Articles

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THE TWO HEADED EAGLE (From the past to the future of human settlements)

SYNOPSIS: When thinking of the future of human settlements, Man has to take into consideration our biological, social, economic and cultural inheritance, as well as the inevitable evolution lying ahead of him. This article uses the example of the Urban Detroit Area, in order to observe the continuity of man's actions in building his cities. We are in the middle of a great explosion of the cities, with which we so far refuse to deal in a constructive way. The inequality in mobility, the dangers the children face in the streets, are only a few indications of the confusion Man has found himself in. Instead of preventing the great city of Man forming, which is both inevitable and natural, we should avoid its negative effects by protecting people, nature and culture from the explosion.

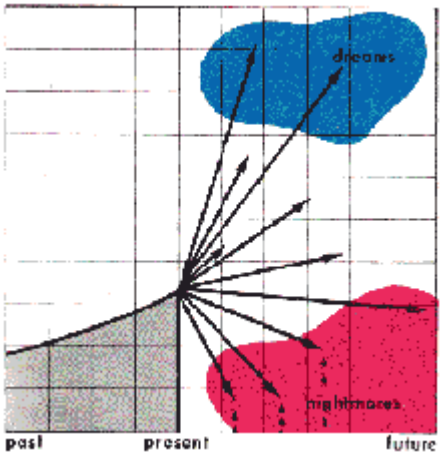

Fig. 1. What is the future?

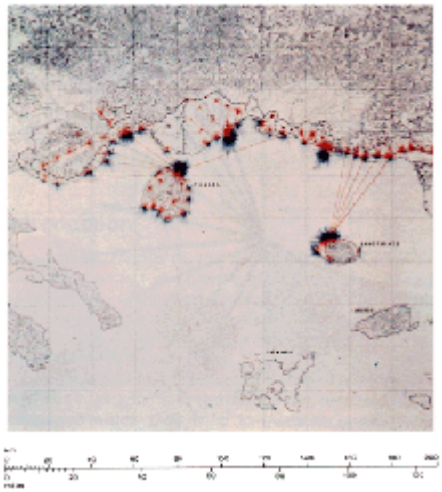
Fig. 2. Fields of human energy: Thasos, Abdera, Maroneia and Samothrace, Hellenistic period

Introduction

When I was invited by the American Association for the Advancement of Science to address their annual convention on human settlements, I sat back and wrote a text which I illustrated with a special set of drawings and plans in order to transmit this difficult subject in one hour.

I started and ended the lecture with music and paintings because I think that artists early received some message which they tried to transmit to us. After giving the lecture, I added a few details which could not be inserted in a one-hour address. This publication contains the entire text of the lecture with some additions and several of the plans I presented during it. It is an attempt to reach those who deal with the many sciences out of which we have to build ekistics, the science of human settlements.

1. The question

We have seen a series of paintings painted during the last hundred years, from the Impressionist school, which began in 1872, the year after the upheavals of the Paris commune, to our days. We have heard the music which breaks a long tradition of painting and music to human settlements, our subject? Human settlements are the physical expressions of the systems of our life. In the '60s we all began to understand and be concerned with the great changes in our human settlements, but the artists received the message of change before most of us. They did not understand its meaning, but they felt it, and they expressed themselves through their art. Many of them became very concerned, worried, angry, and some of them like Van Gogh or Jackson Pollock, committed suicide or led themselves to an early death after transmitting to all of us the message of great change.

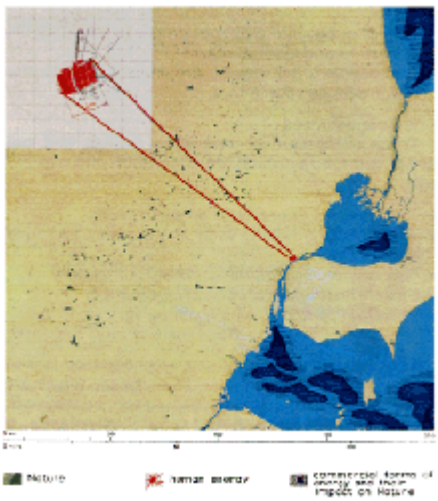

Fig. 3. Babylon, 680 B.C.

The message of a great explosion, the great explosion of knowledge, population, economy, energy and confusion. The explosion of our cities, of our system of life. The explosion that frightens us and takes us out into the streets screaming, or forces us to hide deep underground and cry. But this is not the way to face our problems. Screaming is the witch-doctor approach; it is not the medicine. What can we do for our case?

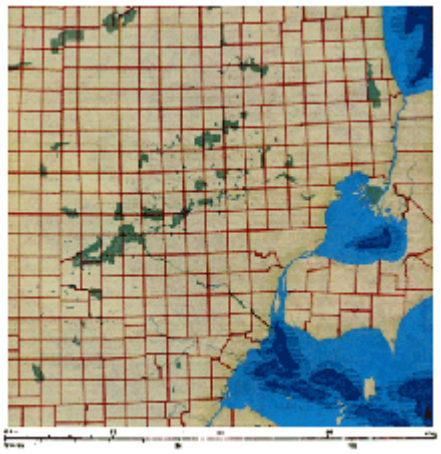

Fig. 4. Organization of space: townships 6 X 6 miles, imposed upon the urban Detroit area

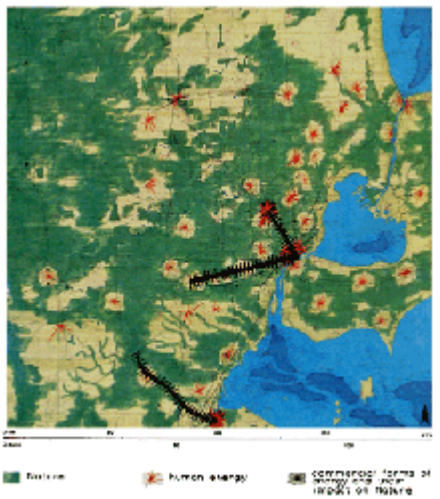

Fig. 5. The birth of the modern city (1825-1950), imposed upon the urban Detroit area

2. The answer

There is only one answer to such a difficult question: Try to understand our crisis, our case, the explosion we are in. To achieve this, we should not remain close to the explosion, for we will be blinded. We should step back and try to see from far out, to look at the cities we live in from the distance, in the proper scale and time, with open eyes. If we don't do this, we don't see clearly and we make the usual mistakes:

- We either become great pessimists by thinking only of decline and nightmares, or
- We become great utopian dreamers who think that any dream can come true.

