Urban Land Use--A Geographic Case Study: Cedar City, Utah

Rex J. Hulet
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URBAN LAND USE--A GEOGRAPHIC CASE STUDY:
CEDAR CITY, UTAH

by
Rex J. Hulet

A report submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE
in
Social Science
Plan B

UTAH STATE UNIVERSITY
Logan, Utah
1970
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<td>Back cover</td>
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SECTION I
INTRODUCTION

The Problem

Statement of the problem. The purposes of this study are: (1) to better understand the impact that accelerated urban growth is having on the city as a place for man to live and work; (2) to gain knowledge of the inter-relationships between urban planning, zoning, and land use; (3) because most land use studies that are available have been made on cities of more than 50,000, this study will attempt to acquire some knowledge of land utilization on a small city of less than 10,000 inhabitants; (4) to gain firsthand experience in compiling a land use survey and map; and (5) to draw some conclusions concerning land use in small cities and large cities.

Delimitations

This study will be confined to: (1) literature dealing with urban land use patterns to date; (2) a self-constructed classification taxonomy for land use within urban areas of less than 10,000 people; (3) application of developed land use taxonomy to Cedar City, Utah, as a case study; (4) compiling an up-to-date land use map of Cedar City, Utah, to be restricted to the administrative area of the incorporated city; and (5) to draw basic conclusions from analysis
of the field survey and land use map related to the future development of
Cedar City, Utah.

Definitions

**Small city.** Generally this term refers to a city with a population
under 50,000, but for this study it refers more specifically to any urban
community with fewer than 10,000 people.

**Urban land use map.** A map of the corporate city showing the use
being made of each lot.

**Urban land use survey.** A study of each lot located within the corporate
city with the purpose of ascertaining the use being made of that lot and applying
the findings to a classification index.

**Urban planning.** Making careful and comprehensive surveys and studies
of the existing conditions and probable future growth of the city and its environs.
These studies and surveys shall be made with the general purpose of guiding
and accomplishing a coordinated, adjusted, and harmonious development of the
city in accordance with existing and future needs.

**Urban zoning.** In order to accomplish the purposes of city planning,
the city is divided into several zones, and in each of the zones, the height and
number of stories, the size of buildings and other structures, the percentage
of a lot that may be occupied, the size of yards, courts, and other open spaces,
the density of population, the location and use of buildings, structures, and
land are regulated and restricted.
SECTION II
REVIEW OF LITERATURE

Urban Land Use

Importance of urban land use knowledge. Knowledge of the arrangement of land use in the city is the key to successful planning and zoning. An understanding of the amount of land devoted to the various urban activities and their spatial relationship is basic. City planners must be able to observe their city and analyze the activities taking place within their city, understanding the spatial relationships that exist between these activities, and plan accordingly. With our complex urban community nothing should be assumed because much of the chaotic conditions found within our cities today are the result of unsound planning and zoning policies. Many of these conditions can be overcome if city planning and zoning are based upon a sound understanding of the internal structure and function of the city. This knowledge and understanding can come through the use of a valid land use survey, and utilization of the mapped results for analysis and prediction.¹

and economic pressure in relationship to the local physical geography. Until our modern complex urban cities came into existence each city conformed to local traditions and customs, built around the natural local topography based upon an eighteenth century concept. The amount of land utilized by the various activities and their spatial distribution reflected the traditions and customs of that city. Today the United States urban community has become so complex that internal city structure based upon traditions and customs are not meeting the needs of the people.²

Conditions of change. The urban community is a dynamic organization, constantly changing in a variety of ways to meet new needs and conditions, dictated by human behavior. As a community grows older many areas become obsolete and must be rebuilt, while other areas are taken over by activities that make better use of the land. As the community grows there are progressive changes in the social and economic structure, such as the size of families, age composition, character of the population, and the nature of quantity of occupations. All these changes tend to produce new and different demands on the land usage.³

Growth itself brings the greatest change to an urban community, and there is little doubt that a greater percentage of our population will live in


urban areas in the future. The following graph, using current trends, clearly indicates that our population will continue to grow and that a greater and greater percentage of the people will live in urban areas.

![Graph showing population growth](image)

**Figure 1.** Past, present, and anticipated total and urban United States population at current rate of increase. 

As the city grows new living and working space must be added. There are several ways that this new demand for space can be satisfied. The most common method of adjustment is by peripheral expansion, called urban sprawl. However, studies made by Bartholomew revealed that even the largest cities
contained, on the average, 45 per cent vacant land. 4 This would indicate that most cities could satisfy some growth internally. Unfortunately community growth has been allowed to flow into areas offering the least physical and economic resistance, and with little thought to other human needs. As a result, growth has been in the form of lateral expansion into surrounding agricultural areas. 5

Land use classification and definitions. All urban land is classified as developed, vacant, or water.

