URBAN LAND USE

1949
By and large, our cities are composed of a great number of relatively small parts - buildings insignificant as individual structures but vitally important in combination. While no one will deny the importance of major streets, super highways, off-street parking areas, Class VI airports, or parkways which we see illustrated and discussed so often in current publications and which appear so well in plan or model, these features, after all, are only to serve the basic community pattern. The latter must be the first objective of planning and control.

The "city of tomorrow" is being built today. If past experience is any criterion, much present development will remain and buildings built today will be with us for many generations. If a city does not have an up-to-date zoning ordinance that is an integral part of a city plan, an ordinance that at least is directing new buildings into a satisfactory city pattern, that city is not doing much really effective planning. We might paraphrase a biblical quotation and say that: "By their zoning ye shall know them".

Our record on zoning is none too satisfactory. The Municipal Index of 1948 showed 1072 cities of more than 10,000 population in the United States. Only 548 or 51 per cent of these cities indicated that they had a comprehensive zoning ordinance. As we all know from personal experience many of these ordinances are obsolete and inadequate. Not only are many of them ineffective in directing new growth, but only a handful contain any of the so-called "retroactive" provisions so essential to the correction of past mistakes.
The purpose of zoning, as stated in many enabling acts, is to "direct growth in accordance with a comprehensive plan". Before this can be done there must be careful estimates of the amount of growth both of total population and of the area required for the various types of land use. For example, if an ordinance is to properly direct the growth of a city's commercial area it is necessary to know whether this area will be 100 or 1000 acres. A zoning ordinance cannot be effective unless the areas of the zoning districts are closely related to the areas that will be required for the different urban land uses such as commerce and industry.

The preparation of a zoning ordinance should be preceded by studies of existing land use and estimates of future land use needs. Early zoning ordinances were not based upon such studies, one of the factors accounting for their ineffectiveness. In recent years, and particularly since 1932 when "Urban Land Uses" by Harland Bartholomew was published by Harvard University, the making of land use studies has come to be a common practice.

The 1932 "Urban Land Use" study analyzed land use in 16 "self-contained" cities. An additional 32 cities have now been surveyed and it is hoped that a new revision of this book can be published soon. This paper is a summary of the analysis that has been made of the 48 cities.

The Land Use Survey

The land use surveys of the 48 cities have all been made in the same manner. The land use classification is largely a functional one but has been carefully related to the classifications customarily used in zoning
ordinances. The many land uses are grouped into twelve classes, as follows:

1. **Single-family homes.**
2. **Two-family homes.**
3. **Multiple Dwellings.** (Structures with three or more living units and rooming and boarding homes.)
4. **Commerce.**
5. **Light Industry.** (Industry not offensive due to emission of odor, dirt, noise, gas, smoke, etc.)
6. **Heavy Industry.**
7. **Railroads.**
8. **Public and Semi-Public Uses - Schools, churches, hospitals, institutions, etc.**
9. **Parks and Playgrounds.**
10. **Streets and Alleys.**
11. **Vacant Land.**
12. **Water Areas - (rivers and lakes).**

The usual procedure has been to obtain large scale city maps, place data from all available sources that will indicate land use (such as Sanborn Atlases, aerial photographs and Assessor's records) on these maps and then to check this data in the field. This field check should be made by personnel with technical training who are familiar with the ultimate use of the data. It also should be made on foot in a developed urban area. Otherwise many "rear lot" uses and conversions of single-family homes to multiple dwelling uses may be overlooked.

After the field inspection, the areas devoted to the various use classifications are computed.

**Summary of the 48 Cities**

The 48 cities range from Williamsburg, Virginia with a population of 4000 to St. Louis, Missouri, with a population of 822,000. Combined they have a population of about 5½ million persons and a total area of some 800 square miles.
The data presented here are for "self-contained" cities and for the corporate area only. In some cases this includes very nearly all of the "urban" area; in many cases it does not. Two types of information are most useful, the percentages of the total developed area (vacant land excluded) and the acres of land used for each one-hundred persons.

Percentage of Total Developed Area. The percentage of total developed area occupied by the various land uses in the 48 cities is shown on Table 1, together with separate averages for cities of less than 50,000, cities 50,000 to 150,000 and cities of more than 150,000.

On the whole, the percentages of the total developed area devoted to the various uses is remarkably consistent among the three population groups. The percentage used for two-family dwelling, multiple dwelling and commerce increases as the cities become larger. Surprisingly, the percentage of the total developed area devoted to parks also increases. In larger cities where development is more intensive, a smaller percentage is devoted to streets.

Acres Per 100 Persons. Table 2 shows the average acres per 100 persons for the three population groups and for the 48 cities. The smaller cities with their more spacious development use a larger amount of land per unit of population than do the larger cities. This increase is found throughout most of the land use classifications but is most marked in areas used for single-family residence, for public and semi-public purposes, for light industry and for streets and alleys.

These figures are more consistent and more comparable than
those relating to the percentage of the total developed area, since an abnormality in any one use does not distort the remainder.

