BUILDING HEIGHT AND COVERAGE REGULATIONS
IN EGYPT AND THE UNITED STATES

A THESIS

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the Faculty of the Graduate Division
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Master of City Planning

By
Kamal-Eldin Sabry Shehayib
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BUILDING HEIGHT AND COVERAGE REGULATIONS
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Approved:
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SUMMARY

Zoning is a new field in my country, Egypt, and it has not been practiced there in the same manner that it has in the United States. Although some towns in the suburbs of large Egyptian cities have some kind of zoning regulations, no city has a comprehensive zoning ordinance. The existing building regulations in Egypt were established to provide light and air for buildings, but no thought has been given to controlling the building height and coverage according to the desirable population densities in different sections of the city as well as the whole city. These existing regulations permit huge buildings of large bulk which are responsible for many problems of light and air, open spaces, land values, traffic, transportation, off-street parking, loading and unloading, besides utilities and community facilities.

The purpose of this paper is to discuss the problems that are influenced by the building height and coverage, and to find out the kind of height and coverage regulations which seem appropriate for Egyptian cities.

In accomplishing this aim, the following steps have been taken: first, a discussion of the need for building height and coverage regulations, besides other zoning provisions, if a city is to have a fruitful growth; second, an analysis and comparison of typical building height and coverage regulations in the United States and in Egypt and a determination of the advantages and disadvantages of each; and third, consideration of those features of height and coverage regulation in the United States that might be applied in Egypt, with or without modifications.
The conclusions are presented in the form of recommendations in accordance with the findings of this discussion. These recommendations aim to meet the needs of Egyptian cities and to help in solving the problems resulting from excessive building height and coverage.
CHAPTER I

WHAT IS ZONING AND WHAT ARE ITS OBJECTIVES

What is Zoning

Definition.—Mr. Newman F. Baker has defined zoning as "... the exercise of the community-right to control the use of buildings and land, the height of buildings, and the space about them for the protection and preservation of the public health, safety, comfort, and general welfare."¹

In Local Planning Administration, the definition is "Zoning is the division of a community into districts for the purpose of regulating the use of land and buildings, the height or bulk of buildings, the proportion of lot that may be covered by them, and the density of population."

Mr. Philip P. Green, Jr., defined zoning in his book Zoning in North Carolina, as "... the division of land within a community into districts and the regulation within those districts of (1) the height and bulk of buildings and other structures, (2) the percentage of a lot that may be occupied and the size of yards and other open spaces, (3) the density of the population occupying an area, and (4) the location and use of buildings and land for trade, industry, residence, or other purposes."

The first definition explained zoning and the reason for it and the right of the community to practice it. The second and third definitions pointed out what zoning is and how it is accomplished by dividing the community into districts. All mentioned the regulations of height and bulk of buildings and coverage of lots, which are the subject of this paper.

Zoning Regulations.—Zoning regulations may vary from one district of the community, city or region, to another; but they are the same within each district. They are enacted under the police power of the state for the purpose of promoting health, safety, morals, or general welfare of the people of the community.

Cities have become congested and badly organized because of a lack of such regulations as well as city planning as a whole. If our grandparents had planned adequately for the future when they built the cities, the problems of sewage disposal, traffic congestion, housing conditions, public recreation and the like would not have become such serious problems and cities would have been in much better shape.

The uncontrolled growth of cities is as much an anti-vital process as the uncontrolled destructions of totalitarian warfare: they are both symptoms of a deeper disorder.

To control the growth of cities, it is the obligation of the people to determine the standards they deem appropriate for their cities and to translate these standards into effective rules and regulations. If we are to bring improvement to the urban environment it devolves upon the people, civic leaders in business, industry, the arts, and public
office, to assume this responsibility with vision, integrity and a will to serve the public interest.

As a tool of comprehensive planning, zoning should have rules and regulations to accomplish its functions. These rules and regulations, which become laws after their adoption by the city, limit the people's rights in using the land and buildings, as well as the form, height and bulk of the buildings they build. This is appropriate to the democratic process that people who design and invest in urban building shall find free expression and action within the limits prescribed by law. These laws made by the people, express the obligations every individual has toward his community. In other words, the objective of zoning is to promote the general welfare of the community by protecting the interests of each individual who invests in the development or redevelopment of the community.

General Background.—The European cities practiced zoning to control private development along the streets within their boundaries, long before it was practiced in either England or the United States. It really started in Altona, Germany, in 1881, spread to Frankfort-on-the-Main in 1891, and then to many German and Scandinavian cities. England took it up as the British Housing and Town Planning Act of 1909 got under way. Zoning started relatively late in the United States because it is a country where individual rights have been carefully preserved and protected against any arbitrary control by the city. But as American cities increased in size, it was recognized that grave and lasting harm was being done by unregulated use of land and overcrowding of buildings on
the land, and that is in many cases the offending individual lost, too, through lowering the usefulness and value of his property.

In 1892, Boston passed the first building height regulations; and in the case of Welch v. Swasey, in 1909, the Supreme Court upheld its constitutionality.2

New York was the first city in the United States to pass a comprehensive zoning ordinance, which it did in 1916. Nearly 1,300 cities, in 1950, have adopted zoning ordinances, and about three-quarters of the urban population are living in communities with this form of regulation. About half of the municipalities in the United States are still without zoning ordinances, but the popular acceptance of this form of control for urban development represents considerable progress.3

What are the Objectives of Zoning

Zoning regulations should be made in accordance with a comprehensive plan and should be designed to: (1) lessen congestion in the streets; (2) secure safety from fire, panic and other dangers; (3) promote health and the general welfare; (4) provide adequate light and air; (5) prevent the overcrowding of land; (6) avoid undue concentration of population; (7) facilitate the adequate provision of transportation, water, sewage, schools, parks and other public requirements. But zoning will not reach these goals if it is practiced by itself and not in accordance with a comprehensive plan for the community. It is a vital enforcement device.


by means of which plans for the future may be carried out—but it is only one of several such devices.

What Zoning Cannot Control.—

(1) Zoning is not nuisance legislation which may be used to exclude undesirable uses from a community. The purpose of zoning is to find a place for all community uses of land and buildings and to put everything in its proper place.

(2) Zoning is not ordinarily a retroactive measure, but provisions for gradual elimination of non-conforming uses, without inflicting unreasonable hardships upon the property owners, should be provided.

(3) Zoning is not a means of accomplishing racial segregation. Zoning for racial segregation has repeatedly been declared unconstitutional by the courts.

(4) Zoning cannot be used to vary tax rates. Taxing is done for a public purpose and should be uniform as to all property within the taxing agency's jurisdiction, because otherwise, the legislature could gradually divide up and classify property until there was such discrimination as to destroy any semblance of uniformity.

(5) Zoning usually is not a means of accomplishing esthetic control. Regulations establishing minimum number of stories of buildings or requiring a particular style of architecture are examples of controls that cannot be exercised under the police power. However, as the North Carolina Supreme Court has pointed out in the case of Turner v. New Bern, the fact that esthetic considerations are a part of the

187 N. C. 541, 122 S. E. 469 (1924).
motive for enactment of a particular ordinance is not sufficient to invalidate it, if the measure can be supported on some proper basis. Such esthetic requirements undoubtedly appeal to the eye, but measures requiring them must be supported on the basis of their relationship to the public health, safety and general welfare. In the case of *State ex rel. Twin City Building Co. v. Houghton*, Justice Holt made this significant comment:

Another reason is that giving the people a means to secure for that portion of a city, wherein they establish their homes, fit and harmonious surroundings promotes contentment, induces further efforts to enhance the appearance and value of the home, fosters civic pride and thus tends to produce a better type of citizen. It is time the courts recognized the esthetic as a factor in life. Beauty and fitness enhance values in public and private structures. But it is not sufficient that the building is fit and proper, it should also fit in with the surrounding structures to some degree. People are beginning to realize this and are calling for city planning.

European countries have better municipal esthetics than American or Eastern countries. England, in 1913, passed a law entitled "Ancient Monuments Consolidation and Amendment Act", which provides for the preservation of the objects of beauty. France has always been very active in protecting her art treasures and natural beauties. In the United States of America, it has been considered proper use of public money to erect memorial halls, monuments, and statues, and to plan public buildings upon a more expensive scale than if designed for utility alone. However, the courts are willing to accept an esthetic purpose as an incidental consideration, especially the preservation of historical areas and

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5*144 Minn. 1, 20; 174 N.W. 885, 174 N.W. 159 (1919).*
buildings, which may be upheld as furthering the "public welfare". There is hope that the courts may be prepared to go much further in the future than at present.

Has Zoning Reached Its Goals

In spite of the fact that zoning has been known and practiced in some communities for more than half a century, it is still a comparatively new field and its regulations need a lot of improvements based on more study and research. It does not mean that zoning has failed completely to reach its goals, but it means that, in reaching these goals, zoning progress is very slow.

Because of the lack of sufficient study and research, one can notice the congestion and blight that beset cities today, in spite of the zoning regulations adopted and practiced. Mr. Harland Bartholomew has said, in his book Urban Land Uses:

Zoning had come about partly through the desire of certain residential districts to obtain a protection which is difficult, if not impossible, to secure by private initiative, and partly through municipal authorities to seek to curtail the enormous losses brought about by uncontrolled growth. Zoning as now practiced, however, has scarcely succeeded in attaining either of these objectives. The same forces of speculation that have warped city growth in the past continue to do so through distortion of zoning ordinances.

Generally speaking, if zoning regulations have failed to establish standards of urban development that produce good cities, this is because of the laws themselves and how they are framed. The people who make such regulations are to be blamed, but not zoning.

In New York City the zoning regulations permit a building volume sufficient to house 77,000,000 persons. Translated into terms of
population density it would be possible, according to zoning law, to house 1600 persons or 1460 families, per acre in New York.⁶

If the city of Chicago were built to the maximum of the zoning limits prevailing until recently, it could have housed the entire population of the United States. Population density in this case would have been 2200 persons, or 630 families per acre.⁷

These are two examples of zoning regulations in two cities, but there are other regulations that permit some unbelievable densities, too, in many other American cities. But this does not mean that these cities have reached the terrific densities these laws permit. The question is why should such regulations permit such high and bulky buildings far beyond any possibility of construction and use. In other words, why should they permit such very high and impractical population density?

The population density the law allows is responsible for the congestion we daily observe in all large cities and some small ones. Zoning laws prescribe the "highest and best use" of property, and property values are established accordingly. When land is developed to the maximum density permitted by law, a saturation point is reached before all properties have been so developed and the value of unbuilt or under-built property is drained off by the over-built neighbors. Congestion thus injures the over-built and the under-built properties alike; excessive density is undesirable for the property so developed and injurious to the property that cannot be developed at all. The fact that this situation is not bad enough

⁶Gallion, op. cit., p. 169.
⁷Ibid., p. 169.
to appear alarming to some property owners does not reduce the harm done to urban investments by the fantastic limits the zoning laws allow.

It is also noticeable that through zoning regulations, the only zones restricted to the use for which they are designed are the single-family zone, and, in some cases, the industrial zone. In two-family zones, single-family dwellings are permitted, both types are permitted in multiple-family zones, all residential uses are usually permitted in industrial zones. This means that while the single-family dwellings are on the outskirts of the city, the inner part of the city becomes a hodge-podge mixture of houses, apartments, business buildings and industrial plants. Some progress has been made in protecting industrial areas against residential and business uses through zoning regulations, but these regulations are far from universal.

Excess of land zoned for business in most cities is one phase of the haphazardness of zoning regulations in these localities. There was a time when land zoned for business in Milwaukee was three times as large as the area actually developed for business while 10 per cent of the existing stores were vacant.\(^8\) New York City has enough area zoned for business to accommodate a business population of 311,000,000, a working population five times as great as the potential capacity of dwelling accommodations in the city.\(^9\)

"Strip" business zoning along traffic streets, spot zoning for commercial uses in residential areas, and the excess of land zoned for

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\(^8\) Gallion, op. cit., p. 174.
\(^9\) Ibid., p. 174.
commercial and business uses, do not produce orderly or useful communities.

The above examples of fantastic zoning regulations are presented to show that urban problems are grave and numerous, and to help solve some of these problems by zoning, more care should be given to the way the zoning regulations are formulated. According to the thought behind each regulation of the zoning law, zoning may do some good, or bad, to the community.
CHAPTER II

ZONING IN EGYPT

Before writing about zoning in Egypt, the writer would like to give an idea about his country and its background.