The term developed included all land that is used for purposes that are recognized as urban in character, whether public or private in nature, and whether devoted to open use such as parks or playgrounds or commerce. Vacant land is that not given over to any urban use even though it may be potentially available for development. Thus for our purposes, agricultural land is considered vacant land. Water areas include natural and artificial bodies of water and represent no urban use except when embraced within a park or recreational area. Broadly then, the land we are concerned with can be described as land now used for purposes that are characteristically urban. 6

A further breakdown of the land use classification yields the information shown in Figure 2 on the following page.

Broadly speaking, about one-half of all land in urban use is privately developed; and the other half is in public use. In the preparation of the city plan the designer is concerned largely with the public land. In zoning it is


6 Ibid., pp. 13-14.
important that the load on the land imposed by private development be in scale and in harmony with the usage of the public land and facilities. It is in this context that the several functional uses of land will be reviewed.  

Privately developed areas are those lands developed by private interests or by the public if operated in a private capacity. Functional uses in this group include the following: single-family dwellings, two-family dwellings,
commercial areas, light industry, and heavy industry.

The titles of these uses are largely self-explanatory. There are some exceptions that should be noted. A single-family dwelling is a detached structure used for residence by one family alone. The two-family dwelling can include various forms of structures, with the duplex being the most common. Multi-family dwellings include tenements, apartments, and apartment hotels for non-transients, dwellings which house three or more families. Rooming and lodging houses are included in this classification. It should be noted that it is not always possible to determine the exact use being made of a structure. The practical considerations in survey practices require a certain latitude. So many structures that were built for one family have been converted into two-family dwellings, or rooming houses.

Commercial uses include all land and buildings wherein trade or business is conducted. Included in this classification are wholesale and retail houses, along with land that is devoted to amusement and personal services.

Industry is divided into two types, light and heavy. It becomes rather difficult to draw a precise definitional separation between these two types. Generally, if an industry is considered a poor neighbor to an area where people live it is considered heavy industry. Thus, all industries that are known to emit smoke, dust, odor, or undue noise are classed as heavy industry. Any industry that does not have these objectionable characteristics are classified as light industry.

Publicly developed urban areas include streets, railroad property, parks and playgrounds and public and semi-public property.
Public and semi-public property includes city property, airports, public and private schools, churches and cemeteries, and other institutional property. This general category includes uses developed either by public or private capital which may, in fact, be public facilities or may be restricted, as in the case of private clubs.

The land not accounted for in the above classification is counted as unimproved vacant land and water areas. The meaning of these terms is evident, but they are included in this study to give a complete accounting of all land within the defined region of study. Agricultural lands are considered vacant because agriculture is not considered an urban activity. ⁸

The Land Use Survey and Map

The importance of a land use survey. The land use survey is the means by which the city planner can gain a knowledge of the land use patterns in his city. As stated before, the modern urban community with its many problems demands a comprehensive city plan. A land use survey and its analysis are essential tools for the preparation and administration of any comprehensive city plan. Knowledge of land use is more than a planning concept; it has legal significance. A city must be able to prove that each district is suitable for selected use. ⁹

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⁸Ibid., pp. 267-268.

The land use survey. Considerable thought and planning must precede the land use survey and the purpose of the survey must be carefully outlined. The kinds of information and the amount of detail must be keyed to the use that is going to be made of the survey. All land use surveys can be standardized to some extent, but each community presents special problems that will not conform to a strict standard. Therefore, many classification problems cannot be anticipated in advance; such problems must be met and solved in the field. The kinds of data and the form in which the data is to be presented, will determine the technique that will be used in carrying out the actual survey and completing the resultant land use map.  

Whatever technique employed, the land use survey will require a field investigation. However, before the field work can take place, suitable outline maps must be obtained or made. If the city is large several sectional maps may be desired, but in a small city one map is usually sufficient. At any rate, the map must include street and lot lines; in addition other data may be required, such as prominent buildings or landmarks that would be of help in keeping oriented. The scale of the map should be such that will allow for considerable written information during survey work.

The field work requires a lot-by-lot inspection to determine specific land utilization. Where there is a great amount of mixed use, greater care is

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required than in a single-family subdivision. After the use has been determined, an agreed upon symbol is placed on the lot along with a note to clarify any question that may require further investigation. Following are the symbols used by Bartholomew in his study. These symbols can be expanded to fit any activity found within a city. All field sheets and notes must be kept for reference and records.

Table 1. Land use symbols

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<thead>
<tr>
<th>Main Classes of Urban Land Uses</th>
<th>Symbol</th>
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<tbody>
<tr>
<td>Single-family residences</td>
<td>R-1</td>
</tr>
<tr>
<td>Two-family dwellings</td>
<td>R-2</td>
</tr>
<tr>
<td>Multifamily dwellings</td>
<td>M</td>
</tr>
<tr>
<td>Commercial areas</td>
<td>C</td>
</tr>
<tr>
<td>Parks and playgrounds</td>
<td>P</td>
</tr>
<tr>
<td>Public and semipublic property</td>
<td>S.P.</td>
</tr>
<tr>
<td>Light industry</td>
<td>L.I.</td>
</tr>
<tr>
<td>Heavy industry</td>
<td>H.I.</td>
</tr>
<tr>
<td>Railroad property</td>
<td>R.R.</td>
</tr>
</tbody>
</table>


