Articles

From *Main Currents in Modern Thought,* May-June 1966, vol. 22, no. 5

A Technique to Control Technique

On the March

We are all concerned with technique, its evolution and its role, for whether we like it or not, it constitutes an increasingly important part of our lives. Thus it is much in the news, and some of its forms are studied through a discipline which is called technology, for the same reasons that the study of the zoon or animal is called zoology. Unlike zoology, however, which covers all studies related to animals, technology does not cover the study of all techniques. The technique of administration, for example, is studied by management, not by technology. This phenomenon is due to the fact that while we can all agree more or less on what an animal is, we cannot easily agree on what a technique is.

In any case, what we have to concentrate on is the technique, which is the phenomenon, and not technology, which is the discipline. For all practical purposes, we can accept two general definitions of technique: one, given us by Harold Lasswell, as "the ensemble of practices," and a corresponding definition given by Jacques Ellu as "the ensemble of means" or "the totality of methods." (1) Both of these apply to all fields of human activity.

I do not want here to enter into the discussion of whether "technique has now become almost completely independent of the machine, which has lagged behind its offspring," or whether "technique transforms everything it touches into a machine," as Ellul states. (2) I only ask whether a dancer with an excellent technique has turned into a machine, or whether such a view holds even in the case of the ancient Egyptian slave, who carved hieroglyphics on stone under very strict rules, it is true, but always while expressing his own individual artistic talent.

What matters more, in the present context, is that technique is here to stay. It poses grave problems which require an answer, for they may create great dangers for man. In this respect, the question whether the evolution of technique has up to now followed the proper course has meaning only if it can illuminate the question of how we must proceed and what we must do for the future. Society is on the march--but it is not formed only by homo faber, man the maker, as Ellul states. (3) As in the past, society consists of people who pass a short period of time on this earth, during which they become centers of reception, processing and transmission of both material and non-

material goods. We may here dismiss the action of man in relation to material goods, for it is the same as with many other animals. However, man's function as the receiver, processor and transmitter of non-material goods is of interest to us, for this human action leads to the formation of society and the growth of civilization. It is for this society that he creates a technique which poses problems that demand an answer.

A State of Confusion

It is not a coincidence that we cannot agree on a definition of technique or on its present meaning and role. This is just one facet of the current confusion about the evolution of our society. A characteristic example may illustrate. Everybody states that man now lives at higher densities than he did in the past--a statement based on increasing world population. The truth is, however, that although the gross density of man on earth increases, the practical density, that is, in the human settlements where man spends the greatest part of his life, is now decreasing for the first time in human history. Many of man's present problems, in fact, result from the circumstance that he lives in lower densities.

Our confusion is not only due to misconceptions. It may also be traced to world change, although we do not yet know what the effects of this change may be. What may be the impact on man of the varieties of speeds at which he now travels, extending from the pace of a walking man to the sonic boom of a jet? We do not know whether or not this great range of speeds will in the long run be beneficial for our bodies, our nerves, and our senses.

Confusion is also increased by the fact that from time to time we concentrate on some aspects of our world to the exclusion of others. We speak seriously of the dangers posed for man by the products of his techniques, but it is obvious that man himself is far more dangerous than anything he has created. In this connection it is worth remembering the words of the ancient Greek king who, when shown a new and more powerful type of bow, cried, "Helas! The valor of man has been defeated." In so far as man is concerned, it does not make any difference whether the atom bomb is more destructive than the arrow, if he cannot protect himself from either. It is not the technique, but the balance of techniques and their uses that matter for us.

Modern techniques confuse us by their complexity, and because they develop at different rates in different directions. We can imagine them as forming a great mobile, constantly in motion and constantly growing. At times the mobile may be exceedingly lop-sided, because of an excessive rate of growth in one direction or another, and then symmetry and balance are temporarily lost (and

men may suffer enormously). But if we think of the mobile as an organic whole, we do not wonder that after past excesses the internal balance reestablishes itself--and society continues on the march. So, while the danger of imbalance is present and serious, there is nothing to suggest that the evolution of technique will lead us either to salvation or to disaster. Rather, it poses a challenge: to learn how we may control the whole complex of techniques, in order that it may serve man's proper goals.

Need for Proper Goals

Technique should not be more frightening than science or art or religion. Any one of these activities of man, if used wrongly, can be equally disastrous. What we need in order to control technique is proper goals.

