The Nature of Cities

By Chauncy D. Harris and Edward L. Ullman

CITIES are the focal points in the occupation and utilization of the earth by man. Both a product of and an influence on surrounding regions, they develop in definite patterns in response to economic and social needs.

Cities are also paradoxes. Their rapid growth and large size testify to their superiority as a technique for the exploitation of the earth, yet by their very success and consequent large size they often provide a poor local environment for man. The problem is to build the future city 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 helps in studying another. Location types and internal structure are repeated so often that broad and suggestive generalizations are valid, especially if limited to cities of similar size, function, and regional setting. This paper will be limited to a discussion of two basic aspects of the nature of cities—their support and their internal structure. Such important topics as the rise and extent of urbanism, urban sites, culture of cities, social and economic characteristics of the urban population, and critical problems will receive only passing mention.

The Support of Cities

As one approaches a city and notices its tall buildings rising above the surrounding land and as one continues into the city and observes the crowds of people hurrying to and fro past stores, theaters, banks, and other establishments, one naturally is struck by the contrast with the rural countryside. What supports this phenomenon? What do the people of the city do for a living?

The support of a city depends on the services it performs not for itself but for a tributary area. Many activities serve merely the population of the city itself. Barbers, dry cleaners, shoe repairers, grocerymen, bakers, and movie operators serve others who are engaged in the principal activity of the city, which may be mining, manufacturing, trade, or some other activity.

The service by which the city earns its livelihood depends on the nature of the economy and of the hinterland. Cities are small or rare in areas either of primitive, self-sufficient economy or of meager resources. As Adam Smith stated, the land must produce a surplus in order to support cities. This does not mean that all cities must be surrounded by productive land, since strategic location with reference to cheap ocean highways may enable a city to support itself on the specialized surplus of distant lands. Nor does it mean that cities are parasites living off the land. Modern mechanization, transport, and a complex interdependent economy enable much of the economic activity of mankind to be centered in cities. Many of the people engaged even in food production are actually in cities in the manufacture of agricultural machinery.

The support of cities as suppliers of urban services for the earth can be summarized in three categories, each of which presents a factor of urban causation: [1]

1. Cities as central places perform-

[1] For references see Edward Ullman, "A Theory of Location for Cities," *American Journal of Sociology*, Vol. 46, No. 6 (May 1941), pp. 853–64.

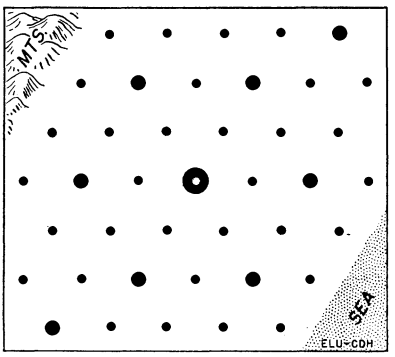

FIG. 1.—Theoretical distribution of central places. In a homogeneous land, settlements are evenly spaced; largest city in center surrounded by 6 medium-size centers which in turn are surrounded by 6 small centers. Tributary areas are hexagons, the closest geometrical shapes to circles which completely fill area with no unserved spaces.

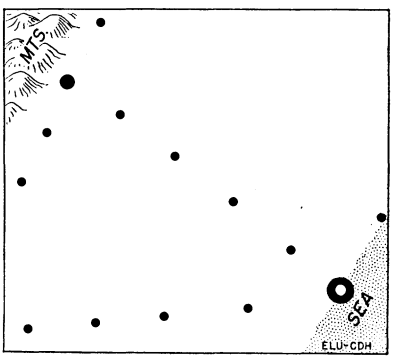

FIG. 2.—Transport centers, aligned along railroads or at coast. Large center is port; next largest is railroad junction and engine-changing point where mountain and plain meet. Small centers perform break of bulk principally between rail and roads.

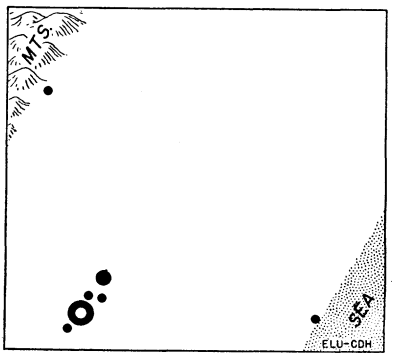

FIG. 3.—Specialized-function settlements. Large city is manufacturing and mining center surrounded by a cluster of smaller settlements located on a mineral deposit. Small centers on ocean and at edge of mountains are resorts.