The land use map. After the field investigation is completed the information must be transferred to a land use map. Without the information being condensed and organized on a map, the survey has little value. With the land use map one can gain an insight into the overall land use situation within the city. Colors are used on the land use map whenever possible, but black and white symbols can be used to designate each land classification. The scale
for the final land use map can be larger than for the map used during the lot-
by-lot survey. 12

Value of land use data. There are many ways that the data gathered
during the land use survey, and presented on the land use map, can be used.
The map will reveal the general location of the major urban land uses. It
will also give an overall impression of the city land use, and this overall
impression is very important to planners, for they can readily see any inconsist-

cencies in the total land use pattern. The land use map will show the amount of
land being used by the city for various uses, and in zoning it is most important
to have this information. Professional city planners can determine the number
of acres devoted to a particular purpose, the percentage of the total area, and
the ratio of land used to the given population. Zoning that is based upon such
information is much more valid than that based only on opinions. 13

Information obtained from the land use survey can be used in comparative
studies with other cities, and there are values in such comparisons. But, as with
all comparisons of this nature, there are definite limitations. This is especially
ture with regard to small cities of less than 10,000 people. Very few studies
have been made on small cities, and there is little value in comparing the studies
that have been made on large cities, those over 50,000 people, with the limited
information available for the small cities. Current ratios are of some value in
predicting a community's future land use requirements. However, with our

12 Ibid.
13 Ibid.
changing concept of the functions of cities as a place to live and work, these current ratios must be applied with care. Ratios will not hold constant but will vary with city size. The data gathered from the land use survey must be applied with wisdom, forethought, and imagination.

The land use survey and map serve only as a beginning for research. If urban life is going to be improved, the land use map must be understood and used. Since the land use map gives the city planner an overall picture of land uses in the city as they exist in interrelationship, he has a natural foundation for planning research dealing with the city and for testing various research ideas. In the planning office the general land use map is in constant demand, since it is the foundation for the planner's work. Not only is it consulted in daily planning activities, but it serves a useful purpose as a wall map for public talks and discussions with city officials, a necessary part of the planner's work if he is to see his plans bear fruit. 14

Keeping the land use map current. A land use map that is not current is of little value to city planners, and to those having the authority to establish zoning laws. The urban land use map must be kept up-dated on at least a yearly basis. This can be done with little effort if it is carried out in a systematic manner. A careful record of all building permits must be kept, and this information recorded on the land use map on a regular schedule. If this is done the yearly survey will take very little time or expense, and the city planners

14 Bartholomew, Land Uses in American Cities, pp. 11-19.
will have a valid current map for their use at all times. 15

Findings of Current Research

Importance of research. Research must be concerned with establishing new principles, or with applying existing principles to new problems. In the process of gathering data, and in the construction of a land use map from the data, both phases of research should be covered. This organized knowledge should be directed to practical application in urban planning and in the formulation of new zoning laws. The urban geographer is central in this research, because he has the ability to do field work and classify land according to its functional usage. 16

General findings. Bartholomew has made the greatest contribution to our knowledge of land use in American cities. He and his associates prepared land use maps for fifty-three central cities, thirty-three "satellite cities" and eleven urban areas. Table 2 shows a summary of his findings.

Cities vary in size, in their organization, in their economic activities, and in the number and types of institutions. Each city is the product of many forces, and, therefore, has a character and individuality of its own. Despite the differences found between cities, all cities have many features in common. Each is, in varying degrees, a center of production and consumption of

15 Murphy, The American City: An Urban Geography, p. 197.

16 Donald W. Griffin and Richard E. Preston, "Land Use in the Central Commercial Area," Journal of Geography, LXVII (September, 1968), 342-351.
materials, goods and services, in which particular trades and activities tend to group together, and each contains the dwellings, institutions and amenities necessary for urban living. The majority of conclusions valid for diverse groups of cities will apply, in appropriately modified form, to any city of approximately the same size. 17

Table 2. Summary of findings of land use in American cities

<table>
<thead>
<tr>
<th>Use</th>
<th>Per cent of developed area</th>
<th>Per cent of city area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single-family dwellings</td>
<td>31.81</td>
<td>17.76</td>
</tr>
<tr>
<td>Two-family dwellings</td>
<td>4.79</td>
<td>2.68</td>
</tr>
<tr>
<td>Multifamily dwellings</td>
<td>3.01</td>
<td>1.68</td>
</tr>
<tr>
<td>Commercial areas</td>
<td>3.32</td>
<td>1.85</td>
</tr>
<tr>
<td>Light industry</td>
<td>2.84</td>
<td>1.59</td>
</tr>
<tr>
<td>Heavy industry</td>
<td>3.60</td>
<td>2.01</td>
</tr>
<tr>
<td>Railroad property</td>
<td>4.86</td>
<td>2.71</td>
</tr>
<tr>
<td>Parks and playgrounds</td>
<td>6.74</td>
<td>3.77</td>
</tr>
<tr>
<td>Public and semipublic property</td>
<td>10.93</td>
<td>6.11</td>
</tr>
<tr>
<td>Streets</td>
<td>28.10</td>
<td>15.69</td>
</tr>
<tr>
<td><strong>Total developed area</strong></td>
<td><strong>100.00</strong></td>
<td><strong>55.85</strong></td>
</tr>
<tr>
<td>Vacant areas (including land used for agriculture)</td>
<td></td>
<td>30.10</td>
</tr>
<tr>
<td>Water areas</td>
<td></td>
<td>14.05</td>
</tr>
<tr>
<td><strong>Total surveyed area</strong></td>
<td><strong>100.00</strong></td>
<td></td>
</tr>
</tbody>
</table>