We are confused.
To be successful we have to be realists, and look at the four futures which are interwoven into one system:

- *The constant future*, such as earth itself;
- *The declining future*, such as ourselves and most of our works;
- *The continuing future*, such as our children and those who receive our social inheritance;
- *The creative future*, which will be very small tomorrow but which will be huge the day after tomorrow.

Looking at these four futures we understand that we must also look into the past, because the future is a continuation of the past. We cannot eliminate our biological, social, economic, and cultural inheritance. In this connection we may remember Aristotle, who in his *Physics* advised: "Here and elsewhere we shall not obtain the best insight into things until we actually see them growing from the beginning", which is also true of human

settlements (Ref. 1).

We have, moreover, to look to the past and the future, for they are a continuum and anyone looking in one direction gets confused. To do this we must develop the ability of the two-headed Byzantine eagle. We cannot return to being a Homeric man, always looking at the past, nor can we be a present-day man, who thinks of himself as looking only towards the future. We have to look back to the past and ahead to the future of human settlements, from their origins to their evolution, form their foundations to their rising structure. Our two-headed eagle, of course, is only the symbol. In fact, in order to understand our whole system of life we have to look to the past and to the future with thousands of heads, with lenses of all sorts, catching everything from small to big, on all possible scales from the DNA of human settlements (Man himself) to the whole container, the earth. How can we achieve it?

To transmit the experience of the past, I had to use many continents and civilizations, and in order to speak of the present and the future to an American audience, I had to select a well known American city. The change of the natural frame and reference would be so big that any comparison would be impossible and even the eagle would be confused. I could only see one solution: to use the natural frame of an American urban area and attempt to transfer onto it the whole experience of the evolution of human settlements.

I therefore selected the Urban Detroit Area, because it has had the courage to prepare an advanced study for its future (Ref. 2). On this urban area I attempted to trace Man's experience from the past to show comparisons which can help us understand the continuity of human actions, and learn the lessons we all need to know. However, what appears as the past of human settlements is related to a universal image, and only the present and future is directly related to the Detroit area. To transmit our experience to the many people concerned about human settlements we must use some abstractions, and a basic one is to simplify the physical frame which always differs from case to case. If we devote too long a time to each specific case we cease to be able to understand it in its general context and in its relationship to Man.

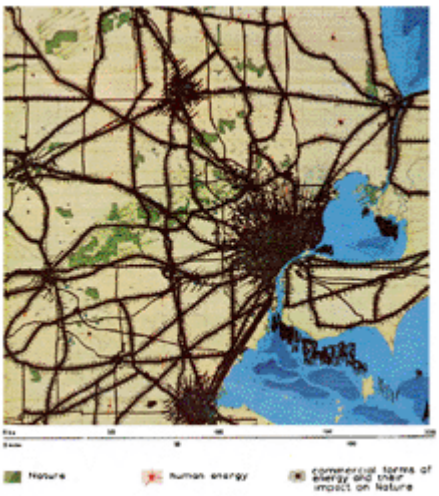

Fig. 6. The multi-speed city blows up (1930-1950), imposed upon the urban Detroit area

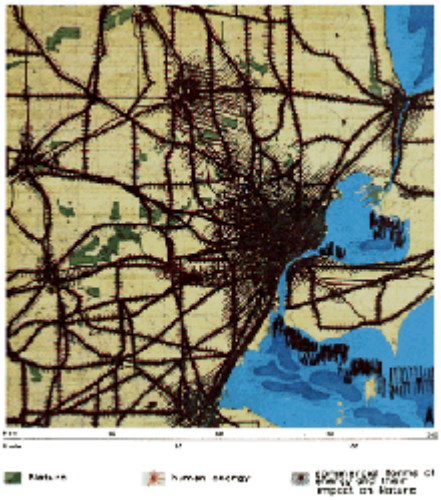

Fig. 7. The multi-speed city begins to burn (1950-1971), im-posed upon the urban Detroit area

3. The past

It is now fashionable to think of the times when Man had not yet exercised any influence on Nature, and to dream of a beautiful unspoiled Nature in which the predominant colors were blues and greens. But this situation never really existed on any large scale. Nature always has polluted its own resources. The picture was not so beautiful. Water and wind were causing changes, and fire was often there as well, upsetting the balances. This action, however, was self-renewing and led to new balances.

Man appeared on the scene, but his influence was very small at the beginning when he ran around as a hunter using all the energy available to him. His influence was negligible until, learning from natural fires, he burned the forests and killed the fleeing animals or ate them after they had been burned. Man began to act against his environment and created the first man-made large-scale pollution. This may have been the result of chance or necessity, or it may even be explained by the fact that "consciousness responds to the enmity of the environment by an effort directed against it", as Alexis Carrel said (Ref. 3). In any case, this was probably Man's first explosion by the use of non-human energy, and it was a negative one.

Such action was dangerous, and Man learned the hard way that it was not helpful to him to upset the natural balances in a way which destroyed many resources. So he tried to change by development. He experimented by farming and domesticating animals, and thus another explosion began, this time a positive one.

Primitive societies were born and adapted the natural environment to their own needs. They organized the space in villages. They eliminated the forests for more farms, often in a dangerous way, until Man learned to create a balance between his fields and his forests. After a while Man began to feel the need for a better organization of his space. The first cities and city-states were born.

This positive explosion entered a new organizational phase as we can now clearly see in our studies of ancient Greek settlements. City-states did not always live in peace. Competition over territorial rights began. Wars were fought. Cities, villages, and their fields were destroyed and burned. This situation could last for many centuries or even thousands of years.

Later humanity entered a new organizational phase: Empires were born - all roads led to Rome - but their size was not necessarily very big. At the very beginning they may have been as small as the area we are using as a standard frame for this study. Their capitals, like the famous Babylon were seldom larger than a mile and a half across, like a small community of our cities. This high-level

organizational phase lasted from very short periods to many centuries.

Invasions began and a great explosion of barbarians destroyed the great capitals, cities and villages. Too much human energy was used the wrong way and the so-called Dark Ages began. People survived in very small settlements organized in small city states and feudal states. The cities were small and unhealthy. They re-created civic values but their populations had constantly to be replenished from the countryside as many people died young in the crowded dwellings and sometimes great numbers of people fled the cities in order to escape the great epidemics.

