Articles

The Ancient Greek City and the City of the Present

SYNOPSIS: Man was dominant within the framework of the ancient city because it was built according to human dimensions. The modern city, on the contrary is torn between humans and machines and thus man is displaced in favour of machines. The ancient city-states were created in two fashions: the older ones through natural growth whereas the newer ones by the Hippodameian system. Despite their differences, the concept hidden behind both building processes was the same: To take advantage of the natural landscape and to create both public and private spaces according to rational and functional considerations with man at the center. In the cities of the present, by contrast, both human dimensions and coherence among men and among buildings are lost. What men need to do is first, to adhere to human dimensions and create smaller units where man is the master and second, to use machines as the means to control larger units where mechanical dimensions prevail. In other words, to create cities for man.

When I sometimes feel overwhelmed by the problems of the modern city I go to the Acropolis. First I enter the Ancient City and stand in the small plain where the Agora used to be. As soon as I leave the modern city behind, and stand in the Agora, with its arcades and view of the Acropolis, I begin to feel happy. I live in the past, or rather, I live happy in my escape from the contemporary; and then I slowly walk up to the Acropolis, I cross the Propylea and happiness gradually turns into supreme satisfaction. Here I am not just in the ancient city, but in the ancient grandeur. Crossing the Acropolis I come up to the ancient walls surrounding it and, on its eastern side, I lean on the large parapet to contemplate the whole plain around me. Then despair seizes me at the sight of the modern city, the city in which I feel no security at all, the city of noise and polluted air, the city where, at every moment, I am in conflict with the machine. A machine which, although designed to move through space at 150 km per hour, barely manages to cross Athens at 15; exactly the speed at which horse driven carriages used to cross it, before the advent of the automobile.

There is indeed a sharp contrast between the ancient city and the present city, and between the knowledge and the understanding we have of each of them. This contrast is natural, however, if we realize that it is not only our knowledge which differs, but that the cities themselves are really dissimilar. They have different magnitudes and different functions. In the ancient city man was the sole inhabitant, while the city of the present is inhabited both by man and machine. The functions of the city have

changed, and so have its inhabitant and its dimensions.

When man of the present succeeds in relieving himself of the great pressures of his time and turns his attention to the ancient monuments to draw lessons, he confines himself to those still projecting above the ground: that is to say, to the temples and the public buildings. He studies their construction and aesthetic value, whilst overlooking the fact that these buildings only formed individual, though central, elements of a city that expressed a way of life.

We take lessons from the monuments, but what kind of lessons? First we copied them and tried to revive the dead city as it used to be. Then we found out that we had only attempted a resurrection of the dead, that we had erected corpses in our towns and we started to laugh at them. What we forgot was that the monuments and the buildings are but the skin of the real city, of real life. Our concern for the skin remind me of the people who once visited the workshop of the sculptor Auguste Rodin and asked him how he managed to create such perfect surfaces for his statues. "Surfaces?" said he, "but I am inside the marble and work from there". That is something we forget when we study the works of the ancients. We confine ourselves to the skin and do not realize that this is the expression of a whole life, a way of life expressed by the city as a whole.

It is time that we excavated the ruins, removed the masses of earth which cover them and saw clearer not only the monument as a unit, but also the whole ancient city as a living organism with heart, lungs and body, and try to understand the human settlement which was created once and which can teach us now. That is what I shall try to do in this study.

How can this be accomplished? How can we study the city without falling into the trap of admiration of the old merely because we are disappointed by the present? To do so we study the city in a specific way, that is, on the basis of magnitudes which can be measured.

This is possible if we confine our observations to two very concrete elements: the scale and the unity of the city.

The scale is a feature that can be proved, because it is measured by the dimensions of the city. Here our observations must be very concrete in order to avoid any subjective attitude. Unity, on the other hand, can again be proved by the dimensions of public spaces and of private ones, also open spaces and buildings. Both of these elements, scale and unity, can be studied according to objective criteria, and thus they will form the basis of our study.

Since my school years I have studied the ancient city and

have lived in it also. Since my childhood I have lived in the modern city. I have grown and also have suffered in it. By comparing them I therefore wish to draw and support the following conclusions:

a. The ancient Greek city was built on human dimensions which gave it a human scale and unity.

b. The city of the present has lost its human dimensions.

c. There is an imperative need for human dimensions in the city of the present.

d. The city of to-day also needs other dimensions suitable for the machine and, accordingly, a synthesis of two scales is required: the human scale and the scale of the machine.

e. It is therefore absolutely necessary that we give back to the city its human dimensions, even though we have imposed on it the dimensions of the machine. It was a mistake to let the historic continuity of the human dimensions in the city to be lost. We must establish it again, in harmony with the evolution imposed on us by the new factors.
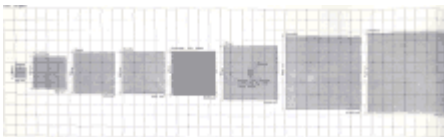
THE CITY STATE

