Articles

Document R-GA; 289, 1963, 64 p.: ill. plans.

The future of Copenhagen: considerations in the abstract

INTRODUCTION

1. To write an article on the future of Copenhagen if you have visited it for only a few days does not appear, at first sight, very natural. Actually, apart from the very short visits of a few hours, I did visit Copenhagen once for a few days in December 1961, in order to pay a visit to the city officials and to lecture at the Akademisk Arkitektforening and the Royal Academy of Fine Arts. It was during that short visit that I got just a feeling of the situation without, however, being able to increase my knowledge about the city and its problems enormously. Thus, when I was asked to express an opinion about the future of Copenhagen I could only say that I could express an opinion about the city only in the abstract, only in an abstract analysis of problems and solutions. The usefulness of such considerations in the abstract is exactly the opposite of that found in a detailed account by somebody who has thorough knowledge of all problems: Remaining aloof, considering the problems in a detached, disinterested way, regarding them in the abstract, sometimes helps us to avoid pitfalls created by the very great knowledge of a situation, the great knowledge which sometimes also means too much attachment to detail.

2. Here again, but in a different way, we have the same old story of the trees and the forest. In order to understand the whole situation I must be able to look at the trees as details and at the forest as a whole. It is quite often very difficult for the people concerned with the trees, with the details, with the day-to-day problems, to detach themselves from this pre-occupation and develop the capacity to look into the whole. It is in those cases that the role of an outsider, looking at the problem only as a problem of the forest, and not of the trees of which it consists, may be of some use.

3. This is the task I have chosen for myself in this case, for whatever it may be worth.

B. THE EXISTING SITUATION

4. Copenhagen is a rather densely built city, a city of the past growing in the 20th century. With all the characteristics of the city of the past, with all the characteristics of the city passing into the new era of human settlements, Copenhagen has the advantage of a well-conceived master plan, which has guided its development for over a decade, the five-finger plan. Published in 1947, and enforced by an Act in 1949, this

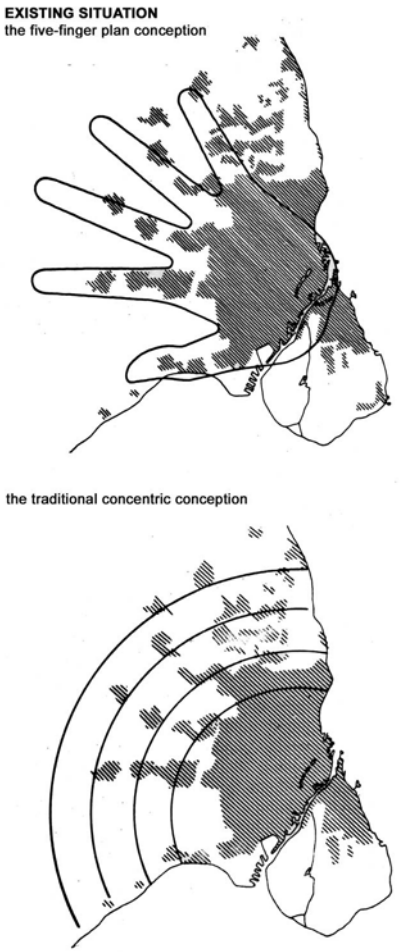


Figure 1

plan formed the basis of Copenhagen's future growth.

5. This plan became well known because of the courage underlying its conception, the courage to break the walls of the city not in order to create again a city, which in conception would be like the old one except that rings would replace the walls, but a city growing in some directions only along the main transportation lines.

6. Figure 1 shows what could have been expected as a conception of the Copenhagen plan if it were to conform with plans of almost all cities prepared in the same period. Instead Copenhagen's plan opened a new path for the planned growth if cities.

C. OFFICIAL PROJECTIONS AND PROPOSALS

7. Eleven years after the publication of the five-finger plan and only nine years after the 1949 Act was passed, it was already felt that the whole metropolitan region should be conceived again afresh. The work that was being started then was published in a series of documents in 1961. On the basis of this study, the situation in Copenhagen appears as follows:

8. The population of Copenhagen, which is now 1,500,000 will increase to 2,500,000 by the year 2000, which means an increase of 66% in about forty years.

9. The population of the country, which is now 4.5 million, will be 6 million by the year 2000, which means an increase of 33% in the same period.

10. The total urban population which is now 3 million, will be 5 million by the year 2000, whish means an increase of 66%.

11. The conclusion is quite obvious – namely, that the total growth of the population in the next forty years will occur in urban areas while rural population will remain at the present 1.5 million mark even in forty years time. Out of the total urban population increase of two million people, one million will go into Copenhagen. If this happens, Copenhagen will be relatively lucky as in other cases, under similar trends, we can expect a much higher percentage of increase to go into the largest urban area of the country. We should keep in mind, however, that this is an optimistic proposal and it is more probable than not that the increase in the Copenhagen area will be larger than in the other urban areas of the country, which means that the population of Copenhagen may well be doubled by the year 2000.

12. Under the present assumptions, about 50% of the total national expansion in industry and commerce is going into Copenhagen. Again, we have to keep in mind that this is probably the minimum possible increase.