At approximately this time (the end of the 14th century) Man moved from small city-states to national states. Gradually some of them, because of the international trade which developed in the 15th century, turned into great economic empires based on transportation by sea. What happened was similar to what happened before, but on a different scale this time, and this period of the great economic empires lasted about four centuries.

During the latter part of this era people began to organize their space on the basis of previous human experience. The most characteristic example appeared in the United States, when, after many efforts in several parts of the country and many proposals and Congressional discussions, an ordinance was passed in 1785 establishing the township, a square six miles by six miles, as the basic unit of human settlement. This meant that no citizen was further out that one hour's walk from the center of his town. This was the last great organizational decision of the era of the walking Man.

4. The present

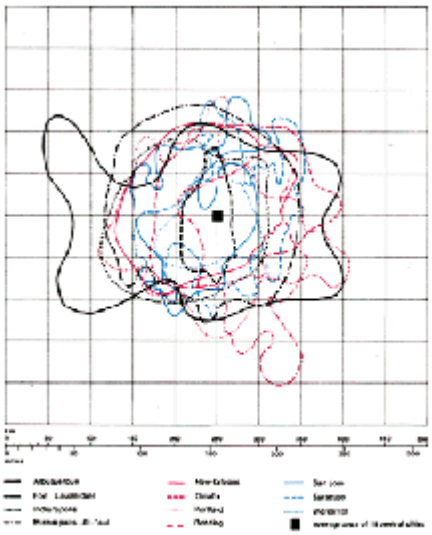

Fig. 8. Commuting fields of 11 American cities in 1960

Our present city was conceived by the scientific and technological revolution which started in the 17th century, but it took time to be born. In 1800 the London population reached the one million mark, which was the peak reached up to then for short periods in some capitals of great empires, like Peking. The present city was not yet born.

The present multi-speed city was born only in 1825, when the first passenger train ran in northern England. Almost 150 years of gestation. Great masses of people swarmed into cities. In social and hygienic terms the situation became critical, and people began to suffer enormously. Cruikshank drew a cartoon of London "going out of town in a march of bricks and mortar", as Arnold Toynbee tells us (Ref. 4).

Many people profited from this enormously and, as a result, new forms of taxation were proposed. Protests and social revolutions began and the first environment

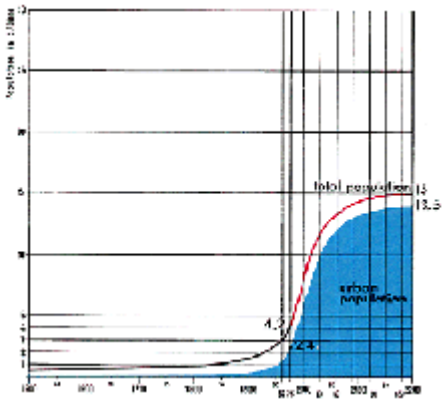

Fig. 9. The population explosion

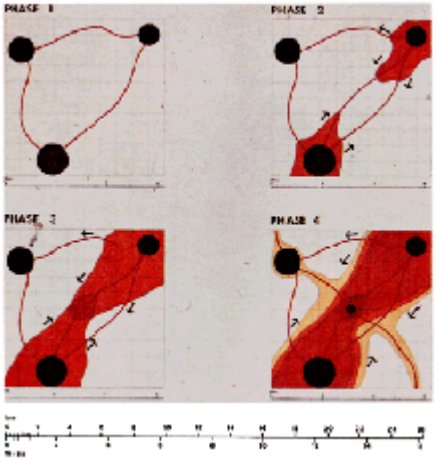

Fig. 10. The birth of the Great Lakes Megalopolis

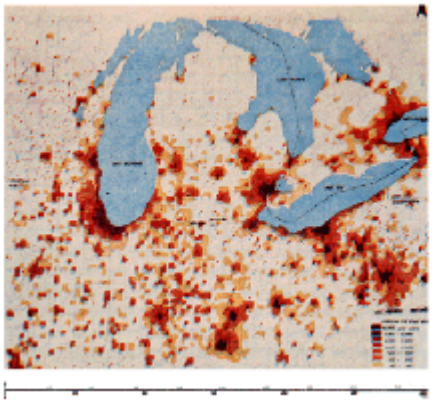

Fig. 11. Generalized population densities within the Great Lakes Megalopolis, 1960

movement was started in the USA. Gradually, technology provided better systems for water supply and sewage, especially after the great spread of epidemics in European cities.

Then, as our century began, the automobile entered. Mobility and the use of energy increased more rapidly. Industry, people, and the city began to spread far out, but Man could no longer walk across the street. Commercial forms of energy controlled the entire city and human energy lost the battle in the street. Everybody was proud of the growing cities, but those who could afford it began to abandon the central city. The explosion continued and, in spite of the two world wars, the congestion became unbearable.

People began to build highways in order to get away, but the only result was a greater increase of congestion. It was like the story of the lady and the skunk: One day a skunk entered a lady's basement and she rang the fire chief to ask what she should do. He advised her to out some crumbs of bread leading from her basement to the nearby forest to induce the skunk to leave. The next day she called again and the fire chief asked if the skunk had gone. "No", answered the lady, "I now have two".

By now the city has grown even more and, as an energy system expressed in pollution, noise, and impact on Nature, it extends far beyond the built-up area. The situation has become so difficult that people have abandoned the central cities where the population density gets lower and lower (Ref. 5). The central business districts are under the complete control of machines. The human scale is lost (Ref. 6).

One of the results is segregation, for the people who can afford to escape are the wealthier ones, and the people who remain in the declining areas are the poorest citizens. The average American city is seeing its wealthier citizens move out from the center at a rate which ranges from 1 to 2 yards a day, including weekends (Ref. 7).

We are in the middle of a confusing explosion. Not only painting but also poetry warned us early enough. As T.S. Eliot wrote, "Where is the wisdom we have lost in knowledge? Where is the knowledge we have lost in information?" (Ref. 8) This explosion was clearly presented by people like Lewis Mumford who stated that "the city has burst open and scattered its organs and organizations incoherently over the landscape; even the surviving core of the city seems threatened with disintegration" (Ref. 9).

