The science of ekistics

The text that follows is a slightly edited version of a document by C.A. Doxiadis extracted from Ekistics – An Introduction to the Science of Human Settlements *(London, Hutchinson, 1968), Chapter 2, pp. 44-51.*

Our knowledge of human settlements

This is not the first time that Man has dealt with human settlements. It may, therefore, be useful to examine how he faced his problems in the past. Actually, he has been handling these problems for thousands of years—very roughly speaking for about ten thousand years in villages, and five to six thousand years in towns; and, for as far back as we know, he has always set the same goals for his life in a city. We have Aristotle's word for that. If this is so, then how has Man dealt with the problems of the study and creation of human settlements, and why are we now seeking new methods and solutions for old problems?

For several thousands of years, Man lived in villages. The demand for community services was very small, and we have no reason to believe that the villages failed to provide the services they were expected to provide for Man. Then, about five to six thousand years ago, Man started to build cities. Conditions in these cities must have been quite satisfactory for quite a long period. This may seem a strange assumption when we consider the technological progress achieved very recently in cities—the progress of sanitary facilities for example, or even the large capital investments in cities made in recent years. However, if we consider that more and more people are being killed or maimed in traffic accidents; if we re-

member how difficult it is today to move from one part of the city to another without wasting time and effort and without getting tired and exasperated; if we remember that racial and social problems are increasing and reaching critical proportions, that the delinquency rate is very high; and if, finally, we recognise that our settlements usually do not create a proper environment for a better life, we may conclude that conditions were more satisfactory in the past. This is especially true when we take into consideration the lower expectations of Man in earlier times.

In the past, settlements were certainly poor and technologically much less developed than today, but so was the whole of mankind. Expectations were, therefore, lower than at present. From the point of view of health, conditions in the larger cities were in several respects less hygienic in the past, especially in the poorer sections; but contemporary cities do cause diseases for body and mind. In many villages, on the other hand, conditions were not greatly different from what they are today. Life in the cities and towns, so far as we can judge, was better organised, more unified and more homogeneous. Certainly a reason for this was that the cities were much smaller than they are today. Until the eighteenth century, most cities of the various civilisations of the world did not exceed fifty thousand inhabitants. It was only on rare occasions that they reached higher figures, and, on the whole, only for very short periods. Beginning in the eighteenth century, however, cities started to attract several hundred thousands of inhabitants, so that around 1800 Man witnessed the emergence of London as the first million-inhabitant city of the contemporary era.

Thus, with small populations and no mechanical means of transportation, most cities of the past, even the larger ones, did not exceed about two kilometres in length (fig. 1) and could
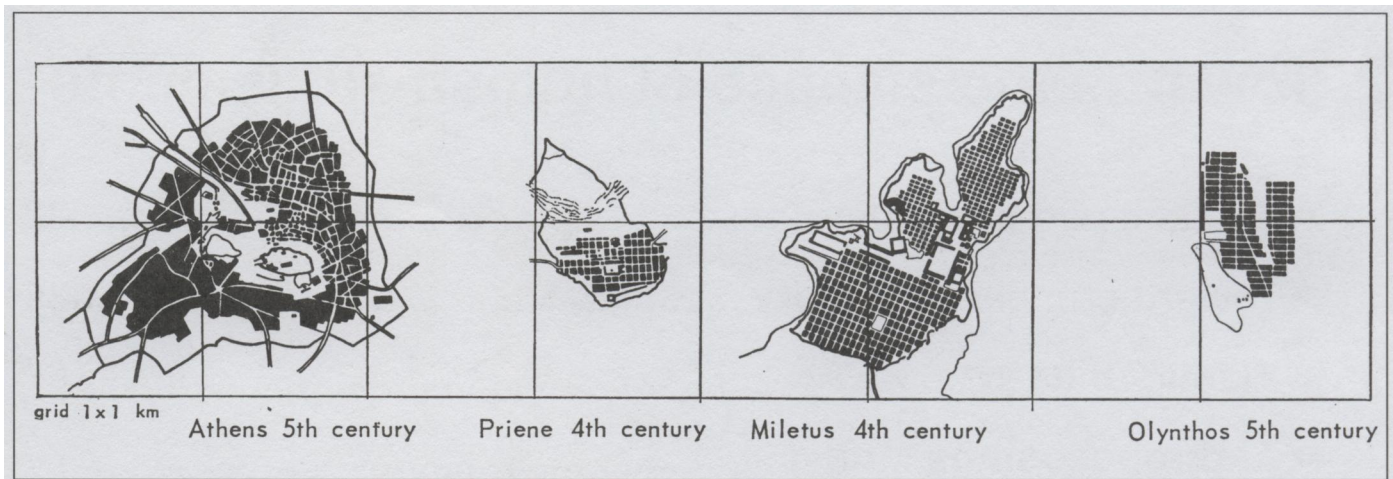

grid 1 x 1 km   Athens 5th century   Priene 4th century   Miletus 4th century   Olynthos 5th century