Small cities tend toward a more generous use of land for most purposes. There is also less competition for land use in small cities, thus

17 Bartholomew, Land Uses in American Cities, p. 120.
land in small cities has less market value. Usually the larger a city is the greater the market value of the land. The cost of the land generally reaches a peak in the core of the central city, and in order to offset the handicap of high land cost in the larger city, a more intensive use is made of the land.

Residential areas. More of the developed area of cities is devoted to residential use than any other use. The majority of all cities range between 30 and 50 per cent, and the size of the city does not seem to be a factor. Cities of less than 50,000 people average 39.56 per cent, while 39.97 of the developed land in cities of over 250,000 is devoted to residential use.

Single-family dwellings occupy a greater percentage of the developed area of the city than any other use. The average for cities under 50,000 people is about 34 per cent, for cities over 250,000 the percentage is about 28. The average for all cities is near 32 per cent.

Two-family dwellings rank second in popularity as a housing structure in cities. Compared to the large area utilized for single-family dwellings, the two-family dwellings occupy comparatively small areas. Two-family dwellings tend to scatter through all sections of the city, but occur most often in areas of high land values. There is a wide variation within cities of the same population, and there is little relationship between the population and the space devoted to two-family dwellings in a community. The total amount of land used for two-family dwellings will always be rather small.

The multifamily dwelling has become popular in areas of high land values. In general the apartment has tended to predominate in the zone adjacent
to the central business district, however; large-scale projects insured by the Federal Housing Authority are changing this pattern to the fringe areas of some cities. There is a distinct tendency for the percentage of land used for multifamily dwellings to increase with an increase in population. 18

Commercial areas. The competition for most advantageous sites places a higher market value on commercial land than can be commanded by most other uses for urban land. The strip along each major thoroughfare, the corners of every busy street intersection and a large zone centering on the hub of the city are seen as choice business sites. Most cities have over-zoned for commercial purposes, resulting in depressed property values for owners of the less strategic locations. Over-zoning has the effect of sterilizing large areas that might have developed for some other use. The average amount of land used for commercial purposes is 3.32 per cent of the total developed area. The percentage of land devoted to commerce increases as the population increases. In the smaller cities, commercial facilities are almost entirely confined to a single area in the center of town. Demand for commercial outlets depends very largely on the income level in the community.

Light industry is usually found in the main business district of the city. It is found on one side or the other of the major commercial area. The amount of land devoted to light industry makes up less than 4 per cent of the developed part of the city. The amount of land used by light industry tends to

18 Ibid., pp. 26-46.
increase with population. In a large part, light industry is local in nature. Light industry consists of small service establishments, such as laundries and garages.

There is very little pattern to the location of heavy industry. Some small cities have much land devoted to heavy industry, and at the same time some large cities have very little. When all cities are compared, it is found that on the average, light and heavy industry occupy about the same percentage of urban land. Many heavy industries are found outside the corporate limits of large cities.

The amount of land classed as railroad property varies from community to community. The city's location in relationship to the transcontinental network makes a great difference. Cities with large concentrations of heavy industry have more railroads. The amount of land devoted to railroad usage has little relationship to population. 19

Streets. The second largest use of urban land is that occupied by streets. On the average, about 28 per cent of the developed area is devoted to streets. City size has little effect on this percentage. The most characteristic street pattern is the "gridiron." This pattern of street development requires more land to provide the same service than is required by streets based on functional and informal design principles. Newer methods of subdivision can result in lower ratios. 20

19 Ibid., pp. 46-63.
20 Ibid., pp. 63-65.
Parks and playgrounds. Large cities devote a greater percentage of developed land to parks and playgrounds than do small cities. Planners have set a standard for park and playground space which calls for one acre of park-playground area to each 100 persons, but very few cities reach this standard. The average is about one-half the suggested standard. Lack of foresight has often resulted in inadequate and poorly distributed parks and playgrounds. In many cases all park-playground land is found in one holding at the edge of the city. 21

Public and semipublic property. It is very difficult to generalize concerning public and semipublic property, because each city is unique in itself. There are so many variations that a trend is difficult to find. If the airport, for example, is found within the corporate limits it can make a great difference. State capitols, county seats or a university, can make a city atypical. There is a tendency for the amount of land for this use to decrease with an increase in population. 22

