

Man in the city of the future

When I decided on the subject of this article – Man in the City of the Future – I started thinking about the future and became confused. So, I decided to go to Delphi and ask the advice of the oracle. I went there and sat in the sun outside the temple until my turn came a few hours later. I went in and asked what the future of man and the city would be. The answer I received was, as always, quite confusing. I read: "prospects of survival no death of city". As you will understand, I lost my courage and I did not know what to do; I only thought that I had better take the plane and come here. But then I discovered that I was not in the year 1967, but in the year 2067.

Since I had to go to Illinois anyway I went to my hotel in Delphi and I asked how I could travel to Urbana. I was told that the simplest way was to take a helicopter because at that time there were so many automobiles in the streets that the authorities were not expecting the streets to be free for at least 7 days. A helicopter took me far away to the north of Athens where I found a large airport. After waiting for several hours, I managed to get a plane, which took me to the Jet Port from where, in 5 minutes, I reached Chicago. There the story started again. It took me hours to get out of Chicago, hours to get into Urbana. The journey from Athens to Urbana could lead one to conclude that the new law of transportation was "the shorter the distance, the more time it takes to cover it".

Flying over Europe and the United States, I could see a very great city covering large parts of both continents, a city which was very wide in places, very narrow in other places, but was at all times continuous. This was the city which, by then, humanity had called the universal city or Ecumenopolis. After suffering so much to arrive, I started thinking that we must proceed in a systematic way and understand the city. Not only because I come from a medical family, but also because I think that it is time for us to start studying the city carefully, I proceeded to the pathology of the city, and as any good pathology demands, I had to go back and understand how this enormous universal city had grown. I had to go back to the 17th century and fly over the same area, then an open countryside with few cities and minor villages spread over large distances. In the 18th century, I noticed an unnatural growth around a few of these spots. Later I saw some railway lines entering the picture, causing even greater growth, especially where the lines crossed. When new lines were built there was more growth, and new cities were born all along them, while the old ones did not grow as much. It took years of industrialization until the moment came when the automobile entered the picture

and a second ring of growth beyond the one caused by the railways was apparent. Roads, big roads, came into the picture and connected several cities together. Then there was another ring of growth, due to expansion of construction along the highways. It was then we discovered that, because of this growth, the centers of our cities were suffering. We decided to proceed with surgery and started cutting through our cities, hoping that in this way we would be able to de-congest them, not realizing that the only result would be even more construction all around.

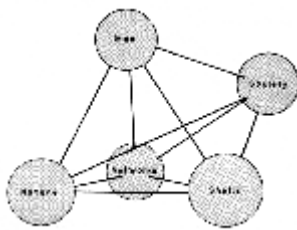


Fig. 1 The five elements.

We did not remember the story of the lady with the skunk. She rang the fire chief one day and complained that a skunk was in her basement. The fire chief said, "Well, if you want to get rid of it you can just put some crumbs of bread, leading from the basement to the forest nearby and the skunk will follow them out." Next morning the lady rang again and the fire chief asked, "Has the skunk gone?" "No", she said, "I now have two." This is what happens to our cities. We still have the impression that by creating better systems of transportation, we can get the traffic out. We forget that a better system of transportation brings the traffic in; speeds increase and, therefore, people from even greater distances are able to come into the cities. Thus our cities begin to suffer enormously. All five elements within our cities are suffering. The five elements are Nature, in which we live; Man, who has come to it; Society, created by Man; Shells, houses, buildings of all sorts with which Man covers his life; and Networks, roads, railways, water-supply lines, telecommunications, and so forth (fig. 1). All five elements are getting quite confused.

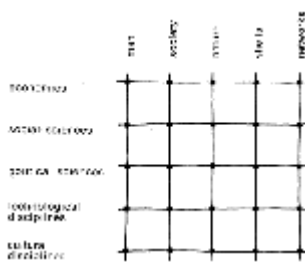


Fig. 2 Elements and sciences in the study of human settlements. 5 elements and 5 sciences. 725 nodal points. 1023 combinations of 10 by 1, 2, 3, 4, 5. 33,554,431 combinations of the 25 nodal points.