Physical Aspects.—Egypt lies in the desert belt which stretches across the Northern Hemisphere from the Atlantic Ocean, through Arabia and Persia, to the heart of China and which forms the main habitat of the Moslem peoples. Apart from the narrow Mediterranean fringe, Egypt receives practically no rain during the whole of the year and, but for the Nile, would have been as barren as the Sahara of the Libyan desert. The topography of Egypt is fairly simple especially in the Nile Valley where substantially all of the people live.

Egypt is about 390,000 square miles in area, or more than three times the size of the British Isles and about six times the area of the state of Georgia, U.S.A. Of this area about 97 per cent is deserts, marshes, lakes, etc., and the cultivated land is about 13,000 square miles, an area approximately that of Maryland, U.S.A. The cultivated area is the river valley where the Egyptians live. Nature has divided the country geographically into two equal parts, the narrow river valley of Upper Egypt (the Southern part) and the broad lowlands of Lower Egypt (the Northern part known as the Delta). For more than eight thousand years, the geographical and geological aspects of Egypt have been the same.
Climate.—As regards climate, the winter is cool and the summer is as hot as Georgia. There is no rainfall in summer and very little in winter, except on the North coast. Spring and autumn, as understood by Europeans and Americans, are unknown, not only because there is no climatic break between winter and summer, but also because practically no trees shed their leaves in winter, while crops ripen, not only in July and August, but also in April and May. Except for the variations in temperature there is little difference between the seasons and Egypt is deprived of the bracing effect of the sudden cyclonic changes which take place in Western Europe. This explains why there are three crops a year which are dependent on the Nile water.

Historical Background.—The first feature of the history of Egypt is the unbroken unity of the country throughout her six or seven millenniums. Since the time that Menes unified Upper and Lower Egypt and founded the first dynasty up to the present time the land has always been under a single government. This unity has created unparalleled degree of racial and temperamental homogeneity sharply differentiating the Egyptians from their neighbors. Their build, their features, their psychological make-up and their ways of thought are the same and even the differences in idiom are negligible when compared to those prevailing in other countries. Foreign racial elements have of course often burst into Egypt but they have mostly been absorbed by the old national stock and can only be distinguished in the larger cities.

The second striking feature is the numerous foreign dominations; the Persian conquest in 525 B.C.; the Macedonians in 332 B.C.; the Romans
in 30 B.C.; the Arabs in 642 A.D.; the Turks in 1516 A.D.; the French in 1798 and the British in 1882. In 1163, the Egyptian Empire had to fight against the European countries, and was saved from the Crusaders by the famous king Salah-Eldin. After being a monarchy for more than six or seven millenniums, Egypt became a republic in June, 1953.

Culture.—Knowing this history of Egypt and that Egypt was one of the important routes of the Indo-European trade before the discovery of the Cape of Good Hope route, and is the main route since the Suez Canal was opened, we can have a good idea of the Egyptian culture. Some people refer to her culture as Mediterranean culture because it is a mixture of South-European and Near-Eastern culture.

Political and Economic Aspects.—Since the beginning of history, Egypt has been an agricultural land. Mohammed Ali (the founder of the last Royal family) tried to create an industrial, closed, state-controlled economy and to absorb a part of the Ottoman dominions. This plan was defeated by the Powers\(^1\) in 1841, a date which marks the beginning of a process, consummated only after the British occupation, integrating Egypt as an agricultural colonial unit in the international politico-economic system. Its main features were specialization in cotton; the expansion of the cultivated area by means of dams and canals; the opening up of the country by means of railways and canals; the immigration of foreign technicians and traders; the depression and eventual dis-

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\(^1\) Austria, England, Prussia and Russia formed an alliance against Napoleon in 1815. They were referred to as the Powers. France joined the Powers about 1820.
appearance of most of the domestic industries owing to foreign competition; and the accumulation of a large foreign debt.

The process was not a local phenomenon. It extended over the whole colonial and semi-colonial world: South America, Africa, India, China. In most cases it led to a loss of independence and annexation by one or other of the European Powers.

Egypt had none of the advantages which enabled others to escape absorption: no Monroe doctrine to cover her as Latin America was covered; no immensity of territory or remoteness from Europe as had China; not even, after the defeat of France in 1870, sufficient international rivalries to make it possible for her to play off one power against another, as did Turkey. But she had one positive disadvantage: the isthmus of Suez, which was bound, sooner or later, to be pierced by a canal and which converted Britain's interest in Egypt from a negative to a positive one, from a desire to keep other powers out of Egypt to a desire to secure control over Egypt.

The Suez Canal has rendered an immense service to the world, but cost Egypt many millions of pounds and deprived her of the profits of the transit trade. Egypt, like England at the Industrial Revolution, like the Soviet Union after 1917, was one of the victims over whose bodies economic progress had to pass in a planless competitive world.

Social Aspects.—Since the Arabian conquest, the Egyptians have used the Arabic language. In the ninth century, the majority of the Egyptians became Moslems. About 90 per cent or more of the Egyptians are Moslems, and the rest are Christian "Copts" with very few Jews. And according to
the Islamic religion, there is no racial discrimination of any kind, and all people are equal.

Herodotus was puzzled by the Egyptian customs, habits and traditions, praised their fear of God, their cleverness and uncanny memory. Diodoros pronounces them "the most grateful nation on Earth". The Egyptians have the reputation of preferring their own land. Very few emigrate out of the country, and those that do emigrate usually go to Sudan.

**Population.**—By the year 1798, the population of Egypt was 2,500,000 after being six or seven millions in Roman and Arab times. The last census in 1917 showed the population to be over 19 million. Last year, 1953, the bureau of census estimated the population to be more than 22 million. More than 2,500,000 people live in Cairo and about 1,250,000 in Alexandria.

The population density is about 2.6 persons per acre cultivated, which is considered a very high density. Notice that the population is growing faster than the provision of new cultivatable land furnished with water. The rate of population growth is about 12 per cent every decade. This increase is in spite of the high infant mortality and death rate.

One may notice that the birth rate is high in Egypt. That is true, and there are two reasons to make it that high. First, the farmer needs more children to help him on his farm, especially for growing cotton. A cotton expert once declared that "cotton requires not only a dense population but one with a birth rate above the average".

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2See Table 1, Population Growth 1897-1947, page 17.
Secondly, there are such social factors as the almost obligatory nature of marriage and the early age at which it is concluded. Averaging over 40 per thousand, the Egyptian birth rate is the highest in the world. This high birth rate is accompanied by a high infant mortality and death rate in Egypt.3

As the majority of the Egyptians are Moslems, and polygamy and divorce are permitted in their religion, one may think that these factors are responsible for the high birth rate. But the 1937 and 1947 censuses disclose that polygamous households represented only 3 per cent of the Moslems' population; but divorce was higher, with 29 per cent of all marriages ending in divorce according to the 1947 census.

Education.—Generally speaking, education is still very poor in Egypt. More than 70 per cent of the people are illiterate.4

The writer hopes that the new regime in Egypt will solve this particular important problem, education, without which it is very difficult to provide a democratic way of living.

3See Table 2, Birth Rate, Infant Mortality Rate and Death Rate, p. 18.

Table 1. Population Growth, 1897-1947^5

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<tr>
<th>Year</th>
<th>Population</th>
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<td>9,711,525</td>
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<tr>
<td>1907</td>
<td>11,287,359</td>
<td>16.2</td>
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<tr>
<td>1917</td>
<td>12,750,918</td>
<td>13.0</td>
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<tr>
<td>1927</td>
<td>14,217,864</td>
<td>11.5</td>
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<tr>
<td>1937</td>
<td>15,932,694</td>
<td>12.1</td>
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<tr>
<td>1947</td>
<td>19,021,840</td>
<td>19.4</td>
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^5Ibid., p. 1.
Table 2. Birth Rate, Infant Mortality Rate and Death Rate

<table>
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<th>Year</th>
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<th>Infant mortality rate per 1000 of live births</th>
<th>Death rate per 1000 of population</th>
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<td>1948</td>
<td>12.9</td>
<td>136.6</td>
<td>20.5</td>
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<td>1949</td>
<td>12.1</td>
<td>134.7</td>
<td>20.6</td>
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<tr>
<td>1950</td>
<td>12.4</td>
<td>129.6</td>
<td>20.6</td>
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*Tbid., p. 34-35.*
Planning in Egypt

**Ancient Egypt.**—City planning and zoning have been known and practiced in Egypt for more than six or seven millenniums. The cities of Kahun, Memphis, Thebes, and Tel-el-Amarna were good examples of ancient Egyptian planning. These cities were divided into different residential zones, for slaves and artisans engaged in building the huge tombs and temples, and for the noble ruling class. The business district was the city market square. The height of buildings was established in proportion to the width of streets, as in the Indus Valley. One and two stories predominated. Narrow lanes served as open drainage sewers along the narrow streets. Walls surrounded the cities to protect them against the seasonal floods of the Nile rather than against the armies of invading enemies. No land within the city walls was zoned for agricultural use. According to historians, there were slums in the ancient Egyptian cities.

Alexandria is one of the oldest and most famous cities in Egypt. It was founded by Alexander the Great in 332 B.C., and planned by Dinoocrates, the famous Macedonian planner. A great part of Alexandria still has the same gridiron (checker-board) type of streets laid out by Dinoocrates. The streets have been planned parallel and perpendicular to the sea shore to enable the sea breeze to reach the inner part of the city.

**Modern Egypt.**—Generally speaking, all cities of modern Egypt have been laid out in a gridiron street pattern. This is like most of the old cities of the world. As most of the Egyptian cities are located on the Nile River, which flows from south to north, one may notice the influence of the river on the streets of cities. The streets are invariably
parallel and perpendicular to the river. This type of street layout was very logical, because the Nile was the main route of transportation before the railroad, the automobile, or the plane were known. Besides, people liked to walk or drive in their buggies along the Nile. Also, the breeze blows from the north and northwest most of the year, and streets running north-south have been found advantageous, especially in summer.

City planning and zoning have been neglected by the Egyptian cities until recently. Planning, as was practiced, was confined to the laying out of streets. Fortunately, the Egyptians have begun to realize the importance of and the need for more and better planning. Last year they created the "Board of National Production" as an independent planning agency responsible to the President. Cairo and Alexandria each have a planning agency; other cities may follow their example in the near future.

One of the examples of modern planning in Egypt is Heliopolis Town which was planned about 50 years ago by a Belgian company. It is located about five miles northeast of Cairo, and is considered a part of Cairo. It has been designed according to the latest planning principles and is a self-sufficient town. This town has its own zoning regulations besides other planning regulations, which help to keep Heliopolis a better place in which to live.

Another example is the town of Maadi, about eight miles to the south of Cairo on the Nile. Madinet-El-Awkaf, to the west of Cairo on the Nile River, is a very new town designed less than ten years ago. Each of these towns has its own zoning and planning regulations.

The latest example is the Mokatem Town, which is to be located on a plateau of the Mokatem Mountains, to the east of Cairo. This town is
Figure 1. The Mokattan Town in the Suburbs of Cairo, Egypt - About 1500 Acres
planned with nine neighborhood units and will be self-sufficient. The project has been studied since 1951, and the first neighborhood is being laid out and developed at this time. The plan of this town is more advanced than any other planned Egyptian cities. The Mokatem Town will also have its own planning and zoning regulations to carry on the development program.

There are some examples of such small towns near other large cities in Egypt. In Alexandria, Samouha Town and Shamaa Town are two good examples.

All these examples show that sound planning has been accomplished in some districts of large Egyptian cities. But there is no city in Egypt which has a master plan and a comprehensive zoning ordinance to regulate the height of buildings, coverage of lots, the population density, and the use of buildings and land in the entire territory of the city.

Zoning Regulations

Zoning has not been practiced in Egypt in the same manner as in the United States and in most of the European countries. The Egyptian zoning laws are combinations of zoning regulations, housing standards, and building codes; all combined in one law known as the Building Law.

The Building Law, after being passed by the Parliament, has to be followed by all cities. Municipalities have the right to pass regulations in addition to those of the Building Law, or to pass more restricted regulations, but not regulations that are less restrictive than those of the Building Law. In other words, the Building Law contains the minimum regulations that municipalities and other cities should have.
Each municipality administers the Building Law. In case the city is not a municipality, the Department of Tanzim\(^7\) administers it.