But we did not catch the real meaning of this explosion and we did not deal with it. As a result, within our growing cities we have, among other phenomena, an increase in crime, but I mean the term in a different sense than it is usually understood. The greatest crimes are indirectly

Fig. 12. Open the road for the explosion

committed by society as a whole:

- For the first time in history our children cannot safely cross the street.
- We do not have space in the streets, but still we built skyscrapers on them and increase our problems.
- We destroy the cultural values of the past. One automobile manufacturer in Europe advertises the ability of its cars to penetrate the old city of the walking man.
- We create a new segregation based on different types of mobility, for those who have private cars have several tens of times more mobility than those without cars.

The result is not only a city which is wrong in several respects but also great confusion about our system of life. The best proof of this confusion is that we do not even know the dimensions of our cities. We keep the old concept of the 6x6 mile city (the small square at the center) or even a smaller one but people interact over a much greater area (Ref. 10).

Man has decided that his real city is today 102x102 miles. This is in area 300 times larger and in population many hundreds of times larger than we believe, and it grows at a higher rate than we realized (Ref. 11). The lack of understanding of the dimensions of the real city and its growth leads to inaccurate statements, such as: Industry is abandoning the cities. It would be more accurate to say that, after the escape of masses of people from the city, employment locations follow and a new structure is created. It is equally wrong to state that small cities cost less than big ones, because if we provide the same opportunities to people the cost is much higher in small cities. We go to extremes by stating that we now have the urban poor. We forget that they are simply the eternal poor of the countryside who flee into the cities and for the first time expose the leading classes to reality.

The outcome of such a confused situation is that we develop all sorts of incorrect theories, such as the green belt. To try to create a green belt for a multi-speed city is naive. Instead, our real city demands a deep infiltration of green into the built-up area because only in this way can the city grow normally and the people in it be closer to Nature.

The result is great confusion for all of us and a misinterpretation of most contemporary phenomena which are related to our system of life and not only the social ones of which we usually talk. We are like the man who, as a humorist said, mounted his horse and rode off in all directions at once. One indication of this is our spending money to suspend a huge plastic curtain across the mouth of a valley, supposedly for decoration. This confusion can

be seen everywhere. Some modern rooms are overdecorated and others are completely empty. This is natural as it shows our cultural freedom, but it also creates confusion in our minds. We receive too many different messages and we feel unsafe. Our child, our city is sick. We look only at the symptoms and we do not understand the causes. We are frightened. The mother goes out in the street and screams.

5. The future

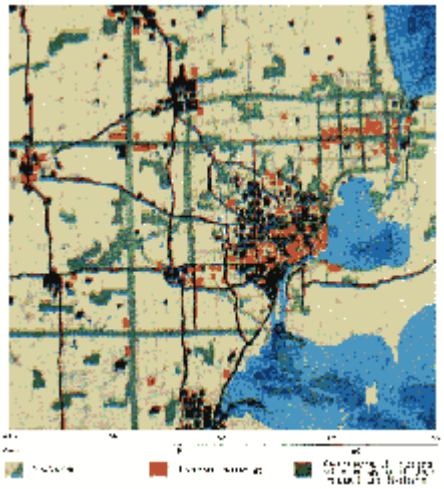

Fig. 13. Building the human city (2000 A.D.), imposed on the urban Detroit area

The witchdoctor enters, dances around the patient, makes unreasonable recommendations and plans, and fails. The disease spreads, the problems multiply.

The pessimist enters and cries that the city will die. He makes all possible pessimistic projections about people, the economy and energy. Because his patient has fever now he says that fever will necessarily go on forever. Sometimes he stops there. Sometimes he continues and predicts than in a few decades the patient will die because of the big explosion of energy. He does not mention what we can do to save the situation and overcome the disease.

The reason for such pessimistic approaches is that we do not understand the explosion we are in. We speak about it but we do not analyze it. We look at the rising world population and think that it will always rise. It is better to be realistic and see, as does the two-headed eagle, that any such curve of rising population usually levels off. And the urban curve does the same.

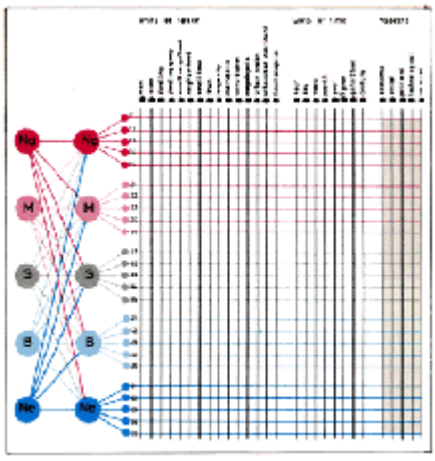

Fig. 14. The urban system model of interactions within any city

A systematic approach shows that probably:

- The global population is going to level off somewhere around 15 billion people
- The urban population is going to level off at about 13 billion people.
- The development of the economy and energy are not going to, nor should they, level off in the same way. If we don't understand that progress depends on them, let's at least not forget the low-income groups which badly need higher incomes and much more energy.

But these are not the only increasing forces. Complexity grows at a much higher rate than energy, and we know the resulting confusion in our life. Our expression of it is our belief that as soon as the explosions threaten disaster we can stop them overnight. I have been asked, sometimes importuned, by different groups, to recommend how we could stop these explosions, and I only could find two methods, both of which were firmly rejected. The first method is to kill all scientists and

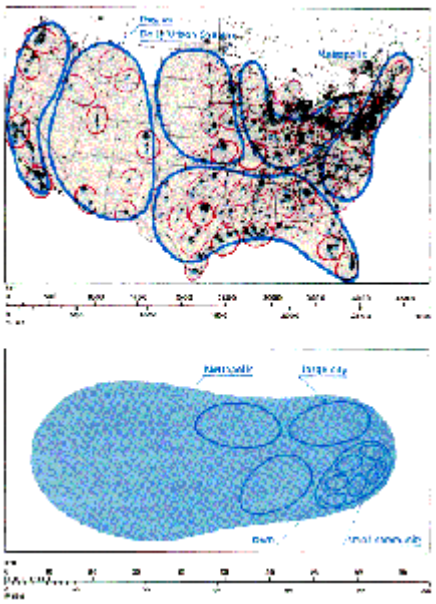

Fig. 15. Daily urban systems in six geographical regions of the USA

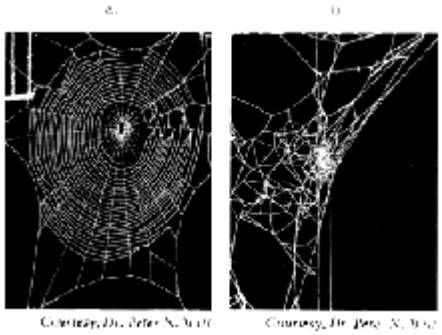

Fig. 16. The effects of dextro-amphetamine upon a spider
a. The effect of a drug on the ability of a spider to make a web may give some indication of the drug's effect on human behavior. This typical web of an adult female Araneus diadematus spider took 20 minutes to complete.
b. The same spider attempted this irregular and incomplete web 12 hours after drinking sugar water containing dextro-amphetamine. It was several days before she could again build a web similar to the first one.