It seems to me that these must embody the Aristotelian definition of the goal of the city: to make man happy and secure. I realize that the term "happiness" renders many experts quite unhappy. But common man does dream and work for a happy and secure life, and the experts themselves strive towards specific goals of human satisfaction (whatever that may include) in many fields of action. We learn, for example, that we can satisfy people in human buildings, not by talking about elevations and style, but about dimensions, shapes, colors, temperatures and materials and then about views, music and running water. These all yield satisfying human experiences. If we do not pursue happiness in the abstract, but express it in specific terms for specific purposes, it is not as evasive as it seems. And technique, after all, can have as a realizable goal the provision of a multitude of interlocking, even minute, sources of enjoyment for man which lead toward his happiness.

This, it seems to me, is the goal of a proper technique: that it should serve man as fully and as effectively as possible to satisfy his specific needs, whether they be for air or food, for ideas or for art, for administration or comfort. Thus when we speak of a technique which has human goals, we mean one which will change as human needs grow and change, so as to be always at the service of man.

But we have many techniques for many purposes, each one developing according to its own milieu, and each creating new problems when the vigor of its growth throws the whole out of balance. By now we have learned that this is unavoidable. Our challenge, therefore, is not to learn how to keep any specific technique under control, but to begin to understand how to maintain the dynamic interrelations in balance, so that the integrity of the whole is preserved and enhanced. In other words, what we need is a technique for our whole action. In the past, society was usually able to evolve its way of life through a natural,

even unconscious, process of growth. Now there is no time for such a slow process. We have to act consciously and deliberately to develop a technique to control technique, and use its proliferating powers for the benefit of mankind.

Is there a way to achieve this? I do not know, but I think we should try to find it. I can only explore some possibilities which look reasonable to me in the light of what I have learned through my profession, in the hope that they will generate a discussion. Before proceeding to that, however, I want to state my belief (based on a bricklayer's experience) that unless we can measure, classify and relate the phenomena we are dealing with, as well as identify them, there is no hope for a solution, for even if we all talk about the same things there will be no way for us to understand that we are in agreement.

Of Snails and Shells

Because of the richness of our technical resources, it is difficult for us to focus when we speak of the balance of the whole system. But we need to focus if we are to become specific. One systematic approach may be made through society itself, which developed technique, and both enjoys it and suffers from it.

Studying society is like studying the snail. Our great and evolving society is a complex creature, very difficult to catch and measure. This has led me (with all my occupational weaknesses) to turn from the snail to its shell, and base my study on human settlements. They themselves are many and varied--from nomadic tents to villages, cities, metropolises and megalopolises--but they are more tangible and manageable than the society that inhabits them. Yet, like the snail shell, they are essential to the living creature within, and reflect its character and needs. Therefore, if we study the shells and the human settlements as a whole, we can understand something of the animal body that moves within it.

Such a study can illuminate our subject -society- without endangering our conclusions so long as we do not mistake the shell for the snail itself. We must always keep in mind that the shell is but one expression of the inner life. This expression can help us to understand society only as long as we remember that the shells are just one element in the composite and real phenomenon which human settlements as a whole represent.

The study of human settlements has not only the advantage of permitting us a view of our complex society; it also makes it possible to understand special problems created by developing techniques. As an example, I might mention the case of air-purification which, together with air-conditioning, is becoming more and more commonplace. Now we purify the air of buildings by

throwing the waste of streets into the air, just as we threw liquid waste into the streets a century ago. So now when we go for a stroll in the park we breathe the contaminated air. Is this the right technique: to let the air as a whole be contaminated, and then clean it at very high cost inside some buildings?

Human Settlements

Until the eighteenth century, human settlements made more sense than they do today. Although they were deficient in many respects, as regards water supply systems or sewage treatment, as a whole they were more reasonable. People could move easily within them, and they were much safer than at present. Life was simpler, administration was easier, and the aesthetic quality of the city--an expression of the balance of forces within the shell -- was unquestionably superior.

Since that time, the high speed development of society and its techniques has caused many technical advances within our cities, but the net result is a worsening of man's living conditions. The picture is misleading because we tend to think of the effectiveness of machines and not of its services for man. Let us think of transportation. Until the eighteenth century, urban man lived at an average maximum distance of ten minutes from any city center. This time increased during the railroad era, and has now extended to about one hour in the great metropolises. In spite of the high speeds of which we are so proud, the large cities of the world today can be crossed at an average speed of nine miles per hour -- the same rate of progress of horse- driven carts at the beginning of the century. What does it matter that we can ride instead of walk? From the human point of view, man loses both time and comfort -- and an opportunity for exercise while traveling to the center of his city. Even if suburbanites think it is an advantage to play cards in the train, there are far greater numbers who must stand in subways or drive in cars, and all of these people could spend the extra time sitting in their living rooms, playing golf or digging in their gardens.