The five elements making up the human settlement can be seen in five different ways. They can be seen as economic phenomena, as social phenomena, political, technological or cultural (fig. 2). It would be hasty to say that we have only 25 types of problems. Any proper calculation will show that our problems are more than 33 million.

The father of a family feels his city is an excellent city. What he means is that business is thriving; he looks at the city from the economic point of view in its operation as a Society. The mother says this is an awful city. What she means is that she now lives in the outskirts and her chances to meet her friends and gossip during the day are very small. The daughter says, but this is a very interesting city, and what she means is that they now have excellent music and dancing lessons. The son says it is an awful city and what he means is that the city does not have the proper sports grounds; and the grandmother says this is the most beautiful city in the world, and what she means is that in her own small street the old trees have survived. Each one of us looks at the human settlement in his own peculiar personal way, problems are multiplied and we cannot agree.

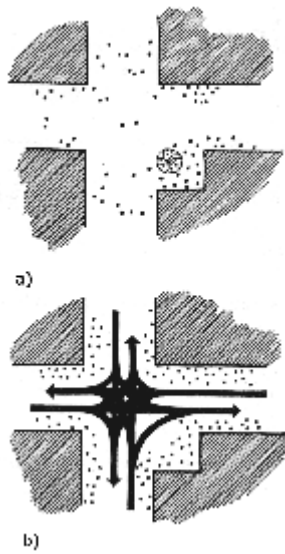


Fig. 3 Contacts in public space:
 a) easy and pleasant in the past,
 b) very difficult and dangerous at present.

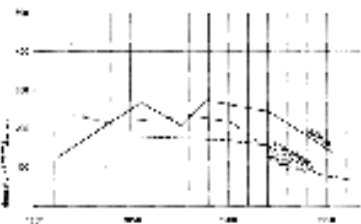


Fig. 4 Diagram of densities in three big cities.

In Nature we fail completely, we spoil natural resources, we spoil beautiful landscapes, we contaminate the air, and we pollute the water as never before. Man, who was free in the past to move into his cities, to decide about his own movements, has been deprived of even this simple freedom. The freedom to move is controlled by the machines which regulate the traffic in the city (fig. 3). Society does not operate as well as in the past. We can understand this from a single example. In the past, people lived at higher densities, now, in many cities, the density has dropped to one third of what it was in 1920 and, therefore, people have to cover larger distances in order to be interconnected (fig. 4). One could say, yes, but today we have automobiles and we have means of telecommunication. Who has automobiles? Even in a very affluent society no more than 50 % of the people do. The young ones, the very old ones and those suffering from disabilities cannot have their own automobile; they have to be driven by others. So 50 % of the population, even in a very affluent society, is deprived of the right to be connected with others. How are we to use the means of telecommunications? We have said that we have telephone and television to bring people together, but is television really to replace the father at bed time when his children need him, and can the telephone replace the relationship of the two sexes?

Man himself is losing the battle in his cities. He is turning gradually into a troglodyte, he cannot move freely in the streets any more, he cannot and does not want to breathe the air of these streets. We now have air conditioning in several big buildings, we have the contaminated air outside, but we are supposed to breathe it when we go out to get some fresh air. Man no longer wants or enjoys his architecture. The age-old love affair between man and architecture has been lost. You cannot see architecture if you have automobiles between yourself and the building. The only way to look at an architectural creation is to look at it from a large distance, to walk towards it, to go to the side and find the angle from which you like it. If you try this with any building in the modern city you will be killed. We cannot have art which is based on esthetic conceptions if we cannot use our senses properly. The real relationship of man to his works of art is related very much to space, to the senses of man and to his movements. Man, the troglodyte, is upset in the city and he abandons it, he goes far out. He turns into a nomad, living in low densities, losing the most precious advantage of the civilized city, that is, high density which aided in the creation of philosophy, democracy and the arts. Man has reduced his freedoms, he is losing his battle.