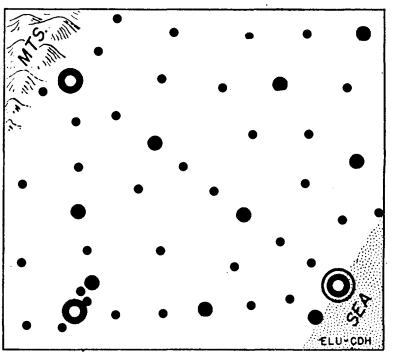

FIG. 4.—Theoretical composite grouping. Port becomes the metropolis and, although off center, serves as central place for whole area. Manufacturing-mining and junction centers are next largest. Railroad alignment of many towns evident. Railroad route in upper left of Fig. 2 has been diverted to pass through manufacturing and mining cluster. Distribution of settlements in upper right follows central-place arrangement.

ing comprehensive services for a surrounding area. Such cities tend to be evenly spaced throughout productive territory (Fig. 1). For the moment this may be considered the "norm" subject to variation primarily in response to the ensuing factors.

2. Transport cities performing break-of-bulk and allied services along transport routes, supported by areas which may be remote in distance but close in connection because of the city's strategic location on transport channels. Such cities tend to be arranged in linear patterns along rail lines or at coasts (Fig. 2).

3. Specialized-function cities performing one service such as mining, manufacturing, or recreation for large areas, including the general tributary areas of hosts of other cities. Since the principal localizing factor is often a particular resource such as coal, water power, or a beach, such cities may occur singly or in clusters (Fig. 3).

Most cities represent a combination of the three factors, the relative importance of each varying from city to city (Fig. 4).

Cities as central places

Cities as central places serve as trade and social centers for a tributary area. If the land base is homogeneous these centers are uniformly spaced, as in many parts of the agricultural Middle West (Fig. 1). In areas of uneven resource distribution, the distribution of cities is uneven. The centers are of varying sizes, ranging from small hamlets closely spaced with one or two stores serving a local tributary area, through larger villages, towns, and cities more widely spaced with more special services for larger tributary areas, up to the great metropolis such as New York or Chicago offering many specialized services for a large tributary area composed of a whole hierarchy of tributary areas of smaller places. Such a net of tributary areas and centers forms a pattern somewhat like a fish net spread over a beach, the network regular and symmetrical where the sand is smooth, but warped and distorted where the net is caught in rocks.

The central-place type of city or town is widespread throughout the world, particularly in nonindustrial regions. In the United States it is best represented by the numerous retail and wholesale trade centers of the agricultural Middle West, Southwest, and West. Such cities have imposing shopping centers or wholesale districts in proportion to their size; the stores are supported by the trade of the surrounding area. This contrasts with many cities of the industrial East, where the centers are so close together that each has little trade support beyond its own population.

Not only trade but social and religious functions may support central places. In some instances these other functions may be the main support of the town. In parts of Latin America, for example, where there is little trade, settlements are scattered at relatively uniform intervals through the land as social and religious centers. In contrast to most cities, their busiest day is Sunday, when the surrounding populace attend church and engage in holiday recreation, thus giving rise to the name "Sunday town."

Most large central cities and towns are also political centers. The county seat is an example. London and Paris are the political as well as trade centers of their countries. In the United States, however, Washington and many state capitals are specialized political centers. In many of these cases the political capital was initially chosen as a centrally located point in the political area and was deliberately separated from the major urban center.

Cities as transport foci and break-of-bulk points

All cities are dependent on transportation in order to utilize the surplus of the land for their support. This dependence on transportation destroys the symmetry of the central-place arrangement, inasmuch as cities develop at foci or breaks of transportation, and transport routes are distributed unevenly over the land because of relief or other limitations (Fig. 2). City organizations recognize the importance of effi-

cient transportation, as witness their constant concern with freight-rate regulation and with the construction of new highways, port facilities, airfields, and the like.