"Ranges". A wide range of conditions is represented by the 48 cities. The range of the land use statistics, shown on Table 3, is very great. The percentage of city area that was vacant varied from a low of 11.7 percent in Hamilton, Ohio, to a high of 36.78 percent in Santa Fe, New Mexico. Comparable ranges are found in the individual land uses both in their percentage of total developed area and area used per 100 persons. Cape Girardeau, Missouri, used only 0.01 acres per 100 persons for two-family residence while Schenectady, New York used 0.74. The total developed area varied from 2.85 to 17.88 acres per 100 persons. Streets and alleys were 19.10 percent of the total developed area in Davenport, Iowa and 58.55 percent in San Angelo, Texas. Single-family homes were 8.4 percent of the developed area in Newark, New Jersey and 51.5 percent in Springfield, Missouri.

Application of the Statistics

The land use statistics, like all other statistics, are merely a basis for a judgment or conclusion. They have to be used with caution and with a full knowledge of their limitations.

The "ranges" discussed above would seem to indicate such a wide variation between cities as to make comparisons meaningless. As a matter of fact, however, the majority of land uses in most cities come within a fairly narrow range. Table 3 is largely a reflection of the unusual conditions that are often found in one or two classes of land use in an individual city.
The averages serve as a check on any study of an individual community and, most important of all, reveal unique characteristics of a separate city. For example, the basic character of the District of Columbia can be indicated by a very simple comparison with the average of the 48 cities. In Washington the percentage of the developed area devoted to single-family homes is 11.6, the average is 33.5; the percentage devoted to multiple dwellings is 11.2 in comparison with 2.51, the percentage devoted to industry is 1.8 in comparison with 6.5, and the percentage in public and semi-public and park uses is 39.5 in comparison with 12.3. While such comparisons may seem most obvious and elementary to the professional city planner, they emphasize and dramatize basic considerations to the layman and help materially in obtaining intelligent public support.

Cities also show a tendency to eliminate aberrations in an individual land use with the passage of time. In Schenectady, for example, very few two-family homes are being built. In the future, the land area occupied by two-family homes can be expected to approach the average more closely than in the past.

The land use "averages" should not be confused with an "ideal" land use allocation that might be made if a "new town" were being planned. The averages represent the results of the operation of our "free enterprise" system of city building, based on "supply and demand". Our zoning ordinances, which are designed to bring about better cities by directing this method of city building into improved channels, must be based on this type of factual study, and not on theory, if they are to succeed - and if they are to be enacted.
Urban Area. The land use statistics shown previously have all been for the corporate areas of cities. In some cases, such as Des Moines, Iowa and Santa Fe, New Mexico, the city limits include the entire area of urbanization. In others such as St. Louis, Missouri, Newark, New Jersey, and Greenville, South Carolina, the city limits include only a part of the urban area.

In recent years, whenever it has been possible and practicable to do so, the land use surveys have been extended to include the entire urban area. Comparative land use statistics for the corporate area and the urban area of three cities are shown on Table 4. The differences are considerable and significant. The total acres used per 100 persons increases when the entire urban area is included because of the greater spaciousness of the outlying development. Considerable differences occur in the various classifications of land use depending upon the local conditions.

Eventually, it should be possible to obtain sufficient data of this kind to permit the preparation of new averages for the total urban area of cities. These should be more significant than the averages prepared for the corporate areas. These averages will change gradually, however, so long as the automobile continues to extend the decentralization process.

A word of caution should be given, however. In a sense the boundaries of the "urban area" are just as arbitrary as those of the corporate area. The "urban area" is the result of many individuals building at random and usually without any control as to the extent of urbanization. It is difficult to determine the precise area affected by this process in many cases. It is probable that no two city planners would place the line in exactly the same place in the same city.
An intimate knowledge of the individual community is essential in order that the application of the land use statistics may be guided by a complete realization of their limitations. In those cases where a complete survey of the entire urban area cannot be obtained, the land use figures for the corporate area are useful - when coupled with sound judgment.

**Future Trends.** Due cognizance must be taken of new trends in land use in the preparation of estimates of future land use needs. There are many of these trends but three are now quite obvious: the trend toward a more spacious residential development, the trend toward larger commercial areas with integral off-street parking, and the trend toward one-story industrial operations on large industrial sites.

How can we expect these trends to affect the land use statistics over the next two or three decades? Past experience would indicate that there will be no universal pattern; the effect will be different in each city. Nor can we expect these trends to have an appreciable influence on city-wide land use data for many years, because so many of the existing uses will remain.

If the new residential growth of a city were to consist largely of single-family homes on lots of 7500 square feet (a not too unusual prospect in smaller mid-west cities) the area required for residential use per 100 persons for the new population would be about five acres. This is almost twice the average of 2.68 acres per 100 persons (all types of residential use) shown on Table 2.

Provision of off-street parking areas on the minimum "one to one" ratio (one square foot of parking area for each square foot of floor space) may double the commercial area required, particularly in outlying parts of the city.
An industrial development consisting of one-story buildings with parking space equal to the area occupied by the buildings will require an area at least four times as large as the older industrial developments where there are multi-storied buildings with high land coverage.

Careful studies of the effects of these trends are required in each city before satisfactory estimates of future land use needs can be made. A zoning ordinance, based upon such studies and made as a part of a comprehensive plan should then effectively direct the growth of the city.

We need more basic land use information. We have only "scratched the surface" in the analyses of land use made so far. Of particular importance is the collection of land use data that is kept up-to-date, data that will permit a year by year check of the actual effect of new trends.