If we could project ourselves to the year 2067 we would see that even dancing would look mechanical. Man, who has to walk in all his streets conditioned by the green and red light, cannot express himself in any different way in

dancing. He enjoyed jumping high in folk dances when he lived in the mountains, because his natural way of walking was by jumping from rock to rock. Pindar, the ancient Greek poet, says that he could hear the steps of the dancing men in Delphi. This was misinterpreted to mean that there were dancers in Delphi, but there were not. The people coming from the mountains to Delphi were dancing. In the past, man could develop his senses, including his movement. I do not know whether you know the story of the Chinese dancer who went to visit a temple on top of a hill and, after walking up all the stairs, ran down. Up he walked again and once he had done so the monk asked him, "What is the matter?" He answered, "Two steps are missing." The monk said, "No, that is not possible, because you can see the top of the hill is paved, and it has always been this way." Then the dancer said, "You can dig down", and they dug and they found the two missing steps. There were people who could feel space and these were the people who created the arts. Today we create art for museums and this is not the right way for the expression of humanity. This is the city we are building for the future.

There are many people who oppose this idea and say, look, these cities are not going to occur, so do not be worried. Their arguments are the following:

First, that we are not going to have a continuous increase of the population, but all the studies carried out prove that the population of the Earth will grow for several more generations. It may well level off by the end of the next century, but not before. This means that even if a universal birth control act was passed by the United Nations tonight, we would still have 12 billion people on this Earth, because of the ongoing forces. As this act is not going to be passed, it is much more probable that we will have 25 to 30 billion people, that is 8 to 10 times more than at present, which means an urban population (today 1.3 billion) almost 25 times larger than the present one. One must, therefore, think of the average city at the end of the next century as having 25 times more people, 75 to 150 times larger area, many more cars, and so forth. It is not possible to plan on a decreasing or stable population, it is not realistic.

Second, that urbanization will not continue. The people who speak in these terms say that today we have a movement towards centralization; actually we are already beginning to witness a movement towards decentralization, and I mention the example of the corporations moving out of New York or out of the heart of London. Their argument is incorrect because the city is not only the central part of New York or the central part of London; the city is these big corporations and the big functions of man. So if all our functions are moving out of the city to new places, it is there that we will have the big city and the high densities. It is wrong to believe that we

will reverse the trend of urbanization or centralization.

Third, that technological progress and mass communications will solve this problem for us. We have no proof for that. On the contrary, all studies which have been done carefully by some companies (including companies in the New York area) prove that whereas the number of units of information which we receive daily from new means of communications, such as newspapers with wide circulation, telephone, television, networks, and so forth, increases very much, the number of person-to-person contacts does not decrease at all. This proves that the new means of communications have added a new dimension of more contacts, but they have not had any impact on person- to-person contacts.

Fourth, finally, that technological changes are so big that they are unpredictable. And as a result of all these they want us to cross our hands and sit back and say because there are unpredictable factors (and there are unpredictable factors) we should not work on the basis of the predictable ones. But that is also wrong. It is wrong, because we know that even if we have a very important invention tonight; it will take several decades for this invention to have an impact on our lives.

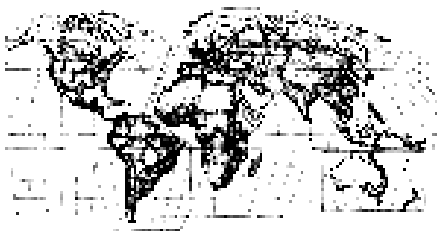


Fig. 5 Ecumenopolis in 2100 A.D.

We can therefore reach the safe conclusion that we are heading towards a very big universal city and that this system will continue developing. This is the city which we call "The Universal City" or "Ecumenopolis", (fig. 5) which is going to be much larger than the present ones and which is, by necessity, going to eliminate and kill man and civilization, because this city is not under the control of man. We have the obligation to ask ourselves: if this happens, if this is the pathology of the situation, why do we not make the proper diagnosis, why do we not understand what is happening and why it is happening? I think it is high time for man to start working towards a systematic diagnosis of the situation. The best way is to start with an effort to inscribe all the phenomena we are talking about on a proper scale.