Mere focusing of transport routes does not produce a city, but according to Cooley, if break of bulk occurs, the focus becomes a good place to process goods. Where the form of transport changes, as transferring from water to rail, break of bulk is inevitable. Ports originating merely to transship cargo tend to develop auxiliary services such as repackaging, storing, and sorting. An example of simple break-of-bulk and storage ports is Port Arthur-Fort William, the twin port and wheat-storage cities at the head of Lake Superior; surrounded by unproductive land, they have arisen at the break-of-bulk points on the cheapest route from the wheat-producing Prairie Provinces to the markets of the East. Some ports develop as entrepôts, such as Hong Kong and Copenhagen, supported by transshipment of goods from small to large boats or vice versa. Servicing points or minor changes in transport tend to encourage growth of cities as establishment of division points for changing locomotives on American railroads.

Transport centers can be centrally located places or can serve as gateways between contrasting regions with contrasting needs. Kansas City, Omaha, and Minneapolis-St. Paul serve as gateways to the West as well as central places for productive agricultural regions, and are important wholesale centers. The ports of New Orleans, Mobile, Savannah, Charleston, Norfolk, and others served as traditional gateways to the Cotton Belt with its specialized production. Likewise, northern border metropolises such as Baltimore, Washington, Cincinnati, and Louisville served as gateways to the South, with St. Louis a gateway to the Southwest. In recent years the South has been developing its own central places, supplanting some of the monopoly once held by the border gateways. Atlanta, Memphis, and Dallas are examples of the new southern central places and transport foci.

Changes in transportation are reflected in the pattern of city distribution. Thus the development of railroads resulted in a railroad alignment of cities which still persists. The rapid growth of automobiles and widespread development of highways in recent decades, however, has changed the trend toward a more even distribution of towns. Studies in such diverse localities as New York and Louisiana have shown a shift of centers away from exclusive alignment along rail routes. Airways may reinforce this trend or stimulate still different patterns of distribution for the future city.

Cities as concentration points for specialized services

A specialized city or cluster of cities performing a specialized function for a large area may develop at a highly localized resource (Fig. 3). The resort city of Miami, for example, developed in response to a favorable climate and beach. Scranton, Wilkes-Barre, and dozens of nearby towns are specialized coal-mining centers developed on anthracite coal deposits to serve a large segment of the northeastern United States. Pittsburgh and its suburbs and satellites form a nationally significant iron-and-steel manufacturing cluster favored by good location for the assembly of coal and iron ore and for the sale of steel to industries on the coal fields.

Equally important with physical resources in many cities are the advantages of mass production and ancillary services. Once started, a specialized

city acts as a nucleus for similar or related activities, and functions tend to pyramid, whether the city is a seaside resort such as Miami or Atlantic City, or, more important, a manufacturing center such as Pittsburgh or Detroit. Concentration of industry in a city means that there will be a concentration of satellite services and industries —supply houses, machine shops, expert consultants, other industries using local industrial by-products or waste, still other industries making specialized parts for other plants in the city, marketing channels, specialized transport facilities, skilled labor, and a host of other facilities; either directly or indirectly, these benefit industry and cause it to expand in size and numbers in a concentrated place or district. Local personnel with the know-how in a given industry also may decide to start a new plant producing similar or like products in the same city. Furthermore, the advantages of mass production itself often tend to concentrate production in a few large factories and cities. Examples of localization of specific manufacturing industries are clothing in New York City, furniture in Grand Rapids, automobiles in the Detroit area, pottery in Stoke-on-Trent in England, and even such a specialty as tennis rackets in Pawtucket, Rhode Island.

Such concentration continues until opposing forces of high labor costs and congestion balance the concentrating forces. Labor costs may be lower in small towns and in industrially new districts; thus some factories are moving from the great metropolises to small towns; much of the cotton textile industry has moved from the old industrial areas of New England to the newer areas of the Carolinas in the South. The tremendous concentration of population and structures in large cities exacts a high cost in the form of congestion, high land costs, high taxes, and restrictive legislation.