In 1889, the Khedive (King) of Egypt signed the first law concerning building regulations. Under this law, nobody is permitted to build, construct, demolish, change or remodel any kind of building or structure in a city, town or village in which there is a Department of Tanzim, unless he gets a permit from that Department. No certificate of occupancy is required. No height limits were established, nor were there coverage regulations, but the applicant was not permitted to exceed the height or coverage stated in his building permit. The building permit is effective for one year only. The Minister of Public Works acted as the Board of Appeals. The Department of Tanzim inspects the buildings in the city, and orders the owners to repair their buildings or demolish them, if necessary for the public safety, within a stated period. If the owners fail to do so, the Tanzim does the job and charges them. In case of a violation of the law, the owner is ordered to remodel his building to conform with the law, even if he has to demolish some part or parts of it. This decision has to be made by the court, which has the right to fine or imprison the owner.

Also, the same law required a permit for opening a public street or alley. After being opened, a street or alley becomes publicly owned without any compensation to the owner. Every builder is required to check the street line with the local authorities before starting to build.

\(^7\)Tanzim means the act of regulating.
This law was not a comprehensive zoning ordinance; as a matter of fact, there has not been a comprehensive zoning ordinance in any Egyptian city.

Before 1940 there were no building height regulations of any kind. People built low buildings for two reasons. First, it was more expensive to build one high building than to build two low ones; this was because of the expensive foundations required for tall buildings and the relatively inexpensive land. Second, the fire equipment used could not protect very high buildings, and every owner needed fire protection for his building. But there was no law limiting the height of buildings. However, the building inspector informed owners of the height the fire equipment could reach. Then came an unfortunate occurrence in 1940.

A company sought a building permit for a huge building of 14 stories. The company was ready to install a special system of piping, tanks, etc., to take care of any fire which might occur in the building. In addition, the building itself was to be fire resistant. The company obtained a building permit because there was no law limiting the height, and the "Immobilia Building" was built. It was built in downtown Cairo where no set back was required, and it was about 60 meters (196.8 feet) in height at the street line, while the street was 20 meters (65.6 feet) wide.

After the granting of the building permit for this structure, the authorities realized the need for building height regulations to provide light and air for buildings as well as for the streets. In 1940, a law was passed to limit the height of buildings to one and one-half times
the width of the street, but not to exceed 35 meters (114.8 feet), which was the maximum height permitted.

After the depression, business became active and land values increased. Owners wanted to build higher buildings to gain the maximum profit and this became cheaper than constructing two buildings instead of one, because of the relatively expensive land.

In 1948, the law was amended to limit the height of buildings to one and one-half times the width of the street, but no maximum height limit was established. If a building is to be higher than one and one-half times the street width, the structure above the permitted height has to be set back within a plane at an angle of 60 degrees from the horizontal at the building line. In the case of buildings fronting a street of less than eight meters (26.2 feet) in width, their height shall be the height permitted if the street were eight meters wide. Following this rule, a building could be as high as the width of the street and the shape of the lot permit. Because of this regulation, the high buildings in the Egyptian cities look like wedding cakes or the old skyscrapers of New York City.

There are no front yard, set back requirements, or any side or rear yard regulations in the 1948 law. But, there are regulations establishing sizes and dimensions for inner and outer courts in relation to the height of the building to be built. The dimensions of the courts are to be measured from the building walls to the lines of property, and not to the adjacent buildings, unless the two or more neighbors have a recorded agreement to have a common court for their buildings.

The courts are of two kinds. The purpose of the first kind is to ventilate such service units as kitchens, bath rooms, storage rooms and
halls. This kind of court, if used only for such purpose, is required to have a minimum area of ten square meters (107.6 square feet), with no dimension less than two and one-half meters (8.2 feet). The minimum dimensions of the service court have no relation to the height of the building.

The second kind of court is that used to provide light and air for any livable room, excluding the hall. In case of an inner court, the minimum dimension shall be not less than two-fifths of the height of the building. A court is considered to be an outer court when it is connected to the street light and air, from at least one side, through an opening of not less than two and one-half meters (8.2 feet) in width. In case of an outer court, the minimum dimension shall be not less than one-fourth of the height of the building. For these kinds of courts, the building height that controls the dimensions of courts is considered to be the height from the window-sill of the lowest window which is depending on that court for its light and air. Balconies and bow windows are not permitted to project outside the street line more than 1.25 meters (4.1 feet).

In the Egyptian Building Law, one finds some regulations other countries may have in their building code or their minimum housing standards, but not as a part of their zoning regulations. To illustrate, in the Building Law of Egypt, the ceiling height within residential units shall be not less than three meters (9.8 feet); but for service units,

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8 The hall of an Egyptian dwelling unit is more or less equal to the living room of American homes, but it is not used as a parlor.
such as kitchens, bath room, toilets, and garages, it shall be not less than 2.30 meters (7.5 feet). Offices and stores shall have ceiling heights not less than 2.30 meters. There are also other regulations for fire escapes, area of windows compared to area of floor, width of stairway related to the number of units in the building, number of steps in each single flight, and specification for lintels, water-proof layers on roofs and in walls, toilets and wash basins, minimum dimensions of bath rooms and toilets, etc.

The main feature of the 1948 Building Law is the provision of a Board of Appeals. The Board consists of five members: the Under Secretary of Public Works, head of the local Building Inspection Office or Department of Tanzim, the City or State Attorney, and two architects elected by the Engineering Syndicate. The judgement of said Board is considered final.

Subdivision Regulations

Since 1940 there has been a national set of subdivision regulations in Egypt known as Subdivision Law. The definition of a subdivision in this Law is "... any piece of land divided into lots for sale, trade, rent or lease, for the purpose of erecting buildings, where one or more than one lot is not facing an existing street". That means one can divide his land into lots, all facing the existing street, without following this Law. In cases where the Law is applicable, the subdivider is required to have the local authority approve the subdivision of his land. Every lot

*Engineering Syndicate is the society for all engineers in Egypt.
must face a street on at least one side. Streets in a subdivision must not be less than 10 meters (32.8) unless the local authority decides otherwise; and if a street is 1,000 meters (3,280 feet) or more in length, it shall be not less than 20 meters (65.6 feet) in width. Streets more than 30 meters (98.4 feet) wide shall have islands in the middle. The local authority has the right to ask for wider streets than these minimum requirements.

The Subdivision Law requires that one third of the area subdivided shall be used for streets and open spaces. Half the width of the existing streets surrounding the subdivision shall be included in this one-third. If the local authority determines that more than one-third of the area should be used for streets and open spaces, the owner is compensated, as in the case of eminent domain land takings in the United States, for the extra area needed for such use.

The Law does not have any regulations concerning the minimum lot size, but it requires that no building shall cover more than 60 per cent of the lot area. Balconies, stairs or steps and open porches can cover an additional 10 per cent of the area permitted to be built upon. The local authority has the right to increase the percentage of the area built in some districts as seems necessary.

The developer has to furnish all the utilities in his subdivision, except pavement of streets which is not mentioned in the Law. Unless he completes the development of the subdivision, no building shall be erected on any lot. And the developer should record the deed restrictions of his subdivision, if any.
The Subdivision Law does not provide for a Board of Appeals other than the court. This law is to be applied for only the new subdivisions in every municipality and in every city that has a Department of Tanzim.

One may notice that both the Building Law and the Subdivision Law are very general in their regulations and requirements. But these laws are formed for the whole country and not for a specific city. Cities may adopt other regulations to suit their local situations and needs in addition to these national minimum regulations. Up to the present time, there is not even one Egyptian city that has done so.
CHAPTER III

THE NEED FOR BUILDING HEIGHT AND COVERAGE REGULATIONS

Centuries ago, cities recognized the need of controlling building heights. Today, almost every city in the world, especially the large ones, has some kind of regulations to control the height and bulk of buildings. These regulations may differ from one city to another, as well as from one district within a city to another district, according to the need. The regulations in different cities may differ in the way they are formulated, or in the way they are administered and enforced, but all have the same goal and principle. This chapter is to point out the need for such regulations and their goal.

Light and Air.—No one would deny the need for sunlight and air for good health. But one will be surprised at how many dwelling units in a large city do not get any sunlight at all. Such dwelling units are located in slums. The people who built these units did not place much value on sunlight, because the profit from building the maximum rentable floor area blinded them. These builders are not to be blamed alone. The city fathers, who should know better, are to be blamed first for allowing such slums to exist.

Many studies have been made to show the importance of sunlight, light and air to dwelling units and offices. Statistics show how much higher are the infant mortality and death rates in the areas of cities where buildings are crowded. Sunlight is very important for children's
health and growth, and it kills many harmful germs. Light from the sky, or skylight, is equal to one-third or one-fourth of the value of direct sunlight. From this point of view, north-and-south streets or streets that run as nearly north and south as possible, have great advantage, although not so important in residential areas where houses are separated.

Mr. Lawrence Veiller presented a remarkable paper entitled "Light" in 1929 at the National Conference on City Planning. In this statement he pointed out that light is far more important than all other factors put together in determining what open spaces should be required about buildings. According to the same study, the Law of Ancient Lights dates back to the reign of Richard the Lion-Hearted in 1189.

The importance of light is shown also by a comparison of the rent of an apartment or an office which has enough light with that of another which has not. In 1907, before high buildings were numerous or closely packed together as they are now in New York, Mr. Richard M. Hurd said:

> When skyscrapers were new, rents diminished from the ground floor up, as in older buildings, but the upper stories being more desirable on account of better light and air and freedom from noise and dust, the rents were soon equalized. The demand for the upper stories has continued, so that in some buildings higher rents are charged for them, the least desirable floors being from the third to the sixth, this less productive stratum furnishing an economic check to the height of buildings.

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1"Planning and Problems of Town, City and Region," Papers and Discussions of May, 1929, meeting of National Conference on City Planning.

But this does not mean that skyscrapers are the answer to providing enough light and air for buildings. Each skyscraper tends to lose its monopoly of sky advantages very soon. Neighbors are forced to compete with it and the rival structures which they put up alongside deprive it of light and cut down the profits of its owners. In other words, the value of the skyscraper and the land it occupies will decrease; and if this goes on, it will create the slums of the future.

Another point is to be mentioned. High buildings make dark canyons of the streets. These streets belong to the public, and people walking in them have the right to enjoy light and air; and the city should protect the citizens' rights.

**Economic Aspects.**—Some people say that high buildings are necessary because of the high value of land. When high buildings are to be built in a city where heights are unrestricted, and it is anticipated that people will be concentrated in a few high buildings, the price for the land on which these buildings may go up rises on the expectation that the high buildings will be erected. But if building heights have been restricted, the price of land will not rise above the figure upon which low buildings can pay rents. If the city requires more offices or apartments what will happen is that, not a few sites rise to fabulous prices, but that many lots appreciate moderately in value.

Buildings of great bulk also depreciate other buildings, and therefore values on adjacent sites, by withdrawing tenants from them. The capital required to replace the old low building with a skyscraper may be so great as to prevent an owner making use of his site for a high building.
The high buildings reduce the demand for land, by using air, lights, and by casting a shadow on other buildings. Out of 1,100 business blocks in Detroit, 105 had obsolete buildings more than fifty years old. Land is more valuable vacant than improved. In three years preceding 1940, ninety-six buildings in Detroit's central business district were demolished, because there was no demand for them. In 1936, the same thing happened in the lower east side of New York.3

Among the costs which the community has to meet with regard to high buildings as compared to low buildings, are those of the special equipment of the Fire Department required to fight fires in high buildings and in securing a water supply at a sufficiently high elevation to enable the upper stories of high buildings to be reached. There is also a burden thrown upon the community of taking care of widening streets, and providing adequate transportation to serve these high buildings. On the other hand, vacant properties and those improved with low buildings cost the municipality more to serve than do properties improved with higher buildings, insofar as distribution mains of all kinds, and such services and facilities as police protection, street pavement, and sidewalks.

In conclusion, both vacant or under-developed properties and high buildings impose a greater burden upon the community than those that are improved with buildings of intermediate height and bulk. But from the point of view of the developer, Captain William J. Pedrick, Vice-President and General Manager of the Fifth Avenue Association, made the following comment:

It would seem that the time is here when it is no longer possible to figure the maximum return on property from the erection upon it of the bulkiest building the law permits. The modern trend, as evidenced all over the city, is to question the economic value of such buildings. After all, the erection of these huge bulks causes the land to lose much of its individuality and the entire return is on a competitive square foot basis, with cheap land almost as well favored as expensive land in the competition. On the other hand, higher priced land, if thoughtfully developed along lines for which it is particularly featured, with buildings designed to create distinction rather than cubage, may yield not only a better return but an increased return.¹

From the economic point of view, height and bulk regulations should not decrease the value of land. The Zoning Resolution of 1916 in New York City does not seem to have had much, if any, effect in reducing values as a result of the limitations on building height and bulk. These regulations aim to maintain and stabilize land values on the basis of the highest economic use of the land from the owner, as well as the community, point of view. As is shown above, property owners are prepared to go much further than the zoning law requires in limiting height and bulk of their buildings even where land is most expensive.

