houses was 57.6, as against 28.6 for semi-detached and 13.8 for rows; whereas the Emergency Fleet Corporation percentages were 22.1 detached, 37.5 semi-detached, and 40.4 groups or rows.[2]

It is especially desirable in neighborhood planning and zoning, whatever types and distribution of houses may be found to be most appropriate, to supplement the plan of distribution of buildings by family-density restrictions. This is best accomplished by requiring a minimum lot area per family, and by reënforcing this requirement by front-yard, side-yard, rear-yard, and other zoning requirements. The English practice of limiting the number of families that may be housed on any one acre in areas included in town-planning schemes, has much to commend it.

BUILDING LINES AND SETBACKS

The determination of building lines, which control the setback of buildings on the ground level, is specially related to density zoning and street planning. As is well known, building lines may be established under eminent domain, or by front-yard and setback requirements under zoning ordinances, or by covenants running with the land. They should accord with the zoning regulations affecting heights and densities of buildings and coverage of lots, and should provide the space needed between fronts of buildings over and above what is required for traffic.

When residential buildings are converted into business buildings, the original building line that existed for residences should be retained for the business buildings. In other words, the front yards should be added to the streets. The street area required for traffic and for public safety in connection with business use is greater than for residential use. As an indication of the development of public policy on this matter,

[1] President's Conference on Home Building and Home Ownership, Vol. IV, 1932, pp. 146–152.
[2] Morris Knowles, *Industrial Housing*, N. Y., McGraw-Hill Book Co., Inc., 1920, pp. 45–46.

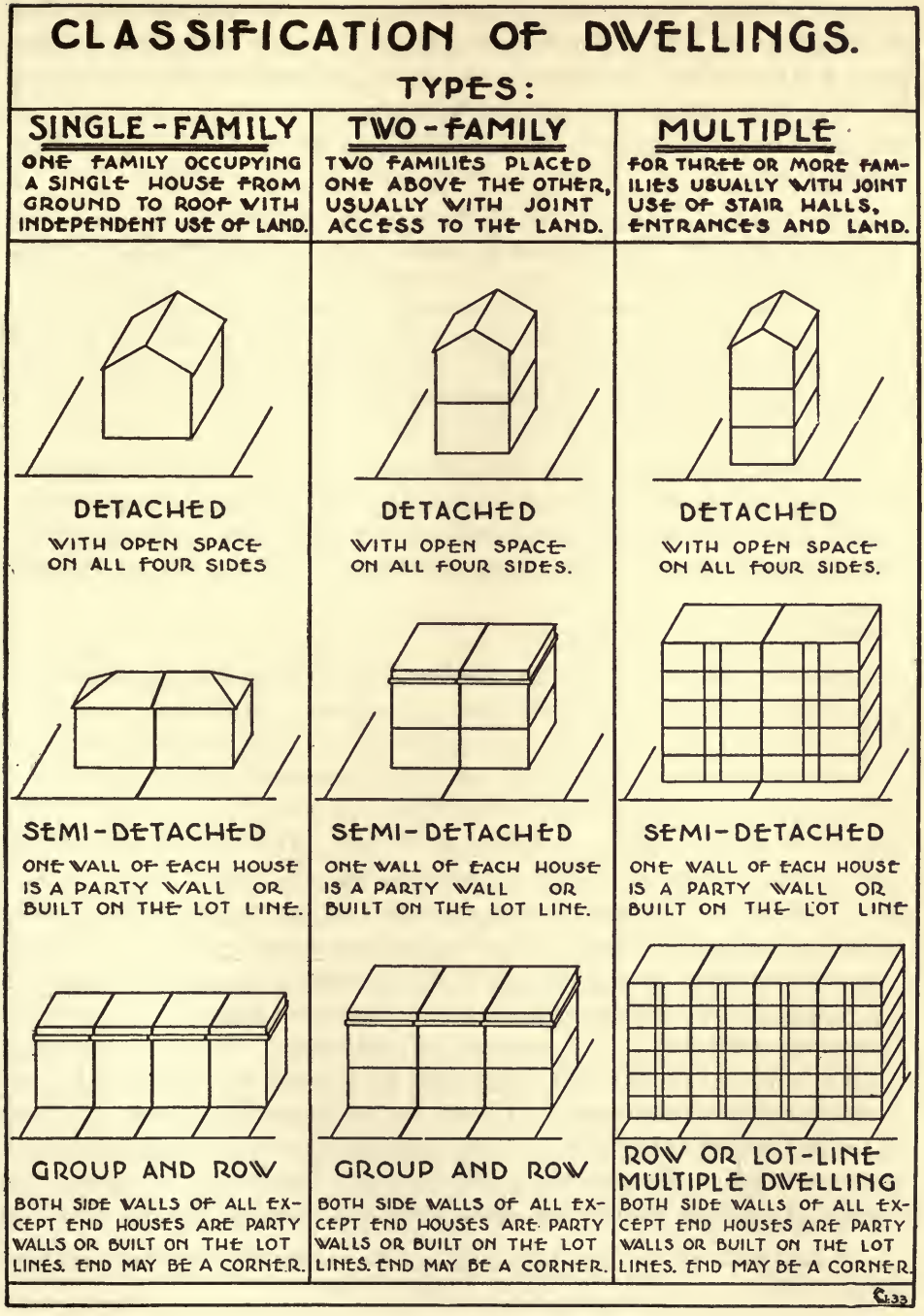

CLASSIFICATION OF DWELLINGS.
TYPES:
SINGLE-FAMILY
ONE FAMILY OCCUPYING A SINGLE HOUSE FROM GROUND TO ROOF WITH INDEPENDENT USE OF LAND.
TWO-FAMILY
TWO FAMILIES PLACED ONE ABOVE THE OTHER, USUALLY WITH JOINT ACCESS TO THE LAND.
MULTIPLE
FOR THREE OR MORE FAMILIES USUALLY WITH JOINT USE OF STAIR HALLS, ENTRANCES AND LAND.
DETACHED
WITH OPEN SPACE ON ALL FOUR SIDES
DETACHED
WITH OPEN SPACE ON ALL FOUR SIDES.
DETACHED
WITH OPEN SPACE ON ALL FOUR SIDES.
SEMI-DETACHED
ONE WALL OF EACH HOUSE IS A PARTY WALL OR BUILT ON THE LOT LINE.
SEMI-DETACHED
ONE WALL OF EACH HOUSE IS A PARTY WALL OR BUILT ON THE LOT LINE.
SEMI-DETACHED
ONE WALL OF EACH HOUSE IS A PARTY WALL OR BUILT ON THE LOT LINE
GROUP AND ROW
BOTH SIDE WALLS OF ALL EXCEPT END HOUSES ARE PARTY WALLS OR BUILT ON THE LOT LINES. END MAY BE A CORNER.
GROUP AND ROW
BOTH SIDE WALLS OF ALL EXCEPT END HOUSES ARE PARTY WALLS OR BUILT ON THE LOT LINES. END MAY BE A CORNER.
ROW OR LOT-LINE MULTIPLE DWELLING
BOTH SIDE WALLS OF ALL EXCEPT END HOUSES ARE PARTY WALLS OR BUILT ON THE LOT LINES. END MAY BE A CORNER.
C.133

FIGURE 6

a decision of the New York Court of Appeals is worth noting. The decision related to the constitutionality of fixing a setback of 10 feet from a street which was zoned for business purposes. A lower court held that the ordinance fixing the setback was detrimental and prejudicial, but the Court of Appeals reversed this judgment, expressing itself as follows:

> It thus appears that a wise public policy may require the owners of new buildings in business districts under proper conditions to set their buildings back from the street in order to enable their business to function without congesting the streets. (*Gorieb* v. *Fox*, 274 U. S. 603.) . . . . It does not appear upon the face of the ordinance or from any facts of which the court must take judicial notice that in Islip evils do not exist for which this zoning ordinance is a proper remedy. The record does not show unreasonableness.[1]

This judgment is a striking illustration of the advance of court opinion and public policy in regard to what may be called zoning for convenience. Hitherto it had been considered to be unconstitutional to require front-yard space to be reserved for purposes of traffic incidental to the buildings.

ESTHETIC PHASES OF ZONING

Advances in public policies as reflected in zoning decisions have also been made in connection with esthetic phases, particularly combined with other factors. Typical examples are the control of roadside uses, such as offensive hot-dog stands and filling stations, the preservation of natural amenities along the public highways, and the restraint of billboards of objectionable location and design. The need for combined state and municipal control of the location and design of necessary structures and for the preservation of amenities on all main thoroughfares is widely recognized. There is less recognition, however, of the need for control of matters of appearance in local streets. It is there that the untidiness and offensiveness that creep along the highways have their origins in exhibitions of ignorance or bad taste. The battle against ugliness must be fought on a wide front by education of the people, and particularly of the children. It can never be won by isolated efforts to restrict this or that example of destruction of natural beauty. So long as there is urban disorder there will be rural disorder, for the motor car carries the urban vandal far afield from his dwelling place. Until he

[1] Town of Islip *v.* F. E. Summers Coal and Lumber Co., Inc. 257 N. Y., 167, 170–71, 177 N. E. 409, 414 (1931).

perceives the value of good appearance in the immediate surroundings of his own home, we cannot expect to persuade him to protect the amenities of property in which he has no direct interest.

The control of architectural design presents great difficulty. Of necessity, such control involves decisions on matters of taste and cannot be arrived at according to any agreed standards. On occasion, courts have not been hesitant to approve esthetic objectives in zoning and planning when it was clearly shown that general welfare was involved. For example, there is the well-known judgment of the Minnesota Supreme Court in 1920, part of which was as follows:

> It is time that courts recognized the aesthetic as a factor in life. Beauty and fitness enhance values in public and private structures. But it is not sufficient that the building is fit and proper, standing alone; it should also fit in with surrounding structures to some degree.[1]

However, it is mainly in private endeavor that we must look for improvement of architecture in residential as in other developments. Such examples as Roland Park in Baltimore, Forest Hills on Long Island, Shaker Heights in Cleveland, the Country Club District of Kansas City, St. Francis Wood in San Francisco, and Palos Verdes near Los Angeles, are private schemes that demonstrate the economic and social value of architectural design allied with landscape design and city planning. The increase of such object lessons, aided by leadership of architects and landscape architects in the field of public education, offers the best hope of improvement in architectural design.

A CONSTRUCTIVE ZONING POLICY

A complete and satisfactory neighborhood plan is a coördinated subdivision and zoning plan. As a basis for determining a constructive zoning policy, it is suggested that all zoning plans should aim to secure: (1) the most healthful and agreeable conditions in building development as a primary consideration, and only secondarily the creation and maintenance of property values; and (2) the coördination of detailed neighborhood plans with master regional or city plans.

The following is a summary of the matters of chief importance to be dealt with under a constructive zoning policy as related to residential areas:

(1) The classification of building uses and densities, and the adjustment of the layout of streets to the character and density of different zones.

[1] 144 Minn. 1, 20, 176 N. W. 159, 162 (1920).

(2) The determination of the varied residential uses of land with a view to insuring comparative stability in the original development over a long period, by means, for instance, of the permanent restriction of areas to different types of residence with provision for possible changes of use *if and when this is demanded in the public interest.*

(3) The restriction of apartment houses and business buildings to areas *specially* planned for them, with streets of adequate width to meet traffic and other requirements of intensive building use.

(4) The further restriction of business buildings (stores and commercial buildings) to areas that are either permanently zoned for business or that are restricted from industry but otherwise undetermined as to use.

(5) The determination, as far as practicable in advance of development, of the definite locations of sites required for public and semi-public buildings, and the provision for adequate control of heights and setbacks of all semi-public buildings and business buildings.

(6) The prohibition of residential building on land that is subject to flood, or is so located that it cannot be economically drained, or is otherwise unsuited for habitations.

One difficulty in carrying out such a program will be that of overcoming the general acceptance of the theory that it is impracticable, if not undesirable, to impose restrictions that have the effect of giving a high degree of permanence to a building development. The opinion is widely held that the city planner cannot determine the trends of future urban growth in newly planned developments with sufficient accuracy to justify him in proposing permanent zones for particular types of building. It has come almost to be taken for granted that permanent zoning is a mistake; for instance, that to fix an area permanently as a district in which nothing but single-family dwellings can be erected would be an undue restriction upon property and a possible impediment to future progress.

One reason for this opinion is that the rapid growth of American cities up to now has given the impression that rapid change in areas already built upon is inevitable. The fallacy behind this opinion, for it is a fallacy if we inquire deeply enough, is difficult to expose for the reason that most cities and neighborhoods have not been planned with the intent that they should be permanent. They are deliberately planned in their street systems, if not in their lot sizes, as if convertibility to higher densities or different uses were both inevitable and desirable.

Probably, however, most of the conversion that has occurred in cities would have been unnecessary if they had been properly planned from the beginning.

The possibility of securing more permanence may be illustrated by reference to the Beacon Hill district of Boston. This district has the qualities that are necessary to give permanence to a residential district. It lies between a public park and a river, and is on high land. It does not lie in the direct stream of through traffic between centers. Thus it has a degree of isolation which gives it desirable residential qualities that should be stabilized by zoning.

A high degree of permanence of residential building could be created by artificial means in some parts of all cities. Every well-defined neighborhood that it is desired to preserve for private residence should have a belt of open space surrounding it and should be away from the sections of the city that are on the lines of main traffic roads.

New York is too much of an exception in size and topographical conditions to afford a good example for other cities. But even there one finds that a level piece of land in southeast Manhattan has become a blighted area largely because it has not been permanently zoned for residence and provided with public open space. It forms a tongue of land projecting away from the lines of transit and arterial systems of roads. Had it been properly zoned, provided with adequate local parks, and its river front laid out and improved in a manner suitable for a residential area, the Lower East Side of Manhattan would have become a high-class residential district instead of being the most deteriorated district in New York City. Of course, where conditions are already established they cannot be reformed by planning and zoning except at great cost.

In planning new residential areas it should be quite feasible to determine permanent zones for residence, allowing that change of housing types and densities might occur. In doing this we could plan a street system adaptable for residence up to a prescribed density. Enormous saving in cost would result because by adhering to the original plan it would be unnecessary to build roads to meet the needs of avoidable changes and undesirable increases of densities.

The manner in which the planning of narrow residential roads may react in stabilizing a system of zoning can be illustrated by the example of Lawrence Farms in Bronxville, N. Y., which, notwithstanding its proximity to a railroad station, has been given a certain degree of isola-

tion by reason of its hilly character and its plan.[1] Narrow, winding, and partially one-way roads provide ample facilities for the traffic needs of the residents. On both sides of these narrow roads there are wide front yards planted with trees and grass, giving the houses an admirable setting. The nature of the road system thus makes it impracticable, or at least wholly undesirable, to erect apartments in this neighborhood, even if the private restrictions permitted this to be done. If the single-family houses in Lawrence Farms were to be replaced by apartments, it would become necessary to replan and greatly to widen the road system at large cost. Thus, the effect of the original plan and of the comparative isolation of the district has been to prevent change of use from a low to a high density, or from residence to commercial use. It would be doing no injury to the owners to make permanent the zoning of this district as a place of residence only, or even as a place limited to the erection of single-family houses.

The same considerations apply to estates like Roland Park in Baltimore, and to others where unusual attention has been given to their planning as residential areas. I repeat that what has been successful in the case of these privately restricted estates for large houses could be applied with equal success to residential areas for small houses, but only if planning and zoning were combined.

It is not practicable to rely on zoning to prevent considerable changes of buildings and uses in many areas, especially when buildings become physically obsolescent. In most residential areas away from the main centers, however, change of use need not occur when buildings have to be replaced as a result of decay of structures. The kind of obsolescence that is most avoidable is what is known as social obsolescence, namely, forced change of use while the structure is still in good condition. This form of change is frequently the main cause of blight in districts, and it could largely be prevented by comprehensive planning.

It would appear that the conditions essential to give permanence to zoning for use and density in residential areas include the following:

(1) Sites for new neighborhoods should be selected away from the areas that are intersected by main streams of traffic.

(2) Residential neighborhoods should be surrounded by open areas so as to give them a certain degree of isolation from other neighborhoods.

(3) The street system should be planned so as to provide for traffic circulating around instead of through the neighborhood.

[1] See pages 259–260 and Plate XI.

The program I have outlined involves doing things that are now considered unconstitutional. This particularly applies to the proposal that private land be zoned for open uses, a restriction that conflicts with the present conception of the exercise of the police power. But if it is reasonable and proper in the public interest that such restrictions on land use be imposed, the law can be amended as it has been amended in the past. To limit suggestions to what is immediately practicable may be to ignore the important fact that our public opinion and law may advance as well as our methods of planning. Too many city planning proposals have been dictated by fear of legal limitations. It is better to suggest what should be done, even if for the time being only part of the ideal can be achieved.

CHAPTER VI

BASIC ECONOMIC FACTORS IN HOUSING

IN the final analysis, the proof of the residential subdivision plan is the home it produces, the proof of residential zoning is the degree and permanence of the protection it affords to the home, and the proof of the home is social contentment. The culminating point of social contentment can only be reached if the home is not alone healthful and agreeable to live in, but also does not cost its inhabitants too great a part of their income. Therefore the really dominant question in developing urban land for housing is how to plan it so as to provide proper living conditions for those persons who require houses and can meet the cost of their erection. To answer this question we have to discover, first, how to adjust the cost of dwellings to the incomes of such persons, and second, how to obtain the maximum economy in land and building development consistent with conditions that are essential to health.

The amelioration of defective housing conditions in cities is one problem and the prevention of the occurrence of these conditions in new areas is another problem. It is with the second of these problems that we are specially concerned in this discussion; but in proportion as we succeed in preventive measures, we shall succeed in showing the best ways to improve existing conditions.

As I shall continue to argue, the most important aspect of the housing question is how to get satisfactory shelter in cities for families whose earnings do not exceed $3000 per annum. It is not correct to assume, however, that everybody who earns more than $3000 can readily obtain good housing and pleasant surroundings to his home. Indeed, many people of wealth suffer from undesirable housing conditions because of factors in the environment of their homes over which they have no control. Many neighborhoods, in themselves of good quality, suffer from having bad approaches or from defects in adjacent neighborhoods. Too often a high-class suburb is impaired in attractiveness by having to be approached through a blighted area, or by having no better prospect from its houses and gardens than a view over a "slummy" district. Every family in a city has to carry some part of the burden of bad

housing conditions, and every well-to-do family has to suffer in some degree from the evils that especially affect the poorest families.

In the planning of neighborhoods it is essential to give consideration to the desire of people to live where they are assured of congenial neighbors, and this involves in practice that the houses shall conform to a certain uniformity of price and quality. One consequence of this practice is that cities are divided into neighborhoods of rich and neighborhoods of poor. Whatever the degree of necessity for this separation in modern communities, however, it is not productive of the best civic and social conditions. Both suffer from the separation, and some leaven of the one with the other would be a mutual advantage. In the early New England towns there was an agreeable blending of large and small houses and a resulting opportunity for intercourse between richer and poorer families. The same has been and even now is true of many of the old villages and towns of Europe.

So far, in discussing basic considerations and, later, in facing questions relating to design of residential areas, I have thought of the community needs as a whole rather than solely of the housing needs of those having the smallest incomes. However, it is essential to a solution of the problems connected with land development to give special attention to the particular problem of how to provide economic housing for the great majority whose incomes are below $3000 per year. This is the problem that presents the greatest difficulties and calls for the most urgent action. It is to this phase that I will now direct attention by discussing such economic factors as:

(1) The wage-earning capacity of those who need houses.

(2) The proportion of wages that should be paid for suitable and complete dwellings.

(3) The apportionment of the total cost as between the fully improved lot and the structure.

Both earnings, on the one hand, and cost of land and buildings, on the other, vary considerably in cities of different size. At the one extreme there are the large metropolitan communities of over 1,000,000 inhabitants with relatively high wages and land values, and at the other extreme, the small village or town with the lowest wages and land values. Therefore, no statement regarding economic factors can be taken as applicable to conditions in general. While, however, the problem of low-cost housing in the largest cities, with their comparatively high land values and dependence on transit facilities, differs in its financial phases

from the problem of housing in smaller cities and villages, it is influenced by the same basic considerations.

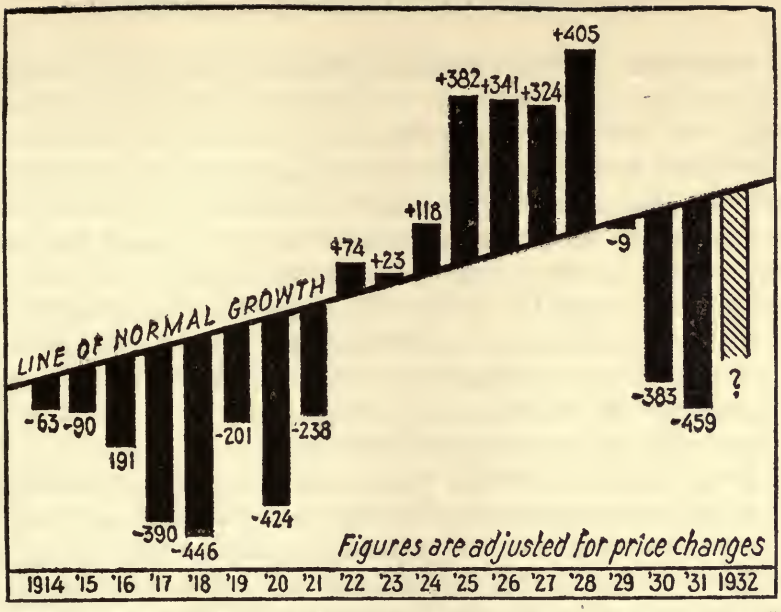
EXISTING SUPPLY OF DWELLINGS

It seems to be an inevitable concomitant of urban growth that the supply of dwellings always falls short of the demand, and this shortage usually relates to houses for the lowest-income groups. One way of showing the inadequacy of the supply in the United States is to compare the rate of growth of population with the rate of increase of the money spent on home building. The accompanying two charts, taken from an article by Mr. Paul M. Mazur of Lehman Brothers, bankers, in *The New York Times* for October 25, 1931, give an approximate indication of the extent to which expenditures on housing fall below estimated needs. The first chart shows the excess or deficit (in millions of dollars) in building of homes compared with normal needs.

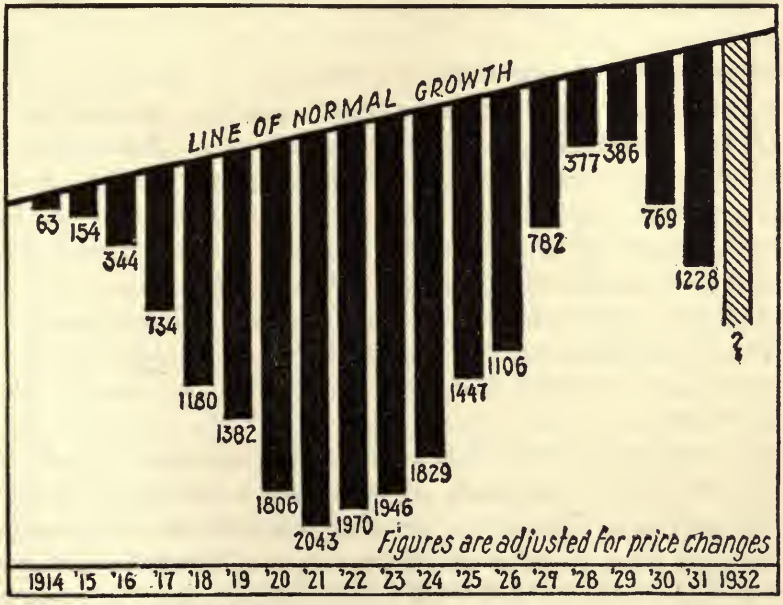
It will be seen that in 1931 there was a deficit of 459 millions, as compared with a maximum excess of 405 millions in 1928. The line of normal growth is determined on the basis of the figures for growth of population between 1900 and 1916, and Mr. Mazur's estimate of building requirements in the United States prior to 1922. The deficit before 1918, which reached 446 millions in that year, was due to cessation of building during the war. After 1921, building increased with the result that an excess was provided in the seven years between 1922 and 1928. But in 1928 this excess was $377,000,000 less than sufficient to make up the shortage of the eight years ending 1921. Beginning with 1929 there has been an increasing deficit. Whatever the causes of this falling off, it has resulted in a deplorable shortage of new accommodations, in consequent overcrowded conditions in old buildings, and in depriving municipal governments of revenues.

TRENDS IN HOME OWNERSHIP

In the census of 1930 it is shown that 46.8 per cent of the families in the United States owned their homes. This compared with 44.6 per cent in 1920. Between 1900 and 1920 there was a decrease of one half of one per cent, and between 1920 and 1930 an increase of 2.2 per cent. In New York City the number of owned and leased homes increased 50 per cent and of owned homes more than 100 per cent. These figures prove that home ownership is still popular with a great proportion of the American people in spite of the trend towards apartment construction.



Showing the Excess or Deficit (in Millions of Dollars) in American Home Building Compared with Normal Needs.



Courtesy of *The New York Times*

The Cumulative Deficit (in Millions of Dollars) in Home Building Compared with Normal Needs.

Figure 7

The advantages of home ownership and the desirability of encouraging people who are in a position to do so to acquire their homes are so widely recognized and have been dealt with in so many works on housing, that it is unnecessary to make more than a passing reference to these questions in this book. The greater the number of citizens who own their homes, the greater the stability of society and of government in any country. Home ownership improves civic standards and conditions because of the incentive which it gives the owner both to improve his property and to protect the good qualities in his surroundings. It is a stimulus to thrift and has the effect of increasing the interest of citizens in public improvements, economy in municipal government, and coöperative action in obtaining community and cultural facilities.

The proportions of dwellings that are owned by their occupants vary greatly in different parts of the country and in different parts of urban regions. In cities of 100,000 or more inhabitants the proportions in 1920 ranged from one half to one fifth, Manhattan being a special exception with only 2.1 per cent of its families owning their homes. The districts in which homes are in largest degree owned are those that lie outside the immediate boundaries of cities.

HOUSING PROVISION IN RELATION TO INCOMES

The income of 98.9 per cent of the working population in the United States is said to be under $5000 per annum. The average annual earnings of 90 per cent of the 36,000,000 workers in 1927 have been estimated as not quite $1500.[1] Another general estimate is that the incomes of a third do not exceed $1200, another third earn from $1200 to some figure below $3000, the balance having earnings above the latter. Under the policy of the United States Government inaugurated in 1933 an effort is being made to stabilize incomes in accordance with certain minimum standards, which will probably diminish the number who earn less than $1200.

These estimates may be taken as an approximate index of earning capacity, but there is no basis of information on which precise data can be worked out. Moreover, there are bound to be elements of much uncertainty in all such calculations by reason of the facts that earnings vary in different periods, that total family earnings may be much greater than the individual earnings of the head of the family, and that for

[1] See Willford I. King, *The National Income and Its Purchasing Power*, N. Y., National Bureau of Economic Research, Inc., 1930, pp. 56–57, 60–61, 146–147, 158–159.

considerable periods great numbers suffer loss of earnings through unemployment.

If it is true that, up to the present, one third of the heads of families in the population have no greater earning power than $1200, it would appear to be impracticable to provide new dwellings of a satisfactory character, at existing costs of construction, for this large group. Even those who earn $1200 cannot afford to buy a house at more than $2400 or to rent one at more than $20 per month, — for which figures satisfactory houses cannot be provided in cities.

Data collected for the President's Conference on Home Building and Home Ownership,[1] however, show that workers having incomes as low as $1000 do own their own homes, although this is true of few families earning less than $1250 in some cities. Salaried workers employed in downtown Pittsburgh with incomes of from $1000 to $2600 owned homes costing from $4150 to $7000. Others with average yearly expenditures of $2500 or less owned homes costing from $3400 to $7000. Thus the ratio of cost of home to total annual income in such cases may be over 4 to 1 and probably in most cases is 3 to 1. Where, as in most cases, homes are heavily mortgaged, the ratio of the cost of a home on which annual charges must be paid to the owner's income should not exceed 2 to 1. This probably means in average cases that a quarter of the income of the owner has to be expended for total carrying charges of his home, which is a reasonable maximum proportion of income to allot for shelter. Where the 2 to 1 ratio is exceeded by owners, they are bound to be confronted with financial trouble during any period of diminution of earnings through unemployment. Indeed, it may be argued that there can be no stability in a society where any large proportion of its members acquire mortgaged homes at prices that exceed twice their annual income, or pay more than a quarter of their income for annual carrying charges of a home they are purchasing.

In the case of rented homes, not more than 20 per cent of annual income should be paid for rent. Comparisons of existing data and special studies made by Mr. Robert Whitten for the School of City Planning of Harvard University led him to estimate that 18 to 20 per cent was normal for families of lower or medium incomes.[2] In cases of owned homes the annual payments are usually larger than for rented homes for two reasons: first, the portion of the payment that represents retirement

[1] Vol. IV, Report of Committee on Relationship of Income and the Home, pp. 64–65.
[2] *Neighborhoods of Small Homes*, p. 14.

of principal or repayment of the capital cost consists of savings; and, second, most people are prepared to lessen their expenditures in other directions in order to purchase a home.

The base of price and rent for low-cost housing is taken by the President's Conference on Home Building and Home Ownership as $3000 and $35 per month respectively.[1] Assuming an earning capacity of $1500 per annum, I should set these figures at $3000 and $30. Examples of houses cited as available at a rental of $35 in New York City include those in partially philanthropic or subsidized (tax-exempt) schemes such as the Amalgamated and Farband dwellings, where good apartment houses are rented at $11 down to $9.63 per room per month. While many of these apartments are rented at $35 or less, the accommodation at this rent is necessarily less than the desirable four rooms. But New York conditions are exceptional, with costs a third higher than in average cities. Conditions in other cities at various times between 1927 and 1931 are illustrated by the following data.

At Cincinnati, houses built in rows, semi-detached pairs, and in multiple groups were rented at $5.36 per room per month. This would permit a family earning about $1300 per year to occupy four rooms. At Nashville, Tenn., 1600 wooden frame houses of four rooms were erected prior to 1931 to sell for less than $3000, but these were without furnaces.

A one-story row house of five rooms, bath, and cellar, but without heating, has been provided at $1600 with lot in Chester, Pa., and a two-story house with six rooms, bath, and hot-air heating, at $2200 with lot in Philadelphia. A one-story bungalow type of four rooms and bath in frame construction has cost $2750 with lot in Seattle, Wash. At Birmingham, Ala., houses have been erected at a cost as low as $950 for four rooms and $1150 for six rooms, both semi-detached, and including baths and toilets. The ground values range from $150 to $500. At Richmond, Va., frame houses have been built for $3000, but this price did not include the cost of the lot.

Houses that are being built in the southern states for as little as $1000 are not likely to be satisfactory homes for urban areas, even where central heating is not a necessity. In northern states satisfactory houses at $2500 in small cities and $3000 in large cities seem to be unattainable under present conditions. In Cleveland, for example, no new houses were built between 1926 and 1931 to sell at less than $3000.

[1] Vol. IV, Report of the Committee on Relationship of Income and the Home, pp. 69 ff.

Many small houses are built under conditions that make it impossible to ascertain their cost. In numerous cases no check is kept on much of the labor employed, particularly the labor of the person who assists in building a house for himself. In small cities and villages people acquire cheap land and by contributing their own labor and contenting themselves with the minimum of local improvements are able to get comparatively good accommodation at a low cost.

In his study of low-cost housing, Mr. Whitten collected data from 73 cities, ranging in population from under 50,000 to 500,000 and over.[1] He estimated that 10.8 per cent of the total number of families covered by his inquiries were in the rental class of $5 to $14.99; 26 per cent in the class of $15 to $24.99; 24.2 per cent in the class of $25 to $34.99; 14.9 per cent in the class of $35 to $44.99; and the balance of 24.1, $45 and over. The investment values ranged from $1200 for houses renting at less than $15 to $4800 for houses renting between $35 and $45. He found that in a number of cities an appreciable number of houses were built at a cost of under $4000, and the most prevalent types of houses and apartments in 1930 were those costing from $1800 to $4200.[2] But it was pointed out that houses costing below $4000 were apparently without satisfactory street and sanitary improvements. Therefore, the prices were not for completely equipped houses.

An important omission in all statistics relating to comparative costs of houses is the absence of a specification of what is covered by the prices quoted. One price may relate to a complete house with adequate local improvements, and another to an incomplete house with few or no local improvements.

In 1932 an investigation was made into the home-ownership conditions of 1400 families of unionized hosiery workers in Philadelphia.[3] About 66 per cent of the workers owned their homes. The average cost for fully owned houses ranged from $3840 in an old section to $8760 in a new section, with a general average of $4750. The average income of the entire group that reported, including those having no income, was $21.40 per week; and of all those families in receipt of any wages whatsoever, $26.75 per week or $1390 per annum. The average house price was thus 3.4 times the income of persons employed.

[1] *Op. cit.*, Table 1, p. 8.

[2] *Ibid.*, Figure 4, p. 19.

[3] W. W. Jeanes, *Housing of Families of the American Federation of Full-fashioned Hosiery Workers*, Philadelphia, 1933, pp. 9, 14, 40, 42.

The yearly taxes varied from $63 to $143, exclusive of water rent, the higher figures representing about a tenth of incomes. I recall that forty years ago in England 10 per cent was regarded as the proper proportion of annual income that the medium-income classes should allot for rent, as against the present 20 to 25 per cent. But at that time cities did not have to undertake such expensive improvements and educational facilities, and consequently taxes were much lower. In American cities the high cost of the modern school system alone has enormously increased the financial burden that has to be borne by the owner of a house, and other services have increased in cost as they have been improved in efficiency. The fact that to-day taxes alone may impose as heavy a burden on the renter or home owner as the total rent and taxes did in earlier times is largely due to the increases in taxation that have occurred in response to public demands, and this fact should be borne in mind in discussions of costs of houses and of the measures necessary to reduce these costs.

In the Philadelphia investigation it was shown that in spite of the heavy cost of houses in relation to incomes, less than 10 per cent of owners in old sections and over 50 per cent in new sections owned automobiles, and about a third of these had to rent garages away from their dwellings. It was brought out also that the greater number of the homes that were owned were not new when purchased, that there was a general absence of convenient playgrounds, that the values of homes were being depreciated by invasion of industry, and that fewer owners of houses priced at less than $3000 failed to maintain their payments than owners of more expensive houses.

One of the incidental results of the prevailing high cost of homes in relation to incomes is the doubling up of families. This results in vacancies even in times of a housing shortage. Recently the Illinois Housing Commission found that in Chicago and adjacent cities, 17 per cent of the total family accommodations were vacant and 12 per cent of those occupied were inhabited by more than one family.[1]

In New York City the high prices of land and houses are offset to some extent by correspondingly high wages, but the relations between incomes and housing costs are comparable with other places. New houses of good quality cannot be built to rent at less than $10 per room, and the greater part of the working population must live in two or three rooms or in second-hand houses including run-down tenements. For old

[1] Illinois Housing Commission, *Final Report*, Apr., 1933, p. 13.

tenement houses, rents vary from $3 to $8 per room on land that is priced from $10 to $20 per square foot. Attempts to meet the problem in part by tax exemption have resulted in most of the benefits going to the owners of land. The migration between 1920 and 1930 of 416,971 persons from Manhattan, including 246,791 below 19 years of age, was an indication of the results of excessive costs in relation to value received. It reflected also the growing desire of parents to remove their children to a better environment, and of many to own their own homes.

Defective and expensive housing conditions in Manhattan are largely the cause of the enormous loss of property values in recent years. It has been calculated that this loss amounts to about $45,000,000 out of the total potential rent estimated at $350,000,000 per annum, assuming 100 per cent occupancy. The extent to which city values depend on residential property is indicated by the fact that, in 1929, 75.5 per cent of the buildings in Manhattan were residential in character and their value was about equal to that of all other buildings.[1]

Considering the foregoing facts and figures it is not surprising that in most cities only a small part of the housing needs of the lowest-income groups is supplied by the construction of new houses. Perhaps a more disappointing because a more avoidable condition is that houses provided for the middle-income groups in most cities are overcrowded on the land and without adequate local improvements. A large proportion of the population has to be content with second-hand houses, which is not necessarily an undesirable thing. At present about two thirds of the population of the country live in old houses, many of which are quite satisfactory; but unhappily great numbers still live in defective houses located in overcrowded slum districts.

Perhaps it is not too much to hope that satisfactory new houses may be built in the future for those families whose earnings are below $1500, down to a minimum of $1200, although it is doubtful if new housing of reasonably good quality can ever be provided for those whose earnings are less than $1200. This lowest-income group will have to receive financial aid from governments or philanthropic agencies if they must have new houses. Within the income range of $1500 to $3000 and the total house cost range of $3000 to $6000, however, it should be possible to obtain new houses of a satisfactory character by taking full advantage

[1] Thomas Adams, "The Character, Bulk, and Surroundings of Buildings," in *Regional Survey of New York and Its Environs*, Vol. VI, 1931, pp. 55–56.

of improved methods and consequently lowered costs of construction, materials, and land development.

COST OF LAND AND LOCAL IMPROVEMENTS

It has been necessary to discuss total costs of small houses before discussing the costs of land and local improvements which form an important part of these total costs and are of primary consideration in the design of residential areas.

A building site in a subdivision may be classified as improved or unimproved land, according to whether it is developed with local improvements. Even without these, of course, it may still derive much value from the existence of general public improvements in its vicinity. The value of land for building is largely due to the combination of values of general and local improvements. The costs involved in converting acreage into subdivided land, and partly improved lots into fully improved lots, have to be considered in relation to planning residential areas. These costs come within two main categories, as follows:

(1) The cost of "acreage land," so-called, the value of which may be *appreciated* by: its proximity to populated districts or industries or markets; the presence near by of highways, water pipes, main sewers, parks, and other desirable things that contribute to comfort or convenience; a good quality of social standards and community life; and the degree of efficiency of government; or *depreciated* by the costs incidental to converting unsuitable land (*e.g.* marshy or flooded land) into suitable land for building.

(2) The cost of local improvements directly contributing to the utility of the land in the form of access roads, sidewalks, water supply, sewer connections, etc. Such costs will vary with the sizes and shapes of the lots into which the land is subdivided and with other factors.

In addition to local improvements carried out at the cost of developers, other general improvements have to be paid for indirectly by means of taxation. It is difficult to segregate the direct and indirect payments and the relative contributions of owners and tenants. The costs of both general and local improvements will be affected by requirements of city plans, official street maps, and ordinances.

Land Costs. Statistics relating to prices of acreage land must always be taken with caution. Wide differences may exist within the same district due to variations in the "ripeness" of the land for development

or to topographical conditions or to the fact that one set of figures is quoted for a small parcel and another for a large estate. There are retail and wholesale transactions in land, and prices per acre in the former may be double or more than in the latter.

In *Neighborhoods of Small Homes*, Mr. Whitten obtained data in the collection of which some consideration was given to these factors. He gives the average acreage land value for 35 tracts in twenty cities that were used for houses costing $5000 or less, as $1049, with a median acreage value of $1000, and a range from $500 to $1900. The same median, $1000, held true in cities both over and under 300,000. Philadelphia is an exception, with acreage values of land ripe for development running as high as $20,000, according to Mr. Whitten.[1] Mr. Bernard J. Newman, Secretary of the Philadelphia Housing Association, gives $5000 to $10,000 per acre as the value of unimproved raw land in the northeast part of the city.[2]

Acreage has been purchased in recent years within 12 miles of New York City at less than $2000. Probably $1500 per acre represents a fair value of land for small houses in cities of average size. This constitutes a land cost of $150 per house with 10 houses to the acre, or 5 per cent of the price of a house and lot selling for $3000. A satisfactory ratio of the cost of raw land to the complete house cost is from 5 to 7 per cent, so that 95 to 93 per cent may be available for improvements and building.

Cost of Partially and Fully Improved Lots. It is even more difficult to get accurate data regarding the values or prices of "improved" lots. Great variations exist between the standards of construction of local improvements, and between the degrees of direct and indirect influence that general public improvements have on different areas of land. Again, what are called partially improved lots may range from those in a subdivision where the only improvement consists of sidewalks to those that have all local improvements completed, except the final surfacing of the street pavements. It has also to be borne in mind that statistics based on conditions in communities where land subdivision and building development have proceeded on the haphazard lines that have operated in the past are not the best guide for new and properly planned developments. Typical existing conditions cause land to carry too much expense

[1] *Op. cit.*, pp. 31–32.
[2] In a letter to the writer dated Dec. 8, 1931.

to cover losses on premature or forced subdivision, excessive profits on sales, and artificially inflated land prices. Improvements are usually extravagant in some features and totally neglected in others. In many areas, from 10 to 25 per cent of the cost of development in the form of streets, sewage disposal, and excavation of soil could be saved by proper planning.

The average cost of improved lots on which Mr. Whitten obtained data from 38 builders in 25 cities was $1150, and the range of cost was from $500 in Denver to $1800 in San Francisco.[1] Twenty-nine subdividers located in 24 cities supplied data showing that the average sale price of improved lots was $1645, which, though not strictly comparable, shows an increase of 43 per cent over the figure reported by the builders. It is suggested that this higher cost is probably due to the extra cost of marketing and the necessity of earning a separate profit on sales by the subdivider as compared with the builder. The average ratio of improved-lot cost to total cost of house and lot for all cities included in Mr. Whitten's study, except Philadelphia, was 18.1 per cent. Partial street improvements averaged $437 per house or $9.93 per front foot, with $10.46 as a more usual figure. These statistics represented both minimum costs and minimum improvements.

Normal lot widths for low-cost houses vary widely from city to city, while lot costs are relatively constant. Indeed, Mr. Whitten concludes that the cost of the fully improved lot for a low-cost house of a given value does not appear to vary greatly between various communities whether the width is 14, 25, 30, 40, or 50 feet. Undoubtedly the greater the intensity of use the higher the price of land, and this is another reason for preventing high densities. Nevertheless, the greater part of the actual *cost* of local improvements, assuming that the standard of construction is constant, should vary almost exactly with the width of lots; that is, if each foot of improved frontage cost $20, a 14-foot lot should cost $280 as against $1000 for a 50-foot lot.

In Radburn, N. J., the total value of fully improved lots is given as 50 cents per square foot, which is made up of 10 cents for net building land, 35 cents for local improvements including landscaping of parks, and 5 cents for overhead. These prices show a ratio of 20 per cent for bare land and 80 per cent for improvements in the total cost of the improved lot. Thus a lot 30 by 80 feet (2400 square feet) would cost $1200, which is satisfactory for a house of a total cost of $6000.

[1] *Op. cit.*, see Chapter V.

Mr. Newman gives the figure of $1000 as the cost of an improved lot (15 by 66 feet) for a number of dwellings having a sale price of $4950 in Philadelphia.[1] The approximate ratio of the first figure to the second is thus about 20 per cent.

ECONOMIC ASPECTS OF THE SEVERAL HOUSING TYPES

The question of classifying land for different types of houses is discussed in the previous chapter, which also contains definitions of the different types. Appropriate classifications having been determined for the several parts of a given area, the question will arise as to what is the economically and otherwise desirable width and size of lot for each type. This problem will be discussed in detail in Chapter X. Some general considerations regarding different types and their relation to land development costs will be presented here.

It is of primary importance that the choice of types to be used in a particular location should be based on accurate appraisal of three related factors, as follows: first, the prevailing demand and the considerations on which it is based; second, the relative costs of each type per room; and, third, the necessity that each shall have equally good conditions in regard to light, air, and yards for play.

In this connection there is need of much investigation of the respective merits of detached, row, and apartment houses. In this country, the detached single-family house has been the most popular in the past, but in recent years the apartment house has become the type in greatest demand for rental. The group or row house, which is a sort of compromise between the detached house and the apartment house, possessing advantages of both, has been least popular in most sections of the country.

Detached Single-family Houses. It must be admitted that the free-standing house has many social advantages over all other types. In small towns with cheap land, where wood is the cheapest and most appropriate material for construction, where the cost of local improvements can be kept comparatively low, the single house is the best type for most people. There is no reason why the land in such towns should not be planned in a way that will give sufficient space between such houses both for good appearance and safety. One of the most attractive features in small American communities is the single-family house district with its park-like streets and garden spaces.

[1] In a letter to the writer dated Dec. 8, 1931.

The greatest defect in detached-house districts is the usual insufficiency of sanitary improvements, due to the fact that the cost of the unimproved site and the building absorb so much of the capital available for the complete home, and the further fact that the width of lots involves higher expenditures for local improvements than the home owners can afford. One important need is for better planning of neighborhoods of free-standing houses so as to obtain economy in development and keep costs of local improvements down to a reasonable proportion of the total cost.

There is some tendency in the United States toward the adoption of a single-family type of house known as the bungalow, and if this tendency increases, it will affect the design of land for residential use. In some European cities the same tendency has occurred as a sort of reaction against the apartment house. The bungalow shares with the apartment the advantage of being on one level, or mainly so, thus simplifying domestic work. It is, in effect, an apartment flat cut out of a block and made self-contained. It has also the advantage of being a single-family home. While it has been objected to as ugly in cases where it has been badly designed or erected in monotonously uniform rows, this is not an objection inherent in the bungalow, but rather to defects in its design. One real disadvantage of this type, however, is that it involves more expense for local improvements than other comparable houses, owing to the width of frontage which it occupies.

The bungalow is also more costly in construction than the ordinary two-story small house and has the same disadvantage, compared to the multiple house, namely, that a heating system has not yet been invented which enables single low buildings to be heated as cheaply as large buildings. Another drawback is the extra cost for the greater extent of roof in proportion to cubic capacity that must always be required in the bungalow as compared with other types.

Group Houses. In America there is much prejudice against group or row houses. One of the causes of this is that ownership of a house in a row is not regarded with the same favor as ownership of a completely detached house. Another cause is that, in most places, no effort has been made to plan the land for group houses, and consequently the typical examples have been crowded on small, awkwardly shaped lots.

The Committee on House Design, Construction and Equipment of the President's Conference points to the "lack of group design, the chief cause of the failure in the design of the current product of small dwellings

in the United States." [1] In this connection also it is of interest to note that whatever success has attended the provision of low-cost group housing in England has been due to the development and coördinated design of such houses for *rental.* Detached houses *sell* better in England, as in America.

With proper landscape and architectural design, group houses can be arranged so as to be more attractive in appearance than detached houses of the same class. It is of fundamental importance that the density of group housing should be regulated so as to give sufficient space about the buildings for healthful occupation, and so as to prevent the land speculator from using the group house as an instrument to raise land prices above those obtainable for separate houses of the same size. In Philadelphia and Baltimore, where group or row housing prevails, its success from a social point of view has been qualified by the crowding of too many houses on the land in order that land prices may be maintained on a high level. The small Philadelphia lot (15 by 70 to 100 feet) is not a natural result of group housing in itself but of an artificial use of it for purposes of land speculation. This is an abuse of group housing and means that any savings in cost of erection are absorbed by developers and are not passed on to the purchasers and tenants of houses. But the fact that it is possible for group houses to be erected on very narrow and shallow lots, and in longer rows than is desirable for health and amenity, is not a reason for objecting to their erection under more spacious and agreeable conditions.

Compared with the detached house, the group house may occupy a narrower lot without being undesirable from the point of view of healthful occupation. This should mean a first saving of 15 to 20 per cent in cost of land and local improvements as compared with a free-standing house providing the same amount of living space. Money can also be saved in the actual building of groups. A group of six houses has only two exterior walls at the ends as compared with the twelve exterior walls of six detached houses. For this and other reasons, the group house may be erected at a saving in construction cost of a further 5 to 10 per cent as compared with the detached house. Too often, however, these economies are offset by high prices of land so that they are not perceptible in the prices paid by purchasers or tenants.

In comparing the costs of the group house and the detached house, one must have in mind the quality of the construction. For purposes of

[1] President's Conference on Home Building and Home Ownership, Vol. V, p. 2.

safety the group house, like the apartment house or the three-decker, needs to be more solidly built than the detached house with open surroundings. Therefore, the savings in erecting houses in rows are to some extent offset by higher costs of construction.

The placing of groups of houses around an open space, consisting of a square or quadrangle off a traffic street, gives more privacy than is obtained in detached houses facing the traffic street. The open places can be used for road access, planting, parking, and to some extent as recreation space. In the New York Region there are good examples of group housing at Lawrence Farms and Forest Hills. Land and street layout and the design of groups can be carried out in such a manner as to make it unnecessary to provide alleys; garages, where they are required, may best be arranged in groups on special sites.

If the prejudice against individual ownership of group or row houses could be overcome, their wider use would assist in securing improvement in housing conditions, economy in development, and improvement in appearance of residential areas.

Multiple or Apartment Houses. Although there is still considerable prejudice against multiple houses on the part of those who do not live in them, their great increase in American cities proves their suitability to some type of use. Like the group house, they are objectionable when introduced haphazardly into districts of detached single-family houses. Even more than other types they require that areas should be specially designed for them. Probably most people would agree that it is desirable for the majority of families to live in self-contained rather than in multiple houses, to have separate gardens rather than the common use of an apartment yard, to own a house rather than to rent an apartment, and to have the greater spaciousness and social advantages of the small-house neighborhood. But the attraction to the apartment has occurred in spite of all its disadvantages, as well as the further inevitable disadvantage of being more costly to erect per room than the small house, since apartment dwellings have to be more solidly constructed than small houses and their organization as multiple units involves higher costs for equipment and services.

The cost per room of an apartment dwelling will usually be found to be 25 to 30 per cent greater than the cost per room of a small house suitable for the same class of occupant, even where they are both built on improved land of the same value. This is partly borne out by the fact

that a three-room apartment usually rents for as much or more than a four- or even five-room house in adjacent single-family house districts.

Investors have been willing to erect apartment houses in great numbers, however, knowing that they will have to continue to own them and rent them, or sell them to other investors; while they usually erect small houses for sale to occupiers. The security they have for renting of apartments is based on the popularity of the apartment dwelling, and this popularity arises from such causes as (*a*) absence of capital to buy, (*b*) unwillingness to be tied to a house for any lengthy period, owing to uncertainty of local employment, (*c*) uncertain liabilities for local-improvement costs and taxes that go with ownership, and (*d*) the fact that apartments usually provide more labor-saving appliances than do houses.

The most important improvement needed in apartments is that they should be designed so as to have more light and more access to outer air.[1] On the other hand, one of the important needs of small houses is that they should be better equipped with labor-saving appliances. Each could thus compete with the other on a better basis than at present. It may be doubted, however, whether the apartment house can continue to compete successfully with the single-family house in meeting the needs of small-income groups. This doubt would be converted into a certainty in favor of the small house if apartment houses were required to have a satisfactory degree of spaciousness in their surroundings, to carry a proper share of costs of streets, parks, playgrounds, etc., in comparison with small houses, and to have a minimum of four rooms.

Good apartments are costly to maintain. In New York City, service costs in apartment houses amount to about $60 per room per annum. Services and special equipment that are unnecessary for other dwellings than apartment houses are: fireproof stairs, roof equipment for drying laundry, dumb waiters, fire escapes, and numerous extras for maintenance and service. The apartment house having these services, whatever the demand for it, is a luxury house.

The economic justification of the elevator apartment depends on land prices that are so high as to prevent low buildings from carrying the land cost. The unheated non-fireproof tenement apartment is the proper dwelling to compare with the smallest type of house, for the greater

[1] Cf. George B. Ford's *Building Height, Bulk, and Form*, Cambridge, Harvard University Press, 1931, pp. 31–33. (Harvard City Planning Studies, II.)

proportion of low-cost apartments in the United States have no heat supplied from a central source common to more than one family.

The apartment house is not a financially advantageous building from the point of view of the community. In a survey made in 1929 by the Planning Board of New Rochelle, N. Y., it was found that the apartment house pays about half as much in taxes per family as the single-family dwelling.[1] The further fact that the apartment house pays three times as much in taxes per square foot of land as the single-family dwelling is of no importance, as this merely means that it heaps the values in one small area instead of spreading them more widely. Every apartment that is built on the top of another means so much land out of use. Given the same number of families in a community, whether housed in apartments or single-family houses, the aggregate land values would be about the same.

The crux of the matter in regard to the competition between the apartment house and the small dwelling is that the former is usually allowed to obtain economic advantages as a result of making a more intensive use of land than is desirable in itself, or is practicable for the small house. If apartment houses were properly restricted in respect to area of coverage and height, their financial advantage in comparison with the single-family house would be less than at present. The result would be that apartment houses would be as healthful as small houses, would only be erected to serve a demand based on their special conveniences, and would not be forced upon the community to maintain land prices by artificial means.

NEED OF IMPROVED STANDARDS IN NEW HOUSING

While no comprehensive survey of housing conditions in American cities has been made, it may be accepted as beyond question that a very large proportion of new as well as old houses in urban areas fall below reasonable standards of health and safety. In the case of new houses this has been inevitable, mainly because of the disparity that exists between average earnings of low-income groups and the cost of erecting houses for these groups.

In one connection, namely that of permitting overcrowding of buildings on the land, reduction of densities and consequent reduction of land costs could be obtained without making housing accommodation in general dearer than at present. It cannot be overemphasized that bad

[1] *City Plan and Twenty-Year Program of Public Improvements for New Rochelle*, 1929, p. 62.

conditions, in so far as they are due to overcrowding of the land with buildings, are an avoidable evil. This overcrowding of land is less justified than bad construction and insanitary conditions of buildings because it exists on no basis of necessity for cheapness. Overcrowded building results in the kind of conditions described in the 1929 Report of the New York State Board of Housing, which says of a typical industrial city that "seventeen per cent of the buildings have dark rooms. These rooms have no outside window, not even a window in an interior wall to admit light and air indirectly from another room." [1]

The Board recognizes that bad housing conditions are largely caused by "congestion of buildings, irregular location of structures on lots and blocks, rear dwellings, bad state of repair, sheds and ramshackle outbuildings cluttering yards, unworkmanlike construction and repairing, and the fact that private dwellings, tenements, business, and industry all exist side by side in a helpless conglomeration." [2] Thus it indicates that the fundamental causes of bad housing are due to absence of planning and zoning regulations and are reparable without adding to the cost of building houses even for the poor.

The Board said that these conditions existed in a greater or less degree in other cities of New York State. They are also present in greater or less degree in the cities and towns of all states. There is a general awakening to the necessity for some solution of the problem, but this awakening is not yet accompanied, as it can hardly be expected to be, with an understanding of its root causes or of the technical methods of removing them. Without more of such understanding, we shall continue to witness the promulgation of social ideals and vague schemes of reform that have no basis of practicability and hence do not lead to action. The point has been reached where it can be fairly well assumed that the public is aware of what are the right objectives in connection with land development and housing, but needs still to learn the methods of attaining them. Put in other words, social understanding lags behind social idealism. Therefore, the great need of the moment is the spreading of more knowledge of sound economic methods in relation to both land development and building, and of the principles on which such methods have to be based.

[1] New York State Board of Housing, *Report*, Mar. 6, 1929, p. 46.
[2] *Ibid.*, pp. 49–50.

CHAPTER VII

RETROSPECT AND SUMMARY OF CONCLUSIONS

THE first chapters of this report were written from a vantage point overlooking a pleasant home neighborhood in a small city, and perhaps it is fitting that this retrospective summary is being penned on the roof of a skyscraper overlooking the disorderly conglomeration of building in a great metropolitan center. Looking downwards I recall the eloquent words of President Franklin D. Roosevelt: "the tall, slim buildings standing white and clear against the sky — but too often around their feet cluster the squalid tenements that house the very poor — buildings that should have been destroyed years ago, full of dark rooms where the sunlight never enters, stifling in the hot summer days, no fit habitation for any man, far less for the thousands of children that swarm up and down their creaking stairways." [1]

And there are such conditions too in the suburbs that lie beyond, in the distant towns and villages, and in the more remote hamlets. The metropolitan center gives striking evidence of the same errors, only in different form, that interpenetrate the whole urban scene. To know how to correct them we must know the causes of them, for it is in the removal of these causes that the only effective remedy lies.

Lest it be thought that the partial analysis and discussion of causes contained in the preceding chapters are not worthy of special research, let me explain my attitude. I think too much research in city planning has related to mere fact finding regarding existing conditions and to attempts at working out projects that accept these conditions as inevitable without inquiring as to whether it would not be better to ignore them because of their false foundations. The mathematical precision with which this type of fact finding is done and the resulting interpretation of facts give an impression of solidity, but these painstaking inquiries into details deal with the shadows rather than with the substances of things.

The influence of root causes remains with us through generations of change in economic conditions, in prices of things, and in habits of people.

[1] New York State Board of Housing, *Report*, Feb. 28, 1930, p. 2.

Photograph by Gottscho.

R. Clipston Sturgis and Andrew H. Hepburn, Architects.
Arthur A. Shurcliff, Landscape Architect.

WAR HOUSING IN BRIDGEPORT, CONNECTICUT.

(*See page 242.*)

Courtesy of City Housing Corporation.

A CUL-DE-SAC COURT IN SUNNYSIDE, LONG ISLAND.

PLATE IV.

A few years may destroy the premises on which we base calculations of what it will cost, at a given time, to remedy an apparent defect in conditions. But there is a high degree of constancy in the prevalence of causes that are rooted in custom and political policy, and if we can get an understanding of these, we have the foundation for a structure of ideas as to what should be done to bring about improvement. Without this understanding it is futile to pursue the methods of scientific analysis and to formulate specific proposals. The incursion I have made into the field of underlying considerations is a necessary preliminary to the discussion of principles and methods if that discussion is to be fruitful for guidance.

The fact that these underlying causes remain operative over long periods makes it difficult to say anything new about them. Over twenty years ago Mr. F. L. Olmsted, Jr., said some of the things which I have been now arguing as of vital importance in the treatment of modern problems. At the National City Planning Conference in 1911 he urged, as basic ideas of city planning, the modification of building laws towards constructive zoning and the improvement of methods of taxation; the exercise of real initiative in forecasting the probable future requirements of land and in preventing obstructive private occupation, especially in undeveloped areas; and the importance of marked differentiation in design between main thoroughfares and local streets.[1] During twenty years of experiment much progress has been made towards the realization of these ideas, although many real issues still remain almost untouched.

The need of improvement has increased in proportion to an increased lethargy in dealing with fundamental causes. There is nothing so clearly proved in America as that disasters follow booms, yet booms are cheerfully welcomed as evidences of returning prosperity. In connection with land development, they have destroyed the wealth that should have gone into making real home neighborhoods; and from them society inherits blighted areas, disorderly suburbs, and the untilled fields that surround cities.

One of the affirmations I have made is that the dominant question in developing land is how to plan it so as to provide wholesome and agreeable living conditions for all citizens at prices they can afford to pay. Contrast with this obvious need the almost universal prevalence of unwhole-

[1] Frederick Law Olmsted, "Reply in Behalf of the City Planning Conference," in *Proceedings of the Third National Conference on City Planning*, N. Y., The Conference, 1911, pp. 9, 11.

some conditions in houses and residential neighborhoods occupied by the workers in American cities. It is not necessary to dwell on this contrast between the reasonable ideal for human welfare and the practical results. The economic folly represented by bad housing is revealed in facts that thrust themselves upon urban dwellers in their everyday experience. As a social blunder its evidences lie in physical and moral deterioration of large numbers of people, in delinquency of children, in the restlessness of workers, and in the despair of governments at the task of ameliorating bad conditions that might, with the exercise of intelligent foresight, have been prevented.

In concluding this discussion of basic considerations I will summarize certain conclusions that need special emphasis:

(1) The discrepancy between what is and what should be in housing conditions is largely caused by the tradition of treating land as a commodity to gamble with, instead of as a commodity to conserve and develop for human use; and of framing policies and following practices based on the assumption that it is more important to preserve land prices than to get rid of non-social uses of land. An entirely new approach to the whole problem of planning, developing, and valuing land in urban areas is essential to secure a sound economic foundation for community life. It is not enough to proclaim as an objective of development that the control of land and buildings be effected in the interest of health, safety, and general welfare of the community, while making this objective secondary to the right of private profit making out of organized speculation in land. The objective must be supported by public policies that put human values before financial values and thereby stabilize both.

(2) The capital value of land should be based on its income value, in the interest of every home owner, investor, and tax-gathering body. It is of fundamental importance that real estate be restored to its proper place as a "gilt-edged" security for investment of capital, for only thus can adequate funds be attracted towards building to provide a sufficiency of shelter.