Fig. 1: Ancient Greek cities.

be crossed on foot in not more than about twenty minutes. These cities had yet another characteristic: most of them were surrounded by walls for long periods of their existence so that, either their population could not increase, or the increase was so small that it could be absorbed inside the existing walls. Only seldom, and with intervals of whole centuries between, did it become necessary to expand the area of the towns and build new walls. In the Byzantine city of Constantinople, one of the largest cities before the eighteenth century (fig. 2), created by Constantine the Great in the fourth century, enlargement was necessary only once; it was carried out by Theodosios II in the first half of the fifth century.
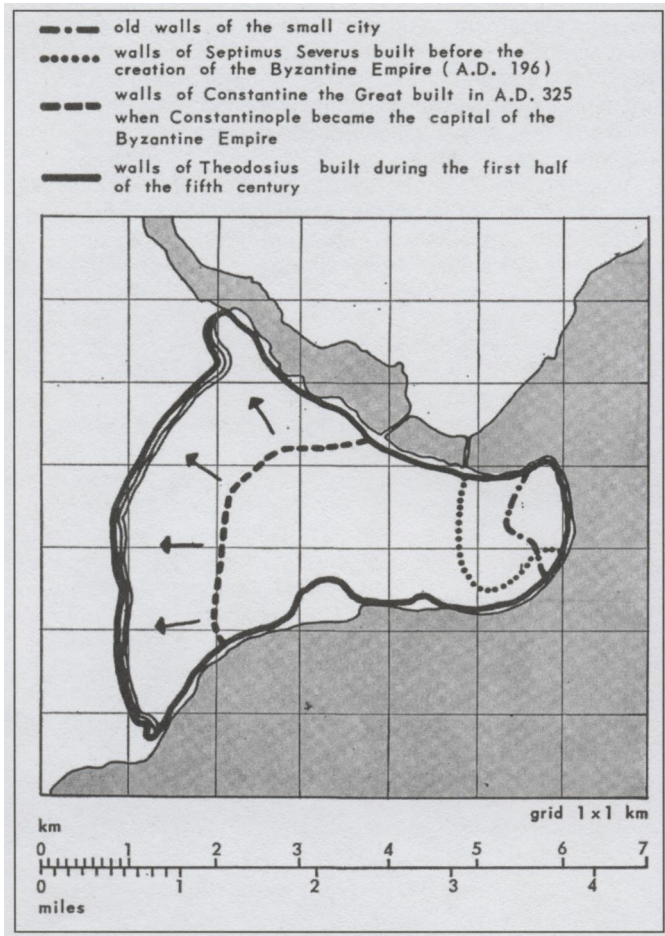

Fig. 2: The expansion of Byzantine Constantinople.

Because their physical dimensions were small and their development slow, these towns were built on a human scale. Man walked freely inside them from one end to the other without meeting obstacles. He walked about the town feeling at home in it, enjoying it, hating it, admiring it, criticising it, living in it, so that it gradually became for him a kind of work of art in which he was deeply involved. This was the beginning of a long love affair between Man and art, as expressed by the town in which he lived. To realise this better, let us remember that the Acropolis of Athens was built over a long period of years and during several different phases of Athenian history. And we also remember that many important towns did not change in size over long periods of their history. Michelangelo, for instance, grew up and lived the greatest part of his life in Florence, a town that was essentially static. He walked its streets and its squares, and had time to think and let ideas ferment in his mind as to where statues or monuments were

needed. The statues and monuments which he created were therefore linked with the town and with its inhabitants. When he placed his David at the Piazza de la Signoria, people came at night and stuck notes of praise or disapproval on the statue. Town, square and Man were all interconnected to form a unified entity.