Another example showing how zoning protects property values, is furnished by Atlanta, Georgia. In 1922, Atlanta adopted a zoning ordinance with the advice of Mr. Robert Whitten; it was inoperative from 1926 to 1928, during which time property values suffered heavy damage.⁵

¹Regional Survey of New York and its Environs, op. cit., p. 159.

⁵Hubbard and Hubbard, Our Cities Today and Tomorrow; Harvard University, Cambridge, 1929, p. 350.
Open Spaces about Buildings.—It has been mentioned before that light and air are very important and necessary for buildings. To provide the required light and air for buildings, open spaces should be provided about them. But there are other needs for the open spaces about buildings besides providing light and air. Yards required by the coverage regulations serve as fire lanes between buildings for the purpose of safety. They also provide a better outlook, privacy, control of population density, and a place for children to play safely away from the streets. The front yard has an advantage in future street widenings, but this purpose is considered subsidiary to zoning. As Mr. Basset had frequently pointed out, setback regulations in “zoning” are “front-yard” regulations, and should be so denominated, in order to impress upon the courts their fundamental relation to light and air around dwellings, and safe areas for children’s play, rather than their incidental advantages in future street widenings.

Most cities provide for yard space only in residential districts, where naturally the reasons are obvious, but not always in business or industrial districts. They usually provide for yards for dwellings erected in business or industrial districts, even though business and industrial buildings need not have them. Some cities have yard requirements for such districts for the purpose of reducing fire hazards, providing adequate light and air for buildings, and for controlling the day-time population density, besides facilitating off-street parking, and loading and unloading.

One of the extreme ideas relative to providing open spaces about buildings is a suggestion made by Le Corbusier. He recommends that in
Figure 2. Dark Canyons. Crowding. No Adequate Open Spaces

(From: Gallion, op. cit. p. 176)
the residential districts people should live in high buildings covering no more than five or ten per cent of the land with a density of 170 persons per acre. The rest of the land is to be planted with lawns and treets, among which stand the churches, schools and clubs. His idea is that the city should not allow the construction of low houses which cover a large percentage of land, but instead, these houses should be stacked on top of each other in the form of tall buildings, to cover the minimum area of land and provide the largest area possible for open spaces. The city is to be a huge park.

When he saw New York skyscrapers, he was shocked with the tremendous energy of the industrial processes in America. He knows that the average height of buildings in New York City is only four and one-half stories, and he proposes that the floor space be enclosed in skyscrapers which would thus leave great open spaces about them. Maybe he goes too far in his suggestions, but he has a good point that we should consider which is not to build cities without adequate open spaces.

Le Corbusier believes in machines and what machines can do. His desire for the machine, conditioned air, push-buttons, and swift elevators is like a romance with science. It is not enough to substitute air-conditioned cells in multistory buildings because we have the technical know-how to create them. The horizontal space means much to human beings, and people like to live near the ground, not in the air. There is a healthy sensation when interior and exterior living spaces merge into unity, with

no more visual separation than a crystal sheet of glass. As a matter of fact, modern architecture all over the world emphasizes this point.

Also, it is not economical to build such a city as Le Corbusier suggests. If we are concerned with economy, it is not the skyscraper that produces it. The skyscraper is not built because it is economical. It is not. It is built because the cost of land is "extravagant", and continuing this process without restraint only adds fuel to the flames of urban congestion, blight, and disintegration.

Le Corbusier is a very human architect and planner. It is a sense for human needs that has fired his driving energy. The people's desires and Le Corbusier's theories meet in the open spaces for which they yearn, and for which Le Corbusier pleads, plans, and ponders.

Traffic and Transportation.—In New York City, 15,000 people work in the Empire State Building alone. At rush hours one can have an idea of the traffic congestion in the streets surrounding it. There is no doubt that traffic congestion increases travel time, besides causing accidents. In Los Angeles, it was found that a stretch of 1.5 miles on one of the city's boulevards could be covered in 1937 in 2.3 minutes, and the same distance could be traveled in 1947 in 6.2 minutes. The increase in travel time was 170 per cent. Other tests on other streets showed increases from 30 to 80 per cent.7

Traffic congestion increases traveling time; in other words, it wastes time. This time costs the people and the city money. In a federal survey all over the nation, it has been found that if the time

7"Let's Get America Out of the Traffic Jam;" Detroit Times.
Figure 3. Generated Traffic Congestion!
How to Move and Where to Park!

(From: Parking Manual, American Automobile Association,
Washington, D. C., p. iii)
of the motorists was worth a cent a minute, the savings in time alone would amount to $209 million a year if we could solve the problem of traffic congestion.

The traffic congestion generated by buildings depends on the uses of these buildings as well as on their height and bulk. Different types of building uses create different demand upon the street. For example, a 21-story office building creates the same amount of traffic as a 12-story loft building and a 1-story department store. From the traffic and transportation point of view, it is desirable to regulate building height and bulk with regard to building uses. This aims to accomplish a more or less even distribution of the traffic generators throughout the city, instead of concentrating traffic generators in different areas of the city and thus creating bottle-necks in the traffic and transit systems.

The relation between bulk and traffic is complicated not only by the question of use of buildings but by other factors. These include the relation between the transit facilities and street capacities, already referred to; the average height and bulk of buildings in a district, whatever the maximum heights may be in part of it; the proportion of traffic that passes through a district from and to other districts; the amount of street and court space that surrounds the more bulky buildings in comparison with that which surround smaller buildings. Traffic congestion is not caused by separate bulky buildings, but by excessive bulk of buildings

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8Thid.

over an entire district, together with defective distribution of functions and of the transportation and transit facilities.

In 1929, Mr. Daniel L. Turner, formerly Consulting Engineer to the Transit Commission, pointed out that a building accommodating a circulating population of 100,000:

...will saturate over four times the sidewalk space and ten times the roadway space normally available around it, and will also require one-fifth of the full capacity of an existing four-track subway to serve it in the rush-hours. Five such buildings would fully utilize the entire capacity of a four-track subway. A single big shop can be built on another block that will serve 75,000 customers a day, or coming and going will create 150,000 transit passengers. And in the residence sections, block after block of home barracks ten and fifteen stories high may develop a population at the rate of 1,400 to 1,500 people per acre. ... It does not take much of this kind of land use to saturate all of the rapid transit facilities that can possibly be constructed through any given area.10

The New York World magazine commented on building such high and bulky buildings in New York City, "... every mile of new subway means new skyscrapers which, in turn, require more subways, the cost of which will have to be met by the sacrifice of needed parks, playgrounds and schools."11

Pedestrian traffic is also getting congested because of bulky buildings and their uses. If the average number of visitors per worker in an office building is taken to be about four visitors during the day, the daily pedestrian traffic of the Chanin, Chrysler and Lincoln buildings in New York city would be 92,000. In the St. Louis studies it was found

11 Issue of September 8, 1929.
that five large retail stores employed 11,662 persons and had a daily
average traffic of 613,500 persons, showing that the department store
throws a vastly greater burden upon the streets than the office building.
In Detroit one store had a traffic of 111,727 persons and another 88,920
persons. 12

The fact that department stores create this exceptionally heavy
traffic means that they should be especially limited in regard to area
covered and bulk of building, and have good provision for loading and
unloading facilities on their own property, and off street parking
facilities very near, if not on, the property. Department stores require
such wide sidewalks that they would gain considerable advantage from hav­ing
their front walls set-back 10 or 15 feet from the street line, if
this set-back were made uniform.

Traffic and transportation problems are causing acute headaches
to every large city. In spite of the expenses involved in operating and
storing the private automobile, as compared with the lower cost public
rapid transit, yet the automobile is steadily increasing. Electric cars
that carried 35 per cent of the passengers in 1922 carried less than half
the passenger traffic in 1940. 13 People prefer to drive their automobiles
rather than take an overcrowded bus or street car. Transit companies are
aware of this fact and try to furnish better service; but if they do so
for a reasonable fare, they lose money and cities have to compensate for
the losses of these companies.

12Regional Survey of New York and Its Environs, op. cit., Volume
VI, p. 69.
13Gallion, op. cit., p. 196.
Widening of streets, off-street parking, and one-way street systems help temporarily in relieving the traffic congestion; but as the population, as well as the automobiles, are continuing to increase in cities, the traffic congestion takes place again. In addition, widening the streets and providing for off-street parking have their limitations. The amount of people living and working in city buildings is too great to be carried by the city streets. This means that the buildings in the city have a capacity for people greater than that of the streets. This is an unbalanced situation. Regulating the bulk of buildings in relation to street capacities has obvious advantages.

Off Street Parking.—The lack of parking facilities imposes an economic loss upon cities. According to Thomas C. Desmond, the Philadelphia main shopping district loses an estimated 10,000,000 dollars in sales each year because parking is inadequate. In Baltimore, downtown property values lowered 60,000,000 in 15 years for the same reason. The probable loss in property values for the entire country is close to 5,000,000,000 dollars a year.\(^\text{11}\)

The physical and fiscal problem presented by the parking requirements and devices cannot be ignored much longer. In the report of the Advisory Committee on Traffic Relief of New York City, submitted to Board of Estimate and Apportionment on December 28, 1925, it was stated that if builders were required to provide proper accommodations within new buildings for the parking incidental to their use, it would do much to relieve congestion, and, was one of the most practical means of doing so.

\(^{11}\text{Ibid.}, p. 200.\)
Figure 1. Average Reported Intersection Capacities for Streets of Different Widths by Type of Area and Parking Regulations

In 1946, Mr. Robert Moses, Construction Co-ordinator for New York City, proposed a change in the zoning ordinance to restrict lot coverage to 65 per cent of an interior lot area and 60 per cent of a corner lot, unless off-street parking and loading facilities were provided. Opposition to the change, in spite of all the facts and figures mentioned above, was supported by the claim that one-third of the estimated $1,000,000,000 dollars in real estate value in central Manhattan would be sacrificed.\textsuperscript{15} The zoning was not changed.

The chief difficulty in getting anything done about restricting street parking is due to objections of retailers and owners of business property. Some of these parties do not seem to realize sufficiently that the effects of their own obstructions to traffic result in lessening values by reducing accessibility to their property, and that the greater part of the burden of cost of providing extra street space has to be borne by them.

There is no doubt that parking on the streets reduces their capacity, hence increases the traffic congestion. Widening streets costs a large amount of money that the community could save if owners of properties would provide parking and loading facilities for buildings on their properties. It is surely wrong to spend taxpayers' money in widening streets in cases where they could be made adequate for moving traffic by compelling property owners to cease using them for private purposes. This usurpation of the public's right to the street is solely due to overcrowding land with buildings and consequent lack of open space on private property. Of course this space can be obtained only through greater reduction of height

\textsuperscript{15}Ibid., p. 174.
and coverage of buildings. The size of off-street parking and loading space required depends on the bulk of building as well as on its use.

Even requiring open spaces about buildings to be used for parking is not enough. Zoning regulations should require that the space of parking, which may be greater than the open space necessary to meet other standards, be on the ground level or provided under or above ground. In 1933, a report by the Automobile Club of Southern California indicated that 50 per cent of the ground area in the "downtown" district of Los Angeles was in parking lots. In this city, with more "space" for parking than in any other city in America, traffic is jammed. Parking space increased in downtown Detroit from 110 lots in 1927, with a capacity of 7,720 cars, to 265 lots in 1933, accommodating 17,251 cars. Walter Blucher also reported that open-lot parking in Milwaukee increased from 3,080 cars in 1927 to 9,009 in 1935.

In a large city, there is not enough land area in the whole business center to park all the cars that enter this section every day. Congested use of land for buildings has forced parking underground as it has rail lines in subways. It has been proposed to build such a "garage" in Los Angeles. To build such parking spaces is very expensive. The city of Pasadena proposes to increase the amount of ground level parking space to serve the central business district. The estimated cost per car space is 800 dollars—one-half the estimated cost per car in the Los Angeles.

16 Ibid., p. 200.

17 Blucher, Walter; "The Economics of the Parking Lot"; The Planners' Journal, Volume 2, No. 5.
Figure 5. High Capacity Highways, Provided and Planned for Cities, May Create More Problems Than They Solve Unless Adequate Parking and Loading Facilities are Provided

(From Parking Manual, American Automobile Association, Washington, D.C., p. 20)
underground garage. These expenses that a community has to bear are due to the bulky buildings which attract vehicles to park, as well as to load and unload. These buildings are inadequately provided with surrounding open spaces to meet these demands.