Three fourths of all urban land is used for residence, and much more capital is invested in residential than in all other types of building in a city combined. Hence the importance from the community point of view of obtaining economic stability for its residential property. The extent to which real estate values are based on speculation tends seriously to weaken the national economic structure. Observe by way of con-

firmation the following statement from the Cleveland Trust Company *Business Bulletin* for Apr. 15, 1933:

> It seems probable that if an effective restraint could be placed upon real estate speculation it would prove in the long run to be a more valuable safeguard to the future of American banking than would the restriction of speculation in commodities and securities.

(3) Tendencies toward metropolitan centralization seem likely soon to be reversed in favor of decentralization towards smaller cities and towns. Public policies are now being directed to stimulate the existing technological and other forces that are influencing this movement. Such phases of President Roosevelt's reconstruction program as the Subsistence Homesteads Corporation and the Tennessee Valley Authority, for example, involve the planning of many small semi-industrial, semi-agricultural communities.

(4) There is no longer any scarcity of buildable land in the environs of cities. Enormous areas in excess of needs are now provided with means of communication with places of employment. The super-abundance of buildable land makes it wholly unnecessary to crowd buildings on the land to the injury of residents and the community, and at the same time demands increased attention to planning and zoning classification to prevent further wasteful subdivision and development. Even in the New York Region there is a sufficiency of land within easy reach of the main center of economic activity to house 76 million people at 45 persons to the acre, whereas the future population seems not likely to exceed 15 to 20 millions.

(5) Among present conditions that are both causes and effects of civic evils, one of the most important is overbuilding on the land, that is, the erection of more bulk of building in an area than can be served economically with adequate means of communication and provided with adequate light and air. Such overbuilding occurs in the intensively developed business blocks of villages as well as in skyscraper districts of large cities. (As a rule, overbuilt conditions may be said to exist where more than 40 per cent of the total area is built upon and the front and rear walls of buildings cannot be given an angle of light of 45 degrees. Both of these figures are, of course, somewhat arbitrary, but general experience shows them to be approximately correct.)

Another highly injurious tendency is scattered and haphazard building, that is, the erection of isolated structures in suburban neighborhoods resulting either in extravagant developments for local improvements

or in insanitary conditions owing to the impracticability of providing adequate local improvements. This condition is not necessarily an incident to a badly planned street system. It can only be prevented by comprehensive planning that deals simultaneously with control of building development and layout of streets.

(6) To achieve sound social and economic objectives in land development, all land should be planned in two stages: first, with master plans for regions or cities, and second, with more detailed subdivision plans for residential and other neighborhoods. Subdivision control, to be most effective, should be combined with constructive zoning, and together they should be directed to secure both economy and the highest attainable degree of permanency of development. In planning subdivisions it is necessary to determine a reasonable apportionment of the costs of building, of local improvements, and of land; to limit the land cost to the smallest practicable percentage of the cost of the completed dwelling; and, coincidently with making reservation for streets and laying out blocks and lots, to reserve adequate spaces for local recreation.

(7) Since by far the largest number of families do not have earnings of more than $3000 per annum, the greatest need in housing is to provide houses of a satisfactory type and quality of construction, and with wholesome surroundings, for these families. There is no real difficulty in meeting this need for those families who can pay an economic price or rent. For these as well as for the lowest-income groups who may require state-aided housing, the problem is to reduce the cost of development of land and building to the lowest level consistent with providing basic conditions for human welfare.

The major difficulty involved in securing such an improvement of conditions is that it requires both the raising of standards and the reducing of costs. To secure reduction of costs there must be, of course, improvement in methods of construction, and also more equality between the wages and profits earned in the building industry and those earned in other industries. But these matters lie outside the scope of this monograph, which is concerned with improved standards of planning land for building as the first step towards economy in building.

PART II

Principles and Methods

CHAPTER VIII

BASIC PRINCIPLES AND REQUIREMENTS IN CIVIC DESIGN

IN approaching the consideration of standards and methods, it is well to remind ourselves of certain principles and requirements on which a true technique of city planning is based. Basic principles of design have been discussed in many books,[1] and I shall allude only to a few aspects of them that seem to me to need emphasis.

FUNDAMENTALS IN DESIGN

One universal principle in all city planning is that plans should conform to time, place, and circumstance. Design as "applied intelligence" means the reasoned application of acquired knowledge to the special conditions set by each problem. Its success depends on the extent of understanding which guides the designer either in following or in dispensing with formulæ as occasion may require. Good design must express both feeling and thought, and cannot be truly founded merely on the desire for artistic expression any more than on logic alone. Civic design should embody the material objectives of communities but should also express ideas born of their spiritual and purely social aspirations. Because it must be based on the uncertainties that go with defects in human understanding and the interplay of reason, emotion, and the power of habit, it can never lead to completely perfect results. It must be subject to continual correction and modification, under experience both of mistakes and of successes.

The successes should be measured less by the material gains of the moment than by the permanence of the more spiritual gains. What every artist and planner needs most is a sense of what constitutes real and abiding values. These values are not always obtained from planning and may on occasion be obtained instinctively. Moreover, it needs to be remembered that it is not the *act* of making a plan, but the *art* which is behind the making that matters in producing values. But, going still

[1] See, for example, *An Introduction to the Study of Landscape Design* by Henry V. Hubbard and Theodora Kimball, N. Y., The Macmillan Co., rev. ed., 1929.

deeper, we find that the *motive* behind the art is more important than the quality of the art itself. City planning, in other words, may be technically right and yet socially and economically wrong. Sound objectives are thus of first importance in planning. It is the lack of such objectives that is responsible for most of the unsatisfactory results of planning and that permits it to be said that some cities and districts that have been deliberately planned are not so attractive as many that have grown up without conscious planning. One may recall as examples of good development the early New England towns, which were apparently arranged instinctively rather than deliberately planned in a technical sense; and contrast with them many towns of subsequent periods, such as the common checkerboard type, that were planned in accordance with technical rules but that failed to be good in execution.

In the layout of early New England towns, consideration was given to utilitarian purposes from the point of view of the happiness and welfare of the community rather than of the gain of a few at the expense of the many. These towns were not injuriously affected by land speculation with its inevitable financial wastes and social injuries. They represented an ideal balance of town and country life. Where some of their best qualities still exist, they shame modern methods in supplying modern needs.

In the future, many hundreds of small towns and new residential neighborhoods will be built, and the question will arise as to how they should be planned and what principles should govern their development. Enough, and more than enough, experience has been gained to show the stupidity, on the narrowest economic grounds, of the standards that have been followed in the greater part of speculative developments of recent generations. New communities should be planned with as much respect to function, to natural conditions, to social well-being, and to true economy as the early towns of New England.

Social and Economic Considerations. In a sense, the whole of Part I of this book is a discussion of certain general principles of social purpose and economy in the planning of residential areas. In actual design these principles require that the space about homes should be adequate for purposes of health and convenience, and that their surroundings should be agreeable to the greatest degree that is economically practicable. As there is an excessive supply of buildable land in relation to the demand

for its use,[1] its price should not be such as to prevent the provision of space in home neighborhoods to the full extent required for health and outdoor recreation. The cost of congestion is greater than the cost of preventing it; therefore, when the land is planned, the public space in streets and open areas should be made fully adequate to potential needs of movement.

It may be accepted as a principle of social justice that every inhabitant of a house in a civilized community has a right to demand the means to obtain access of light, sunlight, and ventilation from the outer air. There are no insuperable difficulties in the natural order of things to prevent this demand from being met, but difficulties are artificially created by man to enable one small group in society to obtain financial benefit by restricting the amenities of a larger group.

As a rule, the open space required for street traffic, access to the land, movement on the land, and neighborhood recreation, will not be greater than is needed for light and air for the dwellings. As a minimum, these needs must be met. Further provision of open space for pleasing prospects to buildings and for embellishment generally may, however, be curtailed on account of economic considerations in cases of necessity. To meet these requirements as to amount of space and to prevent waste due to its bad distribution, it is essential that areas be intelligently designed so as to relate streets, local parks, and playgrounds to uses and sizes of lots. A defective arrangement of space may be even more harmful, socially and economically, than some degree of inadequacy of space.

The highest perfection in the arrangement of space is that which provides the maximum social benefit, in terms of healthful environment, within the means of the inhabitants. As I have already suggested, attempts to maintain profit making in land uses that are anti-social are based on false ideas of economy; but it is also true that attempts to achieve standards of spaciousness and artistic arrangement that go beyond the necessities for health, and impose an excessive financial burden on members of the community, are based on false ideas of social well-being. For example, we might conceive it to be desirable that every family should have, in some form, the space for a home that is contained in a 50- by 100-foot lot; but if half of that area is sufficient for health, and a family cannot pay for the purchase, adequate improvement, and maintenance of more than half, then the smaller lot is the more desirable from a social as well as from an economic point of view.

[1] See pp. 26–29.

Esthetic and Economic Composition. Whatever esthetic purpose we may have in mind in our designs must be subordinate to the social purpose, and both must have regard to sound economy. Only intelligent consideration of the three factors and of their proper bearings on one another will yield the best results. It has become a commonplace that we should not aim to achieve beauty as a direct objective in city planning but rather that we should create order in form and function in the hope that we may achieve beauty. The composition, esthetically, should express order in the visible relation of parts to other parts and of parts to the whole. The design should relate to the city both as a distinct unit in itself and as a coördinated structure of neighborhoods, and also to the natural conditions of the site. The city planner cannot ordinarily be sure that he will achieve beauty, since he does not himself carry his work to completed form, but he can set up forms of order which will make beauty most easy of achievement by those who build according to his general plans.

This order is, of course, a matter of "elevation" or vertical dimensions, as well as of "plan" or horizontal dimensions. No plan can be good which has not considered the resultant elevations. Economically the composition should similarly express order in the uses of the parts, considered separately and together. Order so achieved will indeed *tend* to make a place more pleasing in appearance, but the fact that an area is well arranged to serve different functions may not insure its effectiveness as an artistic composition either on paper or on the ground. Conversely, the fact that a plan composes well in street arrangement and in suggested grouping and arrangement of buildings may not mean that its functional composition is good.

If we say that a plan composes well for the reason that it appears to us to have a symmetrical or an organically well-arranged system of streets for traffic, we have too narrow a conception of what composition means. To understand the quality of its composition we must view it as comprehending streets, public and private buildings, parks, playgrounds, and all physical features necessary to serve community needs.

In a proper sense, a street is an open space, the enclosing walls of which are its abutting buildings. The composition of the street is the whole development as it appears to the eye and not merely the level piece of land used as a right of way. One difficulty in town design is that of considering composition simultaneously in relation to both dimensions, the one dealing with horizontal and the other with vertical features,

and at the same time accomplishing a proper distribution of building uses.

Proportion and scale considered by themselves have a bearing on the general layout of the town, as well as on the relationship between building heights and street widths or on the details of building elevations. A group of buildings may have proper scale in relation to one kind of open space and be out of scale in relation to another. An example of this is the skyscraper range of buildings in Lower Manhattan. This range is in proper scale to the upper bay and the Hudson River, and that is one reason why we admire it from the water. But the buildings are out of scale with the adjacent streets. Can we say that it is desirable to have the Lower Manhattan buildings scale well with the wide expanse of water on one side even if they fail to be in proper scale with the streets on the Island? Perhaps the answer is that they should have been planned to satisfy both requirements in the matter of scale. For instance, they might have been designed on the street fronts with heights less than the width of the streets, but with occasional high towers which could have been sufficiently close together to create the massive effect that it is desirable to obtain from the bay.

Symmetry, strictly so called, is not essential to all good composition, and the result of it in a paper plan may not be to produce symmetry on the ground. Symmetry should be considered as a subordinate feature: that is, from the point of view of whether it aids in securing good composition or not. The only full justification of a symmetrical arrangement is that it will serve *all* the functions of the community more economically and beautifully than any other arrangement. It is essential to see a civic problem in general perspective, that is, both in its totality and in the interrelation of its parts, in order that we may properly analyze it as a basis for obtaining a satisfactory synthesis in design.

One of the goals to seek is unity in organization without standardization. Order and its esthetic results may go with a certain degree of standardization in layout of streets and buildings. What has to be avoided is that unintelligent repetition of units which produces a dreary monotony without any economic benefit. A design should express unity between topography, plant growth, and buildings, but much of its success will depend on treatment of details and minor compositions. Emphasis of some appropriate feature in every building group or street picture, and the values of climax and dominance in appropriate places, are all important to produce desirable effects.

Adjustment to Topography. The question of adjusting a plan to topography so as to gain esthetic effect with economy is a much more involved operation than is usually realized or, at least, than is implied in some dissertations on this phase of planning. The adjustment needed is much more than that of fitting streets to the ground so that they shall have reasonable grades in relation to street traffic and approaches to lots.

The word "topography" denotes not only the levels of the land but all the natural features on a given site. The extent and character of such features — simple or complex undulations, watercourses, near and distant views from different points of observation, and individual or massed effects of trees — have varied relations to one another and to all developments that can be foreseen. Every element in topography should be considered as an opportunity to be used even when, as in the case of hilly ground or rivers, it seems to impose obstruction to traffic movement or difficulties of access to buildings. Indeed, one may express it as a sound principle for general application that every natural feature should be looked upon as an opportunity for achieving a purpose in design and only treated as an impediment to be removed as a last resort. Nature always demands full payment for the changes we make on her face. We may not be able to lay out streets and build houses without making some more or less costly changes, but the ultimate as well as the immediate values of these should be appraised before they are proposed or undertaken.

The questions of whether, when, and to what extent a man-made plan should be modified to suit the topography, or the topography modified to suit a logically arranged plan, cannot be answered in specific terms. As I shall presently point out in referring to the question of form, it will never be appropriate completely to subordinate our ideas of what is a logical or artistic arrangement of streets and lots to the topographical conditions, or vice versa.

Form, Flexibility, and Originality. In planning there are no requirements in regard to such questions as form, flexibility, and originality that are not best left to individual judgment, always assuming that it is exercised by those of proper training and understanding. A few observations, however, may usefully be made with regard to phases of these matters that are not always appreciated by planners and citizens in general.

Either formality or informality, irregularity or symmetry, may be defects in a plan, not because of any technical imperfection of either

style, but rather for the reason that the use of either may in a particular case involve the subordination of organic purpose to style. In the technical approach to design we may be influenced, for different reasons, to employ either formal or informal patterns. What the intelligent planner of a residential area conceives as sound will be that form which gives the best standards of social conditions in matters of health, safety, and general welfare, and the most agreeable result in the matter of appearance that together can be obtained within the means of the prospective residents.

It is natural for man to plan in straight lines and right angles unless he has reason to depart from them. Their adoption in any given case, however, may indicate intelligence or lack of intelligence. Buildings are normally rectangular, and this suggests the adoption of rectangular plans of lots as the simplest expedient. Curves and irregularities are often avoided as involving too much complexity in arrangement, even when there is good reason for adopting them either to adapt the plan to the natural conditions or to secure greater convenience.

As has already been suggested, the form of a ground plan may to a considerable extent be dictated by topography, but we should not allow natural conditions completely to dominate our planning. On the other hand, we should not adopt any preconceived pattern, such as a checkerboard system of streets, and attempt to make it dominant over natural conditions; nor should we conceive planning primarily in terms of symmetry and of axial vistas, with natural features as completely subordinate elements. To do so will lead us to neglect the opportunities provided by the existence of a hill, a tree, or a stream. The pure formalist is apt to commit the error of respecting natural conditions only to the extent that they fit in with his architectural conception. On the other hand, he who accepts nature as sole dictator may go too far in disregarding geometrical forms in landscape planning, *e.g.* by losing the conveniences of simple surfaces or of straight lines and right angles, to gain an adaptation to topography not worthy of consideration.

Peculiarities of site and special requirements of the prospective development will involve consideration of some compromises between ideas and conditions in every problem of design. Successful planning will depend largely on the intelligence and skill that are shown in making these compromises and in seizing the opportunities they present for creative design.

A plan should be sufficiently flexible to permit adjustment to changes in ideas or conditions or to the results of experience in carrying it out.

As a city or neighborhood is a growing thing, a city plan should be a diagram for guidance rather than an instrument for control. Its purpose is to guide civic growth through its various stages of development. Except in regard to the main outlines of its system of communications, it should never be prepared on the assumption that it predetermines lines and forms with the precision that an architect is able to achieve in designing a building.

Originality should not be a purpose in design. Novelty has no merit in itself. Nevertheless, where creative effort is devoted to solving a problem for the purpose of achieving a sound social, economic, or esthetic objective, it may result in an original conception. It is this honest seeking of a practical end which is the real opportunity for successful invention and for demonstrating that a new way is better than the old way. The greatest improvements in art are products of evolution through a succession of individual achievements, notwithstanding the fact that in new circumstances successful results may sometimes be attained through inspiration. No subsequent change in conditions has as yet been so great as to vitiate the soundness of the dictum of Sir Joshua Reynolds in a discourse to the students of the Royal Academy in 1769. Referring to the art of painting he said:

> The more extensive . . . your acquaintance is with the works of those who have excelled, the more extensive will be your powers of invention; and what may appear still more like a paradox, the more original will be your conceptions.[1]

PRINCIPLES AND PRACTICE

However sound our ideals and aims may be, their value to human society lies in the degree of their realization. It is the residuum of our ideals that remains after their contacts with human life and material things that are the constituents of progress. The general principles to which I have been referring realize themselves in more intangible forms than do those more specific or concrete principles that can be expressed in precise formulæ. But these intangible things that grow out of feeling, thought, tradition, and custom are more powerful in shaping our lives and community growth than the things we can express in the form of rules.

Following the achievement of a true understanding of social, economic, and esthetic purpose, we have next to achieve the maximum realization of

[1] "Discourse II Delivered to the Students of the Royal Academy," in *The Works of Sir Joshua Reynolds*, London, T. Cadell, Jun., and W. Davies, 1801, p. 29.

that purpose. This maximum must always trail far behind the ideal, — how far depending on the success of the planner in resisting the forces of the widespread obscurantism that permeates all society in matters of social improvement. His influence for good depends more on his having the imaginative powers and logical habits of mind that are necessary to produce artistically sound results than on his technical ability. These powers and habits have their origin in natural aptitudes, but they must be perfected by training. Having the gifts of foresight, an instinctive feeling for order in composition, and courage to create, he must develop them. When he has done so, his personality will become a force in molding his designs and giving them living qualities.

There is a sense, however, in which it is not so true of a city plan as of other works of art that its living qualities depend on the personality of the planner. A city plan can never be a completed design nor free of the influence of community expression. As a rule, the painter and the sculptor have full opportunity for self-expression in their works. The architect and the landscape architect, too, although more largely controlled by their materials and the conditions of their employment, have much opportunity to do creative things in accordance with their own ideas and feelings. The city planner has least scope for self-expression because, in part, his design relates to a growth rather than a fixed structure, and because, in other part, he has to submerge his ideas and feelings in great degree to the ideas and feelings of the community.

Unfortunately, too, the planner's opportunity for doing creative work is limited by the fact that so much of his work is primarily corrective. So generally is this the case, particularly in connection with zoning, that city planning is widely regarded as an art of remedying something that has gone wrong instead of as an art of creative design. Nevertheless, every city plan in considerable degree expresses the city planner, and reveals his individual approach in diagnosing problems, in conceiving solutions, in appreciating values, in suppressing or subordinating false issues, and in the artistic embodiment of a design.

Public Taste. Unfortunately public taste cannot be relied upon to follow the leadership of knowledge or of wisdom, although on occasions it does so instinctively. Its major defects are in failing to do the right thing for lack of understanding rather than through deliberate choice of the wrong thing. Defects of public taste will always hamper attempts to secure orderly arrangement and esthetic effects in city building through

the agency of city planning. The structure built up by imaginative foresight is too remote from its foundations to seem other than visionary to the "man in the street."

There are, however, matters of detail regarding which more guidance should be given the public. Untidiness about buildings and landscapes, vandalism in the countryside, ostentatious vulgarity in design of structures, all reveal the need of education in taste. In a sense, the artistic defects of the city are the expression of the artistic defects of the back street and rear yard and vacant lot and picnic ground. Orderly appearance of the city will never be realized so long as large numbers of private individuals and corporations are unconscious of disorder about their homes and factories.

Happily, in America, there are now appearing tendencies towards greater tidiness in the use of spaces about buildings, allied with a growing sense of artistic appreciation. Happily, too, this has been accompanied by a growth of appreciation of social values. The attitudes of public authorities and of industrial leaders towards art and art forms have been changing slowly for the better during many decades. The fine arts have been gradually achieving a stronger position in both private and business life. In the latter connection, change of outlook has been shown by appointment of art directors and committees to control the appearance of their structures by such corporations as the General Electric, Westinghouse, Standard Oil, and some telephone and railroad companies. In other connections, however, business has been slow to adopt artistic standards. Most public advertising, for instance, is not yet affected by the attitude adopted by the Fifth Avenue Association in New York.

Advances in esthetic appreciation have taken place in the design and placing of buildings, in landscape architecture, and in protection of neighborhood amenities by zoning. There is still need of more emphasis on architectural design of small homes, and on more intelligent design of governmental buildings; but the architectural leadership in the design of larger residences and important commercial buildings is gradually extending its influence to all types of buildings. Economy and true esthetic appreciation go together, and one direction in which advances have been made is in the public recognition of the failures in art that have accompanied extravagance in building. The field of city planning can probably make its best contribution through the creation of object lessons that show the result of good design, for it is by example rather than by precept that the general level of public taste can be raised.

Conformity to Law. Law is a reflection of public taste and desire. It usually lags behind any improvement in these, however, so that what it permits should be regarded not as the most, but as the least that can be attained. Nevertheless, it is essential that proposals in a city planning design which are intended to be carried out should comply with the law as it is. A city plan in a special sense is an instrument of government, for it defines the "legal qualities" of land, the methods of treatment of public property and of control of private property. This phase of city planning is fully discussed in other works.[1] It is referred to here to indicate its important bearing on principles of design.

However, since the law as a rule lags behind what the public desires or will permit, the practicability of a plan looking to the future need not be measured by the extent of its compliance with an existing state of law, but rather by its compliance with a rational conception of what can be achieved by the education of public opinion and improvement of the state of law. A proposal which cannot be carried out under the law as it stands may indeed be so commendable as to justify its inclusion in a design, on the ground that such inclusion will influence a desirable modification of the law.

In other words, law is a flexible instrument expressive of the people's will and continually adjusting itself to new ideas. But the new ideas must conform to a reasonable conception of what public opinion is likely to demand or permit.

Naturally the restraints of law are greatest where plans deal with the problems of existing cities or developed portions of cities, or in other words, where the extent and ramifications of established interests are greatest. Many plans have been prepared that have a certain attractiveness as artistic presentations of ideas but that cannot be carried out in any conceivable set of consistent circumstances, — in which case they are false in conception.

Control is most difficult where the purpose is to promote some esthetic objective as the primary or the only consideration. As, however, there are usually sound reasons from the points of view of health and economy for promoting and preserving the order that makes for beauty, and as this relation of order to health and economy is becoming increasingly recognized as essential by governments and councils, a great deal can

[1] See, for instance, Frank Backus Williams' *The Law of City Planning and Zoning*, N. Y., The Macmillan Co., 1922.

now be accomplished in preserving natural beauty and controlling the appearance of buildings.[1]

TECHNICAL APPROACH

In one sense, the technique of planning may be divided into, first, the technique of approach or pre-organization of a design and, second, the technique of making the design. The first is called into action between the stage of determining objectives and the stage of drafting proposals, which in turn precedes the stage of the elaboration of details. Brief consideration will be given here to certain governing principles affecting the organization of designs; while questions relating to their actual content and the specific standards which should be considered in their details will be set forth in the three subsequent chapters dealing with the civic pattern, the elements in the neighborhood plan, and the neighborhood pattern.

There are some ordinary and more or less self-evident requirements in the technical approach that may be taken for granted. These include requirements that all planning should be preceded by the making of a careful diagnosis of problems as well as by studies of the physical, economic, and social conditions; that surveys of problems and conditions should be limited to essentials; that accurate topographical and, where practicable, graphic aërial maps should be prepared in advance of planning; that careful distinction should be made in all stages between the features that can be delineated on maps and those that can only be written into ordinances; and that the ultimate development should be kept in mind in preparing the ground plan. These and many other matters are matters of procedure that may be accepted as logical parts of every planning program. There are, however, certain major considerations that enter into the technical approach, although they are part of the philosophy rather than of the mechanics of planning, which I think it well to refer to here with a view to attempting some statement of principle. I will refer to them under the three heads of (*a*) technique and social purpose, (*b*) planning and stability of use, and (*c*) scope and order of treatment of problems.

Technique and Social Purpose. I have already suggested that the determination of sound social and economic objectives comes before technical perfection in city planning, or, in other words, that wisdom in our aims is more important than skill in our methods. This statement is

[1] See pp. 70–71.

SCHEME A.

SCHEME B.

PLATE V. ALTERNATIVE DESIGNS FOR THE DEVELOPMENT OF THREE BLOCKS IN JACKSON HEIGHTS, LONG ISLAND.

(*See pages 231–236.*)

based on the underlying assumption that whatever condition gives us the social environment that is essential to health and general welfare and is consistent with true economy, is sound and wise.

It has to be acknowledged, however, that beyond a certain point opinions may differ as to the nature of these objectives, as well as the manner of their realization, and also that beyond a certain point, what I call aims and what I call methods may overlap so much as to become indistinguishable. For example, a city planner who starts with a communistic outlook will adjust his methods to this outlook and color all his operations by his own peculiar political philosophy or that of his clients. On the other hand the individualist, with an entirely different outlook, will color his operations in a different way. Up to a certain point they have similar ideals in regard to the quality of social environment that is desirable. They both want the things we vaguely define as being health-giving and pleasing to the eye, but they part company in their conceptions of what these things are and of the methods of attaining them.

This matter may be illustrated by allusion to certain controversies now taking place in the field of architecture that have a bearing on the future of civic design. If certain "modernists" in architecture are right, the whole approach to city planning, including architecture, must undergo revolutionary change. It is futile to discuss planning of cities or of residential areas for a democratic and strongly individualistic society if this is to be replaced in the near future by a communistic society. A revolution in social and political aims cannot but lead to a revolution in methods of planning and building.

The issue as it is being presented by a cult of modernists is much more than that tradition should never be blindly accepted and that buildings and city plans should be adapted to new materials and new ideas of living. To the extent that this is the issue, there is nothing to be said against it. Sooner or later, city planning and architecture must adjust themselves to new materials and ideas. But some apostles of so-called modernism in architecture argue that this adjustment, and the new "style" of architecture to which it is giving rise, will overcome defects in city building, — defects that may in fact exist in association with any architectural style. Incidentally, they are equally in error when they assume that civilization grows out of architecture instead of the contrary.

Referring to the "so-called international style," Frank Lloyd Wright asks: "Since when, then, has the man sunk so low, even by way of the machine, that a self-elected group of formalizers could predetermine his

literature, his music, or his architecture for him?" He maintains that "form, and such style as it may own, comes out of structure industrial, social, architectural." [1]

Everything vital that is claimed for the new methods and styles can be obtained without their eccentricities in design, yet these eccentricities are lauded as essential to a new social order. The main requisite to securing a new social order in cities is such control of the development of land and building that every family will have the space and environment necessary for healthful living. Everything we can invent and every change of method we can evolve to achieve this objective must be welcomed. But the invention and the changes should harmonize with that conception of society which is acceptable to the greatest number, and this means in America that it shall be appropriate to the needs of individuals having equality of opportunity in a free democratic commonwealth. The architecture may be picturesque, classical, or modern, and have equally good or bad results. Witness, for example, Sir Raymond Unwin's picturesque Garden Suburb at Hampstead and Otto Haesler's community development at Rothenberg. What it should not be is machine-made and institutional architecture that ignores the rights of individuals and the spiritual elements in family life.

However important it may be to improve public taste, for instance, by educating it to despise "decorative gimcrackery" and admire simple forms and good proportions, this can be done without the aid of communistic government and architecture. It is as debasing completely to submerge the individual to the community as it is to submerge the community to the individual.

In art and public policy, the issue in America is not, and is never likely to be, between individualism and communism as two opposing forces. The weakness of community action in the past has been due more to weakness within itself than to the antagonistic influences outside of itself among the forces of private enterprise. Hence the future strength of municipal government lies in purifying and ennobling itself as an institution representative of the public will, rather than in destroying opportunities for individual enterprise. No sanctuary can be built out of the materials either of sentimental communism or *laissez-faire* that will enable the world to escape from human selfishness and the evils which it generates. There can never be a complete freedom from evil in city building or any other building, and there can be only partial escape

[1] "Of Thee I Sing," in *Shelter*, Apr., 1932, p. 10.

through coöperative action based on individualism. But certainly escape will be made more rather than less difficult by methods that reduce men to a common level and suppress individualism even in its ideal forms. Individualism must be controlled by associations of individuals. Despotism will be as repulsive if exercised by idealists as it is when exercised by monarchs.

This issue is not irrelevant to our discussion of the technical approach to city planning. Obviously, how we plan must depend on the social, political, and architectural structure for which we plan. Certain "new" ideas of architecture are based on a new-born philosophy of living. Seizing on certain obvious weaknesses in the art of building in the past, such as over-reliance on tradition and failure to make the best use of new materials and changes of ideas, it is heralding itself as truly "organic" architecture. But its possible utility as such is being undermined not only by the excessive claims that are made for it, but more fundamentally by the erroneous ideas with which it is sometimes implicated as to the advantages of replacing an individualistic by a communistic society. Some of its more extravagant claims are that it will prevent overcrowding, back-yard building and congestion, give more sunlight and air to buildings, assist in comprehensive planning, pave the way for cheap money and limitation of profits, and promote flexibility. What *will* achieve these objects is a matter apart from style of architecture. That it may give us institutional barracks to live in instead of homes that express the romanticism of individual desire is the kind of questionable advantage that may be admitted. That such institutional forms will permit us to obtain mass production is also admitted, but the alleged advantages of mass production may well prove as illusory in this field as they have already in many others.

In so far as the objectives of modernist architecture accord with our ideal of securing more spacious environment for homes, I repeat that it has been proved that this is as attainable with picturesque and romantic architecture as with the modern styles. For the moment, the "new" architecture has claimed public attention because of certain merits of simplicity and organic utility. We must capitalize these things in design — whether of buildings or land — without accepting the errors of those who are endangering their good results by linking them with political propaganda and trying to prove too much.

The important points in all this discussion of technique in relation to social purpose are: first, that we must determine our purpose before we

plan, and adjust our methods to our aims; and second, that so far as the major social requirements are concerned, they can be attained in any style of architecture or civic design.

Planning and Stability of Use. In the technical approach we will be much influenced by our attitude towards the inevitability and desirability of change of use of land and buildings. If we conceive *planning* in comprehensive terms and *stability of use* as that degree of permanence which is associated with the life of a building, then planning should be done in a way which will promote such stability. As a general rule, it may be taken as a sound principle that social obsolescence caused by changes in uses of buildings should not be encouraged to proceed more rapidly than physical obsolescence caused by deterioration of buildings. In other words, the most satisfactory condition is that obtained where the original use of a building or neighborhood endures just as long as the physical structures can be well preserved for that use, *e.g.* where a single-family district is maintained as long as its individual structures continue to be satisfactory for the original development.

Some changes in cities are inevitable and desirable, as for instance in places that, having previously been comparatively inaccessible, are provided with new facilities for transit or are intersected by a new arterial highway. But most changes in cities occur in piecemeal fashion for no other reason than that of making particular sites more profitable to one owner or group of owners; the resulting financial gain to a few owners of property usually involves serious loss to other owners and to the community as a whole. The rapidity of growth of American cities has given rise to fallacious assumptions as to the value and inevitability of changes, however indiscriminately they occur; and such assumptions, as well as their corollary that it is futile to plan for a stable development, have been widely accepted in the city-planning movement.

Almost in every city changes occur where they are least desirable, and the parts that should be changed are left untouched. Manhattan is perhaps the most striking example of a place where fine developments have been destroyed to give place to more intensive developments, while adjoining deteriorated districts have remained blighted. But every city has its own examples of the same thing, — in centers, in suburbs, and in outlying districts. The degree and extent of blight in every city will be found to have close relation to the increase of densities and changes of

uses that involve rebuilding in areas that, on the whole, would have been better left unchanged.

In planning we have to consider first, how to prevent unnecessary and wasteful change, and second, how to regulate change when it occurs. For the first purpose, we should plan and zone together so as to give the maximum stability to the development over a long period.[1] This *can* be done in spite of the common allegation that the planner is unable to foresee the future. To achieve the second purpose, control needs to be exercised simultaneously over indiscriminate encroachment of new uses and increase of densities in districts.

In the approach to the planning of new areas we should endeavor to conceive a physical arrangement of streets and other features in harmony with a system of regulations that will discourage change and insure durability. In the control of changes in areas already developed, the important principle is that replanning and re-zoning of sections should precede any indiscriminate change of parts. There are places and occasions where provision must be made for convertibility of streets and buildings to new uses at some future time; but these, rather than the stable developments, should be the exceptions.

The question of securing the highest practicable degree of permanence in development, and incidentally of preventing changes from low to unduly high densities of building, is not merely one of preventing local blight and economic waste during periods of transition; but also one of solving the modern problem of overcentralization. Some conversion of residential into business buildings, and of one type of residence into another, is one of the things that inevitably happens. And so far as it is inevitable it need not be harmful. The harm is done by the extent of conversion beyond what is necessary, the disorderly way in which it occurs, and the progressive increase of densities of buildings which accompanies it without simultaneous increase in street capacity and public open space. We cannot effectively restrain overbuilding simply by zoning heights and densities. The first cause of overbuilding, namely, the ease with which deleterious changes occur, must be dealt with in advance of height and density zoning.

Every plan should provide for the requirements of industry and for the business needs of residential areas; and if this is done with proper care, few changes will be forced upon the community prior to the time when physical obsolescence of building takes place and replanning of de-

[1] See Chapter V.

teriorated areas becomes necessary. In many respects it is equally as important to replan obsolescent areas as to plan undeveloped ones, and it should not be regarded as unreasonable to require such comprehensive planning of deteriorated districts as a condition precedent to zoning.

The methods of planning chosen have an important bearing on this matter of making permanence, rather than provision for change, the objective of planning. In so far as we can make the ground plan appropriate only for the type and density of the original building development, we will not only save money but assist in giving stability to development.

Scope and Order of Treatment of Problems. In the technical approach we should have in mind the division of planning between the master outline plan and the neighborhood plan.[1] Detailed planning should be dealt with in small units. The plan of a city either by itself or as part of a larger region should be in broad outline only. First, it should be tentatively planned in accordance with theoretical principles and then worked out in relation to practical considerations.

A home neighborhood unit should be planned with consideration of its relation to and integration with the whole community of which it is a part, and also of its constituent elements of street, block, and lot. The most appropriate area for a neighborhood unit is, in a city, one which provides for the establishment of a school unit within the boundaries of main thoroughfares, or, elsewhere, one suited for development as a self-contained village.

The needs of industry, or, in a purely residential area, the convenient relationship of the area to the centers of economic activities, should have first place in the consideration of uses or functional arrangement. The location and grouping of homes, and the provision of space for health and recreation, are second in order of study, but of major importance. Next to be considered are the centers of community life, including the markets and shopping facilities. The means of communication and the public utilities required for convenience of movement, for sanitation, and for comfort, need to be considered simultaneously with each group of functions and finally coördinated with the whole arrangement of functions.

The question is often raised as to whether it is more logical to determine use areas before the system of communications is determined, or vice versa. The matter, however, does not admit of definite decision as to order according to preconceived rules. The procedure varies in dif-

[1] See pp. 13–14.

ferent stages and phases of planning. The proper procedure in making a master city plan is to deal simultaneously with communications and with the broad zoning classifications, but to give primary consideration to the main system of communications. When, however, a neighborhood or subdivision plan is made, almost always the main system of communications is already established or determined; and, in such plans, it is appropriate that the primary emphasis should be placed on the zoning.

CHAPTER IX

THE CIVIC PATTERN

THE first operation in planning a city is to create the framework of the master city plan, in which the chief elements are an outline of the system of communications and a broad conception of land uses. Within this framework we have to embody existing neighborhoods or subdivisions, anticipate the needs and different characteristics of new or changed neighborhoods, and relate the main centers to existing and prospective sub-centers.

The organization and design of the main system of communications and land uses involve consideration of the basic factors and general principles discussed in the first part of this study. The application of these principles will be illustrated in this and succeeding chapters both by theoretical diagrams and by plans that have actually been carried out. As stated in Chapter I, theoretical diagrams are of benefit to illustrate ideas and stimulate imagination, but they may be harmful rather than beneficial if they are used as plans for specific application. The diagram, or the ideas embodied in any preconceived pattern, must always be subordinate to the practical considerations of the existing social and economic conditions, and of natural characteristics of site. Probably the greatest failure in city planning in the past has been in the matter of proper adjustment of theoretical conceptions of form and structure to social and natural conditions.

TRADITIONAL FORMS OF STREET PATTERN

Modern civic patterns of the formal type usually are imitations or adaptations of old ideas. This is certainly true of geometrically arranged street plans with their combinations of straight streets and rectangular blocks, of formal curves and circles; of spider-web shapes; of forms with predominatingly diagonal lines, occasionally creating hexagonal and other special shapes of block; of through streets and culs-de-sac; and of varied forms of axial approach and arrangement of vistas. The plans of ancient cities like Athens and Rome, of medieval cities like Rothenburg and Carcassonne, of Renaissance cities like Karlsruhe and Washington, of cities or towns of recent creation like Canberra, New Delhi, Letchworth, and Radburn, and of some of the most modernistic patterns and develop-

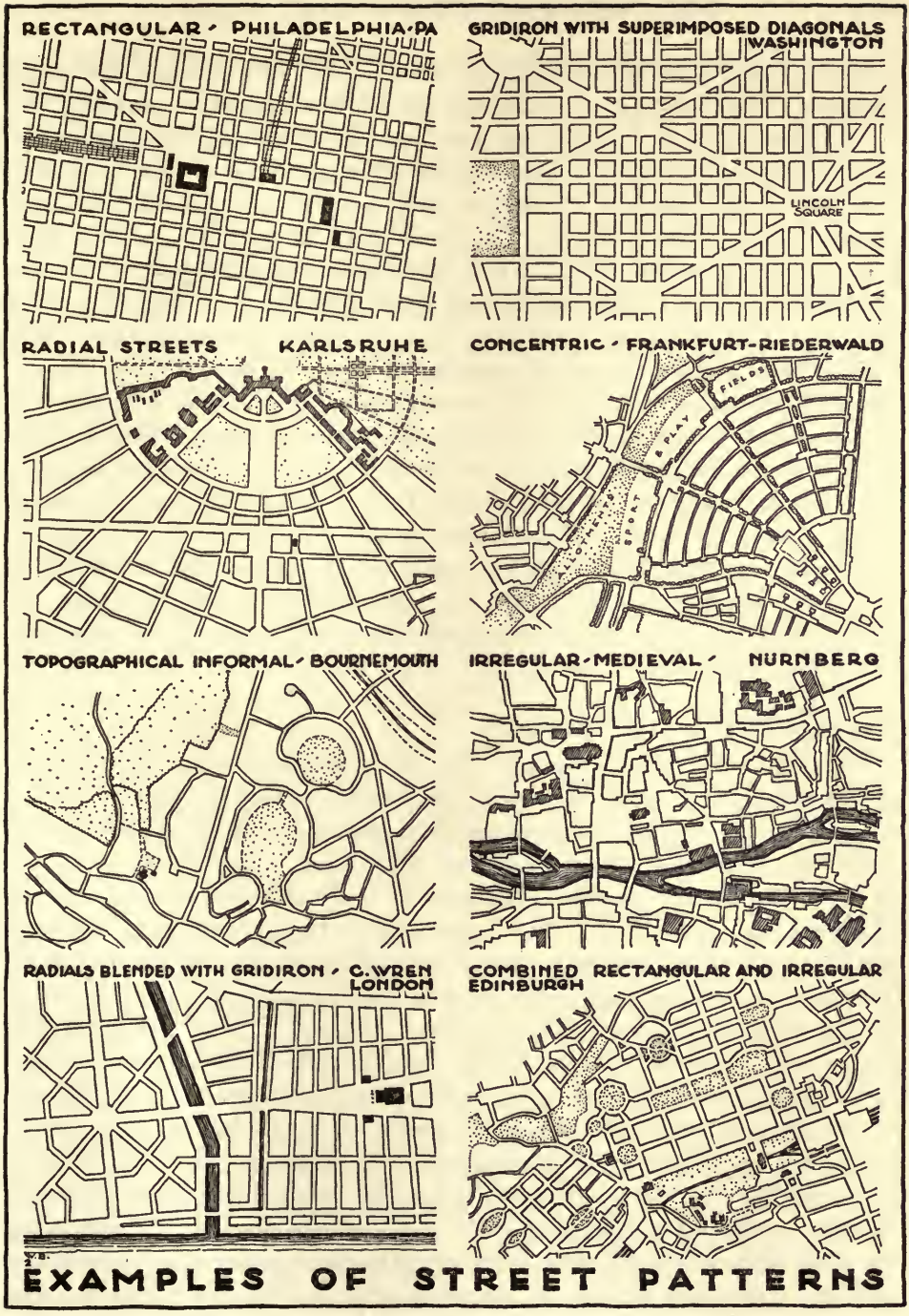

RECTANGULAR - PHILADELPHIA-PA
GRIDIRON WITH SUPERIMPOSED DIAGONALS
WASHINGTON
LINCOLN SQUARE
RADIAL STREETS
KARLSRUHE
CONCENTRIC - FRANKFURT-RIEDERWALD
FIELDS
& PLAY
SPORT
TOPOGRAPHICAL INFORMAL - BOURNEMOUTH
IRREGULAR - MEDIEVAL -
NURNBERG
RADIALS BLENDED WITH GRIDIRON - C. WREN
LONDON
COMBINED RECTANGULAR AND IRREGULAR
EDINBURGH
EXAMPLES OF STREET PATTERNS

FIGURE 8

ments, all show certain similarities, being based on principles that have guided the technique of the planners since cities have been planned.

Originality in such instances is to be found in detail, as, for example, in adjusting old forms to new conditions of time and place, or in approaching the organization of a design with a new concept of the functional arrangement of parts. In the modern large city that has been geometrically planned, adjustments have had to be made to meet unique problems of urban aggregation and concentration, to conform to new ideas and materials, and to arrange systems of transportation and traffic communications on two levels instead of one. In the field of informal design there is more scope for inventiveness in practice, and this has resulted in the incorporation of original features in many modern plans. This is in the nature of things when the informality is based on adapting a plan to a peculiar set of natural conditions. It is in informal landscape design that the opportunities arise for creating new forms: nature's variety forces these opportunities upon the designer. But all design is and will always be influenced to some degree by traditional forms, because these are the product of inherent tendencies that have influenced the mind of man in all ages.

EXAMPLES OF FORMAL PATTERNS

The accompanying diagram (Fig. 9) shows six types of pattern of street systems for small cities with one center. Probably no pattern has more merit as a general conception than that of the Roman Vitruvius, of which the plan of Palmanuova is an adaptation. Both these plans are superior to the rectangular plan and to the combined rectangular and diagonal plan in respect to the opportunities they present for relating a major center to subordinate centers of neighborhoods, and for combining the most convenient and logical arrangement of main lines of communication with a subordinate street system that can be kept comparatively free of through traffic. One of the chief merits of the Vitruvius design is the introduction of open squares between the diagonal thoroughfares.

In ancient times and during the period of the Renaissance, geometrical forms were allowed to dominate in city planning, although perhaps more respect was shown to topography as a subordinate element than is usually assumed. Examples from the Renaissance period commonly used for illustration are Mannheim, with its rectangular street system for the old town and formal radiating system in the new suburbs; and Karlsruhe, with its organized fan-shaped design of radiating arteries.

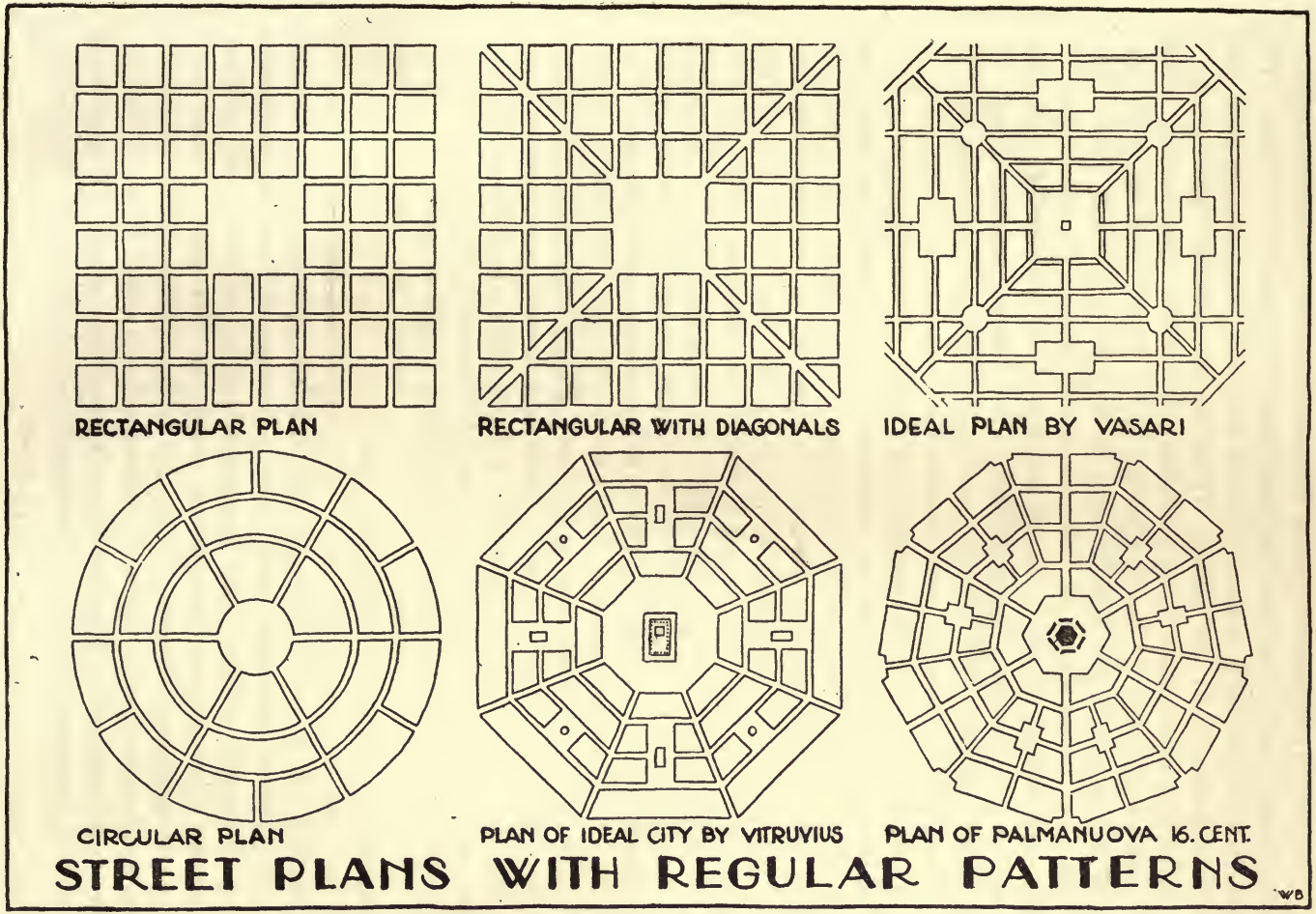

RECTANGULAR PLAN
RECTANGULAR WITH DIAGONALS
IDEAL PLAN BY VASARI
CIRCULAR PLAN
PLAN OF IDEAL CITY BY VITRUVIUS
PLAN OF PALMANUOVA 16. CENT.
STREET PLANS WITH REGULAR PATTERNS
WB

FIGURE 9

The general alignment of street systems in medieval cities was geometrical, although with less symmetry and more irregularity in detail. The pattern of Rothenburg is an example of this, with its encircling walls and radial approaches to the center. In so far as its streets are lacking in symmetrical arrangement, the probabilities are that this was the result of conscious effort to fit the plan to the site. The plan of old Moscow is another example of the combination of circular and radial lines. The picturesque irregularities of these medieval cities were due rather to variations in local details or in architectural treatment of buildings than to deliberate planning of irregularities in the general street systems. In the later Middle Ages strictly rectangular plans were made, as for example, that of Montpazier in southern France.

Probably it is correct to assume that L'Enfant, in making the plan for Washington, was dominated by preconceptions of geometrical forms that were then popular in the French school of architecture. But he made every effort to adjust his pattern to the ground by selecting dominant sites for public buildings and by adapting the lines of his diagonals to topography. He also suggested sufficient reservations of public open space to give his formal design a high degree of flexibility. Apart from his consideration of sites for public buildings, and of approaches, vistas, and prospects, he was probably little influenced by social purpose.

At a later period Frederick Law Olmsted made a different approach. He perceived, in a higher degree than any of his predecessors, the importance of subordinating the form of his designs to social needs and natural conditions. There is no example of a landscape plan applied to a complete city, but the Olmsted-Vaux plan of Riverside, Ill., is a good early example of a landscape plan for a residential neighborhood.[1]

TRANSPORTATION IN MODERN CITY PLANS

In making a city plan usually we have to recognize the existence of some facilities for transportation and industrial development, although provision for the extension of either may be one of the requirements to be met. In its widest sense, transportation may be defined as provision for movement in all forms, although it is usually restricted to mean long-distance transportation only. The part of the main system of communications that consists of harbors, railroads, and transit lines will usually have to be accepted as being determined, or at least as permitting nothing more than some adjustment. It will influence the design of a town more

[1] See pp. 237–240.

than the design will influence changes in the transportation system. The present static condition of the development of railroads and the great cost of making any considerable changes give them such a high degree of fixity that it would be futile to attempt any statement of specific principles regarding the remodeling of existing conditions.

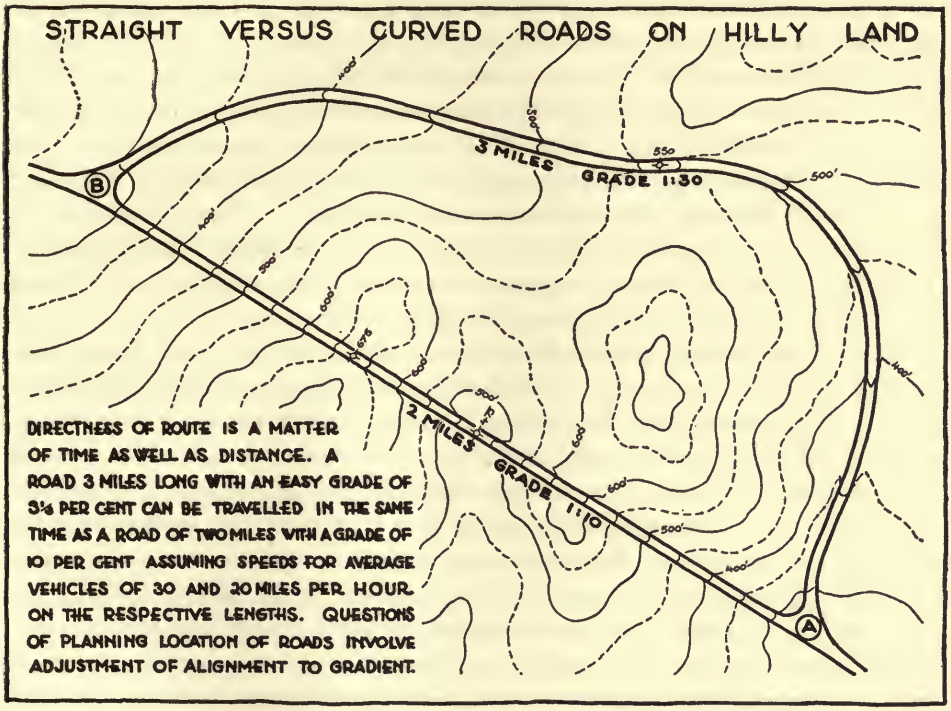


FIGURE 10

Main Thoroughfare Systems. To some extent also every urban area is served by existing main thoroughfares and these have to be incorporated in any plan. As a rule, however, the existing highway system can be changed more easily than an existing railroad system. A skeleton plan of the main thoroughfare system, comprising new highways and improvements of existing highways, should be prepared in advance of making a plan for the secondary street system, with the primary object of serving the needs of through traffic. Directness of route and ease of grade are essential elements to be considered in designing traffic arteries. In curving roads, what we lose in directness we may gain in ease of grade and thereby avoid danger going down, and grade resistance going up, steep hills. (See Fig. 10.)

Except at points of convergence at centers, highways providing for the main traffic flow between populous districts should not be nearer to each other than 1000 feet. Highways crossing such main highways should be at least half a mile apart unless carried over or under the intersections on separate levels.

The question of the width of the highway right of way can only be determined by special circumstances in every case. Usually it will be found desirable to make the principal arterial highway right of way 120 to 180 feet wide. Other principal highways, including main cross connecting roads, should be from 76 to 120 feet in width. The maximum social benefit can be obtained by keeping the land fronting on express highways as free from building development as is practicable. One of the reasons for the desirability of the parkway is that it has open land on both sides. An effort should be made to preserve at least occasional strips of open land on the frontage of all main thoroughfares.

The construction of service roads as constituent parts of main thoroughfares will be necessary where there must be access to buildings fronting on the thoroughfare but where the main traffic should not be interrupted. Service roads along main highways may be more costly than independent development roads separated from the main road by private property; but there are stretches of highway that are so valuable for building use that it pays to provide service roads, and these are also useful in providing facilities for ramping up or down to bridges or subways at intersections. There are costs incidental to the construction of combined express and service roads, including the cost of providing planted strips between them, that have to be added to the cost of the service road in comparing it with that of the separate development road. Estimates of these costs should be prepared and the pros and cons of the alternatives considered in preparing specific plans.

Every section of a main arterial road should be studied and planned so as to secure the combination of (*a*) the maximum use of the road as a freeway for through traffic and (*b*) the most economical building development or open use of its frontage. To satisfy both requirements the number of cross roads entering a main highway should be reduced to the minimum. The most dangerous collision points and the greatest hindrance to movement of traffic are road intersections.

The value of the frontage of main arterial roads is usually overrated. Such frontage is not very desirable for residence, except for apartment buildings with a deep building line or having an approach by a service

road; and only a small proportion of it is required for commercial use. Therefore the common practice is for great stretches of land abutting on arterial roads to be used for temporary structures, billboards, and other unsatisfactory developments.

While the method of developing the main highway as a combined traffic route and building street has proved to be a mistake in many instances, on the other hand it is impracticable to make all highways into freeways and prevent all building on their frontage. It will probably be found that limited lengths should be developed as at present with buildings abutting on their frontages, longer parts made freeways with no abutting buildings or right of access permitted, and other parts provided with parallel building streets, which we have defined as service roads.

Where an existing highway passes through a town it will be desirable, as a rule, to construct a by-pass road around the town instead of attempting to widen the street through it, thus enabling through traffic to proceed without the interruption of local traffic, and at the same time making the local street better able to cope with the local traffic. It is mainly from local traffic that the shops derive their custom, and when through traffic interferes with the convenience of shoppers it is injurious to trade. Although it will usually be found to be impracticable to prevent shops from being located on the frontage of main thoroughfares, the best locations for them are often just off these thoroughfares or on the principal secondary streets, some of which should be specially designed for business use. When they are located on main thoroughfares, the important thing, as we have already indicated, is to provide special service roads to separate local from through traffic.

Probably from a third to a half of the patrons of stores in business districts use private transportation by automobile.[1] These patrons require space for parking as near to the stores as practicable. It is advisable to provide, in addition to space within the street area, special parking places either on reservations between service roads and through roadways, or in bays between buildings. The use of the street space on the immediate fronts of stores should be limited to cars stopping for short periods.

In planning new thoroughfares it is generally desirable to reserve sufficient width of space for their ultimate requirements and not to depend on future acquisition of private land, even when the latter consists of front yards on which building has been prohibited. Numerous

[1] See A. H. Johnson, "Functions of Municipal Government which Affect Business and Industry," in *Harvard Business Review*, Jan., 1927.

complications are likely to arise in acquiring open land in front of buildings, once private uses of this open land have been permitted for any lengthy period.

The percentage of an area that should be reserved for the main highway system will vary in every district. It is not a matter that can be determined precisely on a percentage basis in a specific area, although space requirements for highways, including parkways as distinguished from local streets, may be calculated as from 10 to 15 per cent of any large urban district. This part of the open area of a district is often ignored in calculations that are made as to the percentage of area required to be left open for public space.

Parkways.[1] Parkways that are intended to be used for through traffic should be planned as an integral part of the thoroughfare system; and their position and layout have to be considered in connection with both the general highway system and the park system. Other parkways are more strictly drives through parks, and as such, they are the most appropriate type of approach to and through residential districts.

It is of special importance that parkways should follow the existing levels of the land, as far as is practicable, so as to secure conformity with natural conditions and the consequent attractiveness of a landscape setting. When they run along the bottom of river valleys or ravines, the abutting land is usually of the least suitable character for building and the most attractive for open reservations. In such depressed locations the parkways may be economically bridged over for cross-valley connections, thereby connecting the natural levels of the higher land on the sides of valleys.

Since the frontage of parkway roads is not to be used for building development, there is no object in adjusting their alignment to the levels of abutting land, and it is therefore practicable to arrange for easy grades and curves and to avoid excavation and filling of soil that impair the natural amenities. The park fringe on each side of such a road should not be less than 100 feet wide and should be increased up to 1000 feet or more where this is needed to preserve natural beauty or to provide space for recreation.

The construction of a parkway through districts where development of a residential character is anticipated provides attractive settings for

[1] A description of parkways, their character, uses, and value, is contained in *Regional Plan of New York and Its Environs*, 1929, Vol. I, pp. 269–286.

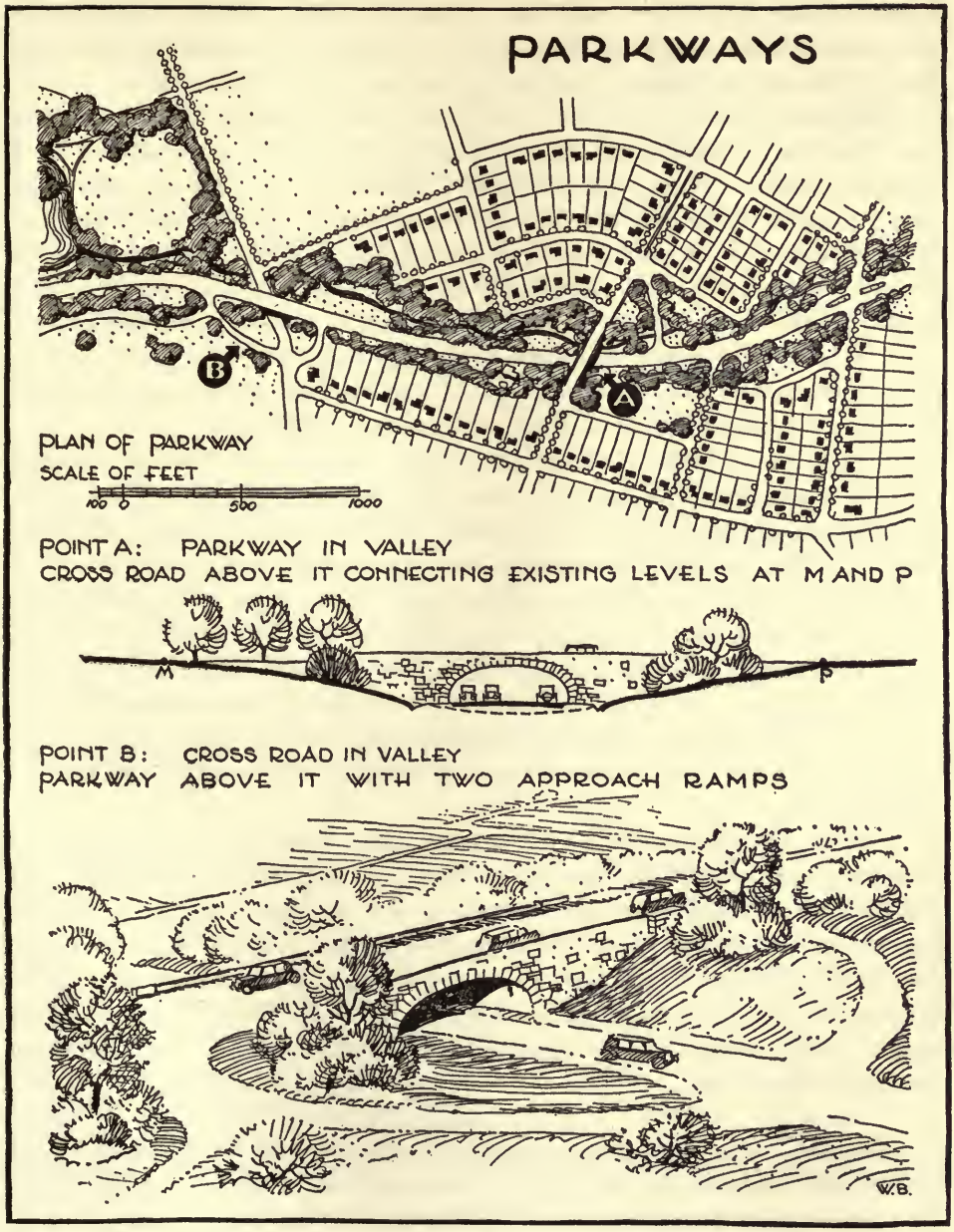

PARKWAYS
B
A
PLAN OF PARKWAY
SCALE OF FEET
100 0 500 1000
POINT A: PARKWAY IN VALLEY
CROSS ROAD ABOVE IT CONNECTING EXISTING LEVELS AT M AND P
M
P
POINT B: CROSS ROAD IN VALLEY
PARKWAY ABOVE IT WITH TWO APPROACH RAMPS
W.B.