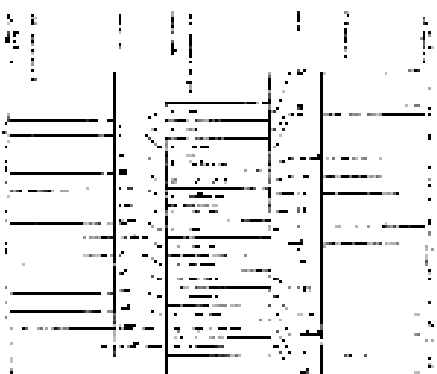


Fig. 6 Ekistic logarithmic scale, graphic interpretation.

I use a scale I call the Ekistic Logarithmic Scale which presents in equal columns all the units in space with which man is dealing, from the smallest unit, man, himself, to the room, the house, the neighborhood, the small city, the small city of the past to the big metropolis, to the megalopolis, and finally to unit 15, which is the whole Earth (fig. 6). If we try now to inscribe our phenomena on a scale from 0 to 100 % we begin to see that we could put some order in our thoughts and define some of our problems. For example, we often speak of the human scale and I have heard people speaking about the human scale in the megalopolis between Boston and Washington. This is absurd, it does not make sense, and there is no human scale between Boston and Washington. The human scale is where man gets with with his own natural forces.

How far can I walk in a city? History proves that the average man usually wants to walk ten minutes, and this has been confirmed by recent studies in many cities. Ten minutes walking takes man up to the boundaries of a small city. The percentage drops because older people, and people who do not like to walk, do not walk the whole distance. Then beyond the home, in the neighborhood, people begin to use bicycles. They may use them over larger distances and then they start using automobiles usually up to the end of their metropolis. Beyond the metropolis we have other means of transportation such as the airplane, the jet and others.

We say the Earth is shrinking. Thank God we are wrong in this statement. If we want to make a statement like this, it is preferable to say man is expanding. But even this would be wrong, because man is not expanding in his body and in his senses. I cannot walk longer now and I cannot see farther and I cannot hear over longer distances. An auditorium built for 5,000 people could not contain 20,000 people; they could not see what the lecturer was drawing.

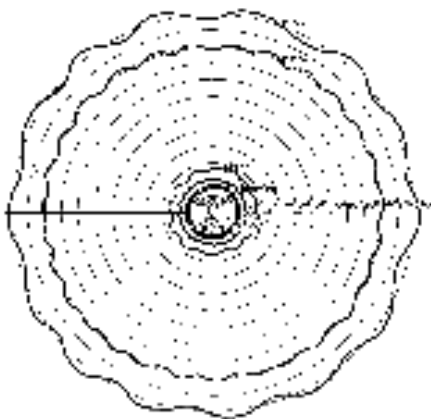


Fig. 7 Human dimensions as defined by the body and senses of Man.

There are human dimensions which remain constant. They are dimensions derived from the body and the senses (fig. 7). Man has certain natural abilities which do not change, and in the modern city, in the modern way of living, we tend to overlook this. Because I can fly over vast distances it does not mean that the dimensions of my room, the dimensions of my street should be changed, it does not mean that distances between people sitting together should change. In this way we can begin to put some order in some of the phenomena and we can start moving into specific areas of great concern to us and try to understand them.

If we consider a crossroads as it was in the 17th century we will see that people walk about on the crossroads and meet in groups. They talk, they walk together, mother and child, and so forth. Now if we take this same crossroads in our century we will see a new factor which does not allow people to move in the middle of the street, and therefore the people are squeezed. We are very much concerned in physics about atoms and molecules and their distances. When the distances change, we have new problems. Why should we not begin being concerned about ourselves, our own atoms and our own molecules? We change the structure of the city, we stop being able to see, we cannot see the other side of the street because we have big buses and high - speed cars in between. Where it was of great value to have a window on the street, now it is of great value not to have a window on the street. Who can work with cars passing at high speeds outside, and who is interested in walking in a street, even if it has a statue, which is crossed continuously by cars? The statue itself looks much more like a traffic policeman, because you can see only its head above the tops of the cars.

I think we are forced to say that we have overlooked the impact of technological progress on the city. We have gained in the big scale, we have lost in the small scale. We cannot walk freely in the streets, our children cannot run freely in the streets, and thus, we do not know how many of the phobias of modern man are due to the fact that, for the first time in his history, he is not free in his cities. We are entitled to say that the conclusion of our diagnosis is that our battle is lost.