Greece is divided by mountains into small plains. It is in these plains that the major part of land cultivation takes place and we can roughly say that these do not exceed 22% of the ancient Greek peninsula. The physical boundaries of the small plains form the boundaries of the city-state. These areas range from fairly small states with an area of 100 sq. kms., such as the state of Aegina, to fairly large states, such as the states of Arcadia and Laconia which spread over an area of about 5,000 sq. kms (Ref 1). Diagrammatically, we can thus visualize the ancient Greek states as squares of 10 by 10 km., which could be crossed from end to end in 2 hours or so, to squares of 70 by 70 km., which one needed 14 hours to cross on foot. (Fig. 1).

We might perhaps say that the average dimensions of an ancient Greek state were 40 by 40 km., which means that one needed an 8 hours' walk to go from one end to the other and that, as a rule, one did not have to cross mountains, which in almost all cases divided one city-state from the other.

If we now consider that the city was placed in the center of each state, we find that in a state of average size the city would be a 4 hours' walking distance from its edges; in the case of the smaller state it would be an hour's walking distance and, in the larger states, 7 hours' distance from the borders. This means that within a day, between sunrise and sunset, one could set forth from the

Fig. 1. Area of ancient Greek-city states.

central city and reach the furthermost point even of the largest state, whilst in the case of an average size state one would be able to set forth from the most distant point, go to the central city and return before sunset.

Man could dominate in his state, with all his human dimensions, not only because he could walk easily from the city to the borders in one day, but also because he could climb up any summit and view the whole state, appreciate the whole vital space of the city, and even because he could very easily receive news of what was happening throughout the state by cry or torch and other signals, from hill to hill, in a few minutes.

The vital space of the whole state had human dimensions. The population of these states started with a few tens of thousands, perhaps around 30,000, and reached a figure of some hundreds of thousands- perhaps up to 300,000- whilst the average population was perhaps in the neighbourhood of 100,000 (Ref 2).
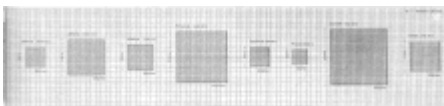
THE BUILT-UP CITY

The built-up district, that is to say the city, had a smaller population than the state, and of course, a much smaller area. The average population of the ancient Greek city, that may have ranged between 5,000 and 50-60,000 inhabitants, was possibly in the neighborhood of 20,000 inhabitants- and I say possibly because we do not know for certain how many were small and how many were large cities (Ref 3). If, however, we judge from the fact that we know the population of a good number of large cities did not exceed 30,000, we can say that the average population of all cities probably did not exceed 10,000, for there must have been a large percentage of small cities with 5,000 population (Ref 4).

The built-up city was very small. Even if we examine some of the most important ancient cities, such as Athens, Corinth, Delos, Priene, Miletus, Piraeus, Olynthos and Selinus, of which we have more accurate plans and information, we can draw the conclusion that the average area of the ancient city was hardly 1.8 sq. km., that is to say a square whose side was 1.3 km (Ref 5). We might perhaps say that the size of the actually average ancient Greek city was a square whose sides did not exceed 800 meters. (Fig.2).

If we now examine the dimensions of the cities, we shall see that, in fact, they did not tend to be square but were adapted to the landscape. They are of circular shape when developed around an Acropolis, as in Athens, or rectangular if they are built on a peninsula, as in Piraeus or Miletus. Their average maximum dimension was equal to 2 km., which means that one could cross the city from end to end by walking 20 to 25 minutes, or that no function or dwelling in the city was more than 800 meters

Fig. 2. Area of ancient Greek-city states. Average area 180 ha.

Fig. 3. Ancient Greek City. Evolution of Planning.

distance from the center or a 10 minutes' walk.

The density in the cities was fairly uniform, averaging 194.2 inhabitants per hectare, which means that nearly 35 families corresponded to 10,000 sq. meters or some 330 sq. meters to each family. We can realize this if we imagine that each family had a plot of 10 by 20 meters, that is to say 200 sq. m., and corresponding public spaces, roads, squares, sanctuaries that were equivalent to about 130 sq. m. We can say that this is a normal density, because it allows one house of 100 sq. m. per family, with a corresponding garden and a sufficient area for public spaces (Ref 6).