FIGURE 11

houses along the outer edges of the park strips. These strips act as cushions between the residences and the highway in lessening the objectionable noise, gas fumes, and dust produced by through traffic.

Parkway roads should not have roads entering them at intervals of less than half a mile, and all main cross thoroughfares should be on a separate level. Traffic on parkways should be limited to passenger vehicles, as in the case of the existing Westchester parkways, but this may be understood to include busses of special types. The roadways should be wide enough, but no wider than necessary to take four lanes of fast through traffic plus two lanes of slow traffic. At least for occasional stretches, it will usually be found expedient and an aid to good appearance to have the roadways divided by park strips, each separate route being wide enough for three lanes of one-way traffic.

There are advantages from an economic point of view in running parkways parallel with railroads used for passenger traffic. The points where main roads overpass such parallel parkways and railroads are often appropriate locations for railroad stations and adjacent business centers.

It may sometimes also prove desirable to construct a parkway near and parallel with an existing highway in preference to widening the highway. In some localities having large open areas of back land, the construction of a new parkway and park reservation with an average width of 500 feet on the back land will actually be cheaper than widening an existing highway, both in respect to cost of land to be acquired and cost of construction.

A new parkway should be far enough away from an existing highway to occupy comparatively cheap land, but near enough to drain passenger traffic from the highway and thereby give more space on the latter for movement of trucks, local traffic, and parking. Foot and bridle paths should be provided in the park areas adjoining the parkway roads. Filling stations or garages should be permitted only in special places at intervals of about five miles, and should be required to conform to prescribed standards of design.

Airports. Under modern conditions special provision must be made in the civic pattern for open areas to be used as airplane landing fields. The appropriate location for airports is outside the main centers but in convenient relation to the focal points of the railroad and transit systems. Theoretically, they should not be too far from the center to be reached in ten or fifteen minutes by vehicular transportation, or, say, two miles;

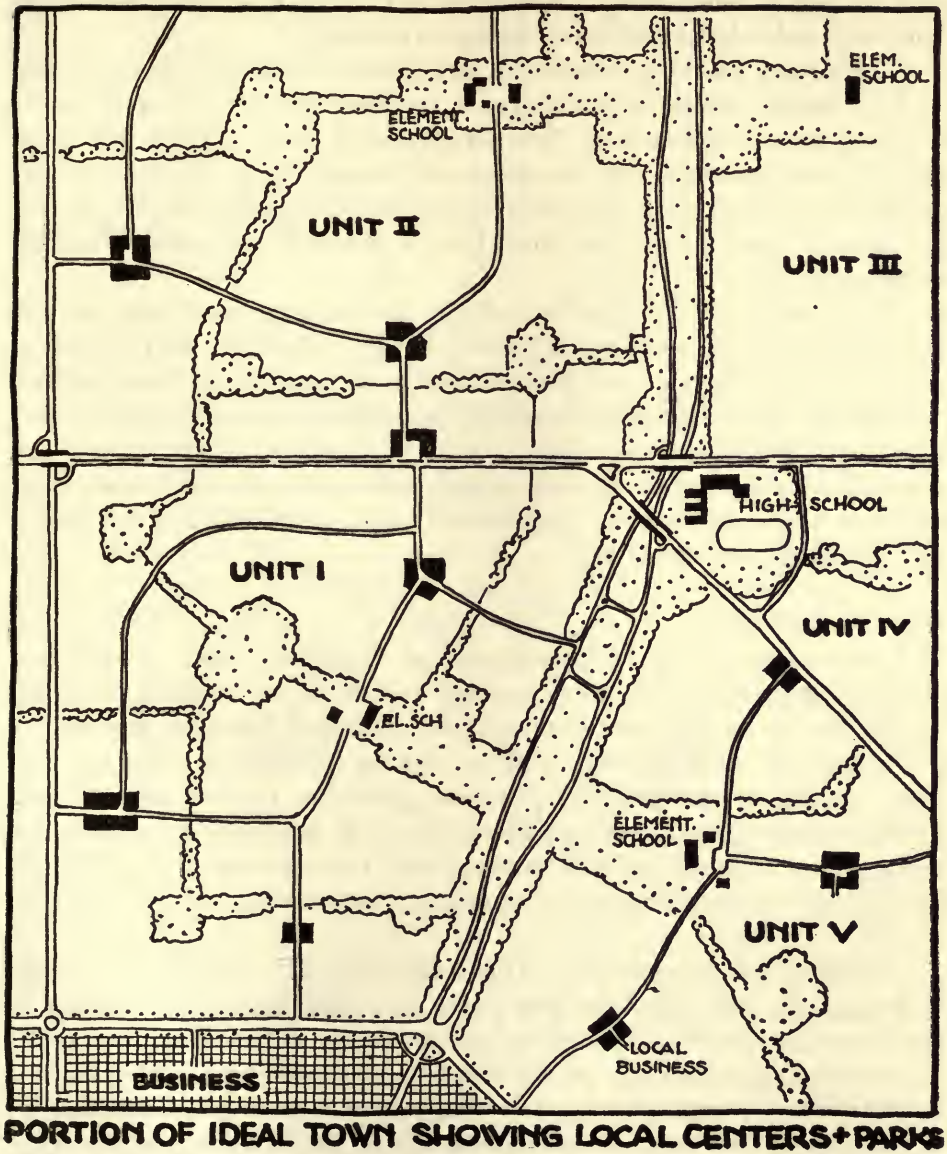

ELEM. SCHOOL
ELEMENT. SCHOOL
UNIT II
UNIT III
HIGH SCHOOL
UNIT I
UNIT IV
EL. SCH
ELEMENT. SCHOOL
UNIT V
LOCAL BUSINESS
BUSINESS
PORTION OF IDEAL TOWN SHOWING LOCAL CENTERS + PARKS

FIGURE 12

but actually the determination of their location will rest less on any principle of convenience than on the determination of where sufficient open land of suitable level and surroundings is available.[1]

The airport has to be considered in relation to land utilization as well as to transportation. It comes in a special category of open space devoted to transportation. The existence of such a field will have the collateral advantage of providing additional "lung" space to a city, although it cannot be regarded as supplementary open space for recreation except, perhaps, in the sense that it provides certain sight-seeing attractions.

Anticipating what follows regarding the use pattern, I may remark that the zoning of the surroundings of airports should be carried out so as to prohibit industrial uses that pollute the atmosphere and also heights of building that might add unduly to the difficulties of approach to and departure from the landing field. Neighborhoods in which airports are established will tend to become mixed industrial and residential, with light industries auxiliary to the transport services and middle- and lower-class housing predominating.

THE USE PATTERN

The land uses of the city comprise (*a*) the public uses, *i.e.* the sites of public buildings, community centers, and the areas devoted to parks, and (*b*) the group of private uses, chiefly residence, business, and industry, which are usually dealt with by zoning regulation. The farm or truck garden in the environs of cities is another type of private use. Before considering these two groups of uses it is desirable to consider the arrangement of neighborhood sections and the location of appropriate focal points for centralizing the community activities.

Neighborhood Sections and Their Centers. The network of main thoroughfares will divide an urban area into sections. Park systems in the civic pattern may be equally influential in determining the sizes, boundaries, and character of the neighborhood divisions, although the neighborhood arrangement may in turn influence extensions and changes of the park system and will always determine the location and distribution of the small local parks and playgrounds.

[1] See Henry V. Hubbard, Miller McClintock, and Frank B. Williams, *Airports: Their Location, Administration, and Legal Basis*, Cambridge, Harvard University Press, 1930, pp. 5–19. (Harvard City Planning Studies, I.)

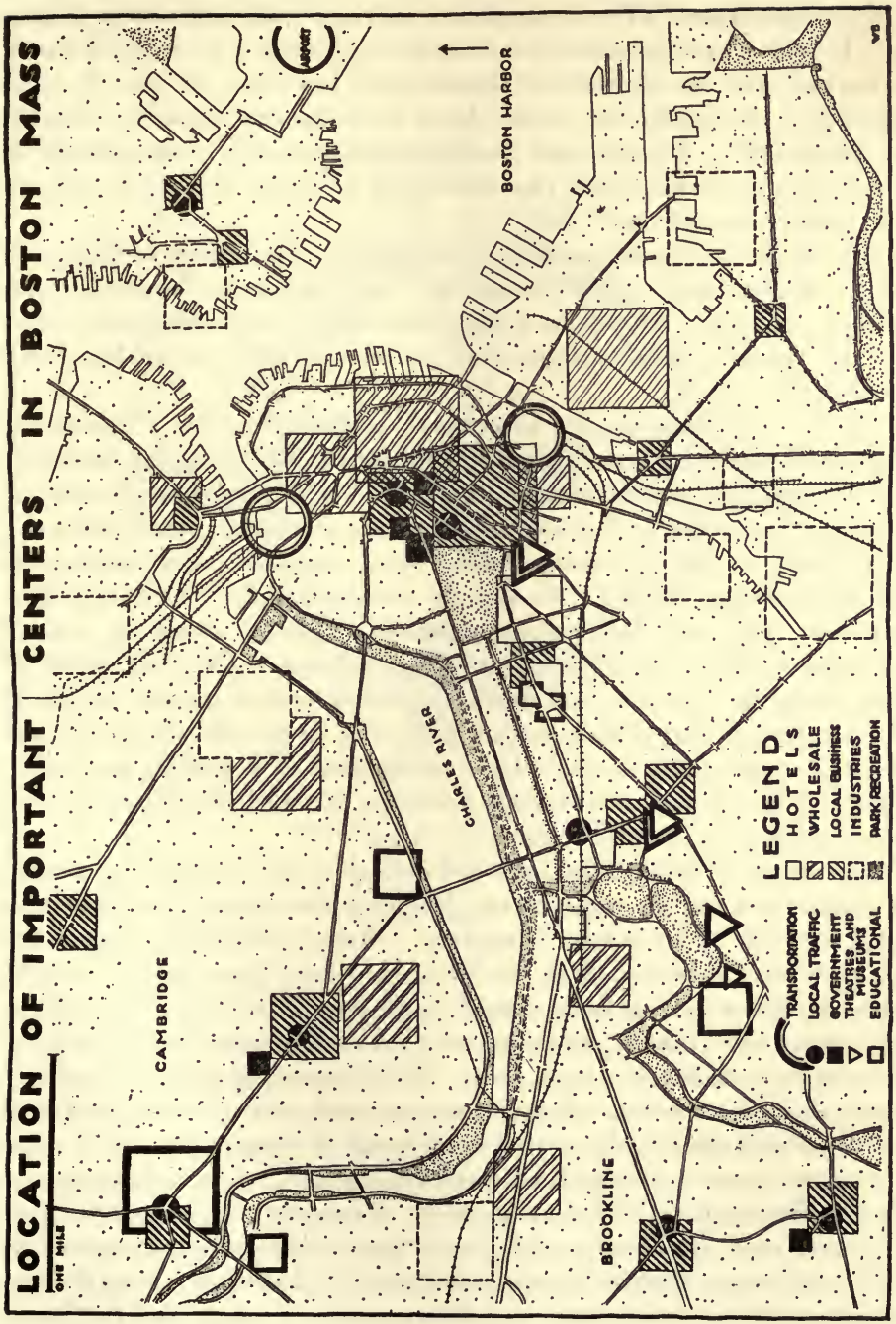

LOCATION OF IMPORTANT CENTERS IN BOSTON MASS
ONE MILE
CAMBRIDGE
CHARLES RIVER
BOSTON HARBOR
BROOKLINE
LEGEND
HOTELS
WHOLESALE
LOCAL BUSINESS
INDUSTRIES
PARK RECREATION
TRANSPORTATION
LOCAL TRAFFIC
GOVERNMENT
THEATRES AND MUSEUMS
EDUCATIONAL

FIGURE 13

No neighborhood will be complete that is devoted exclusively to one use. It may be predominantly industrial but should have some housing for workers and an appropriate allocation of business. It may be predominantly residential but should have some lighter industries and its business district. Ideally, each neighborhood should be large enough to provide the optimum child population for a school and to permit of some organized community life.

Two major considerations will determine the focal centers of neighborhoods: the topography and the points of convergence of the local transportation systems. In recent generations cities have tended more and more to recentralize themselves and to increase and strengthen their sub-centers.

This is illustrated by the accompanying diagram (Fig. 13) showing the distribution of centers devoted to transportation, industries, business, cultural facilities, and recreation in part of the metropolitan district of Boston. The harbor and later the main railroad centers determined the development of the old town. As the town extended, local transportation centers were created. In the old center the chief industries that remain are wholesale distributing warehouses. Other wholesale centers and industrial areas have grown up in the environs. The chief center of government and the principal business centers have remained stabilized between the two major transportation centers, while sub-centers of local government and business have been established at Brookline and other points. Cultural and recreational facilities are well distributed in the areas outside the oldest settlement.

The residence areas, which are not indicated on the diagram, occupy the greater part of the area of the Metropolitan district and are integrated with the whole system of centers. Many residential communities also have been established in the environs where there are convenient transit facilities. To a large extent these dormitory towns depend for their existence — that is, for means of livelihood for their inhabitants — on the industries in the central area. This diagram illustrates a manner of growth, a distribution of urban centers and uses, and combinations of new and old developments that are typical of modern cities.

Looking back to the days of small cities, one finds a high degree of organization applied to the development of centers. This was particularly so in Greek and Roman cities, with their public buildings connected by colonnades and grouped around open spaces. Later there were the formal plazas of the Renaissance, and the opportunities provided in Vienna

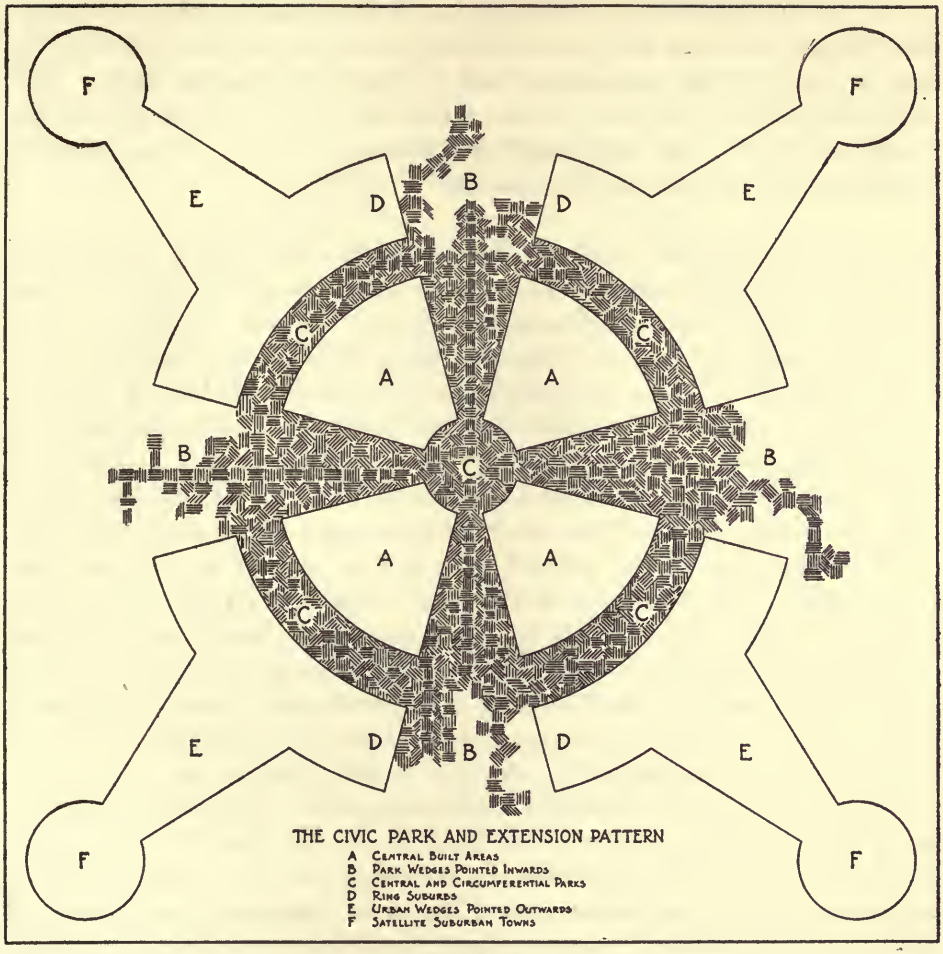


FIGURE 14

and other cities for developing the sites of open fortifications as inner ring highways, to which nothing corresponding exists in American cities.

In city planning, as a rule, it will be found desirable to group public buildings devoted to administrative uses in one center. College, museum, and art buildings may be combined with the administrative groups when spacious sites are available, but it may be more appropriate to have distinct centers for the major buildings devoted to cultural activities. Schools for younger pupils will be naturally segregated from other public buildings and located in residential areas. Administrative and cultural institutions should be separated from fire stations, theaters, and stores.

In recent decades the concentration of buildings devoted to amusement in central areas has not continued to increase in proportion to the growth both of the population and of the theater-going habit. The moving-picture theater has become a feature to be reckoned with in the design of every large residential neighborhood where its appropriate location is in the local business district.

The General Park System. Theoretically, the larger open areas devoted to uses of pleasure and recreation should be of two types of shape and should be equably distributed throughout the area of the city. The first type should consist of wedges between different sections with their points directed towards the center, and the second, of belts or girdles. This dual arrangement is illustrated by Figure 14. The open areas of both types should be coördinated with the thoroughfare system and provide some sites for parkways as part of that system; at the same time, they constitute the best form of division between the various use areas.

The total area of the general park system should not be less than 10 per cent of the total area of the city. Above this limit it may vary according to the density of the building, on the one hand, and the extent of additional open area provided in neighborhood parks on the other hand. The combined area devoted to major highways and public parks should be 20 to 30 per cent, or from two to three fifths of the total of 50 per cent of city area that should be devoted to public open uses.

In practice, there is both less likelihood and less desirability of securing a formal arrangement of parks than of streets in a city. The areas for parks should be selected on the principle that the most attractive natural scenery should be preserved for scenic parks and the most level sites for athletic fields. As a rule, land that is least suitable for building, such as a wild rocky ravine, is most attractive for park purposes. But even while respecting topography, the planner's primary attempt should be to provide a well-distributed system of wedge and girdle parks.

The influence of the park system on the character of the development and on the maintenance of property values may be great or small, depending upon how well the parks are selected, arranged, and designed. Usually neighborhoods that have no parks are most susceptible to deterioration. It is of interest to note from an investigation made by the Committee on Land Utilization of the New York Building Congress that the property nearest the parks in the Borough of the Bronx had the highest rentals even when most distant from the occupational centers.

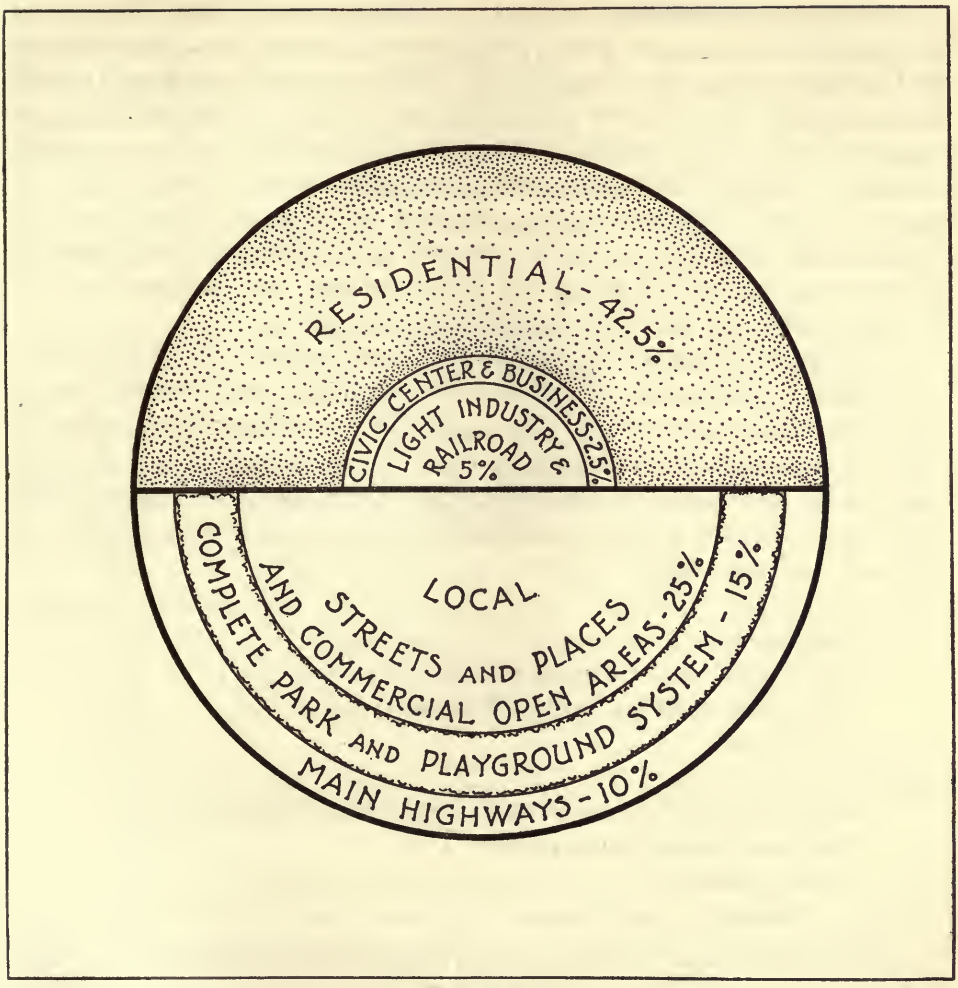


FIGURE 15

The lowest-rental property was in the neighborhood of mixed uses nearest to Manhattan. The advantage of geographical proximity to the main center was offset by the undesirable conditions created by mixed uses and absence of parks. The highest values existed in the Riverdale and Pelham Bay sections, which were interspersed by parks and parkways and more homogeneous in their development. The lowest rentals per family were for houses on the river front which, under proper control of the uplands and outlook, should have provided the most choice locations.[1]

[1] New York Building Congress, Committee on Land Utilization, *Research Bulletin 3*, Oct., 1933.

Percentage Distribution of Uses. Probably no city has been zoned completely in accordance with a preconceived pattern of use distribution. In University City, Mo., large areas were developed in conformity with a zoning plan,[1] but as a rule zoning has been applied almost entirely as a corrective measure to prevent undesirable changes and not as an agency in creative design. The same is also true to some extent where completely new cities have been developed, although the designs of such modern communities as Radburn in this country and Letchworth and Welwyn in England, have been based on predetermined use patterns and on principles affecting uses and densities of building.[2]

No definite standards of use allocation and distribution can be taken as a guide for all cities; but it will be of interest to set forth a rough approximation, based on study of conditions in existing communities, of what are reasonable percentages to allow in the zoning pattern of a predominantly residential community. The accompanying diagram (Fig. 15) takes a square mile of area and indicates proportions allotted to different uses as follows:

Buildable Areas	Percentage of Total Area
Residential	42.5
Civic center and business districts	2.5
Light industrial and railroad property	5.0
Total	50.0
Open Areas	
Local streets and places, and commercial open areas	25.0
Park and playground system	15.0
Main highways	10.0
Total	50.0

Any pattern based on these proportions would probably give a satisfactory result for a complete community; but as every town differs in its requirements, neither that which is theoretically ideal nor that which has proved to be practically sound in any one case can be taken as an unalterable basis for constructive zoning regulation. At the same time, such studies and speculations have their value for guidance in design.

A Skeleton Diagram. What is meant by a skeleton plan for a town is shown on the accompanying diagram (Fig. 16). This illustrates the four main elements to be considered in such a plan: the main distribution center, the general thoroughfare system, the general park

[1] See Harland Bartholomew's *Urban Land Uses*, frontispiece. [2] See pp. 248, 252–254.

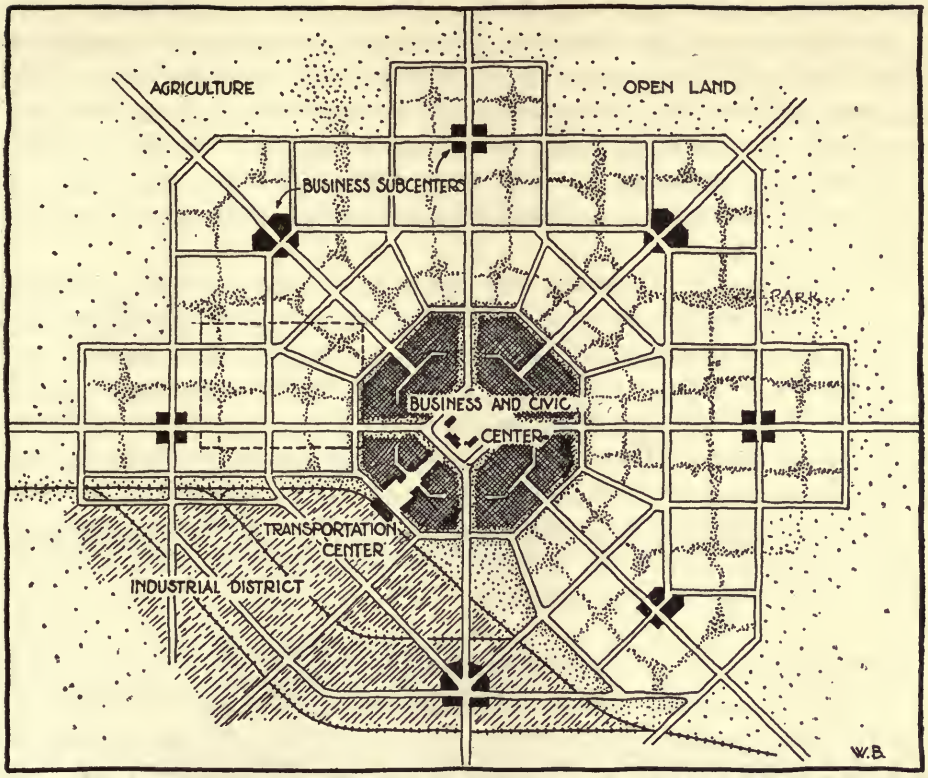


DIAGRAM OF IDEAL TOWN PATTERN OF NEIGHBORHOOD UNITS

FIGURE 16

system, and the principal community center and sub-centers. The sub-centers are located at the focal points of residential sections or neighborhoods. Seven diagonal thoroughfares connect the town center with the environs, and a broad avenue connects the transportation with the civic center, around which the main business district is developed.

Connecting roads are designed to cross the radial thoroughfares at right angles and make adequate provision for intercommunication between districts and by-passes for diversion of through traffic. The sectional areas between these main thoroughfares should comprise from 160 to 200 acres and be planned in detail, with secondary and minor streets carefully adjusted to topography and so designed as to discourage through traffic from using them.

The residential and main business parts of the town are shown on one side of the railroad and the industrial district on the other. Part of the

latter could be developed with homes for workers in the industries. The residential parts of the town are divided into six sections or neighborhoods, each with its sub-center for focusing local community life. The planning of these neighborhoods should be dealt with as a problem distinct from the planning of the general civic pattern.[1] In neighborhood or subdivision planning we deal more intimately with the details of topography and with development in blocks and lots than in making skeleton plans of cities.

In the practice of making city plans for new areas many planners seem to be too much influenced by the motives of making the zoning rigid and the street arrangement symmetrical on paper. This rigidity and symmetry may suggest order, but it is order of the mechanical type in which, as a rule, proper consideration is not given to natural conditions and social changes. There is also a mistaken tendency to elaborate general plans of large areas in too much detail and for too distant or indeterminate a future. All possible concentration of effort is required to work out the main lines of development, and successful realization of a plan depends on this concentration.

LIMITS AND SHAPES OF CITY EXPANSION

Many have argued that it is desirable to limit the sizes of cities. In his original proposals for building "garden cities" Ebenezer Howard specified 30,000 people as the ideal size for a self-contained town,[2] but later conceded that 100,000 was the desirable limit. Viscount Bryce and some American city planners have suggested similar definite limits.

It is obvious, however, that limitation of size would be ineffective in promoting improved civic conditions without planning and organization of the development. And if large cities, even up to the sizes now existing, were properly planned and organized, the need for artificial limitation would not exist. Howard conceived that groups of garden cities could be developed in one locality with permanent agricultural areas between them. Each city would in effect be a neighborhood section in a metropolitan region with combined urban and rural areas.

In any event, the question of size of particular cities is secondary to the questions of planning and organizing the urban and related rural areas within them so as to secure a healthful and efficient arrangement. There is no reason, apart from custom and artificial necessities, why the

[1] See Chapter XII.

[2] *Tomorrow*, London, Sivan Sonnenschein & Co., Ltd., 1902, p. 31.

largest metropolis should not have its open belts or wedges to secure a proper apportionment of urban and open areas. The need of this is one of the justifications for the reservation of not less than 50 per cent of the area of cities as public open space in the form of streets and parks.

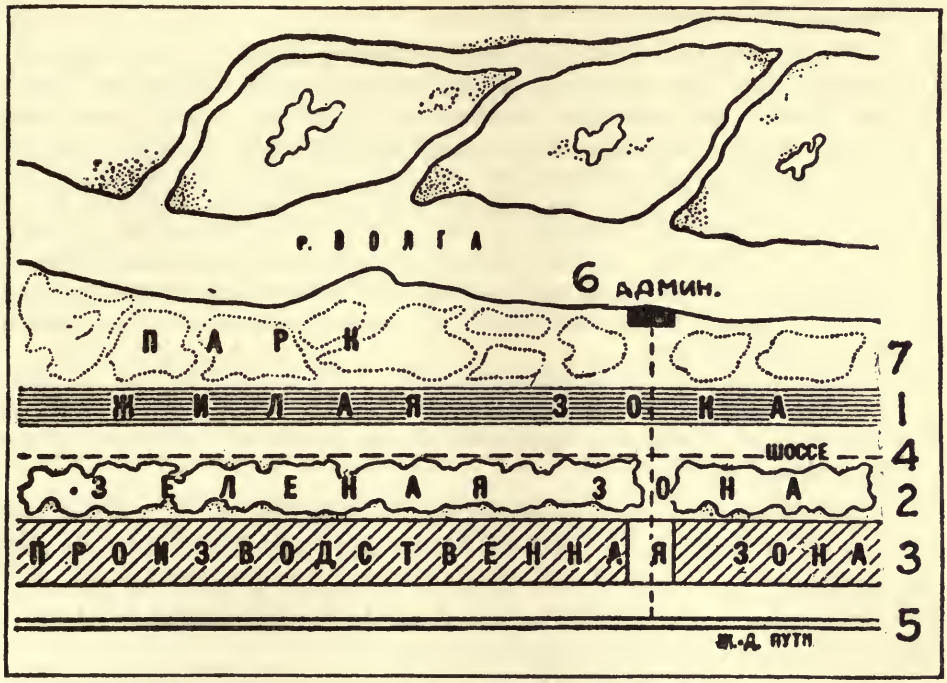


FIGURE 17. A RUSSIAN SCHEME FOR A LINEAR TOWN

Key: 1. Residential zone; 2. Green belt; 3. Industrial zone; 4. Heavy traffic; 5. Railway; 6. Town administration; 7. Parks and social centers.

Linear Patterns. Howard conceived cities as conforming to the shape of a circle; and in this chapter I have been considering the civic pattern as relating to some circular or square form. A linear form, or the development of urban strips along two sides of a main artery, has also been suggested partly with the idea of securing limitation of size by confining the city to narrow dimensions, with an open hinterland on its longitudinal edges.

There is more to be said in favor of planning linear extensions of existing cities than of laying out new towns in linear form, as is being proposed in Russia. Mr. Berthold Lubetkin, in an address on planning in Soviet Russia,[1] stated that the policies being pursued in that country were

[1] "Town and Landscape Planning in Soviet Russia," in *The Architectural Association Journal*, Jan., 1933, pp. 186–192.

directed to secure, *inter alia*, decentralization of industry, more disurbanization of towns, and greater urbanization of the country. It was conceived that this object would be better attained by building linear rather than concentric cities.

Mr. Lubetkin said in part:

> The theoricians of disurbanisation suggested building new agglomerations along the network of main roads. "We must not have concentrated and unhealthy habitations" they say, "but throughout the country endless streams of human dwellings along the big arteries of contemporary life, joining our centres of industry and agriculture."
>
> It has been decided that wherever local, topographical and other conditions allow it, industry must be stretched out along railway lines. . . . Parallel to this industrial zone and separated from it by a belt of vegetation of not less than 500 metres wide, runs the zone of habitation including buildings of a social character, restaurants, crèches, schools, etc.
>
> We thus see that the adopted policy, although rejecting the idea of linear distribution of the whole population over the country, yet sanctions the principle of such distribution in so far as plans of towns themselves are concerned.

It is difficult to see how the objects of decentralization of industry and of promoting more unity between urban and rural life can be secured any better by linear strip towns than by towns in concentric forms. Yet the idea has some plausibility behind it, because of the extent to which it utilizes the major lines of communication.

The original proposal for the linear type of city was made in 1882 by Don Arturo Soria y Mata of Madrid in a series of articles in *El Progreso*. He recommended the building of a linear city (La Ciudad Lineal) in strips along both sides of an arterial highway 160 feet in width. Services of railroads, trolley lines, and public utilities were to be provided, and provision was to be made for widening of the urban belt wherever cheapness of land or topographical conditions rendered this propitious. Soria y Mata argued that a main thoroughfare should be the axis or spine of the city organism. The Compañía Madrileña de Urbanización was formed to undertake such a project, and between 1894 and 1896 constructed a section of a linear city about three miles long between the Aragón highway and the fir forest at Chamartín.[1]

[1] See Compañía Madrileña de Urbanización, *La Ciudad Lineal: Fórmula Española de Ciudad Jardín Como Sistema de Arquitectura de Ciudades y de Colonización de Campos*, Memoria presentada al XIII Congreso Internacional de la Habitación y de Urbanismo, Madrid, Imprenta de la Ciudad Lineal, 1931.

In harmony with the proposals of Soria y Mata, the Compañía Madrileña de Urbanización has suggested that the extension of cities should take the form of wide "ribbons" of built area with cultivated or forest belts on either side.

It was claimed for the linear form that it would assist in securing proximity of urban populations to agricultural land and thereby assist in agricultural production; and that satellite towns should be linked with metropolitan centers by linear city developments. For example, definite proposals were made to connect existing concentric cities with linear cities, thus leading to the creation of a network of triangles, with their apices being formed by the old towns, and their interior spaces being used for industry and agriculture.

There are places away from the edges of cities where some type of linear development cannot be avoided and may be entirely satisfactory. A small-scale example of this kind may be found in the village development at Niagara Glen Heights in Ontario. This plan is for a long strip between a railway and a parkway. No effort was made to make one community center for the whole area. It happened that two classes of residents had to be provided for, and two distinct centers were projected, thereby creating in effect two villages in the one longitudinal area.

The Practical Pattern of Extension. Abstract considerations of sizes and shapes must be modified by practical conditions. One cannot conceive circumstances arising in the average country that will justify definite restriction of urban growth beyond certain boundaries, either in the case of circular or strip cities. A city is a growth, and while the manner of its distribution should be controlled, precise limits cannot be placed on its extension. Beyond a certain circumference, the existing city throws out swellings of suburbs about its periphery and long tentacles of suburbs along the sides of its radial thoroughfares, railroads, and transit lines. In places its tentacles swell into roughly concentric form and become what we call "satellite" towns.

Which of these forms of expansion are we to consider as most or least desirable, and how can we control their unsatisfactory features?

Growing cities will always swell around their circumference and *prima facie* one accepts this as a logical form of expansion, only requiring control by planning and organization of new sections to make it a desirable form of growth. The important thing is that these additions should be planned either to provide proper extensions for existing neighborhood

sections or form nuclei for new sections in which some degree of local community life will be generated. When one considers the dependence of the modern large city on its system of communications, however, the most logical form of expansion, from an economic point of view, is the much condemned projection of urban growth in attenuated "ribbons" along the radial lines of communications. Here, too, the solution of the problem would seem to lie rather in control by planning and organization than in attempts to restrain an inevitable process.

In some cases satellite towns are separated from the metropolitan city by open country, but by their very nature they depend on transportation to and from the central city, and this means that they are usually linked with the center by "ribbons" of urban growth. Whatever objection there may be to the character of the developments which take place in either of these forms, the forms themselves would seem to be too much a part of natural processes of city expansion to be easily changed. Raggedness and incompleteness are incidents of rapid growth wherever it occurs, and are associated with all shapes of developments.

Although we should always attempt to give some redirection to the existing forms of urban growth by planning the system of transit lines and highways so as to encourage more circumferential development in the environs of cities, yet it is pertinent to ask whether the tentacle form which suburban growth now takes is so inherently wrong that attempts need to be made to arrest it. The answer surely is the one already given, namely, that existing linear developments are wrong only because their planning is neglected, not because of their forms *per se*. They need to be planned and surrounded or interspersed with parks and parkways.

The ideal pattern for the extremities or extensions of a city is the one which most logically extends the pattern followed in its central areas. As a framework of communications the pattern will combine radial and circumferential lines to facilitate the outward march of urbanism in rings on its boundaries and in wedges that penetrate into the surrounding country. As a pattern of land uses it will provide for well-balanced distribution of industry, residence, and open areas, in harmony with the pattern of ways of communication. It will give opportunities for the creation of different shapes and types of community neighborhood. As a skeleton its arrangement will conform more to the spider web than to the checkerboard or the attenuated gridiron, although in its possible applications it must be subordinate to the requirements of nature whatever its geometric pattern.

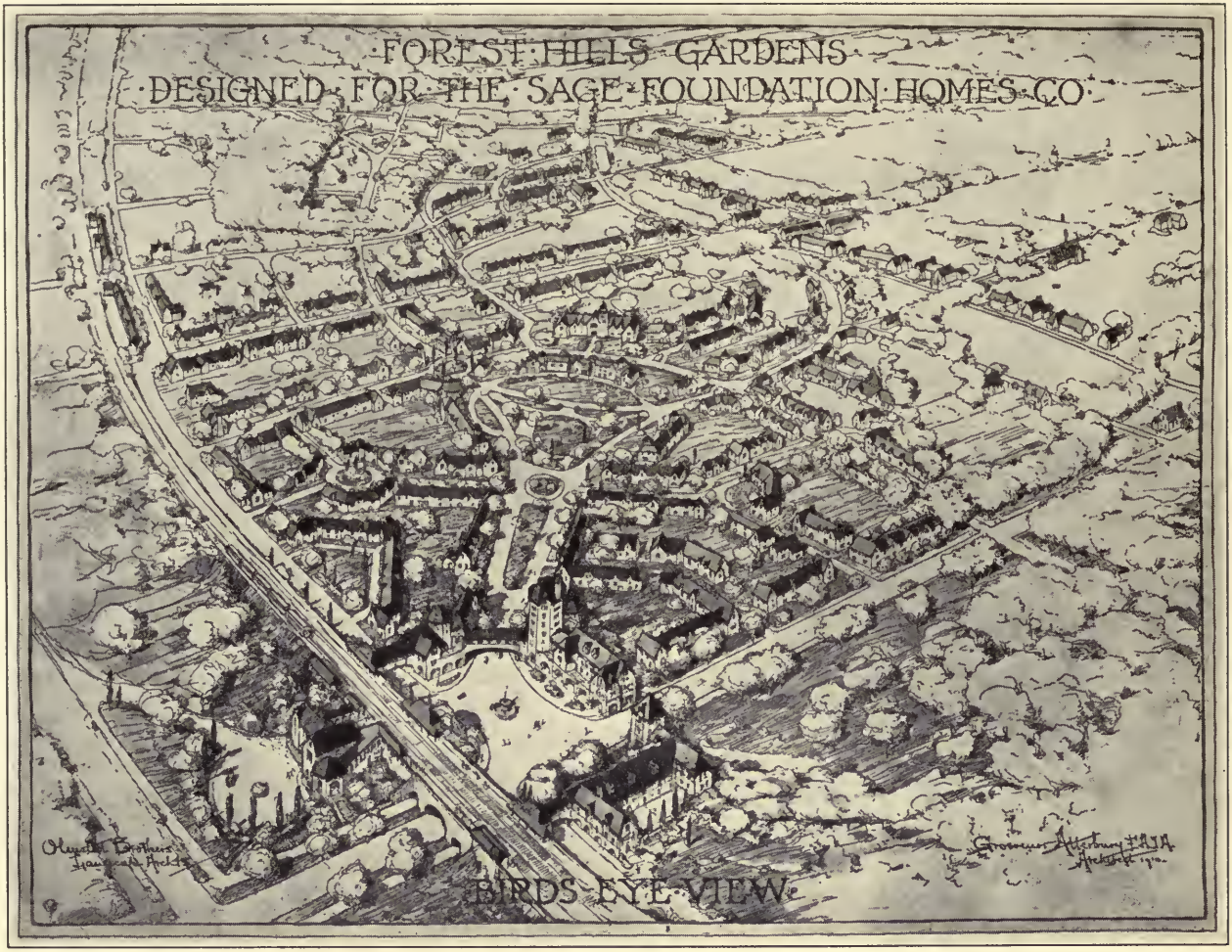


PLATE VI. FOREST HILLS GARDENS, NEW YORK.

(*See page 240.*)

CHAPTER X

ELEMENTS IN THE NEIGHBORHOOD PLAN

WHERE it is practicable to plan in logical order, the planning of neighborhoods should be the final operation after the broad planning of the city and after a study of the constituent elements of both the city and the neighborhood. Thus, having considered the general outline or civic pattern, we should proceed to the consideration of the elements of street, block, and lot, and work backwards to the neighborhood plan. This process of working first from the general to the particular and then returning to the consideration of intermediate problems is the most logical in city planning, although it is only fully practical in the case of new communities. In replanning existing cities we have to be content with superimposing a master plan on an uncoördinated system of subdivided areas, with their predetermined conditions in regard to street layout and arrangement of lots. Whatever the circumstances, however, the plan of the neighborhood is, in one aspect, subordinate to the general plan of the city and, in another aspect, is a composition of elements that need to be studied beforehand. When the study of the neighborhood is reached, certain of its broader aspects will have received consideration in the master plan. Thus the major systems of transportation and public parks in the latter will have determined the general boundaries, the broad distribution of uses, and the appropriate location of centers in the former.

The chief objects in making the study of the design of a section of the city *after* the study of its constituent parts are that proper emphasis may be given to details, that peculiar local circumstances which give character and variety to design may be taken into account, and that the costs of different arrangements of building area and street may be ascertained in advance of completing the neighborhood plan.

The four chief elements to be considered in the design of neighborhoods will now be referred to in the following order:

(1) Major and minor local streets and the related drainage and sewerage systems.

(2) Precise zoning of districts and organization of local centers.

(3) Sizes and distribution of permanent open areas.

(4) Sizes and shapes of blocks and lots.

All the related matters affecting streets, drainage, zoning, centers, recreation spaces, blocks, and lots, should be considered separately and in combination. It is essential repeatedly to work out the coördination of the physical layout with zoning proposals.

The aims and effects should be to secure: the best economic use of the land in different situations; the proper apportionment of costs of local improvements to the value or cost of raw land and to cost of building; the orderly spacing, grouping, and arrangement of buildings; a convenient and economical arrangement of streets to permit of ease and rapidity of movement for both vehicular and pedestrian traffic and to provide rights of way for public utilities and drainage; the preservation of agreeable natural surroundings about homes, and the provision of safeguards against future introduction of offensive uses in residential areas; the provision of adequate and properly distributed spaces for recreation; and the proper location of public and semi-public buildings in relation to the tributary population.

MAJOR AND MINOR LOCAL STREETS

In making a neighborhood plan, the major thoroughfare and principal connecting street system, and the main drainage and sewerage systems, have to be regarded as predetermined and subject to modification only where study of details leads to suggestions for partial change. On the other hand, although the principal local streets which form the local connections for through traffic between the major thoroughfares should at most be only tentatively suggested in the city plan, they should be incorporated as definite proposals and receive primary consideration in the planning of neighborhoods.

In city planning literature a fairly clear distinction is made between the principal arterial streets and the major local streets, the former being understood to comprise the different grades of major thoroughfare that provide for road communications through and beyond the whole city; and the latter, the system of connecting roads that provide for local circulation in neighborhoods. Distinctions between major and minor local streets are not usually so clear.

Major local streets may be subdivided into: (*a*) principal local streets, namely, those, other than main thoroughfares, which provide for the main streams of local traffic through a district; and (*b*) secondary local streets, which provide through access for traffic in two directions but mainly for the purpose of serving the buildings that abut upon their

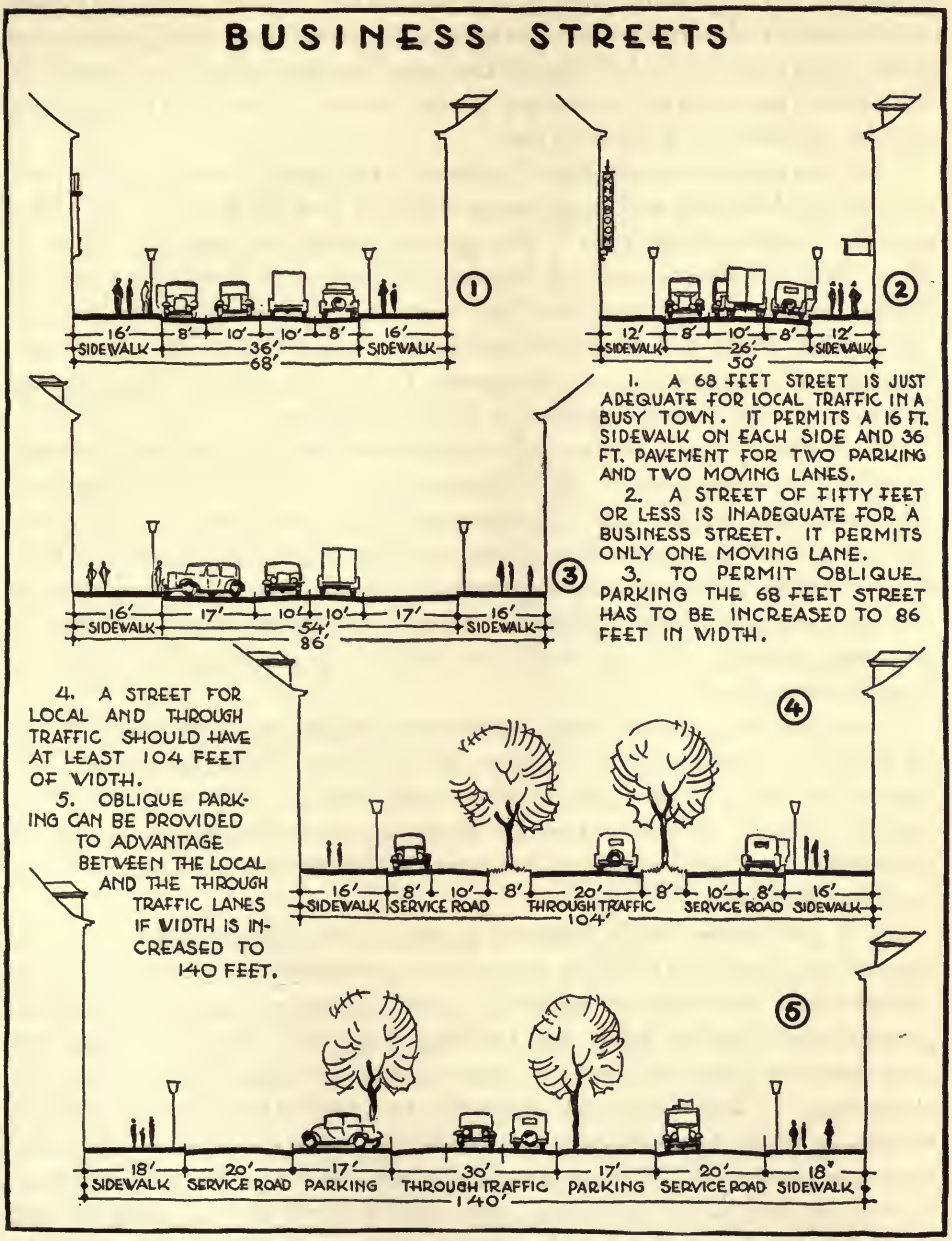

BUSINESS STREETS
1
16′ SIDEWALK 8′ 10′ 10′ 8′ 16′ SIDEWALK
36′
68′
2
12′ SIDEWALK 8′ 10′ 8′ 12′ SIDEWALK
26′
50′
1. A 68 FEET STREET IS JUST ADEQUATE FOR LOCAL TRAFFIC IN A BUSY TOWN. IT PERMITS A 16 FT. SIDEWALK ON EACH SIDE AND 36 FT. PAVEMENT FOR TWO PARKING AND TWO MOVING LANES.
2. A STREET OF FIFTY FEET OR LESS IS INADEQUATE FOR A BUSINESS STREET. IT PERMITS ONLY ONE MOVING LANE.
3. TO PERMIT OBLIQUE PARKING THE 68 FEET STREET HAS TO BE INCREASED TO 86 FEET IN WIDTH.
3
16′ SIDEWALK 17′ 10′ 10′ 17′ 16′ SIDEWALK
54′
86′
4. A STREET FOR LOCAL AND THROUGH TRAFFIC SHOULD HAVE AT LEAST 104 FEET OF WIDTH.
5. OBLIQUE PARKING CAN BE PROVIDED TO ADVANTAGE BETWEEN THE LOCAL AND THE THROUGH TRAFFIC LANES IF WIDTH IS INCREASED TO 140 FEET.
4
16′ SIDEWALK 8′ SERVICE ROAD 10′ 8′ 20′ THROUGH TRAFFIC 8′ 10′ SERVICE ROAD 8′ 16′ SIDEWALK
104′
5
18′ SIDEWALK 20′ SERVICE ROAD 17′ PARKING 30′ THROUGH TRAFFIC 17′ PARKING 20′ SERVICE ROAD 18′ SIDEWALK
140′

FIGURE 18

frontages. The greater part of the local street system of many towns would consist of principal local streets with probably a small proportion of secondary streets. My use of the term "minor street" is limited to the street that is either a one-way street or a cul-de-sac. An alley may also be regarded as a minor street.

The major and minor street system is the traffic circulation system of the neighborhood and constitutes the chief link between the city plan and the neighborhood plan. The system should be designed so as to serve the four major needs of economy, efficiency in local movement of traffic, safety for pedestrians, and development of property values. These four needs will be better served in proportion as the streets are aligned and arranged so as to discourage their use by traffic that does not originate or have its destination in the neighborhood.

Each street should be specially designed to suit the prospective character of the development on its frontages as well as the topographical conditions that affect both the street and the development. In a residential district the conception of what are the appropriate sizes and locations of buildings should largely govern the conception of the appropriate arrangement and width of streets. Thus it is the complete street with its abutting buildings that we have to visualize in planning the neighborhood street system.

In adjusting a street layout to natural conditions, every effort should be made to conserve such features as fine trees, running brooks, and wooded or rocky glens. Any of these may justify a change in the direction of a street. Where curves are necessary or desirable they should be gracefully fitted to the ground and provide a clear view of at least 120 feet in either direction.

It is not proper to fix definite standards of width for streets. The prevailing practice in the past has been to prescribe for all streets in a city definite lines and uniform widths in a few categories based on maximum possibilities of traffic needs and building densities. The result has been to impose excessive burdens on communities for unnecessary street construction. It would be more desirable to provide for a greater variety of widths where the necessity for definite specification arises. It is still better in the case of all secondary and minor streets for public authorities to suggest widths for guidance only and to leave the planning of each local street to be undertaken by the city planner, subject to approval by the city plan commission. The effect would be to permit each street to be related to topographical conditions and to a zoning classification that

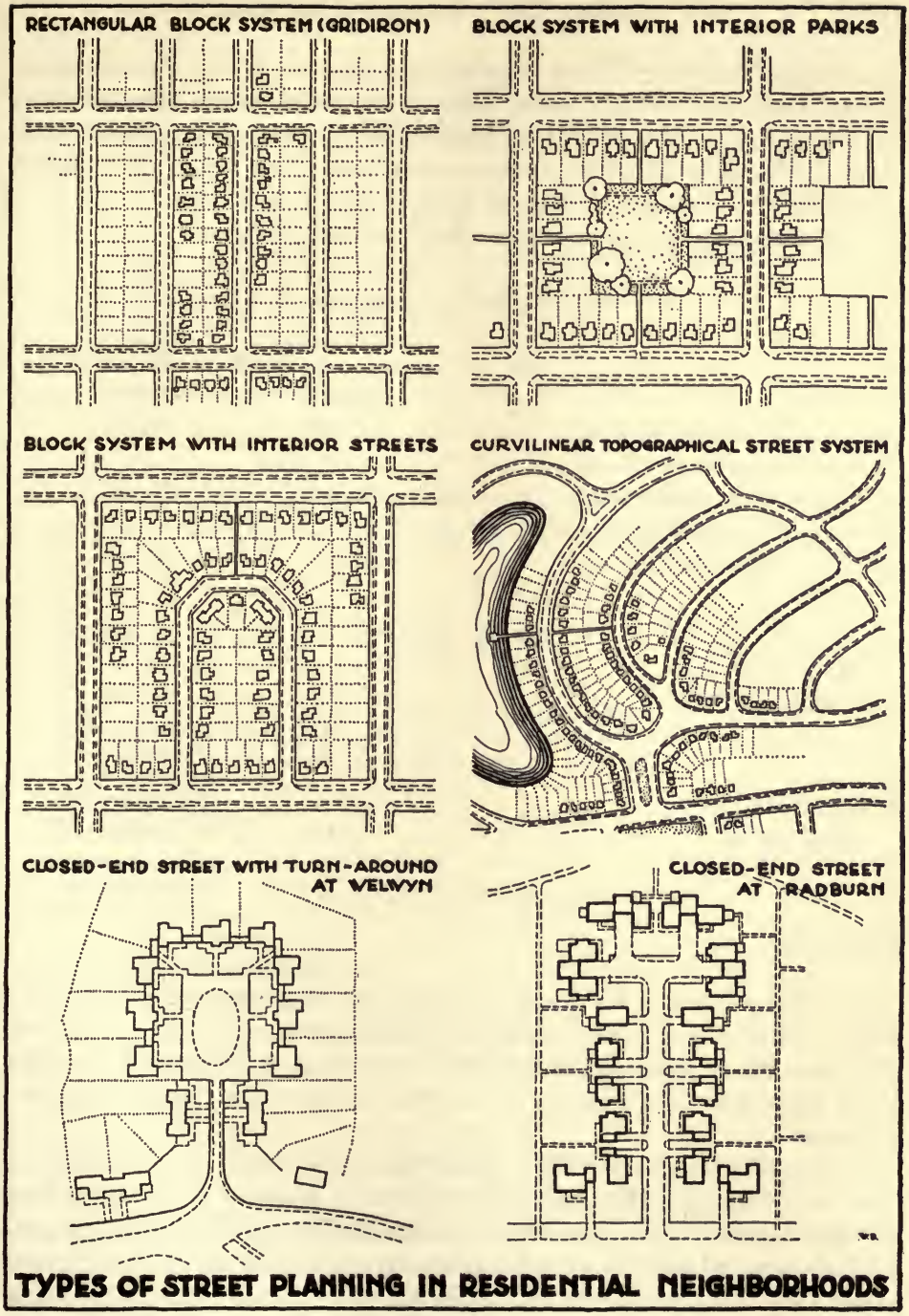

RECTANGULAR BLOCK SYSTEM (GRIDIRON)
BLOCK SYSTEM WITH INTERIOR PARKS
BLOCK SYSTEM WITH INTERIOR STREETS
CURVILINEAR TOPOGRAPHICAL STREET SYSTEM
CLOSED-END STREET WITH TURN-AROUND AT WELWYN
CLOSED-END STREET AT RADBURN
TYPES OF STREET PLANNING IN RESIDENTIAL NEIGHBORHOODS

FIGURE 19

would result in giving a high degree of permanence to the development. For example, where single-family districts are zoned and can be stabilized for a long period, it will be possible to save much money in street construction by permitting much narrower streets than would be required to provide for anticipated changes towards higher densities.

The following specifications are suggested for guidance:

MAJOR LOCAL STREETS

	Width Between Property Lines in Feet	Width of Paving in Feet
Principal Business Streets	68–76	36–45
Principal Residential Streets (3 and 4 traffic lanes)	44–60	27–36
Secondary Residential Streets (2 and 3 traffic lanes)	40–60	18–27

MINOR STREETS

Residential Streets (one-way)	40	14–18 (14, with occasional widenings for turnings, or 18 feet throughout)
Residential Streets (culs-de-sac)	40	14–18 (with occasional bays for parking, and a turn-around at end)
Rear Alleys	24	18

A constant width for a street should not be sought as an object in itself. Streets may well be wider at intersections than between them. At places where special parking space is required, it is better to provide for it by occasional widenings rather than to provide a continuous parking lane.

The incorporation of minor streets in a plan requires much skill so that the advantages they offer in the matter of economy will not be offset by inconveniences. For example, the one-way street should not be permitted except where it is part of a comprehensive street plan for a properly zoned area. It may be seriously objectionable when it is introduced as a separate feature in a development that is not comprehensively planned.