In these towns which were, as we like to say, technologically undeveloped in relation to modern ones, but small and on a human scale, a man could walk about, comprehend, assimilate, become integrated. If a new idea in architecture was implemented, it could be established only if public opinion accepted it, because a new house was one of the very few being built in one year. Naturally, it would become the centre of attention and criticism, and, if it seemed to be good and to contribute to progress, other people copied it. If it was ugly, society did not accept it, and the house was ignored; no one copied it and little by little it was forgotten. Thus, through small experiments, small mistakes were corrected and improved. Through trial and error, architecture and the city developed.

In a way, each man was an expert on the subject of his town. If a town had only two-storey houses, nobody would lightly and without good reason have dared to build a three-storey house. Everyone knew that the masons were not accustomed to it, that the people would revolt against such a construction, since everybody was used to the idea that all people lived in similar types of houses, and that only public buildings or buildings dedicated to God could distinguish themselves from the others by location, height and investment. There was no necessity even for the common man to possess any special knowledge in order to know exactly what type of house was acceptable in every street and neighbourhood, and to know that public buildings should give a special character to every settlement and every section of it.

We can see then that most of the towns of the past were created by their inhabitants in a collective, slow, systematic and not always conscious collaboration, which ensured survival of the best elements already in existence. This was a collective knowledge, which for many people could have been conscious, but for many others was certainly unconscious. As for the few towns, which were created as such from the beginning, or the parts of towns which did not grow by themselves but were given shape by leaders and craftsmen, these as well had to be in harmony with the traditions created by the people, traditions which demanded that a man of talent express them in more elaborate, official and monumental forms.

When Hippodamos organised the Greek town and planned Miletus, when the Roman planners spread their new towns over their empire, when the Renaissance artists redeveloped the Italian cities, when the Khan-I-Meamaran, or the master-builders of the Great Moguls, created Fatehpur-Sikri and Agra, or the Chinese emperors, Peking, they were all expressing, in an organised, official and monumental way, the trends and traditions which had been created throughout the centuries by the inhabitants of all the villages and small towns they had known in their parts of the world. The ability to grasp such tendencies and the talent to express them in more official forms were necessary in order to lead from the modest achievements of everyday architecture to an artistic and extraordinary creation. That is how the important built-up areas in many towns were created in the past. For us today these are model cities, with qualities that induce us to stay in them as long as possible. This is true not only for the famous ancient and medieval cities, but also for less known settlements of the past that through the years grew gradually and naturally into works of art.

I must repeat: for about ten thousand years Man has lived

in villages, and for more than five thousand years in small urban settlements whose size and slow growth permitted the creation of continuous and compact settlements, and endowed these with values which remain important even today. Man created in these static settlements suitable shells and environment for an organised human life. In almost all these settlements, the five elements (Nature, Man, Society, Shells and Networks) were in complete balance. And even when they did slip out of balance, the divergency was small, and could be brought back into balance without a major effort.

Then, beginning in the eighteenth century, continuing through the nineteenth, and especially in the twentieth century, the picture changed completely. The elements of human settlements are now developing individually at such different paces that the balance between them is lost. Man is developing demographically, culturally and intellectually. Society is growing and becoming more complex. The Networks of the settlements are being multiplied and complicated. Nature is being spoilt; the air and the water are being polluted; precious resources are being destroyed. The Shells which have to cover all these elements and connect them into a rational whole, can no longer catch up with these developments. The changes are too numerous, and they take place too fast.

The magnitude of the change can be clearly seen, for example, in the form of the city and the factors influencing it, the landscape, functions and also the inhabitants. The inhabitants, for many thousands of years, had been limited to human beings and some domestic animals. Then, in the nineteenth century, the advent of the railway had a great effect on the city, although it was able to exert a major influence only on its form, making it spread along the lines of its tracks. But, in the twentieth century, the city is inhabited by both humans and machines, mostly cars. Let us see how the latter influence the form of the city. Man moves at a speed of about five kilometres an hour (three miles per hour), just as he did in ages past, but cars, even in urban areas, move at speeds of up to two hundred kilometres per hour (125 miles per hour). These speeds, however, are not constant, since on many occasions cars cannot, and should not, move at speeds higher than the speed of Man. So, in addition to the original inhabitant, whose speed is constant and uniform, we now have a second one, whose speed fluctuates from five to two hundred kilometres an hour. This fluctuation depends on two factors: an exogenic one, imposed by the form and paving of the streets and traffic regulations; the other endogenic resulting from Man's personal desire to use different speeds. While in the past the structure and form of the city was largely influenced by the movement of Man, now it is influenced by the movement of Man and machine (fig. 3). Furthermore, we now have to reckon with the constantly changing maximum speed of the machine which depends on external causes, such as the design and condition of the roads on which it is moving, or internal ones, such as mechanical improvements which increase its power and speed.