The Planning Concept

Introduction. For urban man there is no shortage of land. The urban system can provide man with plenty of room for work, for sleep, for play, and many other activities. However, the problem that faces man in the urban setting

21 Ibid., pp. 65-68.

22 Ibid., pp. 68-70.
is the effective use and organization of his space. This does not mean that there is not a shortage of land for non-urban activities, or that the growing world population is not a threat. What this could mean is that the shift from a rural world to an urban world is changing our values away from land hunger. Man's old drive for outward expansion can now be directed toward opportunities for work and living within the region where he lives. The space problems of an urban community is not a shortage of land, but lack of planning, waste of space, and from the unnecessary despoliation of good environment.23

Despite the fact that most people live in cities, and a greater percentage of the people will live in cities of the future, and most of our current social problems seem to center in urban areas, our knowledge of the city and the process of urbanization is conspicuously incomplete. The momentum behind urban growth, the social and industrial forces that draw people to the city, is difficult to direct and control. If the job is to be accomplished it will require the most positive planning and administrative measures.24

There are a number of questions that city planners must answer if they are to find remedies for the many ills that face the urban areas of 1970. Planners must define and have a clear understanding of what a city is. They must decide what there is in the urban situation that requires central planning and regulation. Can city planners do anything about the economic changes and

problems of social adjustment that seems so much of urban life today? How can city planners help the people of the city fit their activities into changing conditions? What can city planners do to reduce the possibility of individual maladjustment?  

**Early attempts at city betterment.** In the study of the city, people are dealing with a complex physical and human situation. Too often in the past the city was thought of as only a political administrative unit. The welfare of the people within the city was not considered as part of the city government responsibility. As undesirable situations became evident to many of the city dwellers, city betterment movements were organized in an attempt to do something about the evils of congestion. In time these movements increased in number, each concentrating on a problem. The result has been chaos and disorganization, because these attempts have lacked a basic understanding of urban problems and thus seldom succeeded.  

City planning is new, while most cities are old. This fact has placed great problems at the feet of current planners. They are faced with the problem of undoing the situation created by the Industrial Revolution and the resulting urban congestion. They are faced with a city built on a foundation suitable for the horse and buggy and now occupied by automobiles in great numbers.

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Urban planning began with a negative spirit. Cities were faced with an intolerable living condition, and reforms were demanded. A great number of reform movements developed simultaneously with each group working on a separate problem, little realizing that their problems were interrelated. Thus, there were parallel movements operating independently; one group was working on housing, another on sanitation, still others were working to improve transportation, and civic architecture.

These piecemeal attempts at city betterment have served to force people to recognize the value of planning. The first attempts at city planning were based on traditions and customs. These conventions were all that was needed in many communities until the modern problems associated with sanitation, housing, transportation, health, and open space had to be met. These traditions and customs have failed to meet the needs of people with the overwhelming city growth that the United States is now experiencing. Cities were forced to turn to more deliberate guidance of urban development. 27

The need for scientific comprehensive planning. The fact that cities have recognized the need for urban planning does not mean that steps are undertaken in a scientific and systematic manner. City planning has made great strides since the early 1930's, but it has not kept pace with our social, economic, and technical advances. There are very few communities that are not guided in some degree by planning, but there still remains a great deal to be done all

27 Bartholomew, Land Uses in American Cities, pp. 11-19.
along the urban planning continuum. Sound urban planning involves the coordination of manifold activities and the orderly arrangement of space for their proper functioning. It stands to reason that this must be done with the needs of the private individual in our free society in mind at all times. For city planning to be justified it must rectify past errors in city building, provide for the present, and insure the future social and economic needs of the city in an orderly manner. 28

The need for a comprehensive treatment of urban problems as a method to improve living conditions in urban areas has become evident to many. The federal government moved into the field of urban planning and has had some success in bringing order to the planning movement. City planners are just now realizing how comprehensive their program must be, because they must deal with the total urban problem. Today city planning must face problems of industrial location, the erosion of social values in slums, decay in the central business district, the Interstate Highway, and many other problems.

In sum, planning has advanced far since the day when it meant little more than civic embellishment. Today, planning is a powerful tool for shaping the urban structure, and its use is recognized as a significant function of local government. It is a device for coordinating many of the activities of local government and finally, it is a positive guide to community redevelopment and growth. 29

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29 Bartholomew, Land Uses in American Cities, p. 4.
The Zoning Concept

Introduction. In 1926 the Supreme Court ruled that zoning was a proper exercise of police power (Euclid Village Case of 1926). Until that time cities had very little power to direct their growth patterns. Many cities after 1926 adopted zoning plans in an effort to bring order to the development of urban areas. Before zoning laws were passed and enforced, city growth was uncontrolled and many excesses resulted; as a consequence, most cities are still paying for this unplanned and uncontrolled expansion. 30

Most of the zoning plans of the late 1920's and early 1930's were not well written. In most cases these laws were uncertain, and many would not hold up in a court of law. Cities were growing at a tremendous rate, but city planners were not able to keep up with this rapid growth, and at the same time meet the speculative pressure that was brought to bear on them. Each planning group was faced with the lack of reliable knowledge of the kinds and amount of land required for urban development. There was a lack of factual data on the use of urban land. 31