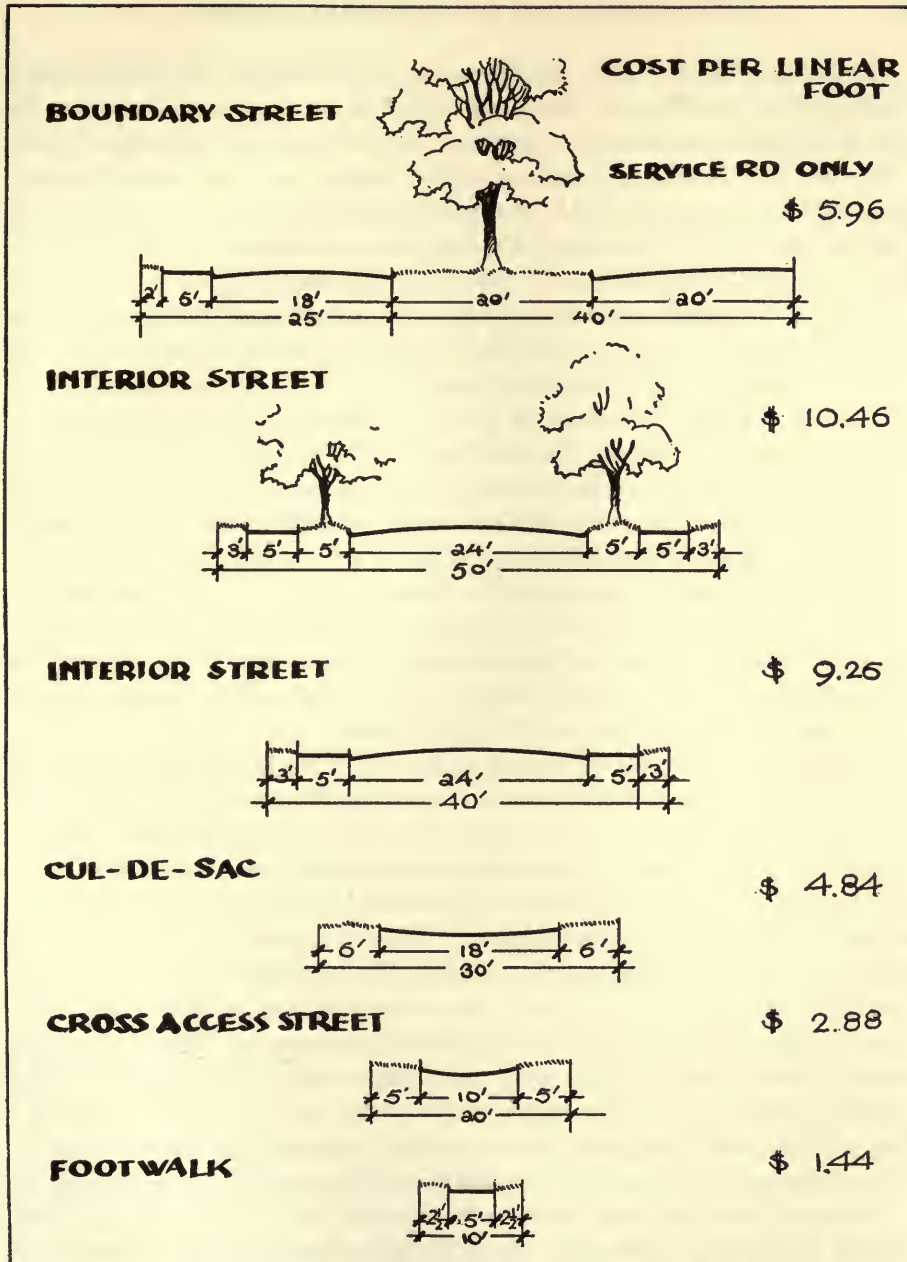

COST PER LINEAR FOOT
BOUNDARY STREET
SERVICE RD ONLY
$ 5.96
2' 6' 18' 25'
20' 40'
20'
INTERIOR STREET
$ 10.46
3' 5' 5' 24' 50'
5' 5' 3'
INTERIOR STREET
$ 9.26
3' 5' 24' 40'
5' 3'
CUL-DE-SAC
$ 4.84
6' 18' 30'
6'
CROSS ACCESS STREET
$ 2.88
5' 10' 20'
5'
FOOTWALK
$ 1.44
2½' 5' 10'
2½'
CROSS-SECTIONS OF STREETS

FIGURE 20

Cul-de-Sac Streets. For effectiveness in preventing through traffic, obviously the cul-de-sac or dead-end street is the best type. It can be utilized to great advantage in providing access to groups of houses in the interior of large blocks at a saving of both street area and cost of public improvements compared with the usual through street, besides giving houses a desirable privacy and freedom from the noise of motor traffic. Culs-de-sac are undesirable only (*a*) when they are not a related part of the whole street design; (*b*) so long as the public authority objects to maintaining them; or (*c*) when they unduly lessen the convenience of access between parts of a neighborhood.

There are many varieties of dead-end streets and of methods of arranging them in relation to buildings. There is the short entrance drive to a group of houses built about a square open space in the form of a quadrangle, the type of street that fulfills all the functions of a traffic street except that of furnishing connection with another traffic street; and there is the type developed at Radburn, which is a cul-de-sac service road for vehicular traffic to the abutting buildings with separate pedestrian ways on the opposite or garden side of the houses. Each type has a proper place in design, and its utility and cost must be considered as a distinct problem in relation to all local factors.

The common demand that the garage be attached to the house or preferably incorporated in it, makes it necessary to build the pavements of cul-de-sac streets wider than is necessary for purposes of mere access to houses. When garages are grouped on special sites it is possible to limit the entrance ways of houses to narrow driveways, but grouped garages are not favored by purchasers of houses. Every cul-de-sac street should have wide turning places not less than 400 feet apart.

In Radburn, as already stated, the principal face of the house looks toward the gardens and parks, while the service part of the house abuts the service street or garage drives. Pedestrians are encouraged to use the special walks provided between the ends of the gardens and through the parks. These walks are accepted as public ways and lighted.

In planning culs-de-sac it is essential to give special consideration to the means of securing convenience for making deliveries equal to that provided by through streets. The wide pavement and the space available at the garage drives in the cul-de-sac streets makes a turn so easy that they probably cause no addition to normal delivery costs. It is desirable, however, that provision be made for vehicles to get close to one entrance of the houses. Some cul-de-sac arrangements provide for

vehicular access only at some distance from the entrances to the houses. This permits of an artistic arrangement and a desirable degree of privacy, but is not suitable for small houses where the cost of deliveries of bulky materials has to be kept down to the minimum.

In any closed place like a cul-de-sac street, the question of homogeneity of the residents is more important than in through streets. An uncongenial family in such a street will constitute a more objectionable element than it would in a street which is a public way.

Certain considerations have to be borne in mind in connection with the question of public versus private control of the cul-de-sac. Where public authorities have taken over the narrow closed-end streets, as at Radburn and in some instances at Sunnyside, this kind of street has proved to be most successful. Where maintenance of such streets has to be borne by the abutters, control is difficult and charges are involved in addition to construction cost that make them compare unfavorably with other types of development. In most cities, before a street is accepted for dedication it has to be 40 to 50 feet wide, have through connections and a sufficient width of pavement to accommodate through as well as local traffic. The general unwillingness of public authorities to accept closed-end streets for public maintenance has been one of the causes of hampering progress in adapting street systems to their functions, which are determined by whether they properly serve local or general communication.

In the provision of sub-surface utilities it is frequently less expensive to construct mains in the form of a loop running close to the houses than to construct lateral mains in the middle of the street and make separate connections therefrom to each house, especially where the houses are removed from the lane.

When minor streets in residential districts take the form of alleys, they should be properly constructed and lighted, but often the money spent upon them would be better spent in improving access from the front. On the other hand, they are most desirable as a means of giving improved access to business buildings.

Streets on Hilly Land. The greatest difficulties and the best opportunities for interesting treatment arise in designing streets on hilly land. In order to obtain economy in constructing roads and sewers and in making excavations for the foundations of houses on hilly land, it may be necessary to design streets at right angles to the contours. This insures

that houses facing one another may be on the same level, whereas on roads aligned with the contours the houses on one side are higher and those on the other side are lower than the road level, both of which conditions involve difficulties in development.

It is sometimes desirable to design roads diagonally across contour lines for convenience of circulation, but such roads may be responsible for creating inconvenient building sites. This is not because the streets are diagonal to the contours but because they are likely to intersect at acute angles. In planning diagonal streets it may be necessary to widen the street area and to establish small open spaces at junctions to avoid sharp corners and badly shaped lots.

When any two streets connect in such a manner as to create an acute-angled lot, the opportunity should be taken to add to the attractiveness of the street by reserving part of such a lot as a planted space and throwing part into the street to permit rounding of the corner. The reservation of such planting strips is especially desirable on hilly land where opportunity can be taken to make the reservation a means of adjusting the grade of the road to the grade of the lot.

The attractiveness of a residential road will be increased by slopes and curves, but some streets should be designed in straight lines along valleys or plateaus. These will afford good opportunities for obtaining axial approaches to churches or other semi-public buildings. The question of prospective maintenance costs should always be considered in designing streets. Sloping streets are more costly to maintain and need to be more carefully drained than level streets.

Streets in business areas should be comparatively straight and level to permit safe shopping and economical building. Where, however, the control of the architecture and the land development is in the hands of one person or authority, business buildings can be fitted to sloping streets in such a way as to produce a convenient and artistic arrangement.

The larger the lots the easier it is to fit the streets to topography, not only in respect to ground levels, but also in respect to preservation of natural beauty. The rectangular layout is wholly unsuited for hilly land and is not always best for level land, either for traffic or economy in development. Even on level land, there may be obstacles to be avoided or beauties to be preserved which make it desirable to divert streets. On the other hand, curved streets or diagonals may, for purposes of ease of movement of traffic, be fitted to a difficult topography and yet lack

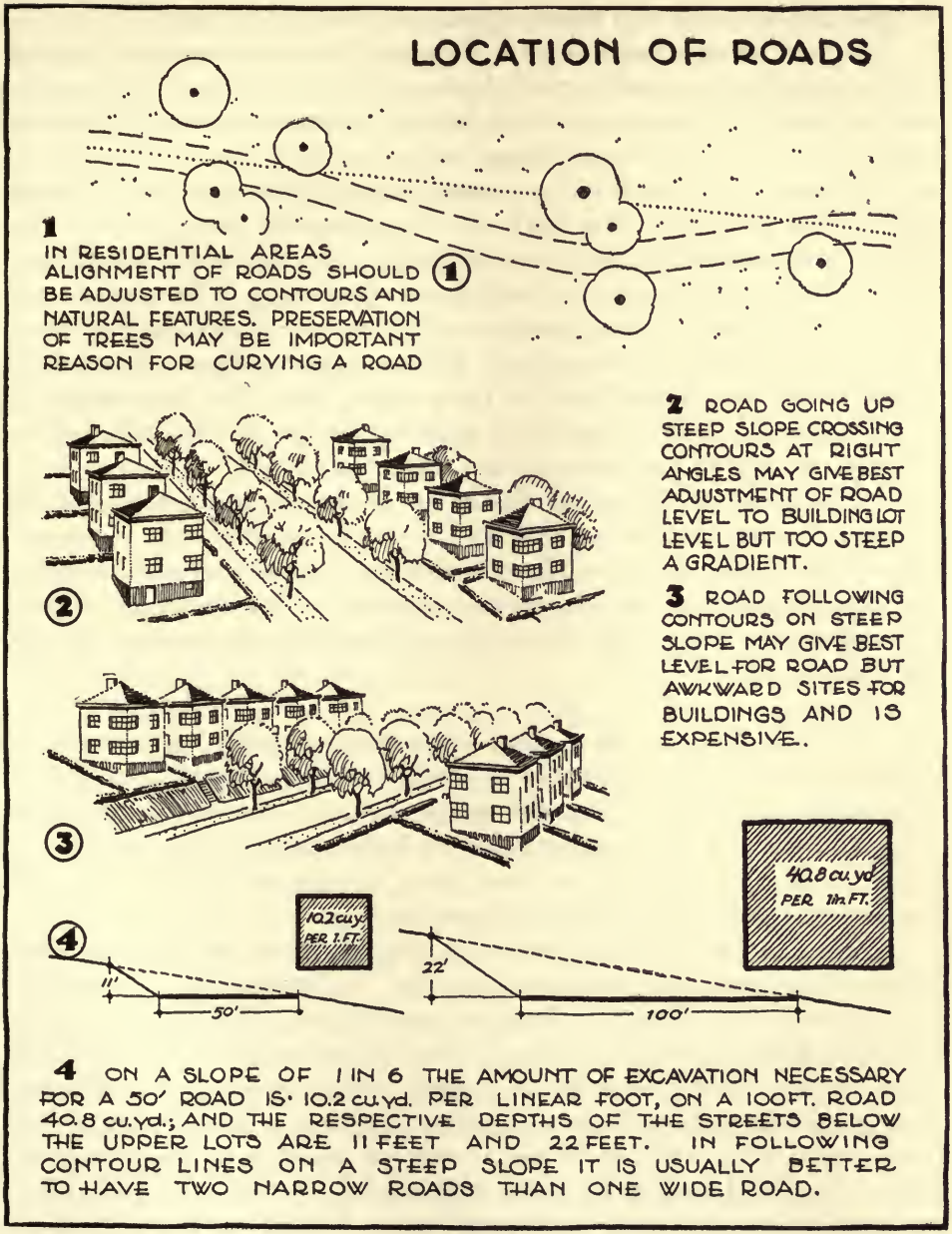

LOCATION OF ROADS
1
IN RESIDENTIAL AREAS ALIGNMENT OF ROADS SHOULD BE ADJUSTED TO CONTOURS AND NATURAL FEATURES. PRESERVATION OF TREES MAY BE IMPORTANT REASON FOR CURVING A ROAD
1
2
2 ROAD GOING UP STEEP SLOPE CROSSING CONTOURS AT RIGHT ANGLES MAY GIVE BEST ADJUSTMENT OF ROAD LEVEL TO BUILDING LOT LEVEL BUT TOO STEEP A GRADIENT.
3 ROAD FOLLOWING CONTOURS ON STEEP SLOPE MAY GIVE BEST LEVEL FOR ROAD BUT AWKWARD SITES FOR BUILDINGS AND IS EXPENSIVE.
3
4
10.2 cu.yd. PER 1 FT.
40.8 cu.yd. PER 1 FT.
11'
50'
22'
100'
4 ON A SLOPE OF 1 IN 6 THE AMOUNT OF EXCAVATION NECESSARY FOR A 50' ROAD IS 10.2 cu.yd. PER LINEAR FOOT, ON A 100 FT. ROAD 40.8 cu.yd.; AND THE RESPECTIVE DEPTHS OF THE STREETS BELOW THE UPPER LOTS ARE 11 FEET AND 22 FEET. IN FOLLOWING CONTOUR LINES ON A STEEP SLOPE IT IS USUALLY BETTER TO HAVE TWO NARROW ROADS THAN ONE WIDE ROAD.

FIGURE 21

adjustment to the lots so that the latter are difficult to approach or can be made usable only with much expense for removal of soil.

Streets running straight uphill, diagonals following contours, broken or dog-legged streets, and curved streets, all have their uses. The problem in design is to use any of these forms or combinations of them with intelligence and not to avoid them because on occasion they have been wrongly used. In practice the principle that applies is to do the thing that is most pleasing at the least cost, consideration being given to the effect of lot sizes and character of building on the finished development.

The cross and longitudinal sections of streets should be planned together. No definite principle can be laid down to govern the actual position of pavements and sidewalks in the street reservations. Normally, sidewalks are best placed next to the property line, but on occasion it may be desirable to let them follow an irregular line, in part adjacent to the property and in part lying within a planted strip.

The question of layout of streets to secure proper orientation of buildings increases in importance as the density of buildings increases. Where there is ample space about buildings at front and rear, orientation of the buildings may be largely ignored in the design of streets and sufficiently dealt with by design and variation in location of the buildings.

Utilities in Streets. Streets not only serve as traffic ways but also as rights of way for such services as electricity, water supply, and tributary drains and sewers. The chief matters to be considered in planning these utilities and their connections to buildings are the elevation of cellar floors, depth of front and rear yards, density of building, presence or absence of alleys, and width of front street.

As a rule, it will be found most convenient and economical to place gas mains, sewers, and water-supply pipes in the middle of secondary and minor streets. However, in street reservations of from 50 to 70 feet it will be desirable to have a dual system of gas mains under planting strips on the outer boundaries of streets, with a single line of sewers, drains, and water mains under the central pavement. In main thoroughfares of greater width than 70 feet it may be found most economical to have a double system of all mains and sewers, one on each side under the planting strip next to the property line. As against the greater initial cost of the dual system, substantial economies will be effected as a result of the shorter lengths of connections which are made possible by

this system. The economic desirability of constructing dual service mains in certain wide thoroughfares is one of the factors to take into account in considering whether or not it is advantageous to provide service roads parallel with the thoroughfares. Except where alleys exist, it is not usually an economy to provide easements for utilities at the rear of lots, although this may have advantages where lots are shallow and topographical conditions are specially suitable for rear drainage.

Building Lines. Building lines, if established, should be for the purpose of providing additional space in front of buildings for health and amenity, and not as a substitute for sufficient width in streets.[1] They should be planned in harmony with street and highway width, and in accordance with a consistent policy. It is not advisable to fix a building line with the intention of acquiring private open area at a later date for street widening. The street should be made wide enough in the first instance for the ultimate needs that can be foreseen.

Detail in Street Design. As has been indicated, there are two problems of design connected with streets, — the problem of designing the system as an organic structure and the problem of detailed design of each street as a composition of open space and abutting buildings. In the latter connection there are questions of scale, proportion, emphasis, and decoration that enter into the problem of securing a truly esthetic as well as a truly convenient arrangement. This problem is concerned with the disposition of surface uses of paving and planting as well as with relation of cross sections to heights and character of abutting walls of buildings and to axial considerations.

Details in street decoration are partly a matter of landscape treatment of the planted areas and partly a matter of design and control of public utility structures, within and adjoining the streets. Simplicity should be the keynote of street decoration, whether in planting or in structures. One fine tree in a street may give it more beauty than it might obtain from having half its surface covered with ornamental shrubbery. Too often the planting in a street has the effect only of emphasizing the rigidity of its horizontal lines.

The proper degree of subordination of the landscape treatment to the architecture or the reverse is a most difficult thing to achieve, because few opportunities exist for collaboration in the design of all features of a

[1] See pp. 68, 70.

street; in any case, nearly every street presents different problems, and the determining of relative emphasis requires unusual skill. Probably there is no way to convert poles and wires into decorative features. To place them under ground is the ideal arrangement, and one more practicable in a planned community than appears to be generally realized. In the majority of places where they must be over ground, however, they need to be better arranged and their tidiness better controlled than is usually the case.

The esthetic quality of a community depends to a large degree on the esthetic quality of its minor structures and standardized fittings, such as the treatment of curbs and gutters and the design of its lamp standards. There is vast wastage of public funds in cities owing to introduction into residential streets of the same types of construction and the same heavy materials as are used in main thoroughfares. The types of construction of curbs, channels, and paving that are most economical and most suitable for the locality, always allowing for the presence of good taste in design, are usually the most pleasing in appearance.

Costs of Streets. All the matters I have been discussing affect the question of costs. Actual costs of local improvements, which include residential streets, will be referred to in the next chapter. Costs, and therefore possible savings that may be effected, vary with time and local conditions. Whatever the unit costs may be, it is obvious that considerable savings may be obtained as a result of:

(1) Limiting the widths of pavements in secondary and minor streets, other than business streets, to from 14 to 30 feet, as compared with the much greater widths usually specified.

(2) Planning streets so as to avoid excavation and filling of land, and to give proper access to buildings.

(3) Planning public utility mains, etc., in connection with the street design so as to secure proper sequence in construction, best location of mains, and reduction of lengths of connections to buildings.

ZONING AND NEIGHBORHOOD UNITS

The organization of the neighborhood into its component functional parts or use zones must be made at the time when our ideas of the local street system are crystallizing. I repeat that in preparing a plan for a new development we cannot make zoning fully constructive unless we coördinate it with a specific system of streets and public utilities. On

the other hand, we must coördinate the streets with the zones and building densities in order to get economy in street construction. For example, if a street is purely residential in character and not required for through traffic, then the fewer the houses erected upon it the less the width of street required; and thus the wider the lot, the narrower the street reservation need be, down to a minimum of say 40 feet. On the other hand, the wider the street the greater the cost per front foot of development, and therefore the greater the financial pressure for a higher building density. For architectural and hygienic reasons, as well as for financial reasons, variations in street widths should be adapted to variations in heights and densities of buildings and vice versa.

Homogeneity. One of the underlying considerations in zoning any area is the social standing of its population and the degree to which this involves protecting or maintaining some measure of homogeneity. In preparing a design the city planner should ascertain the extent to which the incomes and social customs of the prospective population will enable provision to be made for more than mere necessities in the matter of space about buildings and preservation of features of natural beauty.

City populations have a tendency to separate themselves into districts of the rich and districts of the poor. These districts lie at two extremes, between which there are people of many social grades who tend to settle in districts of a certain degree of homogeneity, based on comparative uniformity of income, taste, and social habits.

It has to be recognized that most people desire to live in places where they can associate with neighbors who have earnings and standards of education similar to their own. This attitude exists on the part of the average-income and the low-income groups as well as on the part of the highest-income groups. There exist also corresponding groupings on racial grounds. Thus there arises the need for establishing zones for types of houses that will accord with economic and social requirements. Homogeneity is promoted and maintained either by zoning regulations or private restrictions on property, or both. Zoning indirectly promotes segregation of different social classes through regulation of types of dwellings and spaces about dwellings. Private restrictions do the same thing more directly by prescribing a minimum cost for houses and a minimum size of lot, with the primary object of enabling the vendor of the lots to capitalize the value of the security which he gives to a purchaser against poor building development.

Principal Zoning Requirements. After the location of any industrial districts within an urban neighborhood area has been predetermined, the remaining land should be regarded as potentially residential; other uses, including business and open uses, are subordinate to residential use. What the location and extent of the business districts should be depends on the extent, density, and character of distribution of the residences they have to serve. Consumers have to be present in a locality before a store can be made profitable, and the number of stores in a local business district should be adjusted to the buying power of the population having convenient access to it. It is wholly wrong to zone business districts on the basis of utilizing all frontage on main thoroughfares.[1] This was the rough criterion used at a time when paved thoroughfares leading into and out of cities were very few compared with the present time. The linear frontage on principal streets that are zoned for business should be limited to from 25 to 50 feet for every 100 of the potential population.

In respect to heights, business buildings should be so restricted as to insure them a 45-degree angle of light on the street frontage, and a similar angle of light either at the rear or from interior courts. Bulk should be limited as well as height.

As already stated,[2] when residential buildings are replaced by business buildings, the building line of the residences, as a rule, should be adhered to for the business buildings, because the yard space that has been desirable in the case of the residences will be needed, under normal conditions, to provide for the extra traffic (vehicular and pedestrian) created by use of the stores. It is as reasonable to establish building lines for business as for residential buildings.

I have suggested that cities should have not more than 50 per cent of their areas in private building land. When this ratio exists, supplementary requirements should be:

(1) Not more than 40 to 50 per cent of any residential lot should be built upon.

(2) All residential buildings should have an angle of light to every habitable room of not less than 45 degrees.

(3) In addition to restrictions of lot coverage and height, a specified number of square feet per family should be prescribed.[3] Front and side yard spaces, though desirable, are not essential if houses are not more

[1] See Bartholomew's *Urban Land Uses*, p. 75.
[2] See pp. 68, 70.
[3] See pp. 168–171.

than two rooms deep and if ample space for light and air is provided in streets and rear yards. Where private building land exceeds 50 per cent of the total area of a neighborhood, the number of square feet per family should be proportionately increased.

(4) Where buildings are more than three rooms deep, the open space requirements for light and air should be met by side yards so as to secure the desirable angle of light for all rooms.

(5) Public open spaces, in the form of parks and playgrounds, should not be considered in determining the spaces that should be required about buildings on private lots for purposes of healthful occupation.

(6) Zoning should define the kind of use to be permitted rather than the kind to be excluded.

Organization of Neighborhood Centers. Public and semi-public buildings that normally are required to serve the needs of the population of a neighborhood comprise:

(1) A community hall and a library
(2) Schools
(3) Churches
(4) A police and a fire station
(5) A post office
(6) A theater and other buildings devoted to commercial amusement.

The community hall, library, and perhaps the high school and post office, should be grouped together at a focal point in the local system of transportation. It is desirable to include the high school in this center because it is one of a comparatively few public buildings that are likely to be given some distinction in their architecture. However, as it is necessary for the high school to have a large playground area, the desirability of its inclusion in the community group will depend on whether there is a sufficiency of open space adjoining it. If the local center adjoins a park, this will serve the double purpose of giving proper display and dignity of appearance to the whole group of buildings and the recreation space necessary for the school. The inclusion of the post office is also desirable to increase the size of the group of community buildings, but it may in some instances be more appropriately located nearer the railroad station or within the business district than the other community buildings.

Existing examples of good centralization of community buildings about the focal point in the communications system and abutting on a central open space are to be found in many New England towns and

villages, where the centers were developed about the main cross roads and had the advantage of the proximity of an area of common land. Generally the best sites for the civic group of buildings are on high ground overlooking a park area on one side and near the business center and railroad or other transit station on the other side. One desirable method is to compose them around an open square or other open space closed in on three sides. They should be compactly grouped together although set in open surroundings.

While the use of each building will be a major factor in determining its design, every effort should be made to secure harmony and coördinated treatment of the elevations of community buildings in one center. The sites of public buildings should be selected at an early stage in the determination of uses, and the buildings that are intended to be erected in one center should be designed together before the building of any one is undertaken.

With the possible exception of the post office, the other public buildings should not be in the business district but have a quieter situation combined with equal convenience in its approaches and accessibility.

The schools for younger children should be placed by themselves in open situations, away from main traffic routes and with adequate space for play. In many neighborhoods nursery schools should be erected for children not yet of school age. Many children of poor families are denied proper care when the mother has to work for a livelihood, and comparatively open-air nursery schools with provision for "mother centers" are a modern necessity in many districts.

Churches should occupy prominent sites and are appropriately erected on lots at the ends of streets. In such positions they provide good terminating features and secure the salience that is desirable in a public or semi-public building. Their sites should be ample enough to provide parking facilities and also to give suitable display to the buildings.

Accessibility and wide highway approaches are of major importance in selecting sites for fire stations, which should not be near schools, theaters, or other buildings where large numbers of persons congregate.

Provision of special parking places is of particular importance in business districts, especially where these include theaters and other institutions that attract large crowds. In the sense that a shop is a public resort for trading, it is especially important to provide it with good approaches and make it attractive in design and arrangement. Squares and rounded points at the junctions of highways are especially convenient

places for amusement and shopping centers, but these should have sufficient open space to take care of local traffic and as much of the main highway traffic as needs parking accommodation.

Public garages, laundries, and buildings used for light industries should be placed in a light industrial district near the business center, preferably fronting on service roads parallel with the traffic arteries and separated from them by planted strips. Public garages and filling stations should be set back 30 to 40 feet from the service road with sufficient space between the pumps and the roadway to permit cars to stand without interfering with the road traffic. All buildings of a commercial character should have paved and lighted alleys at the rear, or space within them for loading and unloading.

RECREATION SPACE

The questions of the amount of open space that should be reserved in residential areas and, in general, throughout cities, and of the classification of uses of such space for different types of recreation, have been dealt with in works of numerous authorities.[1]

The public space that should be shown on the neighborhood plan for recreation and other open uses depends, first, on the extent to which the general park system of the city has incidentally provided for local requirements, and second, on the density and character of the local development. In regard to the first matter, the local system is supplementary to the general system of county, regional, and city parks referred to in the previous chapter. In so far as the general system includes provision for local parks, athletic fields, and playgrounds in a neighborhood, these would be incorporated in the neighborhood plan and would reduce the amount of additional space to be proposed for reservation. The general park system should include pleasure parks, water-catchment and waterfront reservations, forest parks, botanic gardens, and zoos.

The neighborhood system should include small pleasure parks and playgrounds, partly reserved as public spaces and partly dedicated by owners under legal requirements in the case of large subdivisions in the same manner as street space is dedicated. It is estimated that as an ideal arrangement not less than 15 per cent of space should be kept open in parks and playgrounds, 10 per cent being provided at the cost of the

[1] See, for example, Henry V. Hubbard, "Parks and Playgrounds: American Experience as to their Requirements and Distribution as Elements in the City Plan," in International Town Planning Conference, Amsterdam, 1924, Part I, pp. 215–240; also, Lee F. Hanmer and others, "Public Recreation," Vol. V of *Regional Survey of New York and Its Environs*, 1928.

community at large and 5 per cent contributed by owners for local use in residential areas.

If the 5 per cent reservation of neighborhood open space is made under proper conditions, that is, if it fits in with a well-conceived design and is appropriately located and distributed to suit topographical conditions and social requirements, developers should gain rather than lose from the utilization of part of a subdivision as permanent park and playground space. Many developers, recognizing its benefits to themselves, voluntarily make such reservation. One of the greatest needs in the development of areas of this sort is the provision of recreation and public garden spaces, as at Radburn, in positions that are accessible from houses without crossing traffic arteries.

The amount of open space on private lots affects the extent to which it is desirable or necessary to provide public open spaces and vice versa. Where either public or private open space is inadequate, the other has to be increased to meet the optimum requirements. In the final analysis, by far the greater part of the cost of all open space has to be met by owners of property — whether it is private land or is purchased by the community as public land. An individual owner may benefit financially by leaving inadequate open space on a lot and depending on the community or owners of adjoining lots to make up the deficiency, but in doing so he is in effect enjoying a special privilege at the expense of other owners.

On the whole, it would not seem to be an unreasonable requirement that developers should dedicate a proportion of all subdivisions for recreation space. However, Mr. S. Herbert Hare has stated that actual donation or dedication of park areas in connection with subdivisions should not always be expected or required.[1] Mr. Hare shows that, at the time he wrote, only one out of fourteen representative cities included requirements as to dedication of park areas in their rules governing land platting; and in this one case the city required that five per cent of the area of all subdivisions over five acres in extent be dedicated for public use. He questions whether this requirement was a "reasonable exercise of the general veto power granted the [city planning] commission in connection with the approval of plats," and he regards the results as often of doubtful value. To obtain good results from any arrangement, it is desirable, as Mr. Hare points out, to select neighborhood parks in accordance with the proposals of the city's master plan. And if compulsory

[1] S. Herbert Hare, "Acquisition of Park Land in Connection with Real Estate Subdivisions," in *City Planning*, Jan., 1933.

dedication is considered to be impracticable in any district, adequate local parks should be acquired by means of public purchase.

Consideration will have to be given in all designs for open areas to problems of privacy, convenience to users, scope for planting, prevention of interference of recreational use with residential privacy, and proper supervision of playgrounds, in addition to the general conformity of the park system with the master plan of the city.

SIZES AND SHAPES OF BLOCKS

A great assortment of data has been presented in city planning literature on the subject of block sizes and shapes as if it would be of value in determining the most satisfactory dimensions for any given set of circumstances. For purposes of this study I have examined much existing material and made personal investigations, but these efforts have been largely futile in leading to concrete conclusions. Nothing in the nature of specific rules can be formulated, owing to the presence of too many overlapping considerations in connection with the tangible elements of use, topography, established conditions, and peculiar local needs; and these are further complicated with the intangible elements associated with different customs, tastes, and interpretations of aims and possible effects. The factors of most influence over both sizes and shapes of blocks are the topographical conditions, the layout of the street system that is appropriate to traffic conditions, and the suitability of a given size and shape of lot to the prospective building development.

Obviously the variety of natural characteristics of sites and of types of street will create both the need and the opportunity for varying the sizes of blocks. Sizes are much influenced by the degree to which a plan consists of through or cul-de-sac streets. Where through streets prevail, the length of blocks will be determined by the exigencies of cross currents of traffic, while their depth will be equal to the depth of two lots plus the depth of any space that may be reserved at the rear of the lots for local park area, or alley or easement. On the other hand, any general use of culs-de-sac in the interior of blocks will make it possible to have deeper blocks.

The method employed by the average subdivider in establishing block sizes is to group lots in blocks that fit in with his conception of how to derive the greatest profit. To some extent he is controlled by customary demands, by public regulation, and by considerations of social convenience and economy in providing local improvements; but these

are all kept as subordinate as possible to his financial interest. Even allowing that no specific rules can be laid down, a few suggestions may be made here for general guidance which will more adequately consider the interest of the community as a whole.

Blocks in industrial areas should be large enough to permit factory units of 300 by 1000 feet or an equivalent area, and should never be subdivided into smaller lots except by apportionment of units of block according to specific demand. Yet in most industrial areas one finds the blocks cut up into small residential lots, say 25 by 100, with the consequence that much expense has to be incurred, and difficulties faced that are sometimes insurmountable, in attempting to acquire sites of a suitable size for industrial plants. If areas that seem likely to be converted for industrial use are first subdivided for houses, the blocks should not be shallower than 300 feet or shorter than 1000 feet.

In general, blocks should be as large as possible, subject to the necessities of traffic convenience. In their larger sizes, blocks may be satisfactory in any shape, but in the customary smaller sizes oblong blocks are best. When the width of blocks permits it, interior play spaces or parks should be provided, but an effort should be made to make these spaces not less than two acres, so as to permit of some planting, to enable children to play without unduly affecting the privacy of the surrounding houses, and to justify the cost of some supervision. A block 500 feet square will permit of lots 100 feet deep on four frontages, with an interior space of over two acres.

Interior parks are specially valuable because they can be used by children without the necessity for crossing streets, but they require supervision, and the cost of this must be considered in deciding the question of their desirability. In a well-planned subdivision it should be practicable to provide rear space for recreation at little more than the cost of the bare land. Much space, probably from 20 to 40 per cent in average subdivisions, is now wasted in providing unnecessary street area that could be more profitably used for recreational space, thereby providing the latter at no cost for land and in a form which involves much smaller construction costs.

AREAS, WIDTHS, AND DEPTHS OF LOTS

The bare and unimproved lot is a piece of land forming a potential building site. But to become usable as an actual building site it must be "improved," which means it must be provided with satisfactory road

access, water supply, and other utilities. It is this "improved lot" that is the basic element in the plan of the neighborhood and city. In considering sizes and widths of lots, I will confine my attention to minimum dimensions for the smallest houses.

There are two primary and overlapping considerations in fixing the widths, depths, and areas of lots for small houses in residential areas. These are: first, that they shall have the dimensions that are essential to provide adequate light and air for healthful occupation; and, second, that their cost will be within the means of those who require them as sites for homes. Granted that there is plenty of land in accessible localities in urban regions, there is no reason why both needs should not be met. Obviously lots should be planned to suit the types of building that are likely to be erected in a given location, rather than buildings planned to suit a predetermined shape and size of lot. In many subdivisions, however, it is the latter course that is followed, and lots are arranged without regard to the appropriate building development or to the appearance and healthfulness of the buildings to be erected.

Relation of Lot Coverage to Lot Sizes. In the case of small houses, whether detached, semi-detached, or in groups, we can arrive at certain data as to coverage dimensions which should guide us in determining appropriate lot sizes for different types.

An ordinary two-story house covers an area of from 500 to 700 square feet. A selected group of small houses in the United States Housing Corporation plans ranged from 520 to 532 square feet of ground area covered. The average ground floor sizes of small houses investigated in 1929 by the Division of Building and Housing of the United States Department of Commerce were, for two-story detached houses, 554 square feet, and for row houses, 468 square feet.[1] Bungalows normally cover from 600 to 700 square feet.

If a house covers 600 square feet, what should be the total size of the lot? We may arrive at different answers to this question on the basis of various more or less accepted assumptions. First, we may determine some percentage of coverage with building, after consideration of the amount of open area that should be reserved for front, side, and rear yards and also for gardens or planting. One basis for a calculation is that no house should cover more than 40 per cent of the lot, which, when the

[1] The President's Conference on Home Building and Home Ownership, Vol. V, Report of Committees on Construction, 1932, p. 110.

building occupies 600 square feet, gives us 900 square feet of open land and a lot size of 1500 square feet (20 by 75 feet). Another basis for calculation is that the building should be set back 20 feet from the street line, devote 10 feet to side yards, and have a rear garden space of 50 feet in depth. With the same building coverage this would give us 2400 square feet of open land and a lot size of 3000 square feet (30 by 100 feet).

Detached houses should have a minimum of 10 feet between them, that is, the width of a house on a 30-foot lot should be limited to 20 feet.

Garages should not be erected on the side yards of houses occupying lots less than 36 feet wide, *i.e.* having side yards of less than 8 feet on each side or 16 feet between houses. Where garages are essential to houses erected on 30-foot lots, they should be incorporated in the ground floor of the building. Houses with such spaces between them may be from two and a half to three rooms deep. Row houses should never be more than two rooms deep, and may occupy lots as narrow as 25 feet.

A lot size of 2400 square feet equals 3360 square feet of gross area per family with blocks 160 by 600 feet, streets on the long side of the block 50 feet, and cross streets 40 feet wide. This would give an average density of almost 13 families to the gross acre with lots 25 by 96 or 30 by 80 feet. Where a subdivision adjoins highways and parks, these might be considered as part of the gross acreage and a lower figure for density would thus be obtained.

Group houses on narrow lots need not have alleys, as they can be planned so as to permit access to garages and the delivery of materials from the street. An alternative to incorporating the garage in the house is to provide grouped garages on special sites near the dwellings.

In small-house subdivisions the corner lots should be planned first. These lots should be wider and not so deep as other lots facing the same streets, so as to secure a comparatively uniform width between the corner house and each of the two houses on the adjoining interior lots. This permits a more agreeable arrangement of the buildings at and abutting upon the corners. A corner lot with a narrow frontage on one street and a deep unbuilt-upon frontage on the side street does not permit of a satisfactory arrangement of corner buildings and usually is wasteful of local improvements. If interior lots were respectively 25 by 96 and 30 by 80 feet wide, appropriate corner lots would be 50 by 48 and 60 by 40 feet.

With proper grouping and arrangement of buildings, the small size and narrow widths that have been suggested will permit of healthful con-

Carl A. Ziegler, Architect.

A Street of Semi-Detached Dwellings.

Richard Henry Dana, Architect.

A Four-House Group.

Plate VII. Mariemont, Ohio.

(*See page 243.*)

ditions. As a rule, it is not an advantage to make lots deeper than 100 feet. Rather than have lots 150 feet deep, it is preferable to restrict the depth of a lot to 80 feet and add the additional 70 feet to a common recreation ground.

Front yards are not essential and have become in some respects less desirable since the coming of the automobile. The question of their desirability, however, will depend on the design of the lots in relation to the types of building and the width of abutting streets. Especially in streets used for through traffic, the value of front yards for garden use or park treatment has decreased and the importance of developing rear gardens and park spaces in the interior of blocks has increased.

In suggesting dimensions for the minimum size and width of lots for the cheapest type of house, it is not intended to imply that wider lots are not desirable if and when they can be afforded. But it is claimed to be better to limit lots to a size of 2400 square feet, with widths of from 25 to 30 feet, rather than to make undesirable savings in local improvements or in building construction in order to preserve more space about the building. It is, however, highly desirable to obtain the largest lots that are practicable from a financial point of view. There are no financial reasons why houses costing from $4000 to $6000 should not have lots of from 3200 to 4800 square feet in size, and 32 to 48 feet in width, on land of reasonable price.

A lot size of 3200 square feet would equal 4250 square feet of gross area per family, with blocks 200 by 640 feet, surrounded by streets 40 and 50 feet in width. This would represent about 10.2 houses per gross acre including the street area. A similar calculation with a block 200 by 720 feet shows that a lot size of 4000 square feet would equal 5277 square feet of gross area per family and represent about 8.2 families per gross acre.

No basis can be suggested for determining sizes of apartment buildings for the purpose of indicating the exact sizes of lots they should occupy. Few sites are planned from the beginning for the purpose of erecting apartment houses, as they always should be. The adjustment of their horizontal and vertical dimensions to the lot area, however, should be made in compliance with certain general principles. The chief of these is that they should not be of a height, bulk, or shape that will prevent each room from receiving the benefit of an angle of light as near to 45 degrees as is practicable. This will usually require the depth to be limited to two rooms, and the height to be adjusted to the

coverage of the lot area so as to obtain the desired angle of light to all rooms.

In a block 200 by 720 feet, with surrounding streets 60 feet wide, and allowing 125 square feet per family for highways and parks, a lot area of 900 square feet per dwelling in apartment houses would equal 1392.5 square feet of gross area per family, or 31.3 families to the gross acre. Under similar conditions, a lot area of 600 square feet would equal 970 square feet of gross area and 44.9 families to the acre. On the basis of 3.5 persons per dwelling, these densities of dwellings equal about 110 to 157 persons per acre. These figures compare with the average of 133 persons per acre of occupied residential area in the crowded Borough of Manhattan. Therefore they may be considered to be extreme for ordinary places. At the same time, they represent much higher standards than are now enforced even in small cities, and they would permit apartments to have reasonable light and air so long as the buildings were properly arranged on the land and restricted to a depth of two rooms.

Density of Houses. There is another aspect of the distribution of houses which affects lot sizes and to which it is appropriate to refer at this point. It has been suggested in these pages that land in an urban area should be approximately one half public open area, principally streets and parks, and one half private building area, but with a further percentage of such private area kept in open space about buildings. It is apparent that where this distribution of space exists, control of density is automatically effected to a large extent. And the practicability of such a standard is shown by the fact that even in the part of Manhattan below Fulton Street, 48.9 per cent of the land is in streets and open spaces.

Present information as to densities "per net acre" is very misleading. A figure less likely to be ambiguous is one for gross acreage in large areas, including all public open spaces.

In certain groups of projects of the United States Housing Corporation and of the Emergency Fleet Corporation housing during the war, the percentages of area in streets and alleys were 25.5 and 26.8 respectively, and in public open spaces 10 and 12.9, giving total percentages of 35.5 and 39.7. To this should be added main highways and park areas outside the developments, which would probably result in total open areas of approximately 50 per cent.

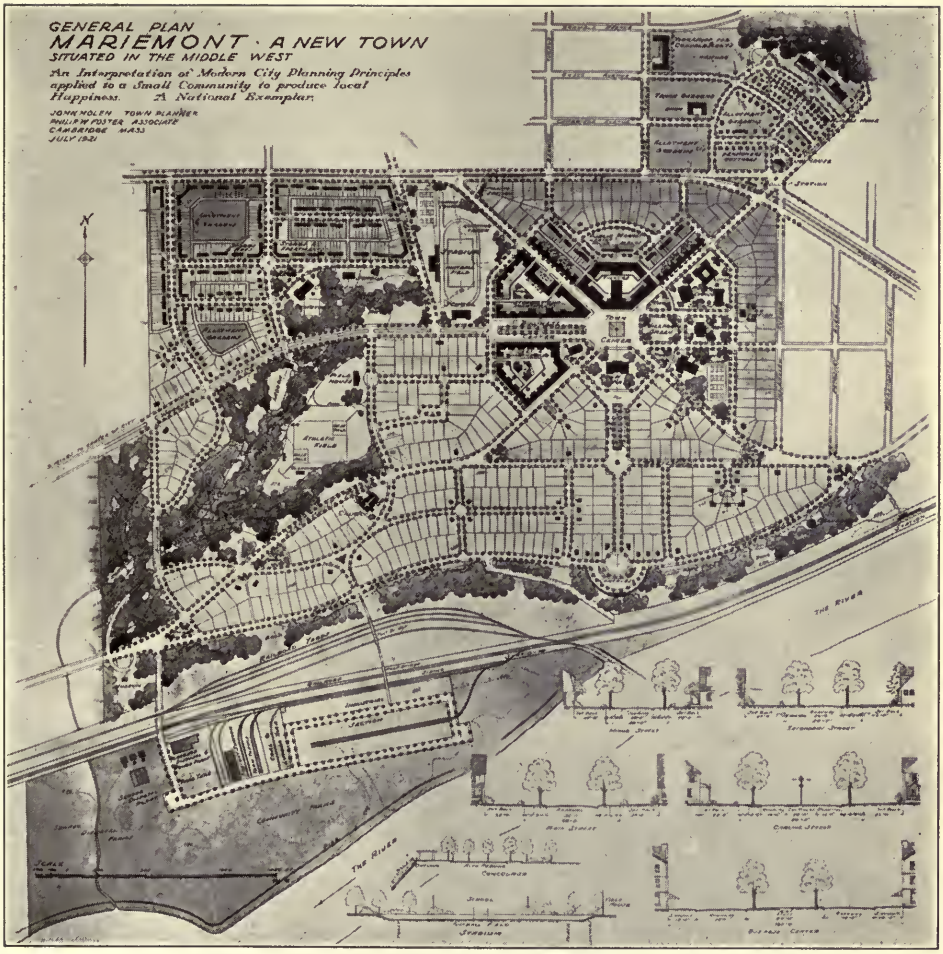


PLATE VIII. MARIEMONT, OHIO.

(*See page 243.*)

The average density of houses within commuting radii of large American cities is less than 8 to the gross acre, but certain sections have enormously greater densities which are offset by considerable areas of vacant land elsewhere. In new developments there is no sound economic reason for permitting a greater average density of small houses than from 8 to a maximum of 12 to the gross acre.

The artificial factor that stands in the way of securing a satisfactory limitation of densities in American cities is the prevalence of high land prices due to wasteful practices of land subdivision and lack of adequate zoning control.

CHAPTER XI

THE COST OF THE LOT

THE lot, constituting the site of the house, is the most convenient and appropriate unit for determining the cost of land development in relation to the total cost of a home.

It should be kept in mind that in these pages it is the ground plan of residential areas that is specially under consideration in discussions of costs. While the elements of the ground plan are elements of site rather than of building, yet in considering how and at what cost sites should be planned and developed we must consider the different types of building. Moreover, we must also have in mind the probable costs of house building because it is necessary to show how site costs are related to building costs.

Any proposals for effecting improvement in methods of subdividing land, and any saving in cost resulting from one method as compared with another, affect only about one fifth of the cost of a complete home. There are, however, important indirect results of methods of subdivision and of planning local improvements that affect the quality and value of the actual building. The whole investment in a home will benefit from a neighborhood design which results in appropriate relations of lots to buildings, an economical and artistic arrangement of streets and parks, conditions favorable to orderly maintenance, and the protection of natural beauty.

At this point it may be well to introduce a note of caution as to the maximum financial and social benefits that may be expected as a result of improvements in methods of land development. While it has to be recognized that the present methods are both extravagant and productive of poor results, it is hard to conceive that any different methods will save money to the extent that is necessary to bring new houses within the means of the majority and at the same time bridge the gap between present unsatisfactory conditions and a reasonable ideal of healthful housing. It may be taken for granted that one object or the other may be achieved, and it should be the aim in policy and design to achieve both

to the greatest extent that is practicable. However, in any given development, the amount of saving in costs will be limited by the measure of improvement desired and obtained, or the degree of improvement will be limited by necessities of economy.

The effective aim may therefore be reduced to this formula of the needs, namely: to secure by design (*a*) a saving in costs of non-essentials and (*b*) such improvements of standards in respect to essentials as is practicable. Non-essentials include the construction of wide streets where narrow streets would do; the planning of lots of a width that is excessive for the type of building proposed; the erection of types of buildings that are inappropriate for the class of purchaser; and the forcing upon purchasers of the extravagant expenses of speculative and premature subdivision. Essentials include proper road access; satisfactory means of disposal of wastes; adequate supply of water, electricity, etc.; sufficiency of space on lots about buildings to give requisite light and air for health; and reservation of private and public open areas for recreation.

As suggested in Chapter VI, the greatest need may be expressed in specific terms as being to secure reasonably improved lots at one fifth of $3000 to $4500 in small cities, or $4500 to $6000 in larger cities. Unless this need is met, families earning from $1500 to $2250 in the former and $2250 to $3000 in the latter must either pay more than they can afford for the complete dwelling or have to put up with unsatisfactory local improvements.

It has to be conceded that before the essentials can be met, so far as the sites of dwellings are concerned, there must be some reduction of present prices of urban land and some modification of the plans and methods now commonly followed in constructing local improvements. What will be said presently with regard to questions of design indicates certain directions in which such modification may result in greater economy and more efficient and healthful conditions, but takes it for granted that the problem of land prices must be solved separately if the benefits of more intelligent planning are to be realized.

There are recent indications of a public realization of the need of adjusting prices of land to proper uses of land. Circular No. 1 of the Federal Emergency Administration of Public Works, issued on July 31, 1933, significantly states that the basis for value of land to be used for housing schemes should be the "earnings reasonably to be anticipated from its use for low cost housing. Costs in excess of such value, whether

based on speculative considerations or on the alleged value of the land for other purposes, will not be recognized."[1] The Administration expresses a preference for land which will not be so high priced as to prevent the provision of ample space about buildings. This should be made a definite requirement according to some prescribed standards.

COST OF LAND

The cost of land affects all the questions discussed with regard to blocks, streets, and lots. Two contradictory statements are often made: first, that the price of land does not influence house prices or rents in a material degree; and second, that the only way to obtain an economic return on high-priced land is to erect buildings of an excessive density and bulk so as to carry the high land cost.

Obviously, low-priced houses should be built on low-priced land. The cost of an unimproved lot should not exceed from 5 to 7 per cent of the total cost of a home, including the lot and local improvements.

In *Neighborhoods of Small Homes* this ratio is supported by evidence obtained in cities in both the United States and England. For example, evidence collected from 23 cities by Mr. Robert Whitten showed that the acreage value of land suitable for houses costing $5000 or less ranged from $500 to $1900.[2] After conversion of this land into lots, and allowing for carrying charges and for loss of area in streets and playgrounds, the bare land in lots would probably need to be priced at 150 per cent more than the "wholesale" acreage price. Thus the price range for land in unimproved lots in the above case would be $1250 to $4750 per acre, or $125 to $475 per lot at 10 lots to the net acre. The former figure would be 4.16 per cent of $3000 and the latter 7.75 per cent of $6000. For small houses a reasonable price for unimproved land is $1000 per gross acre or $2500 per net acre in lots. This price of $2500 would represent approximately 7 per cent of a $3000 house with a density of 12 houses to the net acre, of a $4000 house with 9 houses, of a $5000 house with 7 houses, and of a $6000 house with 6 houses to the net acre.

A personal investigation of a subdivision in the city of Windsor, Ont., showed that on raw land costing $1772 per acre the ratio of land cost to the cost of a $3600 house and lot was 6.15 per cent. Studies of English schemes show 5 to 7 per cent as normal ratios in existing developments.

[1] *The Purposes, Policies, Functioning and Organization of the Emergency Administration*, Washington, Government Printing Office, p. 18.

[2] *Op. cit.*, p. 31.

For purposes of the present discussion of costs, I consider 7 per cent to be the desirable ratio for average suburban developments. It allows for the possibility of rough grading in advance of subdivision, which should be regarded as part of the land cost rather than as a local improvement cost. It allows also for the expense of reserving such local park and playground space as is essential to the neighborhood and properly part of the cost of the lot, in the same manner as is now done with street reservations.

Further it has to be borne in mind that acreage values of land that is "ripe" for development in cities mean values that have been created largely by general public improvements, such as the proximity of main highways and public utility services. Variation in values must depend partly on variation in the quality and accessibility of these improvements. The presence of satisfactory and conveniently located city improvements may make the 7 per cent for site alone in one district a better economic ratio than 5 per cent in another district.

Let us arrive at an estimate of a reasonable price for raw land in a different way. For small houses it may be assumed that the raw land should not cost more than 5 to 10 cents per square foot of lot. The smaller of these prices is double the $2\frac{1}{2}$ cents which Morris Knowles uses for a block study in *Industrial Housing*,[1] and the larger is the price quoted at Radburn in the New York metropolitan region.

Taking 2400 square feet as a desirable lot for houses costing from $3000 to $4000, the price of an unimproved lot would be $120 at 5 cents and $240 at 10 cents. Thus the ratios would be 4 and 3 per cent respectively in the first case and 8 and 6 per cent respectively in the second case. At $8\frac{3}{4}$ cents per square foot, a reasonable intermediate figure, the cost of a lot measuring 2400 square feet would be $210, or 7 per cent of the cost of a $3000 house; at the same price the cost of a lot of 3000 square feet would be $262.50, or 7 per cent of a $3750 house.

Thus, for the lowest-cost housing a price of between 5 and 10 cents per square foot would seem to be reasonable for completely unimproved land in lots of 2400 to 3000 square feet. A higher price would either force a more intensive development or lessen the amount of money available for building and local improvements to an undesirable degree.

The foregoing figures refer to minimum-sized lots for minimum-cost homes. It is of first importance to arrive at the smallest size that will meet essential needs. But I repeat that larger sizes and greater widths

[1] N. Y., McGraw-Hill Book Co., Inc., 1920, p. 17.

will be desirable so long as those who want them can pay for them. This means that, as a rule, such people should not spend more on the fully improved site than a sum equal to about 20 per cent of the total cost of the house and lot. Appropriate lot sizes for houses costing $4000 to $5000 would be from 3000 to 3600 square feet; and for houses costing between $5000 and $6000, from 3600 to 4200 square feet. Because this latter grade represents most of the current demand for houses in suburban areas on the part of the highest paid workers, it is the grade to which special consideration is given in subsequent studies of lots.

COST OF LOCAL IMPROVEMENTS

The local improvements that are essential to convert land into building sites include the following: (*a*) grading, paving, and sidewalk construction in local streets of varied width and character; (*b*) turf and planting; (*c*) local sewerage and drains, and their connections to buildings. The original rough grading of the land, which may be required to adapt "acreage land" for building sites, should be considered as part of the "unimproved" land cost, although it is usually merged with the improvement cost. On the other hand, the cost of the finished grading which is necessary to adjust the street and lot levels and the approaches to buildings may be appropriately divided between the local improvement cost and the building construction cost. This latter item should include the landscaping of the lot, the entrance paths, fences, and the water and sewer connections on the lot. Other improvements will be charged for in taxes. These include street lighting, part of the water supply (as, for example, for fire protection), the main sewers that constitute part of the general sewage-disposal system, and the extra widths of highway that are required for through traffic as distinguished from the traffic incidental to the building development. In the latter connection, it would be proper for public authorities to assume the cost of constructing any width of pavement over 30 feet in streets primarily devoted to residence.

If we limit the meaning of the term "local improvements" in the manner suggested above, it is obvious that it covers a much smaller cost than if we regard it as comprising all the public utilities and paved thoroughfares within the area considered.

It is seldom that comparisons can be made between different estimates of the cost of local improvements. Many of these estimates do not include the same items; and even when they do, they are still not comparable owing to differences in local conditions, including prices and

qualities of construction. But the most frequent differences arise from the fact that most estimates refer to different degrees of completeness or of elaboration in construction of the same things, such as paving and planting of streets. These are reasons why estimates vary from below $10 to above $30 per linear foot of street frontage.

There is room for difference of opinion with regard to what should be included. What I have suggested may be open to question in some respects, *e.g.* the separation of the cost of grading of land so that part of it is assigned to land cost, part to local improvements, and part to building construction. Yet unless this is done, no comparison can be made between the values of two pieces of raw land, one of which is marshy or hilly and the other naturally adapted for building. Nevertheless, there is a sense in which all works of construction, except self-supporting utilities, should be included as items in estimating the cost of local improvements.

However, I regard it as logical and desirable that a distinction should be made between (*a*) those general public improvements that are paid for through taxation, (*b*) those utilities and services such as gas and electricity which are paid for in monthly service charges, and (*c*) those local improvements, such as streets, sewers, and drains, that are necessary for the complete equipment of the house and lot and are strictly part of their capital cost, even when as a matter of convenience to owners, this cost is met by the municipality and recovered by special assessment.

General experience and examination of data prepared by different authorities during the last five years show that complete local improvements within the limitations suggested will cost from $12 to $16 per linear foot frontage of lots. In *Neighborhoods of Small Homes,* $8.85 is given as an average figure in moderate-sized cities and $12.28 in cities of over 300,000 population.[1] These figures are not for complete improvements and in normal cases would be subject to additions to complete them and also to cover profits of developers and the losses that are usually incidental to expending capital in advance of sale. A study of the costs and calculations of reasonable allowances for extra charges gives $16 per foot frontage in developed parts of cities as a reasonable figure under average conditions in an economically sound development. It is not desirable, however, to fix a standard price per foot, for great variations in cost per lot must exist as a result of differences in the layout of land, width and

[1] Whitten and Adams, p. 34.

standards of construction of pavements, sizes and shapes of blocks and lots, and arrangement of buildings.

The following table, based on certain assumptions as to sizes and widths of lots and on the foregoing prices, gives a picture of the possible cost of land and local improvements for small houses.

Total cost of house and lot	$3000	$4000	$5000	$6000
Size of lot (in sq. ft.)	2400	3000	3600	4500
Cost of raw land (7% of total cost of house and lot)				
Per lot	$210	$280	$350	$420
Per sq. ft.	$0.088	$0.093	$0.097	$0.093
Width of lot frontage (in lin. ft.)	25	30	40	45
Local improvement cost at $16 per lin. ft. of frontage	$400	$480	$640	$720
Total cost of lot	$610	$760	$990	$1140
Ratio of lot cost to total cost	20.3%	19.0%	19.8%	19.0%
Portion of total cost available for building	79.7%	81.0%	80.2%	81.0%

This table illustrates how under certain given conditions of a normal kind the cost of an improved lot is approximately 20 per cent of the total cost of the house and lot, 7 per cent being for land and 12 to 13.3 per cent for local improvements. In data obtained from 38 builders in 25 cities, ranging in population from 50,000 to over 500,000, Mr. Whitten found the percentage relation of average value of improved lot to average price of house and lot to be 20.2, ranging from 17.7 in small cities to 25.7 in large cities.[1] A comparable English ratio in cases investigated was about 22 per cent.

RELATION OF FRONT-FOOT TO SQUARE-FOOT COSTS

Mr. F. L. Olmsted, Jr., in a paper on "Land Subdivision from the Point of View of a Development Company," read before the Fourth National Conference on Housing, analyzed the relationship between front-foot costs and square-foot costs in an effort to determine what shape of lot will give the greatest value for a given expenditure. This study is of special value in considering possible reductions in costs of local improvements.[2]

As a convenient index for expressing this relation in figures, Mr. Olmsted adopted as an arbitrary convention the cost per front foot in dollars divided by the cost per square foot in cents. He pointed out:

[1] *Op. cit.*, pp. 33–34.

[2] In *Proceedings of the Fourth National Conference on Housing*, Minneapolis, Oct. 6, 7, and 8, 1915, pp. 158–174.

Thus a development in which the lots had cost 5 cents a square foot plus $5 a front foot would have an index figure of 1.0 . . . while a development in which the cost had been 5 cents a square foot plus $10 a front foot would have an index figure of 2.0, and one in which the cost had been 10 cents a square foot plus $5 a front foot would have 0.5 for an index figure.

In a chart prepared by Mr. Olmsted, which is reproduced in Figure 22, he takes as a starting point a lot of minimum depth, namely, fifty feet, and facing on a forty-foot local street.

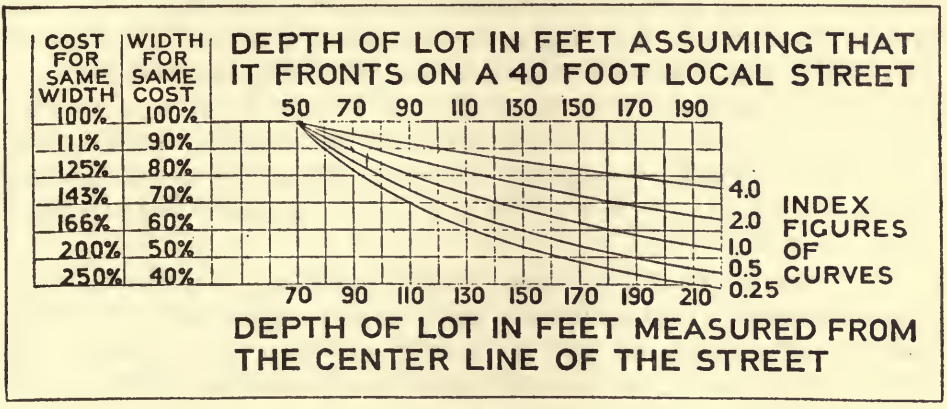


FIGURE 22

The width of this shallow lot is taken as a standard of measurement and is called 100 per cent. Its width in feet may be anything you choose to assume without affecting the use of the chart. Starting from the rear corner of this lot are curves which show, for various index figures, by what percentage the width of the lot must be reduced as its depth is increased in order to keep its total cost the same, and the percentage by which the cost will be increased if the width remains the same. Thus, for the normal index curve of 1.0, if the fifty-foot depth is increased to seventy-five feet, the lot width must be decreased to 87 per cent of the original unit, or the cost increased 15 per cent. . . .

Let us read the chart another way, still using the index curve, 1.0. It shows that you can take your choice, for the same money, between a 50-foot square lot, or one 45 feet wide and 69 feet deep, or one 40 feet wide and 92 feet deep, or one 35 feet wide and 123 feet deep, or one 30 feet wide and 164 feet deep.

The chart also reveals that the larger the index figure, the greater will be the cost incurred for extra width of lot.