Now we must ask ourselves whether this is necessary, whether this is unavoidable, whether we should sit back with crossed hands and see this change, which leads to a disaster for the city and for man. Such considerations made me turn back to the small piece of clay on which my oracle was written and try to read it again; and as with every oracle, I discovered that it could be read in two ways. It all depends where you put the full stop. It could read, "Prospects of survival no. Death of city", or "Prospects of survival. No death of city". This was the old game of the oracle. It allowed you to make any conclusion about what it said. Let us now see whether there is such a chance. Survival of man. No death of the city.

Let us go back to the year 2067, let us go back to Delphi and try to travel to Urbana. Imagine that I go back to my hotel and say that my destination is Urbana. I am told that the plastic bubble in which I am going to travel will be in my room in ten minutes. It is brought in, I enter it, I hang up my coat, I sit in the armchair, I push some buttons which say: "meal to be served at 1 o'clock Greenwich time," "I am not interested in the stories of the steward," "I do not want to be disturbed." From then on I do not feel anything, because the bubble is taken mechanically into an underground network. It is transferred to a jet, to a rocket, it is flown over the Atlantic to Chicago, put again into an underground network and gradually fed under the building of the students union. I then open my door and step out. This looks strange, but it is the most natural solution technologically. By now we are convinced that highways do not lead to any solution.

Two recent studies by the Rand Corporation, published in 1965, and by the Athens Technological Institute, came to the same conclusion, that in the seventies it will be cheaper to construct tunnels under the big cities than highways through or around them. The reason is that the land values increase and the values of the buildings increase and modern technology decreases the cost of tunnels instead of highways in the big cities. In the 80's, in the 90's and beyond, it will be much cheaper to construct underground networks. Therefore, man will learn a very simple truth, which nature learned thousands, millions, billions of years ago: those networks should never run on the surface.

Networks in nature are always underground. In your own

body, which is full of networks, the speeds of the blood, for example, are equal to one in the capillaries, and to seven hundred in our central aorta. But the higher the speed, the deeper they are placed. We must understand that man is gradually shaping the surface of the Earth as a natural phenomenon and that we will have to repeat what nature has done, because this is the only way to have the proper transportation. It is unreasonable to have cars capable of running at a hundred miles an hour, but crossing our cities at nine miles an hour. If we place our networks below the surface, we will free the surface of the Earth for man and for natural phenomena and will have the highest possible speeds. Any proper analysis shows that this is what we can do not only technologically, but also economically.

The great difference between my two trips to Urbana, the grim one and the better one, depends on whether we believe in the extrapolation of trends or in the setting of goals. One of the greatest weaknesses of planning for the future is that people study the trends. They forget that if the extrapolated future is not what man needs, we must have the ability to set a new goal and see how we are to change the trend to achieve it. Think what would have happened if Thomas Edison had believed in the extrapolation of trends? We would have remained with oil lamps; if slightly better oil lamps. Progress is not achieved by those who believe in the extrapolation of trends; it is achieved by those who study the extrapolation of trends, and change them when they do not correspond to man's interests. This is what we must understand, this is what we must achieve, the setting of goals for man's interests.

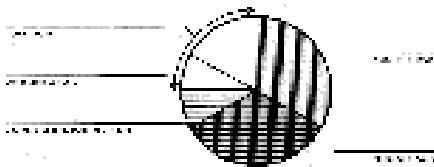


Fig. 8 Time budget.

Man is interested in being free, happy and safe. If we want to build the city of man and not the city of machines, we have to understand this and start by setting the proper goals. What can the proper goals be? Aristotle has found them: happiness and safety. But if we remain with these general terms, we may confuse others and ourselves, we may even cheat society and humanity. We must, if we want to be practical, express these vague terms of happiness and safety in operational terms. Let us try one method. Our most important commodity is time, we have 24 hours a day, of which we spend 8 hours sleeping, 8 hours on the average working, 2 hours eating, washing, etc (fig. 8). We are left with 6 hours, 6 hours that make for the great difference between man and animal, during which we enjoy ourselves, relax, think, create and then implement these ideas, which we conceived during office hours.