The function of zoning. Zoning is part of the social control process in a community, therefore, to be effective, zoning must have public sanction. This


control cannot be left to custom and tradition, but must be in the form of police power in the community. The courts have ruled that the community has the power to promote the general welfare within the city by restricting the use of land within the community. This power includes the control of conditions effecting health and safety, restricting building materials and methods, control of land use, subdivision control, and other planning methods. The development of zoning has increased in recent years. This is indicated by the fact that not until 1916 was an American city comprehensively zoned: whereas, at present most communities have some form of zoning. More recently, zoning has been extended to rural areas as evidenced by the fact that several states have approved laws permitting county zoning. Thus we are moving into a time when all land will come under zoning regulations.

The first function of zoning is to control the use of land and buildings. The second function is to regulate the size and shape of buildings and their relation to each other. Zoning describes the area within which these controls are enforced. Each urban acitivity is allocated sufficient and appropriate land for that purpose. Each activity is controlled to the point that it will not interfere with other activities. Such things as population density, height of buildings, needed open space, traffic, real estate values, and community tax base, all must be taken into account to assure the most economical municipal

services and utilities. 33

Meeting changing urban conditions. Zoning ordinances must face a constantly changing situation as illustrated by the rapid growth of air traffic and the problem thus created. Salt Lake City, Utah, is faced with the problem of changing the highway system entering the city from the west in order to expand the airport to accommodate larger airplanes. Airports are demanding more and more land and the surrounding areas are requiring new protective regulations. Buildings are becoming so large that they may take up more than one entire city block. Automobile traffic has also become a national problem. City streets are overflowing with traffic, and finding a place for all these automobiles to park must be faced by all city planners. New and revised zoning ordinances are attempting to meet these and other major urban problems, but in most cases they have met with failure. These failures bring out the need for improved zoning methods. 34

Cities have found it necessary to continually revise their zoning plans. As a city grows and becomes more complex, zoning must be studied and adjusted to meet the new needs of the city. Since World War II, cities have experienced unprecedented areal expansion caused by the widespread use of the automobile and other forms of transportation. Modern transportation has created problems for city planners that earlier zoning regulations did not


34 Ibid.
anticipate. Also, with the threat of air and water pollution, city planners are faced with even more pressing problems. Meanwhile, zoning techniques must be expanded concurrently and improved to meet the ecological imbalance city growth has placed on nature.35

Failure of zoning. Bartholomew suggests that much of the blame for the failure of cities to meet and solve their problems rests with the conservative manner in which zoning laws have been passed and enforced. Many communities are reluctant to press for full use of the power they have. The courts have left the door open, but the planners have not come up with the innovations needed to meet city problems. City ordinances are not being enforced and nonconforming uses of land are allowed to go on because city officials are finding it politically unhealthy to face the business men of the community. Perhaps in the future, the courts will be forced to act in this situation.36

Planning and zoning. In planning and zoning an attempt is made to bring about consistent and orderly growth. Planning is the task of producing by foresight and skill that which was previously left to chance. Planners are attempting to predetermine a logical land use pattern, but individual and collective desires of the community must be incorporated into the zoning scheme. The urban area is a product of forces over which man has little control and even less knowledge. The demand for urban land is related to the

35 Bartholomew, Land Uses in American Cities, p. v.
growth and distribution of the population, to the social behavior of the people, and to the economic functions. A zoning plan must take these factors into account as well as the personal needs of each citizen. Zoning plans based upon unsound assumptions can, and has, resulted in depreciated land values and urban blight.

The urban complex is, figuratively, an organism that cannot maintain its equilibrium if forced too far from its natural pattern. Thus, zoning can do little to modify the basic forces that produce the demands for land. Rather, it must be a rationalization and expression of these forces—beginning with a clear understanding of the pattern of land uses. 37

37 Bartholomew, Land Uses in American Cities, p. 42.
SECTION III
CEDAR CITY, UTAH, RESEARCH

Introduction

The need and purpose for this study. Basic to this study is the fact that few studies of land use in cities of under 10,000 inhabitants have been made. In reviewing the literature, one finds little information available for small cities. However, one is impressed with the need for, but derth of, individual studies on small cities and the results compiled in such a manner that some overall trends can be described and analyzed. From such studies, city planners in small cities would be able to make plans on a much more knowledgeable basis. This is important because small cities are going to become large cities and planned growth based on knowledge gained from well organized and scientific studies can help the small cities avoid the major urban problems of the past that plague us to date.

The city planners are not the only professionals interested in land use in the city. Those interested in urban geography are going to be concerned with the well-organized urban land survey and the land use map that is based on the findings of the field survey. In many cases the professional could find a ready-made land use map that may serve his purpose, but it is unlikely that the map would be of the quality desired. Too often the available maps are part of a zoning ordinance and show prescribed, rather than existing land uses.
Above all else, there is something individual in each land use map. Those making the land use survey gain an understanding of the city that cannot be acquired in any other way. As the geographer moves from lot-to-lot and from street to street, he begins to see the city from an entirely different perspective; he is looking from the inside rather than from the outside. This is so important because many of the mistakes of the past are the result of assumptions rather than knowledge. The urban land use survey and the land use map are only the first steps in a broad research program.