Taking the index curve of 0.25 on the diagram, . . . we find that what we save by reducing the width 10 per cent (instead of enabling

us to increase the depth from 50 feet to 102 feet as with an index of 4.0) enables us to increase it only to 60 feet, and a reduction of 20 per cent in width would compensate for increasing the depth only to 74 feet.

Basic costs determining the various index figures were the cost of raw, *i.e.* undeveloped land (and this ranged from 1 to 10 cents per square foot, or from $435 to $4356 per acre, with considerably higher figures near great cities), and the cost of local improvements.

At 1915 prices, Mr. Olmsted estimated that local improvements (including a sewer, a narrow macadam pavement, sidewalks, curbs, and street trees) could be provided at the equivalent of from $6.66 per linear foot to $13.33 per linear foot of street, the latter being for construction of a high-class and thoroughly improved suburban local street. Construction costs of main streets or thoroughfares for a gridiron arrangement of streets were considered as likely to be one cent per square foot, falling in some cases as low as half a cent or less, and perhaps rising as high as two or even three cents.

The value of this study is that it suggests methods of working out the relationship of the cost of different widths and depths of lots in a gridiron pattern. Obviously, as land is cheaper and local improvements are dearer, the economy of limiting widths and extending depths of lots would be proportionately greater.

LOT COSTS IN RELATION TO PLATTING METHODS

In 1932 some study was made of the costs of lots based on certain theoretical designs prepared by Mr. Walter Baumgarten, in consultation with me, at the School of City Planning of Harvard University.

The report on this study, which was presented to the President's Conference on Home Building and Home Ownership,[1] discussed matters which have already been reviewed in these pages.

The cost of raw land was taken to be $.0343 per square foot or roughly $1500 per acre. Costs of local improvements were based on the unit prices prepared by Mr. Robert Whitten which are quoted in Appendix 1. Park improvements were also charged against the developments.

Different diagrams were prepared illustrating varied methods of arranging streets and lots and relating them to the actual sites of buildings. These are here reproduced as Figures 23–27.

These diagrams are of interest in showing special combinations in the layout of streets, blocks, and lots. The relative cost of development

[1] See Vol. I, Report of Committee on Subdivision Layout, pp. 85–124.

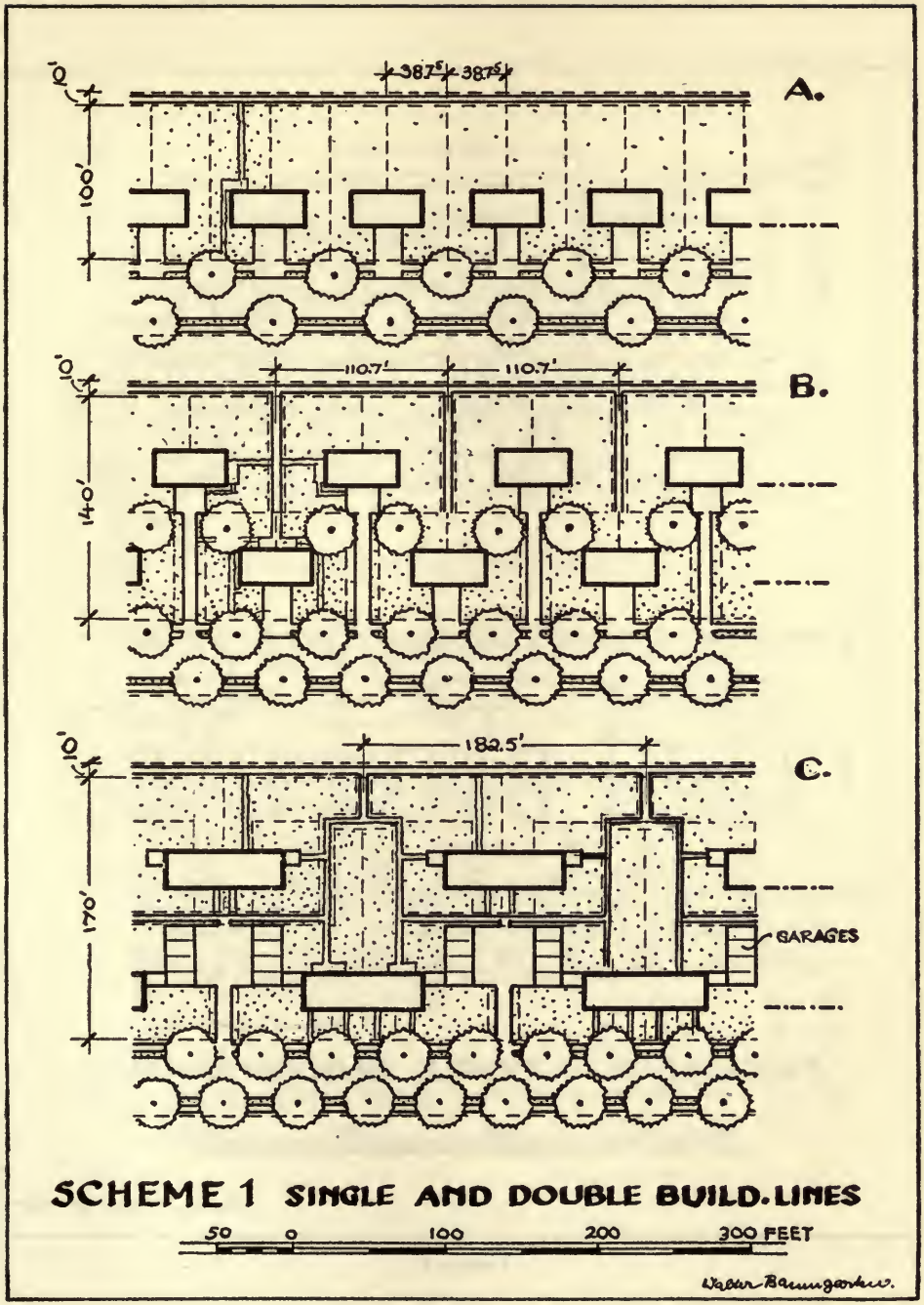

A.
B.
C.
110.7'
110.7'
182.5'
GARAGES
SCHEME 1 SINGLE AND DOUBLE BUILD. LINES
50 0 100 200 300 FEET

FIGURE 23

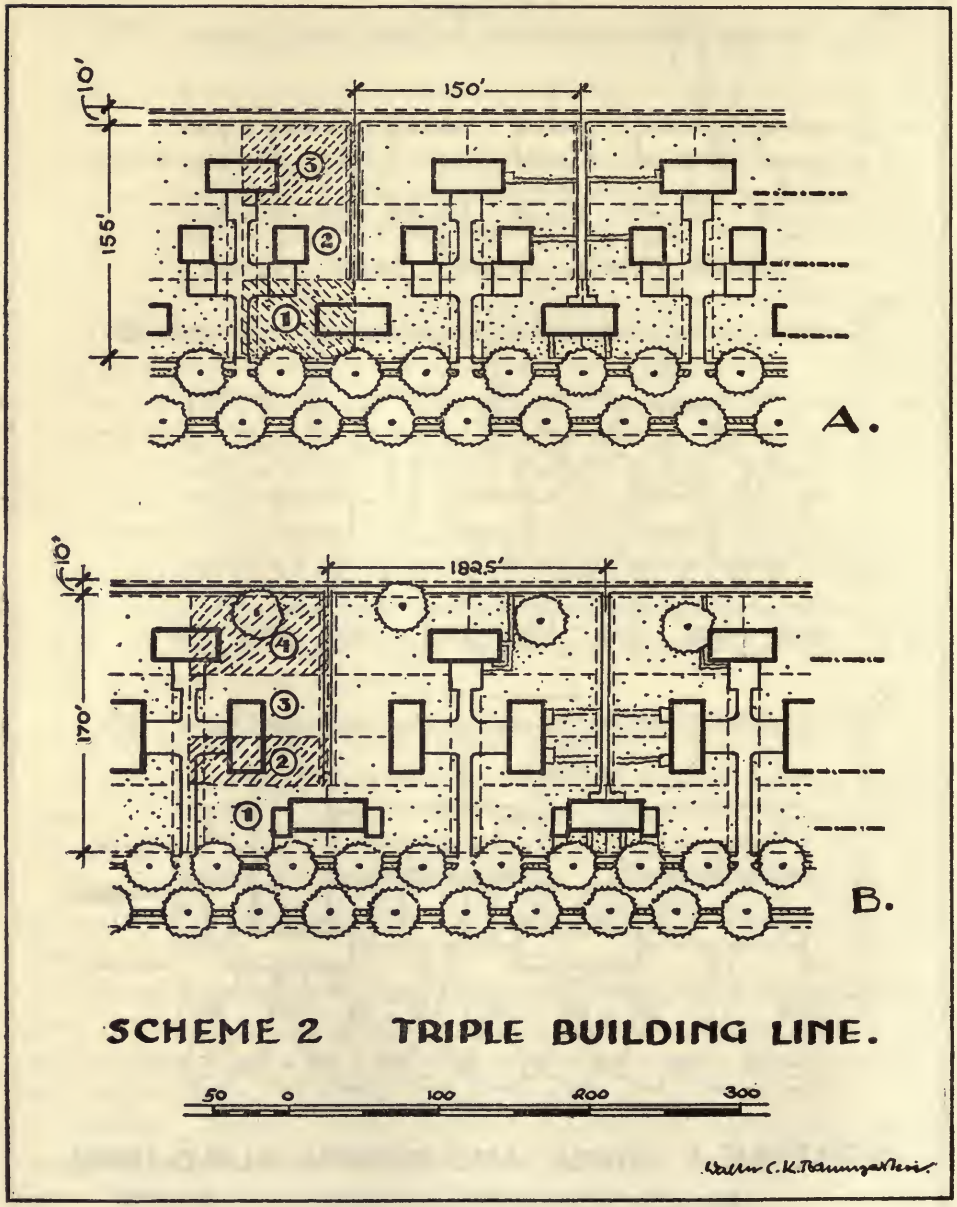

10'
150'
155'
A.
10'
182.5'
170'
B.
SCHEME 2 TRIPLE BUILDING LINE.
50 0 100 200 300

FIGURE 24

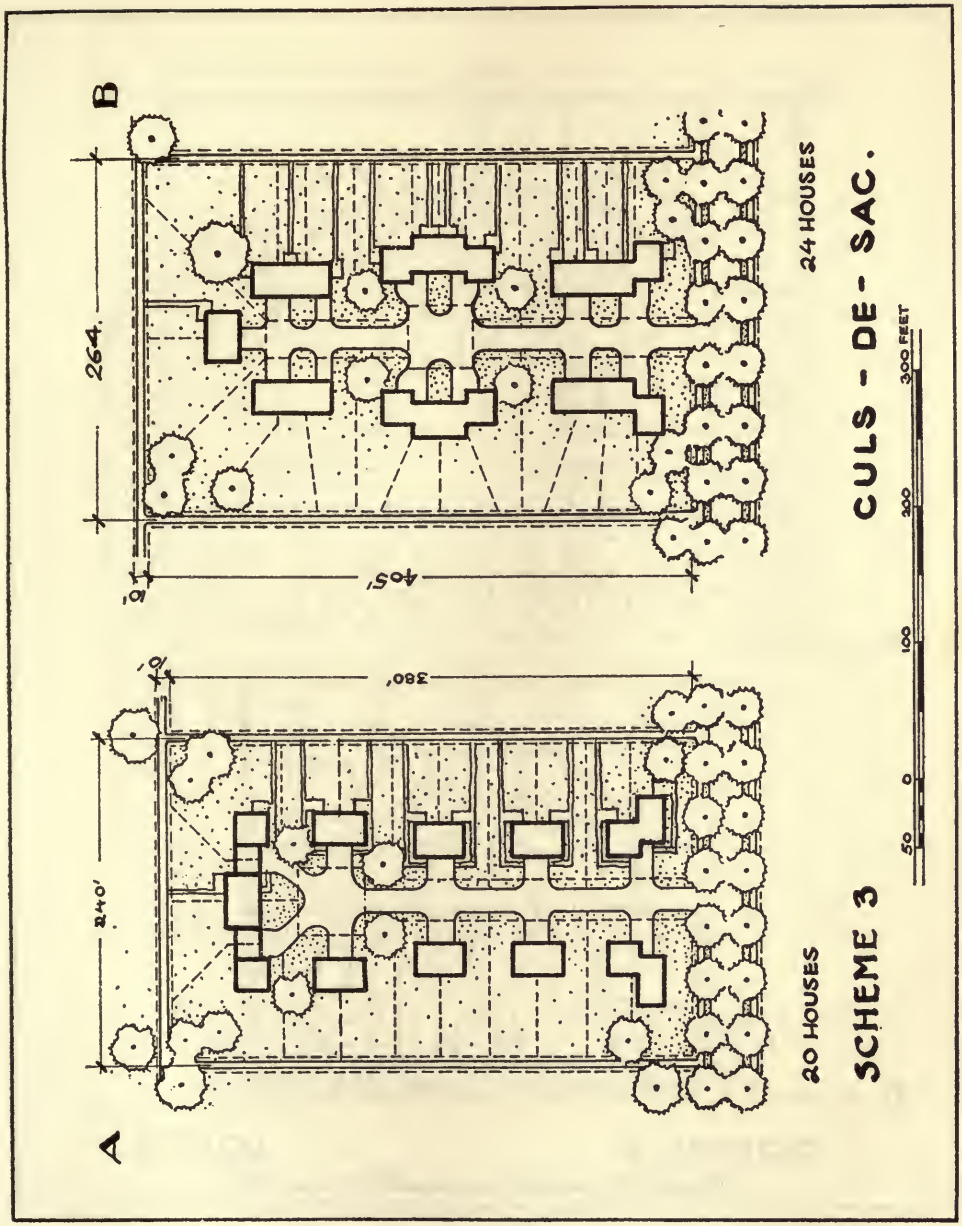

B
264.
405'
6'
24 HOUSES
CULS - DE - SAC.
SCHEME 3
300 FEET
200
100
0
50
A
380'
240'
20 HOUSES

FIGURE 25

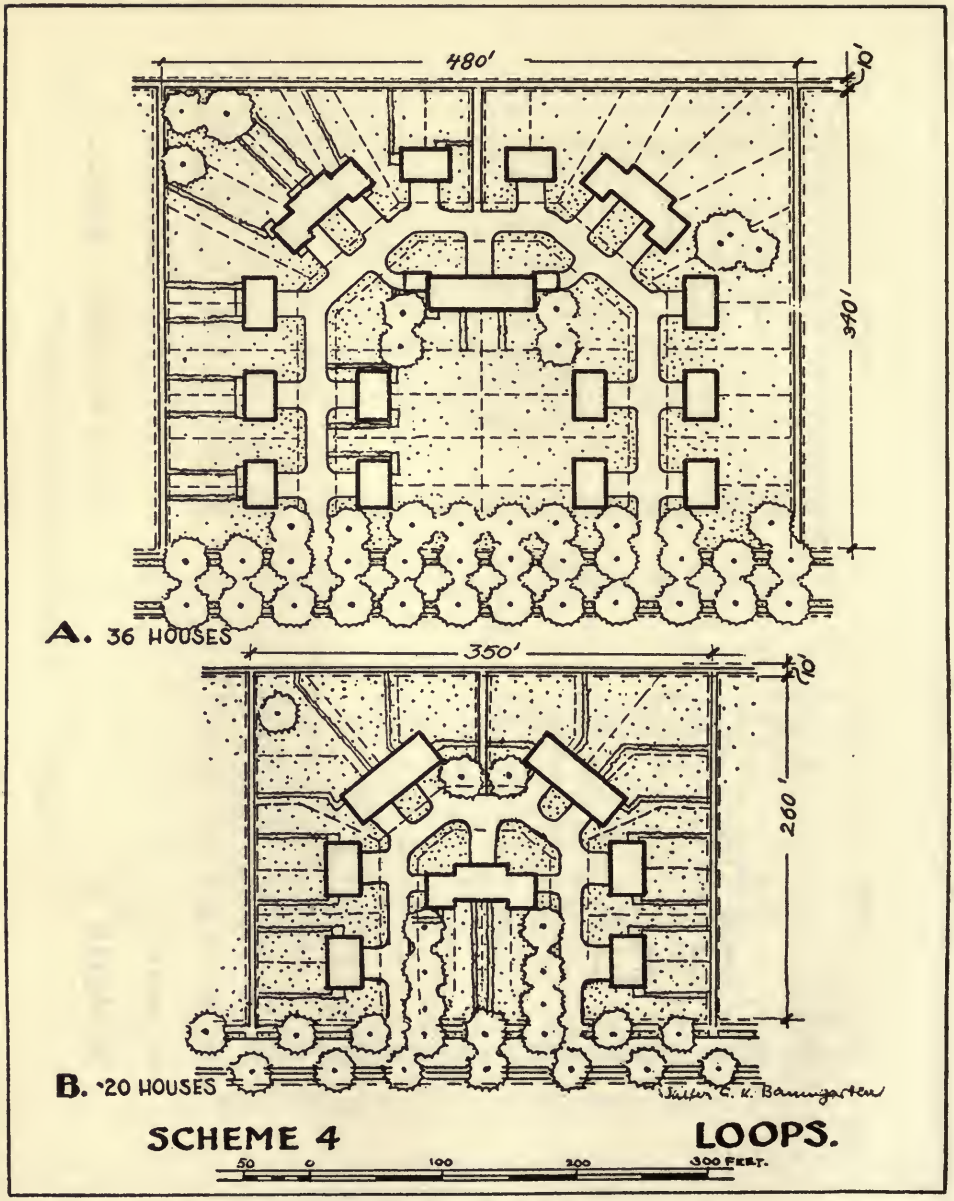

480'
10'
340'
A. 36 HOUSES
350'
10'
260'
B. 20 HOUSES
Miller C. K. Baumgarten
SCHEME 4
LOOPS.
50 0 100 200 300 FEET.

FIGURE 26

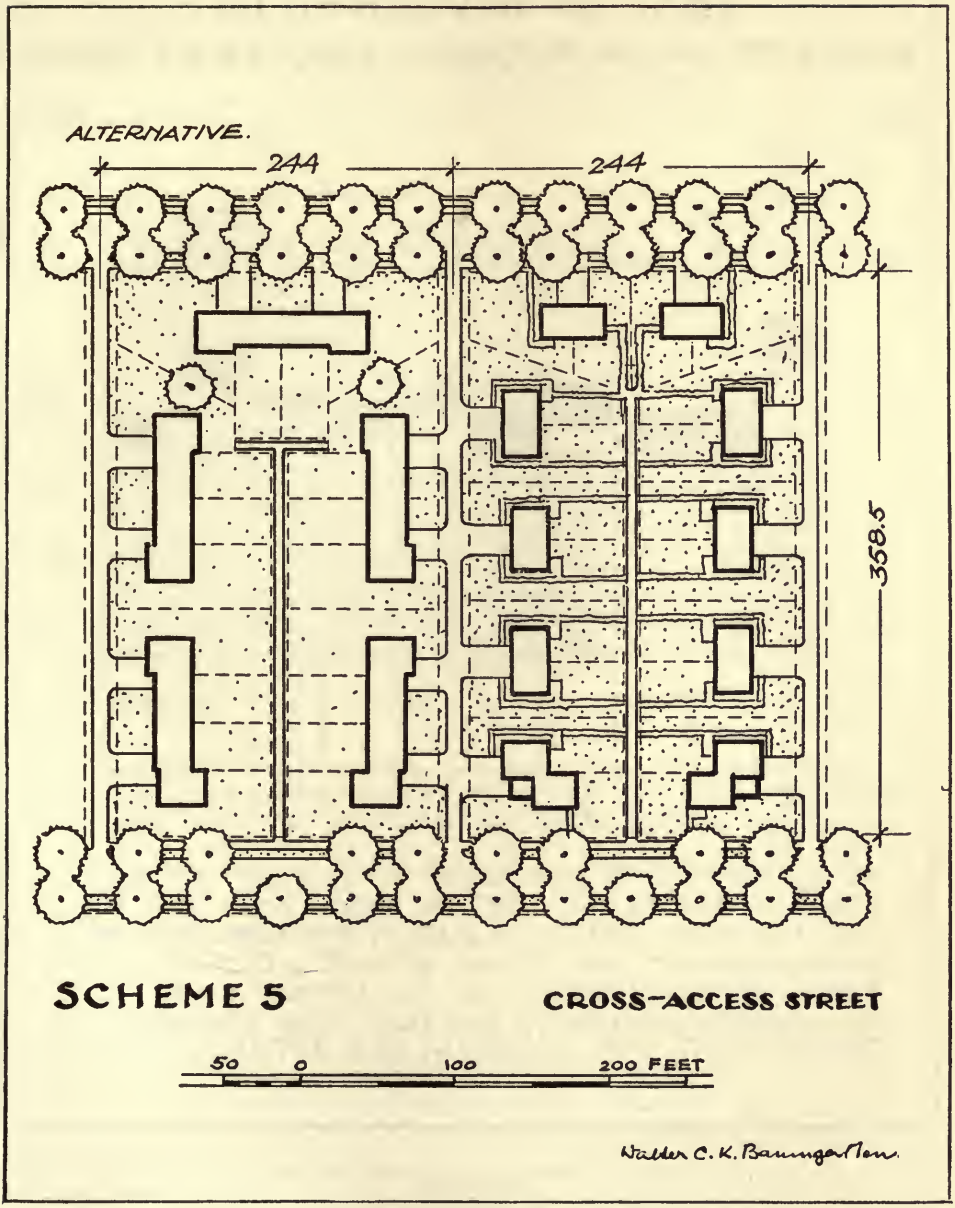

ALTERNATIVE.
244
244
358.5
SCHEME 5
CROSS-ACCESS STREET
50 0 100 200 FEET
Walter C. K. Baumgarten

FIGURE 27

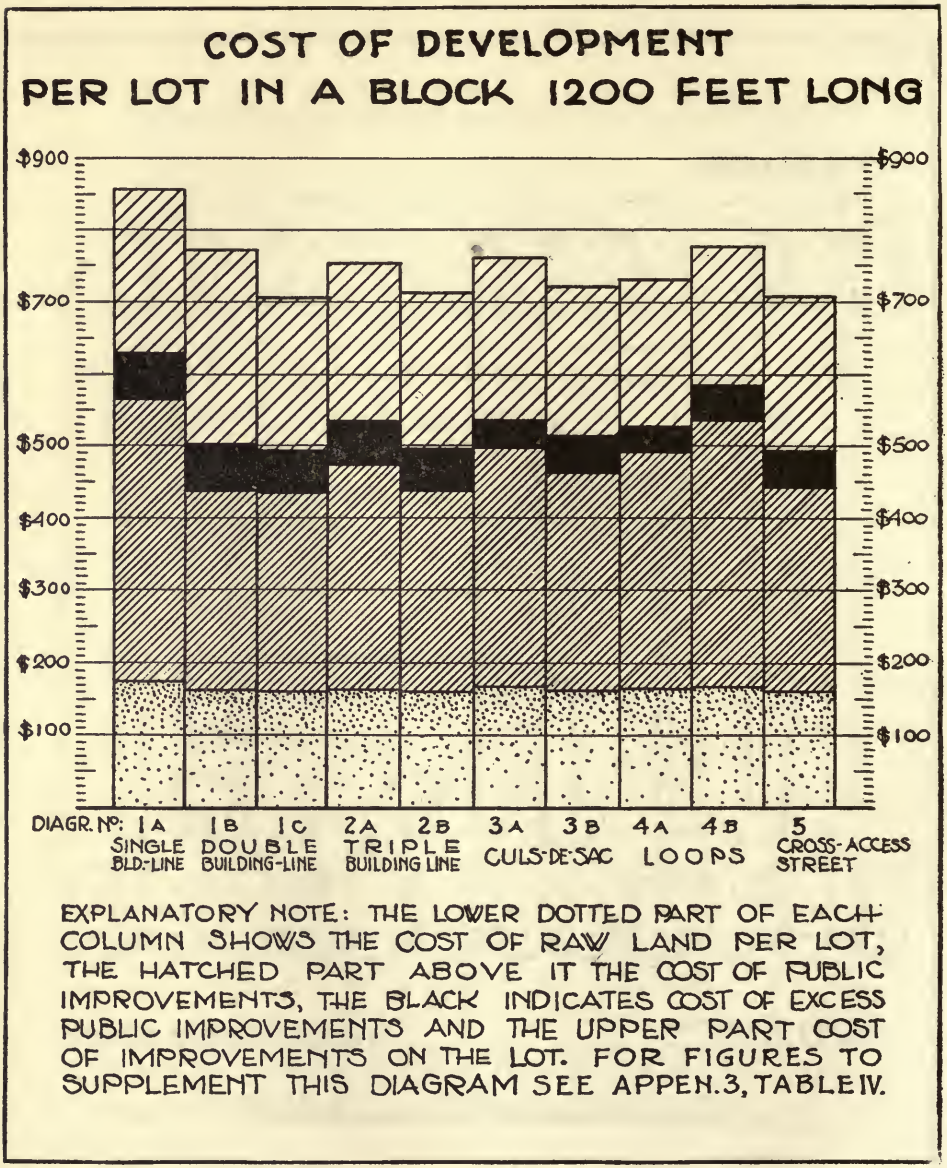

COST OF DEVELOPMENT
PER LOT IN A BLOCK 1200 FEET LONG
$900
$700
$500
$400
$300
$200
$100
DIAGR. Nº: 1A 1B 1C 2A 2B 3A 3B 4A 4B 5
SINGLE BLD.-LINE
DOUBLE BUILDING-LINE
TRIPLE BUILDING LINE
CULS-DE-SAC
LOOPS
CROSS-ACCESS STREET
EXPLANATORY NOTE: THE LOWER DOTTED PART OF EACH COLUMN SHOWS THE COST OF RAW LAND PER LOT, THE HATCHED PART ABOVE IT THE COST OF PUBLIC IMPROVEMENTS, THE BLACK INDICATES COST OF EXCESS PUBLIC IMPROVEMENTS AND THE UPPER PART COST OF IMPROVEMENTS ON THE LOT. FOR FIGURES TO SUPPLEMENT THIS DIAGRAM SEE APPEN. 3, TABLE IV.

FIGURE 28

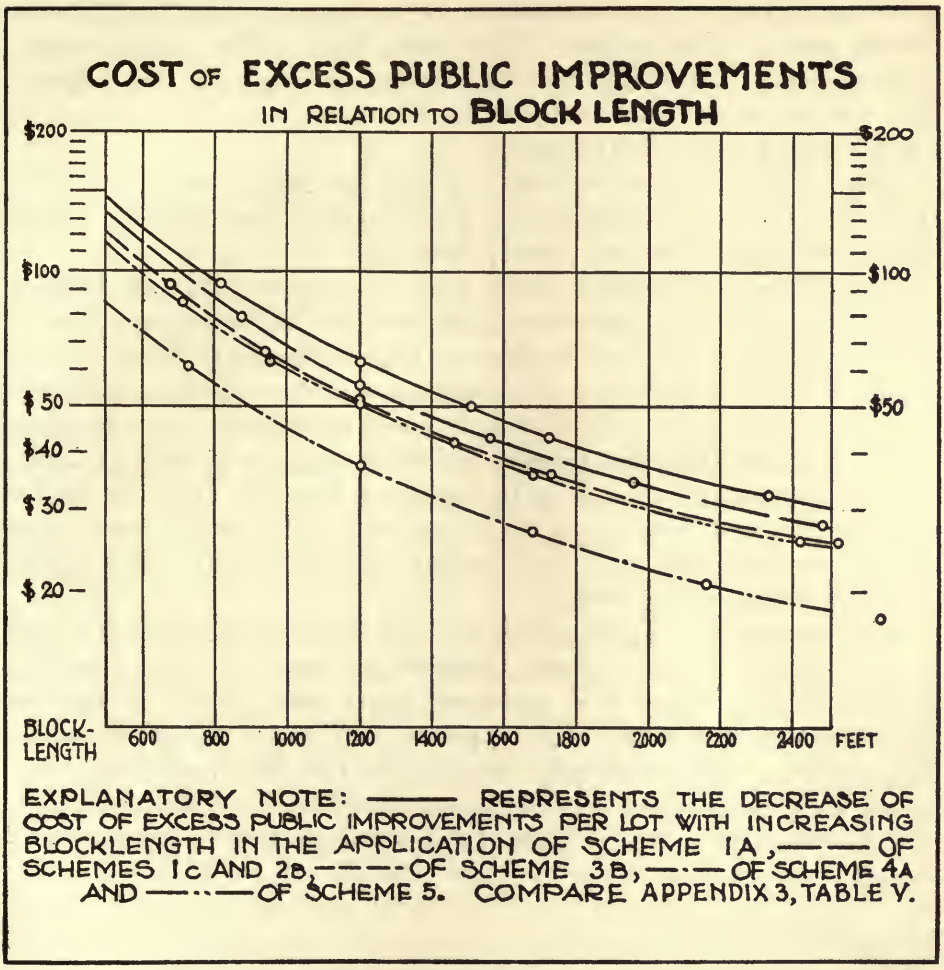


FIGURE 29

per lot for each combination in a block 1200 feet long is shown on Figure 28. The gridiron, as the simplest pattern of streets and cross streets, has been assumed as the street layout of the area on which calculations have been based. The cost of improvements on the lot itself and of improvements which normally lie in the street in front of the lot would represent the total construction cost of each development if it were possible to locate such a development along one street in infinite repetition. Cross streets, however, are required to provide means of intercommunication, so that a block system involves costs in excess of those which

occur along the main access streets, *i.e.* of improvements on the cross streets and at intersections. These have been called "excess public improvements" and their cost represented in black on the diagram. The rate at which this cost per lot decreases with the increase of block length is shown by Figure 29.

While this study does not afford a basis for definite conclusions as to the selection of a particular type of development, it does indicate certain values and limitations that go with each type.

Apart from the interest which may be provoked by the different arrangements in the designs, the real interest lies in the diagram showing comparative costs. It will be observed that the single building line, *i.e.* the usual straight formation of houses along a street front, is the most costly, and that the double building line and cross-access street methods are the cheapest; but that there is very little variation in cost among the other arrangements. It has to be admitted, however, that the double building line and cross-access street arrangements may involve more expense for maintenance to the property owners owing to the presence of closed-end places and walks.

Leaving out the single building line (Fig. 23) and the loop (Fig. 26) types of design, we have a fairly uniform cost level in the neighborhood of $700 per lot, which is a minimum figure and because of the low basic prices used, would probably have to be increased by 25 per cent in most districts. The uniformity of cost shows that the question of choice among these patterns must be settled on the basis of which is most suitable for the land and most likely to prove acceptable to purchasers of houses.

REPLATTING EXISTING BLOCKS

Since so much land in the environs of cities is already subdivided, it is desirable to consider what modification, if any, can or should be made in the existing platting in order to secure more economical development.

The chief weakness in most block patterns in existing rectangular subdivisions is that the blocks are too small. This fact, together with the excessive width of most of the boundary streets, has been a major factor in making building sites expensive. But modification of the existing pattern, even where few local improvements have been carried out, is very difficult. Where it is practicable, the simplest modification is to omit some streets, thereby obtaining larger blocks whose interior

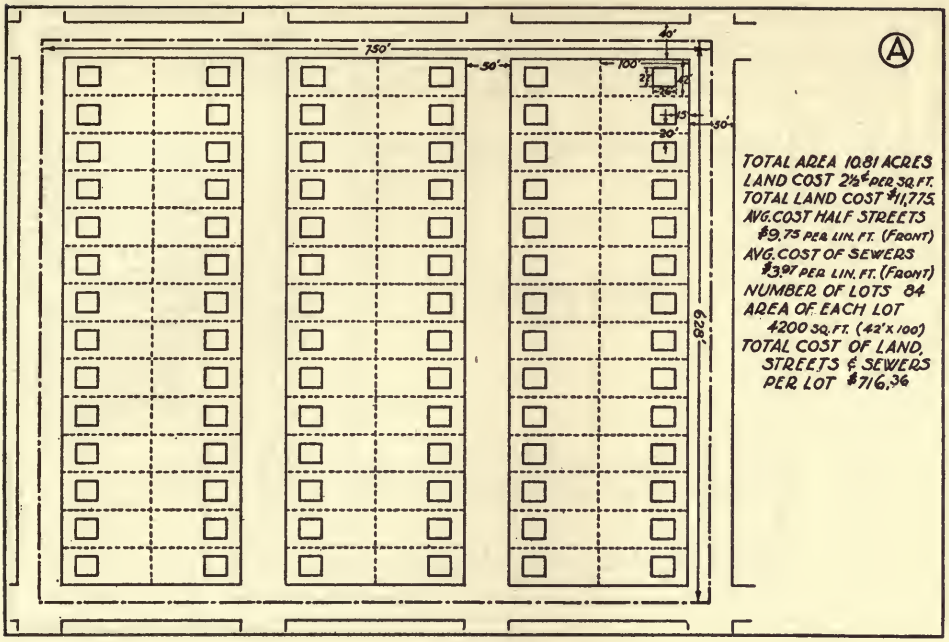


FIGURE 30

spaces may be developed as small parks. To do so may be much more economical than to adhere to the existing street system.

For the purpose of illustrating this suggestion, I have made four replatting studies for an area composed of three blocks, each 588 by 200 feet and surrounded by 50-foot major streets and 40-foot secondary streets. (See Figs. 30–34.) These are the dimensions used by Morris Knowles for the typical block of single houses in the assumed town plan on which he based his study, "The Relation of Size of Lots to Cost of Utilities and Street Improvements in Low Priced Housing Developments," prepared for the President's Conference on Home Building and Home Ownership.[1] It will be observed that the raw land cost is 2.5 cents per square foot. The local improvement costs are summarized on each diagram and are set forth in more detail in Appendix 2.

Plan A shows the arrangement of this area on the gridiron system, with 84 lots, measuring 42 by 100 feet and costing $716.36 each for land, streets, and sewers. The center lines of the streets surrounding the area are taken as the boundary for replatting. In every proposal except

[1] Vol. I, Report of Committee on Utilities for Houses, pp. 147–162.

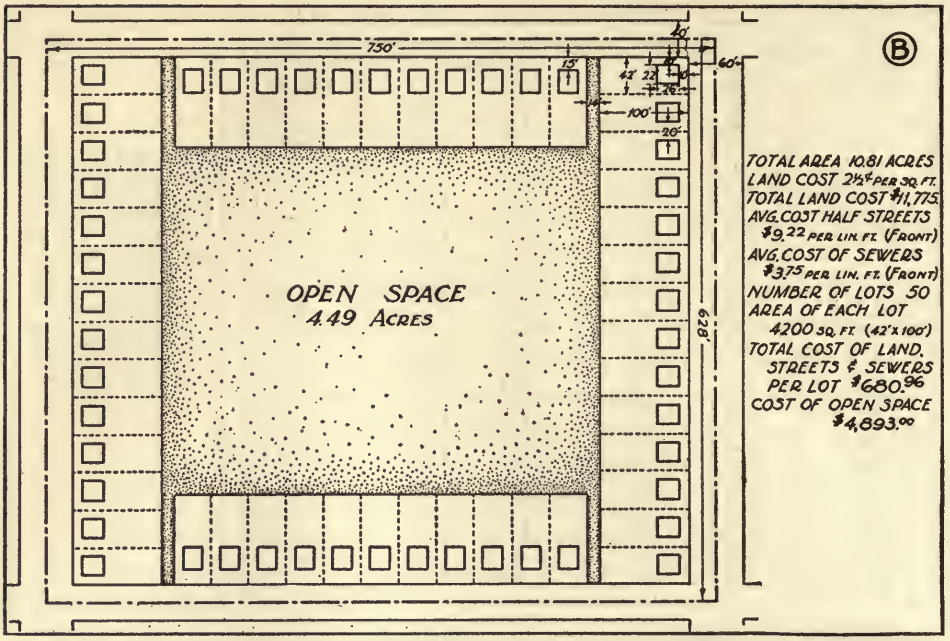


FIGURE 31

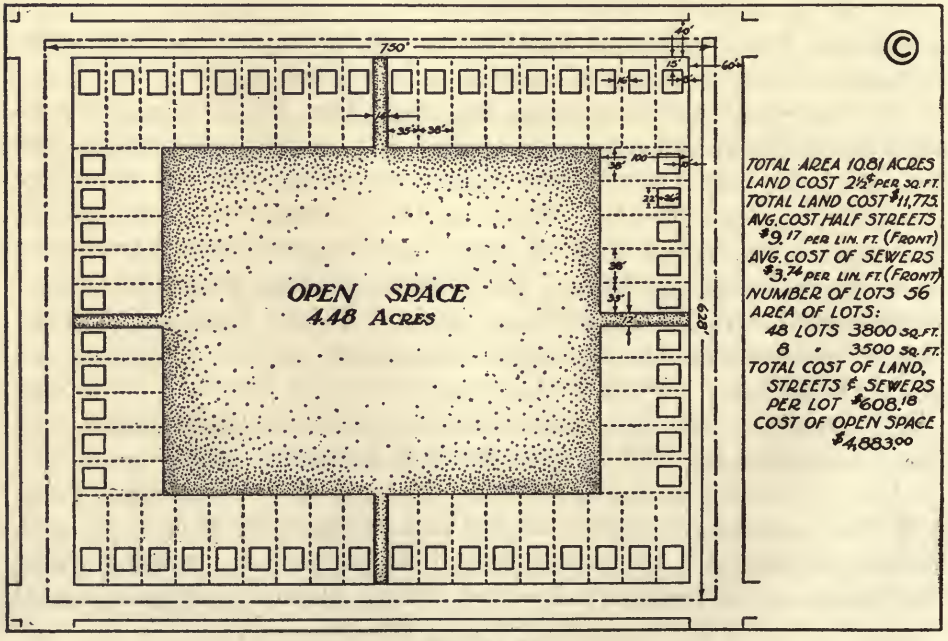


FIGURE 32

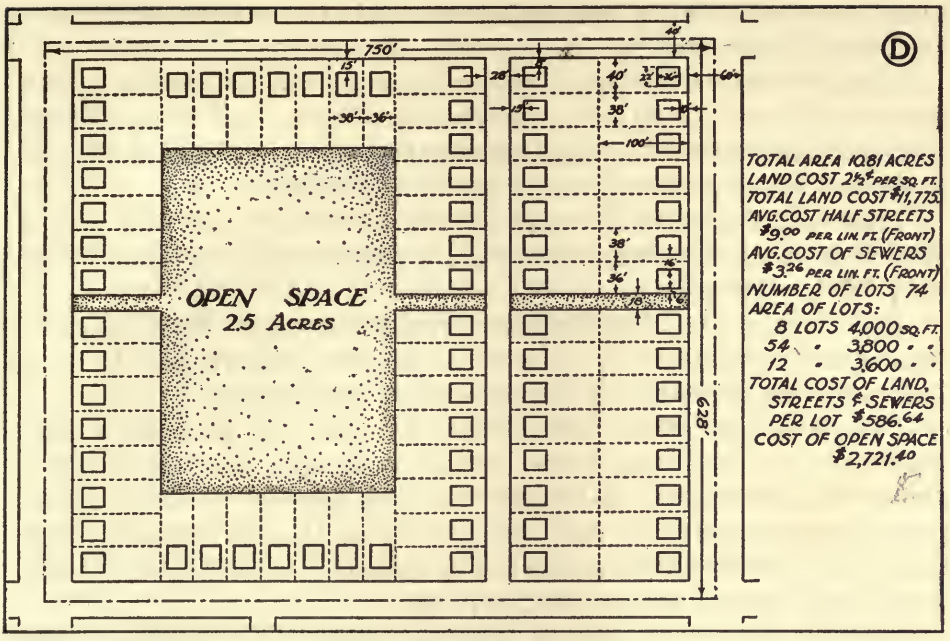


FIGURE 33

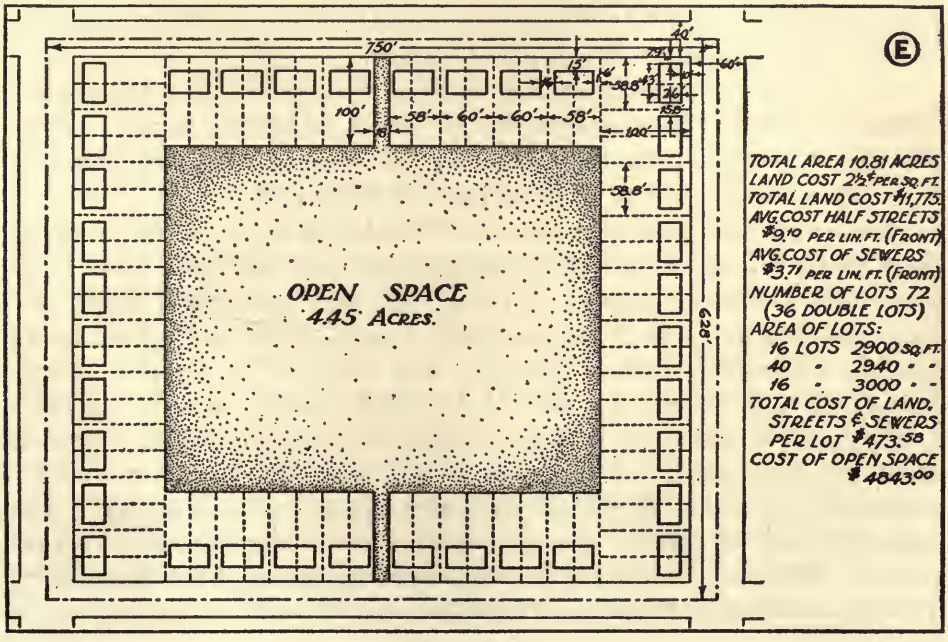


FIGURE 34

Plan D, the cross streets have been eliminated and the three blocks have been thrown into one.

Plan B shows the conversion of the interior of this new enlarged block into a small park of 4.49 acres, and provides 50 lots, each 42 by 100 feet and costing $680.96. The apportionment of the cost of the open space to the lots would increase the cost per lot to $778.82.

Plan C is similar to B except that it provides 56 lots at a cost of $608.18 each, which would be increased to $695.38 with pro rata addition of the cost of the park.

Plan D attempts a less expensive arrangement, with more lots and a smaller park area, probably too small for efficient supervision. It shows 74 lots costing $586.64 or, with park cost added, $623.41.

Plan E is platted for semi-detached houses and presents a more economical and otherwise better arrangement than the preceding diagrams, all of which are platted for detached houses. It shows a park area of approximately the same size as in B and C, but provides 72 lots ranging from 2900 to 3000 square feet in area and costing $473.58 or, with cost of park area added pro rata, $540.84.

In these plans it is assumed that side yards will be necessary, and adequate side yards are provided in every case. The distance between houses in plans A and B is 20 feet; in plans C and D it is 16 feet; and in plan E, along the major street, it is 15.8 feet.

The 15-foot setback in plan A is retained throughout along the 40-foot streets, but along the major streets a 10-foot setback is used. In the latter case, however, the distance between building fronts remains the same, since the street was widened from 50 to 60 feet.

Whereas plan A provides lots of sufficient area for healthful housing, plans B, C, D, and E provide more desirable arrangements from both social and economic points of view. All four patterns provide for fewer families per acre than does plan A, and at the same time make possible appreciably lower costs per lot, even (with the sole exception of plan B) when the cost of the park area is added pro rata. Economy is obtained by savings of 26.7 per cent to 43.9 per cent in street improvements, 34.8 per cent to 43.8 per cent in sewers and by assessing the cost of the central open area upon the municipality. The usual criticism of interior playgrounds is that of the expense of supervision. This may, however, be considered as having been transferred from the eliminated streets, and therefore as not being entirely an added cost.

Larger blocks than have been customary are desirable to reduce the number of traffic intersections. Plans B, C, and E eliminate four of the street intersections of plan A, thus improving traffic conditions on minor streets.

To compensate for the loss of two thirds of the major streets, those remaining are widened from 50 to 60 feet, the extra width going into pavement with the 26-foot paved roadway increased to 36 feet. The assembling of traffic in one third the number of major streets and the separation of through and purely local traffic into different streets allow for its more efficient and satisfactory handling.

In regard to sewers, savings ranging from 22 cents to 71 cents per linear foot of frontage are made possible by land platting as exemplified in plans B, C, D, and E, as contrasted with the standard gridiron pattern of plan A.

Plan A contemplates sanitary sewers on every major street and every second minor street. The saving effected by the elimination of two out of every three major streets is partly offset by the necessity of providing pipes in every minor street, as all four of the new designs provide lots along all sides of each block. Plan D also requires a sewer in the 28-foot cross street.

Storm sewers were included on one-half the length of major streets and intercepting lines on every second minor street in plan A. It is assumed, however, that in the other patterns with their smaller extent of impervious surfaces (67 per cent less major streets, fewer roof tops, drives, walks, etc.) and their large interior park areas, there will be considerably less run-off. Very little advantage is taken of this saving in calculating the development costs of the four new designs. The same sized intercepting lines are retained and collecting lines remain in the major streets, though reduced by two thirds in the process of eliminating two thirds of the original major streets.

So far, the land and local improvement costs that have been referred to in this chapter relate to suburban areas where acreage land is being subdivided into building sites. For the erection of small houses, lots of such land normally should be priced at not more than 10 cents per square foot in a "raw" state and 50 cents per square foot when fully improved. The results of the studies which have been described in this chapter will be found to afford some guidance in determining advantageous relations of width and depth of lots of land of this value.

When, however, we come to consider high-priced land, the question of the relation between the cost of the raw land and the cost of improvements becomes both more difficult and of less significance as the price rises. In the case of most developed land in cities, too long a time has elapsed since it was in a totally unimproved condition to allow its value apart from improvements to be ascertained; and secondly, when its sale value reaches any figure approaching $5 per square foot or $500 per front foot for a lot 100 feet deep, the amount that has been spent by the owner directly on street improvements is too insignificant to be considered. Thus the question of economy in street construction becomes of less and less consequence as land becomes dearer and dearer. At the same time, the ratio of the cost of the fully improved site for any residential building should, as far as practicable, remain at about 20 per cent, with a possible maximum of 25, in order that buildings may not be too crowded on the land or the amount spent on the construction of improvements too much restricted.

PROBLEMS OF HOUSING ON HIGH-COST LAND

For purposes of illustration I will take three areas near the centers of large cities on which land prices are respectively estimated at 65 cents, $7.50, and $13 per square foot of improved land, limiting myself to round figures that approximately represent actual conditions.

In one area within two miles of the center of a large city where a 10-cent commuting fare is in operation, the cost of a fully improved site for a model housing scheme comes to 65 cents per square foot. The total cost of 700 houses on this site is estimated as approximately $4,000,000, or about $5715 per house. The cost of the fully improved land is about $850,000 or slightly over 21 per cent of the total cost. This is for a normally healthful development with an average of 16 houses per gross acre and with adequate improvements including landscape treatment of streets and open spaces. The average area of land per family will be about 1800 square feet.

If the cost of this land were between $2 and $3 per square foot, the density of building would have to be increased in the proportion of almost 3 to 1 to meet the higher development cost and give houses of the same quality and price. Where the cost of the improved land exceeds from 50 cents to $1 per square foot, it is essential to erect multiple dwellings in order to obtain good construction and to keep within the range of prices or rents that can be paid by the majority who require houses. When we

get to land at $5 per square foot, we must have either overcrowded conditions or more expensive housing. At $7.50 per square foot a reasonable density is possible only for apartments that can be rented at from $30 to $37.50 per room,[1] — a figure which is beyond the means of the great majority of people.

When land reaches the high level of $13 or more per square foot, as it does in the Lower East Side of Manhattan, it can be used with propriety only for intensive business developments or for the most expensive apartment buildings of the skyscraper type. This does not mean that it is not possible to use parts of it for low-cost housing. Low-cost housing projects on expensive land, however, are likely to establish highly unfortunate precedents since they are necessarily of such high densities as to constitute a serious menace to health and an excessive burden on means of communication. In fact, proposals of this character are constantly being made, but, if carried out, they will only help to prove the futility of attempting to re-create any large section of the Lower East Side for healthful, low-cost housing on the basis of the present land prices.

It is not the purpose of this study to put forward specific proposals for dealing with slum clearance and re-housing on expensive land; but the foregoing reference to the subject indicates the immense difficulties involved in this type of re-housing, and the vital necessity of bringing the costs of land development in central as well as in suburban areas into such relationship with the total cost of buildings as will make possible reasonable densities and at the same time meet economic demands.

There is an awakening on the part of the public and of governments to the menace of the slum, but the greatest hope for amelioration of the long-established bad conditions in cities lies in creating object lessons in good housing on the open land in their environs. It is there that the opportunities exist for design of residential areas on enduring and sound economic lines, and it is there that the evils that have proved so difficult and costly to cure in the slums may be prevented in the future by wise planning of new developments.

The great cost of re-housing in already congested areas where demolition of buildings has to be undertaken and the cost of the land, including the clearance of the site, amounts to from $10 to $15 per square foot, makes the provision of healthful housing impossible on such sites without heavy public subsidies. At the highest of these figures only 40 square feet of improved land can be provided at $600, which is the cost of 2400

[1] See pp. 230–236.

square feet of improved land in a suburban district within easy commuting distance from centers.

Careful surveys of the housing conditions and requirements of a city should be made before any large housing or re-housing projects are undertaken, especially where it is proposed to advance public money for the purpose. It is not enough that each scheme be sound and well planned in itself; it should be sound and well planned in relation to the whole urban region in which it is situated.

GENERAL SUMMARY REGARDING COSTS OF LOTS

The more important points brought out in the foregoing discussion may be summarized as follows:

(1) While no definite rule can be followed in determining the sizes, shapes, widths, and depths of lots, it is desirable in planning areas for the smallest houses to keep lots to the minimum size that will permit of healthful conditions because of the necessity of limiting the cost of land and local improvements in relation to the cost of the completed dwelling.

(2) The minimum width of lots for detached houses should be 30 feet, for semi-detached houses 28 feet, and for row houses 25 feet, with a minimum lot area of 2400 square feet. Larger sizes and greater widths are desirable for houses costing more than $4000.

(3) In new subdivisions for lowest-cost housing, the cost of raw land should not exceed 5 to 7 per cent, and the cost of land and local improvements together should not exceed 20 per cent of the total cost of the house and lot. Thus, for houses to be sold for $3000 to $6000 the improved lot should not cost more than $600 to $1200. In all low-cost housing developments the cost of improved land should be limited as far as practicable to from 20 to 25 per cent of the total cost of the house and lot.

(4) Material reduction in costs of land development for housing can be obtained by adjusting the layout, width, and character of streets to actual requirements in each locality, instead of the prevailing method of making them conform to preconceived patterns and to general standards. The system of designing all streets as traffic streets is a cause of enormous waste of money and, on the whole, militates against convenience of traffic as compared with an arrangement of streets designed to serve different functions in accordance with a proper plan.

(5) The placing of buildings in straight lines along the frontage of streets is not necessarily the most economical system; there are many varieties of treatment that afford opportunities for saving costs, and per-

Clinton Mackenzie, Architect.

SOME OF THE MORE SPACIOUS SINGLE-FAMILY DWELLINGS.

Clinton Mackenzie, Architect.

THE INN.

PLATE IX. KINGSPORT, TENNESSEE.

(*See pages 243–245.*)

mit of a more interesting arrangement of buildings. No particular method of laying out lots and arranging buildings, however, can be suggested as being the most economical, even for all areas having similar topographical conditions, and still less for the wide variety of local conditions that exist.

(6) Land that is not required for business use may in certain choice and highly accessible locations in cities command prices of over $5 per square foot for expensive apartments suitable for renting at $20 per room and upwards, but such land is not suitable for low-cost housing.

(7) Every city should be the subject of a careful survey as to its housing needs, the rent-paying capacity of those who require houses, and the cost of sites in different localities in relation to the cost of buildings; and all housing projects should be coördinated with a general plan of the city and not planned as distinct units.

CHAPTER XII

THE HOME NEIGHBORHOOD PATTERN

THE "home neighborhood" may be either an integral part of a city or a separate residential community. In either case it has to be related to the civic pattern and to the major ways of communication, public park system, and principal centers of community life. In the suburban neighborhood within a large city, it should have certain distinct community characteristics of its own, although normally it is not so self-contained or independent in its community life as a detached village or town. Where, however, it is an integral part of a city, it may be nothing more than a collection of homes with perhaps some local provision for public worship, education, and shopping.

In dealing with the neighborhood pattern we have to face the detailed task of relating the ground plan to the conception of building development. The relation of the various uses of land and buildings to the form and structure of the physical development involves complex considerations. These include questions of future convertibility from one use to another, as well as the desirability of securing as great a degree of stability as possible. They include also the major question of securing desirable limitations of densities of building in the interest of health and general welfare. Related to this, as matters of social well-being, are the reservation of appropriate sites for local community buildings, the preservation of existing features of natural beauty, and the general street arrangement.

The primary considerations in the design of the neighborhood pattern are:

(1) The approaches and boundaries.

(2) The arrangement of local streets, squares, and public utilities.

(3) The distribution of residential areas for different types of dwellings, and the location of business districts.

(4) The appropriate place for centering community life and locating public and semi-public buildings.

(5) The sizes and shapes of blocks and lots, and the arrangement of neighborhood parks and playgrounds.

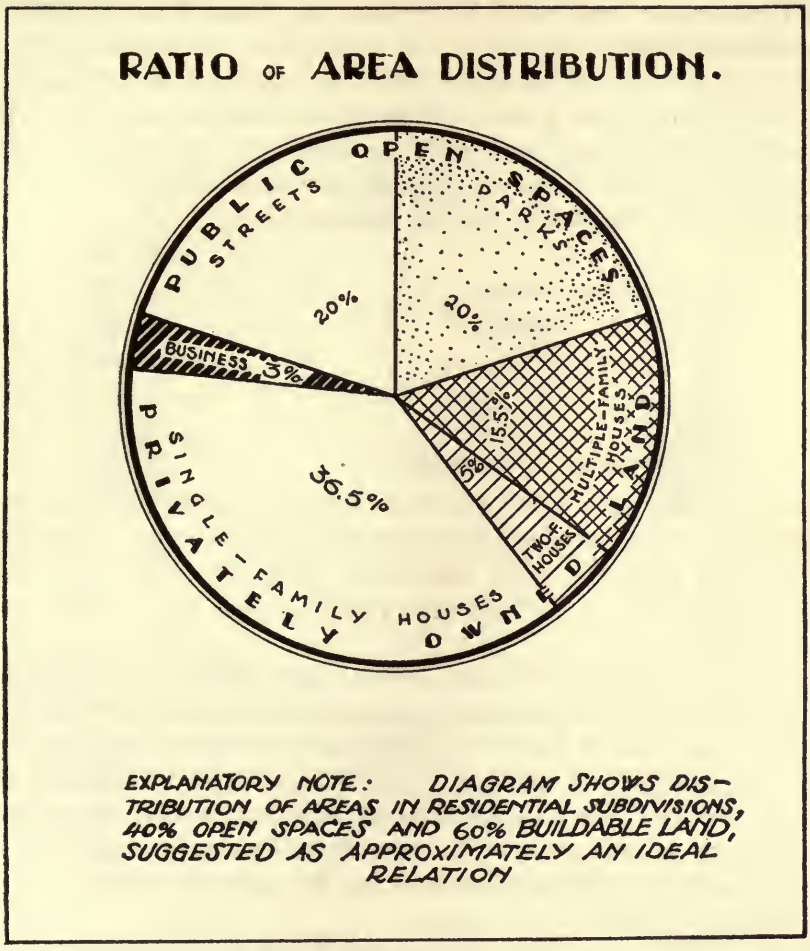


FIGURE 35

The sequence may be varied, but the above conforms to a good order of procedure, although all matters should be considered together in their related aspects in making the design.

THEORETICAL STUDIES OF SUBDIVISION

For a considerable time the Harvard School of City Planning was engaged in making theoretical studies of subdivision methods. Results of these studies, some of which have already been discussed in the previous chapter, and others now to be discussed, were embodied in a report

submitted to the President's Conference on Home Building and Home Ownership in 1932.[1]

The first concern of the study was to determine a theoretically desirable distribution of use areas in a residential neighborhood for a class of resident who could pay from $5000 to $6000 for a complete house and lot. In this specific instance, with no industrial area assumed, ratios, as designated on Figure 35, were as follows:

Use	Per Cent
Single-family houses	36.5
Two-family houses	5.0
Multiple houses	15.5
Business	3.0
Streets	20.0
Parks and school grounds	20.0

There was then prepared an abstract pattern of a neighborhood unit, indicating a theory of distribution of park and other use areas. (See Fig. 36.)

The chief problem to be considered in connection with the seven detailed patterns that were next worked out (see Figs. 37–43) is their relative economy.

The unit of 200 acres chosen allows at least 1300 lots for single-family houses, which would correspond to a density of 6.5 lots to the gross acre. This is the number of family accommodations that is provided in each case. The unit size of 200 acres proves to be more convenient than a "quarter section" for a neighborhood unit but is just as arbitrary a measurement as any other. It represents, however, about the upper limit within which walking distances, as, for instance, to the school and shopping center, are not too long.

Ratios of 60 per cent for buildable land and 40 per cent for open land were consistently applied. The area was assumed to be bounded by a public highway 130 feet in width, and thus provided with a 65-foot strip of open land around its periphery. Service roads were planned for each side of a central through route of four traffic lanes. Assuming that there could be allotted to this neighborhood additional open areas in main highways and in large public parks, this might increase the ratio of total open space that could be credited to the subdivision to 50 per cent.

Interior streets were made 50 or 40 feet wide according to their importance. The dimensions of all streets used are set forth in Figure 20, on page 153.

[1] Published in Vol. I, Report of Committee on Subdivision Layout, pp. 85–124.

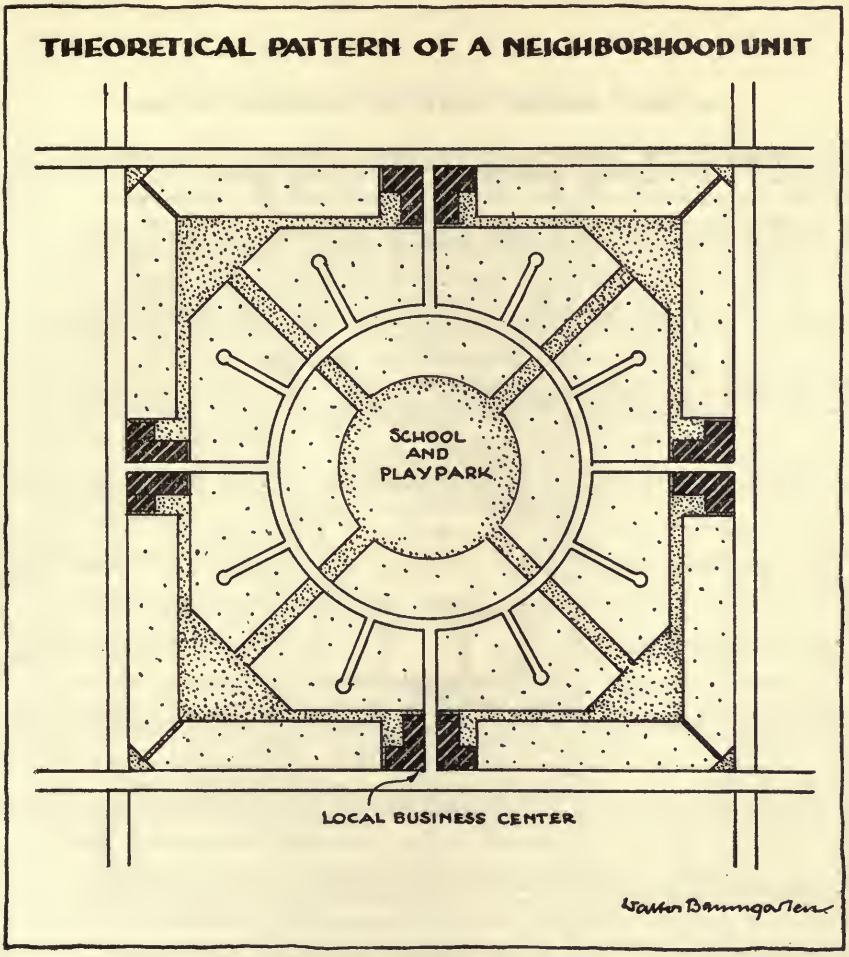


FIGURE 36

A lot size of 3875 square feet is used throughout in all the patterns. Each lot, except those used for apartment buildings, has a garage drive 8 feet wide entering the nearest street. Roads such as the cul-de-sac, which serve purposes of access only, have a 30-foot right of way with an 18-foot pavement. Interior traffic streets are 50 feet wide with a 24-foot pavement, and sidewalks 5 feet in width.