There are some cities which buy land in, or around, their main business districts and keep it as public property to be used for parking. The community has to pay for such expensive land. There is no doubt that cities which regulate the bulk of buildings and the spaces about them necessary for off street parking and loading will save the taxpayer money and time in traveling within the city.

Population Density.—In general, population density is the relationship between a certain area of land or floor space and the number of people or families housed in that area. In measuring city-wide density, all undeveloped vacant parcels and parcels used primarily for farming are excluded, except for special purposes. This type of density measurement is usually made in terms of persons per square mile or per acre. The purpose of such measurement is to give a general impression as to the relative degree of concentration of population and urban land uses. When stated in terms of acres per 100 or 1,000 persons, it can be broken down to indicate the relationships between population and the area of land used for specific purposes such as residence, commerce, industry, streets, and other public and private uses. This type of measurement aids in comparing existing conditions among cities and metropolitan areas, and in relating such conditions to certain standards, estimated requirements,

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or norms that are useful for planning for the present and future growth of the community.

Population density varies from one use district to another. The city should control the density in each district as well as in the city as a whole, to be able to plan for public services, traffic, utilities, community facilities, etc. For example, a city can plan for schools and playgrounds more adequately if the number of people who are going to use them in the near and far future is known. Also, the city may preserve the land for future facilities needed, without much difficulty and expense.

Costs of public services, private utilities, intra-urban transport and of conducting many types of business involving distribution, collection, or movement of goods or persons in the urban area, may be more or less affected by metropolitan and city-wide densities. If places of work and shopping are not highly concentrated in the heart of the city but can be as efficiently operated if dispersed in a convenient and appropriate way, the cost and time spent in reaching them may be considerably reduced. At the same time, congestion in the heart of the city may be relieved without the necessity of expensive street improvements and extensive downtown parking facilities. Controlling the lot coverage and the height of buildings is the most effective way to control population densities.

In residential areas, density can be measured in three basic ways. The first method is intended to measure the degree of crowding and privacy and livability within individual dwelling units, including houses and apartments. The measures used are persons per room, or floor area per room, per person, or per family. The second method is the lot density
which indicates the adequacy of open space about buildings, which affects light, air, privacy, noise, and outdoor living space immediately adjacent to the dwelling. The most commonly used measure of lot density is persons or dwellings per acre, or conversely, square feet of lot area per person or per dwelling. A related measure is that of bulk of building to lot area, which may be stated by coverage and height of buildings or by the ratio of total floor space (or cubage) of buildings to lot area. The third method is the district density. Such density may be measured in terms of persons or families per acre or per square mile. This kind of density measurement forms a basis for assessing the adequacy of, and need for, space for small parks, playgrounds, schools, local shopping and community facilities, as well as serving as a general measure of living space.

In commercial and industrial districts, density is measured by the ratio of total floor space (or cubage) to lot area, or in terms of number of workers (daytime population) per acre of lot. Number of workers per acre is a particularly useful measure in planning industrial districts; but it is less useful for commercial areas because the amount of street traffic generated in such districts is more closely related to the number of patrons of various stores, offices, and other business, than to the number of employees.

In his City of Tomorrow, Le Corbusier suggested a density of 1,200 persons per acre in sixty-story skyscrapers. The density in Radio City is more than twice as much, and it is nearly three times that in downtown Los Angeles. Nearly 10,000 people per acre work in the Empire State Building. Because of this accomplished concentration in America,
Le Corbusier suggested such high density. Stuyvesant Town in New York City has been built to the density proposed by Le Corbusier, but it has been losing population for 20 years.¹⁹

Mr. Lewis Mumford mentioned that "Limitations on size, density and area are absolutely necessary to effective social intercourse; and they are therefore the most important instruments of rational economic and civic planning."²⁰ All the problems of light and air, open spaces, land value, traffic, transportation, off street parking, and loading and unloading are dependable on the population density in every district, as well as in the city as a whole, in one way or the other. People opposed such limitations in the past and thought that congestion meant more profit. Times have changed and they realized their mistakes. Such limitations are now common in many countries, especially the United States and England. These limitations are necessary to break up the functionless, overgrown urban masses of the past. In a metropolitan area, every city would have all the benefits of a metropolis that held a million people, without its ponderous disabilities; its capital frozen into unprofitable utilities, and its land values congealed at levels that stand in the way of effective adaptation to new needs.

¹⁹Tbid., p. 377.

CHAPTER IV

HOW TO REGULATE HEIGHT AND BULK OF BUILDINGS

Regulating the height and bulk of buildings is accomplished by different methods in the United States and in Egypt. In comparing these methods used in the two countries, emphasis has been made on the proposed zoning regulations in New York City because of the nature of the development and the high population densities which are characteristic of both New York and Egyptian cities.

Lot Size and Population Density

Minimum Lot Size.—The general practice in American cities is to establish in the residential districts a minimum lot size, as well as a minimum width of lot. Few cities require a minimum depth of lot. The commonly used minimum width of lot is from 60 to 75 feet at the building line. The depth of lot is not usually specified, but if it is, a minimum of 100 to 150 feet is used. Minimum lot-size requirements for commercial and industrial districts are not commonly used, although some cities have adopted such regulations. In Allegheny County, Pennsylvania, fourteen cities set minimum area requirements for lots in commercial districts and three set minimum area requirements for lots in industrial districts; however, because such regulations are usually phrased in terms of minimum area "per family housed," in commercial and industrial districts they apply only to
those lots which are used for dwelling purposes in whole or in part.¹

The minimum lot size usually required is about 6,000 square feet for one-family use, although some cities may require a minimum as small as 4,000 square feet. In the two-family district, a common minimum size of lot is 8,000 square feet, yet some cities permit a smaller lot. These minima vary from one zoning district to another according to the population density desired. The requirements may be as great as 20,000 square feet or even one or two or more acres. The courts uphold regulations requiring very large lots if they can be demonstrated to be necessary to preserve the public health, safety, morals or general welfare of the community. A minimum lot area of three acres in the single-family district was upheld recently by the Supreme Court of Missouri, in the case of Flora Realty and Investment Company v. City of Ladue.² The testimony in behalf of the city of Ladue showed that the plaintiff's property was completely surrounded by land similarly zoned and restricted; that the school system had been planned for a density of population based upon the three-acre minimum; that the fire-fighting system had also been based on the same standard; that the streets in the area were narrow and could not carry traffic for a more dense development; and that this was the best residential area in the St. Louis region. The Supreme Court confirmed the decision of the lower court, and upheld the constitutionality of the ordinance.


²April session, 1951, 246 S.W. 2d 771.
In areas lacking a public sewerage system or public water service, the type of soil in the area is an important factor in determining the minimum lot size as well as the population density. The commonly accepted standards for lot sizes may be as follows:

(a) Two families to the acre where both water and sewer systems are lacking.

(b) Four families to the acre where either water or sewer system is lacking.

(c) Greater density where both facilities are provided.

In multi-family districts, a minimum lot size is usually required up to a certain number of dwelling units. An additional specific area for each additional dwelling unit, more than that specified, is required. The regulations may specify a certain number of square feet, usually between 500 and 1000 square feet per dwelling unit, besides a minimum lot size.

In business and industrial districts, 500 to 1500 square feet per dwelling unit in apartment houses, are commonly used especially in small and medium-sized cities. The proposed zoning regulations for New York City do not require a minimum lot size in any residential district; but instead, they require a minimum usable open space area in relation to the floor area to be provided on the lot which usable open space may be on the ground, on terraces or on top of buildings. Also, the regulations set minimum dimensions for such open spaces which may differ from one district to another.

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Harrison, Ballard and Allen, Plan for Rezoning the City of New York, a report submitted to the City Planning Commission, October, 1950, p. 154.
Maximum Lot Size.—It has been found that it is more economic for a city to serve a low density area with utilities, streets, etc.; but the density could become so low that the service would be uneconomic. This lower limit may differ from one city to another, but there is always a limit. Recently, there have been discussion of the establishment of a maximum lot size provision, as well as a minimum, in the one-family and two-family districts, but to my knowledge, this device has not been used.

Population Density.—Provisions for minimum lot size should be accompanied by other provisions for the maximum number of dwelling units, rooms, families, or persons per net acre of lot area\(^5\) or per gross acre of developed area. Also, it is satisfactory to present density of population requirements in terms of the number of square feet of lot area per dwelling unit. The purpose of these provisions is to control the population density within the neighborhood, as well as in the city as a whole. Some cities specify the density as mentioned above, others specify it in terms of percentage of lot coverage and building height; floor-area ratio, as in New York; or cubage of building, as in Chicago and Detroit.

The density proposed for multi-family areas in table 3 is considered rather high by most of the planners. It has been found\(^6\) that in American self-contained cities, the average density is about seven dwelling units per net acre in the single-family areas; 17 dwelling units per net acre in two-family areas; and about 40 dwelling units in multi-family areas.

\(^5\)See Table 3 on page 56.

Table 3. Net Dwelling Densities and Building Coverage

Recommended Standard Values, by Dwelling Type

<table>
<thead>
<tr>
<th>Dwelling Type</th>
<th>NET DWELLING DENSITY</th>
<th>NET BUILDING COVERAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(Units per Acre of Net Residential Land)</td>
<td>(Per Cent of Net Residential Land Built Over)</td>
</tr>
<tr>
<td></td>
<td>Standard: Desirable</td>
<td>Standard: Maximum</td>
</tr>
<tr>
<td></td>
<td>Standard: Maximum</td>
<td></td>
</tr>
<tr>
<td>ONE- AND TWO-FAMILY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-family detached ........</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>or 1-family semidetached ........</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>or 2-family detached</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-family attached (row)</td>
<td>16</td>
<td>19</td>
</tr>
<tr>
<td>or 2-family semidetached</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td>MULTI-FAMILY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-story</td>
<td>25</td>
<td>30</td>
</tr>
<tr>
<td>3-story</td>
<td>40</td>
<td>45</td>
</tr>
<tr>
<td>6-story</td>
<td>65</td>
<td>75</td>
</tr>
<tr>
<td>9-story</td>
<td>75</td>
<td>85</td>
</tr>
<tr>
<td>13-story</td>
<td>85</td>
<td>95</td>
</tr>
</tbody>
</table>

Coverage should generally not exceed 30 per cent; on lots of the recommended sizes it will normally be below this figure.

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To put it in terms of persons per net acre, it would be 29 per acre, 69 per acre, and 106 per acre respectively. It should be mentioned that the average height of multi-family buildings in the cities studied was 2.35 stories. Although this study was made in 1932, it has been used for comparison since then.

The Greater London Plan proposes a net density (includes access or internal roads and half the main roads up to a maximum of 20 feet where these give access to residential property) of 100 persons per acre for the central areas of London; 50 persons per acre in the outer area of London; and 75 persons per acre for the area between the central and outer areas. The plan also requires minimum open space of seven acres per 1000 persons in each of these areas.\(^8\)

Generally the population density requirements in American cities are ten families (33 persons) per net acre in the total residential areas. For the whole developed area of the city, 0.3 acres per every 100 persons has been found satisfactory.\(^9\) Since these figures were proposed 15 years ago, and since cities now need more space for traffic and parking, lower density is more desirable. Twelve to 14 acres of total developed area of the city per every 100 persons are preferred.

In Egypt, there are neither minimum nor maximum lot size provisions of any kind established by the national or local government in cities. Also, there are no provisions for number of families, persons, dwelling


units or rooms per acre of lot or developed area. Except for the new subdivisions having deed restrictions, the developer may pile any number of dwelling units on his lot as long as he builds within the national regulations which were formed for light and air purposes only. Population density is not controlled in any Egyptian city.

Lot Coverage

Percentage.—Most of the American cities have adopted regulations to limit the lot coverage. Provisions in terms of percentage of area of lot are widely used. Although the American Public Health Association has recommended that no coverage in the residential areas should exceed 30 per cent of the area of lot, some cities allow more. In Local Planning Administration, the recommended percentage of lot that may be built upon is between 25 to 40 per cent of the area of lot in the most restricted districts with an additional 10 per cent in the case of corner lots. In New York City, a floor-area ratio of 0.50, which is equal to 50 per cent coverage if the building is to be one floor, has been proposed for the one-family and two-family districts. It is more desirable in the residential districts, especially in one-family and two-family districts, to specify the allowed coverage of lot in percentage of the lot area to assure that enough area of the lot shall be not built upon and to provide for light and air, privacy, etc., and for the children to play away from the streets. This

10 See "Zoning Regulations" in Egypt, Chapter II, p. 22.
11 See Table 3, p. 56.
12 Harrison, Ballard and Allen, op. cit., p. 115.
provision may be accompanied by floor-area ratio or cubage regulations, besides yard requirements.