Seen from the anthropocentric point of view, human settlements lose value with every passing day. But we fail to understand the situation because we do not use man as the measure of his city, and we confuse the issue still more when we treat all settlements as if they were similar. The city of New York is not the same as the city of Los Angeles, and neither bear much resemblance to Renaissance Venice or ancient Athens. The modern settlements have two hundred times more people and almost a thousand times larger area, yet we take mice and elephants for the same animals. The results are apparent everywhere.

It is time for us to recognize that man has gradually built around himself a number of shells: the clothes that cover him and isolate him partially from the external world, the house for his family, the neighborhood for his group, the village for his tribe, the city for his small urban community, and many more. The study of human settlements reveals that man has surrounded himself with twelve shells, if we begin with his clothing and end with the megalopolis or fifteen if we include the still larger communities, the continents and the whole earth. Ranging from the smallest (the personal) to the largest (the universal), each of the spheres which lie within these shells is inhabited by a group which is different from the others not only in size but also in character. These spheres, corresponding to the variety of human settlements, are the basic units of our study of society and its technique. (Fig. 1)

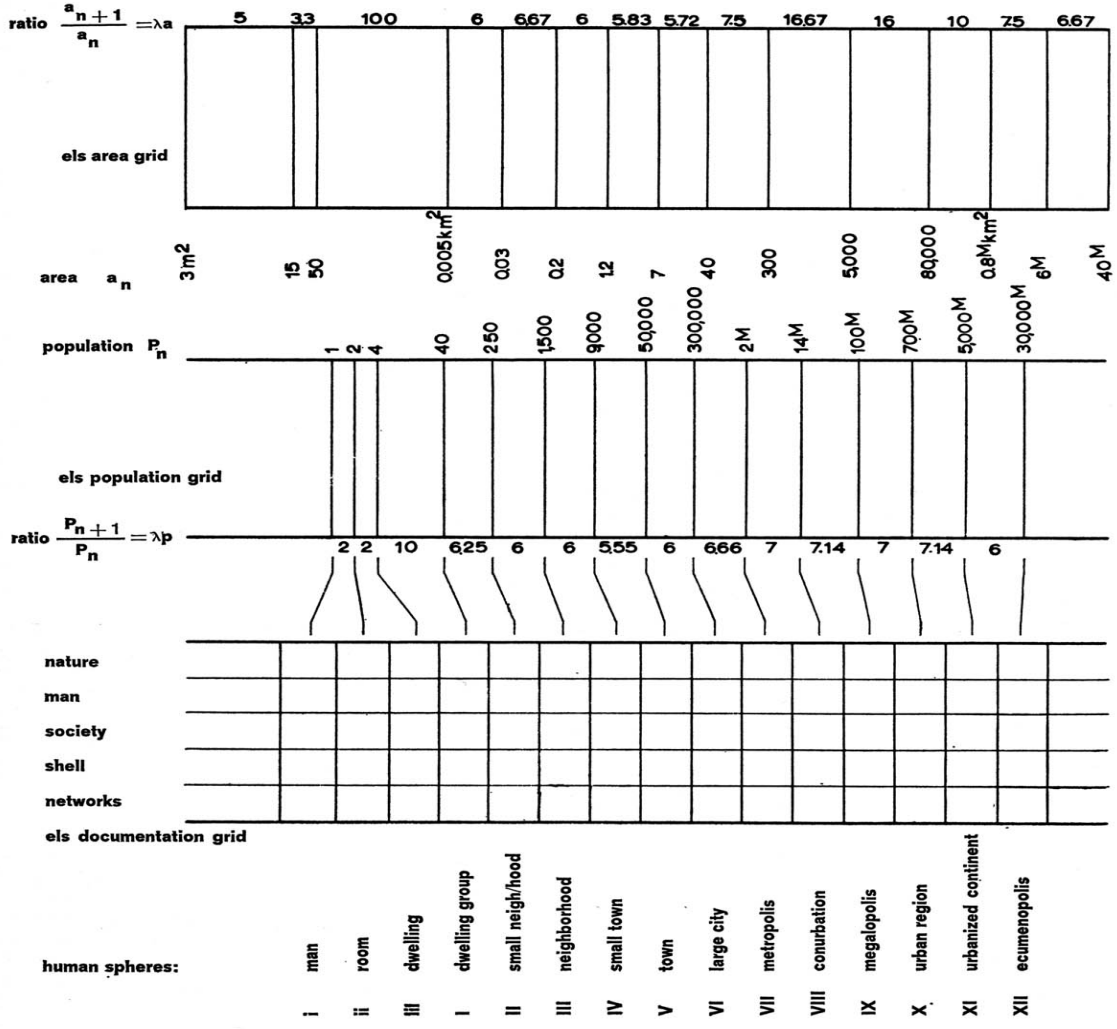

Fig. 1. The fifteen spheres and shells of man's terrestrial space. Ekistic logarithmic scale (eis) graphic interpretation.