Not all industries tend to concentrate in specialized industrial cities; many types of manufacturing partake more of central-place characteristics. These types are those that are tied to the market because the manufacturing process results in an increase in bulk or perishability. Bakeries, ice cream establishments, ice houses, breweries, soft-drink plants, and various types of assembly plants are examples. Even such industries, however, tend to be more developed in the manufacturing belt because the density of population and hence the market is greater there.

The greatest concentration of industrial cities in America is in the manufacturing belt of northeastern United States and contiguous Canada, north of the Ohio and east of the Mississippi. Some factors in this concentration are: large reserves of fuel and power (particularly coal), raw materials such as iron ore via the Great Lakes, cheap ocean transportation on the eastern seaboard, productive agriculture (particularly in the west), early settlement, later immigration concentrated in its cities, and an early start with consequent development of skilled labor, industrial know-how, transportation facilities, and prestige.

The interdependent nature of most of the industries acts as a powerful force to maintain this area as the primary home of industrial cities in the United States. Before the war, the typical industrial city outside the main manufacturing belt had only a single industry of the raw-material type, such as lumber mills, food canneries, or smelters (Longview, Washington; San Jose, California; Anaconda, Montana). Because of the need for producing huge quantities of ships and airplanes for a

two-ocean war, however, many cities along the Gulf and Pacific coasts have grown rapidly during recent years as centers of industry.

Application of the three types of urban support

Although examples can be cited illustrating each of the three types of urban support, most American cities partake in varying proportions of all three types. New York City, for example, as the greatest American port is a break-of-bulk point; as the principal center of wholesaling and retailing it is a central-place type; and as the major American center of manufacturing it is a specialized type. The actual distribution and functional classification of cities in the United States, more complex than the simple sum of the three types (Fig. 4), has been mapped and described elsewhere in different terms.[2]

The three basic types therefore should not be considered as a rigid framework excluding all accidental establishment, although even fortuitous development of a city becomes part of the general urban-supporting environment. Nor should the urban setting be regarded as static; cities are constantly changing, and exhibit characteristic lag in adjusting to new conditions.

Ample opportunity exists for use of initiative in strengthening the supporting base of the future city, particularly if account is taken of the basic factors of urban support. Thus a city should examine: (1) its surrounding area to take advantage of changes such as newly discovered resources or crops, (2) its transport in order to adjust properly to new or changed facilities, and (3) its industries in order to benefit from technological advances.

[2] Chauncy D. Harris, "A Functional Classification of Cities in the United States," *The Geographical Review*, Vol. 33, No. 1 (Jan. 1943), pp. 85–99.

INTERNAL STRUCTURE OF CITIES

Any effective plans for the improvement or rearrangement of the future city must take account of the present pattern of land use within the city, of the factors which have produced this pattern, and of the facilities required by activities localized within particular districts.

Although the internal pattern of each city is unique in its particular combination of details, most American cities have business, industrial, and residential districts. The forces underlying the pattern of land use can be appreciated if attention is focused on three generalizations of arrangement—by concentric zones, sectors, and multiple nuclei.

Concentric zones

According to the concentric-zone theory, the pattern of growth of the city can best be understood in terms of five concentric zones[3] (Fig. 5).

1. *The central business district.*—This is the focus of commercial, social, and civic life, and of transportation. In it is the downtown retail district with its department stores, smart shops, office buildings, clubs, banks, hotels, theaters, museums, and organization headquarters. Encircling the downtown retail district is the wholesale business district.

2. *The zone in transition.*—Encircling the downtown area is a zone of residential deterioration. Business and light manufacturing encroach on residential areas characterized particularly

[3] Ernest W. Burgess, "The Growth of the City," in *The City*, ed. by Robert E. Park, Ernest W. Burgess, and Roderick D. McKenzie (Chicago: University of Chicago Press, 1925), pp. 47–62; and Ernest W. Burgess, "Urban Areas," in *Chicago, an Experiment in Social Science Research*, ed. by T. V. Smith and Leonard D. White (Chicago: University of Chicago Press, 1929), pp. 113–38.