Ancient cities are divided in two categories: those formed through a natural growth and those created on the Hippodameian system.(Fig. 3)

CITIES CREATED THROUGH NATURAL GROWTH

These are the oldest cities and chiefly the cities of continental Greece. Athens is the most typical and important. Such cities were developed around or near a hill or rock, the acropolis. That is where the god-protector of the town was worshipped. At the beginning it was the seat of the ruler and it was also the place where the inhabitants used to take refuge in case of war or attack. It was the core of the city and originally there was no distinction between the city and the acropolis. The city gradually developed in wider circles near the acropolis. With this natural spread of the city a second core was formed at its lower part, the Agora. This was the center of political, commercial and social gatherings. The natural position of the agora was near the acropolis, not far from the main entrance to the town. Acropolis and agora therefore formed the double core of the ancient town, but the agora gradually became its most important element (Ref 7). All the main streets of the town led radically to this main center.

The core of the town was moved from the acropolis to the agora for two reasons:

a. The development of commerce and handicraft.

b. A shifting of political power from the priests and the monarch to the aristocracy and democracy.

Aristotle says characteristically in his Politics (VII, X, 4):

"What is expedient is not the same for all forms of constitution alike; for example, a citadel-hill is suitable for oligarchy and monarchy, and a level side for democracy; neither favourable to an aristocracy, but rather several strong positions".

THE HIPPODAMEIAN CITIES

To this category belong the cities created according to an organized plan at a given time. These new towns started being built mainly in Ionia. The big destruction's caused by the Persians necessitated reconstruction on a large scale. New colonies were built with a subsequent flourish of culture.

The main difference between organized cities and those which developed through a natural process over a long period of time are the parallel streets and the use of a grid in planning. The grid developed into a rectangular system and was the result of purely functional reasons. The grid presents the simplest solution of layout and with the fewest complications.

Here is how, according to Aristotle (Politics, II, V, 2), Hippodamus the Milesian, who was the first to apply this system, viewed the social synthesis of the town:

"His system was for a city with a population of ten thousand, divided into three classes; for he made one class of artisans, one of farmers and the third the class that fought for the state in war and was the armed class. He divided the land into three parts, one sacred, one public and one private: sacred land to supply the customary offerings to the gods, common land to provide the warrior class with food, and private land to be owned by the farmers".

Concerning the Hippodameian system Aristotle, again, (Politics, VII, X, 4) writes:

"The arrangement of the private dwellings is thought to be more agreeable and more convenient for general purposes if they are laid out in straight streets, after the modern fashion, that is, the one introduced by Hippodamus; but is more suitable for security in war if it is on the contrary plan, as cites used to be in ancient times; for that arrangement is difficult for foreign troops to enter and to find their way about in when attacking. Hence, it is well to combine the advantages of both plans, and not to lay out the whole city in straight streets, but only certain parts and districts, for in this way it will combine security with beauty".

As far as the orientation of the cities is concerned, Aristotle writes in the same chapter:

"The site of the city itself we must pray that fortune itself may place on slopping ground, having regard to four considerations: first, as a thing essential, the consideration of health (for cities whose sites slopes east or towards the breezes that blow from the sunrise are more healthy, and in the second degree those that face away form the north

Fig. 4. Piraeus (400 B.C.).

wind, for these are milder in winter); and among the remaining considerations, a slopping site is favourable both for political and for military purposes".

Regarding the alignment of the streets the natural landscape is of outmost importance. When the ground is sloping, the main streets usually follow the contour lines and the perpendicular ones are more steep and narrow, occasionally with steps.

The agora is the core of the city. It is usually at the center and occupies a few blocks which are left free for this purpose. The sanctuaries are gathered around the agora or scattered throughout the city. The remaining blocks are occupied by residential quarters. The whole may be surrounded by walls which follow a free line around the city.

By studying the layout of the cities which were developed through a natural process and those which were planned according to the Hippodameian system we find that they had one feature in common: the form of the ancient town was generally simple. In both of the above mentioned categories one could easily move from any part of the city to its center, first because one could see it from everywhere- distances being such as to permit this- and because one could move directly towards it either by taking one natural turn in the cities formed through natural growth or by a right angle turn in the Hippodameian cities.

The result was that anyone could easily perceive the ancient city in all its extent as a synthesis. The outcome was that the city not only formed a community of people, but that this community was readily perceived by every inhabitant who dominates over its entire area with all his physical capacities. He could view it, he could hear its messages, he could walk over it very easily. The city belonged to the man, it was built on the human scale (Fig. 4).
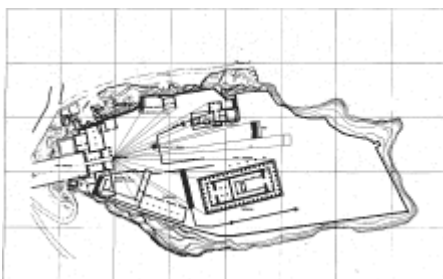
PUBLIC SPACES (SANCTUARIES, AGORA, BUILDINGS FOR SPECIAL PURPOSES)

Religion and worship in general played an important part in the life of the citizen. That is why there is no dividing line between religious and civil architecture in ancient Greece, as there was no distinction between these two notions in everyday life.