technologists in one night and close all universities for ever. The second method is to build high walls around all cities and paint the urban dwellers red and rural dwellers green so the police can make sure that no green people remain in the cities at night.

Let us be realistic. If we allow science and technology to survive, multi-speed human settlements are as natural and inevitable in the future as were the small round cities of the pedestrian in the past. These multi-speed settlements will gradually become interconnected as, for example, have the settlements in the Great Lakes Megalopolis, and they will eventually form the universal city of Ecumenopolis. This is inevitable.

We cannot prevent the great city of Man from forming because we cannot stop the progressive forces of the human mind. The question is, then, whether we can avoid the negative effects such a city is having on Man. The explosion we are in must be dealt with for the benefit of Man. We have to remember that an explosion does not simply move us far away, as we usually think, but it also moves us far apart. An explosion breaks the whole system into pieces and this is the case with all elements of the city. Both the people and the buildings are moved far apart. From the old city as a social system or compact physical structure we go to the new.

The same is the case with the explosion of knowledge, where progress is very great in some directions with specialists who can see into the far distance but sometimes down narrow tunnels. Between tunnels the gaps are wide and people get lost in them. We have an explosion of knowledge. We have, at least in many countries, an explosion of freedom. We have an explosion of contacts everywhere, and we have an explosion of choices. But we lose the ability to synthesize. In science we postulate laws in every discipline, but they do not always help us make connections between disciplines. As I have said, the highways take us far out, but we lose the freedom to cross the street. We have a Dionysian explosion of the spirit, but we lose our wisdom, our synthesis, our Apollonian balance.

How can we deal with an explosion? Some people still follow the "stop the forces" approach. They forget that this will inevitably mean a much greater and much more disastrous explosion. They also do not tell us what we are going to do, when we reach the population figure they set, with the girl who wants to marry a country-boy or with the first child born beyond their limits. Stalin tried to keep Moscow with three million people. It now has more than seven.

What is the alternative? One only: Enable the forces to expand in the least harmful way until they slow down. In the meantime, protect all the values of the past from the

Fig. 17. The chaos of networks in the urban Detroit area, 1971

explosion: people, nature and culture.

Such an approach has been followed for the Urban Detroit Area and it clearly demonstrates that natural values can be saved if we develop the proper high speed corridors in the areas which are best for transportation and other service systems and less interesting for conservation. A second urban center - a second heart - is going to save the old and the whole system of life in the area. Such an action is not only going to guide the explosion of forces in the right direction, it is also going to relieve the existing urban center from great physical pressures and great social problems, and to reestablish human, social and cultural values.

Such guided action is going to lead to a sound expansion in new areas and to a sound remodeling of suffering areas, bringing relief to suffering people. The proper balance will be struck between farmers and their production, and farmers will be, for the first time in human history, members of urban systems equal to all other citizens. The mobility of farmers and urban dwellers will allow them to be citizens with equal rights in terms of all facilities available to Man.

In this way, even an area in crisis like Detroit can become a city in which Man is again in balance with Nature, in balance with his fellow men who will all have the same rights as he has, a city which saves human values, develops Man better and creates a new culture.

In some problems of physics we can learn from an experiment in seconds, some problems of biology in hours or days, but in human settlements we can only learn if the two-headed eagle helps us to scan a large time spectrum of human action.

The system of Nature and Man usually evolves through three phases:

- *First*, attack by Nature,
- *Second*, counterattack by Man which ranges from burning the forests to global pollution by some chemicals. This seems to be especially characteristic during Man's explosions.
- *Third*, peace between the two, either by adaptation of Man to Nature or of Nature to Man or by compromise.

This is an eternal process.

Today Man is simply repeating his attacks and mistakes and he has two choices:

- To reverse scientific and technological progress, which is impossible, or

- To repeat the age-old and wiser process of achieving his goals by creating a new balance between Nature and his actions.

Up to now he survived by achieving balance through his application of five principles:

- The first principle is the maximization of Man's potential contacts with elements of Nature (water, trees, etc) with other people and with the works of Man (buildings, roads, etc). This, after all, amounts to an operational definition of personal human freedom. It is in accordance with this principle than Man abandoned the garden of Eden and is today attempting to conquer the Cosmos.
- The second principle is the minimization of the effort required for the achievement of Man's actual and potential contacts. He always selects the course requiring the minimum effort.
- The third principle is the optimization of Man's protective space at every moment and in every locality, whether it is temporary or permanent, whether he is alone or part of a group.
- The fourth principle is the optimization of the quality of Man's relationship with his environment, which consists of Nature, Society, Shells (buildings and houses of all sorts) and Networks (from roads to telecommunications).
- Finally, man organizes his settlements in an attempt to achieve an optimum synthesis of the previous four principles. This optimization depends upon time and space, actual conditions, and Man's ability to create a synthesis.

He has to achieve this balance again. Now he has a unique opportunity to satisfy all his principles to the maximum degree instead of satisfying, mostly for the affluent, only the first two; that is to Maximize man's potential contacts with the minimum expenditure of energy. Let us not forget that the people in the ghettos who do not own cars come to the big city to satisfy these principles but they do not succeed.

Man-made pollution started with food and dead bodies left around in caves and then buried below the floor. Then came fire, the first non-human energy. When it was first used in homes, probably a strong anti-pollution movement started (guided by women's liberation), which resulted in the invention of fire-places. Many other uses of non-human energy also proved harmful to people until proper technologies were developed.