Local shopping centers, as proposed, provide 3000 feet of store frontage (50 feet per 100 persons) and parking space in front of stores. Footwalks are included to connect residential districts with these centers.

THE SINGLE BUILDING-LINE IN THE GRIDIRON PATTERN

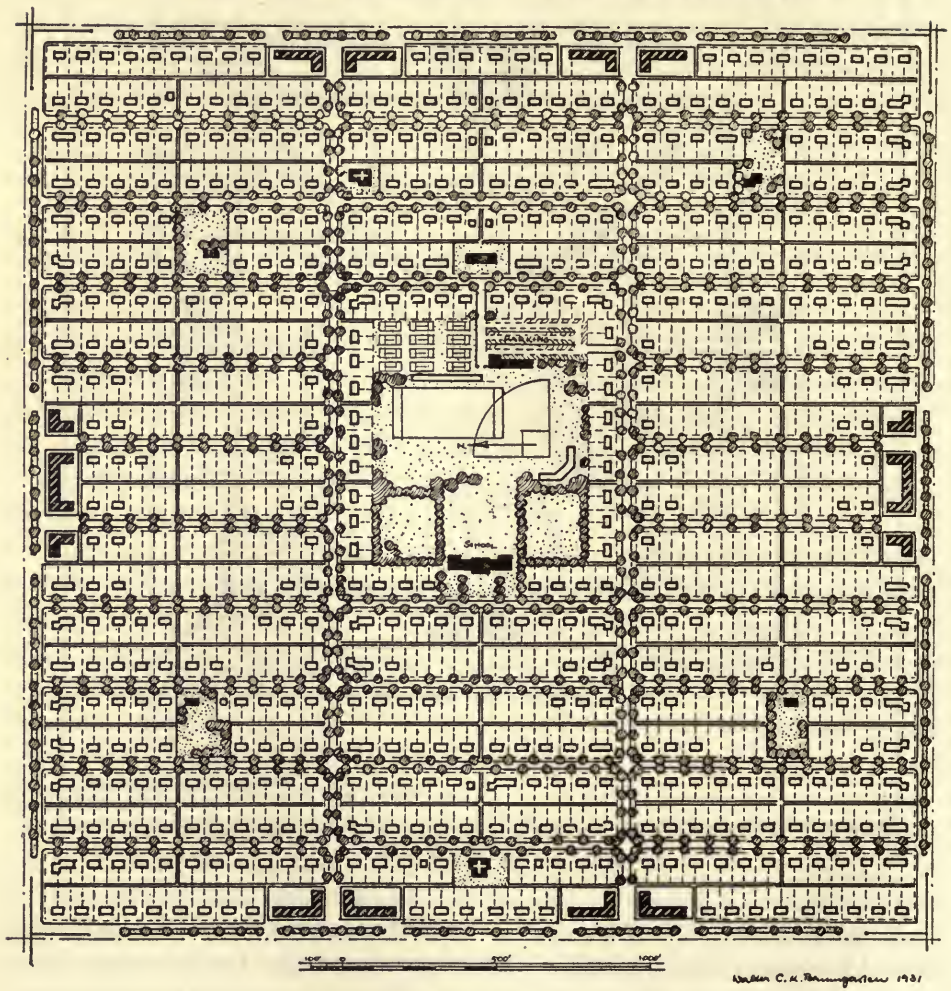


FIGURE 37

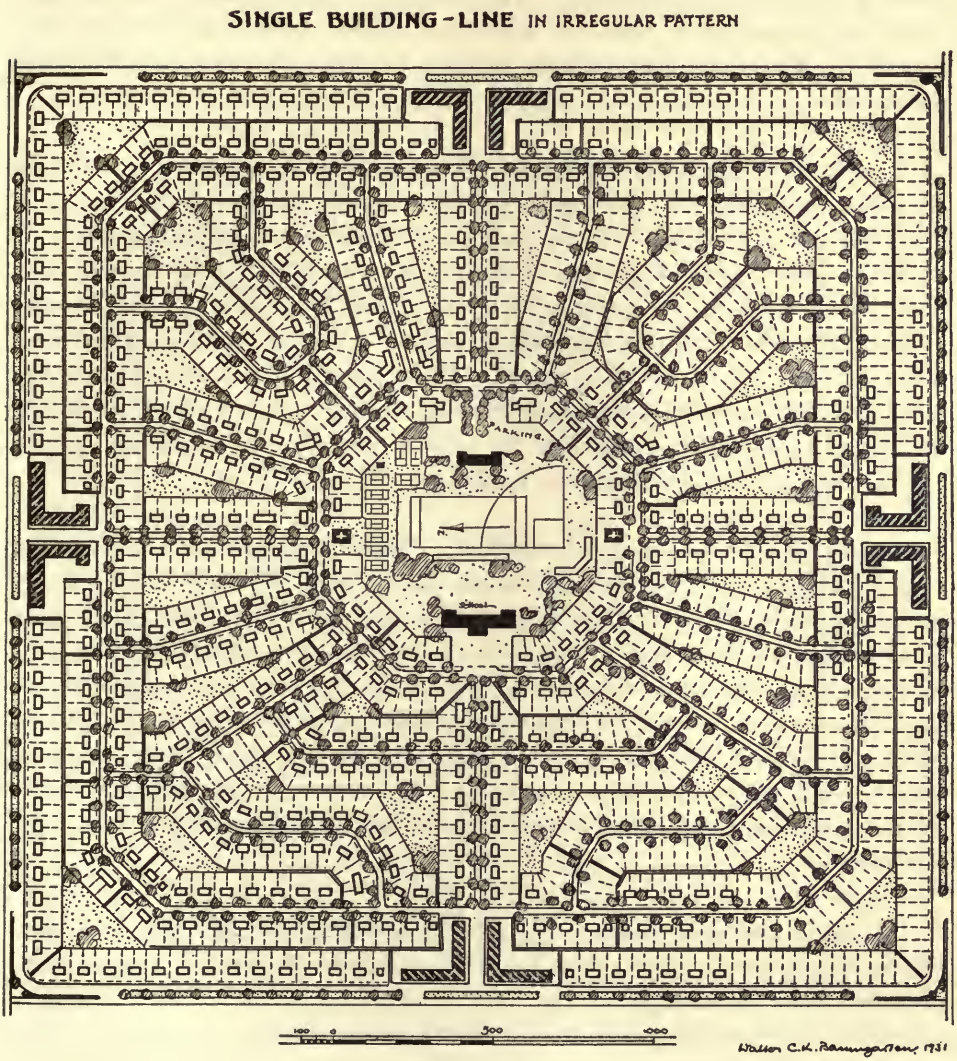

SINGLE BUILDING-LINE IN IRREGULAR PATTERN
PARKING
100 0 300 1000
Walter C.H. Baumgarten 1931

FIGURE 38

Although these are theoretical patterns, they are adaptable in some degree to any area with moderate topography, at least in their fundamental principles. For example, there would be no difficulty in preparing a plan for any area to be developed with its elements in the same proportion, though perhaps somewhat differently arranged.

Single Building Line (Gridiron). Figure 37 shows the single building line and conforms in type of layout and alleys to the customary subdivision. It includes a central park and school site. Objections to this plan are that it puts all streets in the same category as traffic streets, and produces monotony of appearance. Most of the streets run north and south, thus allowing the best orientation. Cross streets, running east and west, are about 950 feet apart. Playgrounds for small children are provided not more than 1000 feet from any house. The central park and play area of 14.2 acres is ample for active recreation. A school ground of 3 acres is situated within the park area.

Single Building Line (Irregular). This arrangement, shown on Figure 38, achieves a considerable saving in area devoted to streets by adopting an irregular pattern instead of a gridiron, and substituting some local park areas for street areas. The former are provided in the interior of the blocks and have connecting footwalks, making the neighborhood park system continuous. It would not be reasonable to connect all these footwalks across the streets by bridges or tunnels, since the density of street traffic does not really require it. The street system gains in interest as compared to the gridiron pattern without losing in clearness or convenience.

Multiple Building Lines. Figures 39 and 40 show multiple-building-line arrangements. Both designs, but especially the latter, assign more area to park purposes than any of the other schemes. Children's play activities are provided for in the local parks inside the blocks. The spaciousness obtained in these local parks extends into the garden units which are adjacent to the public park area and around which the houses are grouped. Tennis courts and other areas for smaller organized games are located in the local park areas, which, however, are intended primarily to provide for passive recreation, such as resting and walking, while the main play areas for adults are in the central park area. The footwalk

DOUBLE BUILDING-LINE IN IRREGULAR PATTERN

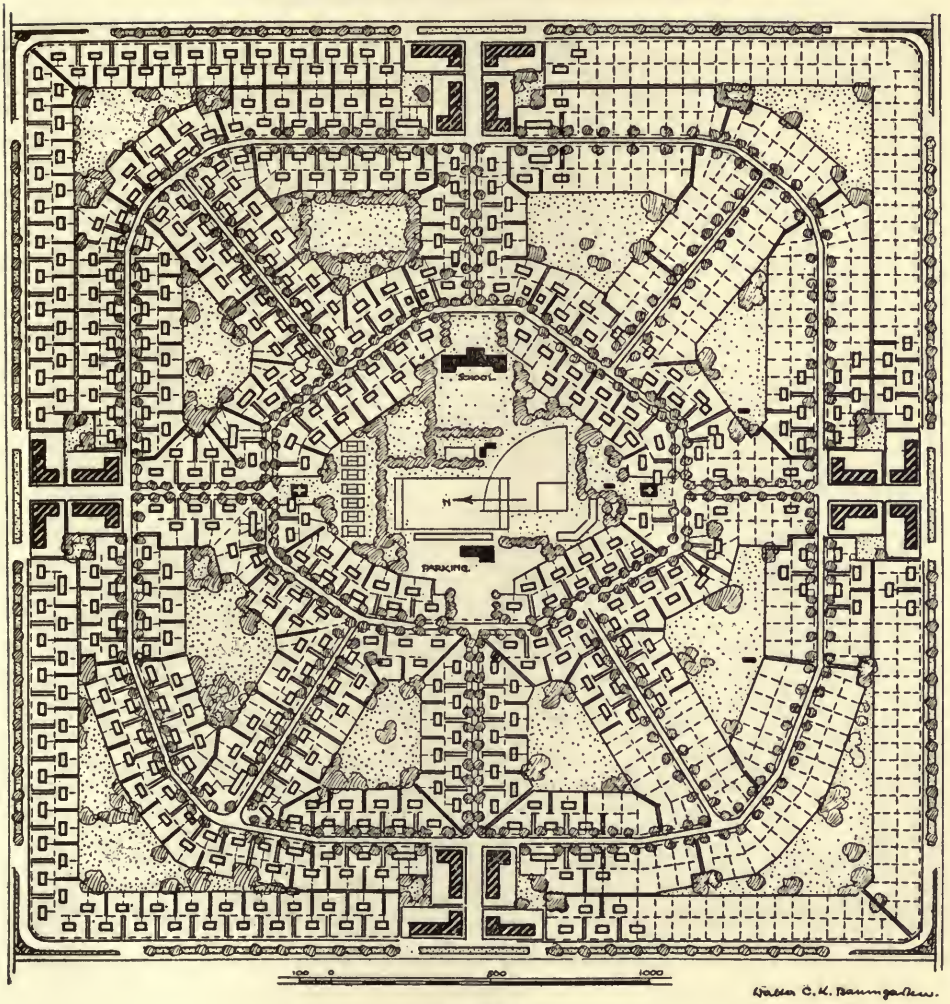


FIGURE 39

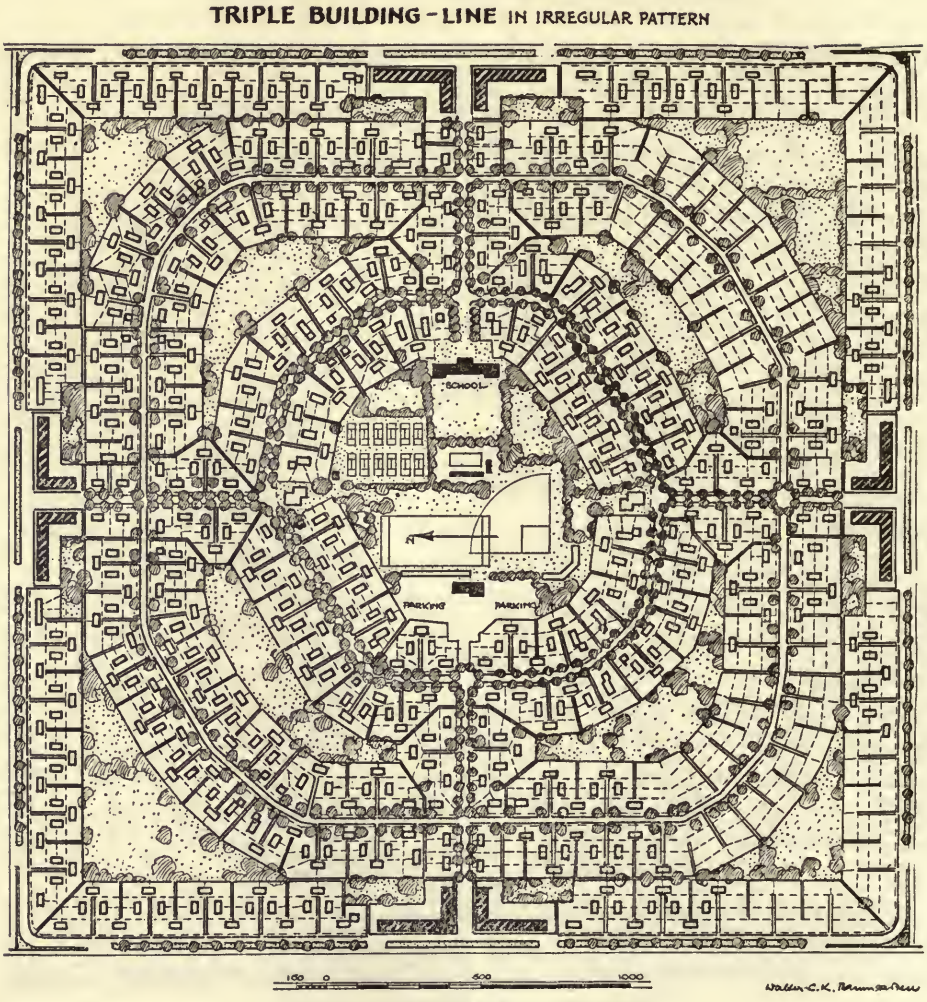

TRIPLE BUILDING-LINE IN IRREGULAR PATTERN
SCHOOL
PARKING
PARKING
100 0 500 1000

FIGURE 40

MODIFIED HEXAGONAL PATTERN

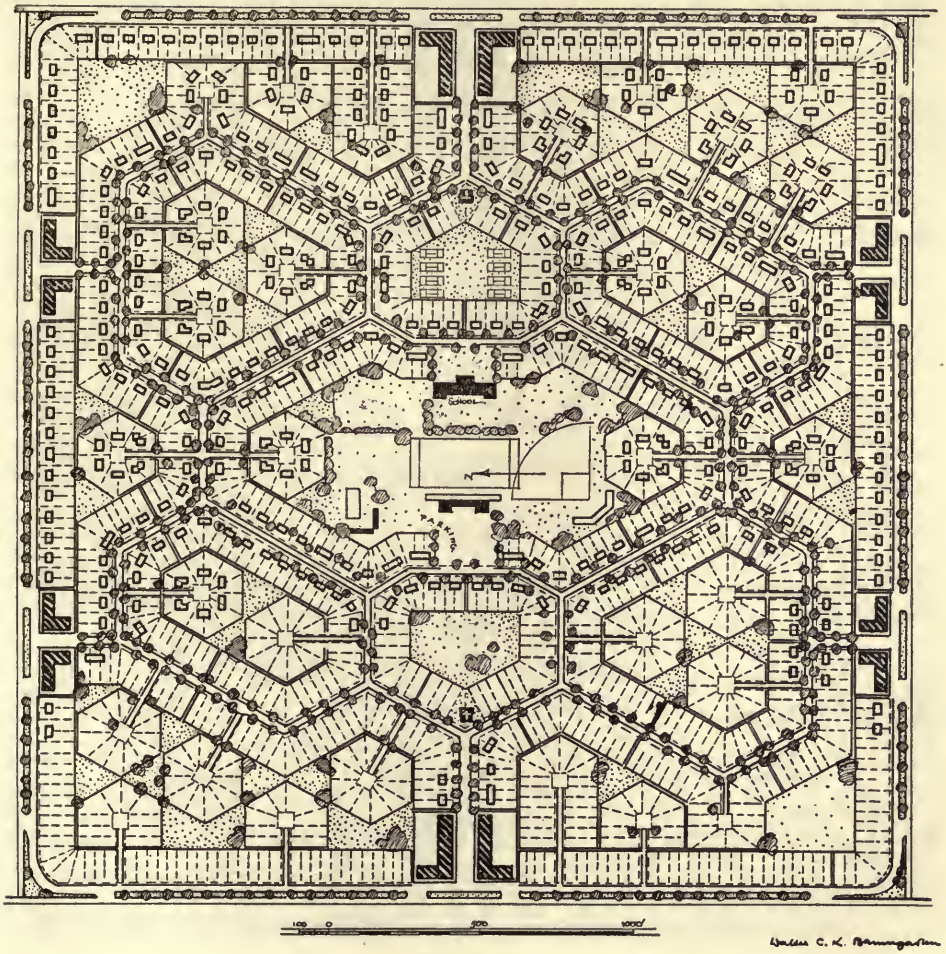


FIGURE 41


CUL-DE-SAC — LOOP PATTERN
SCHOOL
PARKING
N
100 0 500 1000'
Walter C. K. Baumgarten

FIGURE 42

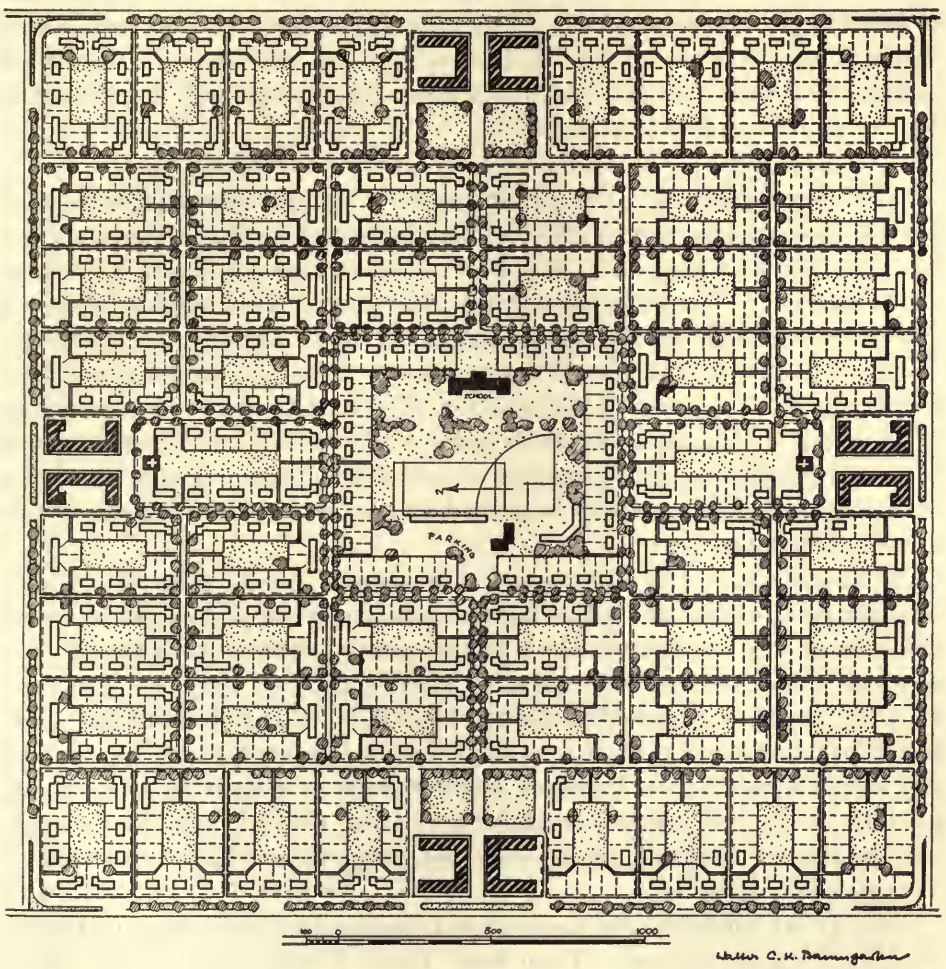

CROSS-ACCESS STREET - RECTANGULAR PATTERN
SCHOOL
PARKING
100 0 500 1000

FIGURE 43

system connects radially with the central park area and school grounds and links the local parks together in concentric rings.

Garage courts could be arranged near the entrances of the unit in connection with the business area, to the improvement in some respects of the designs here presented. The garage drives provided for each house would then be replaced by footpaths, and the considerable saving in construction cost thus effected would more than compensate for the extra cost of providing group garages.

Hexagonal Layouts. The advantages of a layout based on a hexagonal system in comparison with strictly rectangular schemes have been shown by Mr. Noulan Cauchon.[1] Mr. Barry Parker also advocates it because of its savings.[2] The fact that the circumference of a hexagon is less than that of a rectangle of the same area is the main argument. Although there is no doubt that the hexagon may be used in certain cases with advantage, it is no more adaptable for hilly land than the quadrangular block and a special difficulty in its application for low-cost developments is that it produces a large number of odd-shaped lots. The advantages of the hexagonal scheme may be gained by the use of other patterns which avoid its shortcomings.

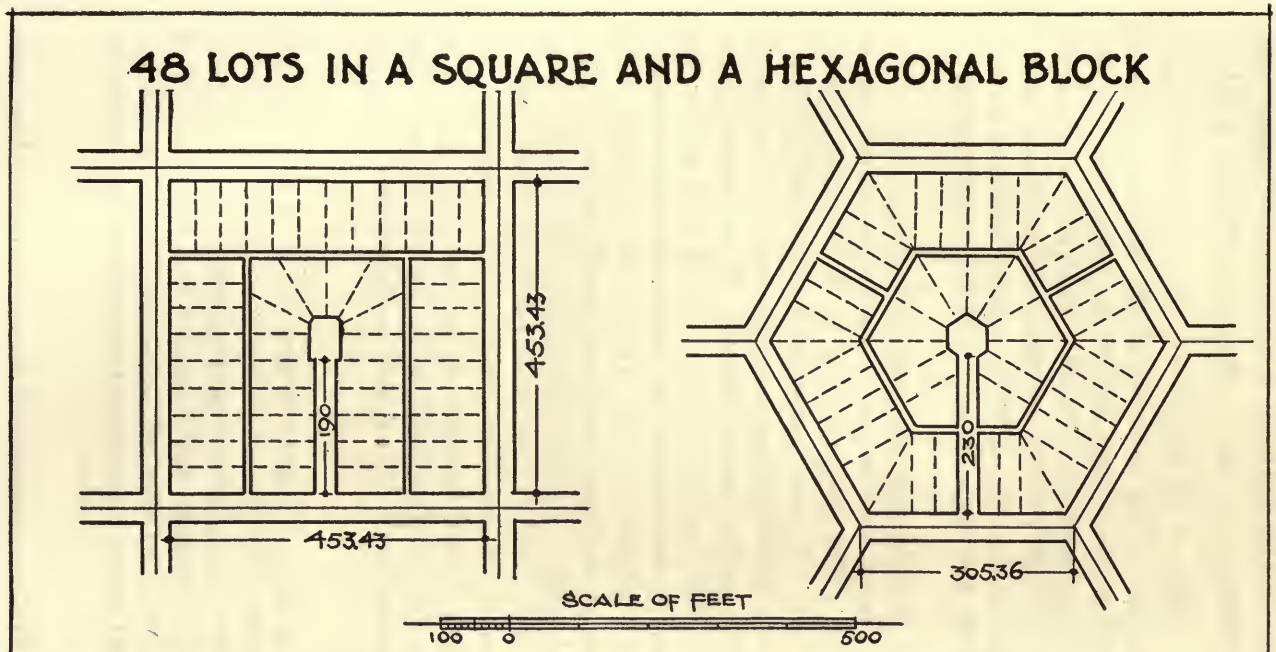
A comparison of a square and a hexagonal block (Fig. 44), which provide comparable amenities for the same number of lots, shows that the gain in the hexagonal block is not nearly enough to outweigh the obvious disadvantages in regard to streets and lot shapes. The fact that the hexagonal block has always been compared only with the gridiron block has created the impression that it is economically superior to any other layout. The hexagon and the circle as a basis for the general pattern of the city unquestionably have their merits,[3] but their usefulness as applied to smaller units does not compare favorably with that of various other schemes.

Figure 41 modifies the stereotyped application of hexagonal blocks within a neighborhood. Two and three blocks have been combined into one, thereby not only reducing the street area but creating larger blocks with local parks and increasing the number of

[1] "Hexagonal Planning, Traffic Intercepter, and Orbit," in *Proceedings of the American Society of Civil Engineers*, May, 1927, pp. 784 ff.

[2] "Economy in Estate Development," in *Journal of The Town Planning Institute*, June, 1928, p. 186.

[3] See Arthur C. Comey, "Regional Planning Theory," in *Landscape Architecture*, Jan., 1923, pp. 81–96.



COMPARISON OF AREA REQUIRED	SQUARE		HEXAGON	
1. 48 LOTS 3875 sq.ft. each	186 000		186 000	
2. BOUNDING STREETS	37 864		35 251	
3. TURN AROUND	2 600		2 500	
4. CUL-DE-SAC, ROAD	5 700		6 900	
5. TOTAL STREET AREA (2+3+4)	46 064		44 651	
6. DIFFERENCE IN STREET AREA		1413		3.07% OF □
7. FOOTWALKS	11 399		11 600	
8. TOTAL PUBLIC OPEN SPACE (5+7)	57 463		56 251	
9. DIFFERENCE IN OPEN SPACE		1212		2.11% " "
10. TOTAL AREA REQUIRED (1+8)	243 463		242 251	
SAVING IN AREA BY HEXAGON		1212		0.5 % " "

FIGURE 44

interior lots, which are more valuable than the outer ones. Affording longer vistas and a more restful pattern, it relieves the rigidity and unpleasantness of the streets.

Cul-de-sac and Loop Pattern. In Figure 42, five superblocks have been combined into one unit. The skeleton of the plan is a circular through street from which access streets and an approach street to the school and the central playgrounds branch off. A small percentage of the houses have direct frontage on the interior crescent-shaped street within the circle; but no houses front directly on the boundary streets. The design uses culs-de-sac and loops in such a fashion as to subdivide the area economically.

Cross-access Streets. Figure 43 illustrates a pattern produced by the use of cross-access streets. This design proves to be the most difficult one to apply to a whole unit. Several house groups are joined in larger blocks with narrow one-way streets giving access to those houses that do not receive access from the traffic-bearing streets. These narrow rights of way are given the name of cross-access streets. Local park area is provided inside the house groups, and may either be held in common ownership by the abutters or be publicly owned. It provides sufficient room for tennis courts or other recreational areas and small children's playgrounds adjacent to the houses. In comparison with other layouts, this one requires a large amount of street area but a relatively small amount of improvements. It should be considered only as an improvement on the gridiron, and probably would be more advantageously applied in relatively small areas within existing rectangular block patterns than throughout a whole neighborhood. Sunnyside contains good examples of such application.

Relative Distribution of Areas. Figure 45 and Table VI of Appendix 3 make possible significant comparisons between the various patterns discussed above. A certain competitive aspect is included in these comparisons. They show, for example, which among the designs — all of which provide for the same number of lots — requires the smallest amount of street area and permits the largest amount of area to be set aside for parks.

Cost per Dwelling. For the purpose of these studies it has been assumed that a neighborhood unit shall bear the full cost of land and the

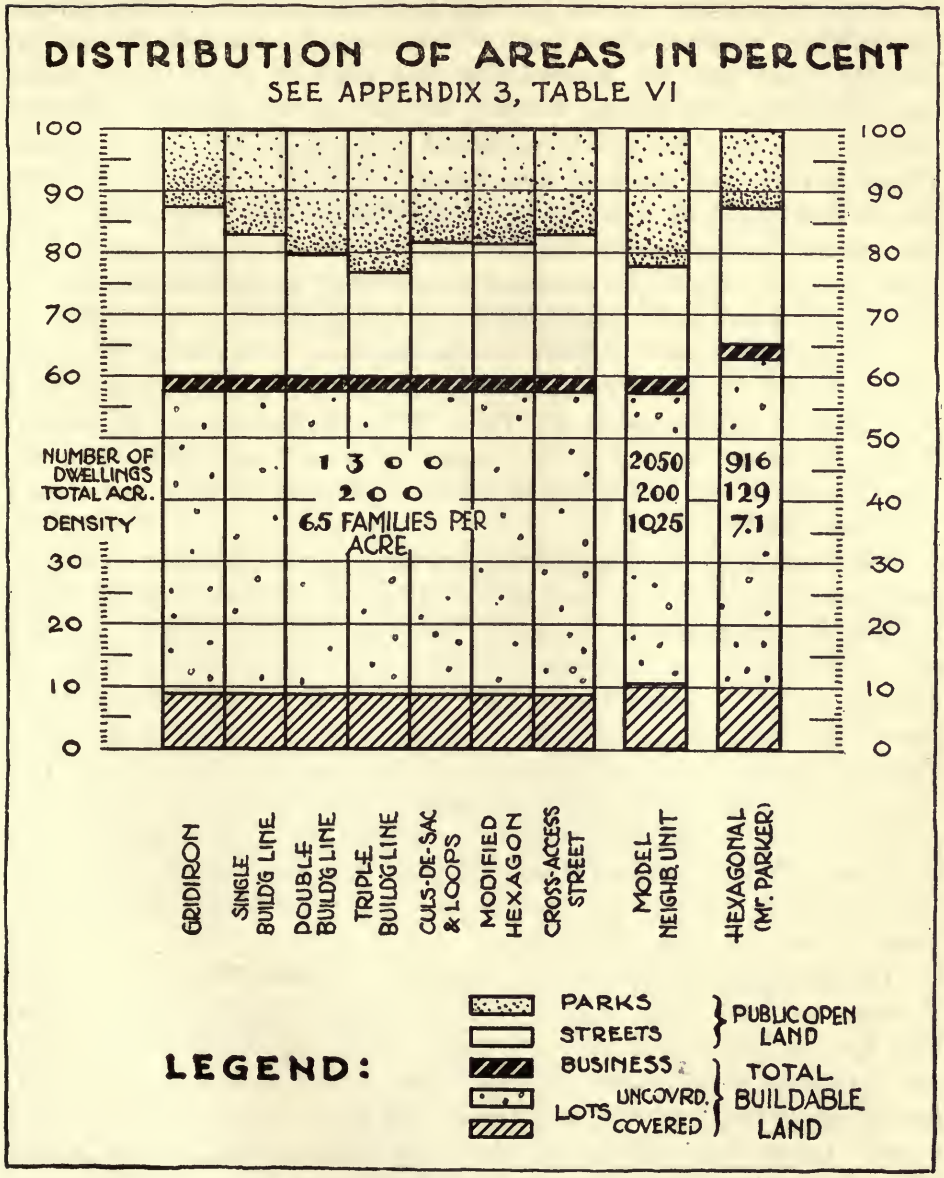

DISTRIBUTION OF AREAS IN PER CENT
SEE APPENDIX 3, TABLE VI
100
90
80
70
60
50
40
30
20
10
0
NUMBER OF DWELLINGS
TOTAL ACR.
DENSITY
13 0 0
2 0 0
6.5 FAMILIES PER ACRE
2050
200
10.25
916
129
7.1
GRIDIRON
SINGLE BUILD'G LINE
DOUBLE BUILD'G LINE
TRIPLE BUILD'G LINE
CULS-DE-SAC & LOOPS
MODIFIED HEXAGON
CROSS-ACCESS STREET
MODEL NEIGHB. UNIT
HEXAGONAL (Mr. PARKER)
LEGEND:
PARKS
STREETS
PUBLIC OPEN LAND
BUSINESS
LOTS UNCOVRD.
COVERED
TOTAL BUILDABLE LAND

FIGURE 45

improvement cost of streets (including the construction cost of the service road on each side of the through highway), and of sewers, drains, and utilities, whether or not some of these may be charged otherwise in practice; and that the construction cost shall be distributed equally among the lots. Of course, actually the cost of lots will differ, but the lesser cost for some lots will be equalized by the increased cost for others. It has further been assumed that the layout of the entire unit permits the establishment of a permanent character for the whole unit; and that (except in the neighborhood of varied dwelling types, illustrated on page 219) the use of the premises is restricted against apartments or any development which would cause one family to live over another.

In figuring the cost of each design, the same unit prices have been used. Figure 46 shows the total development cost per dwelling in each plan, and is supplemented by Table VII of Appendix 3. An item of 25 per cent of the total of all other expenditures is finally added to cover interest, marketing, and overhead of the developing agency, including a 7 per cent profit.

The diagram shows a considerable variation among these seven designs in the total cost of development per dwelling; it is lowest when the triple-building-line arrangement is used. The cost increases slightly with the plan using culs-de-sac and loops. The cost of improvements on the lot differs very little among the several plans; it is the cost of public improvements that shows variations. A comparison with Figure 45 shows that the total cost per lot follows closely the amount of street area provided, except for the cross-access street scheme, where the cost of improvements in the 20-foot streets is low in relation to the amount of area required. This design has about the same improvement cost per lot as the modified hexagonal plan, although it devotes a larger percentage of area to streets than the latter does.

The cost of raw land, being low, has a very small influence on the total development cost. The relatively high amount of park space provided does not increase the lot price, because it is saved in street area. It is the development and maintenance of these parks which is expensive. If instead of parks, however, additional lots were provided, these would require more street improvements and utilities, which would largely offset the apparent gain. Savings need not come from sacrificing open spaces, but may well come from reduction in street area.

Among other factors that affect cost, besides those attributable to the design, topography is probably the most influential. It will increase the

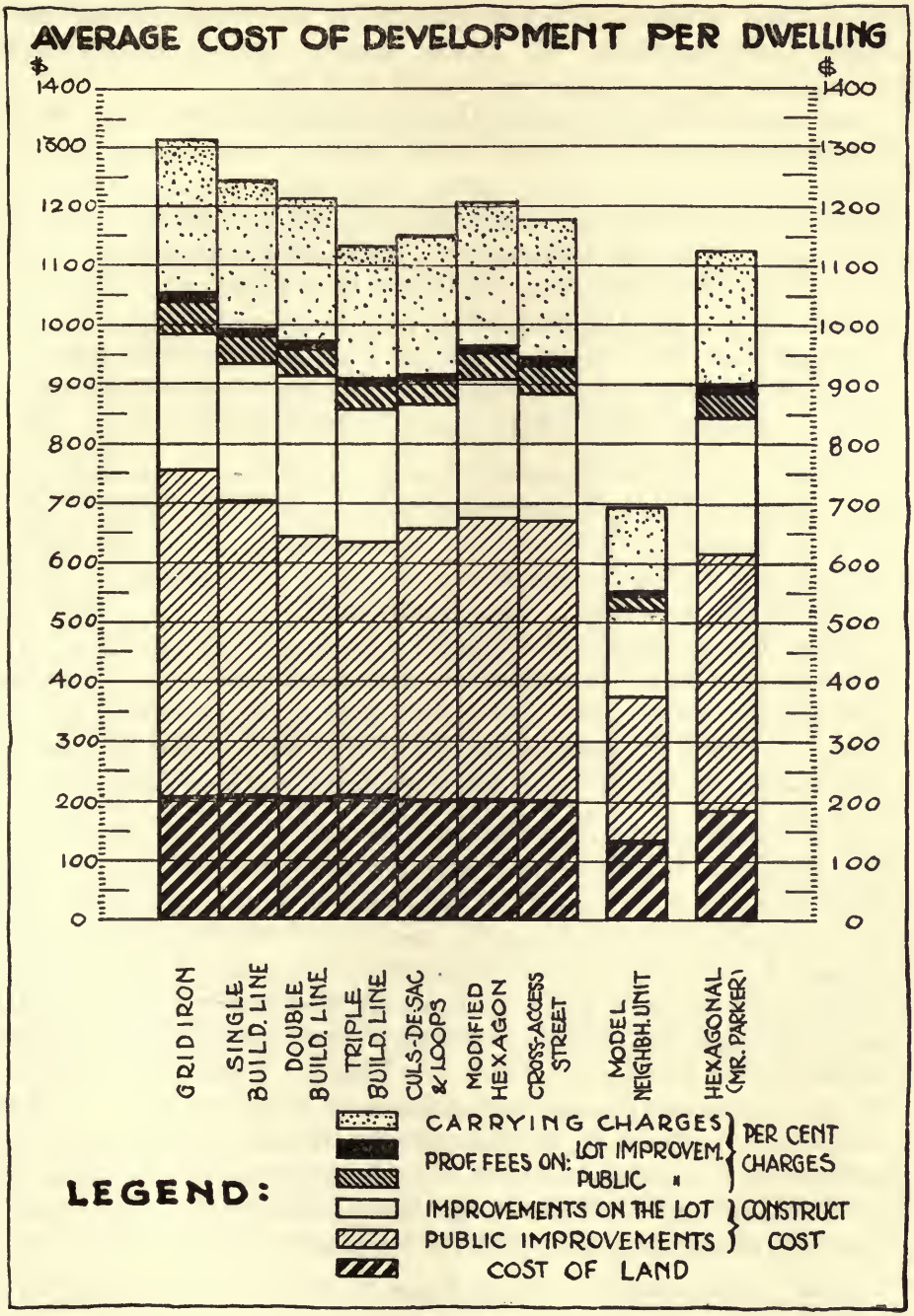

AVERAGE COST OF DEVELOPMENT PER DWELLING
$
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
GRID IRON
SINGLE BUILD. LINE
DOUBLE BUILD. LINE
TRIPLE BUILD. LINE
CULS-DE-SAC & LOOPS
MODIFIED HEXAGON
CROSS-ACCESS STREET
MODEL NEIGHBH. UNIT
HEXAGONAL (MR. PARKER)
LEGEND:
CARRYING CHARGES
PROF. FEES ON: LOT IMPROVEM.
PUBLIC "
PER CENT CHARGES
IMPROVEMENTS ON THE LOT
PUBLIC IMPROVEMENTS
CONSTRUCT COST
COST OF LAND

FIGURE 46

cost of street improvements and particularly of utilities as soon as it involves heavy grading, but gently sloping land is usually more economical to develop than steep or very level land.

Any departure from the square form of subdivision arbitrarily chosen in these diagrams, if it increases the length of the periphery, will ultimately require more street area. Here again, the adjustments in profiles of the bounding streets will have to be weighed against additional street length. Existing thoroughfares may entail compromises in this respect. Mathematically, the circle would be the ideal shape of a neighborhood. Access from the sides and the provision of larger local parks near the corners, however, largely obviate the disadvantages of the square.

As theoretical patterns, of course, the comparative costs as figured from these diagrams should not be taken too literally.

Demarcation of Neighborhoods. As a result of the obstruction to cross traffic offered by high speed arteries, cities are very likely to grow in fairly well-defined neighborhoods between these arteries. But the neighborhoods will not necessarily take square shapes as in the diagrams. Units will vary in size according to local conditions.

Organizing neighborhood units for purposes of planning is a large undertaking. It is not probable that any entire neighborhood will be devoted to one use exclusively, as has been done in the schemes so far discussed. A detached single-family house unit and a unit devoted to apartment houses represent the extremes in residential development.

A Neighborhood of Varied Dwelling Types.[1] To illustrate an example of the residential neighborhood containing all types of dwellings, Figure 47 has been prepared. A unit of 200 acres has again been used. This plan provides for 2050 dwellings, 40.2 per cent of which are single-family houses, 11.2 per cent two-family houses, and 48.6 per cent multiple houses. This classification of types, it should be noted, does not enable comparisons to be made with statements about types in other studies where multiple houses are classified with row houses. What is here called a multiple house provides dwellings which have direct access from a common staircase, and each of which should have through ventilation. These dwellings can be most economically provided in three-story buildings, for four stories give an inconvenient height in walk-up buildings, and the use of elevators is uneconomical in residential buildings of less than five stories.

[1] Called "model neighborhood unit" in Figures 45 and 46 and Tables VI and VII of Appendix 3.

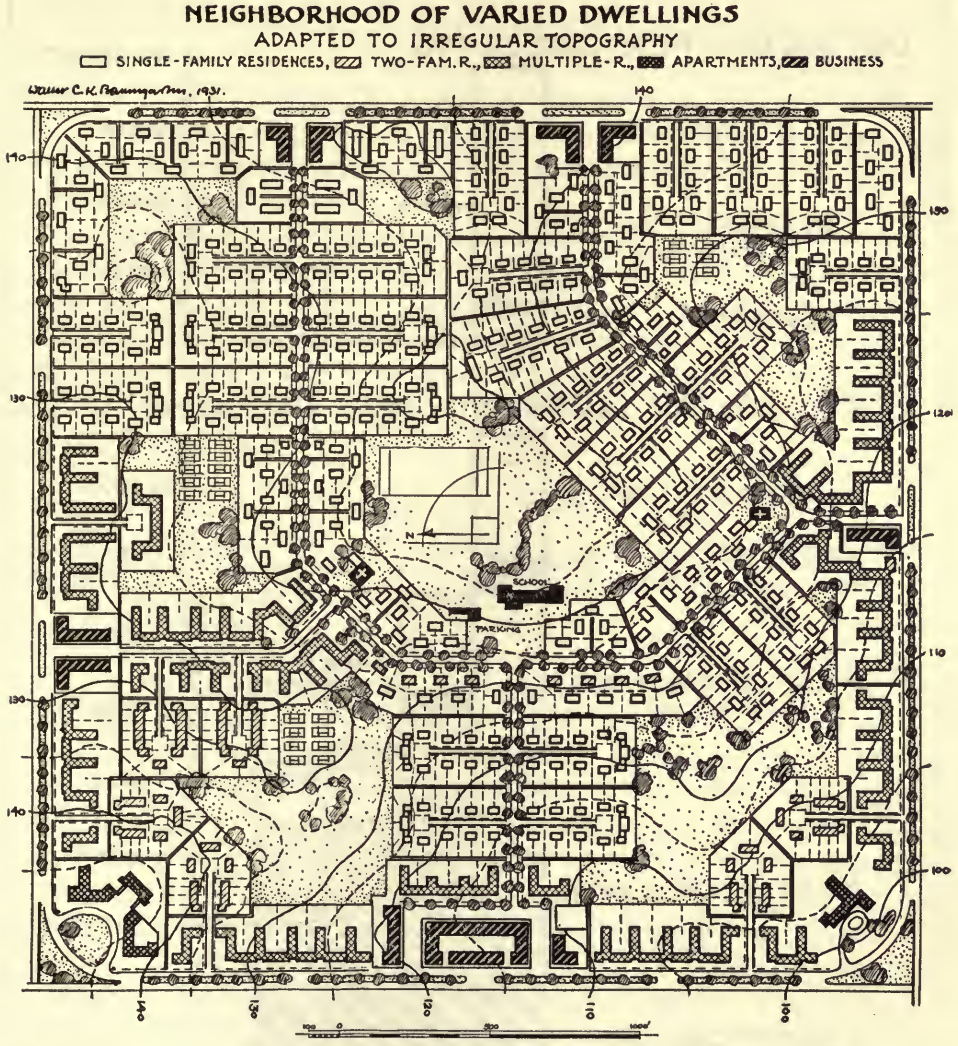

NEIGHBORHOOD OF VARIED DWELLINGS
ADAPTED TO IRREGULAR TOPOGRAPHY
SINGLE-FAMILY RESIDENCES, TWO-FAM. R., MULTIPLE-R., APARTMENTS, BUSINESS
Walter C. K. Baumgarten, 1931.
SCHOOL
PARKING

FIGURE 47

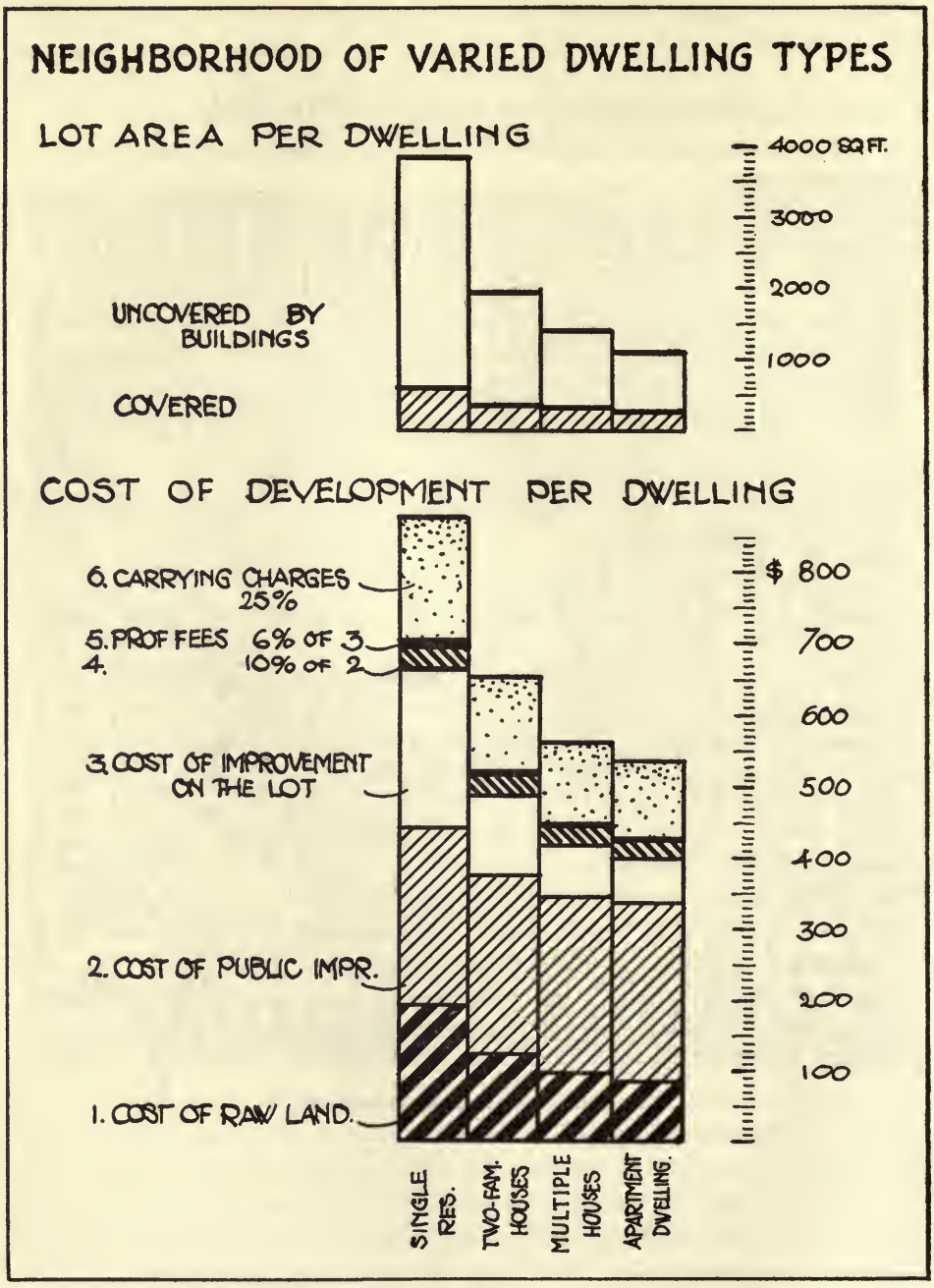

NEIGHBORHOOD OF VARIED DWELLING TYPES
LOT AREA PER DWELLING
4000 SQ FT.
3000
2000
1000
UNCOVERED BY BUILDINGS
COVERED
COST OF DEVELOPMENT PER DWELLING
6. CARRYING CHARGES 25%
5. PROF FEES 6% OF 3
4. 10% OF 2
3. COST OF IMPROVEMENT ON THE LOT
2. COST OF PUBLIC IMPR.
1. COST OF RAW LAND.
$ 800
700
600
500
400
300
200
100
SINGLE RES.
TWO-FAM. HOUSES
MULTIPLE HOUSES
APARTMENT DWELLING.

FIGURE 48

Figure 48 shows for the several types of dwelling provided in this plan (1) the extent of lot coverage, and (2) the total cost of development per dwelling.

It is assumed that each dwelling derives the same benefits from public improvements and therefore must be charged with an equal share of their cost. For example, an assessment for parks based upon the land area per dwelling would not be justifiable, as the families in apartment houses make at least as much use of public recreational facilities as families living in other types.

In Appendix 3 seven tables are given, showing, for the street and lot arrangements illustrated by Figures 23–27: (1) Cost of improvements on the lot, (2) Cost of public improvements per lot, (3) Cost of excess public improvements, (4) Cost per lot in block 1200 feet long, (5) Excess public improvement cost in relation to block length; and, for the eight home neighborhood patterns above described: (6) Distribution of areas, and (7) Average cost per dwelling.

A CASE STUDY: WESTOVER, MASS.

After completion of the theoretical studies of neighborhood design at the Harvard School of City Planning, an attempt was made to apply the principles illustrated in these designs to an actual case. An area of undulating land near Boston was selected for the purpose. This site is at Westover, about one mile from the town center of Norwood, bordering existing developments of medium-sized houses. The site is connected with Norwood by a parkway and is approached from Boston by a main highway that connects with the metropolitan parkway system, the traveling time being about 30 minutes from the center of the city. The property is thus located near enough to Boston to be within easy reach of occupational centers and yet far enough out to permit of a desirable spaciousness in the development.

The area selected for study and planning comprised 363.52 acres with well-defined boundaries. It is beautiful rolling country, gently sloping towards the south. The area falls naturally into two sections, both of which slope towards the brook which separates them from north to south. Besides the main valley of the brook, which is partly swampy and of interesting scenic qualities, two minor ravines branch off at the low point near a pond and continue uphill in between minor ridges. A short slope along the east side is as steep as 10 per cent, which is the steepest grade intended to be used for residential purposes.

FIGURE 49
WESTOVER: KEY MAP OF PLAN A

Possibilities of Development. The swampy valley of the brook, including the steep slopes on its west bank, constitutes a natural park area. As lines for avenues we have the two ravines running up the slopes almost at right angles to the contours. The geologic formation, the irregularity of the ground, the existing trees, a great number of which are well enough grown to give a distinct character to the development, call for residential streets laid out to avoid natural obstructions and capable of such alignment as will secure intimacy and privacy to houses built among trees.

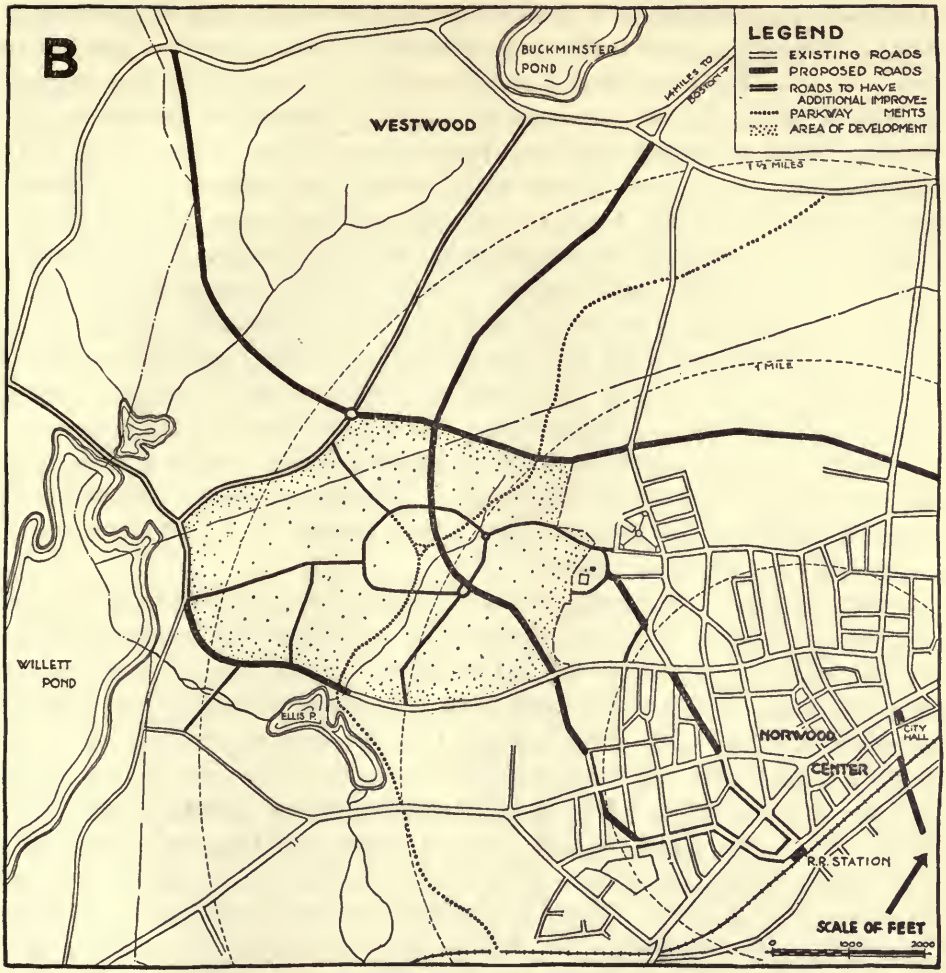


FIGURE 50
WESTOVER: KEY MAP OF PLAN B

Suggested Plans. Three plans, which will hereafter be shown and described as A, B, and C, were prepared for this site. Key maps of Plans A and B are reproduced to indicate the provision for through and internal circulation.

According to Plan A, the development consists of two sections separated by a park occupying the valley of the brook which intersects the property in a north and south direction. Each section has its school centrally located and with grounds abutting upon the central park strip.

The main shopping district is located at the northern edge of the area at the point where outside traffic will enter from Boston, and it is planned to serve as a business sub-center ample enough to provide for the requirements of an additional area which might be developed farther to the north. Two secondary business districts are placed at the other main approaches. A cultural center with schools, an auditorium, a library, and an administrative building occupies a dominating plateau in the center of the whole development to the west of the brook, overlooking both sections and the park valley. A terraced approach to this center is shown on the steep slope to the southeast of the plateau. Although off the line of through traffic, this site is easily accessible from all parts and is adjacent to the major street which connects both sections. Other streets radiate from the square from which the center has its access.

While the main entrance from the adjacent town is made a prominent feature, through traffic is discouraged in built-up areas. Provision is made for pleasure traffic to pass along the parkway in the middle without interception of crossing traffic.

The boundary streets on the south and west follow existing streets, the former being constructed 66 feet wide with a central planting strip of 16 feet and two pavements of 18 feet each. It is proposed to widen the west boundary street to 100 feet between property lines and to provide a central planting strip of 30 feet and two pavements of 28 feet each. A proposed northerly road would extend from the town center and would also be 100 feet wide. A system of major interior streets 50 feet wide with 24-foot pavements is laid out to take care of interior communication to and from focal points, such as shopping and cultural centers, and to connect both units. These major interior streets divide the sections into blocks of 20 to 30 acres. For reasons of economy, as much access as possible is provided from the minor streets, which vary in type. Elimination of through traffic does not necessarily imply the exclusive use of culs-de-sac. Loops and other two-ended streets, adjusted to the terrain, are frequently used.

A desirable spaciousness and open character which cannot be had on the small lot itself are obtained by the provision of parks in the interior of many blocks. The attempt has been made to preserve, in the park strips, existing natural features such as ledges, boulders, and groves of trees. The central park area includes the steep slopes and the swampy land along the brook which cannot readily be used for building purposes. A drive through the park follows the brook, and is accessible from each

FIGURE 51. WESTOVER

section. It underpasses the interior main road and the north boundary street. Local playgrounds, tennis courts, and other open areas have been located where little grading will be required.

The density of the whole area is 7.05 families to the gross acre. Half of the area is used for parks, streets, and sites for public buildings, and half for private building land. Of this private land, 88 per cent is reserved for single-family residences and 9 per cent for multiple houses, leaving 3 per cent to be occupied by business.

The 97 per cent of the private building land that is reserved for residential purposes provides for the housing of a total of 2565 families, with an average lot area of about 3000 square feet for each family. The multiple dwellings have the high average of 1500 square feet of lot area for each of the 465 families living in them, or a density of 29.04 families to the net acre; the remaining 2100 families have lots that average 3332 square feet in size, with a density of 13 families to the net acre.

The wooded character of the south slope is intended to be preserved and the houses to be set among the trees, of which the existing woods contain a great number of large well-grown specimens, — oaks, maples, pines, and in some places birches. Most of them can easily be preserved and will form a distinct feature of the development, relieving the monotony that easily results when small houses are erected in large numbers at one time. Within these parts street trees are unnecessary, but on the northern plateau, where only undergrowth and a few large trees exist, street trees are to be planted.

The zoning of the area assigns 346.17 acres to residential districts and 17.35 acres to business.

Assuming a family to consist of 4.5 members in the single-family district and of 3.3 in the multiple-house district, a population of 10,984 is thus provided for. The addition of 216 occupants in accommodations above the stores gives a total population of 11,200, or an average of slightly over 30 to the acre. The required total frontage of shops will then be about 5600 feet. The number of school children, according to the ratio of school children between the ages of seven and fifteen to the total population of the United States, which is 16.74 per cent, will be 1875. The normal capacity of an elementary school is from 800 to 1000, so that two schools are required.

The unit prices used conform in general with those used for the theoretical patterns described earlier in the chapter. (See Appendix 4, Table II.) Utilities and land within the business zones have to be paid for by

FIGURE 52. WESTOVER

the owners of store property and are not included in the cost. Similarly the cost of boundary streets is charged to the development only up to an amount equaling the cost of an interior 50-foot street, on the assumption that the difference would be met out of public funds. It will be observed that the costs of water and lighting mains are included, although normally these would be constructed by the corporations supplying the utilities. For sewers and surface water drains a figure per linear foot of system is used that is the average of the figures for the eight schemes of the theoretical study.

The density of the area under this plan is a little higher than that of the theoretical diagrams, the average lot size being only 3000 square feet instead of 3875. The allowance for park area, however, is generous — 29.25 per cent. The use of narrow lots naturally brings savings in utility costs per dwelling.

The cost of the fully improved lot works out at $836.45 per single residence and $679.75 per multiple dwelling. Assuming an average total cost of $4500 for small houses and $3400 for multiple dwellings, the above lot costs would represent about 20 per cent.

A rather different scheme of development is represented by Plans B and C, which show two possible variations on a similar general arrangement of major streets and functions, and which cover 353.6 acres, a slightly smaller area than that dealt with by Plan A. Statistical data on distribution of areas, cost of development, sizes of lots, densities, etc., for Plan B are supplied in Appendix 4 for comparison with those of Plan A.

Both these plans retain the central parkway of Plan A, following the line of the brook, but they are distinguished from it by the use of an approximately circular interior street, and they group the civic and cultural buildings on high land in the center of the eastern section, instead of in the western as did Plan A.