Specifically, human settlements must be seen as consisting of five elements: nature itself (which is the basis of all), man, society, the shells (buildings), and the networks which connect the shells into an entity (roads, water and power lines, communications, etc.). We realize how important it is to consider all these elements simultaneously when we think how absurd it would be for a zoologist to study the shell and the gastropod mollusk inside it as two separate phenomena, or to neglect to relate the snail to the soil and the whole environment that feeds it.

Man and Society

Man inhabits the fifteen spheres already mentioned, but he no longer feels at home in all of them. The first spheres present a small problem: he has been accustomed to wearing clothes for tens of thousands of years, and he has also inhabited the second and third spheres -- the room and the house-- for more than ten thousand years. The fourth and fifth spheres, the neighborhood and the village, have existed for ten thousand years, and man has lived in the sixth and seventh spheres, the large village and small town, for more than five thousand years. The eighth sphere, the town, is about three hundred years old; the ninth, the large city, two hundred years old; the tenth, the metropolis, one hundred years old. The eleventh and twelfth spheres, conurbation and megalopolis, have appeared only in our century, and we have not yet seen the three higher spheres, although we can predict their appearance within the next hundred years. (Fig. 2)

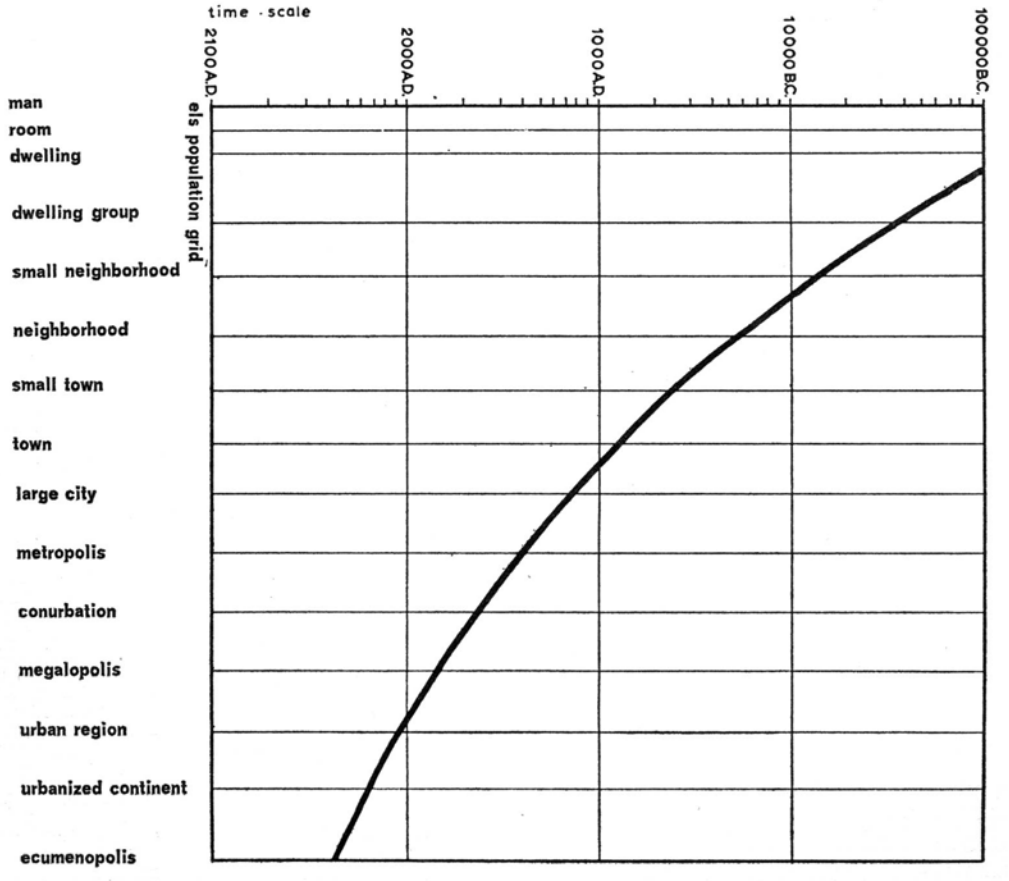

Fig. 2. Historical development of the fifteen categories of shells.