We can also foresee that this potential speed is going to increase continuously, especially when new road designs are accepted and new cars, perhaps radar driven, are in use. We now have to reckon with the form of the city controlled both by Man's slow constant speed and the changing speed of the car and other machines, a speed whose maximum is still unknown. In the past one constant speed factor influenced the shape of the city, but now we have many factors moving at many different speeds and the variety of combination of movements in speed, direction, facilities, and so forth, has become very great. Therefore, we cannot move toward the study of the structure and form of the city without first thoroughly reconsidering the whole system of phenomena and ideas which influence our way of life and the settlements we

build for our life.

This increase in the dimensions and the problems of our cities, as well as the increase of the order of complexity within them, comes at a time when human and social sciences are not sufficiently developed. Fred L. Whipple stated lately that they are in the phase in which the natural sciences were when the telescope was developed.[1] At the same time scientists, natural and social, are tending towards overspecialisation, and consequently losing sight of the whole phenomenon they are dealing with. This is true not only of scientists, but also of the attempts of Man to face the contemporary problems of his settlements. In the first complex settlements of the nineteenth century, and even more in the twentieth-century settlements, Man lost the ability to comprehend the totality of a human settlement, to understand and analyse it, and to create a synthesis out of its many elements. The natural ability which Man acquired in the past, of understanding the evolution of his settlement, of adjusting himself to it and developing it in a way that preserved its existing balance or else creating a new one, has now been lost.

Responsibilities have now been split in many ways. We have a multitude of specialists each trying to solve the existing problem separately. The town-planner is very often no more than a designer of two-dimensional plans with a few
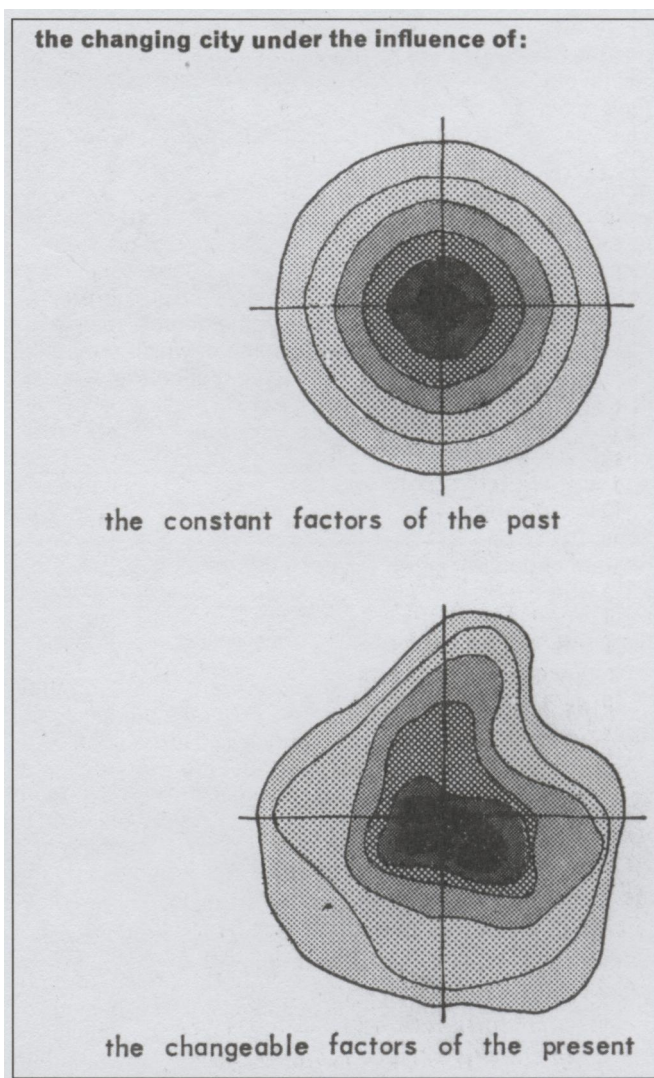

Fig. 3: The changing city under the influence of the constant factors of the past and the changeable factors of the present.

three-dimensional conceptions; the architect can do no more than take a plot of land and build on it and cannot assume the responsibility of the urban space finally produced—he can always throw the blame on the town-planner, or building regulations or attitudes of the neighbours; the civil engineer has been confined to taking care of underground parts of the town rather than what appears on the surface, with the exception of the structural cores of major buildings; the urban economist is simply interpreting urban economic phenomena; the sociologist is only analysing social problems, etc. The traffic engineer confines himself to existing trends, though very often he has to act as a surgeon, cutting open but not healing the city. The artist hides himself in the buildings, as there is seldom place for his work outdoors any longer. But who is it who deals with the whole ? Who is seeing to the balance between Man, Society, Networks, Nature and Shells ?