Plan C differs from Plan B chiefly in the utilization of "continuous closes" in place of most of the culs-de-sac, in an attempt to combine the advantages of culs-de-sac and closed places with those of through ways. By constructing narrow (15- to 18-foot) one-way minor streets, broken at intervals of about 250 feet by small squares, circles, or similar features, the general effect of culs-de-sac is obtained, but easy circulation for delivery of goods, collection of garbage, etc., as well as for private vehicles, is effected. The disadvantages of one-way operation can be minimized by proper organization of the minor in relation to the

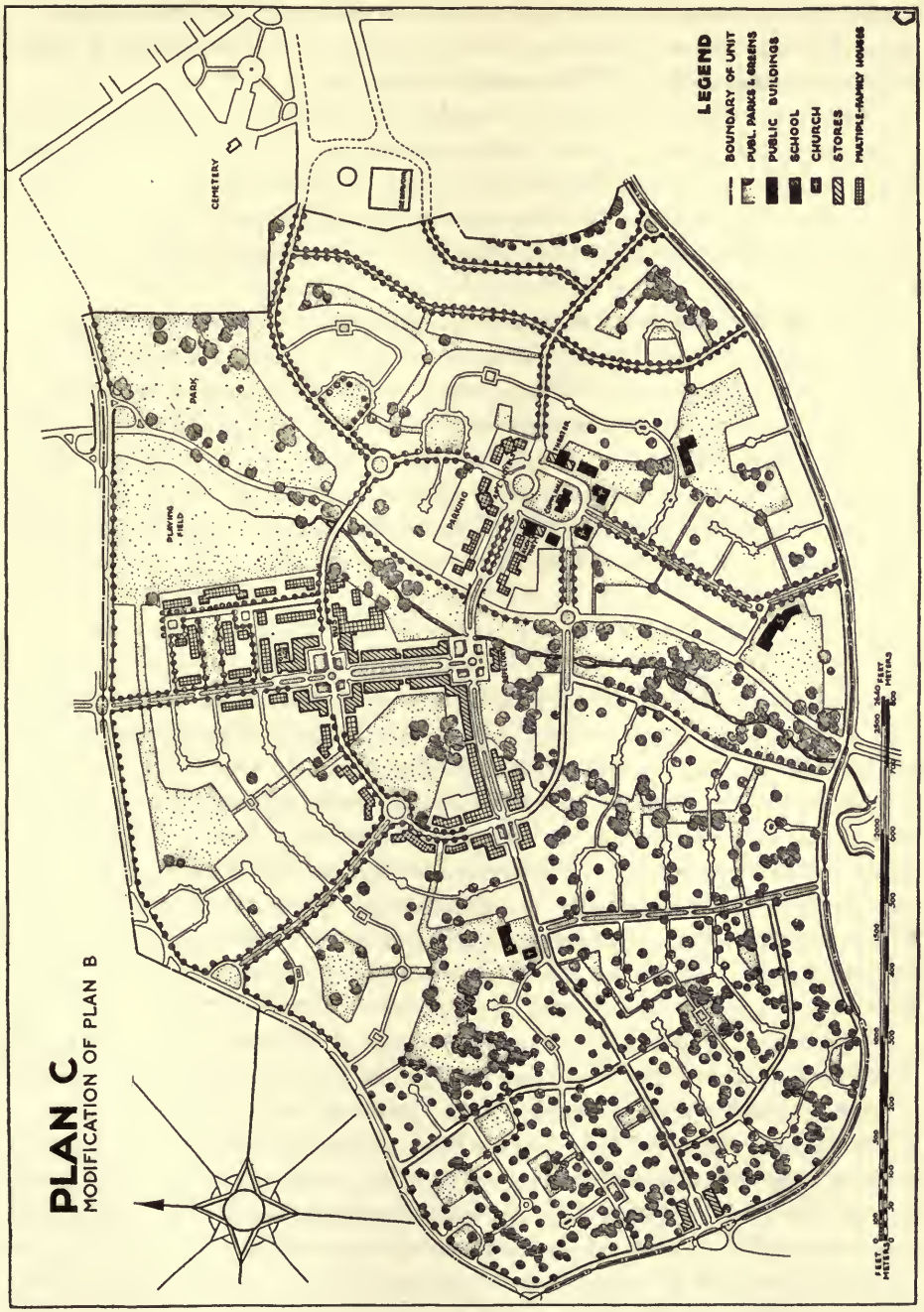


FIGURE 53. WESTOVER

major street systems and by provision of convenient parking places. No more inconvenience, due to one-way operation, need be suffered than is always necessitated by cul-de-sac development.

There are many existing examples, particularly in English garden cities, of closed places connected by pedestrian walks, or lanes with posts and chains to prevent the passage of any vehicles except in special circumstances, *e.g.* during building operations. The grouping of buildings around such places can serve as examples to be adapted to the continuous close.

The through highway entering the area near its northeast corner has been given a different line in Plan C in order to avoid intersection with any but the southern central boulevard. The underpasses at the central and northern boulevard require cuts, but the result is complete separation from traffic to and from the business streets, which was not effected by Plan B. One disadvantage of this scheme is an increase of about 25 per cent in the amount of buildable frontage on this through road. One bridge over the stream at the southern boundary, however, is eliminated.

PLAN FOR HIGH-COST LAND

In the illustrations just given I have been dealing with land costing about 30 cents per square foot when fully improved and provided with public utilities and improvements on the lots. It would be practicable to have a satisfactory development on the same general lines if this land cost up to 75 cents or $1 per square foot, although the lots would have to be smaller per family. Between these figures and a price of $7.50 per square foot there are many possibilities for planning, but none which will permit low-cost housing on healthful lines where the price exceeds $1 per square foot for small houses and $5 per square foot for apartments.

I shall now give details of an illustration of what is possible under the best conditions on land priced at $7.50. It will be seen that this admits of a comparatively good development, but only for expensive houses.

Whatever the ideal may be, we have to face facts and one of them is that in large cities land has already reached a price that does not permit the erection of anything but expensive apartment houses. This price is buttressed by municipal assessments which are based on the high values of land produced by intensive development, by the necessity of maintaining equities in real estate enforced upon banks, mortgage companies,

and owners of property, and by demands for the facilities that the apartment house offers.

What, then, can be done to get some benefits of planning in neighborhoods where land is of high price?

APARTMENT DEVELOPMENT AT JACKSON HEIGHTS, L. I.

In a high-class apartment development at Jackson Heights in the Borough of Queens, Long Island, land is priced at $5 to $7.50 per square foot. In 1931 I undertook, in collaboration with Messrs. Penrose V. Stout, architect, and Frederick J. Adams, the preparation of a detailed plan for a part of this property comprising three blocks. Two alternative schemes were prepared for this land. These are described below, and the statistical data are given in Appendix 5. The changes which have occurred in financial conditions in the meantime have prevented the development from being carried out.

In 1932 Jackson Heights had an existing population of nearly 18,000, living in about 4200 apartments and some single-family houses, mostly leased or managed by the Queensboro Corporation. Approximately 170 of the total of 300 acres comprising the section have been built upon. There are about 25 families per acre of improved land, which is a comparatively low density for a section of New York City that is now within fifteen minutes traveling distance of Fifth Avenue.

At the time the plan was made, prices of land and costs of labor were not far from the peak of 1930, and the figures which I will present must be considered as representing the abnormal conditions that existed in a period of comparative prosperity, high wages, and high land prices. Under present conditions the figures for costs would be considerably reduced, but the rentals obtainable would have to be reduced in the same proportion, so that the change in economic conditions would not necessarily require any great change in the density or design.

The land in Jackson Heights is mostly flat. The study made was for an area comprising three blocks, each 200 feet wide by 630 feet long and running in a north and south direction. These are separated longitudinally by 60-foot streets, the northern and southern boundary streets being 95 and 75 feet wide respectively. The total area exclusive of streets is thus 378,000 square feet, or about 8⅔ acres. Its fully improved value was estimated at $2,835,000, or $7.50 per square foot, the high price being determined by the demand for apartments in a location where

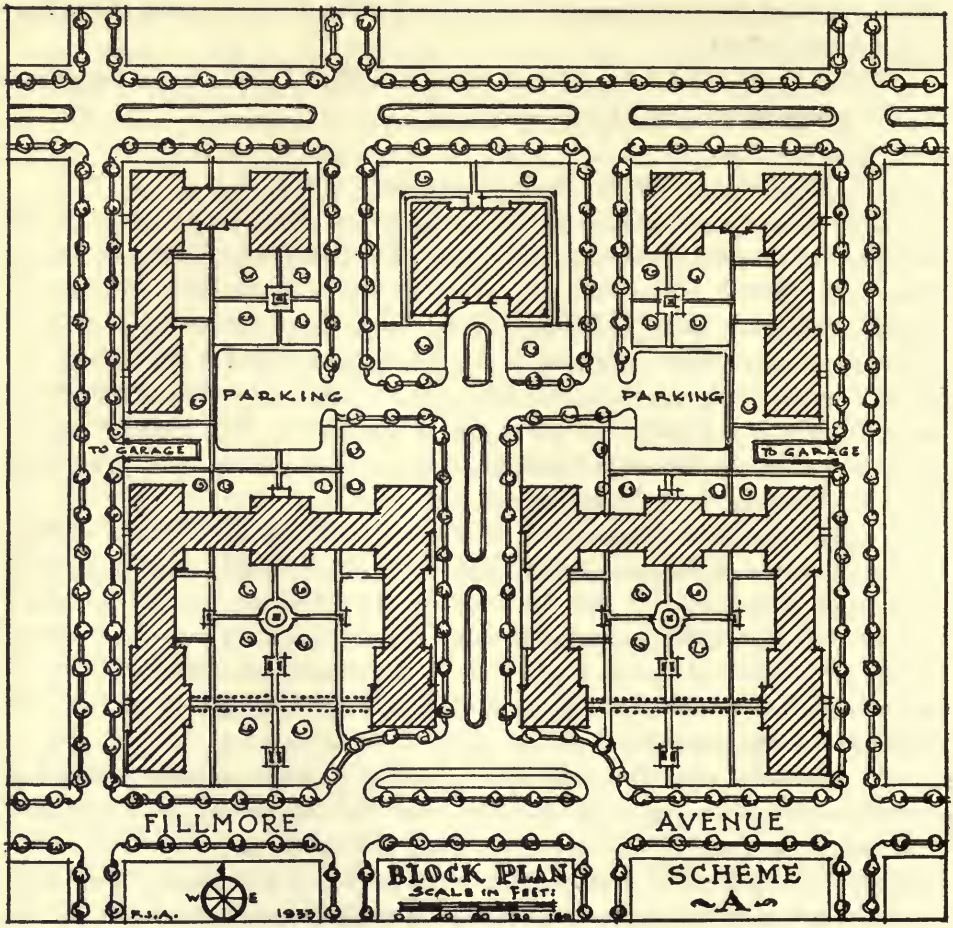


FIGURE 54

ORIGINAL DESIGN FOR AN APARTMENT DEVELOPMENT AT JACKSON HEIGHTS, LONG ISLAND

it was anticipated that rents of between $35 and $40 per room per month could be obtained.

On this site it was proposed to develop apartments of two, three, four, and six rooms. The property is zoned for residence with height limits of one and a half times the street width, and is restricted against stores. The highest buildings erected before 1932 had been six-story apartment houses served by automatic push-button elevators, but it was decided to make a new departure by introducing higher buildings of smaller coverage, — partly because such a change would permit larger garden courts and more favorable conditions of light and air, and partly because the

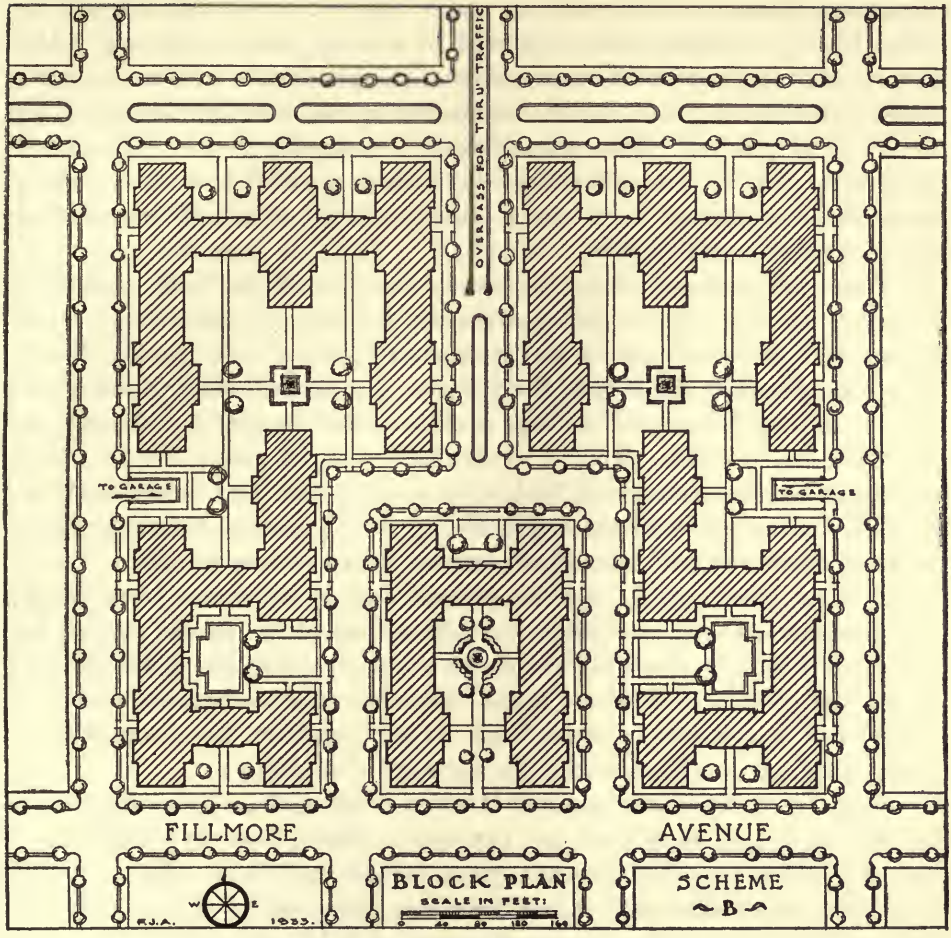


FIGURE 55

ALTERNATIVE DESIGN FOR THE SAME AREA WITH SOMEWHAT HIGHER COVERAGE TO PERMIT OF LOWER RENTALS

density of building necessitated by the land cost could not be satisfactorily provided for in six-story units without crowding the land to an undesirable degree.

The first scheme to be developed, which will be referred to as Scheme A, was based on a coverage of about one third of the site, with buildings ranging from 10 to 22 stories. In addition, a 28-story central tower was planned on the north and south axis, with two balancing towers on the north sides of quadrangles facing Fillmore Avenue. It was proposed to replace the two intermediate streets by a central boulevard that would

pass on either side of the central tower, subject to the approval of the City, thus permitting a development with large court areas and with a street pattern that would discourage through traffic within its center without hampering the general circulation of traffic in the district. The tall central building, which was designed as an apartment hotel, was intended to provide a much needed vertical accent for the whole area of Jackson Heights, and to create a landmark that would be recognizable for a radius of many miles.

The average gross cubage per rental room could be fairly accurately determined, and the cost of construction per room computed by multiplying this gross cubage by the estimated cost per cubic foot. Taking into consideration the size of the project, the savings that would accrue from wholesale buying of building materials and interior equipment, and the economy resulting from a centralized heating plant for the whole development, it was decided that a figure of 55 cents per cubic foot could be assumed to cover all items pertaining to the construction and equipment of the buildings, including overhead and builders' profit.

Typical floor plans of apartment units, each containing from twenty to twenty-five rooms per floor, were developed after several studies had been made of the possibilities of the property from the point of view of the site planner. In these plans, emphasis was placed on economy in public hall space and in apartment layouts, and on the desirability of large, airy rooms with a maximum amount of sunlight.

With the exception of some of the two-room units, all the apartments in Scheme A had more than one exposure. From these typical plans, it was estimated that the average gross cubage per room would be 3970 cubic feet, after allowing for first-floor loss, superintendents' apartments, etc., which gave a total construction cost of $2183 per room.

Another assumption, which later proved to be fairly accurate, was that the gross cost per room for land and building should not exceed six times the annual rent of the room. As the latter was to be kept between $420 and $480, the amounts remaining for land cost per room were $336.50 and $696.50, respectively. As the total land cost was $2,835,000, the required number of rooms was somewhere between 4100 and 8400, depending on the rental charged. This was narrowed down to a range of between 4500 and 5500 rooms, as it was considered undesirable from the financial point of view to have the improved land cost exceed one fifth of the total cost. This is the same ratio that is considered desirable in single-family developments.

The first scheme, in its final form, provided 5000 rentable rooms, and had a coverage of 33 per cent of the site (excluding street area). The annual rental per room worked out at $450, or $37.50 per room per month. As already mentioned, this rent would have to be much reduced to meet 1934 conditions, but costs could also be reduced.

After Scheme A had been developed, a further study was made along somewhat different lines. There was some doubt as to the feasibility of financing a scheme with tall tower units, and the falling rental market indicated that the scale of rents was too high. Scheme B represents an attempt to bring the monthly rental per room down to $30. This was accomplished by increasing the coverage to 50 per cent and the number of rooms to 7000, using a twelve-story scheme and assuming a cost of 45 cents per cubic foot.

Operating Costs. The cost of operating, repairs, and general maintenance for Schemes A and B have been determined on the basis of the cost per room per year of each item, as shown on the following table, the only variable being the allowance for wages for elevator operator service, which for Scheme A worked out at $28.70 per room per year, and for Scheme B, $25.40.

Fuel	$13.00
Electricity	8.00
Gas	2.00
Water	2.50
Supplies	2.00
Repairs	10.00
Decorating	15.00
Insurance	3.50
Miscellaneous	7.00
Total	$63.00

Garages. Garages were planned under the large courts, to be entered from the east and west boundary roads. They were designed to accommodate 750 cars, or somewhat less than one car for every two families in the group, with 280 square feet of floor area being allowed per car.

Taxes. The assessed valuation of the project was estimated by cubing Scheme A at 50 cents and Scheme B at 40 cents, the garages at 20 cents, and adding $10,000 per 20-foot lot for the land, there being 192 lots all to-

gether. A basic tax rate of $2.69 per $100 was used, this being the rate for the Borough of Queens in 1931.

Amortization at 2 per cent for the first mortgage and 5 per cent for the second mortgage was allowed for, and in each case the hoped-for net minimum cash return on the equity, before amortization of the second mortgage, was 12.5 per cent.

Ventilation and Exposure of Apartments. A check-up of a typical floor plan of Scheme B disclosed the fact that 142 of the 166 apartments per typical floor, or 85 per cent, have more than one exposure. Of these, 58 apartments, or 41 per cent, have "through ventilation" as distinct from "cross ventilation." Only 9.5 per cent of the total number of apartments on this floor have rooms with less than a 45-degree angle of light.

Each typical floor contains 24 different varieties of apartment layouts, the average number of rooms per apartment being 3.4. The following figures give the actual distribution of apartments by sizes:

Number of Rooms per Apartment	Percentage of Total Apartments	Percentage of Apartments with More than One Exposure	Percentage of Apartments with Less than 45-Degree Angle of Light
5	6	100	0
4 and 4.5	30	100	3
3 and 3.5	43.5	94.5	12.5
2 and 2.5	20.5	41	15.5

It was necessary to present details of the complete building project at Jackson Heights in order to illustrate the economic possibilities of providing housing accommodation on land costing $7.50 per square foot. The figures confirm statements already made to the effect that land of this price may be successfully developed for high-class apartments but cannot be developed for low-cost housing except with an unhealthful degree of overcrowding. Because of the limited demand for dwellings costing $20 per room or more, it is evident that only land in highly favored locations may continue to command high prices for healthful use.

The emphasis in these pages has been placed on problems of design in areas where the price of land will permit both a successful development from the point of view of health and a limitation of the total cost of improved lots to one fifth or less of the cost of such dwellings as are required to house the great majority of the population.

CHAPTER XIII

PRACTICAL EXAMPLES OF NEIGHBORHOOD AND TOWN PLANNING

IT is appropriate to conclude the foregoing outline of basic considerations, principles, and methods with a brief description of some practical examples of neighborhood and town planning in the United States and England. The examples chosen are limited to those where the neighborhood or town has been planned from the beginning. The towns included are small and in the nature of large neighborhood communities.

RIVERSIDE, ILL.

The plan of Riverside, prepared by Olmsted and Vaux in 1869, is a good example of the landscape method in planning a home neighborhood.[1] The method of approach of Olmsted and Vaux was essentially sound, although to meet modern conditions, such a plan should have a focal center for its community life and a different organization of its street system and block sizes.

The area of Riverside was 1600 acres and the instructions to Olmsted and Vaux were to lay it out for residence. The following are three striking points from their preliminary report:

(1) The desirability of combining urban and rural advantages.

(2) The need of considering tendencies to change, suburban expansion, and increasing demands for sites that have natural amenities.

(3) The desirability of encouraging separation of business and dwelling streets, which was stated to be a new principle in laying out towns.

The primary consideration was access by rail and road, and especially by road. A new parkway approach extending for a distance of nine miles from Chicago to Riverside was projected 200 to 600 feet wide, the road reservation including a drive for pleasure vehicles, promenades for pedestrians, and a riding path. It was stated that by making the accommodations of the approach "sufficiently large and sufficiently attractive, by associating with it several turning-points and resting-places in the midst of pleasure-grounds of moderate extent," a fine recreational promenade

[1] See Olmsted, Vaux & Co., "Preliminary Report upon the Proposed Suburban Village at Riverside, near Chicago," reprinted in *Landscape Architecture*, July, 1931, pp. 259–277.

would be provided. Unfortunately, this parkway, at the time so unique and splendid in conception, was never built.

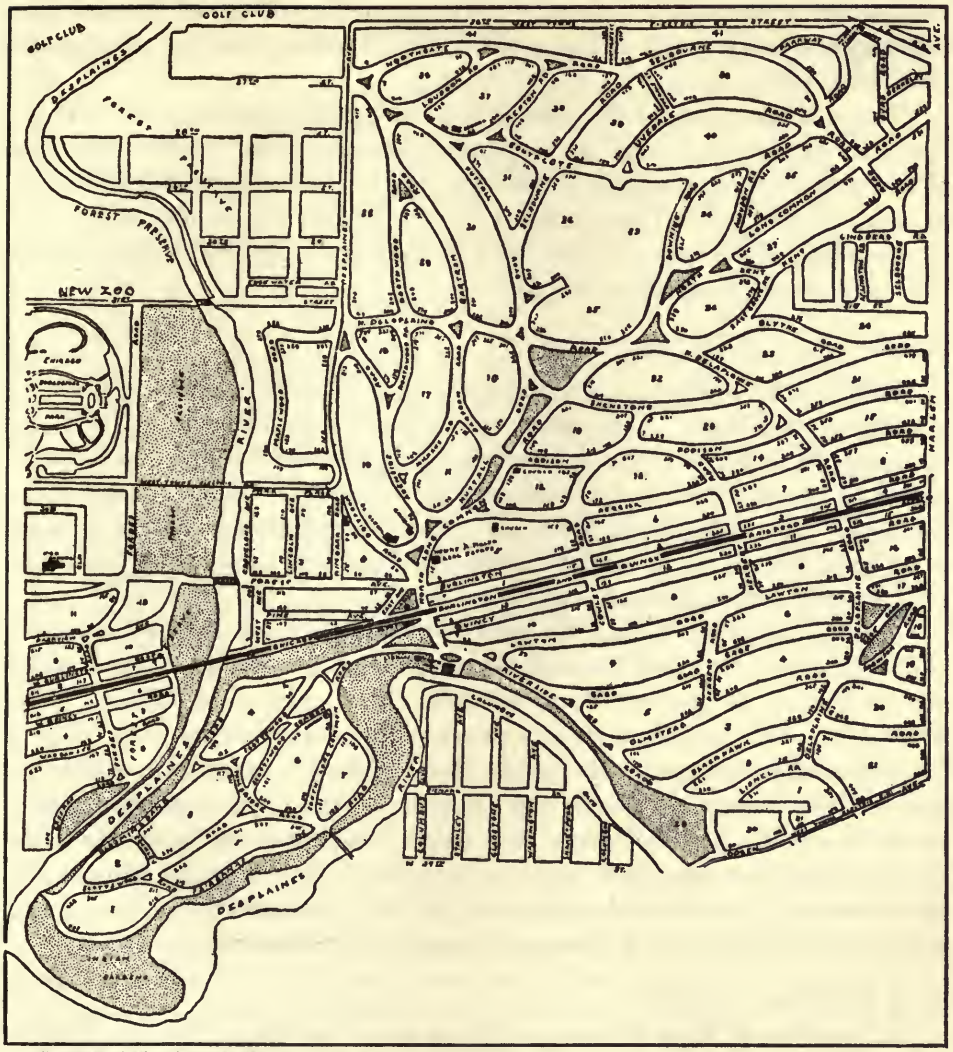
Next to access came the question of public open spaces, for which it was proposed to reserve the areas with the most attractive natural features. Informal village greens in open situations rather than inclosed spaces were recommended. The need of planning with a proper social objective was stressed, whereas the prevailing system of suburban development at the time was described as being based on the sole aim of extending town streets over suburbs and obtaining town values for lots.

In connection with traffic circulation it was stated that comfort and convenience were more important than celerity; that gracefully curved lines, generous spaces with abounding turf and trees, and an absence of sharp corners should replace the customary system of streets laid out in rigid rectangular form. One essential quality that was stressed as desirable was *domesticity* in relation to indoor and outdoor life, and therefore subordination of all that favors movement. Another was the emphasis to be placed on "range," a primary requisite in the arrangement of a subdivision, as well as a park. "If," said the report, "the general plan of such a suburb is properly designed on the principles which have been suggested, its character will inevitably also, notwithstanding its tidiness, be not only informal, but, in a moderate way, positively picturesque, and when contrasted with the constantly repeated right angles, straight lines, and flat surfaces which characterize our large modern towns, thoroughly refreshing."

The plan of Riverside, based on a carefully prepared topographical survey, is shown in Figure 56. The central feature is a parkway system rather than a formal central square. The parkway follows the river bend shown on the lower side of the drawing and crosses the railroad at the station, then intersects diagonally the main part of the subdivision. Apart from the roads that parallel the railroad and certain short lengths elsewhere, the roads are all curved with no sharp corners to the blocks.

After sixty years, it is of interest to note the results that have followed this plan. A visit was paid to the development by Mr. Howard K. Menhinick in 1931.[1] The first striking feature he mentions in his description is a long curving common with an elm-arched road on either side, and with attractive houses facing it but well set back and surrounded by trees. Thus the keynote is that of the New England village, and the

[1] See his article, "Riverside Sixty Years Later," in *Landscape Architecture*, Jan., 1932, pp. 109–117.



Courtesy of Mr. Henry A. Miller

FIGURE 56

THE PLAN OF RIVERSIDE, ILLINOIS. SHADED AREAS INDICATE PUBLIC OPEN SPACES.

chief characteristic, spaciousness. There is no intermingling of commercial and residential uses. The plan, Mr. Menhinick says, "has been carried out in astonishing detail." The park-like effects of the residential streets have been maintained. The winding streets discourage through traffic.

The main purpose in describing the Riverside plan has been to show it as an example of the earliest type of landscape plan. Other examples of the landscape type of plan are to be found at Bournemouth in England, in a suburb of Ulm in Germany,[1] and in the layout of the hilly district in the environs of Vienna, all of which were planned with the characteristics that distinguish the Riverside plan.

FOREST HILLS GARDENS, N. Y.

Forest Hills Gardens is a modern example of combined landscape and architectural design.[2] The plan was prepared in 1911 by Mr. F. L. Olmsted, Jr., and Grosvenor Atterbury. It is related primarily to function and topography, and secondarily to securing a well-organized composition. The component parts are better related than in Riverside, and a rational degree of formality enters into the arrangement of its focal centers and main approach.

A broad diagonal branching into two curving thoroughfares connects the railroad station and the neighborhood centers. Around the station square the inn and stores form an effective closure of buildings. (See Plate VI.) The principal streets provide the maximum of convenience for dispersing through traffic, while short indirect streets give access to the interior blocks and discourage through traffic. The extent of street curvature is not forced beyond the point that is necessary or desirable for agreeable arrangement and convenience. In its social aspect the plan provides for well-to-do residents, but the principles of the design are suitable for application to low-cost housing developments.

WAR HOUSING VILLAGES

A number of War Housing villages were developed by the United States Housing Corporation and the United States Shipping Board in 1918. The purpose was to provide houses in districts where war industries were established or about to be established, and where a labor shortage existed as a result of insufficiency of housing.

[1] See plan in J. Stübben's *Der Städtebau*, Leipzig, J. M. Gebhardt, 1924, p. 117.

[2] See "Forest Hills Gardens as a Neighborhood Community," in *Regional Survey of New York and Its Environs*, Vol. VII, pp. 90–100.

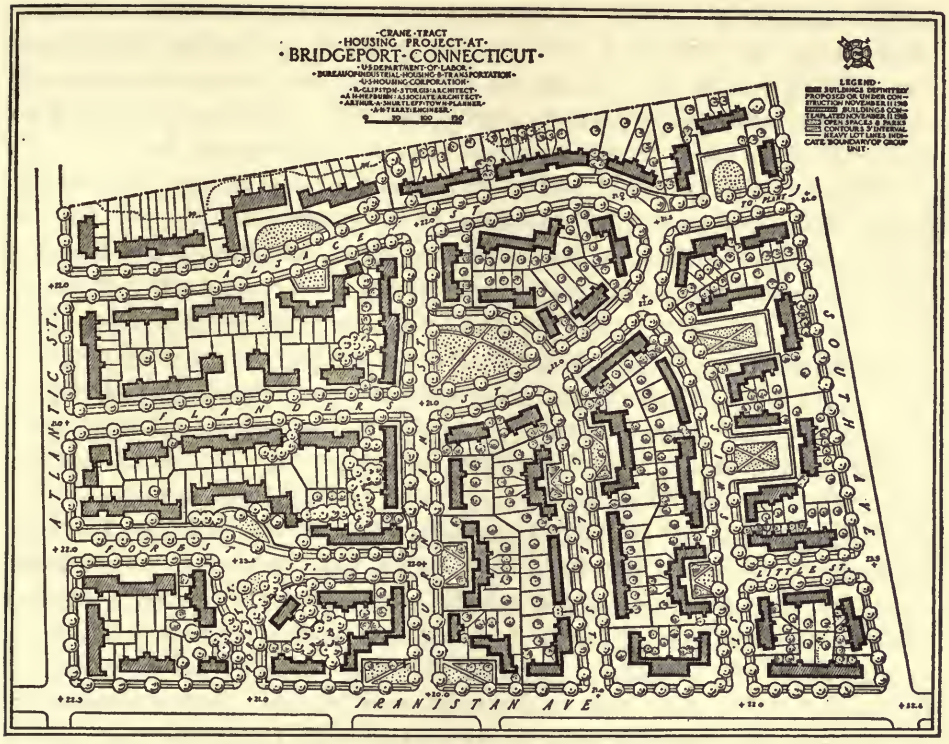


FIGURE 57

These villages were planned by groups of experts consisting of architects, engineers, and city planners. The results of the work of the Housing Corporation were presented in a comprehensive report edited by Henry V. Hubbard.[1] This report was and still remains a very valuable presentation of studies of village planning in the United States, and has never been sufficiently appreciated as a guide in land subdivision. Careful investigation of sites and local conditions was made, and probably in no other housing enterprise in America has the same extent of expert advice and degree of expert collaboration been obtained.

An inspection of the plans reveals interesting variety in technical approach and treatment. In all instances the degree of formality or informality is influenced by topography but also in some instances by the personal approach of the planners. Generally, it was found that the

[1] U. S. Department of Labor, Bureau of Industrial Housing and Transportation, *Report of the U. S. Housing Corporation*, Vol. II, Washington, Government Printing Office, 1919.

gridiron system of streets was the least expensive on level land, and some other layout on hilly land. Where the gridiron system was adopted, it was modified to secure closing of vistas. Curves were introduced in some plans with apparently successful results. Cul-de-sac streets were used with good effect in some designs, *e.g.* at Indianapolis, Ind.

Projects of the United States Housing Corporation for Bridgeport, Conn., have been successfully realized to an exceptional degree. In this city there were erected, on five separate tracts, 889 family accommodations, ranging from small three-room types to large apartment types. The Crane Tract, now called Seaside Village, consists of three-room flats and four- and five-room houses built in rows with good garden space. These houses are largely occupied by mechanics and mercantile employees with an average wage of approximately $25 per week. The average monthly rents, over a period of years, have been $23 for the three-room flats, $27.50 for the four-room houses, and $29 for the five-room houses. While the Bridgeport Housing Company acquired the buildings from the Government at much less than they would have to pay to build under present conditions, the success of the development demonstrates that small houses that are properly laid out and well designed are eagerly sought after by tenants. The garden types of apartment houses at Bridgeport have also been a financial success, and it is claimed that similar apartments could be built to-day and made profitable at rentals of from $35 to $45 per month for apartments of three, four, and five rooms.

The plan of Yorkship Village, prepared for the United States Shipping Board by Electus D. Litchfield, is another interesting example. It is a combined radial and curvilinear plan of the spider-web pattern, with a well-arranged civic center and approaches.[1]

Houses in the development of the United States Housing Corporation were classified as single-family, two-family, group or row, and apartment types. It was found that the two-story detached house was not as economical a form of combining two four-room dwellings as the semi-detached house, that the cheapest house to construct was the row two-flat house, and that apartments could not be built as cheaply as most of the small house types.

It was held that design, arrangement or grouping, and the pleasant relation of the whole layout to the surroundings were elements that could often be obtained without extra cost in a large and isolated develop-

[1] For plan and perspective view see *Regional Survey of New York and Its Environs*, Vol. VII, pp. 248–249.

ment. In discussing good appearance as a financial asset, the report pointed out among other things the desirability of having pleasant views along streets, and of giving some distinction to the setting of houses by intelligent variation in setback in relation to the grouping of the houses.

It was found generally possible to house 18 families per gross acre in row houses, 8 to 12 families in semi-detached single-family houses, and 5 families in detached single-family houses. Ordinary developments consisting of mixed semi-detached and detached houses averaged 6.4 families per gross acre.

Appendix 6 consists of a table showing for fourteen of the Housing Corporation projects the percentages of area distribution in streets and alleys, in other public uses, in residential lots, and for other buildings; also the average lot size, number of families per gross acre, and cost of public improvements per family. The cost of the public improvements in this table is a converted figure obtained by substituting the unit prices used in the studies of the Harvard School of City Planning, described in Chapter XII, for the unit prices given in the Housing Corporation report.

MARIEMONT, OHIO

The plan of Mariemont, designed by Mr. John Nolen in 1922, is an interesting example of formal treatment. It is a satellite town near Cincinnati and located on the main line of the Pennsylvania Railroad. The site comprises about 365 acres and the layout allows for a population density of 6.81 houses per net acre. The dwellings comprise detached, semi-detached, apartment, and group houses. An example of a semi-detached four-family house designed by C. A. Ziegler is shown on Plate VII. This, the central house of the group, occupies a lot 96 feet wide and 90 feet deep and has a building frontage of 76 feet. The monthly rental is $47.50 for the interior houses and $55 for the end houses. A four-house group designed by Mr. Richard Henry Dana is also shown on Plate VII. The frontage of the lot in this case is 85 feet and the depth 115 feet. The rental of the two interior houses is $37.50 and of the end houses $40. These are specially interesting examples of different types of group houses.

KINGSPORT, TENN.

Planned in 1919 by Mr. Nolen and developed with remarkable success under Mr. J. Fred Johnson, president of the Kingsport Improve-

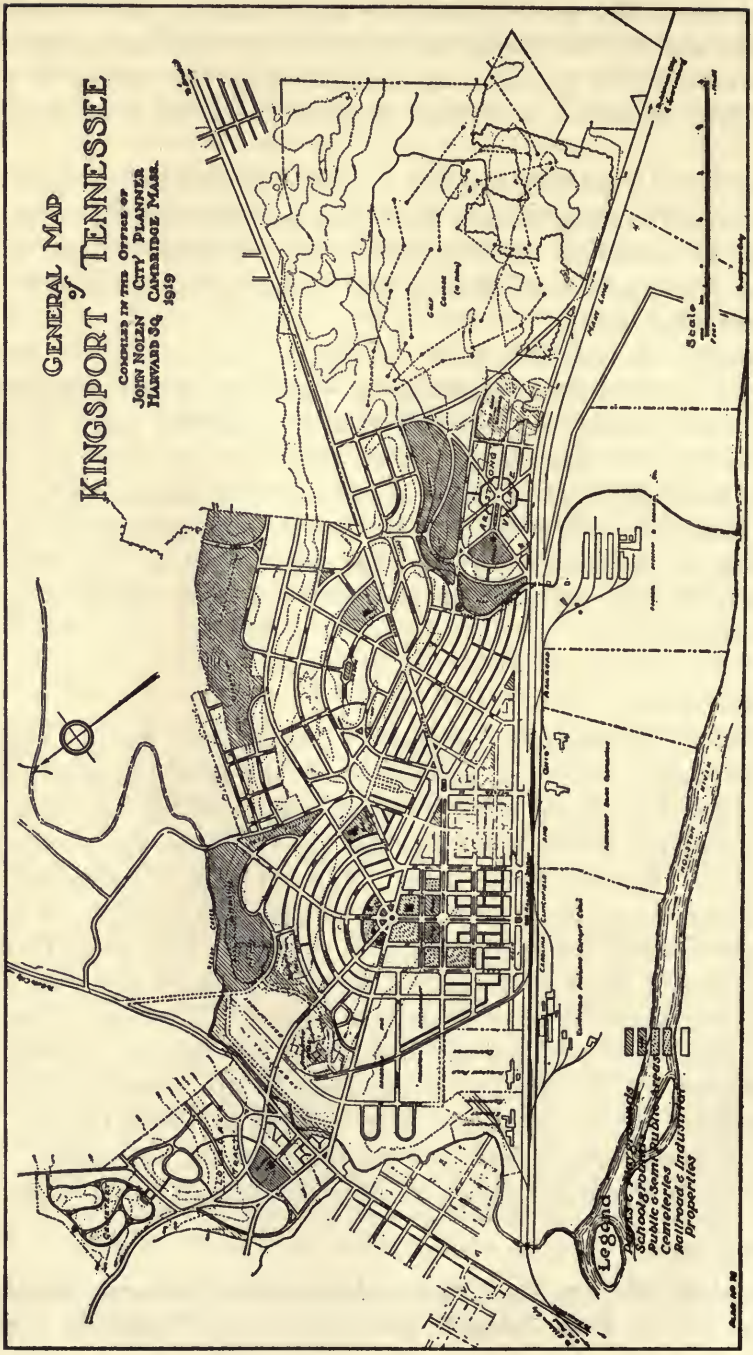

GENERAL MAP
of
KINGSPORT
TENNESSEE
COMPILED IN THE OFFICE OF
JOHN NOLEN CITY PLANNER
HARVARD 34 CAMBRIDGE MASS.
1919
Scale
Legend

FIGURE 58

ment Corporation, the town of Kingsport is probably the nearest approach to a garden city in the United States. It is situated on the Carolina, Clinchfield and Ohio Railway in a region where population was sparse and construction was costly. The layout of the town is shown on Figure 58, and the illustrations on Plate IX give an idea of the finished character of the development. Mr. Clinton Mackenzie has been chiefly responsible for the pleasing architecture. The grouping of the houses is particularly successful, as in the case of the detached houses shown on Plate IX. The prevailing cost of houses in Kingsport has been about $2500. A comparison between these houses and the kind of accommodation that can be obtained in large cities is significant of the greater possibilities that the small town provides for good living conditions at a cost within the means of workers' families.

There are in the town a number of well-established and well-arranged industrial plants, the representatives of which were responsible for initiating the development. It was primarily a business proposition. In its social and industrial life, the town is self-contained and is surrounded by a belt of open land partly devoted to park use and partly to agriculture. It is managed under a model charter and city manager form of government. This is the type of development that provides the most desirable combination of town and country life and is based on the soundest principles of economy.

RADBURN, N. J.

Radburn was designed as a "town for the motor age" where pedestrian ways and automobile roads would be kept separate and where children could go to school and playgrounds without crossing any street. The peculiarities of its design are due in most part to the governing consideration of providing a higher degree of safety and amenity than has usually characterized residential neighborhoods since the use of the automobile has become so prevalent.

The site comprises about 1050 acres of undulating land situated about fifteen miles from New York City, and was intersected by an existing highway, Fair Lawn Avenue. A new arterial road was projected in the plan and has been partly constructed diagonally across the property near its southern fringe. The principal street system was designed to concentrate on the railroad station as a focal point, and the first business district was placed near the station approaches.

The plan, for which Mr. Clarence Stein and Mr. Henry Wright were chiefly responsible, was begun in 1928. It presents in some respects a

new conception of social purpose and includes elements of novelty in design suited to this purpose. In its main outline, however, it does not greatly depart from conventional forms.

The street system consists of three classes of ways: namely, main thoroughfares, principal traffic streets, and minor roads. The two former divide the area into large blocks of irregular shape and of an average size of 35 to 40 acres. As the project has developed, the tendency has been to increase rather than to lessen the size of the blocks, in recognition of the fact that the needs of through traffic can be met by far fewer thoroughfares than have been considered necessary in the past.

A special feature of the plan is the interior park system. This penetrates the large blocks and its units are connected in some cases by underpasses beneath the roads that separate the blocks. This system is a recognition of the sound principle that ample recreation space should be provided near homes, but is partly the result also of the need for separation of pedestrian from vehicular traffic. The parks front for small lengths on traffic streets, but there are no streets leading into them. They are approached by walks between the gardens at the rear ends of the lots. These walks are lighted and maintained as public ways.

The vehicular approaches to the houses are narrow streets with closed ends. The exclusive use of the cul-de-sac in combination with the separation of pedestrian from vehicular traffic, and the integration of connected open spaces in the interiors of the large blocks combine to give the plan its unique quality. Apart from these peculiarities it is an elaboration of principles that have been followed in the Letchworth plan to be described presently.

The cul-de-sac in itself is not a novel feature, having been successfully employed in ancient times and, in its modern forms, in many places, *e.g.* in Cambridge, Mass., and in Letchworth, Hampstead, and Welwyn in England. In Radburn it has been given a new importance because of its more extensive use than elsewhere and of its relation to the park system.

It is unnecessary to describe the features of the street plan in detail, as these are well known. As a street and park layout, Radburn may already be regarded as a success; it combines convenience for through traffic with safety for pedestrians in higher degree than any existing plan. It is somewhat defective in providing for local vehicular traffic, and probably in this respect it does not afford a sound example for wider adoption. The advantages gained in privacy and safety, however, are claimed to be greater than the losses in local convenience. The exten-

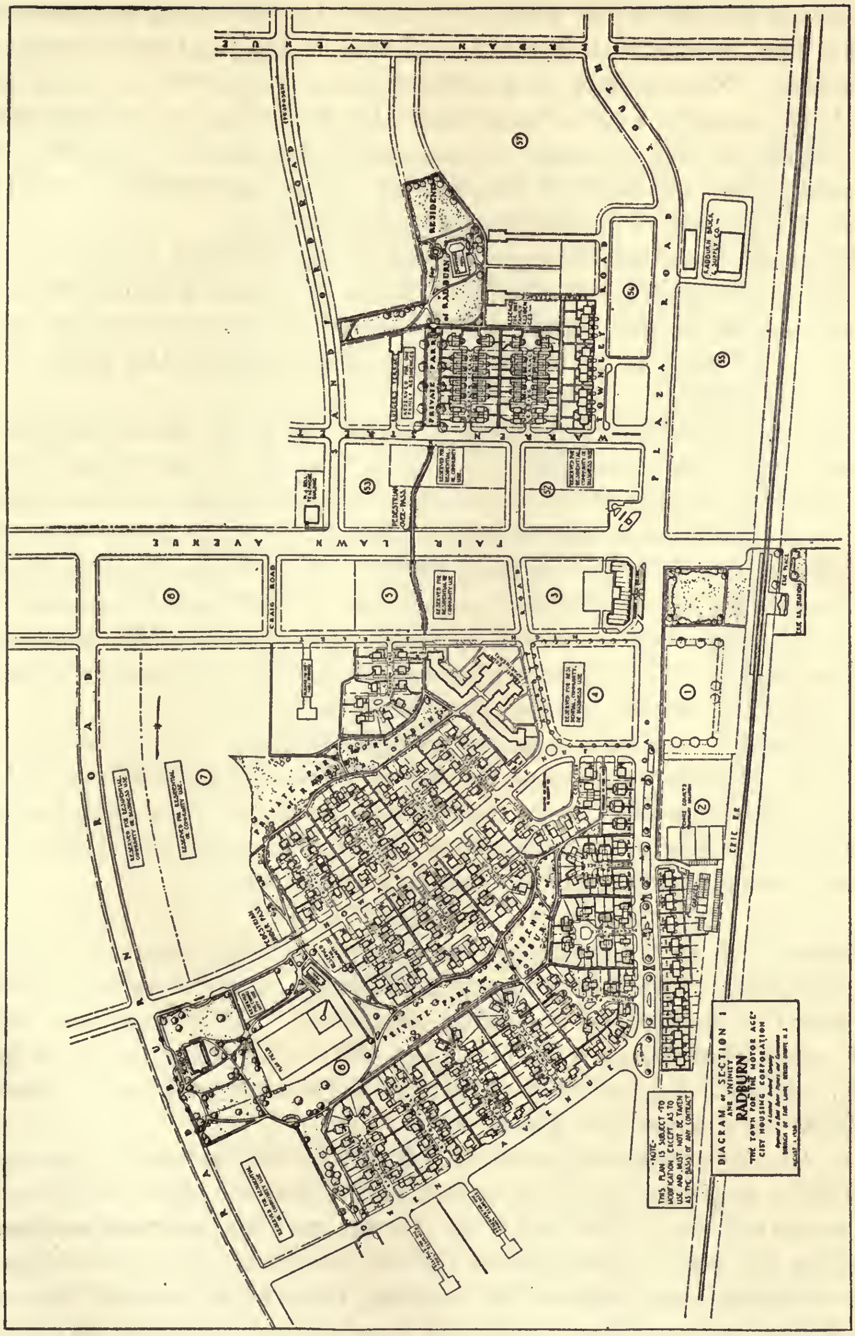


FIGURE 59

Courtesy of City Housing Corporation

sive use of the motor car makes it possible to travel long distances so quickly that there is little actual loss of time in passing from one section to another. Nevertheless, it is open to question whether it would not have been better to have allowed more street crossing by pedestrians in order to obtain improvement in local communication for vehicles. On the whole, there would be an adequate measure of safety if the necessary crossings were limited to narrow one-way streets.

The usual objection to the cul-de-sac as being difficult to control, has not arisen in Radburn. But in the average town with small ownerships and dependence on municipal control, the closed-end street leads to some abuses. Therefore, as an example for general adoption, the system has some serious defects.

The lots at Radburn are generally about 30 feet by 100 feet, which is comparatively large considering the extent of the adjacent park area. The houses are mostly detached or semi-detached though there are some row houses and some apartments. The prices range from $8250 to $18,200 for detached houses, from $8100 to $15,000 for semi-detached, and from $7400 to $10,300 for row houses. It is therefore intended to be a community for those having substantial incomes. At the same time, the plan is suitable for a development of cheaper houses on cheaper land with somewhat smaller lots and park areas.

The fact that the service entrances to the houses are on the cul-de-sac streets has the effect of making the houses back rather than front on the streets. The fronts face open lawns that terminate at the path leading to the interior parks. The result is an absence of privacy that is an objection in comparison with ordinary developments.

Zoning. As in the case of all towns that are being privately planned and developed, there is a tendency at Radburn to resist rather than to welcome the application of zoning regulations. It is conceived with good reason that the plan itself has the effect of dividing the town into zones, and that any attempt to impose an arbitrary system of zones would do more harm than good.

On the accompanying map of uses (Fig. 60) is shown the area allotted to residence, parks, business, public and semi-public buildings, and industrial use. The industrial district may be regarded as determined by the plan. The business districts are those required for immediate purposes, and parts of the existing residential area will be converted into business when residential development is further advanced.

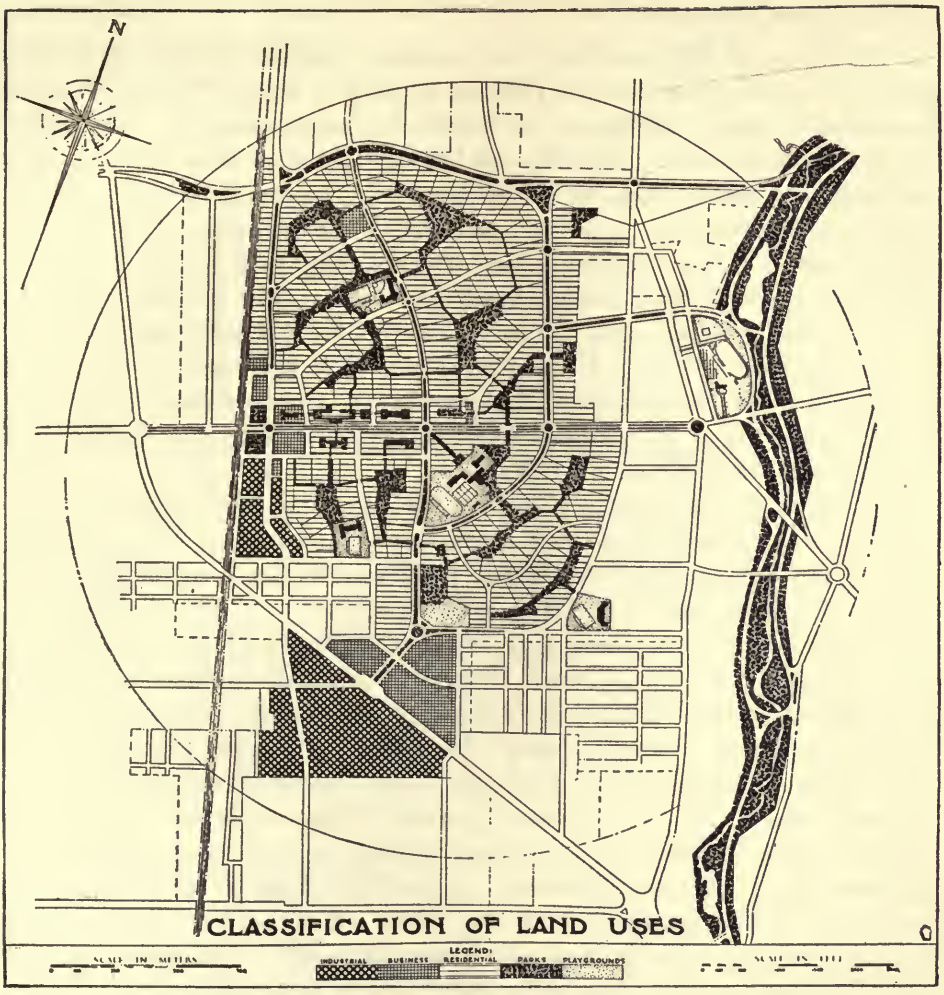


FIGURE 60. RADBURN, N. J.

It has to be recognized, however, that the developers of such large estates as Radburn have definite ideas based on their plans for allocating future business areas. The fact that these are not mapped and that zoning regulations are not desired is due to the obvious disadvantages that would accrue from rigid determination of area and use regulations. Zoning should in normal conditions be flexible, partly for the reason that a greater degree of permanence can be given to zones that are not prematurely determined.

LETCHWORTH, ENGLAND

The town of Letchworth is the original English garden city. The plan of the town was made in 1903 for an area of about 3800 acres (since increased to over 4500 acres) on which it was proposed to establish a completely new town. The site was located about 34 miles from London and was purchased at about $200 per acre. It was intersected in the middle, approximately from east to west, by a railroad line parallel to which there were two highways each from a third to a half mile distant. The land was of an undulating character with no steep slopes. The area of somewhat less than two square miles that lay between the two highways was selected for the town proper. This area had no buildings except a few devoted to agricultural purposes; but there were two villages on the outer fringe of the town site which it was decided to preserve in their existing condition.

Following a topographical survey, the lines of main drainage were determined. Two architectural firms were employed to make competitive plans, namely, Messrs. Barry Parker and Raymond Unwin and Messrs. W. R. Lethaby and Halsey R. Ricardo.

Parker and Unwin gave close study to topography and fitted their street system to the landscape. They selected the highest point near the proposed station for a civic center and laid out the principal avenue, Broadway, along a "hog's back" between the southern highway and the station, following a line that gave most direct access to the largest adjoining town, Hitchin. From the central square, intersected by the broad avenue leading to the station, radiating roads were designed in different directions, but these were controlled somewhat in their position and length by topographical factors. The station site was in a cutting and the broad avenue leading to it from the south was designed to stop at the station entrance, but ultimately to have a somewhat indirect connection with the north side over a bridge to be built at a later date and designed in relation to the station buildings.

On the east and west sides of the spider-web center formed on the plateau, the land dipped into valleys and the railroad passed over these valleys at right angles on an embankment. These valleys suggested lines for north and south roads to provide for main sewers, and underpass connections between two sides of the railroad. The more formal part of the Parker-Unwin plan ended in these valleys; outside of them the street system was laid out in less direct lines, with some curves designed to suit the levels of the land, and with comparatively large blocks

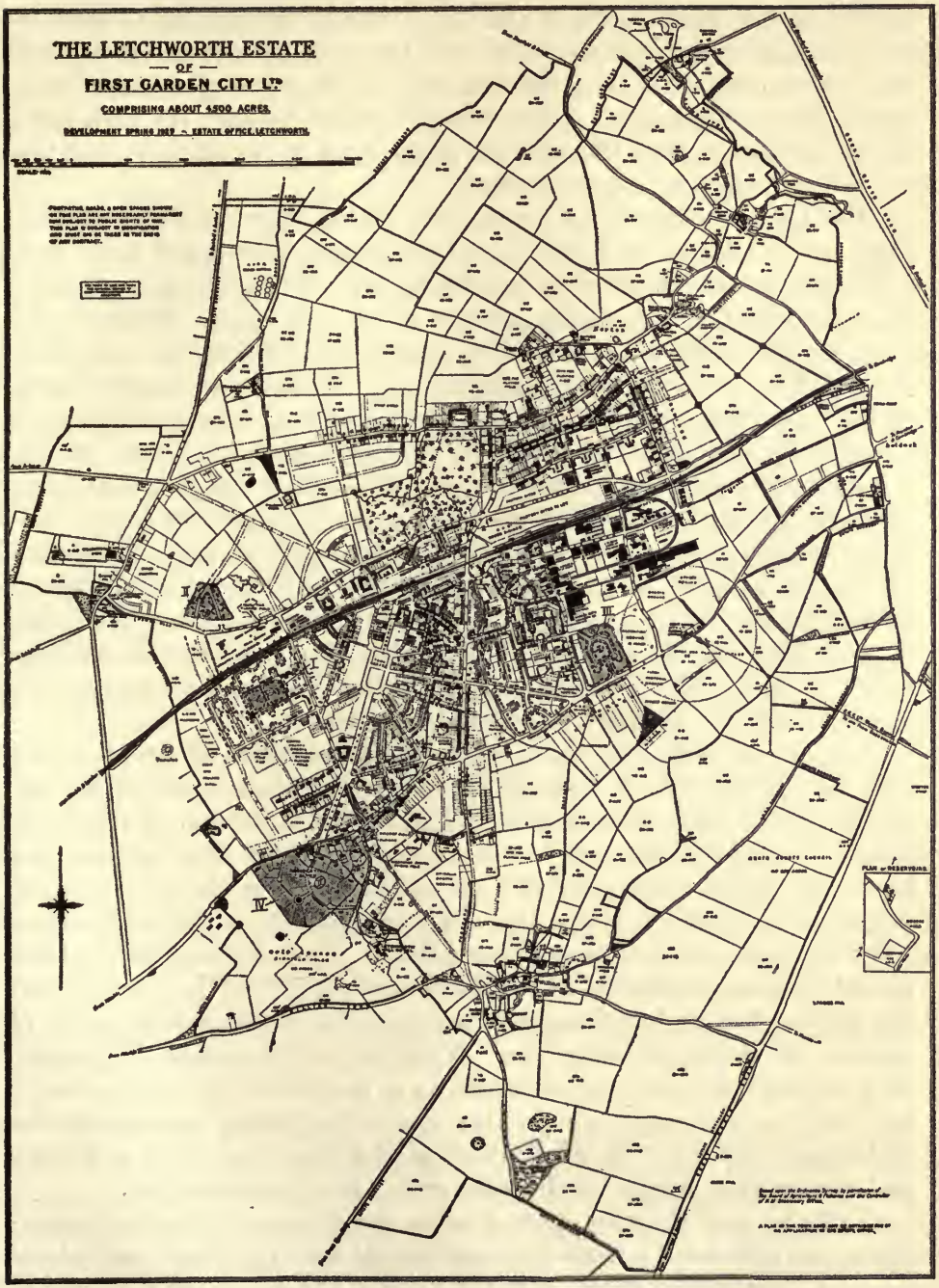


FIGURE 61. THE PLAN OF LETCHWORTH

having narrow interior streets and culs-de-sac so arranged as to discourage through traffic. On the north side the continuity of the street system was permitted to be broken in order to reserve a permanent open space, Norton Common. Apart from the main avenue, the plan lacks direct approaches from the environs of the town to the station; but this has not proved to be a serious defect.

The Lethaby-Ricardo plan was more formal than the Parker-Unwin plan, and presented an architectural conception that might have been suitable on either a level or an undulating site. The planners conformed in general to the rectangular pattern of layout. They conceived the town as something which should be compact in its building and which depended for any charm it might have on architectural quality alone, rather than on combinations of architecture and landscape architecture. Considering the probabilities of the character of development, it was not a suitable plan for Letchworth, which required compact continuity of building in its business and administrative center only, but in its residential areas, a spacious landscape setting agreeably arranged in relation to changes of level, existing trees, and other natural features. Moreover, it was too rigid and left too little opportunity for those adjustments of secondary streets which inevitably follow from experience in development, or for the later planning of narrow streets and culs-de-sac that are essential both for economy and artistic appearance.

Proper comparison of these two plans as examples of design would only be possible if both had been carried out, but as paper plans they represent two kinds of approach which are worth noting. Parker and Unwin approached the problem from the combined architectural and landscape architectural point of view and studied the site so as to make proper adjustments between the different elements in the prospective town structure and the natural conditions. They realized that outside of certain main outlines the plan should not determine the whole layout but rather that it should leave opportunity for continuous planning of parts as development took place. While fitting the plan to the ground, they arranged the main street system so as to provide directness of route for traffic between strategic points; and while leaving opportunity for picturesque treatment of subdivisions for housing, they made a definite and symmetrical design for the main center and its approaches.

Lethaby and Ricardo showed more indifference to natural conditions, and laid down a more rigid and formal pattern, which would have become disorganized unless carried out as a whole. Their aim seemed

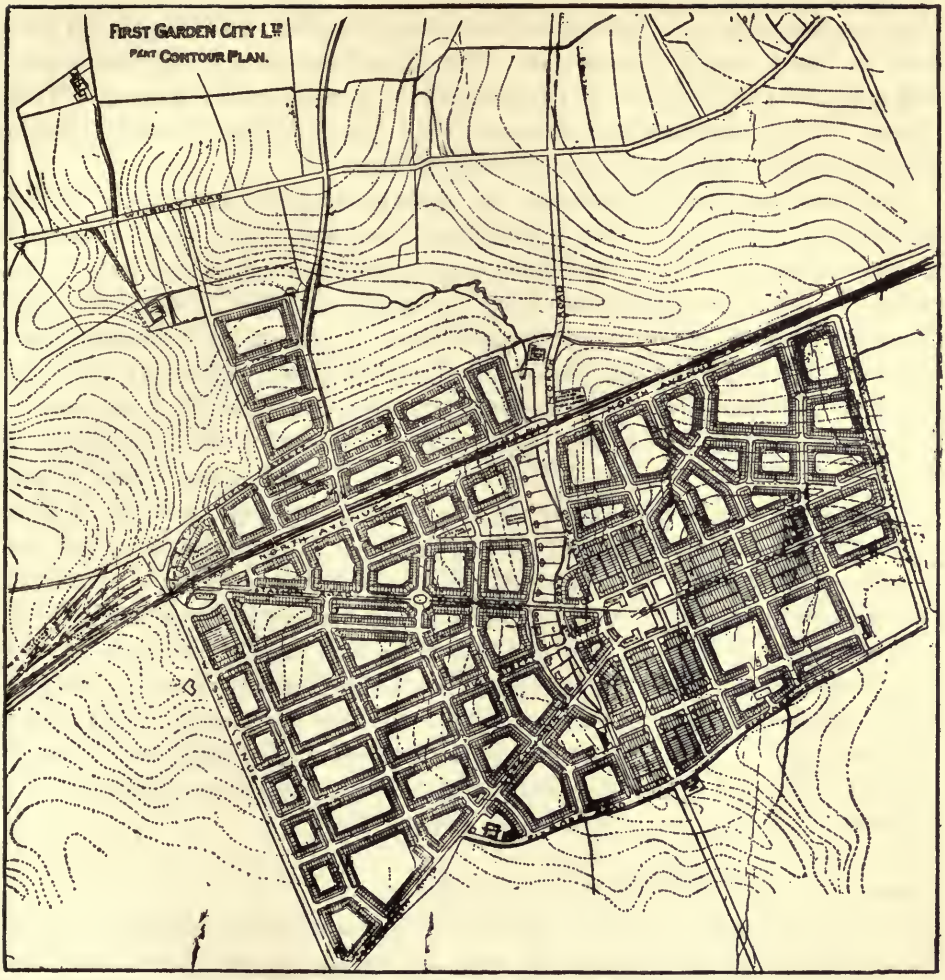


FIGURE 62
THE LETHABY-RICARDO PLAN FOR LETCHWORTH

to be to secure symmetry rather than adaptation to social and economic functions and natural conditions.