The gradual evolution of the first seven shells during many thousands of years permitted man to become accustomed to their conditions, which were drawn on natural human dimensions and scale. Man could walk through his small town, see and hear everything that went on, and participate in every aspect of its life directly. But as the small town gradually grew into a large city, participation became increasingly difficult. Progressing techniques tried to overcome this disadvantage through improved communication facilities, but these extensions of man's spheres of action, and the growth of the corresponding shells, have only created confusion.

For whereas in the past man moved each day within the first seven spheres, within a very short time he began to commute within the next three, and receive messages from all fifteen. Spheres of all orders were superimposed; they overlapped, and their impact hit man in different ways, at different intensities, from different distances. If we assume that a ten-minute distance is a natural one for commuting and receiving information, we notice that in the past man could contact up to ten thousand people in ten minutes. Now he can physically move in areas encompassing fourteen million people, and through his extended senses, in areas comprising three thousand, three hundred million people. Possibilities for physical

contacts have been multiplied fourteen hundred times, and for sensory contacts, three hundred thousand times. (Fig. 3)

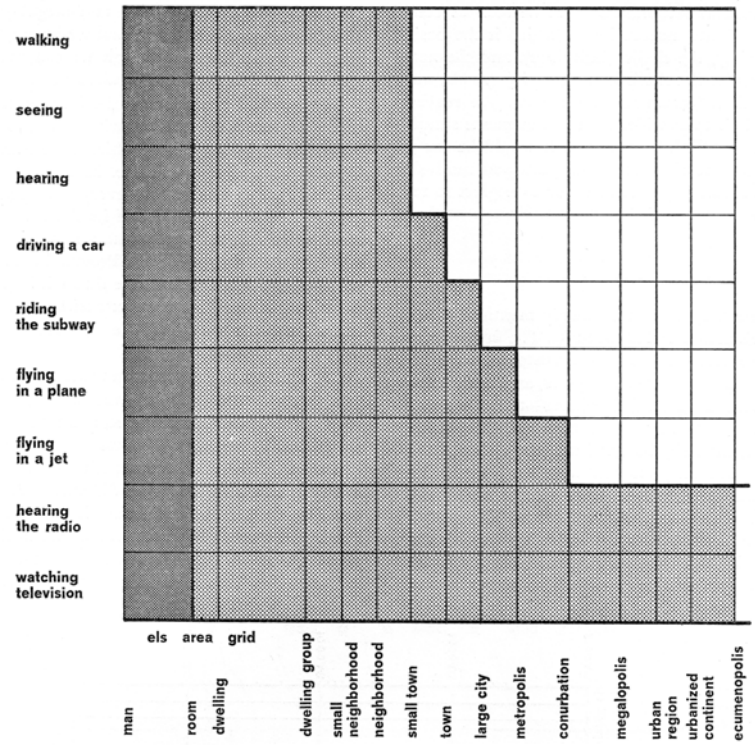

Fig. 3. Man's relation to the fifteen categories of shells considered in a 10 minute period of time.

The result of the great technical progress in transportation and communication is that man has lost his balance with regard to the surrounding society. In physical terms, he has confused the natural human scale of movement (three miles an hour) with the mechanical scale (hundreds of miles an hour). Is it not characteristic that we still allow men and cars to move in the same space? In terms of information, man receives much more than he can understand, from many external spheres which he does not know. In the past, the receipt of such information made men imagine monsters that inhabited remote places. Now it gives way to monstrous misconceptions about the great spheres of which ordinary men know very little.