Man learns but also forgets the balances. Although he built very good sewage systems four thousand years ago, he needed cholera epidemics to recreate them in the 19th century. Although he learned many times how to achieve a balance between open land and forests, he repeated this

mistake again in America. When founding his new system in Pennsylvania, William Penn laid it down that "on one acre in five no trees should be felled". The famous Ponte Vecchio in Florence was one the greatest pollutant of the river because it was full of butcher stalls. The Renaissance leaders changed them to jewelry shops.

Today we have one basic difference from the past: the scale of the explosion. Up to now the impact of Man on Nature has been small and Man the organizer was able to create balances; although he could organize a vast empire, his technology could only enable him to cross it in months. Now it is the opposite; technology has gone far beyond Man's present capacity for organization.

The first proof is the growth of human settlements. Their basic dimension has always been the one-hour distance from their centers. The pedestrian city had a three mile radius, but it is now many tens of miles and is increasing at a speed of more than 3% per year. Is not this growth a deadly disease, people ask? But when a child turns into an adolescent he is not sick unless he is unprepared, biologically or psychologically, for the changes. It is not the size of our cities that is our problem. Who said that the proper scale is the small valley and not the earth? Also, growth is not the problem. Why do we forget that cities which stop growing lose their young and creative people? It is not the growth of our cities that is our problem, but the fact that we are not biologically or psychologically prepared for it.

We did not manage to see the explosion properly in terms of space, time, its contents, or its different aspects ranging from economic to cultural. The result is the great confusion we live in, like the inability to understand the change of scale. This is one reason why I have used the same scale to show all our settlements and to make clear that even the famous and confusing Babylon is a small downtown community in our terms.

Let us understand very clear that our big problem is not growth by itself but our lack of preparation to deal with it. I repeat: If our child goes wrong as an adolescent it is not because of growth but because of lack of biological or psychological preparation for such growth. In addition to this we must remember than, (unlike the youth who may die during his crisis), the city does not need to die; even Berlin and Hiroshima are alive. Optimism about the survival of the city must by definition be greater than about any one of us.

The city is not wrong and it is not doomed to death. It has problems, it suffers but it can be cured if we do not confuse the notions of development, growing pains, and disease. We are in a phase of development which we still consider a disease and, what is worse, we concentrate only on the symptoms instead of on causes.

But this is not the way to deal with a chronic disease, much less with development. Why don't we build the infrastructure before people create their system of life? Otherwise we are late and have to pay more. To develop the capacity needed for a proper cure and in order to guide the development we have to answer some questions:

First question: *What is our goal?*

The answer has to be clear-cut: To serve Man. Not to conquer the world, but to develop ourselves in the best possible way, by being happy and safe. What we need is a better city for human development and in some sectors we have achieved it. "The mechanized city of the railway age was dirtier than its present successor", Arnold Toynbee tells us, who has lived in both (Ref. 12). In other sectors we get worse: We have lost the human scale which existed in the past.

Second question: *How are we going to achieve our goal? By being revolutionary or conservative?*

The two-headed eagle demonstrates that we have to be scientists first and creative builders second. We must find the balance between the values that must be kept and the ones that must be changed. Igor Stravinsky expressed this very clearly by stating "I am no more academic than I am modern, no more modern that I am conservative " (Ref. 13). This is, perhaps, why we need both revolution in the streets and a dispassionate, conservative scientific process in our workshops. Arnold Toynbee has told us what we must do to break the indifference of modern society: "You have to shoot somebody, burn yourself alive, do something violent, in order to get any attention at all, however good your cause or causes, however patient you have been, however well you have put your case. There is an absolute stone wall of indifference. All over the world(Ref. 14)".

We need a revolution in our minds. We can be convinced of this if we remember how much we need the courage that Man had in the past. When people had created the "city" and recognized it as an institution, they then subdivided it in an organic way. Today we have created the metropolis and we are now creating the megalopolis, but we do not have the courage to institutionalize them. On the contrary, we fight them as if they were strange animals and not our own creations. We must connect conservatism and revolution for the sake of creativity.

Third question: *Do we have the courage to achieve the change?*

In some places, as in Rome, even emperors did not have the courage to create order in existing cities, but in other places Man did. In Teotihuacan, in Mexico, an orderly

system was created as early as the 2nd century AD which provided for the city's growth until the 6th century. Experience proves that only those people who could act in time have save the cities, no matter what the political system was. Washington, DC is one of the most recent cities for which people had the courage to plan ahead on a much larger scale than the small 18th century city of Georgetown. Their income and energy was very low in relation to ours, but their courage was high. There is no reason for us not to be courageous. Africa, today, has the courage to create new cities.

Fourth question: *Do we have the ability to achieve our goals?*

Man has survived in most of the cases we know of even when he did not have the knowledge to build a house for himself. When he started to build, chance and necessity led him to numerous different solutions - witness the great variety of strange house types found in the limited area of Easter Island. However, during the course of centuries of continuous experience, Primitive Man almost everywhere ultimately had the ability to develop the innumerable mutations of the hut towards an orthogonal synthesis. It is naive to think that today we do not have the ability for the solutions and the balances we need.

Let us see where we now stand. In the fifties, we were blind. We were only concerned to build houses, highways, factories; we did not suspect that we had to build cities. This was the result of a great confusion about what the city is which started several generations ago. If we study the proper relationship between Man and the city we will find that it is not merely a relationship between Man and the houses he builds, as we used to think some 40 or 50 years ago when books on cities were full of photographs of edifices, both good and bad. It is, also, not something which has to do with Man's relations with transport networks, which was the fashionable subject of conversation immediately after the First World War, or something which has to do with social and racial phenomena, which were topical themes 10 years ago. Nor is it, lastly, something which bears on Man's relations with his physical environment, as it is the fashion to contend today. It is something quite different; much more complex but more natural. It is a relationship between an element and the system to which it belongs.

In the sixties, we have half-opened our eyes. We recognized the crisis which we wrongly call the urban crisis although it is a crisis of our system of life, and we became frightened.

In the seventies, we have to open our eyes completely. We must recognize the need for a new type of action, with fewer talks and discussions. This is our great task.

7. Twelve proposals

The decade ahead of us has to mark the end of the Dark Ages in the field of human settlements and the end of the myths concerning them. It is going to be a difficult decade but we can achieve our goals if we have the courage to see the truth and move in the correct direction.