Now what do we do today in our city? A recent study in the Detroit area has proved that the average man spends 1 hour commuting in the morning, 1 hour commuting in the afternoon, two hours commuting per day, two out of the 6 free hours. One third of our lifetime is lost. If we make a proper analysis we will understand that we are

leading to an impasse, because with every five years that pass we add ten minutes to our commuting time. This is not reasonable. We can start with a time budget, which can be translated into a city and then we can qualify the time we spend. Have we answered the question whether it is better to walk for ten minutes to work, to drive 20 minutes by Volkswagen, or two hours by Rolls Royce? What makes more sense in terms of human values? We need the cars to cover large distances; do we need them for small distances? Could we not start establishing some systematic criteria to help people select the location they want inside the urban area in which they live? This is a necessity and we have to do it.

In order to achieve it we have to understand that above the other sciences we must set a new one: the Science of Man, as Alexis Carrel named it. Being a Greek and tending to new terms, I call it Anthropics — the science of anthropos, of man, which will study him as a whole and will help him to set goals and then form his habitat accordingly.

It was very fashionable when I was a student to speak of cities and to present them only as buildings. Thirty-five years ago, almost all books about cities were full of pictures of buildings. Then the battle in the streets was lost, and many people thought that the problem of cities was a problem of traffic and the era of the highways started. Later it became apparent that this was not a solution and people started talking much more about the city as a social problem; and lately, and especially in the United States, as a racial problem. But all these views are equally wrong, because the city consists of five elements — Nature, Man, Society, Shells and Networks — interconnected in many ways. We are dealing with one unit, the system of human settlements, and nobody can break it any more because we have built the system for thousands of years. We can no longer survive outside the system, and any element we change has an impact on the others; therefore, any effort to solve social problems in the city, to re-establish human values in the city, to build a physically better city, to save nature in the city are doomed to complete failure. Unless we study the whole system and see the impact of the change of one element on another and work simultaneously on the whole, this is so.

It is an imperative necessity that we understand the complex situation with which we are dealing and try to work for the whole system, which forms this surrounding habitat, our own life. How can we do it? We have to use new methods. Setting goals only is not enough. Setting goals gives the directive; but unless we use a completely new methodology we will fail completely.

I was at a loss many years on this point until I finally managed to understand how we think, when we try to

create something. Suppose that I am invited to a village and asked how this village should grow. After studying the situation, I say this village should grow along the valley. I do not say this because I know that this is the only right solution. I say it because I know that the other solutions are excluded. Because there are steep hills on both sides, the only solution, the only possible alternative is to go down the valley. I am positive when I have been able to exclude other alternatives. Gradually I understood that this perhaps was an opening towards the selection of the best solution. Gradually I understood that the best solution could not be defined by me. It was defined by facts and my sole role as the technician, as the expert, was to find the proper solution. This works against the traditional opinion that we need people with imagination, or that we need people with bright ideas about our cities. We do not need people with great ideas, we need people who are very careful workers and who are systematic enough to select the best solution out of all possible solutions.



Fig. 9 Matrix of alternatives.
Step A 1: input.
49,000,000 alternatives.

In such complex situations any careful analysis will prove that we always deal with millions of alternatives. A recent study which we are carrying out now for the Urban Detroit Area of seven and a half million people, has proved that if we want to study all possible alternatives, we must deal with 49 million of them, which means even if we dedicate one page of study to each we will have 49 thousand volumes of one thousand pages. You understand that it is impossible. Therefore we have to start thinking about how we can eliminate many of the 49 million solutions. The only way is to agree on the criteria to use and then begin to eliminate (fig. 9).

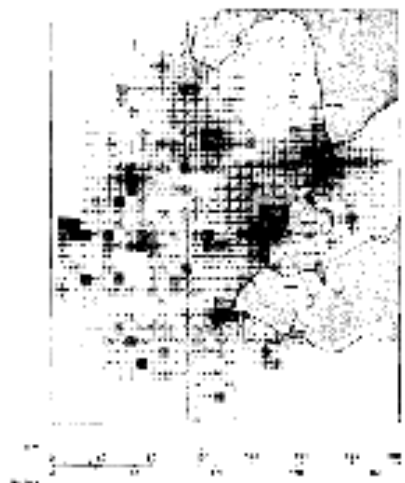


Fig. 10 Detroit area project, population distribution by accessibility model.