In multi-family districts, some cities use the percentage method to limit the coverage of lot. Others use the floor-area ratio or cubage of building, with or without yard requirements. In the proposed zoning regulations for New York City, the only provisions for the multi-family districts are floor-area ratio and 30 feet rear yard requirements, but there are provisions for usable open spaces in relation to the floor area of the buildings. This is much better than the provisions of the multi-family buildings in business districts in Chicago and Detroit which are in terms of cubage requirements only. In some other multi-family districts in Detroit, there are provisions for yard regulations besides lot area per dwelling room requirements. This is to provide adequate open space about the buildings according to the number of dwelling rooms provided. The height in these districts is controlled by the yard widths.

The Egyptian cities have lot coverage regulations in terms of percentage of lot only for those areas subdivided since the 1940 National Subdivision Law. In these new subdivisions the law permits a maximum of 60 per cent of the area of lot to be built upon. As no city has been divided into different use districts, this percentage of lot coverage is applied to any type of building to be erected regardless of its use. For residential buildings, this percentage is considered to be very high. From

13 Ibid., p. 146, 154.
14 City of Detroit, Official Zoning Ordinance, as amended to February 1, 1949, p. 17.
15 Ibid., p. 16.
the population density viewpoint, it is a very high percentage to be provided for "all" the new residential areas in the city. It may be adequate for residential buildings in, or close to, "downtown" areas where the family size is small, but not for the outer residential areas where there are children who need sunlight and open space to play. Children playing football or marbles, in the street, is a common scene in Egyptian cities. The high permitted percentage of lot coverage in Egypt may be acceptable if accompanied by provisions controlling the population density, but no Egyptian city has yet adopted such regulations.

In the old parts of the Egyptian cities, the case is worse because there are no lot coverage regulations of any kind. A building may cover 100 per cent of the area of lot. This may give the reader an idea about the residential buildings in Egypt and how they are crowded. The old sections of cities lack adequate light and air and enough open spaces about buildings. The Egyptian cities, as most old cities, have a large amount of slums, and under the existing regulations, they may be providing for even more slums. Height regulations have been of some help.

As "downtown" areas of Egyptian cities have mixed uses (residential and commercial besides business uses in the same buildings) they are overcrowded, not only by "daytime" population, but by "all-time" population as well. This is because of a lack of lot coverage regulations, as well as of provisions for minimum number of square feet of lot per each dwelling unit, and for minimum usable open space per each dwelling unit or in relation to the floor area of buildings. With the absence of requirements for off-street parking and loading and unloading facilities, and the existing narrow streets designed for the horse and buggy, one can have an idea of the congestion in downtown areas.
Yards.—Yards and courts serve the obvious purposes of assuring light and air, lessening the danger of the spread of fire, and providing space for trees, vegetation, and near-by play of children. Also, yard requirements provide an effective means of control over population density in addition to creating a safer, healthier and more attractive community in which to live.

All the American cities which have zoning ordinances (and more than 1300 cities have such ordinances) have provisions for yard requirements, especially for the residential areas. The front-yard restrictions may be phrased in terms of (a) minimum footage requirements, (b) compliance with existing "setback lines" in the neighborhood, or (c) percentage of lot depth. It is ordinarily undesirable to use percentage of lot depth as a measurement, because variation in lot size might disrupt the whole plan of front yards. The most usual arrangement is a combination of provisions for complying with existing front yard lines, within a certain distance on each side of the lot, or on the opposite side of street, and provisions setting minimum footages. The Pennsylvania Supreme Court held the provision of front yards to comply with the existing setback lines invalid:

... the application of this ordinance is a gross discrimination in that it does not bear alike on all persons living within the same territory. Regulations which do not operate on all alike cannot be justified under the police power. Here it affects property differently on adjoining blocks, or within the same block on opposite sides of the street. ... If there is only one building erected within a block ... say, 100 feet from the street line, then all other buildings erected in the block, whether eighty per cent or more, would have to conform to this one. ...
Nevertheless, many zoning ordinances have such provisions.

The usual desirable minimum standards for depth of front yard between building and street are (a) 30 feet in the single-family district; (b) 25 feet in the two-family district; (c) 20 feet in the multi-family district; (d) at least 20 feet in the local shopping district if the district is less than 1,000 feet long and is in the same block with, or surrounded by, a residential district; otherwise, none; or in such cases the setback requirement of the adjoining residential district may govern; (e) front yards are usually not required in the central business district or in industrial districts unless residences are permitted in the latter; in this case, a front yard of 20 to 30 feet for residences might be required, although many cities have failed to provide such requirements.\(^{17}\)

The proposed zoning regulations for New York City require 15-foot front yards for one-family and two-family districts, and no front yard provisions for the multi-family districts. In these proposed zoning regulations it is assumed that the provision of front yards is primarily an amenity factor, and they are proposed in the low density areas to provide much of the special character of these areas.\(^{18}\)

Side yards are practically always required in residential districts. In business and industrial districts they are not usually required, except for residences. However, if they are voluntarily provided in these districts they must meet certain minimum requirements so that they will not become littered with trash or be excessively dark.

\(^{17}\) Local Planning Administration, Chicago: The International City Managers' Association, second ed. 1948, p. 232.

\(^{18}\) Harrison, Ballard and Allen, op. cit., p. 50, 148.
Regulations as to side yards usually prescribe a minimum width for the yard on either side of the building and a minimum aggregate width for the two side yards. The latter requirement may be given in terms of a percentage of the total width of the lot, but it has been found to be better to include also a minimum width in feet to prevent abuse. In single-family and two-family districts, six to eight-foot side yards are usually required, 10 feet for buildings of three stories or 45 feet high, with two or more inches additional width for each additional foot of height in the multi-family districts.

Present zoning regulations in New York City require three-foot side yards in very high bulk districts and five feet in the other districts wherever the developer elects to provide an optional side yard. The proposed regulations provide for a minimum side yard of five feet and an aggregate width for the two side yards of 20 feet in the single-family and two-family district. In the multi-family districts and other high bulk districts, the side yards are optional, but if provided they shall be not less than eight feet wide. Eight feet has been chosen because it permits driveways and is big enough so that if only one developer elects to provide a side yard it will not be used for dumping garbage or be very dark.\(^{19}\)

For multi-family areas, the provision of side yards related to the height of buildings is desirable to ensure adequate light and air for rooms. Relating the width of a side yard to the length of the building is also used. In multi-family districts having limited height for buildings,

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\(^{19}\) Harriss, Ballard and Allen, op. cit., p. 50, 148.
the minimum width required for side yards takes care of providing adequate light and air. But in districts having unlimited height and in which the bulk of buildings is controlled, the width of side yard should be related to the height of building especially when the side yard is used as the source of light and air for a legally required window. Some cities require one-half of one foot more in width of side yard for every additional story above the specified height of buildings, while others relate side yards to the length of buildings by requiring, about one-half of one foot in addition to the minimum width of side yard for each 10 feet or fraction thereof, by which the length of the building exceeds 50 or 60 feet. These do not provide adequate light and air for tall buildings.

In the proposed zoning regulations for New York City, where the side yards in the multi-family districts are optional, the yard width is not related to the height of building although there is a relationship between the width of the side yard and the length of the building. In cases where there is a legally required window depending on the side yard for its light and air, the provisions for units of the light access to windows shall govern. Such provisions, instead of taking innumerable wall relationships as the starting point, take as the starting point the window for which light must be provided, and set up the requirements for the location and amount of unobstructed open space which must be provided for the window. For this purpose, the required open space is to be found within a specified type of wedge-shaped area determined on the building plan and site plan in relation to each window. For each legally required window, the regulations for the several districts specify the amount and location of the space within this wedge which must be left unobstructed.
The designer may choose any alternate arrangements of building courts and walls which provide the required amount of open space for light to the windows under construction.\textsuperscript{20}

Egyptian regulations contain no provisions for front or side yards. But if a side yard is provided and used as the source of light and air for a legally required window, the width of such side yard shall be not less than one-fourth of the height of the building. And if the side yard is provided and used by any auxiliary window, the side yard shall be not less than five feet in width, and is not related either to the height or to the length of the building. In this case, the provision of five-foot side yards on both sides of the property line is not enough to provide privacy. Occupants of these close buildings, especially high apartment houses, can hear a piece of paper rattling in their neighbor’s house, and are constantly subjected to cooking odors from adjacent windows. If there is no window facing a side yard, there are no regulations to govern its width.

Rear yard requirements are not as common in zoning ordinances in American cities as are front and side yards, although they are usually required in residential districts, especially in one-family and two-family districts. Some cities require rear yards in the commercial and industrial districts.

The rear-yard requirements may be expressed as a percentage of the total lot depth or simply as a minimum number of feet. Fifteen to forty feet, depending upon the width and depth of lots, are common minimum depth requirements for rear yards, particularly in single-family districts.\textsuperscript{21}

\textsuperscript{20}See Figure 6, p. 68.

\textsuperscript{21}Local Planning Administration, op. cit., p. 232.
The proposed zoning regulations for New York City require a minimum 30-foot rear yard for all residential districts, from 10- to 30-foot rear yards for different commercial districts, and 10-foot rear yards for industrial districts. The required rear yard in multi-family districts may be built upon up to six or twelve feet height. In commercial and industrial districts, the rear yard may be built upon up to 23 feet high and not more than one story.22

Egyptian cities do not have rear-yard requirements; but if a rear yard is provided and used as the source of light and air for any legally required window of a livable room in the building, the minimum dimension of the width and depth of yard shall be not less than one-fourth or two-fifths of the height of the building, depending on whether or not the rear yard is connected to the street light and air from at least one side.23 Unfortunately, there are no provisions for minimum usable open space of any kind, other than those for courts and yards mentioned, even in the residential areas on the outskirts of the cities.

According to the regulations of side and rear yards in Egypt, a building may be four times the width of the yard in height where the yard is connected to the street light and air; and two and one-half times the width of the yard in height if the yard is closed by buildings from all sides. These provisions do not allow adequate light, and especially sunlight, into the residence rooms. The Egyptian cities have formed building height regulations in reference to the street widths according to the

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22 Harrison, Ballard and Allen, op. cit., 148, 165, 171.
23 See zoning regulations in Egypt, page 22.
minimum light and sunlight needed for buildings facing the streets; if
this is the case, there is no reason not to apply the same minimum require­
ments to residential rooms facing the side or rear yards.

Bulk Controls

**Bulk in Terms of Floor-Area Ratio.**—The floor-area ratio of a building is
the sum of the gross horizontal areas of all floors of the building measured
from the exterior faces of exterior walls, or from the center lines of walls
separating two buildings, divided by the area of the lot on which the build­
ing is erected, or to be erected.

The floor-area-ratio method is used by some American cities to con­
trol the bulk of buildings. Its main advantages are (a) it is more accu­
race in controlling the population density of the lot, the district, and
the city as a whole, than any other device, (b) it provides a good relation­
ship between the density of population and the bulk of buildings, (c) it
gives the building designers more flexibility and more choice of forms,
(d) it helps to provide more beautiful cities due to the variety of build­
ing forms. It is customarily used in multi-family, commercial and indus­
trial districts. It is not commonly used in single-family and two-family
districts, although it has been proposed for such districts in New York
City.

New York City has practiced the floor-area-ratio method to control
the bulk of buildings, yet under the present zoning regulations, the total
permitted bulk in residential areas would provide for a resident population
of about seventy million, and, in the non-residential areas, for a working
Figure 6. Area for Light Access Proposed in New York City. Radius and Unit Requirements Differ According to the District and to the Building Use.

Figure 7. Floor-Area Ratio Requirements.
population of around three hundred million—more than the total population of the Western Hemisphere. 24

The floor-area ratio should be accompanied by other provisions as deemed necessary. In residential areas, there should be provisions for maximum lot coverage and minimum yard requirements. In this case, the yard requirements should be related to the height of buildings, even though the height might be unlimited. The regulations proposed for New York City in terms of floor-area ratio have provisions for minimum usable open space related to the floor area of the building, provisions for "area for light access" for each legally required window, 25 and provisions for "angle of light obstruction" which, in a way, limit the height of the building. The regulations proposed have no provisions for front and side yards except in low density residential areas; but rear yards have been proposed in all districts. Also, there are no provisions for maximum lot coverage, because the other provisions mentioned would achieve the same aim.