Fig. 5. Athens: The Acropolis.

The religious buildings and the various small sanctuaries were scattered all over the town. Many of them were older than the town itself. There were only certain areas where sanctuaries were more numerous, such as the acropolis and the agora. The city was developed around them. The most famous example of a group of religious buildings in a
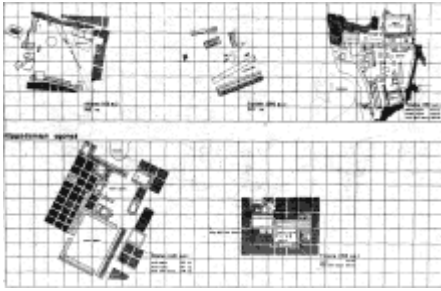
Fig. 6. Ancient Greek cities: Agoras.

city was the Acropolis of Athens.

The main expression of worship in architecture was the temple. Its orientation was ordinarily from East of West. Entrance was from the East, although this was not always observed in practice and was not emphasized as in the Roman period. Arcades, for instance, were usually oriented southwards, even if that involved turning their back to a temple.

Under the Hippodameian system, special provision was made in the city plan for places of worship and whole blocks were allotted to them. Aristotle (Politics, VII, II, I) speaks of a sacred agora, for which a suitable site should be chosen and which should include all religious buildings. Similar observations were made by Xenophon and Plato, who suggested that religious buildings should be located around the agora. Under the Hippodameian system, temples are situated at various points throughout the city, in accordance to functional and aesthetic needs. The location of temples is determined by the layout of the streets, even if this makes it necessary to deviate from the orthodox easterly orientation, as in Miletus. In earlier temples, the proper orientation is observed and the layout of the streets is adapted accordingly.

The synthesis of public places was not determined by artificial geometrical criteria, which may not be directly perceptible, but only by man's own position and movements through these places. Man and his movements were always the measure. From a glance at the plan of the Acropolis of Athens, one might think that it is not based on any specific rules of composition. When one is there, however, one realizes that the buildings are all located in such a way as to be presented correctly to anyone entering by the Propylaea and proceeding towards the Parthenon or the Erechtheum. The synthesis on a human scale becomes apparent (Fig. 5).

The agora is the heart of the ancient Greek city, particularly from the 5th century onwards. All public business, trade, administration, worship, the law courts, were integrated there, and as ancient Greek cities were small, there was usually no need for more than one center. There were, of course, a number of exceptions, due to historical causes, as in the case of Athens and certain other cities. There is no known instance, however, of a second agora or a second independent city center. Since the main center was no more than 15 minutes' walk from any point of the city, there was no need for other centers to serve outlying districts. In fact, 15 minutes was the longest distance, and the average was much shorter, perhaps no more than 5-minute walk.

The original form of the agora, like that of the city itself, was very simple. A flat open space with suitable drainage was the first requirement. Originally, the agora

accommodated all functions. In due course, however, the development of the city, the growth of the population and the construction of new buildings made it difficult for the agora to serve all purposes.

The agora was almost situated at the center of gravity of the city, so that it could be reached with a minimum effort (Ref 8). In each case, the agora had as much open space as was needed to make it possible for the population to assemble there at any give moment. It is noteworthy that the average open space in the center of the ancient Greek cities which are known to us was 1.12 sq. metres per inhabitant. If it is borne in mind that at a large gathering there may be up to six persons to the square metre (in a demonstration, a church, or a crowd assembled to hear a public speaker) it will be seen that the average of 1.12 sq. metres per person allowed ease of movement, even if the entire population of the city assembled at the same moment. It was unlikely, however, that more than half the population would ever assemble at the same time, since children, the aged and infirm represented 40% of the total. Each person must thus have almost 2 sq. metres of open space (Fig. 6).

Under the Hippodameian system, the agora is planned and laid out on more functional lines. The basic principle is the same, but a larger proportion of the area is built over and there is a more marked separation of functions. Ionian architects experimented with various ways of laying out and connecting stoas. Usually they form right angles and integrated with the street network, without forming a closed system. The most usual is the P form with stoas along three sides and a street along the fourth. The agora is occasionally bounded by a stoa along the fourth side.

The configuration of the ground was important in determining the location of special buildings such as gymnasiums, theatres and stadiums. The ancient Greeks did not construct large-scale engineering works and they were therefore obliged to take the configuration of the ground into consideration. In towns which were grown naturally in the course of time, these buildings are often found close to the acropolis, whose steep slopes were suitable for theatres. In Hippodameian cities, on the other hand, they are located somewhat further away from the agora and the city center. The reasons are, first, that the theatres and stadiums were used by large numbers of people on special occasions, and the movement of large crowds in the city center would have been difficult. Secondly, agoras are usually built on flat ground, which is unsuitable for theatres or stadiums. With regard to the stadium, in the first category of cities, the configuration of the ground and the existence of natural slopes was the deciding factor in the choice of the site. In the case of the Hippodameian cities, the stadium was located on the edge of the residence quarter because of its large size.