The gap between Man and his ability to cope with the problems of human settlements is already very big and is constantly increasing. In our course towards extreme specialisation in dealing with the problems of settlements, we have missed the main purpose for which settlements were created: human happiness, the happiness Man finds in the balance between himself and the other elements of his settlement. With every passing day, we are losing more of our ability to face the problem of human settlements in a synthetic way, because the more specialised we become, the more we move away from an understanding of the overall problem, and the more we forget the need for synthesis.

One may ask how we can say that it is only today that we have really lost the ability to face these problems holistically when humanity started to lose this ability in the eighteenth century and more definitely at the beginning of the nineteenth century. It would appear that most of the people now living were born without it. However, I believe, I can insist that the loss of this ability is a continuous process and that we are still losing it, on the following grounds. First, under the influence of many new forces, we are undoubtedly losing this ability in the big cities, although we have, to some degree, maintained it in our villages and small towns, some of which remain under constant, slow development. Even a specialist who fails in a big city may sometimes give a natural and logical solution for the problems of small centres. Therefore, in a way, we still possess these abilities, because we have some small towns and villages that are not under the influence of big, uncontrollable forces, and they can help us to understand correct solutions. Even the most uneducated people, if they give these matters enough thought, will not lightheartedly spoil a small town where everything is still in balance, and even if they do try, it is certain that they will meet with resistance from the inhabitants, unless the latter have already been deformed in their judgment by the nearness of a big city.

Second, I would attempt to answer this assertion in the manner of the aborigines of Australia who, when asked why they put their children in the water of rivers or lakes to swim soon after they are born, replied that they must do so before their children forget how to swim, implying that we have certain natural abilities which we run the danger of losing when life guides us in certain other directions. The ability of our forefathers to produce a synthesis on a certain scale must still exist in us because good examples of their activity still survive, but we are losing it because we are ignoring the various dimensions of the present problem and the need to develop this ability to meet the new requirements of our times.

Faced with the present problems and the present failures, the experts have retreated to their own corners to meet the problems either through separate sciences, such as economics, sociology, administrative sciences, technical and cultural disciplines, or by looking into a special aspect of the problem

like transportation, housing or community facilities. As a result, modern architecture, which could contribute enormously to the creation of better cities, has not done so. Physical planning has been limited largely to regulative rather than creative action, regional planning is lost in theoretical research, and the overall problem has been practically abandoned.

It was only in the twentieth century that the first attempts at a better understanding or solution of this problem were made. Patrick Geddes tried to understand the total situation by extending his research to include several fields of knowledge and several areas of the world.[2] It was not, however, until the years between the two World Wars that specific attempts were made at a better understanding. Some of these attempts were directed towards achieving a knowledge of what was happening, ranging from the micro-scale of Brinckmann's *Platz und Monument*[3] and Camillo Sitte's analysis of old cities,[4] to the enlightening macro-scale efforts of Walter Christaller[5] to understand the interrelationship of settlements in space and the existence of certain networks.

While one group of people dedicated its efforts to an analysis of existing conditions, an analysis leading to a better understanding of the problem of human settlements, and thus limited itself to discovering the causes of our problems, another group, mostly architects, turned its attention to the creation of new forms of cities. In continuation of the efforts already made towards an escape from the existing suffocating cities (the most characteristic example being the garden city movement), there were architects who tried to solve the problems by submitting their own solutions. These efforts are characteristic of the desire of a large number of people to provide immediate solutions to complex problems. But the architects failed to analyse the problems in depth and to understand their cause, partly because they did not have enough facts, and, consequently, they failed in their efforts to find a real solution. They did not act in a scientific way. They did not recognise the changing nature of their subject. On the contrary, most tried to develop a new form of the city by basing their ideas on varying interpretations of the image of the habitat they had from the past. As could be expected, only very few managed to get a glimpse of the forms of the settlements to come, since they had insufficient knowledge to lead them to basically different solutions.