Our system of life changes because of the scientific and technological explosions, and this means that we must chose a definite path. We have to forget unrealistic goals and choose our future road between the only two that are open ahead of us:

- First: Let the system change without guidance as we do at present.
- Second: Let the system change with guidance for the benefit of Man.

I am the second, and I can only justify our existence if we take over an action program. Action is the only justification for concern, lamentation, research, and talk. This is why I feel obligated to submit twelve definite proposals, the first six for the leader and the scientist and the others for the bricklayer.

One: We have to develop ekistics, the science of human settlements, the science of our system of life. It is an extension of biology in larger units of space where laws are made directly by Nature (e.g. geography and ecology) or indirectly though Man (e.g. medicine). Ekistics starts with concepts of processes and organization and ends with bricklaying and art. This cannot be achieved by inter-disciplinary approaches. We should not lose our people in the vacuums between disciplines. We should build a system of bridges and connections between the narrow disciplinary tunnels which quickly take us far out along a narrow path. We have to learn to build bridges, even very small ones.

We should build the new science that we need. It cannot be built in as short a time as were physics or biology, but it can be done. We have learned how these disciplines solved problems by creating new disciplines. Our subject is much more complex, but scientific experience is now much greater.

We have to mobilize all possible resources and do it as quickly as possible. In 1935 Alexis Carrel recommended concentration on the science of Man, which I call "Anthropics" (Ref. 15) and hoped to mobilize scientific action for its formation. "Since the natural conditions of existence have been destroyed by modern civilization, the science of Man has become the most necessary of all sciences"(Ref. 16). His statement was very clear, but nothing has been done. We should not maintain

indifference about science we need.

Two: We must create the tools. We need a vocabulary which will help us understand what we say, and scales to measure all phenomena, compare them, and draw conclusions. The very fact that most of the publications about human settlements do not speak of measurements but ideas, and present to us pictures of drawings or elevations of buildings without people, shows how primitive we are both in the sense of science and art.

One day the painter Degas complained to his friend the author Mallarme, of the difficulties of rhyming. "What a job", he said, "I've lost an entire day on one accursed sonnet without getting anywhere, and it's not that I lack ideas. I have enough of them, more than enough". "You don't make sonnets with ideas, Degas, but with words", replied Mallarme . To create human settlements we do not need great ideas, but bricks with which we can build, and we need bricklayers who can build with them properly. Today we do not have bricks but ideas, not bricklayers coming from one well formed discipline, but dancers between them.

When we have the tools we must build detailed models and develop them accurately to portray increasingly complex human settlements. In the meantime, however, we must take decisions without waiting for ideal solutions. A physician cannot wait. He has to act at once and his actions must be different for each patient according to the patient's temperature and other symptoms which have to be measured and inter-related.

Three: We have to organize our system of life properly, so that it can respond to Man's wishes. This requires us to understand our system of life, recognizing that it consists of 15 units. Most of us recognize the smallest ones: individual Man, our master; room; dwelling; sometimes neighborhood; and then we jump to the nation, and stop there, forgetting our daily urban system of circulation and also forgetting the whole earth.

In the old days, only philosophers like Diogenes could understand and declare their loyalty to their Cosmos, but we must now understand that this is true for all of us. A global pollution works even against ascetics in the deserts. The earth is not at all a village as some people like to say; it is a large and very complex system.

Such a systematic approach indicates the need to organize terrestrial space *in all its units* by defining who is responsible for what. We badly need to recognize *the real units* of our daily life which correspond to the old nation of the city. These real units are the daily urban systems, which in the USA number less than one hundred. That these are the real units of our daily life had been proved by detailed studies in several parts of the world as

illustrated by comparative studies of Detroit, Michigan and Cleveland, Ohio in the USA, Marseilles in France and Barcelona in Spain. Some daily urban systems contain more than 10 million people and some, like Tokyo, may contain 20 million people.

On the other hand small cities, which are today considered doomed, can survive and prosper if they are made rational parts of daily urban systems. The recognition of the new huge human settlements does not mean the elimination of the small ones. When we create a family we do not eliminate the individual. He may have to be restricted in some respects but happiness of the family depends on the degree of freedom of each individual. It is our task to recognize the new units of our life and to preserve, revitalize and recreate the small ones, such as the neighborhood, which we badly need.

Four: We have to properly organize our concept of time. When we say "Our city cannot pay for it", this has no meaning unless we add the phrase "in one year" or "in ten years". There are many things which cannot be done tonight but which easily can be done tomorrow.

We can do many things by acquiring a proper concept of the whole, by starting action immediately, and by planning to compete our project in the proper time. Medieval cathedrals or great temples of any civilization were not built within a five-year plan. We are accustomed to plan for the next hundred years only in a few sectors, such as forestry.

If we don't conceive the proper time scale we get pessimistic, especially if changes occur at high speed. Is it coincidental that the greatest pessimism about cities is in the USA, where speed of growth and change is the highest, and where there is no memory of the slow creation of cathedrals in the Dark Ages? Let us adopt the view of the two-headed eagle, and envision the timely completion of the dream.

Build a cathedral again? Yes, and the cathedral we need in our era is the City of Man. But we must organize the plan of action immediately, for the speed of change is increasing enormously. It is highly probable that the higher the organizational level, the higher the speed of change. How else can we explain that the structure of the village did not change for many thousands of years, nor small cities for centuries?

Five: We have to create new balances. This means not only between the sciences but also in the application of order. We need an orderly structure serving the maximum number of our choices. Although freedom is our ultimate goal and harmony can guarantee it for most of us, it is the order of the structures we build that provides the

foundation for a harmonious life.

For those who may be confused between Dionysian disorder, which we may all like when we are in the mood, some for longer and some for shorter periods, and the Apollonian order, recent research at Stanford showed clearly how a spider acts under normal conditions and after drinking dextro-amphetamine (Ref. 18).

In the past Man has proved his ability to create order and harmony. There is no reason to believe that this ability no longer exists. He has simply to exercise it again, and to do so he must clarify the notion of order, from physical to social.

Six: We have to develop the ability to take decisions. The innumerable number of alternatives are frightening everybody today because they are increasing at a very high speed and thus they increase both the problems and the human stress in facing them. Nonetheless, we have to develop the proper methods which will enable us to select, from among this innumerable number of alternatives, the one which combines desirability and feasibility.