PRIVATE SPACES

The main difference between the two categories of cities which we have been discussing lies in their road systems. In the former, the settlement develops along the streets, which radiate from the city street- the agora- and lead to the more important neighbouring districts. Hippodameian cities, on the other hand, are designed on a strict grid plan with only slight variations. In the first category of cities, the blocks vary in shape and size, and although the houses were very low, it is almost certain that the residential quarters did not have sufficient sunlight by modern standards.
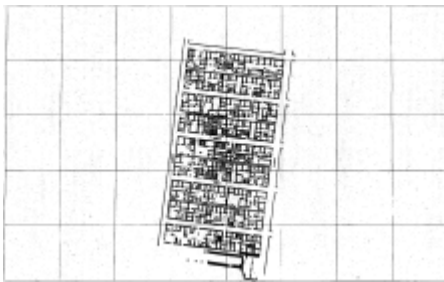
Under the Hippodameian system, the orientation of the streets is of great importance. The blocks are regular in shape and nearly all of the same size throughout the size. The width of the streets varies, depending on their function, and it is generally greater than in the ancient cities. The streets never pass through the agoras or places of worship, as they did in earlier times. All such buildings are located in one block, or more, which is bounded by the streets.

The size of the blocks varies considerably, from city to city, being in some as much as ten times as large as in others. In Miletus they are almost square, 1x1.1, whereas in Olynthos they are rectangular, 1x2.5 (Fig. 7).

The layout of the streets is never academic or strictly axial, even in Hippodameian cities with their precise grid systems and strict orientation of the streets. Rational considerations prevail everywhere. Often, especially near the agora, there are shops on either side of the most important streets, and there is thus a functional extension of the central agora into the residential quarters.

Everywhere, in the agoras and other public places, the streets and small squares are all on human scale. The dimensions are human, the streets three, five or six metres wide, are just sufficient for the needs of man, who was almost their only user (Ref 9). The erection of statues and works of art was always relevant to the activities of man as can be seen from the streets and squares of ancient Greek cities, if we reconstruct them as they really were.

Although the general plan of the city reveals a definite scheme and a definite arrangement of various functions, if each block is taken separately, it will be seen that there is no standardization in the construction of dwellings.

Private dwellings, like public places, were also on a human scale, in keeping with the overall conception. The average dimensions of the plots, 100-300 sq. metres, are exactly

Fig. 7. Olynthos. Residential Quarters.

what is needed for an ordinary house with a small garden even for the present day family (Ref 10). Sometimes there are ten houses to a block, as in Olynthos, in other cases four, as in Priene. Instead of four houses, however, there may be only two larger ones, or even one. The various categories of houses found in Olynthos suggest that there were different social classes in this city.

THE CITY OF THE PRESENT

Different civilizations created cities of different dimensions than the ancient Greek city. Larger cities were usually the centers of large empires.

As an example, we may recall that Rome reached a population of 1,000,000, while Constantinople exceeded 700,000 inhabitants. It is a characteristic feature that these two large cities, which approached the 1,000,000 population mark, that is to say they came to nearly 20 times larger than the ancient Greek city, were the centers of large empires, and both ultimately consisted at least partially of slums and were badly governed, with a mob rule even in the election of emperors.
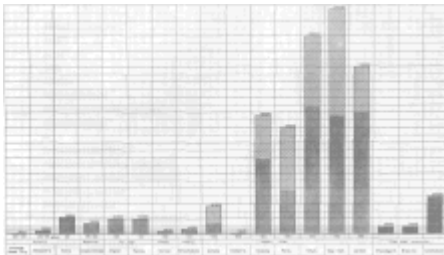
Later on, large capitals of eastern empires reached population marks of 1,000,000 also. Among modern cities, London first attained a population of 1,000,000 in 1800, and, from then on, many cities reached this limit, surpassed it, exceeded the 5,000,000 to reach a 10,000,000 figure - London first, then New York and subsequently Tokyo - and then went much beyond 10,000,000 from the moment metropolitan areas expanded into megalopolitan zones, such as that which extends from Boston to Washington (Fig. 8).

At the same time, the areas of the cities record a similar growth, as can be seen from the comparison of ancient and present-day cities.

Fig. 8. Population. Average ancient Greek city - Cties of other ages.

Fig. 9. Density. Average ancient Greek city - cities of their ages.