Among these attempts, which were necessarily confined to a relatively narrow field as a result of the limitations imposed by the professional backgrounds and training of their authors, we must mention the work of Le Corbusier. His efforts around 1930 to conceive the 'radiant city' are characteristic of great courage, which is even more impressive if we consider how very little knowledge existed at that time about the problem of human settlements and the limitations imposed on the solutions, especially in the fields of economics and the other social sciences. At about the same time thinkers in other fields turned their attention to the city, and here I should mention Lewis Mumford's very important effort to throw light on the problems and the crisis through his deep knowledge of many of the forces that shape human settlements.

In the post-war period, especially since the fifties, attempts to solve the problems of human settlements by the creation of new cities and the amelioration of existing ones were made. Characteristic of these the 'New Towns' especially prevalent in England, Sweden and the U.S.S.R., the building of new capital cities such as Chandigarh, Brasilia, Islamabad, and others; also efforts at urban reconstruction in Europe and urban renewal in the U.S.A. Although these efforts constitute important experiments in city building, they have not and cannot enrich our knowledge and our experience to the degree necessary to meet the present need.

Need of Ekistics

In order to meet the confused situation in the field of human settlements we need a unified approach. Such an approach is necessary for the following practical reasons:

• human settlements are unique biological individuals, they are entitled to a field of knowledge concerned only with them;

• unless this comes about it is impossible for Man to achieve an understanding of, much less a solution to their problems.

This second point may be argued by those who, following contemporary trends, are in favour of interdisciplinary collaboration. They are right in trying it in many fields including human settlements, but they are wrong if they think that interdisciplinary collaboration alone can fill the gaps which exist in this field of human knowledge. The reason is that we are dealing with such a complex subject that unless the total professional effort of a man over his lifetime is dedicated to the whole, the holistic aspect of human settlements, there is little hope of his becoming an expert in this field. Even if he does so, the road is long and life short. Let us not waste the time we have by trying simply to coordinate the multitude of important but dispersed areas of knowledge.

A simple illustration is necessary to demonstrate how complex the subject is and how meaningless it would be to try to deal with it by the simple coordination of a round table discussion. Settlements consist of five elements which can be studied through many disciplines in many ways. We can classify the knowledge we have about them into five basic categories – economics, social sciences, political sciences, technological disciplines and cultural disciplines. If we make a two-dimensional grid, combining the five elements and the five major categories of disciplines, we see that there are 25 nodal points on the grid, and we reach the conclusion that there are 25 ways of looking at our subject. This is true, but we are wrong if we conclude that there are only 25 ways of looking at the subject (fig. 4).
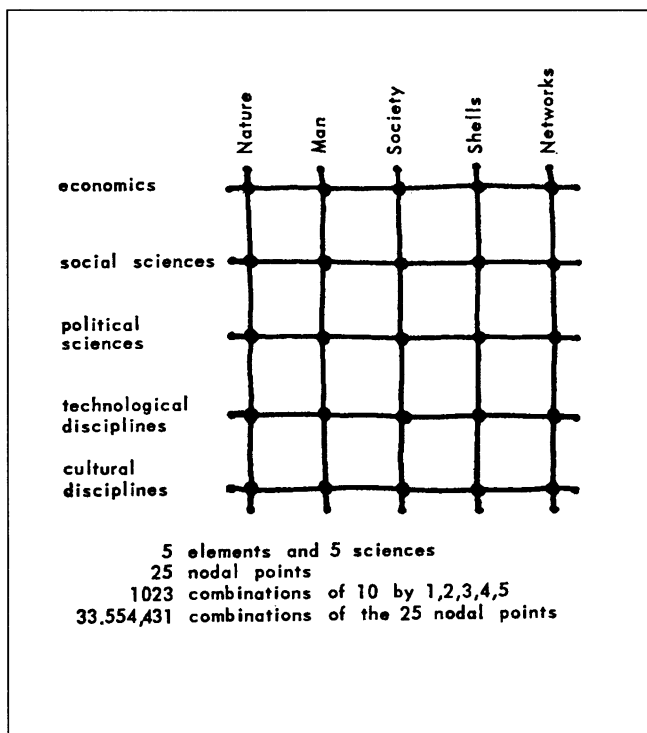

$$5 \quad \text{elements and 5 sciences}$$
$$25 \quad \text{nodal points}$$
$$1023 \quad \text{combinations of 10 by 1,2,3,4,5}$$
$$33.554,431 \quad \text{combinations of the 25 nodal points}$$

Fig. 4: Elements and sciences in the study of human settlements.