We can learn how to do this from the sultan who felt he was dying and had to decide to which of his three sons he would leave his harem and his empire. He let each of them spend one night in the harem, after which he asked his sons what they did. The first spent the night tasting several opportunities separately, the second stayed with many girls at the same time, but the winner was the third, who walked through the harem, looked at all the girls, selected one, and spent the whole night with her. In the morning, he said, she kissed his hand. The ability to select is the principle which leads to the best out of the multitude of choices.

Seven: We must coordinate *all* our Networks *now*. All networks, from roads to telephones, today are spreading in an uneconomic way, having negative effects on Nature. Some are having negative effects on our system of life. Everybody pays in both time and money for the lack of orderly circulatory systems. We must decide immediately and build transportation and utility corridors forming organized grids for generations to come, saving great areas for a life of quality. If we achieve this then we create an orderly system which is hierarchically organized and thus we can help its meaningful operation. Even the control of numbers of people, which is not feasible for large urban systems which have to grow, is feasible in every well-defined spatial community. The same is true of Nature. Such action lays the foundations for the creation of systems of quality of life based on an organization of communities and units of high quality.

Eight: All Networks must go underground. They have to be moved out of Man's space. In the same way in which

Man has moved water and sewers from the surface to underground, and electric wires from the surface of walls to inside them. Highways have to become deepways. Transportation of people and movement of all goods, usable or not, solid, liquid, or gas, has to be automated. Is this not what happens inside our bodies? Most of the goods are automatically absorbed, distributed, and rejected as waste. Why not learn from Nature and copy its processes? It is the only reasonable way.

In some cases we begin to make some progress. When I was a student of architecture a road was built right up to the Acropolis of Athens. We all started a movement of protest but we lost. After the war, however, when my generation was in charge of the government, we eliminated this road. We then asked our professor to design a new and much better road which stopped farther down the slope. Now we must take one more step. This road should be left for pedestrians only and the automobiles should go underground. If we do not do this now the students of today will do it tomorrow.

Nine: We have to create human buildings again. Towering apartment buildings separate the mother from her child on the ground, and from her peers. We need small streets for pedestrians and children's play. We need new small parks and squares to help people interact. One of such squares is Edison Plaza in Detroit. This brings Man together at a separate level from the automobile, which remains beneath him. Motor vehicles have to be under and inside buildings, as was done in Barcelona for horse-drawn carts several centuries ago.

We have to change our concepts about architecture. The inhabitants of a building must be the real judges of it. The architects and builders must consider themselves servants of a cause. The great master-builders must remain as anonymous as those of the cathedrals. We need to develop a method which can create the architectural style humanity needs. The architectural style of Man will not be designed by any single man but by humanity as a whole.

Ten: We have to recreate the human communities we have lost. We have to separate Man from Machine. This has started in several cities on different continents, as for example in Eastwick, Philadelphia, USA. We have to create the multi-level city where Man is the master. Louisville, Kentucky, has a project under construction covering all Networks and bringing Man back in contact with the river which he has not been able to approach for generations. With such action we bring people together and form the frame for the extended family, for the human community, in which people interact and machines do not destroy the human scale. With such action we can save all cultural values of the past, because these were never designed for the scale (size and speed) of the machines, but only for the human scale. Man the builder is very

successful today with single structures, but our system of life depends on the organization of our whole settlement, for only this can end the conflict of people, machines and structures.

Eleven: We must respect Man again as our only master. All previous proposals cannot stand unless Man becomes the measure. We have to save all human and cultural values of the past.

We speak about all sorts of pollution but we forget the most important one, the pollution of human space by non-human machines. This pollution reduces Man's comfort and safety, and his contacts with other humans and with Nature. We need the city of the walking Man which we once had.

This is not all. We badly need Nature close enough to Man so that he will be saved from the dangers about which we have been warned: "Specialized athletics, as taught in schools and universities, do not give real endurance. The efforts requiring the help of muscles, vessels, heart, lungs, brain, spinal cord, and mind - that is, of the entire organism - are necessary in the construction of the individual. Running over rough ground, climbing mountains, wrestling, swimming, working in the forests and in the fields, exposure to inclemencies, early moral responsibility, and a general harshness of life bring about the harmony of the muscles, bones, organs and consciousness ."(Ref. 19)

Only if we achieve this can we hope that Man will dance again; that is he will reach the level at which he can find his personal rhythm and thus become happy and express himself in the creation of a new human culture. When we achieve this everything will be on the human scale for which in the past Nature created the frame and Man created the solution.

Twelve: We have to save Nature. We must conserve, preserve and also develop. We have to bring Nature into the city of Man and not keep it out to be visited only during long weekends. To achieve this we must acquire as much land as soon as possible for the sake of the community of Man. We must define the uses to which may be put throughout each country and the world. Land is the real frame for human settlements. We can achieve this acquisition by demonstrating how much more it costs the city, the country and each individual, if we allow the present explosion and sprawl to continue without guidance and direction. Whether we consider economy, ecology, or aesthetics, the losses are great and Man has to understand it.

Only in this way are Nature and Man going to be again in balance, in all the scales of life, as they were in ancient

cities.

8. Entopia

We have to act. Instead of dreaming of Utopia, the city of no place; instead of crying about Dystopia, the city of evil; we must conceive Entopia, the city for our place on our earth. To achieve this we have to remember one basic truth: this action cannot be taken by the so-called developed nations alone because they are not in fact developed. If they were, they would be finished, but they are not. They have a long road to travel for full scientific, economic, and technological development, and a much longer and more difficult road for their cultural and humanistic development: saving their past, creating their future. On this road they will have to remember that some of the so-called "developing" nations may have a mush lower income, but in them culture and Nature have not suffered so much. It is possible for these nations to move ahead more quickly towards a full development of the whole system of life.

If we properly understand where we are, and where and how we can go, we will become realists in terms of goals and procedures. In this way, instead of fighting the new city of Man, which is not doomed as some people say, we can help its development. We have to open our eyes. When we manage this, we can use the seventies to select our road and to lay the intellectual foundations for the Universal City of Man.

This is all we must do. When we have done it, we can rest assured that we can help the younger generations on a large scale. It s they who will do the detailed construction, and most probably they will do this within a new culture. However, we must act today in order to enable our descendants to develop a new and better Renaissance, to build a world with respect for Man.

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