More cities begin to realize the advantages of the floor-area-ratio method in controlling the bulk of buildings. Boston, Massachusetts, is engaged in a broad scale rezoning study in which the standards proposed for regulating building bulk and density are in terms of floor-area ratio. In single-family and two-family districts in Boston, floor-area ratio is not proposed but other density controls supplementary to, or replacing floor-area ratio, will be used. 26.

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24 Harrison, Ballard and Allen, op. cit., p. 11.
25 See Figure 6, p. 68.
Floor-area ratio, as any other device of controlling density and bulk of buildings, has to be formed according to the city needs and goals. The maximum proposed floor-area ratio in the residential districts in New York City is 10.00; and the maximum in the commercial districts is 15.00, and in industrial districts is 15.00. In Boston the maximums proposed are 3.00, 8.00, and 4.00 respectively. The ratios proposed for New York City appear to be high, but one should not forget that New York is the biggest city in the world. However, the proposed floor-area ratio for New York City would permit a bulk of buildings far less than that permitted under the present regulations.

Egyptian regulations do not have any provisions in terms of floor-area ratio. The present regulations of height, yards, and courts may permit what is equivalent to more than 10.00 floor-area ratio. The building shown in Fig. 8, page 76, has been built on a lot having an area of about 21,500 square feet and the floor area of the building is about 226,000 square feet. That means that the present regulations in Egyptian cities permit a floor-area ratio for all residential buildings higher than that proposed in the most dense residential districts in the largest city in the world. And, in commercial and industrial districts, the Egyptian regulations permit a floor-area ratio, in other words more density and bulk of buildings, higher than that proposed in similar districts in Boston. Knowing that New York and Boston are two cities which present high densities of population in America, and that Manhattan is one of the most densely populated areas in the world; and that the building regu-

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lations in Egypt permit more density and building bulk than what have been proposed in these two cities, one can have an idea about the fantastic building regulations in Egypt. Adding to this the fact that the Egyptian cities have much narrower streets and less adequate transportation than New York and Boston have, one can imagine the congestion in Egyptian cities, especially the larger ones.

Bulk in Terms of Volume of Buildings.—The volume or "cubage" method is used by some American cities to control the bulk of buildings. Like the floor-area ratio, this method specifies the maximum volume of building in reference to the area of lot. Chicago is the largest city using the "cubage" method. If the city of Chicago were built to the maximum of the zoning limits prevailing until recently, it could have housed the entire population of the United States. This bulk control has done little to improve the terrible slum conditions and traffic congestion in Chicago.

Controlling the bulk in terms of the volume of buildings is done in two ways. The first way is to set a volume measure for every district regardless of the width of the street which a building may front; this method is used in Chicago. The second, is to set the volume measure for every district in reference to the width of the street which the building fronts; this method is used in the business districts in Detroit. This should be accompanied by other provisions for maximum coverage of lot, minimum open spaces per dwelling unit, yard requirements, and provisions limiting the height of buildings.

28 Hoyt, Homer, 100 Years of Land Values in Chicago, Chicago: University of Chicago Press, 1933, p. 140.
In Chicago, three of the five volume districts have provisions for maximum lot coverage in terms of percentage. In the other two volume districts, only the residential areas have maximum lot coverage requirements. In all districts of Chicago, there are height limits in terms of footage. The volume and height of buildings are not in reference to the width of the streets. Front yards, where required, are in terms of percentage of the average depth of lots in the block. 29

In the business districts in Detroit, the volume of a building is in reference to the width of the widest street upon which the lot abuts; but the relation between the building bulk and the street width differs from one district to another. There are no provisions of maximum lot coverage, yard requirements, or limiting the height of buildings within these districts. 30

However, the "cubage" method of controlling building bulk is more complicated than the floor-area ratio method, or any other method. That is why very few cities in America use it.

Egyptian cities do not have such regulations for the building bulk. To compare the bulk permitted in Egyptian cities and American cities in terms of the volume of buildings, one might compare the bulk permitted in Detroit and in Egyptian cities, because both are related to the street width, even though there is difference in the method used. Under the existing regulations in Egypt, a building may have a volume approximately

30 City of Detroit, op. cit., p. 17.
equal to the area of the lot multiplied by twice the width of the street upon which the lot abuts.\textsuperscript{31} In the two business districts in Detroit having volume provisions, a building may have a volume equal to the area of the lot multiplied by the width of the street in one district, and by three times the width of the street in the other district. That means that the Egyptian regulations permit about the same average bulk permitted in the business districts with the highest bulk in Detroit. This high bulk is not used only for business districts in Egyptian cities, but is permitted for residential areas, as well as all parts of small or large cities. This is due to the fact that the building regulations in Egypt, as it was mentioned before, were studied only from the light and air viewpoint.

Height as Bulk Control

Height is one of the important factors in determining the bulk of buildings. To regulate height is to provide a maximum, or minimum height for buildings in each area of the city. Many American cities have maximum height districts, as well as, use districts and area districts. However, minimum height regulations have not been upheld by the courts, because they have been found based on esthetic consideration and have no relation to safety, health or general welfare of the community.

There are different ways of controlling the height of buildings. The maximum height may be specified in terms of feet, number of stories, or with reference to the width of the street on which the building fronts. The "angle of light obstruction", which has been used in the proposed

\textsuperscript{31} See Figure 8, p. 76.
zoning regulations for New York City, provides a certain control over height of buildings. The floor-area-ratio, or cubage, method does not, by itself, provide sufficient control on height of buildings from the light and air viewpoint.

Height in Terms of Feet or Number of Stories.—Specifying the maximum height permitted in terms of feet or number of storage, or both, has been used by most American cities, especially in the low density residential districts. It is a very simple method to use. The usual maximum height of buildings specified for single-family and two-family districts is 35 feet, or two stories, or both. In lower density multi-family districts, 50 feet and three stories are used. In other districts, the height limit varies according to the local situation and needs.

Some cities, using this method, have very flexible height limitations, in some or all of their districts, which permit a building to exceed the height limit if larger yards or setback than required are provided. This is based on the idea that if the yard sizes, or setback, are increased, the light and air cut-off is decreased. Some zoning ordinances allow one foot of height in addition to the permitted height for each two inches, one-half of one foot, one foot or more of setback, more than required, from the street line or from lot lines.

The disadvantage of this method is when it is used in high-density residential districts or commercial and industrial districts. It sets a height limit for all buildings in the same district regardless of the width of the street on which the building fronts. The amount of light and air permitted would not be the same for buildings facing different
streets with different widths. That is why some cities have used other methods than that to control the height of buildings in multi-family, commercial and industrial districts.

This method of controlling the height of buildings is not used by Egyptian cities. But sometimes it is used in some parts of the cities which have deed restrictions.

**Height in Reference to Width of Street.**—This method is used by many American cities, especially the larger ones. It is used in commercial and industrial districts more than in low density residential areas. Its advantage is that it governs the building height in relation to the main source of light and air in such districts, which is the street. Whatever the width of the street is, there is always the same amount of light and air for the buildings and for the streets themselves. Some cities set a maximum height, in feet, for buildings abutting streets of different widths. However, if this method is used, the height of buildings fronting public open spaces has to be interpreted, as in New York City, assuming that these buildings are fronting a street of certain width.

New York City has different height districts in reference to the street width, the highest of which is the two-and-a-half-times zones, as they are called, and they are confined to the small financial district at the lower end of Manhattan; and the one-and-a-half-times height districts are in existence in nearly three-fourths of the area in Manhattan. This latter height district exists in some sections of other larger American
Figure 8. Example of the Building Bulk Permitted by the Egyptian Regulations—Floor-Area Ratio More Than 10.00, Volume Approximately = Area of Lot X Twice the Width of the Street, Little Choice of Forms.
cities; but most of the larger cities in the United States have a lower height limit.\(^{32}\)

In Egypt, the building height limit in cities is in reference to the street width. The height permitted is one and one-half times the width of the street on which the building fronts; but the building may rise higher as long as the additional upper part is kept within a plane which makes an angle of 60 degrees with the horizontal on top of the height limit at the street line.\(^{33}\) This is not much more than the height permitted in Paris. According to the Law of Servitudes in Paris, a building may go up as high as the width of the street it faces upon, plus a stated additional height of from five to twenty feet, which differs in different parts of the city, and then the building can go still higher within the one, two, or even three mansard stories. The height limitations in Paris would seem to average about one and one-half times the street width.\(^{34}\) This method is similar to those used for height limitation by some German, Austrian, and other continental cities.

Under the same height limitations, the light and air are more adequately provided in Egyptian cities than in New York City. The angle of direct sun's rays in any Egyptian city is higher than it is in New York, especially in winter. Also, Egyptian cities have much better average atmospheric conditions than New York. Thus, there is more light at the ground story and street level in Egyptian cities.


\(^{33}\)See Figure 6, p. 76.

\(^{34}\)Ford, *op. cit.*, p. 63.
Angle of Light Obstruction.—The angle of light obstruction is the angle between an imaginary plane rising at the center line of the street and leaning against the building, and the horizontal plane. From this, one may notice that the higher the building, the higher the angle is, and vice versa. Hence, by specifying that such an angle should not exceed certain degree, the provision at the same time is limiting the height of the building in relation to its distance from the center line of the street; i.e., in reference to the street width and the setback of the building. The conclusion is that provisions limiting the height of buildings in reference to the street width, and inches-back-per-feet-of-height provisions, are actually angle-of-light regulations.

Many studies have been made on the use of angle of light obstruction, but no city has used this method to control the building height and bulk. In 1950, this method was proposed for New York City. Unlike the flat height regulations adopted in many cities, this method gives effect to a light-angle which takes into account the differences between broad and narrow streets. The whole system of regulations proposed for New York City, using the angle of light obstruction in controlling the building height and bulk, rests on the assumption that light may come along the side or sides of a thin tall building instead of over the top of a wide building. The existing regulations in New York rests on the assumption, perfectly realistic in terms of the building being built in 1916, that the only way to get light into streets and rear yards is over the top of buildings, which is no longer true.

Under the proposed "averaging" regulations of the angle of light obstruction, a building could in effect drop one shoulder and raise the
other, or have a tower in the middle with open space on two sides. Or, as an alternative, one portion could be set back, to compensate for another portion located closer to the street. The architect will be freed to design better buildings of better forms, instead of merely filling the envelope permitted by the existing regulations to build in.

To express clearly these regulations, it has been proposed (1) that the regulations merely state the appropriate angle of light obstruction for each district, and (2) that a developer be permitted to average the angle along the frontage. The advantages of this proposed method are several. First, they give the designer more freedom and the buildings could have a greater variety of better forms. Second, it will be possible to get adequate light and ventilation into side windows. Third, in blocks developed under these regulations, more sunlight will come into the street over the lower portions of buildings.

In order to provide protection against massing of building bulk on very wide lots and against various freak forms, several restrictions have been proposed on the "averaging" principle. First, in each district the regulations specify a minimum angle to be allowed in averaging, in recognition of the fact that the buildings behind on the next street will be obstructing light below that angle in any event. Second, a minimum width is set over which a lower angle may be credited in averaging, in order to prevent narrow slots between buildings. Finally, limits are set on the width of frontage over which angles may be averaged and on the width of the building projecting above the average permitted angle, in order to prevent massing of building bulk on very wide lots.
The angle of light obstruction method in determining the building height and bulk has not been proposed for single-family districts, which would be governed by yard width and height controls as in the present regulations. However, in order to protect privacy and outlook which are appropriate in the very low-density districts, it has been proposed to apply a setback regulation, based on a fixed angle and applying to the front, side, and rear of buildings, to all non-residential structures, such as churches and schools, and to the taller residential structures in those districts in which they are permitted.

This is an adequate and easy way of controlling building height and bulk for the purpose of light and air, and it has more advantages than the other methods used. This method has not been used yet by any American or Egyptian city. If the existing Egyptian regulations are translated into angle of light obstructions, the front angle permitted would be 72 degrees and the rear angle permitted would be 76 degrees if the rear yard is connected to the street light and air, and 68 degrees if the rear yard is surrounded by buildings or lot lines on all sides.\(^\text{35}\) In residential districts in New York, the maximum proposed front and rear angle of light obstruction is 69 degrees, which is less than that permitted in Egypt. Besides, this angle is proposed only in the very high-density residential districts in New York, and not for all districts as in Egypt. That means that the Egyptian cities permit taller buildings for residence in relation to the street and rear yard width than that proposed for New York. The height permitted in all parts of any Egyptian city is approxi-

\(^{35}\text{See Figure 10, p. 81.}\)
Figure 9. Height of Buildings Casting 100-foot Shadow in New York City and Cairo, Egypt, in the Middle of December.