If we combine one element with one discipline, we have 25 combinations. But if we combine all the elements with all the disciplines as we must, then we will have 1,023 or $2^{10}-1$ combinations. If we assume, though, that the right combinations are those of the nodal points (e.g. Nature studied through economics, with Man studied through political disciplines) we will have 33,554,431 or $10^{25}-1$ combinations. All these calculations are based on the existence of one man only. If we consider that there are three people, then we will have 35 nodal points, which means, on the basis of the first assumption 4,095 or $2^{12}-1$ combinations, and on the basis of the second one $2^{35}-I$ or billions, etc.

It is quite clear that only a unified field of knowledge can save us from complete confusion. This is the field of Ekistics, and it is with Ekistics that I deal in this part of the book, leaving the question of whether it is a discipline or a science and that of its relationship to technology and art for later. Ekistics as a discipline needs a definition of its subject which I have already done, and of its vocabulary and its methods, which I do throughout this book.

In trying to define the goals and objectives of Ekistics, we must decide how we want to face the problem – in terms of the dimensions of the subject, or in terms of its nature, through a certain field of knowledge, or in terms of our own intent. It is quite natural that, at this early stage of the study, we should face certain difficulties in terms of definitions, delineation of subjects, setting of goals and methodology. This is no reason, however, why we should avoid the real issues. At this present stage, we have an obligation to examine the problems even if we may have to refine and even modify our definitions later on. It is only by clarifying our goals at the beginning that we can hope to achieve the necessary progress and evolution of ideas. Our duty is to start a process and follow a road, however faint it may be. The important thing, is to be on the march. It is the fact that we are on the march and that we are aiming towards agreed goals that justifies our effort. It is only natural that while on the march we will constantly re-align our route; later we may even redefine our goals when we can see them more clearly. But what is inexcusable is to forget that we are on the march towards a goal, or to lose precious time discussing unimportant or less urgent issues. We must first define the goals and the general directions we should follow in order to reach them, then start to march. Details of the march can be worked out while we are on the move.

The goal of Ekistics as the study of human settlements, in terms of dimensions, is to develop a system and a methodology:

• to study all kinds of settlements, irrespective of size, location, etc., in order to draw general conclusions about them;

• to study each as a whole, without excluding any of its elements in order to illuminate the knowledge of the field and to solve the specific problems of the settlement under study.

It is only by studying all kinds of settlements that Ekistics can draw general conclusions which can be of importance to each individual settlement. For example, in zoology, it is necessary to study all kinds of animals in order to understand each different kind; only after a general theory of species was developed, could each one be placed in its proper perspective. The following is valid for every field of knowledge dealing with many related items: in order to be complete, it must incorporate all species, from the most elementary to the most developed.

By extending our field of study to all kinds of settlements, we include some which, although contemporary, belong to a different historical era. These can range from settlements which have remained at a very primitive level, as in parts of

36

New Guinea and in the most undeveloped parts of Africa and the Amazon basin, to others which have existed throughout the entire historical period of human settlements. These extend our study in time, and help us to understand the evolution of human settlements better.

I must repeat: if we study Man alone or Society alone, if we study the Shells or the Networks alone, we cannot understand the whole subject, which is the human settlement. The role of Ekistics is to study human settlements in a coordinated, interdisciplinary way. Hence Ekistics is a new field of scientific knowledge, comprising the existing disciplines and sciences which study human settlements from their own point of view, and some which have not studied them at all, although they should have done so since certain aspects of the phenomena of human settlements belong to their disciplines. In our endeavour to study Ekistics we must remember that even though we have to study and learn many things, our main obligation is to study the gaps between elements and between disciplines; here is where the weakness lies. If we fill the gaps the whole system will operate as one complex entity in a synergetic way.

By defining the goal of the study of human settlements as the knowledge of all their types, and the approach as an interdisciplinary one, we confine Ekistics to the limits of a descriptive science. This might be enough to satisfy those interested in knowledge only, but it is not enough for those who are interested in creating better human settlements. To enlarge our goal, we must also assign a prescriptive role to Ekistics. Whether this is still within the realm of science, or whether at this point it becomes art, is a matter of further study and definition. At this point it is only important to state that Ekistics must cover both the descriptive and prescriptive aspects of the field of human settlements.