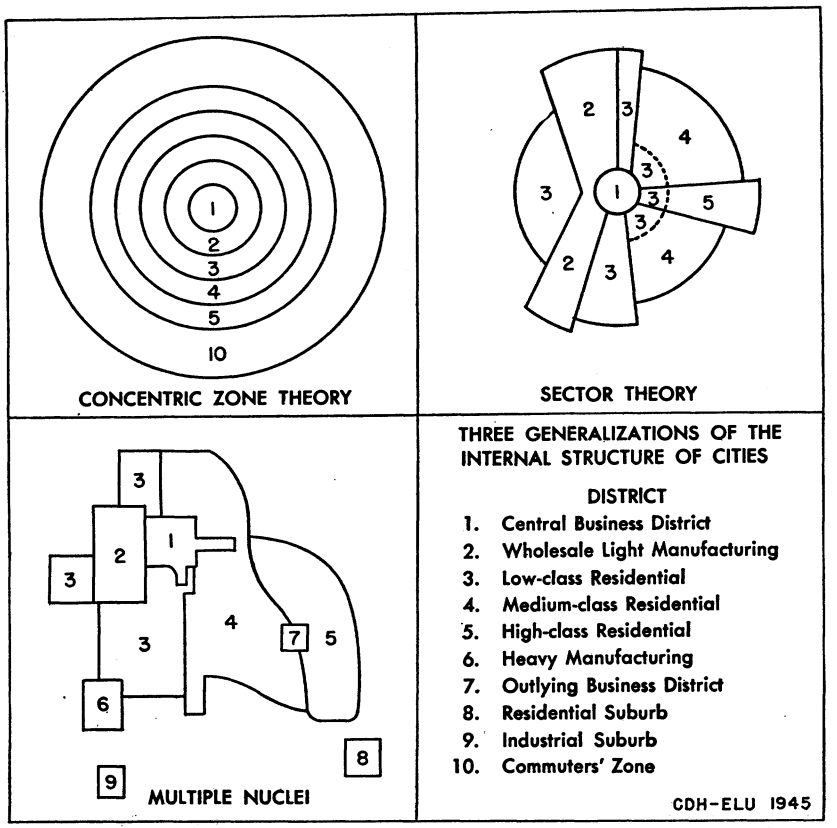

FIG. 5.—Generalizations of internal structure of cities. The concentric-zone theory is a generalization for all cities. The arrangement of the sectors in the sector theory varies from city to city. The diagram for multiple nuclei represents one possible pattern among innumerable variations.

by rooming houses. In this zone are the principal slums, with their submerged regions of poverty, degradation, and disease, and their underworlds of vice. In many American cities it has been inhabited largely by colonies of recent immigrants.

3. *The zone of independent workingmen's homes.*—This is inhabited by industrial workers who have escaped from the zone in transition but who desire to live within easy access of their work. In many American cities second-generation immigrants are important segments of the population in this area.

4. *The zone of better residences.*—This is made up of single-family dwellings, of exclusive "restricted districts," and of high-class apartment buildings.

5. *The commuters' zone.*—Often beyond the city limits in suburban areas or in satellite cities, this is a zone of spotty development of high-class residences along lines of rapid travel.

Sectors

The theory of axial development, according to which growth takes place along main transportation routes or along lines of least resistance to form

a star-shaped city, is refined by Homer Hoyt in his sector theory, which states that growth along a particular axis of transportation usually consists of similar types of land use[4] (Fig. 5). The entire city is considered as a circle and the various areas as sectors radiating out from the center of that circle; similar types of land use originate near the center of the circle and migrate outward toward the periphery. Thus a high-rent residential area in the eastern quadrant of the city would tend to migrate outward, keeping always in the eastern quadrant. A low-quality housing area, if located in the southern quadrant, would tend to extend outward to the very margin of the city in that sector. The migration of high-class residential areas outward along established lines of travel is particularly pronounced on high ground, toward open country, to homes of community leaders, along lines of fastest transportation, and to existing nuclei of buildings or trading centers.

Multiple nuclei

In many cities the land-use pattern is built not around a single center but around several discrete nuclei (Fig. 5). In some cities these nuclei have existed from the very origins of the city; in others they have developed as the growth of the city stimulated migration and specialization. An example of the first type is Metropolitan London, in which "The City" and Westminster originated as separate points separated by open country, one as the center of finance and commerce, the other as the center of political life. An example of the second type is Chicago, in which heavy industry, at first localized along the Chicago River in the heart of the city, migrated to the Calumet District, where it acted as a nucleus for extensive new urban development.