Figure 10. Angle of Light Obstruction Applied to the Building Height Permitted in Egyptian Cities.
mately equal to the height proposed in the commercial and industrial districts of highest bulk in New York, which would have a maximum front angle of light obstruction of 73 degrees, and a maximum rear angle of 78 degrees.

As for providing light and air, maybe the Egyptian height regulations are not as bad as they seem to be in this comparison; this is because of the higher angle of direct sun’s rays and the better climatic conditions in Egypt. But even so, they seem to be inadequate for residential areas, especially those which are not in the inner part of the city. As a device to control the bulk of buildings, the existing Egyptian regulations are far from adequate.
CHAPTER V
RECOMMENDATIONS FOR CONTROLLING HEIGHT AND
BULK OF BUILDINGS IN EGYPT

The recommendations presented in this chapter are set in a general form as they are not recommended for a specific Egyptian city. Some of these recommendations are in the form of pointing out the problems and the way to attack them without specifying the exact solution. The writer does this with the understanding that these recommendations must be subject to a vast amount of further study and application to conditions of all sorts before they can be pronounced workable in practice.

General Recommendations.—The first general recommendation is that every Egyptian city have a comprehensive zoning ordinance in accordance with a master plan if the city is to have a fruitful growth. Second, it is recommended that the National Building Law and Subdivision Law be amended to replace the system of overlapping regulations in these laws and the zoning ordinances of cities. The Subdivision Law should have the minimum general requirements and the city should adopt other regulations besides these minima as it deems necessary. The National Building Law should be in the form of a building code together with minimum housing standards, and each city should be free to adopt additional regulations, or more restrictive ones, in accordance with the standards needed within the city. The Building Law should cover all conditions inside the building, and the
zoning regulations should cover the height and location of exterior building walls, population density, lot area requirements, coverage of lot, bulk of buildings, their uses and the open spaces about them, as well as the uses of land.

Recommendations for Height and Bulk Control.—(1) The present and future population of the city should be studied, and the desired densities should be worked out. For small- and middle-sized cities the population density should be from three to four families (15 to 20 persons), or dwelling units, per developed acre of the entire city; and for larger cities, the density should be not more than six families (30 persons) per developed acre of the entire city. Assuming that the net residential areas are about 10 per cent of the total area of the city and that the average family-size is about five persons, the recommended densities will be from 37 to 50 persons per net acre of total residential areas in small- and middle-sized cities; and should be not more than 75 persons per net acre of total residential areas in larger cities. These may seem to be high, but many Egyptian cities have much higher densities.¹

(2) The building bulk needed should be determined for the city as a whole, as well as for each district, according to the desired population density. This building bulk should be distributed among the different districts within the city in such a way as to avoid unnecessary centralization. All the problems of light and air, open spaces, land values, transportation, off-street parking, loading and unloading, besides utilities and community facilities are dependent on the population density. In

¹See Table 4, page 65.
### Table 1. Population Densities in Four Egyptian Cities
As Reported in 1947 Census

<table>
<thead>
<tr>
<th>City</th>
<th>Population</th>
<th>Number of Persons Per Acre of Total Area of the City (developed, vacant and undeveloped areas)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cairo</td>
<td>2,090,664</td>
<td>47 (about 57 in 1953)</td>
</tr>
<tr>
<td>Alexandria</td>
<td>919,024</td>
<td>52 (about 71 in 1953)</td>
</tr>
<tr>
<td>Dumyat (Damietta)</td>
<td>53,631</td>
<td>99</td>
</tr>
<tr>
<td>Suez</td>
<td>107,241</td>
<td>1.4</td>
</tr>
</tbody>
</table>

*Population densities per acre developed are not available.

The population density in Suez may seem to be very low, but this is due to the fact that the city of Suez is a large territory. The total area of Suez is about twice that of Cairo. Most of the land in Suez is undeveloped, and the developed areas are very crowded.

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2Department of Census, Annual Census Pocket Book, Government Press, Cairo, Egypt, 1953, p. 4-5.
other words, they are dependent on the permitted building bulk in each district as well as in the city as a whole. It is recommended that this building bulk be estimated in terms of the floor area needed within the buildings. Knowing the floor area needed and the net acreage of building sites within the district, a floor-area ratio could be established for each district. The floor-area ratio may not be applied for the single-family, two-family and low-density multi-family districts where the desired controls can be obtained more readily by specifying number of families per acre.

(3) In commercial and business districts where residences are permitted and where commercial, business and residential uses may be in the same building, a certain maximum, in terms of percentage of the permitted floor area of the building, should be specified for each different use. This is to control the amount of commercial and business uses in the district according to the traffic, transportation, etc., and to help in planning more adequately for schools, parks, playgrounds and community facilities for residences in such districts. If residences are provided in the building, they should be in the upper part so that they will be far from the noise and dust of the street, besides having more sunlight and fresh air. Also, it is recommended that the residential regulations be applied to the residential parts of the building only and not to the non-residential part. The regulations controlling residential buildings, or parts of buildings, in non-residential districts, depending on the number of dwelling units to be provided, should be the same as those in corresponding residential districts.
(4) In commercial and business districts, studies should be made to find out the amount of traffic generated by different building uses in relation to their floor areas, and different floor-area ratios should be set for different uses permitted in these districts. The floor-area ratios should be established in accordance with traffic studies and street capacities within the city.

(5) Special studies for off-street parking and loading and unloading facilities should be made for different uses with reference to: the number of dwelling units in a building; number of square feet of floor area used for different commercial and business uses; number of seats in a theater, auditorium and the like; and number of employees for different industrial uses. The regulations should specify the number of parking spaces needed for each of the above units of measure and the minimum area for each space. Twenty square meters (215 square feet) is recommended as the minimum area for each parking space, which includes a minimum adequate space for entering and leaving the parking facility. The parking facilities should be on the property or very close to it. Loading and unloading facilities should be on the property.

For buildings already built before such regulations are in effect and which have not enough parking space according to their bulk and use, cities might (a) permit such parking spaces to be located within certain maximum distances from existing properties; (b) plan for parking facilities to serve all the property owners in a block; (c) through enabling legislation, utilize their right of eminent domain to acquire properties and resell them to property owners so that they could meet requirements of the zoning ordinance.
Minimum lot requirements should be provided for all residential districts and for all residences in the commercial and business districts. It is recommended that no residential uses should be permitted in industrial districts; but if some cities permit such uses in industrial areas, minimum lot size requirements should be provided for residences in these districts. The minimum lot size requirements for residences in non-residential districts, depending on the number of dwelling units to be provided on the lot, should be the same requirements as those in the corresponding residential districts.

In residential districts, the minimum width of lot at the building line should not be less than 18 meters (59 feet). The minimum lot size recommended for single-family districts is 500 square meters (5380 square feet); for two-family districts is 700 square meters (7532 square feet); and for low-density multi-family districts is 800 square meters (8608 square feet) up to three dwelling units, and an additional lot area of 75 square meters (807 square feet) for each additional dwelling unit to be provided on the lot. For multi-family districts of high density, the floor-area-ratio method is recommended.

In areas lacking a public sewerage system, or public water services, or both, the type of soil in the area should be examined and the minimum lot size provisions, or lot area per family, should be established accordingly. The city may adopt provisions for maximum lot size in single-family and two-family districts according to what seems economic for the community.

Provisions for maximum permitted lot coverage, in terms of percentage of the lot area, should be provided. The recommended maximum
Lot coverage for single-family and two-family districts is 30 per cent of the lot area with an additional 10 per cent in the case of corner lots; for low-density multi-family districts, 40 per cent; for multi-family districts of high-density, 50 per cent; and for commercial and business districts, 55 per cent. In the residential districts, these recommended lot coverage provisions will provide for minimum open spaces about the buildings to assure light and air, privacy, outlook, space for trees, vegetation, and near-by play of children. In commercial and business districts they would provide for light and air, loading and unloading facilities, besides off-street parking spaces at the ground level instead of storing vehicles under or above the ground which is very expensive especially in Egypt. For industrial districts, the percentage of lot area to be built upon should be determined according to the type of industrial uses permitted in these districts. However, no lot coverage should exceed 65 per cent in the industrial districts.

Inner courts less than 50 square meters (538 square feet) in area should be considered as built areas. If an inner court exceeds that size, 50 square meters of its area should be considered as having been built. An outer court should be connected to a yard or to the street from at least one side, which side should be the longest side of the court; otherwise, the court should be considered as an inner court.

If a part of the building is supported on free columns, the area underneath this part of the building should be considered as having been built upon even if it is open from all sides.

(8) Courts necessary to ventilate service units such as kitchens, bath rooms, toilets, and storage rooms, should conform with the existing
regulations for such courts. If an inner court is used to provide light
and air for a legally required window of a livable room, a residence's
hall, or an office, the court should have no dimension less than two-
thirds of the height measured from the window-sill to the top of the
building.

(9) Yard requirements should be in terms of meters. The recom-
mended minimum front yard between the building and the street is (a) six
meters (19.7 feet) in the single-family and two-family districts; (b) five
meters (16.4 feet) in multi-family districts and for residences in non-
residential districts; (c) five meters (16.4 feet) for local shopping
centers surrounded by residential districts.

In single-family and two-family districts, the width of side yards
should be not less than 3.5 meters (11.5 feet). In multi-family districts,
the minimum width of side yards should be 3.5 meters (11.5 feet), and if
the yard is providing light and air for a legally required window of a
livable room the side-yard width should be increased by one decimeter for
every additional two decimeters in height above 10.5 meters (34.4 feet),
or for every additional one meter in length of the building exceeding 15
meters (49.2 feet). In commercial, business and industrial districts, the
side yard is optional; but if provided it should be not less than 3.5
meters (11.5 feet); and if it is used to provide light and air for a legal-
ly required window the side-yard width should be increased by one decimeter
for every additional three decimeters in height above 10.5 meters (34.4
meters), or for every additional one meter in length of the building ex-
ceeding 15 meters (49.2 feet).
Rear yards should be not less than 8 meters (26.2 feet) in all residential districts. In multi-family districts the rear yard should be not less than two-thirds of the height of the building. In non-residential districts the rear yard should be not less than 5 meters (16.4 feet) or not less than one-half of the height of the building. For these purposes the height of the building may be averaged in the same manner as the height of the building in relation to the street in those districts where this is permitted. Rear yards in non-residential districts could be built up to five meters (16.4 feet) high but not more than one story above the curb level.

No balconies should be nearer than five meters (16.4 feet) to the side or rear lines of the lot in any district. Balconies facing side or rear yards should not project more than 1.50 meters (4.9 feet).

(10) The maximum height limits recommended are (a) 10.5 meters (34.4 feet) or not more than two stories in single-family and two-family districts; (b) 14 meters (46.9 feet) or not more than three stories in low-density multi-family districts. In multi-family districts of high density, the maximum height of buildings should be not more than three-fourths the width of the street, and the building may go up higher than that if it sets back four decimeters for each three decimeters of additional height. In commercial and business districts the height limit should be not more than the width of the street, but the building may be higher if it sets back one decimeter for each decimeter of additional height. In industrial areas, the height requirements for multi-family districts should be applied. If a building is fronting a public open
space or a street of more than 20 meters (65.6 feet) in width, the building will be considered to abut a street of 20 meters in width.

In all districts having height regulations in reference to the street width, the method of averaging the height of a building is strongly recommended. The same averaging method will be applied to the building height facing the rear yard in such districts. A minimum height of one-fourth of the street width is recommended to be allowed in averaging, in recognition of the fact that the buildings behind on the next street will be obstructing light below that height in any event. Second, a minimum width of eight meters (26.2 feet) is recommended over which a lower part of the building may be credited in averaging, in order to prevent narrow slots between buildings. Finally, a maximum width of 35 meters (114.8 feet) is recommended for the frontage to be averaged; and a maximum of 20 meters (65.6 feet) for the width of the part of the building, exceeding the average permitted height, in order to prevent massing of bulk on very wide lots.

No balconies or bow windows should be permitted to project outside the street line in any district.

The writer believes that these recommendations will go much further than the existing Building Law or Subdivision Law in Egypt in assuring a desirable minimum of sunlight, light, air, outlook, privacy, open spaces about buildings, and control over the population density. These recommendations will result in developments that will prove to be more economic for the community, and practicable and more profitable for the building owner, especially in the long run.
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