This is due to the fact that the built-up section of present-day cities has completely changed dimensions. Many of the cities have population of over 10,000,000, and their areas are much larger. We only have to consider that the metropolitan area of present-day Athens is 142 times larger than ancient Athens and that the larger metropolises are 600 (Paris) to 6,000 times (New York) more extensive than the ancient city. We shall have the same impression if we also think in terms of dimensions of length. Whereas the ancient inhabitants had to walk 1,000 metres, at the most, to go to the center of the city, there are at present inhabitants who have to travel 150 km. to reach their place of work. Thus, despite the use of the machine, while the ancient Greek city dweller needed a maximum of 12 minutes to approach the center of the city, the present-day inhabitant, who has a car capable of running at 150 km. An hour, often takes two hours or more to reach the center of his own city. We might thus

come to a droll conclusion: the better and faster the means of transport, the more time it takes for man to cross the corresponding city.

Another characteristic feature of the present day is that, whereas the cities grow in dimensions and colossal buildings are erected in the center and one would think that densities increase, actually they are considerably diminished in large cities of the present. Thus, whereas the centers might still have 1,500 inhabitants per hectare as compared with the 180-200 figure in ancient cities, overall metropolitan districts have around 17 inhabitants per hectare, as in London, that is to say only 1/10th of the density of the ancient Greek city, or 42 inhabitants, as in New York, and 57 inhabitants per hectare, as in the case of Tokyo (Fig. 9).

Concurrently, with the growth of the city, public spaces have begun to be destroyed. The old squares have lost much of their value since they were covered by cars. We are no longer able to view the famous Michelangelo Piazza Di Campidoglio, in Rome, because it is full of parked cars and of other cars crossing at high speed. Human values have deteriorated in the old squares. On the other hand, the new squares and the large roads become inhuman in their dimensions. They are large to permit mechanical traffic, thus completely displacing man. If we compare the dimensions of public spaces that are created at present, with the ancient ones, we find that the necessary area is no longer available to man. There are few physical spaces where man can be certain to have his gatherings and contacts, as in antiquity.

Perhaps the only spaces that have not suffered deterioration in the city are private spaces, private housing spaces in particular. The average plot in an ordinary city has retained its physical dimensions, because the average house, too, has not grown much in comparison with the ancient house; it is nearly the same area. There are no precise statistics available, but we might safely say that the average plot in an average modern city, when intended to serve as a family residence - for this is the most usual case - is commensurate in size with the plot in the ancient city. Conversely, plots designed for public functions (public buildings and others), or for production (factories, warehouses), or to serve as office premises for large organizations, have completely different dimensions from these of the ancient city.

LOSS OF HUMAN DIMENSIONS

In comparing the city of the present with the ancient Greek city, we can reach the leading conclusion that the present-day city has lost its human dimensions. It is no longer dominated by man. The change in size has not allowed maintenance of the human dimensions. If we consider the overall space of the city, the built-up city, the

public spaces or the private ones, we find that human dimensions have only been preserved in the interior of the buildings and the small house plots that belong to a family.

We have reached a point where we can conceive neither the aggregate city, for we are unable to view it as a whole, nor the small space, or dominate over it. That, too, has been taken over by the machine.

We have thus reached the tragic point where, without having conquered the larger space of the city, we have lost the smaller space too, that is, precisely that space that was of greater value to man.

In this way, man has lost the scale of the space that belonged to him and, in losing it he has also lost the intercourse he had with his fellow-men who lived in the same space. We talk about the explosion of population and the explosion of so many other phenomena, but we forget that this explosion had all the characteristics of an explosion, that is to say, a scattering of innumerable small fragments in space, which have remained unconnected. The result has been to lose coherence among men and coherence among buildings. People have lost their local communities, and buildings have lost their coherence. The result is that we now see large cities that have a completely anti-aesthetic pattern, for there is no cohesion whatsoever.

It is imperative for us to provide once again human dimensions for roads, squares, neighbourhoods, in order that we may again build up human communities. This, of course, may be contested. One may say that the human community of the district, of the neighbourhood, is no longer required, since the communities that nowadays link people are different. They are, for instance, communities of ideas, because one might stand more in need to see his colleagues, the people who have the same trade or the same social or cultural needs, than his neighbours. This argument, however, is not well founded, because the existence among people of linking ties, other than that of neighbourhood, is not something new. In the ancient city, too, there were people who had a community of the neighbourhood. Community of ideas, community of trades, community of religion, community of interests. We have many ancient cities with inhabitants who had different religions, and yet the community of the neighbourhood - the local community - played an important role. It was natural community. We see no reason why it should be taken away from man. Additional ties are, of course, necessary, but why should they deprive man of the natural local ties? We have no evidence that the community of the district, the community of the neighborhood, is not required today, and yet we destroy it.

Fig. 10. Ancient Athens and Islamabad: a comparison.