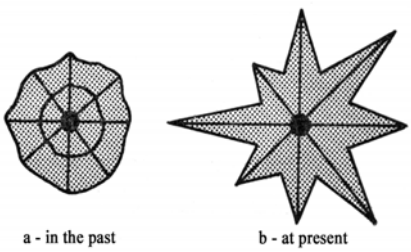

Fig. 4. Man and his contacts with the surrounding environment

When we think of how man is exposed to these new technical forces, we can understand why he suffers. In the past, information came to him in a natural way from small and equal distances, and thus he could make meaningful connections, and integrate it into a whole. (fig. 4a) Now, information is received in such a way that the connecting lines do not exist, and so man is unable to unify his knowledge or even his impressions. (fig. 4b)

We tend to talk a great deal about man and machine,

about the driver's identification with the car, and his will to kill through the machine that has become part of him. But this is only part of the hazard. If we go on this way, the machine is not only going to kill people, directly and by breathing its exhaust fumes; it will have a disastrous over-all effect upon man, even leading him to dance like an automaton, conditioned by the green-red-green-red lights at the crossroads. Is it not time to think that it is too dangerous to allow man and machine to exist, physically superimposed, in the same space?

A technique to control technique means, in the case of human settlements, that it is time to separate the space of man -- who needs clean air, an absence of noise, and slow motions -- from the space of the machine, which needs just the opposite.

The New Frame

If present confusion is due to the overlapping of many spheres and shells, to the detriment of man, we must turn our attention to the future in order to define the new frame of reference within which man must live. Since it is too late to act for the present, we have to try to act for the future.

How many people will inhabit the earth in the future? Present trends show that by the end of this century there will be at least seven billion people, and forty years later this number may well be doubled. It will not be at all easy for us to interfere drastically with the increase of the population in the near future. However, we have many reasons to believe that the rate of growth will start decreasing in the 21st century, and it may well tend to slow down enough for the population of the earth to become stabilized. The limiting factor will probably not be food production, but rather the practical and psychological impact of limited space upon the population -- an impact which can be expressed consciously or unconsciously, as it has been many times before in nature and in isolated human populations.

It is too early to say at what height this leveling off will take place, but on the basis of present projections we may conjecture that it will be between twenty and fifty billion people, or an average of around thirty-five billion. (4) A population of this size will require a space of 7.8 million square miles for its settlements, an area nearly equal in size to what will be needed for cultivation -- 9.8 million square miles, or about double the corresponding area today. This population will spread around the world in areas favorable for human settlements, such as low lands with ample water resources or near great transportation lines, settling at densities which are much higher than the present rural ones, but lower than the densities of contemporary urban settlements.

Such a distribution of population at different densities will create systems of continuous settlements in the most favorable areas, such as the Eastern Seaboard, the Great Lakes and the Southwestern Coast areas of the United States, the eastern coast of China, the Ganges and Nile valleys, the eastern Brazilian coast, and so on. These areas will form great chains of settlements leading to a universal human settlement, or ecumenopolis.

Within ecumenopolis, we can expect that the changes taking place will show up more clearly, leading to a new type of society based on different patterns. These changes are so great that the city of today will be replaced by ecumenopolis, and our civilization will be gradually transformed into ecumenization. If this trend continues, it will mean that no longer will the city alone have an impact on man's evolution through civilization, as in the past. The whole "ecumeni" will deliver such an impact.

The Great Dangers

The dangers which loom ahead lie within the framework of the society to come, but they also lie within ourselves and relate to our own attitudes. The universal city of the future will be very complex, including ten times more people, thirty times more urban dwellers, a far greater number of interconnections, and a much greater exposure to new technical forces. All these will create unprecedented dangers for man, who can be easily led to his destruction by his own wrong decisions.

Obviously, the first great danger lies in the possibility that we may misunderstand the present and thus make incorrect assumptions about the future. Alternatively, we may make no assumptions at all and just let ourselves drift. Our first task, therefore, must be to understand the present as fully as possible, and make our predictions on the best possible grounds.

The second danger is that we may set the wrong goals. To my mind, it would be a great mistake to attempt to interfere with man's biological evolution while we still know so little about the forces which are shaping him. There are many other elements which cry out for our attention. Before we try to play God, why not play the role of farmer and bricklayer really well?

The third great danger is that we may misuse technique in pursuing our goals. One example is the attempt to build machines which will fly within our cities in order to cut down commuting time. The result of this trend will be that the air will be contaminated even more, the city will be noisier, and people will be forced to seal themselves in behind closed windows, turning into troglodytes, and leaving the control of ground and air to machines. This

could certainly turn into a life underground, as H. G. Wells predicted in Anticipation.