Zoning. As at Radburn, no definite zoning policy was applied to the town and it is not subject to public zoning regulations. The plan, however, was prepared in harmony with a general zoning policy and the main business section was determined in the position shown on the map. No definite apportionment of area to business and to residential uses was worked out, but business was largely centralized in one district. The

frontage intended to be allocated for business is about 40 feet per 100 persons of the ultimate population. The industrial area comprises about 200 acres or 11.7 per cent of the area allotted to the town proper. This allows a very spacious development with low buildings, mainly of one story and with the advantage of roof lighting.

One weakness in the plan that has been revealed by experience is that the provision for a secondary business street near the streets designed for the principal business buildings has retarded the development of the latter. Under the conditions prevailing at Letchworth, it was necessary either to provide for business in temporary structures to be later abandoned, or to construct more permanent buildings in a secondary business street in the hope that in time this would be superseded by a more central business street. In the Parker-Unwin plan the latter alternative was adopted, and a secondary business street, Leys Avenue, was allotted for the first shops. Unfortunately, the permanent shops erected on this street have absorbed capital that should have gone to building up the streets adjoining the central square that were intended to be used for commercial purposes. Leys Avenue was not designed of sufficient width to make it the important business thoroughfare it has become; a further unfortunate feature of its development was the reservation of a strip of land in the sidewalk over which the owners of the shops were given rights of private use. This use they have insisted on retaining for the display of goods, with the effect of impeding pedestrian traffic, preventing street widening, and creating a disorderly appearance.

HAMPSTEAD AND WYTHENSHAWE, ENGLAND

One of the most successful layouts for a home neighborhood is that of Hampstead Garden Suburb,[1] designed by Sir Raymond Unwin and Mr. Barry Parker. The plan includes a civic and educational center located in the midst of the residential area, and a system of cul-de-sac streets admirably arranged from the points of view of economy of development and attractive appearance.

Mr. Parker in 1930 prepared a plan for the Wythenshawe Estate near Manchester, England, where he adopted the principle that no road should be made to fulfill the functions of both a through traffic road and a building development road. The plan, shown in Figure 63, includes hexagonal blocks and provides for gyratory circulation of traffic around

[1] The plan of the Hampstead Garden Suburb is shown in *The Regional Survey of New York and Its Environs*, Vol. VII, p. 26.


RIVER MERSEY
PRINCESS R.
AGRICULTURAL BELT
PRIMARY SCHOOL
SHOPPING CENTRE
SENIOR SCHOOL
WYTHENSHAWE PARK
RECREATION GROUND
INDUSTRIAL AREA
HOSPITAL ZONE
SANATORIUM
CEMETERY
SECONDARY SCHOOL
N
W
E
City of Manchester
WYTHENSHAWE
ONE MILE

FIGURE 63

islands at all major street crossings. A through parkway and numerous culs-de-sac are special features. The use pattern of the neighborhood is indicated by lettering on the plan. This estate is being developed by the Manchester City Corporation and is intended eventually to accommodate over 100,000 people, of whom about 20,000 are already in residence in more than 4600 houses.

WELWYN, ENGLAND

The Welwyn plan, prepared by Mr. Louis de Soissons, is more formal than the Letchworth plan, and there is considerable difference in the central street system of the two towns. The approach to the railway station in Letchworth is by a broad diagonal parkway, with the civic square laid out on two sides of its axis at some distance from the station. The location of this square was dictated by the desire to use the highest available site for the civic center. At Welwyn, the parkway approach to the station is at right angles to the station buildings and railroad and widens out to give the effect of a longitudinal plaza, the end of which opposite the station is crossed at right angles by a wide parkway leading at one end to the proposed civic center.

Zoning. While Letchworth is the older town and is further advanced in its development, Welwyn already has a more orderly business center. Instead of land's being leased for shops to private persons when the first development took place, a temporary coöperative store was erected to serve the needs of the early inhabitants. Thus when it became necessary to permit development of private shops, they were allowed only on the most central business sites and were architecturally designed to harmonize with a comprehensive plan of the central groups of buildings.

The zoning map of Welwyn (see Fig. 64) shows the allocation of areas to uses under the plan, but these uses have not been confirmed by public regulation and are subject to change.

Welwyn has a larger proportion of area devoted to what is called industrial use than Letchworth. This amounts to 20.75 per cent of the town area, but includes gravel pits and other open uses which are likely to be abandoned as industrial area. The zoning plan provides for six subsidiary business districts in addition to the central business district. The frontage zoned for retail business is 36 feet per 100 persons, but owing to the fact that business use is especially limited by the presence of a general store operated on coöperative principles, the frontage in use

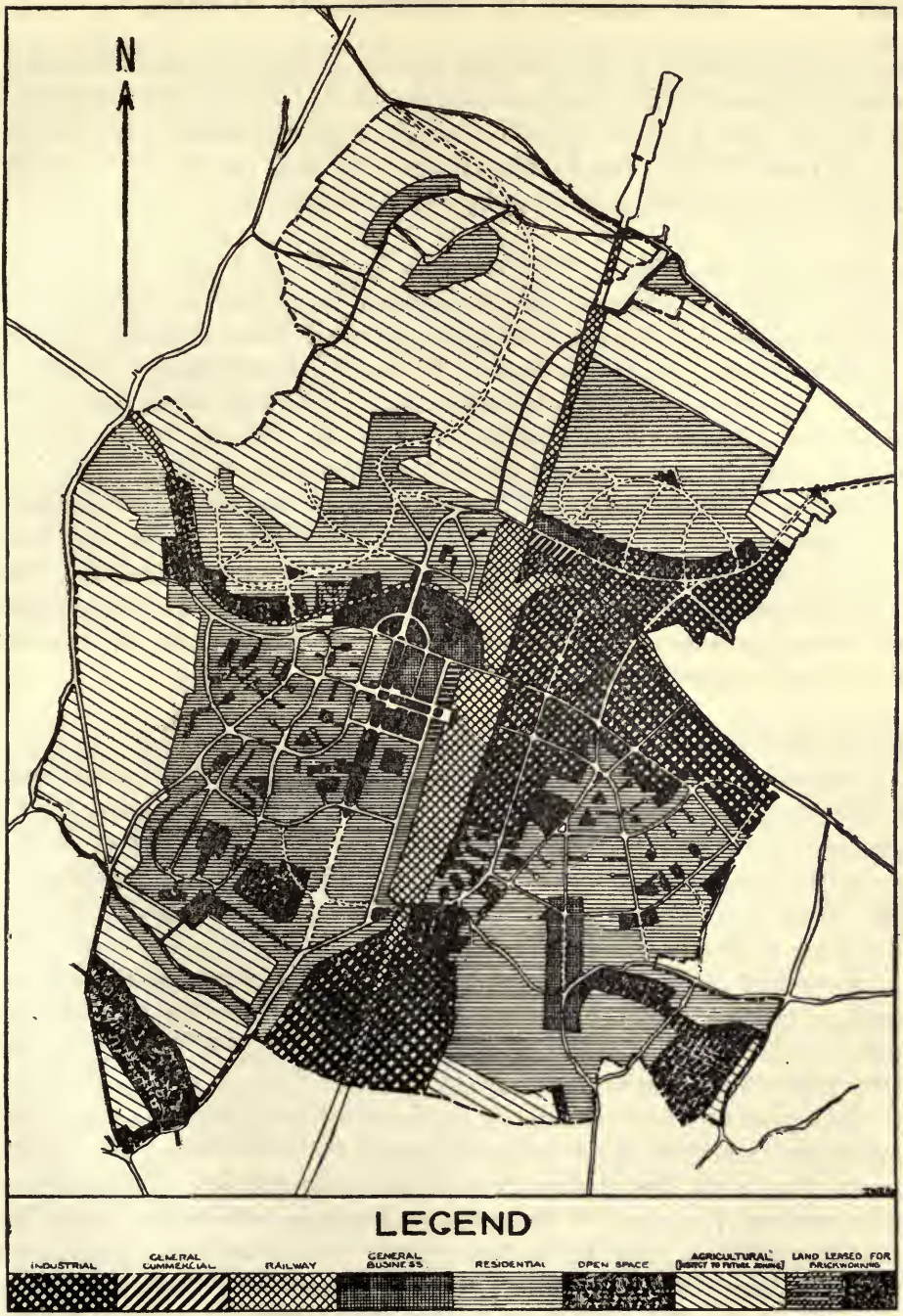


FIGURE 64

THE ZONING MAP OF WELWYN GARDEN CITY

at present is about 15 feet per 100 persons. This strikingly small percentage shows that the frontage actually needed for business purposes is much less than what is normally required under competitive conditions.

In both Welwyn and Letchworth density is governed by the design and private restrictions and not by zoning regulations.

CORNER BROOK, NEWFOUNDLAND

In 1923, I prepared a plan for Corner Brook on the west coast of Newfoundland for housing workers in the paper plant of the Newfoundland Power and Paper Company. It presented the unique problem of laying out a town on three plateaus separated by deep valleys and overshadowed by high, forest-clad hills. The site thus had great natural attractions but made an economic layout very difficult to secure.

It was necessary to have the lots approximately rectangular in shape. The approach to the town had to be along a narrow plateau only wide enough to permit of three depths of lots, one on each side of the main approach street and one facing a narrow driveway leading along the edge of a steep palisade. The business district was planned on the frontage of the main approach street.

CHATHAM VILLAGE, PITTSBURGH, PA.

One of the best opportunities for planning a neighborhood arises when a corporate body or an individual is prepared to find the capital for the purpose of carrying out a comprehensive scheme, as was the case at Forest Hills Gardens and more recently at Chatham Village. The plan for the latter was made by Mr. Clarence Stein and Mr. Henry Wright, designers of Radburn.

Usually it is difficult to obtain sufficient land at a reasonable price for such enterprises. The Buhl Foundation, which promoted this development, had considerable difficulty in obtaining a site of 45 acres within easy reach of the center of Pittsburgh.

The plan of Chatham Village is of special interest because it shows successful treatment of a small area of comparatively steep land. It was found that single-family detached houses could not be built for sale at prices within the reach of those whose earnings were under $2500, but that group houses could be built at savings of from 15 to 25 per cent over detached houses of similar grade and floor space. Therefore, in spite of an original prejudice against row houses, it was decided, after much study of their advantages and disadvantages in comparison with free-standing

Photograph by Aerial Surveys of Pittsburgh, Inc.

THE FIRST UNIT OF HOMES.

Courtesy of the Buhl Foundation.

GROUP HOUSING ADAPTED TO A HILLY SITE.

PLATE X. CHATHAM VILLAGE, PITTSBURGH.

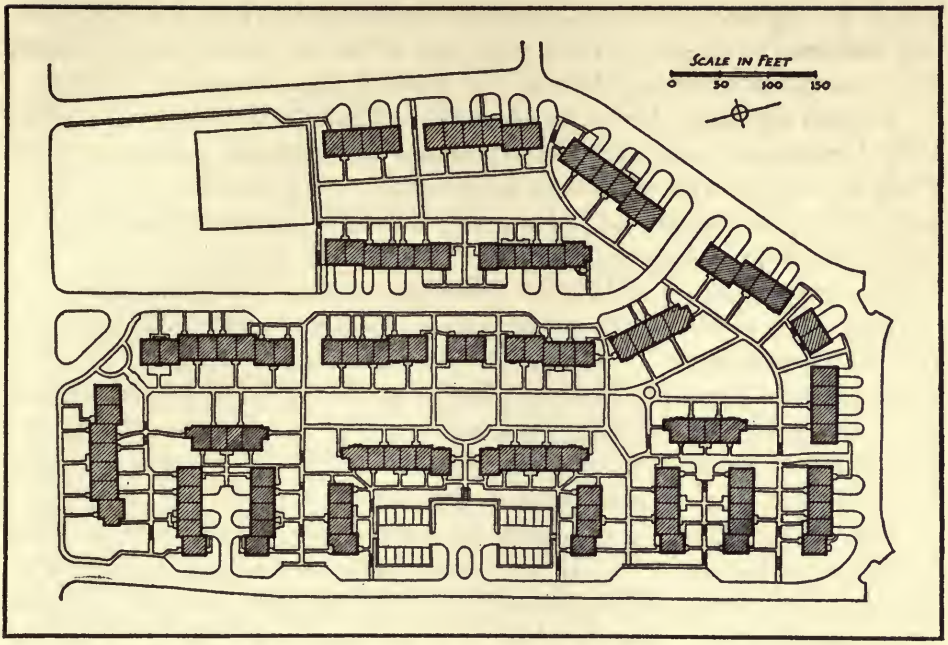


FIGURE 65. THE PLOT PLAN OF CHATHAM VILLAGE

houses, to erect group houses for rental. It then became one of the chief considerations of the designers to achieve the economy of row houses and at the same time provide as much privacy as possible to their occupants.

Chatham Village has been financially successful and has paid substantial interest to the Foundation on its investment. However, it cannot be regarded as a low-cost development. The average cost of the houses, including site charges, is about $6500.

LAWRENCE FARMS, WESTCHESTER COUNTY, N. Y.

Lawrence Farms, which is now being developed from a design prepared by me in collaboration with Mr. Penrose Stout, is of unique interest in that it was prepared for a small compact village community in the heart of a large subdivision of spacious residential properties. There are also certain interesting peculiarities in the topography of the site.

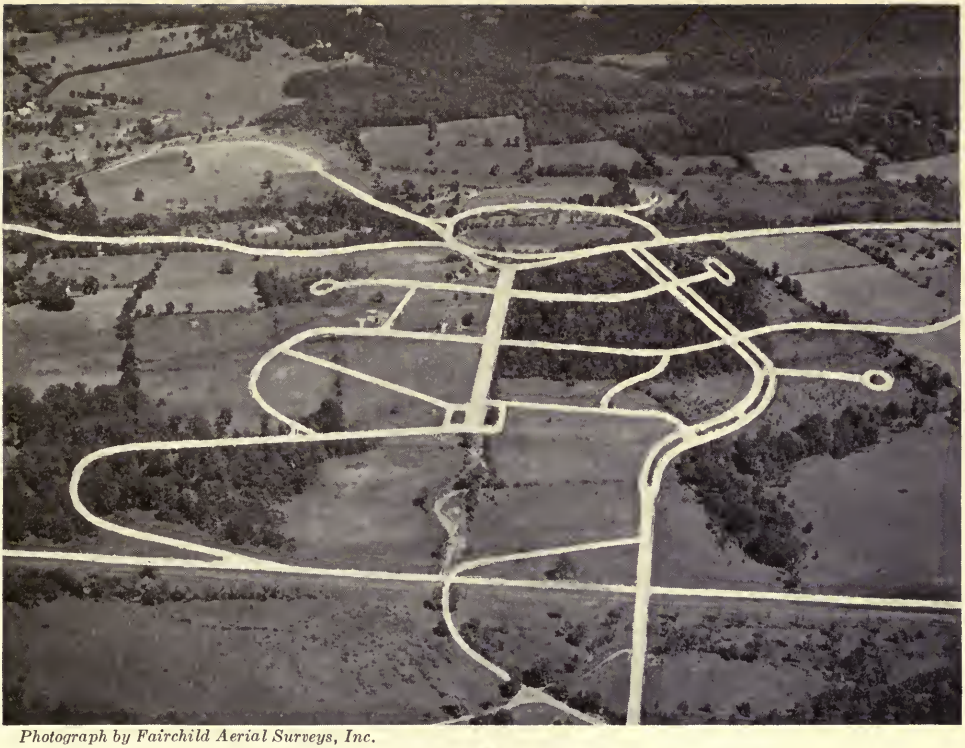
The shopping street was designed off the main thoroughfares and practically as a dead-end avenue, one of its ends terminating on the top of a steep hill. The intention was to provide a shopping center free of through traffic. The business avenue was designed to be 120 feet in

width and connected with a square the frontage of which was also used for business purposes. Preference was given to having the business groups compactly arranged about the sides of the avenue and square.

A main highway skirted the site on one side, and parallel with this along the opposite side extended a railroad and adjacent parkway. The shopping avenue was laid out at right angles to the highway but did not lead directly to the station. However, a curved approach was designed to give an indirect connection.

The main cross artery between the highway and the high land beyond the parkway will be seen in double lines on the plan. (See Plate XI.) It skirted the center of the town, but at some distance from it. It was necessary for the road to pass on a higher grade than that of the railroad and parkway; and the point was selected which permitted this grade separation at least cost. Ramp approaches from this main highway were provided to give connection to the station.

In many subdivisions of a semi-rural character no provision is made for proper urban centers. In this case the surrounding subdivision of large lots covered many square miles of territory and provided sites for hundreds of houses. The developer did not want to rely on any existing town for a shopping center or place of residence for those who had to have small homes. This gave rise to the idea of providing a new village center for the community life of the whole of a small region. Thus the financial benefits accruing from the sale of land for business purposes are obtained by the developer, and the danger which arises from permitting disorderly business districts to grow up in the neighborhood, even of high-class subdivisions, is averted.



Photograph by Fairchild Aerial Surveys, Inc.

THE SITE OF THE VILLAGE AND ITS PRINCIPAL HIGHWAYS.

Courtesy of Regional Plan Association, Inc. *Penrose V. Stout, Architect*

THE PLAN FOR ITS ULTIMATE DEVELOPMENT.

PLATE XI. LAWRENCE FARMS, NEW YORK.

CHAPTER XIV

EXISTING TRENDS AND FUTURE POSSIBILITIES

SIGNIFICANT TRENDS

IT can hardly be said at present that there are trends toward significant change in the practice of the art of city planning or, still less, in basic principles of design. There is a continuance of the now well-established trend toward increased specialization and the division of city planning technique under fairly well-defined branches of expert knowledge. This has followed from the increased complexity of the civic problems to be dealt with in the modern city.

Perhaps there has been advance in recognition of the need of coördination which is a natural corollary of the growth of specialization. Perhaps, too, design is now pursued with greater intelligence in regard to what may be called the science of city planning. We equip ourselves better in knowledge of social and economic conditions than previous generations have done. This greater knowledge is stimulating improvement in the application of the art of planning, particularly in directions of true economy and high social purpose. It seems as if we rely more on sound principle and are more independent of expediency than hitherto.

The most profound influences on technique are the customs and public policies which together, at a given time, determine private and public demands and the costs of meeting them, and therefore determine the scope and character of designs. One or two trends in public policies may be noted as of special significance in relation to future possibilities of improvement of methods.

City Planning, Zoning, and Housing. We seem to be in the midst of an era of sporadic effort in movements of policy associated with the planning of cities. The effort may become a more consistent one if those who plan make sure of their scientific foundations, and if political leadership improves, — both of which it is reasonable to expect. At the moment in this country, city planning and zoning are in the descendant as to the degree and extent of effort being made by state and municipal governments, while national effort is being increasingly directed towards large-

scale housing improvement and varied activities in public works. In time this national effort may revive city planning and zoning on a broader base, bringing it into closer contact with the problems of housing and living conditions in both urban and rural areas.

For many years there has been a definite trend in the direction of exercising more public control over the private uses of land and methods of developing it. The public mind has recently awakened to the need and value of city planning and zoning as a result of attempts to find remedies for excessive financial burdens, as well as for traffic congestion, overcrowded housing conditions, and disorder and deterioration of home neighborhoods. A temporary cessation of activity in some phases of planning is not likely to interfere materially with the continuance of this trend.

Land Values. There is now some evidence of a trend towards giving more consideration to income values in the process of determining capital values of land. To some extent this is a result of the losses on real estate during a period of depression and may be temporary, though there are reasons to expect a permanent trend in this direction in the future because of the desirability of restoring confidence in real estate as an investment. The development of sound planning policies is essential also to promote this confidence. There is no evidence, however, of any trend away from the theories that the increase of land values is desirable and that land in cities over a long period of time must always appreciate. It is true that until recently, certain select areas in cities have progressively increased in price or value with the result that the appreciation of the land value has offset the depreciation of buildings. This has given rise to the theory, accepted in real estate circles, that in districts of high land values the cost of buildings should not exceed 40 per cent of the total cost of building and lot. This theory holds only in the case of skyscraper buildings on land of such exceptional situation, and low initial cost for its situation, that an increase of land value is certain. It is a false doctrine in relation to most land and in relation to all residential land for comparatively intensive housing. As has already been suggested, the actual structure for medium- and low-cost housing should represent 75 to 80 per cent of the total cost of building and improved lot.

There also continue to be assumptions that land cost, when worked out per room, is not a serious item in the cost of housing. Yet, as already pointed out, those who make this statement commonly justify over-

crowding of land on the grounds of its high cost. Of course, small differences in land cost do not make much difference in cost per room. The proofs which are put forward in defending this point of view, however, usually depend on calculating the land price per room in a development where the number of rooms has been adjusted to a certain land price.

Actually the limitation of the cost of the land is essential to the increase of the real values of land. Most speculative land prices are a delusion and a snare. They are a delusion if they are based on expectations of use that can never be realized, as a great part of them are. They are a snare if they give opportunity for predatory taxation on unrealizable capital values; that procedure gradually destroys equities. To have the value of the land determined on its income-producing ability is to find its real value and make it a secure investment. To spread development over more land means that more land will be brought into profitable use. For every area that is overcrowded there are other areas lying idle. A wider spreading of development would result in spreading land values rather than depreciating their aggregate amount. The maintenance of real values is not inconsistent with the reduction of prices of lots; for high prices are largely due to excessive costs that can be avoided with proper planning and control.

If proper housing is to be obtained and overcrowding of land is to be avoided in the future, one fundamental requirement will be that neither the amount of money available for building nor the size of a lot required for a healthful house will be unduly restricted by the price that has to be paid for the unimproved site.

Housing Trend. The trend toward the multiple house instead of the single-family house may or may not be significant in itself, but it calls attention to some of the significant causes from which it springs. So far as it is a result of choice we may accept it as inevitable, and, accepting it, by proper design and regulation make the multiple house as desirable as any other type. But so far as it is forced upon the community by attempts to maintain a high degree of concentration in large cities and to maintain high land prices, it is not inevitable, it leads to blighted conditions by reason of overcrowding and congestion, and it can never be made desirable. There is good reason to believe that the tendency toward the apartment and the tenement and away from the small single-family home is the result of a forced and artificial desire. For example, in most small communities where land is cheap and close concentration is not a

necessity for convenience of access to places of work, the choice of the typical inhabitant is still the small individual house.

The Blighted Area. The social trend that is especially strong and significant in the immediate present is not toward any particular type of home, nor any particular conception of city planning, but toward achieving some public policy that will prevent, arrest, or ameliorate unsatisfactory living conditions. Its main attack is on the so-called "blighted area," a term which is used to describe different kinds of areas that are suffering from some process of deterioration, and which is therefore susceptible of various interpretations.

Of the many varieties of blighted district, only one, the slum district, is incident to the poverty of the occupants. The extent of blight, if the term is used in relation to all districts where there has been deterioration of property values and structures, reveals the absurdity of blaming blight in general on poverty. Most of these districts, including some we designate as slums, are the natural result of the haphazard methods of land development and higgledy-piggledy building development that have been permitted or encouraged in the city. Many of them were potential slums when they were first developed.

In these pages I have touched on the residential aspect of this great problem, but every city needs to investigate the origins and effects of blight in all its aspects in order that it may discover how to arrest it and still more, how to prevent its recurrence.

In its residential aspect, I repeat that overcrowded building is the worst feature in blighted districts. The financial losses to cities and property owners as a result of overcrowded building may be judged from the fact that the crowded central parts of cities are suffering most from loss of population and consequent depreciation of values. Yet, seemingly in order to restore the population, steps are being taken to increase the degree of overcrowded building.

If proper steps had been taken to plan and control the development of land in the beginning and to regulate changes in development by wise zoning, the extent and degree of blight in cities would never have occurred beyond a point that would have been controllable. In other words the blight would have been limited almost entirely to two kinds of districts: first, those where poverty was the major factor in causing deteriorated conditions, which need not have been extensive in American cities; and second, those where change of use or physical obsolescence of buildings

has caused a district to be deteriorated for a short period of time. Probably most of the long-time deterioration in cities could have been prevented by planning and zoning.

Unfortunately in current agitations to remodel slum areas the chief lessons of the slum are being overlooked, namely, that overcrowding of land with building is an economic blunder, and that all undeveloped areas should be planned and zoned so as to prevent overcrowding and premature change of use.

Replanning of Slum Areas. While the major need in American cities is to develop wise planning and zoning policies for controlling new residential developments, the attack on slum districts must not be relaxed. This attack, however, can be indirectly assisted by the development of model home neighborhoods in suburbs just as much as by replanning and rebuilding the slum areas themselves. *No direct attack on the slum districts will yield completely satisfactory results.* If the attack is limited to rebuilding in these districts, there are dangers which may offset every advantage gained by clearance and remodeling. The chief danger arises from the fact that the excessive prices that have to be paid for land and obsolete buildings cause the new buildings to be as overcrowded on the land as those they replace. When this occurs, the result is retrogression and not a forward step in housing.

Public aid of some kind is essential in slum clearance. But it should be given only where the new buildings to be erected comply with modern ideals as to space about buildings for light, air, and ventilation. Whatever the price paid for the land, its real value in a district to be devoted to housing is what it is worth for healthful housing. For this reason the most practicable opportunities for improving blighted districts are in the suburban areas where the blight is not a concomitant of already overcrowded conditions, and where land values are comparatively low.

Future Possibilities. There are two major facts that have to be borne in mind in considering future possibilities. The first is that whereas there has been overproduction in almost every other commodity, the production of houses has fallen far short of the needs. This has been made clear in the preceding chapters of this book. Authorities point out that no industry affords greater scope for expansion than the industry of building houses, and therefore that it provides the largest opportunity for

employment of labor and materials. It also provides the greatest opportunities for employing the art of planning sites for building.

It has been represented that the annual requirements for capital investment in this industry are $10,000,000,000. The manner in which this money or any large part of it is invested is surely of vital importance. Will the land be developed so as to insure the stability and security of the investment and *inter alia* to prevent the price of land, which represents little or no employment of labor, from so increasing as to diminish the amount available for actual building, which employs much labor?

The second fact, related to the first, is the need for providing employment in forms that will create national wealth. Surely there is no form of wealth that is more secure than that of healthful homes. Surely also, it is proper to stimulate the use of unemployed labor in the building industry, and also to attract other labor from industries suffering from overproduction to the building of homes, the supply of which lags so far behind the demand.

In meeting this demand the opportunity should be taken to build more beautifully, so that spiritual as well as material wealth may be increased. It is better to have men paid to perform tasks that give added healthfulness, grace, and nobility to buildings, even if this goes beyond mere utilitarian objectives, than to have men idle.

Apart from what we call blighted districts, there is a very large amount of residential building that has degenerated below its original standards, and that is suffering in some degree from depreciation in value due to uncontrolled changes in use and surroundings. The modernization and maintenance in proper repair of old buildings that are somewhat depreciated but not yet actually blighted, should be made as much a duty of property owners as the proper construction of new buildings. This field offers almost unlimited opportunity for the employment of labor.

One of the reasons for the financial difficulties of cities is the low assessed values of comparatively new property that is shoddily constructed. The assessed values of many homes erected in the last fifty years are so low that the revenues derived from them are wholly inadequate to pay for essential services supplied by the city.

Part of the task in the future must be to apply more science and inventiveness to the production of actual buildings and also to bring about more equality between the cost of materials and labor employed in building and corresponding costs in other industries. The extent to which the labor employed in building earns more than the labor employed in other

skilled industries will stand in the way of meeting the demand for houses and will lessen opportunities for employment in the building industry.

It may appear that some of the problems here discussed have only an indirect bearing on design of residential areas. But in fact they have a direct and vital bearing, for unless they are solved, a great many of the advantages to be gained by planning of land for residence and by reduction of costs of land development may be offset by extravagance in building.

Finally, what are the future possibilities in improvement of methods of design of residential areas? In technique the kind of improvement that is most needed is that which comes from practice, correlation of experience, and the testing of hypotheses against facts. There is probably little scope for advances in basic theory, but there is need for great advances in the knowledge and skill which would come from widely extended practice. The real need for practice, however, is not *per se* to create better qualified practitioners in city planning, but to obtain the results in economy, in social and civic improvement, and in order and beauty, that only skilled men perfected by experience can produce.

Perhaps there never was a time when the application of this skill was more needed. On every hand projects are being advanced for wholesale building. So keen are men to get on with building that they take no time to think of the planning that should precede building. Cities that have grown poor for want of city planning are still unable or unwilling to plan so as to save future generations from the evils from which they are now suffering; and cities that have plans are halting in their execution because they are too busy remedying the faults that have come from not planning. It is not a time for inaction. The evils of congestion and of haphazard growth in cities have now so established themselves that only major operations will cure them; and the first part of this operation must consist of the adoption of a saner and firmer policy in controlling the development of land, and of the application of sound principles in planning cities and home neighborhoods.

APPENDICES

APPENDIX 1

UNIT PRICES OF LOCAL IMPROVEMENTS

Item	Unit	Prices	
		Knowles [1] (1931)	Whitten [2] (1930)
Streets			
Grading	cu. yd.	$1.25	$0.75
Paving			
Bituminous Macadam	sq. yd.	2.50	
6″ Concrete	sq. yd.		2.00
7″ Concrete	sq. yd.		2.25
7″ Bituminous Macadam	sq. yd.		1.80
Curbs			
Plain	lin. ft.	1.00	
Integral with concrete pavement	lin. ft.		0.55
Gutters, cobblestone	lin. ft.		0.25
Sidewalks			
4½′ wide	sq. yd.	2.25	
Cement concrete 4–6″ thick	sq. yd.		2.07
Planting Areas			
Seeding	sq. yd.	0.25	0.25
Trees	each	6.00	8.00
Sanitary Sewers			
8″ pipe at average depth of 8′	lin. ft.	1.75	2.00 [3]
8–10″ pipe at average depth of 8′	lin. ft.	1.90	
10″ pipe at average depth of 8′	lin. ft.		2.25 [3]
12″ pipe at average depth of 8′	lin. ft.	2.25	
12″ pipe at average depth of 10′	lin. ft.		3.00 [3]
18″ pipe at average depth of 10′	lin. ft.		3.50 [3]
24″ pipe at average depth of 12′	lin. ft.		4.00 [3]
Manholes — 8′ deep, 3′ diameter	each	80.00	
Storm Sewers			
12″ pipe at average depth of 6′	lin. ft.		2.25
15″ pipe at average depth of 5′	lin. ft.	2.10	
15″ pipe	lin. ft.		3.00
18″ pipe	lin. ft.		3.50
22″ pipe	lin. ft.		4.00
Over 22″ pipe	lin. ft.		5.00
24–30″ pipe at average depth of 6′	lin. ft.	5.10	
Inlets and connections	each	100.00	
Manholes — 8′ deep, 3′ diameter	each	80.00	

[1] In President's Conference on Home Building and Home Ownership, Vol. I, Report of the Committee on Utilities for Houses, pp. 157 ff.

[2] In *Neighborhoods of Small Homes*, p. 164, and President's Conference on Home Building and Home Ownership, Vol. I, Report of the Committee on Subdivision Layout, pp. 87 ff.

[3] Including manholes.

APPENDIX 2

BLOCK-PLATTING SCHEMES A–D
COMPARISON OF COSTS AND DISTRIBUTION OF AREAS

(Cf. pp. 190–196 and Figs. 30–34.)

	A	B	C	D	E
Cost of land, including half of surrounding streets	$11,775.00	$11,775.00	$11,775.00	$11,775.00	$11,775.00
Cost of street improvements	$34,388.76	$19,292.53	$19,292.53	$25,225.54	$19,292.53
Cost of sewers	$14,010.36	$7,873.40	$7,873.40	$9,132.40	$7,873.40
Total cost of land, streets, and sewers	$60,174.12	$38,940.93	$38,940.93	$46,132.94	$38,940.93
Average cost of half-streets, per lin. ft.	$9.75	$9.22	$9.17	$9.00	$9.10
Average cost of sewers, per lin. ft.	$3.97	$3.75	$3.74	$3.26	$3.71
Cost of land (not incl. park), streets, and sewers, per lot	$716.36	$680.96	$608.18	$586.64	$473.58
Area of open space, in acres	0.0	4.49	4.48	2.5	4.45
Cost of open space	0.0	$4,893.00	$4,883.00	$2,721.40	$4,843.00
Number of lots	84	50	56	74	72
Size of lots, in sq. ft.	4200	4200	3800 (48)	4000 (8)	2900 (16)
			3500 (8)	3800 (54)	2940 (40)
				3600 (12)	3000 (16)
Families per gross acre	7.8	4.6	5.2	6.8	6.7
Percentage of area in open space	0.0	41.6	41.5	23.1	41.1
Percentage of area in streets	25.1	13.9	13.9	17.4	13.9
Percentage of area in lots	74.9	44.5	44.6	59.5	45.0

APPENDIX 3

STATISTICAL DATA ON THEORETICAL DESIGNS

Lot Costs in Relation to Platting Methods

COST OF IMPROVEMENTS ON THE LOT — **TABLE I**

SCHEME Nº: →	SINGLE B-L 1A		DOUBLE B-L. 1B		1C		TRIPLE B-L 2A		2B		CULS-DE-SAC 3A		3B		LOOPS 4A		4B		CROSS-ACCESS STREET 5	
	FT.	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$
WALKS 5' WIDE AT $.35 P. L.FT.	120.00	42.00	95.00	33.25	80.00	28.00	77.00	26.95	75.00	26.25	99.50	34.83	66.67	23.33	65.28	22.85	61.50	21.53	80.00	28.00
GARAGE DRIVES 8' WIDE AT $ 1.60 P. L.FT.	25.00	40.00	35.00	56.00	29.38	47.01	28.00	44.80	32.13	51.38	23.20	37.12	22.33	35.73	23.33	37.33	20.00	32.00	25.00	40.00
HOUSE CONNECTIONS AT $ 2.30 P. L.FT.	22.50	51.75	37.50	86.25	19.38	44.57	21.66	49.82	18.75	43.13	24.00	55.20	20.21	46.48	18.33	42.16	17.00	39.10	20.00	46.00
GRADING, LOAMING, SEEDING AT $ .035 P. SQ.FT.	2715	95.03	2710	94.85	2700	94.50	2820	98.70	2793	97.76	2791	97.68	2896	101.37	2893	101.24	2931	102.57	2835	99.23
TOTAL COST, $		228.78		270.35		214.08		220.27		218.52		224.83		206.91		203.58		195.20		213.23

COST OF PUBLIC IMPROVEMENTS PER LOT (NO ALLOWANCES FOR CROSS STREETS) — **TABLE II.**

SCHEME Nº: →	SINGLE B-L 1A		DOUBLE B-L. 1B		1C		TRIPLE B-L. 2A		2B		CULS-DE-SAC 3A		3B		LOOPS 4A		4B		CROSS-ACCESS STREET 5	
	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$
Nº OF HOUSES PER GROUP	1		4		8		6		8		20		24		36		20		20	
STREETS																				
30' (HALF : $ 5.23 P. L.FT.	38.75	20.66	27.68	144.74	22.90	119.24	25.00	130.75	22.80	119.24	12.90	62.76	11.00	57.53	13.33	69.72	17.50	91.53	12.20	63.81
30' (WHOLE 4.84 " "											12.25	59.29	10.83	52.42	18.33	88.72	19.00	91.90		
20' " 2.88 " "																			17.93	51.62
TURNAROUND 2500 o/k AT $ 0.209 P. SQ.FT.											125 o/k	26.17	104.25	21.81						
SEWER																				
12" AT $ 3.00 P. L.FT.	19.38	58.13									6.00	18.00	5.50	16.50	6.67	20.01			6.10	18.30
10" " 2.25 "			13.84	31.14	11.41	25.67	12.50	28.13	11.41	25.67							8.75	19.69		
8" " 2.00 "					11.88	23.76	15.83	31.66	12.50	25.00	14.50	29.00	12.92	25.84	15.00	30.00	14.50	29.00	15.68	31.36
SURFACE WATER DRAINS																				
22" AT $ 4.00 "											2.01	8.04	1.98	7.92	4.02	16.08	4.14	16.56		
18" " 3.50 "	4.19	14.67	3.86	13.51	3.70	12.95	3.85	13.48	3.70	12.95	6.95	24.33	6.46	22.61	5.16	18.06	6.43	22.51	4.09	14.32
12" " 2.25 "	17.90	40.28	13.53	30.44	13.62	30.65	15.31	34.45	13.62	30.65	15.16	34.11	14.77	33.23	11.21	25.22	13.93	31.34	18.71	42.10
8" " 1.50 "					10.51	15.77	11.89	17.84	10.51	15.77										
STREET LIGHTING																				
STANDARDS AT $75.- ea.	0.113	8.48	0.091	6.83	0.082	6.15	0.082	6.15	0.082	6.15	0.073	5.48	0.068	5.10	0.065	4.88	0.071	5.33	0.10	7.50
CABLE AT $ 1.66 P. L.FT.	22.74	37.75	18.37	30.83	16.03	26.61	17.49	29.03	16.03	26.61	15.61	25.91	14.46	24.00	15.00	24.90	17.14	28.45	19.50	32.37
FOOTWALK 10' AT $ 1.44 P. L.FT.	19.38	27.91	13.84	19.93	11.41	16.43	12.50	18.00	11.41	16.43	25.00	36.00	22.38	32.23	18.46	26.58	25.75	37.08	14.00	20.16
TOTAL COST $		389.88		277.42		277.23		309.49		278.47		329.09		299.19		324.17		373.45		281.54

COST OF EXCESS PUBLIC IMPROVEMENTS IN A BLOCK 1200 FT LONG — **TABLE III**

SCHEME Nº: →	SINGLE B-L 1A		DOUBLE B-L. 1B		1C		TRIPLE B-L. 2A		2B		CULS-DE-SAC 3A		3B		LOOPS 4A		4B		CROSS-ACCESS STREET 5	
	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$	FT	$
DEPTH OF BLOCK	210'		290'		350'		320'		350'		770'		820'		690'		530'		358½'	
Nº OF HOUSES IN 1200' BLOCK	62		88		108		96		108		204		220		184		140		100	
EXCESS STREET EQUIVALENT IN L.FT. OF HALF OF 50' STREET AT $ 5.23 per L.FT.	8.55	44.71	7.45	38.96	6.91	36.15	7.81	40.85	6.91	36.15	4.33	22.64	6.06	31.68	4.12	21.55	5.48	28.70	6.29	32.93
LAND COST OF EXC. STREET AT $ .0343 P. SQ.FT.	213.75	7.33	185.25	6.37	175.28	6.01	195.25	6.69	175.28	6.01	108.25	3.71	151.5	5.19	103.00	3.53	137.00	4.70	157.25	5.39
SEWER		7.50		12.42		8.85		8.78		8.85		8.20		11.10		7.93		10.76		8.55
LIGHTING		3.08		4.55		5.15		5.54		5.15		4.60		4.27		4.29		2.49		4.90
TOTAL EXCESS COST PER LOT $		62.62		62.10		56.16		61.86		56.16		39.15		52.24		37.30		46.65		51.77

COST PER LOT IN BLOCK 1200 FT LONG. TABLE IV.

SCHEME No: →	SINGLE B-L 1A		DOUBLE B.-L. 1B		TRIPLE B.-L. 1C		2A	2B	CULS-DE-SAC 3A		3B	LOOPS 4A		4B	CROSS-ACCESS STREET 5	
	SQ.FT.	$	SQ.FT.	$	SQ.FT.	$	SQ.FT.	$	SQ.FT.	$	SQ.FT.	$	SQ.FT.	$	SQ.FT.	$
No. of HOUSES PER BLOCK	62		88		108		96		108		204	220	184		140	100
1 RAW LAND																
SQ.FT PER LOT	5154		4696.9		4572.8		4752.8		4572.8		4900.8	4533.9	4852.4		5019.5	4695.3
COST AT $0.0343 p sq.ft.	176.80		161.10		160.45		163.09		160.45		168.10	163.06	166.61		172.17	161.05
2 IMPROVEMENTS on the LOT (SEE TABLE I)	228.78		270.35		214.08		220.27		218.52		224.83	206.91	203.58		195.20	213.23
3 PUBLIC IMPROVEMENTS (SEE TABLE II)	389.88		277.42		277.23		309.49		278.47		329.09	299.99	324.17		373.45	281.54
4 EXCESS PUBL. IMPR. (SEE TABLE III)	62.62		62.10		56.16		61.86		56.16		39.15	52.24	37.30		46.65	51.77
TOTAL COST $	858.08		770.97		707.92		754.81		713.60		761.17	721.40	731.66		787.47	707.59

EXCESS PUBL. IMP. COST IN RELATION TO BLOCK LENGTH. TABLE V

SCHEME No: →	SINGLE B.-L. 1A		MULTIPLE B.-L. 1C	2B	CULS-DE-SAC 3B		LOOPS 4A		CROSS-ACCESS STREET 5	
BLOCK LENGTH	815		870		672		720		712	
No OF LOTS	42		76		224		112		60	
COST PER LOT		92.66		79.81		92.68		61.28		86.29
BLOCK LENGTH					936				956	
No OF LOTS					172				80	
COST PER LOT						66.82				64.71
BLOCK LENGTH	1200		1200		1200		1200		1200	
No OF LOTS	62		108		220		184		100	
COST PER LOT		62.62		56.16		52.24		37.30		51.77
BLOCK LENGTH					1464				1444	
No OF LOTS					268				120	
COST PER LOT						42.81				43.14
BLOCK LENGTH	1510		1565							
No OF LOTS	76		140							
COST PER LOT		51.08		43.32						
BLOCK LENGTH	1780				1728		1680		1688	
No OF LOTS	92				316		256		140	
COST PER LOT		42.19				36.37		26.81		36.98
BLOCK LENGTH			1960				2160			
No OF LOTS			172				328			
COST PER LOT				35.26				20.92		
BLOCK LENGTH	2330		2478		2520		2640		2420	
No OF LOTS	120		220		460		400		200	
COST PER LOT		32.35		27.56		24.98		17.18		25.89

For text and illustrations to which the foregoing five tables refer, see pp. 182–190 and Figs. 23–29.

DISTRIBUTION OF AREAS (TOTALS FOR NEIGHBORHOOD UNIT IN THOUSANDS OF SQ. FT.) TABLE VI.

DIAGRAM →	GRIDIRON		SINGLE BUILD. LINE		DOUBLE BUILD. LINE		TRIPLE BUILD. LINE		CULS-DE-SAC AND LOOPS		MODEL HEXAGON		CROSS-ACCESS STREET		MODEL HGH B. UNIT		HEXAG. LAY-OUT BY Mr. B. PARKER	
1 CENTRAL PARK AREA	618.0	618.0	459.5	459.5	643.1	643.1	594.0	594.0	568.0	568.0	653.0	653.0	440.0	440.0	496.0	496.0	655.2	655.2
2 LOCAL PARKS	188.1	188.1	896.9	896.9	1038.5	1038.5	1332.9	1332.9	875.6	875.6	790.1	790.1	910.5	910.5	1256.2	1256.2	51.2	51.2
3 FOOTWALKS ×	320.0	291.6	129.0	121.0	104.0	96.8	94.0	78.0	188.6	160.2	200.4	171.4	149.6	149.6	193.3	174.8		
4 TOTAL PARKS 1+2+3	1126.1		1485.4		1785.6		2020.9		1632.2		1643.5		1500.1		1945.5		706.4	
5 BOUNDARY STREET ×	753.6	230.8	753.6	250.8	753.6	259.4	753.6	242.8	753.6	257.8	753.6	249.3	753.6	261.8	753.6	258.1	595.8	193.9
6 INTERIOR STREETS × 50 ft.	1525.0	1485.0	338.5	294.5	339.5	279.5	347.0	313.0	408.0	276.3	535.0	487.0	299.0	249.0	344.0	338.5		
40 ft.			827.2	827.2	526.0	494.0	283.2	283.2	60.0	60.0	200.8	200.8	541.6	472.8	40.0	31.2	384.3	357.7
20 & 30 ft.									473.4	473.4	196.8	196.8	310.4	290.4	231.3	231.3	155.4	155.4
7 TURNAROUNDS									77.5	77.5	75.0	75.0			80.0	80.0	75.0	75.0
8 PARKING IN BUS. AREAS	47.9		47.9		47.9		47.9		47.9		47.9		47.9		58.2		28.8	
9 TOTAL TRAFF. SPACE 5+6+7+8	2326.5		1967.2		1667.0		1431.7		1820.4		1809.1		1952.5		1507.1		1239.3	
10 TOTAL PUBLIC OPEN AREA 4+9	3452.6	2813.5	3452.6	2849.9	3452.6	2811.3	3452.6	2843.9	3452.6	2754.8	3452.6	2823.4	3452.6	2774.1	3452.6	2866.1	1945.7	1488.4
11 BUSINESS AREA	222.2		222.2		222.2		222.2		222.2		222.2		222.2		270.8		139.0	
12 TOTAL LOT AREA	5037.2	5037.2	5037.2	5037.2	5037.2	5037.2	5037.2	5037.2	5037.2	5037.2	5037.2	5037.2	5037.2	5037.2	4988.6	4988.6	3549.5	3549.5
TOTAL AREA	8712.0		8712.0		8712.0		8712.0		8712.0		8712.0		8712.0		8712.0		5634.2	
TOTAL AREA CHARGED TO RES. ×		7850.7		7887.1		7848.5		7881.1		7792.0		7860.6		7811.3		7854.7		5037.9

DISTRIBUTION OF AREAS IN PER CENT.

RECREATION AREA	12.93	17.05	20.56	23.30	18.70	18.86	17.20	22.33	12.50
TRAFFIC AREA	26.70	22.58	19.07	16.33	20.93	20.77	22.43	17.30	22.10
BUILDABLE AREA	60.37	60.37	60.37	60.37	60.37	60.37	60.37	60.37	65.40
	100.	100.	100.	100.	100.	100.	100.	100.	100.

× BALANCE CHARGED TO BUSINESS AND TO CITY FOR THROUGH STREETS

AVERAGE COST PER DWELLING — TABLE VII.

DIAGRAM →	GRIDIRON		SINGLE B:L.		DOUBLE B:L.		TRIPLE B:L.		C-D-S & LOOPS		MOD: HEXAGON		CROSS-ACCESS STREET		MODEL NGHB. UNIT		HEXAG. LAY-OUT BY Mr. B. PARKER	
	ft.	$	ft.	$	ft.	$	ft	$	ft	$	ft	$	ft	$	ft	$	ft	$
PARK AREA $.046 p □'	620	28.52	1043	47.98	1294	59.52	1482	68.17	1110	51.06	1110	51.06	1039	47.79	854	39.28	770	35.42
FOOTWALKS $ 1.44 p.1ft	223	32.11	92	13.25	74	10.66	60	8.64	128	18.43	132	19.01	107	15.41	85	12.24		
SEWER		76.32		72.88		60.13		81.09		82.57		76.35		68.62		32.40		70.96
SURFACE WATER DRAINS		71.18		65.04		69.07		68.59		74.65		68.72		67.38		37.51		75.79
× BOUNDARY ST. service RD AT $ 5.96 p.L.ft	71	42.32	77	45.89	80	47.68	75	44.70	79	47.08	77	45.89	81	48.28	50	29.80	86	51.26
INTERIOR ST 50' AT $ 10.46	228	238.49	45	47.07	43	44.98	48	50.21	43	44.98	75	78.45	38	39.75	33	34.52		
40 • 9.26			159	147.25	95	87.97	54	50.00	12	11.11	39	36.11	90	83.34	4	3.70	98	90.75
30 • 4.84									121	58.56	50	24.20			38	18.39	57	27.59
20 • 2.88													112	32.26				
TURNAROUNDS $.209 p SQFT									585	12.44	577	12.06			391	8.17	819	17.12
STREET LIGHTING		57.95		55.71		55.15		55.71		52.19		55.80		59.95		35.54		57.56
1. COST OF PUBLIC IMPROV.		576.89		495.05		435.16		427.11		453.07		467.74		462.78		251.55		426.45
2. COST OF RAW LAND PER DWELLING AT $ 0.0343 p. SQFT.	6039	207.14	6069	208.17	6037	207.07	6065	208.03	5994	205.57	6047	207.41	6009	206.11	3832	131.44	5500	188.65
3. COST OF IMPR. ON THE LOT (T.II)		228.78		228.78		270.35		218.52		206.91		228.78		213.23		136.00		228.78
4. CONSTR. + LAND COST PER DWELLING (1+2+3)		982.81		932.00		912.58		853.66		865.57		903.93		882.12		518.99		843.88
5. PROF. FEES 10% OF 1.		54.69		49.51		43.52		42.71		45.31		46.78		46.28		25.16		42.65
6% OF 3.		13.73		13.73		16.22		13.11		12.41		13.73		12.79		8.16		13.73
6. COST OF DEVELOPMENT (4+5)		1051.23		995.24		972.32		909.48		923.29		964.44		941.19		552.31		900.26
7. CARRYING CHARGES, INTEREST, PROFIT, ETC. 25% OF 6		262.81		248.81		243.08		227.37		230.82		241.11		235.30		138.08		225.07
8. GRAND TOTAL COST $		1314.04		1244.05		1215.40		1136.85		1154.11		1205.55		1176.49		690.39		1125.33

× NOTE: ONLY THE COST OF THE SERVICE ROAD IS CHARGED THE AMOUNT VARIES IN ACCORDANCE WITH THE FRONTAGE CHARGED TO BUSINESS.

APPENDIX 4

WESTOVER: A NEIGHBORHOOD UNIT

(*Cf. pp. 221–230*)

TABLE I

Distribution of Areas

AREAS	PLAN A		PLAN B	
	Acres	Per Cent	Acres	Per Cent
Parks	106.348	29.25	88.461	25.02
Greens	4.520	1.25	4.951	1.40
Park walks	5.606	1.54	0.911	0.26
Streets, plazas, and parkway	53.041	14.60	63.202	17.87
Public open land				
In residential areas	169.515	46.64	157.525	44.55
In business areas	12.245	3.36	9.803	2.77
Total	181.760	50.00	167.328	47.32
Buildable land				
Single-family areas	160.641	44.19	159.320	45.06
Multiple-house areas	16.012	4.40	21.843	6.18
Business areas	5.107	1.41	5.109	1.44
Total	181.760	50.00	186.272	52.68
Total area	363.520	100.00	353.600	100.00

Table II

Costs of Development Chargeable to Residential Areas

	Unit	Unit Price	Plan A		Plan B	
			Amount	Cost	Amount	Cost
Parks	acre	$2000.00	106.348	$212,696.00	88.461	$176,922.00
Greens	sq. ft.	0.57	196,891	11,222.79	215,665	12,292.91
Park walks	lin. ft.	1.44	24,420	35,164.80	4,000	5,760.00
Half of boundary streets	lin. ft.	5.07	11,270	57,138.90	12,480	63,273.60
Interior streets						
70-ft.	lin. ft.	12.73	0	0.00	5,430	69,123.90
50-ft.	lin. ft.	10.14	10,220	103,630.80	7,990	81,018.60
40-ft.	lin. ft.	9.26	11,350	105,101.00	19,980	185,014.80
30-ft.	lin. ft.	4.84	13,240	64,081.60	12,190	58,999.60
Turns	each	523.50	38	19,893.00	32	16,752.00
Parkway (where built upon)	lin. ft.	9.17	0	0.00	3,030	27,785.10
Plazas						
Subgrading and paving	sq. ft.	0.23	154,908	35,628.84	120,000	27,600.00
Curbs	lin. ft.	0.55	7,588	4,173.40	500	275.00
Street trees	each	8.00	656	5,248.00	660	5,280.00
Sewers	lin. ft.	2.70	49,220	132,894.00	51,430	138,861.00
Surface water drains	lin. ft.	2.93	39,700	116,321.00	43,050	126,136.50
Lighting						
Underground cable	lin. ft.	1.66	57,300	95,118.00	61,680	102,388.80
Standards	each	75.00	290	21,750.00	265	19,875.00
Total cost of public improvements				$1,020,062.13		$1,117,358.81
Cost of public open land in residential districts	acre	1500.00	169.515	254,272.50	157.525	236,287.50
Total cost of public improvements plus public open land in residential districts				$1,274,334.63		$1,353,646.31

Table III

Costs of Development per Dwelling

Costs per Dwelling	Plan A		Plan B	
	Single-family Residence	Apartment	Single-family Residence	Apartment
Public improvements and public land	$496.82	$496.82	$520.63	$520.63
Lot	114.72	51.65	137.74	37.88
Improvements on the lot	224.91	131.28	252.64	125.64
Total	$836.45	$679.75	$911.01	$684.15

Table IV

Area, Population, and Density Statistics

	Plan A	Plan B
Total area (in acres)	363.52	353.60
Percentage devoted to residence		
Single-family dwellings	44.19	45.06
Multiple dwellings	4.40	6.18
Total	48.59	51.24
Number of families		
In single-family dwellings	2,100	1,735
In multiple dwellings	465	865
Total	2,565	2,600
Single-family dwellings		
Lot area per family (in sq. ft.)	3,332	4,000
Families per net acre	13.07	10.89
Population (4.5 persons per family)	9,450	7,808
Multiple dwellings		
Lot area per family (in sq. ft.)	1,500	1,100
Families per net acre	29.04	39.60
Population (3.3 persons per family)	1,534	2,854
Population in accommodations above stores	216	238
Total population	11,200	10,900
Elementary school population (16.74 per cent [1])	1,875	1,825

[1] The ratio of school children aged 7–15 to the total population of the United States in 1930.

APPENDIX 5

JACKSON HEIGHTS APARTMENT DEVELOPMENT
STATISTICAL DATA FOR ALTERNATIVE SCHEMES

(*Cf. pp. 231–236*)

TABLE I

Scheme A

Total number of rentable rooms	5,000	
Total coverage	33%	
Cube of buildings	19,850,000 cu. ft.	
Cube of garages	2,250,000 cu. ft.	
Cost of buildings at $0.55 per cu. ft.	$10,917,500	
Cost of garages at $0.30 per cu. ft.	675,000	
Cost of land	2,835,000	
Total cost		$14,427,500
Financed as follows:		
1st Mortgage (60% of total cost)	$8,656,500	
2nd Mortgage (80% of land cost)	2,268,000	10,924,500
Builders' equity		3,503,000
Estimated annual income and expenses		
Apartments:		
Gross rent at $450 per room per year	2,250,000	
Operating expenses, repairs, etc., at $91.70 per room per year	458,500	
10% vacancies	225,000	
Net rentals		1,566,500
Garages:		
Gross rent — 750 cars at $20 per month	180,000	
Operating expenses at $7 per car per month	63,000	
10% vacancies	18,000	
Net rentals		99,000
Total net rentals		1,665,500
Taxes ($12,295,000 at $2.69 per $100)	330,735	
Management (4½% of net apartment rentals)	91,125	
Interest on 1st mortgage at 6%	519,390	
Interest on 2nd mortgage at 6%	136,080	
Total of taxes, management, and interest charges		1,077,330
Total net income		588,170
Amortization		
1st mortgage at 2%	173,130	
2nd mortgage at 5%	113,400	286,530
Net cash return on equity		301,640 or 8.6%
Net return before amortization on 2nd mortgage		415,040 or 11.8%

Table II

Scheme B

Total number of rentable rooms	7,000	
Total coverage	50%	
Cube of buildings	24,780,000 cu. ft.	
Cube of garages	2,250,000 cu. ft.	
Cost of buildings at $0.45 per cu. ft.	$11,151,000	
Cost of garages at $0.30 per cu. ft.	675,000	
Cost of land	2,835,000	
Total cost		$14,661,000
Financed as follows:		
1st Mortgage (60% of total cost)	8,796,600	
2nd Mortgage (80% of land cost)	2,268,000	11,064,600
Builders' equity		3,596,400
Estimated annual income and expenses		
Apartments:		
Gross rent at $360 per room per year	2,520,000	
Operating expenses, repairs, etc., at $88.40 per room per year	618,800	
10% vacancies	252,000	
Net rentals		1,649,200
Garages:		
Gross rent — 750 cars at $20 per month	180,000	
Operating expenses at $7 per car per month	63,000	
10% vacancies	18,000	
Net rentals		99,000
Total net rentals		1,748,200
Taxes ($12,282,000 at $2.69 per $100)	330,386	
Management (4½% of net apartment rentals)	102,060	
Interest on 1st mortgage at 6%	527,796	
Interest on 2nd mortgage at 6%	136,080	
Total of taxes, management, and interest charges		1,096,322
Total net income		651,878
Amortization		
1st mortgage at 2%	175,932	
2nd mortgage at 5%	113,400	289,332
Net cash return on equity		362,546 or 10.1%
Net return before amortization on 2nd mortgage		475,946 or 13.2%

TABLE III

Summary

	SCHEME A	SCHEME B
Coverage	33%	50%
Average height in stories	14½	12
Construction	Fireproof	Fireproof
Estimated cost per cu. ft.	$0.55	$0.45
Total cost of land	$2,835,000	$2,835,000
Total number of rentable rooms	5,000	7,000
Average annual rent per room	$450	$360
Average gross area per room	371 sq. ft.	333 sq. ft.
Average gross cubage per room	3,970 cu. ft.	3,540 cu. ft.
Average net area per rentable room (including foyers, baths, closets)	285 sq. ft.	260 sq. ft.
Plan efficiency	76.8%	78.1%
Average number of rooms per apartment	3.2	3.4

APPENDIX 6

AREA DISTRIBUTION, DENSITIES, AND PUBLIC IMPROVEMENT COSTS OF FOURTEEN UNITED STATES HOUSING CORPORATION PROJECTS

(*Cf. pp. 240–243*)

Project	Percentage of Area in				Average Lot Size in Sq. Ft.	No. of Families per Gross Acre	Cost of Public Improvements per Family
	Streets and Alleys	Other Public Area	Residential Lots	Other Building Lots			
Alton, Ill. (Milton Hill Site) [1]	31.64	21.40	45.27	1.69	2,546	7.7	$535.54 [3]
Bath, Me.	24.62	1.64	73.74		3,262	9.8	423.97
Bridgeport, Conn. (Crane Tract) [2]	31.07	1.37	67.56		1,930	15.2	275.27 [4]
Chester, Pa. (Ridley Park Site) [1]	24.15	16.61	52.89	6.35	2,210	10.4	290.23 [5]
Dahlgren, Va.	11.65	26.18	46.67	15.50	37,557	0.5	
Erie, Pa. (East Site)	23.59	6.90	69.51		3,702	8.2	465.92
Indianapolis, Ind.[1]	19.74	10.13	70.13		5,346	5.8	467.12 [4]
Lyles, Tenn.[1]	16.68	42.77	39.38	1.17	8,368	2.0	1035.24 [3]
Mare Island (Vallejo), Calif.	21.02	11.58	62.23	5.17	3,592	7.5	440.71
Neville Island, Pa.[1]	15.40	24.60	60.00		6,534	4.0	
New Brunswick, N. J.	32.35	10.26	55.71	1.68	2,628	9.2	402.71
New London, Conn.	22.84	11.12	66.04		3,554	8.0	424.19
Pensacola, Fla.[1]	31.16	5.95	54.39	8.50	6,195	3.8	875.60 [3]
Quincy, Mass. (River St. Tract)	33.82		66.18		4,362	6.5	594.31

[1] Project discontinued.
[2] Now called Seaside Village.
[3] No storm water drains provided — sewers only.
[4] Combined sewers.
[5] No street lighting provided.

INDEX

INDEX