Planning for the Survey

Establishing geographic limitations. Establishing the geographic limits of the survey is the first problem faced by those undertaking the construction of a land use map. For this study the corporate city of Cedar City, Utah, was selected. The fact that a good base map just covering the corporate limits of the city was available was a factor in this decision. In most cases the map scale changes with the city limits and this creates problems that are very difficult to solve. Also, to include areas outside the corporate limits would require one to go beyond the limits of this study.

Selection of a base map. Selecting a base map presents several problems. Usually those making the study such as this must use a base map that has been prepared for other purposes. Most cities have maps used for zoning and water

and sewage lines, and these can be used in many cases in making an urban
land use survey and land use map. The Engineer Department of Cedar City,
Utah, provided a zoning map with all street and lot lines marked. The fact
that this map was available in a number of sizes proved to be very important
for the purpose of this study. This allowed for flexibility in choosing the size
of map to accommodate needs and purposes. Fortunately, Cedar City, Utah,
is nearly square. This made it possible to use a map with a rather large
scale so that all information could be placed on one map. On the other hand,
long narrow cities present special problems, with the result that several maps
each covering a section of the city would be needed or the scale must be reduced.
Because a rather large map could be used for this study a great amount of detail
was possible. With less detail a much smaller map could be used. A decision
must be made; less detail and one map or more detail and several maps.

In the last analysis, however, applicable to all planners
the area to be included and the scale of the map are often con­
trolled chiefly by expediency: to save time and expense he may
decide to use a base map which the city has in stock. 39

Constructing a classification system. Being familiar with Cedar City,
Utah, made the classification chore considerably easier. The decision was
made to use a modified version of Bartholomew's classification. Because
Cedar City, Utah, has limited industry there seemed little value in separating
light and heavy industry. Also, this study is a general survey of all land uses

39 Murphy, The American City: An Urban Geography, p. 188.
and thus there seemed little need to subdivide the various business and commercial uses. Bartholomew has suggested many subdivisions for all types of urban land use. 40

Whatever the system of classification used, some shorthand method must be devised to indicate the type of land use on the map. In conducting the field survey symbols are more practical than colors; however, on the land use map colors are much superior. In addition to the symbols any item that may need further clarification should be recorded on the survey map. The following Table shows the classification used for this study.

Table 3. System of classification used in this study

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<td>Two family dwelling R2</td>
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<td>Multifamily dwelling R3</td>
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<td>Commercial C</td>
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<td>Industry I</td>
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<td>6.</td>
<td>Railroads RR</td>
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<td>7.</td>
<td>Parks and playgrounds PP</td>
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<td>Vacant V</td>
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<tr>
<td>10.</td>
<td>Streets Streets are always left white</td>
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Mode of survey. On the advice of a professional urban planner the field survey would be conducted from an automobile. This would require the cooperation of two surveyors working together, one to drive and one to record

40 Ibid.
the information as the lot-by-lot study progressed. It was understood that some areas could not be classified from the automobile and these lots would be investigated on foot. It was felt also that no more than two days would be required to conduct the land survey of Cedar City, Utah, using this technique.

**Conducting the Survey**

**Introduction.** There are many technical problems faced by those making a land use survey. Some of these problems can be anticipated, but there are many that must be faced and solved in the field as the survey progresses.

**Classification of business houses.** One of the first questions that demanded an answer was that of classifying business houses with several floors. For this study the solution was to classify only the street floors. Murphy indicates this to be a satisfactory solution unless a very detailed survey is being conducted on the central business district.\(^{41}\)

**Problems with classifying vacant land.** As the survey moved from the central business district there was much land around many buildings that seemed to be vacant. For this study the decision was made to classify this land according to the structures found on the major part of the lot. Family gardens presented a particular problem in this regard. If the garden occupied the entire lot and there were no buildings involved that could be classified for urban use, it was classed as vacant. If any part of the lot was devoted to some urban use

\(^{41}\)Ibid., p. 193.
all the lot was so classified.

**Classifying multi-use structures.** As the survey progressed through the residential districts of the city, cases were found in which part of a structure was used as a dwelling and part as a commercial establishment. Again turning to Murphy for a solution, he suggests that this structure be classed for both uses. For this study the lot was divided to show both uses. Beauty parlors and offices were most common in family dwellings. ⁴²

**The field survey and the base map.** The base map chosen for the field survey was four feet square. Such a large map seemed to have advantages in that more information could be recorded if needed, and it was valuable for this purpose, but the large map presented problems in an automobile. This situation was solved by cutting the map into strips. These strips could be organized in the automobile much easier than the single large map. It was a simple matter to join the pieces together for the completion of the land use map.