Proper Understanding

If we are to avoid these and other dangers that result from misconception and confusion, we need some order in our thoughts, some kind of systematic approach that will permit us to understand our situation, present and future, in an overall sense.
To achieve this, we need to separate, measure, quantify and classify all phenomena which bear on our subject. It is not a drawback to have to measure everything; this is a new need and, in many respects, a new ability for man. For example, we have to measure man's steps in order to conceive a modulus for the space we walk in, and also his vision and hearing in order to determine the best proportions of the space we create for him. It can only do us good to impose the human scale on man's creations. What could do us harm would be to misinterpret and misapply the meaning of the phenomena and their measurements. This can be controlled by keeping a balanced view of the whole.

Quantification can help to lead us to order. If through our measurements we can begin to understand the differences in the spheres and shells, we can apply this knowledge to achieve different solutions. Since much of our confusion is due to the overlapping of many spheres, their measurement can reveal important relationships. Thus man may be able to learn his proper relation to every sphere of influence, and build corresponding shells. He need not be passive, or try merely to escape the social or physical influences which he dislikes; he can begin to fulfill his true role, which is to create his world.

To be specific, if we can measure the frequency and justification of all our movements over all distances, we can find which are indispensable -- because they give us pleasure or because they are necessary-- and which can be eliminated through improved systems of communication. Only when this has been done can we specify the communication and transportation networks that man really needs.

The Proper Balanced Whole

But just measuring the different phenomena of the world around us is not enough to secure us the order we want. In order to move toward the desired end, we have to delineate the shape of the whole we want to create, and clarify its specifications.

If I ask myself, as a builder, whether man can build a better system of space around him, my answer is yes -- so

long as he can conceptualize whatever it is he wants to create. We cannot build a house or a school or a factory unless we think of it as a whole. The same is true of human terrestrial space. If man is to shape it reasonably, he must conceive of it as an entity. This is the only way for us to build ecumenopolis, the universal city of man.

At once the question arises whether an attempt to conceive the whole does not require the use of higher and more refined techniques. Certainly it does. But does this also mean that our advances will take place "by way of elimination of the human," and that it is "more likely than not" that such action "will be catastrophic"? (5)

My answer (which, though it may well be due to a professional distortion, is also due to long practical experience) is that the danger is not related to the intensity of the techniques but to the methods by which they are chosen and the goals for which they are employed. As long as the goal is human satisfaction, as long as the community makes its decisions through democratic processes, as long as individuals are given the information and the means to make their own choices, the danger is minimized. In any case, we have no alternative; we must take the responsibility for our future.

We can achieve a balanced whole only if we understand what creates imbalance. As we have seen in figure 4, man's relationship with the external world is now askew. If we are to provide him with a system permitting a balanced relationship, interconnections which will link him with the whole are required. Such an approach means that we need a unified system which connects man with both the old Euclidean and the new, non-Euclidean types of space. The question whether one or the other type of space is correct has no meaning. As long as man uses his senses both in a natural way and through all kinds of mechanical extensions, he will need a system to connect him with all types of space.

A balanced whole also requires the re-establishment of proper relationships among the five elements which compose our human settlements: nature, man, society, shells and networks. If all these are kept in mind, we can learn how to preserve the values of the human city of the past within the framework of the universal city to come. When man is within a space of human dimensions (defined by his body, senses and natural movements) he will enjoy those values and satisfactions he has developed over thousands of years. When he moves in larger space he will have to protect himself in bubbles of human dimensions and scale.

Proper Techniques

Proper understanding of the concept of a balanced whole

must be implemented by the use of proper techniques, for otherwise the concept will not lead anywhere. A viable technique to control techniques cannot remain merely theoretical. Imagination becomes creative when it confronts actual situations. Today we suffer a good deal because of the gap between idea and practice. We envisage Utopian schemes of social reform while we continue to misuse the resources of nature. We demolish, neglect and abandon man-made treasures in our old cities and villages, and justify such wanton destruction on the grounds of our desire to create better conditions for man.

Of the five elements that combine to form the anthropocosmos, or the human crust of the earth, by far the most recent is the networks, which are really no more than two centuries old. (Figure 5 represents the comparative ages of the five elements.) Perhaps naturally, this is where man is failing most conspicuously. Any reasonable attempt to re-establish order in the anthropocosmos, therefore, should give precedence to the development of fresh, new concepts of networks. One such concept might indicate a system of transportation that bears a resemblance to the circulatory system of the human body: the higher the speed, the deeper the network. Others would devise new types of communication systems and methods of processing information. (6) In any event, the problem of the networks is one of the most pressing and acute of all the hazards which lie in the path of our developing ecumenopolis; it needs man's ingenuity and understanding, and perhaps even more, his interest and concern.