COMMUNITIES ON A HUMAN SCALE

Working on these principles, we find that, in the city of the present, we can build communities that have roughly the dimensions of the ancient Greek city, and that within these we can recreate the human scale. This experiment has been carried out in various cities. These human communities have the following characteristics:

a. They have populations proportionate to those of ancient cities, from the smallest, corresponding to ancient cities such as Priene, of 1,000 families or 5,000 inhabitants, which constitutes the smallest unit of human community in present-day cities, to human communities comparable with the ancient Athens and a population of 40-50,000 inhabitants, as is the case with the new communities of Islamabad (Fig. 10).

b. These community dimensions are analogous to those of ancient cities, from a width of 500 m. and a length of 800 m., up to a square with sides of 2km. that would permit the creation of a center at a distance of not more than 1,000m. or of 12 minutes for every inhabitant, even those living at the greatest distance.

c. The form may be simple, to enable anyone to view the center, to go to it, needing but a simple turn from any point at which he may happen to be.

d. It is not necessary for the automobile to be a dominant factor in such a community. It may be strictly subordinate to man, and leave public spaces free for human traffic. In the smaller of these communities, man and children many walk freely, from home to school, to the market, to friends' houses, or to any other point of the community without crossing cars. In the larger ones, again, one can perform all these displacements without crossing motorcar traffic lines, except in one case, if he wants to go to the large center of the community.

Before closing, there is a question which should be answered. It is permissible to arrive at conclusions about settlements, human or otherwise, solely on criteria of physical dimensions? It should not be thought that in my capacity as a "mason", I tend to disregard other considerations and only attach importance to the physical dimensions of the city.

There are material reasons why we should pay special attention to dimensions. It is true, of course, that if we limited ourselves solely to criteria of dimensions, we would not be entitled to draw conclusions as to the human qualities of a settlement. The dimensions may be small and on the human scale, yet the community may not have human qualities, because the overall conception is mistaken. On the other hand, if the dimensions are not on

a human scale, there will be no chance of creating a human community with human qualities.

In order to build human communities, it is vitally necessary to adhere to physical human dimensions. If we do so, we can be sure of creating an environment which will have all the essential human qualities.

It should not be forgotten that the communities which we build are the shell within which life grows. If we create a suitable shell, a shell with the right dimensions, we can hope to ensure happiness within it. If we do not create the right shell, there will be no hope of creating a better existence.

The human communities which we are trying to create today are not the answer to contemporary town-planning problems. They are, however, the basic elements with which we should build our big cities. If we create human communities, link them together in the right way, and repeat them as often as necessary, we shall be able to create modern cities. The modern city should be a synthesis of the human scale and the mechanical scale. Smaller units, which can be planned on human dimensions, should be based on the human scale, while larger areas are based on the mechanical one.

Thus we come to realize that we must employ two scales and two dimensions:

a. Those which man creates without mechanical means. In this sphere man is and must be the master. He must impose his own dimensions.

b. Those which man creates by mechanical means. Here he must dominate by mechanical means and impose the dimensions and characteristics of the machine.

When man succeeds in mastering these large dimensions, the whole world will be one city. When space satellites allow him to survey the entire globe and television enables him to hear the news from every corner of the world, the mechanical dimensions of the city will shrink to those of an ancient Greek city. Not only will man live in a small human community and dominate it by human dimensions, he will also live in a worldwide community, which he will dominate by means of the mechanical dimensions which he has created.

It would be a mistake, however, to think that man's mastery of his environment on the mechanical scale does away with the need for a proper relationship between man and his environment on the human scale. If we make this mistake, we shall our human qualities. On the other hand, in order to preserve our human qualities, it is not necessary to reject the opportunities offered by the

machine. We must make use of them for the benefit of man. It is imperative to achieve a synthesis on two scales: the human and the human-mechanical.

The human scale is determined by our physical human qualities, and we only need to study them. They have been reflected in many cities of the past, especially in the human dimensions of the ancient Greek city. The human mechanical scale, on which larger environments are to be created, will be found gradually, as we study the problems of contemporary cities, realize the mistakes of the past and understand their causes.

CONCLUSIONS

What is the outlook for the future? It must be admitted that we are undoubtedly moving towards ecumenopolis, a world city. The great metropolitan and megalopolitan complexes which extend over whole countries and continents will gradually merge into one universal city. Our environment will become less and less human, and, in order to function, the city will have to rely to an increasing extend on machines.