**Special techniques involved.** It soon became apparent that a certain amount of skill was required, and that there were certain techniques involved that would make the survey move more smoothly. Each time the automobile made a turn it required the turning of map; this seemed to cause a certain amount of confusion and loss of time. It was found that by conducting the survey always in the same direction, where possible, solved this problem. Also, the survey seemed to move faster and with more accuracy when only one

⁴²Ibid.
side of the street was worked at a time. It was almost impossible to keep oriented whenever the direction was changed or an attempt was made to work both sides of the street simultaneously.

Survey of the less built-up outer fringe. The outer edge of the city, those areas that are not built up, and where streets are not completely developed or well marked, presented a special problem. It proved to be very difficult to locate accurately each lot in these areas. Air photos were valuable in surveying these areas. Buildings could be located very accurately through the use of these maps. Because the air photos were three years old, a very careful on-the-spot check of all new buildings was required.

Conclusion. All situations and problems such as these must be met and solved by those making the field survey. Each community is unique and no two people would arrive at the same conclusions. A great amount of reliance must be placed upon the judgment of those making the survey as they meet various problems in the field.

Constructing the Land Use Map

The final map. The chief product of the process that has been described is a general land use map. The field map is usually prepared with the use of symbols and notes, but can be in color. The final map can be in color or black and white, depending largely upon the purpose for which it is to be used. If the map is intended as a wall map, or otherwise for display purposes, it is customary to use colors. If it is to be reproduced for a book or magazine,
however, it will have to be prepared with this in mind. The use of colors in reproduction ordinarily is prohibited by cost, so a sufficient number of black and white patterns must be selected, patterns that will stand reduction to the final, desired map size. 43

Choice of base map and colors. For this study the base map chosen could serve both as a wall map and as a foldout in a book or magazine. This base map had several important assets, including well defined lot and street lines as well as the various zoning districts. 44

Mongol brand colored pencils were selected to color the base map. One reason for this choice was the fact that there was a good selection of colors and each color had an assigned number. With several people working on the coloring process the numbering was essential. Some care is necessary in choosing colors to assure as much contrast as possible. This color contrast becomes most important in analyzing the land use map for planning and zoning.

Cedar City, Utah, Land Use Map Analyses

Summary of Cedar City, Utah, land use map. The land use map, the object of this study, is only the first step in a comprehensively planned and zoned city. However, from the land use map constructed for this study, one

44 Ibid.
finds that: (1) Cedar City, Utah, is a very compact city; (2) due to the high percentage of vacant land, Cedar City, Utah, can take care of much growth within the present corporate limits; (3) growth is taking place in three main subdivisions, and a subdivision south and east of the access road from the south gives room for future expansion in that direction; (4) most of the commercial activities are located along main street, and a new developing area just off the 200 north interchange; (5) there is ample space for industrial growth along the railroad; (6) the Interstate Highway seems to be encouraging expansion to the west; (7) Southern Utah State College divides the residential area of the west and hinders north-south circulation in that region; (8) all recreation areas are concentrated in one locality to the northeast; (9) Cedar City, Utah, has the traditional grid street pattern; and (10) the most valuable residential districts are found on the elevated areas of the east and west margins of the city.
SECTION IV
CONCLUSION

Cities are the focal points in the occupation and utilization of the earth by man. They are influenced by and influence surrounding regions. Cities develop in definite patterns in response to economic and social needs.

The rapid growth of cities as the habitat of man testify to their superiority as a means of exploitation of the earth, yet they often provide poor local environment for man. The problem is to build future cities and reform old ones in such a manner that the advantages of urban concentration can be preserved for the benefit of man and the disadvantages minimized.

Each city is unique in detail but resembles others in function and pattern. What is learned about one city helps in studying another. Location, types and internal structures are repeated so often that broad and suggestive generalizations are valid, especially if limited to cities of similar size, function, and regional setting.

Urban planning is a fairly recent phenomenon in our history. In simplest terms urban planning is micro-geography. The basic geographic unit is the city region which exists as a vital, thriving organism. Within this region a planner is interested in the distribution and pattern of land use. One of the most important jobs confronting an urban planner and the urban geographer is predicting the future spatial distribution of urban land use, and to make development more orderly.
Urban planning, then, treats the city as a unified whole and has as its framework a knowledge of the internal patterns of distribution, the impact of these patterns upon the present and future lives of the citizenry, and finally the rearrangement of these patterns, if need be, to insure the effective and continued growth of the community. Since this framework is basically geographic, it is natural to assume that geography can function as a complementary field and geographers in particular serve as active contributors to the planning process.

The city is a distinct element-complex. Segments of this unit, the residential areas, commercial districts, and industrial sites, exist as independent features, but also are members of an organized whole by virtue of their incorporation in the definable urban landscape. A geographer views this area as an integrated unit; it provides the framework to which he can attach his technical skills, for a geographer is more than a technician and can make a far greater contribution because he is not limited in this respect. This ability to view distribution of diverse elements as part of one integrated whole is a necessary trait in the present and future planning of our urban areas, especially when we realize that the city as a region is undergoing change constantly, both internally in a functional sense, and externally as the boundaries change.
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