I believe that if we approach the concept of the anthropocosmos with "reason and dream," as the Romantic poet, Dionysios Solomos, has said, we can build the city of man. With human goals clearly defined, our developing techniques need not be frightening, but rather offer an ever more effective means to translate ideal conceptions into reality. We have to accept the challenge of the future, and build. If we try to sit back and leave the issue to the next generation, we shall be engulfed in chaos. The way out of our dilemma is to face the situation with open eyes, and conquer it by mobilizing all the resources of man's accumulated experience.

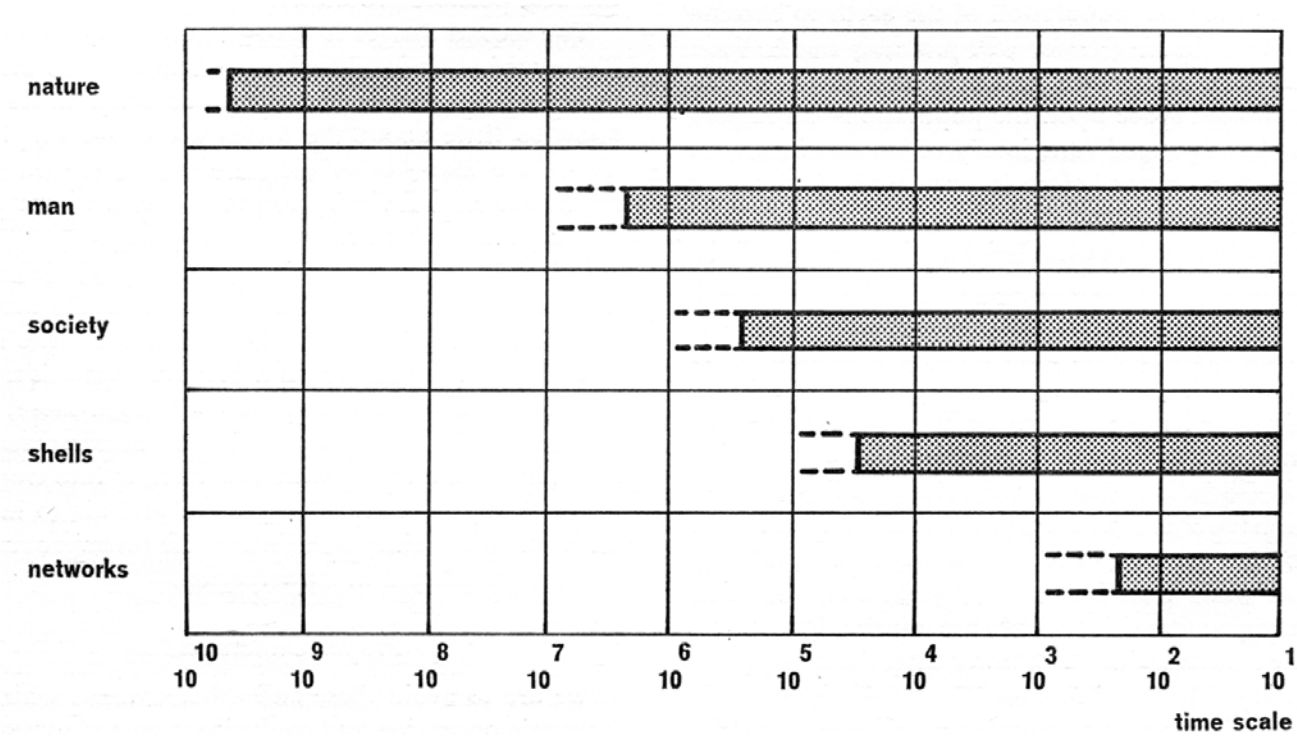

Fig. 5. The five elements of human settlements classified as to their age.

References

1. Ellul, Jacques, The Technological Society, Knopf, New York, 1964, pp. x, xxv.
2. Ibid p. 4.
3. Ibid, p. 24.
4. These estimates are from a research project by the Athens Center of Ekistics entitled "The City of Man," the first systematic report of which was published in Ekistics, July 1965.
5. See Ellul, op. cit., pp. xviii, xx.
6. I presented a system of such ideas during the Mayo Centennial Symposium at the Mayo Clinic, September 1964, under the title On the Measure of Man, "Challenge and Response in the Anthropocosmos."