Within a century at most, this city will be an accomplished fact. The process has already begun in many parts of the world. When this materializes, unless we have taken steps to make this city a human one, the end of our civilization will be near. We are being daily left with less and less of our former human environment. Historical continuity with the environment created in the past has been broken, and today we live in unnatural conditions, like fish out of water.
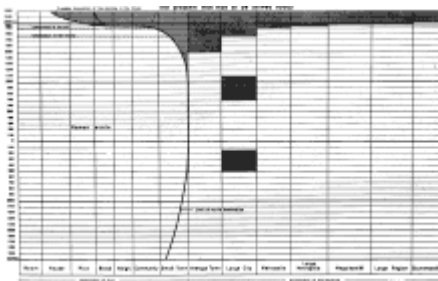
Since the start of the century, leading intellectuals have been conscious of the threat of the machine. "It will always be a threat to all that mankind has achieved, so long as to present in the sphere of the spirit, instead of the sphere of subservience", wrote Rainer Maria Rilke.

Other thinkers, however, have taken the opposite view. Saint-Exupery, writing to a fellow aviator, Guillaumet, in 1939 (La terre des hommes), said: "The handling of a highly developed mechanism has not turned you into an arid technician. It seems to me that those who are particularly alarmed by technical progress are mistaking the means for the end. Whoever strives merely in the hope of acquiring material benefits, will certainly never gain anything worth living for. The machine is not an end. The airplane is not an end. It is an instrument, like the plough".

We must bear in mind that there are great dangers ahead, but we can avoid them, if we remember than man is the goal. In the interests of man, we should return to our ancient heritage and see hoe the ancient Greek city can be

Fig. 11. Synthesis in two scales.

of special help to us (Fig. 11).

We must not permit disaster to occur. The battle is not yet lost. We have not yet allowed the machine to master our spirit, nor to dominate the smaller shells which we make for ourselves. We still have a stronghold in which human values prevail, our rooms and houses. This stronghold will enable us to regain strength set out to master the machine, and build human communities with only one purpose in mind: to create cities fit for man.

References

1. For size and population of ancient Greek city-states, see "Population", Oxford Classical Dictionary.
2. Halfway through the 5th Century BC the state of Aegina had a population of 25,000-30,000, including slaves. The state of Attica in 431 BC had a total population of 310,000. The state of Arcadia had a population of 80,000-90,000, and that of Boeotia 90,000-100,000 without allowing for slaves, who were comparatively few. The figures given for the population of the state of Corinth vary considerably According to Freeman (op. Cit., p. 93), the free population in the 5th Century BC was around 40,000-50,000 and there were some 100,000 slaves. According to W. Durant, (The Life Of Greece, New York, 1939, p. 91), in 480 BC there were 50,000 citizens and 60,000 slaves. The Oxford Classical Dictionary estimates the total population at some 80,000 in the 5th and 4th Centuries BC. Concerning population, Wycherley writes: "Hardly more than a score of city-states ever had more that 10,000 citizens, i.e. a free population of 40,000 or more, and most must have had considerably less". (p. 14).
3. The city of Priene had a population of 4,000 (see Wycherley, p.27). Olynthos had a population of some 15,000 (see L. Mumford, The City in History, New York, 1961, p. 164). The population of Selinus is estimated at some 20,000 (see F. Hiorns, Town-building in history, London, 1956, p. 31). The population of Miletus is considered to have been 20,000-30,000 (see K. Freeman, Greek City-States, London, 1950, p. 129). The total population of Delos was 20,000-30,000 (see P. Roussel, "La population de Delos a la fin du IIe siecle avant J.-C." Bulletin de Correspondance Hellenique, Vol. LV, 1931). The population of Athens in classical times is estimated at 36,000 to 50,000 (see Travlos, op.c., p. 72).
4. Wycherley (p. 27) says: "Priene can only have had a population of about 4,000, but we must not let our natural interest in the great and famous cities of Greece make us forget that there were few like Corinth, hardly any like Athens, but hundreds as Priene in size, and they all rightly claimed the name of Polis".
5. The area of these cities in hectares is as follows: Athens 215, Corinth 520.5, Delos 100, Priene 41.4, Miletus 106, Piraeus 420.3, Olynthos 60 and Selinus 63.4.
6. The population density is estimated to have been as follows: Selinus 315.4 inhabitants per hectare, Athens 200, Miletus 236, Piraeus 119, Olynthos 250, Priene 96.8, Corinth 86,5 and Delos 250. In the case of Selinus, Delos and Olynthos, the estimates are approximate.
7. Wycherley, pp. 5-7 "The Acropolis was the historical nucleus of many older cities; the town grew on its slopes. The Agora was the center, the place of "gathering" for political, commercial or social business. The Acropolis and the Agora were a double nucleus, but the Agora gradually emerged as the most vital and distinctive element of the city".
8. R. Martin, Recherches sur L'Agora Greque. (Paris, 1951), p. 544.
9. R. Martin, Recherches sur L'Agora Greque. (Paris, 1951), p. 544.

10. Wycherley, op. cit., p. 179.