If we assign a prescriptive role to Ekistics, we have to define its goal. The basic goal of Ekistics is to create human settlements which will make their inhabitants happy and secure, as Aristotle expressed it. There have been attempts to define this in many different ways. Gradually, however, and regardless of the viewpoint from which people look at this problem, it is widely recognised today that settlements must be 'human' not only in content but also in quality; they should provide for the well-being and satisfaction of their inhabitants.

This turns us back to statements like Protagoras', who said that, 'Man is the measure of all things'.[6] In our era, we are beginning once again to understand this basic truth, which remains valid in spite of the conquest that has been accomplished since then of wider spheres of the universe through knowledge. John Dewey tells us that, 'Humanity is not, as once thought, the end for which all things were formed; it is but a slight and feeble thing, perhaps an episodic one, in the vast stretch of the universe. But for man, man is the centre of interest and the measure of importance'.[7]

Once we are able to turn our attention back to Man, as the measure of the satisfaction which can be provided by human settlements, we can state that the goal of Ekistics is to achieve the best balance between Man and the physical settlement; Man and Society on the one hand, and Nature and the man-made settlement on the other.

Such a goal raises many questions relating to Man's happiness, well-being and satisfaction. These are difficult questions to answer. May I draw attention to only one aspect of well-being, that of health, in order to show how delicate is the problem we are dealing with. The World Health Organisation tried in 1946 to define health. Its definition covers quite a wide field and raises another set of problems, since it reads, 'Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity'.[8] Thus, health alone requires the satisfaction of many hu-

man needs, and human settlements must satisfy all these needs plus many others, such as cultural ones.

Such definitions also raise other and different questions: how far does a settlement satisfy human needs, some of which were found in the distant origins of Man while others are contemporary and are changing continuously ? Are we going to set ourselves the goal of satisfying Man as a relic of the past, or Man as he is now developing? Which man do we have in mind? The type of man who is becoming a modern centaur (I refer to those creatures found in many advanced countries that are half-man, half-car), or the man foreseen by Orwell in *1984*,[9] or by Huxley in *Brave New World*[10] or in *Island*[11]? I think that human settlements should satisfy the man who is continuously developing into a better species. Therefore, our aim should be to provide the best continuous balance between Man and his habitat. The more perfect this balance, the greater his satisfaction (fig. 5).

Fig. 5: Man and his habitat consisting of natural and man-made elements.

If we look at our problem from the point of view of Man, the content of human settlements, Man the inhabitant, we will see that the greater his adaptation to the habitat, the greater his happiness. If we look at the same problem from the point of view of Ekistics, we will reach the conclusion that human settlements best serve their objective when they give Man the best chance to adapt to his habitat, provided, of course, that the adaptation is to his benefit.

Therefore, a goal of Ekistics as a prescriptive science is to assist Man in being happy and safe within his settlements by creating conditions of balance between the elements of the settlements, so that he can adapt himself easily to the re-

quirements imposed by the settlement as a whole, and in a way that will help him develop according to his own intentions.

When we set a balance between the elements of human settlements, as a goal for Ekistics, we are dealing by necessity with:

- Nature, which is being spoilt;
- Man, who is changing;
- Society, which is changing;
- the Shells, which must be created;
- Networks, which are changing.

We are creating Shells, but we do not know how much they contribute to the creation of a better Society, better Networks or even a better Man. Only one thing is certain: if we absolve Ekistics from the duty of producing an environment of better quality, we run the great risk of contributing to the deterioration of Society, to the deterioration of Man himself, and to the destruction of natural wealth. Therefore, Ekistics, as a prescriptive science, must aim at creating a balance which will be to the benefit of Man.

Notes

1. Fred L. Whipple, during his address at the Smithsonian Bicentennial, September 1965, as noted by the author.
2. Patrick Geddes, *Cities in Evolution,* 1949.
3. A.E. Brinckmann, *Platz und Monument als Künstlerisches Formsproblem,* 1923.
4. Camillo Sitte, *Der Städtebau nach seinen Künstlerischen Grundsätzen,* 1922.
5. Walter Christaller, *Die Zentralen Orte in Süddeutschland,* 1933.
6. Plato, *Theatitus,* 151E-152A.
7. Loren Eiseley, *The Mind as Nature,* page 36.
8. World Health Organisation, *Preamble to the Constitution,* Geneva, 1946.
9. George Orwell, *Nineteen Eighty-Four,* 1959.
10. Aldous Huxley, *Brave New World,* 1960.
11. Aldous Huxley, *Island,* 1962.