In the process of elimination we had to train our minds to answer the basic questions of the future. When we started working with the transportation expert we found that we had a range of opinions about the speeds of automobiles and railways in the year 2000, they were ranging from a hundred miles an hour to 6 hundred miles an hour. Where do we stop? We found that it was not up to us to decide, it was up to the city to answer. Many of our alternatives were built on these various assumptions of speeds (fig. 10). When we started working on our system we found that several sets of speeds were completely excluded. The sets of speeds with more than 250 miles an hour were completely excluded by themselves, because it would take man so much time to enter this high-speed system that it would not be worthwhile to use them within the Urban Detroit Area with a hundred miles radius. In order to use these high speeds man had to travel at least to Chicago. So they were not speeds within urban areas, but speeds connecting urban areas. In the same way we found that if we continue with speeds of hundreds of miles we have other weaknesses, and we came to the conclusion that the speeds, which could provide solutions for the year 2000 for such big urban areas, were between 200 and 250 miles. Thinking in the same way, we start with all sets of

reasonable densities, from the very high densities to the very low ones and by combining these densities with the speeds and with the maximum traveling time and the cost of the city we found that we could not continue with very low densities, because then we would never have enough services, would never have enough buses to help us. School children would find it very difficult to reach their schools; communities would not be able to support the systematic cleaning of streets, or the maintenance of postal services. Services would be completely uneconomic relating to the incomes of the people; and, therefore, we came through economic considerations, social considerations to conclusions about the densities and many other factors.

What the system provides is the following: even if we are wrong in many of our assumptions and even if we forget a possibility we can insert a new factor into the system and in 22 minutes of computer time can show the impact of this new factor on every other factor. So every new factor can be inserted and can be judged.

In the way we begin a systematic objective study of the city and its problems, we begin to remove likes and dislikes, only valid for esthetics, or in small spaces, as far as man can see and feel, but which are not valid where man cannot see. The forces here are much more technological, economic and geographic. In this way, by developing a proper system about our cities, we do not solve the problems but help those concerned to solve them.

The role of the experts is not to make the decisions for humanity and the community. In a democracy these decisions have to be taken by those concerned. The role of the experts is to illuminate the alternatives and permit those who decide about our future to take the proper decisions in full knowledge of what they mean.

The city of the future has to be built on a human scale. This is our greatest obligation. If we study our scale of the human influence properly and see how far our senses go, we will discover what humanity had discovered up to the 17th century and forgot afterwards, that man's human scale leads up to a circle or a square of about 2,000 yards. If you walk to a distance greater than 2,500 yards from the Arc de Triomphe in Paris, you will see it, but you will not know whether it is a cardboard cut out on the horizon or architecture and sculpture. In order to understand this great monument, the Arc de Triomphe, you have to be within a distance of less than 2,500 yards, and then you begin to see that it is three-dimensional. When you are within a distance of 1,000 yards, you will see that it also has sculpture on it. Over greater distances it is immaterial what it consists of. In this unit we can establish the human scale as it was in the past. But the big city will cover the whole world in relation to this small unit. Therefore the

answer is the one nature gave when building organisms. Nature itself started with cells, and then built animals and plants by their repetition. This is what we must do. In the 18th, 19th and 20th centuries man made a grave mistake in allowing one cell to grow into an animal; this animal does not operate. The problem is to allow this cell to be multiplied and then bring into it the various networks: the nervous systems, the transportation system, the blood system, which will make it work in a reasonable way. This is our great task, the establishment of human values, of a human way of living within the universal city, which by nature will be inhuman in its size. Is this going to happen? I cannot answer this for anyone else. The reader must stand in front of his mirror, and ask himself this same question. My generation can contribute in recognizing the problem and in paving the way. It is the younger generation that will survive this turning point. Perhaps after going to the mirror, after asking this question, the reader may come back to me and say: but it is difficult, it is a difficult task! And then I can only answer by quoting something that the Greek writer Nikos Kazantzakis has written, before dying, "reach where you cannot."