The initial nucleus of the city may be the retail district in a central-place city, the port or rail facilities in a break-of-bulk city, or the factory, mine, or beach in a specialized-function city.

The rise of separate nuclei and differentiated districts reflects a combination of the following four factors:

1. Certain activities require specialized facilities. The retail district, for example, is attached to the point of greatest intracity accessibility, the port district to suitable water front, manufacturing districts to large blocks of land and water or rail connection, and so on.

2. Certain like activities group together because they profit from cohesion.[5] The clustering of industrial cities has already been noted above under "Cities as concentration points for specialized services." Retail districts benefit from grouping which increases the concentration of potential customers and makes possible comparison shopping. Financial and office-building districts depend upon facility of communication among offices within the district. The Merchandise Mart of Chicago is an example of wholesale clustering.

3. Certain unlike activities are detrimental to each other. The antagonism between factory development and high-class residential development is well known. The heavy concentrations of pedestrians, automobiles, and streetcars in the retail district are antagonistic both to the railroad facilities and the street loading required in the wholesale district and to the rail facilities and

[4] Homer Hoyt, "City Growth and Mortgage Risk," *Insured Mortgage Portfolio*, Vol. 1, Nos. 6–10 (Dec. 1936–April 1937), *passim;* and U. S. Federal Housing Administration, *The Structure and Growth of Residential Neighborhoods in American Cities* by Homer Hoyt (Washington: Government Printing Office, 1939), *passim.*

[5] Exceptions are service-type establishments such as some grocery stores, dry cleaners, and gasoline stations.

space needed by large industrial districts, and vice versa.

4. Certain activities are unable to afford the high rents of the most desirable sites. This factor works in conjunction with the foregoing. Examples are bulk wholesaling and storage activities requiring much room, or low-class housing unable to afford the luxury of high land with a view.

The number of nuclei which result from historical development and the operation of localization forces varies greatly from city to city. The larger the city, the more numerous and specialized are the nuclei. The following districts, however, have developed around nuclei in most large American cities.

The central business district.—This district is at the focus of intracity transportation facilities by sidewalk, private car, bus, streetcar, subway, and elevated. Because of asymmetrical growth of most large cities, it is generally not now in the areal center of the city but actually near one edge, as in the case of lake-front, riverside, or even inland cities; examples are Chicago, St. Louis, and Salt Lake City. Because established internal transportation lines converge on it, however, it is the point of most convenient access from all parts of the city, and the point of highest land values. The retail district, at the point of maximum accessibility, is attached to the sidewalk; only pedestrian or mass-transportation movement can concentrate the large numbers of customers necessary to support department stores, variety stores, and clothing shops, which are characteristic of the district. In small cities financial institutions and office buildings are intermingled with retail shops, but in large cities the financial district is separate, near but not at the point of greatest intracity facility. Its point of attachment is the elevator, which permits three-dimensional access among offices, whose most important locational factor is accessibility to other offices rather than to the city as a whole. Government buildings also are commonly near but not in the center of the retail district. In most cities a separate "automobile row" has arisen on the edge of the central business district, in cheaper rent areas along one or more major highways; its attachment is to the highway itself.

The wholesale and light-manufacturing district.—This district is conveniently within the city but near the focus of extra city transportation facilities. Wholesale houses, while deriving some support from the city itself, serve principally a tributary region reached by railroad and motor truck. They are, therefore, concentrated along railroad lines, usually adjacent to (but not surrounding) the central business district. Many types of light manufacturing which do not require specialized buildings are attracted by the facilities of this district or similar districts: good rail and road transportation, available loft buildings, and proximity to the markets and labor of the city itself.

The heavy industrial district.—This is near the present or former outer edge of the city. Heavy industries require large tracts of space, often beyond any available in sections already subdivided into blocks and streets. They also require good transportation, either rail or water. With the development of belt lines and switching yards, sites on the edge of the city may have better transportation service than those near the center. In Chicago about a hundred industries are in a belt three miles long, adjacent to the Clearing freight yards on the southwestern edge of the city. Furthermore, the noise of boiler works, the odors of stockyards, the waste disposal problems of smelters and iron and steel mills, the fire hazards of petroleum re-

fineries, and the space and transportation needs which interrupt streets and accessibility—all these favor the growth of heavy industry away from the main center of the large city. The Calumet District of Chicago, the New Jersey marshes near New York City, the Lea marshes near London, and the St. Denis district of Paris are examples of such districts. The stockyards of Chicago, in spite of their odors and size, have been engulfed by urban growth and are now far from the edge of the city. They form a nucleus of heavy industry within the city but not near the center, which has blighted the adjacent residential area, the "back-of-the-yards" district.

The residential district.—In general, high-class districts are likely to be on well-drained, high land and away from nuisances such as noise, odors, smoke, and railroad lines. Low-class districts are likely to arise near factories and railroad districts, wherever located in the city. Because of the obsolescence of structures, the older inner margins of residential districts are fertile fields for invasion by groups unable to pay high rents. Residential neighborhoods have some measure of cohesiveness. Extreme cases are the ethnically segregated groups, which cluster together although including members in many economic groups; Harlem is an example.

Minor nuclei.—These include cultural centers, parks, outlying business districts, and small industrial centers. A university may form a nucleus for a quasi-independent community; examples are the University of Chicago, the University of California, and Harvard University. Parks and recreation areas occupying former wasteland too rugged or wet for housing may form nuclei for high-class residential areas; examples are Rock Creek Park in Washington and Hyde Park in London. Outlying business districts may in time become major centers. Many small institutions and individual light manufacturing plants, such as bakeries, dispersed throughout the city may never become nuclei of differentiated districts.

Suburb and Satellite.—Suburbs, either residential or industrial, are characteristic of most of the larger American cities.[6] The rise of the automobile and the improvement of certain suburban commuter rail lines in a few of the largest cities have stimulated suburbanization. Satellites differ from suburbs in that they are separated from the central city by many miles and in general have little daily commuting to or from the central city, although economic activities of the satellite are closely geared to those of the central city. Thus Gary may be considered a suburb but Elgin and Joliet are satellites of Chicago.

Appraisal of land-use patterns

Most cities exhibit not only a combination of the three types of urban support, but also aspects of the three generalizations of the land-use pattern. An understanding of both is useful in appraising the future prospects of the whole city and the arrangement of its parts.

As a general picture subject to modification because of topography, transportation, and previous land use, the concentric-zone aspect has merit. It is not a rigid pattern, inasmuch as growth or arrangement often reflects expansion within sectors or development around separate nuclei.

The sector aspect has been applied particularly to the outward movement of residential districts. Both the concentric-zone theory and the sector theory emphasize the general tendency of central residential areas to decline in

[6] Chauncy D. Harris, "Suburbs," *American Journal of Sociology*, Vol. 49, No. 1 (July 1943), p. 6.

value as new construction takes place on the outer edges; the sector theory is, however, more discriminating in its analysis of that movement.

Both the concentric zone, as a general pattern, and the sector aspect, as applied primarily to residential patterns, assume (although not explicitly) that there is but a single urban core around which land use is arranged symmetrically in either concentric or radial patterns. In broad theoretical terms such an assumption may be valid, inasmuch as the handicap of distance alone would favor as much concentration as possible in a small central core. Because of the actual physical impossibility of such concentration and the existence of separating factors, however, separate nuclei arise. The specific separating factors are not only high rent in the core, which can be afforded by few activities, but also the natural attachment of certain activities to extra-urban transport, space, or other facilities, and the advantages of the separation of unlike activities and the concentration of like functions.

The constantly changing pattern of land use poses many problems. Near the core, land is kept vacant or retained in antisocial slum structures in anticipation of expansion of higher-rent activities. The hidden costs of slums to the city in poor environment for future citizens and excessive police, fire, and sanitary protection underlie the argument for a subsidy to remove the blight. The transition zone is not everywhere a zone of deterioration with slums, however, as witness the rise of high-class apartment development near the urban core in the Gold Coast of Chicago or Park Avenue in New York City. On the fringe of the city, overambitious subdividing results in unused land to be crossed by urban services such as sewers and transportation. Separate political status of many suburbs results in a lack of civic responsibility for the problems and expenses of the city in which the suburbanites work.

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