Figure 2

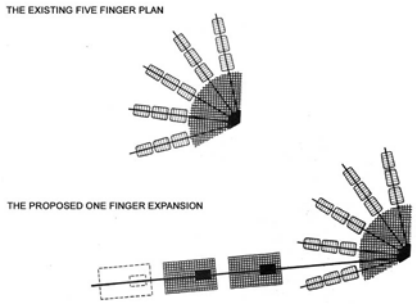


Figure 3

Figure 4

13. On the basis of the assumption of a population of 2.5. million, the increase of flats and houses in the Copenhagen area will be from 0.5 million to 1 million, which means an increase of 100% which could be a natural assumption, although perhaps on the low side, for an increase of the population of 66%.

14. On the basis of the official plan, the density of the population, which is now 300-350 square meters per person, may be 400 square meters per person in the year 2000. This projection, on the basis of experience gained in other cities which have grown under the impact of the automobile, may be on the low side. Our experience is that the per capita consumption of land is increasing at a much higher rate in the era of increasing motor transport. This slower increase in Copenhagen may be due to the constraints imposed by land scarcity. Yet, unless special measures are taken against the waste of land, which is a usual phenomenon in growing metropolitan areas, it could be expected that the area per person may be well beyond the 400 square meters.

15. These considerations are based on the prediction that the 200,000 cars registered today are going to reach the 1 million mark, which means an increase of 400%. The built-up area itself is expected to increase by 200%

16. How these projections affect Copenhagen is shown in Figure 2 where the two squares show the land requirements up to 1980 first and from 1980 to the year 2000 second, within the whole metropolitan region. The shaded area shows land requirements up to 1980 together with a reserve area of 100 sq. km.

17. The new proposals change in substance the five-finger conception into one major finger conception, as shown in Figure 3. This conception is based on the idea of reliance on a mass transport system working at a higher speed. It is in substance an adjustment to time and to technological progress of the initial five-finger projection. Both are based on the idea that urban growth follows the line of easier organized transportation.

18. In detail, this one-finger expansion takes the form of a development which is high-density residential in some of its parts, especially around the proposed new centres, a residential development of a more open character in its main parts, and industrial zones (Figure 4).

19. This development will be based on a main line of transportation as shown in Figure 5. This whole area will have half a million inhabitants served by the two centres, each of which is going to serve a quarter of a million people.

20. The conception of this one-finger expansion instead

Figure 5

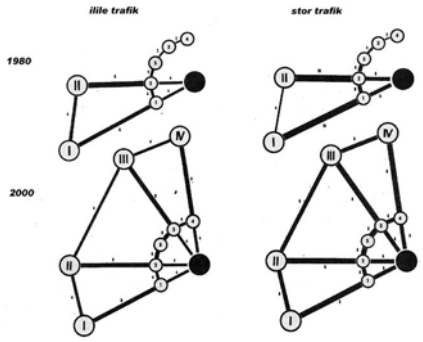


Figure 6

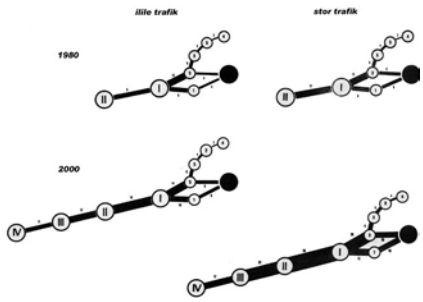


Figure 7

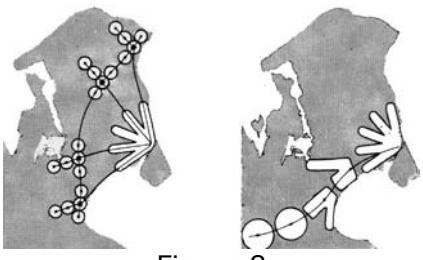


Figure 8

of the five-finger one is a result mainly of a traffic study in which several possibilities have been compared. From this analysis, which is better shown in Figures 6 and 7, it is noteworthy that the whole emphasis is put on a linear development of the whole metropolitan area along one main axis, which will have the best master transport system.

21. Where such solutions lead in the long run is shown in Figure 8, where two possible solutions are compared. The first could be termed a solution of satellite sub-centres at major distances from Copenhagen, while the second involves a solution of a linear development of several centres along one main axis.

D. THE THEORY OF URBAN GROWTH

22. In order to look into the problem of Copenhagen, as of every other city, we need a basic conception of the notion of urban growth. Such a basic conception we do not have today. This is the reason why almost all cities in the world continue developing their plans for the future as if they were static cities of the past, the Growth of which was so slow that the dynamics of change could have no importance on their forms.

23. The truth is that almost all cities of this earth, from the middle of the 19th Century but especially within the last generation, are growing at an unprecedented rate, which at once changes their very structure and nature. Unfortunately it takes some time for the corresponding change in our own conception of them.

24. In order to better understand some considerations about the future of Copenhagen, I will attempt to present here a theory of urban growth which underlies several of my abstract considerations.

1. The Dynamic City

25. In the past, for thousands of years, our cities were static. In practice they did not grow beyond their walls. If there was a necessity for a larger population, then a decision was taken which was carried out in time for an enlargement of the walls. The city would make a jump towards new walls only to become static again. In spite of the systems of transportation, and the surroundings, the city was well confined within its walls, it was a compact area, densely built around its own centre.

26. Then came the era of a growth in population, a growth in industry, the development of technology and the time when more people, more cars and more machines entered the city. As a result of this trend the city started growing in concentric circles. This is quite easily done if the surroundings are uniform (Figure 9a).

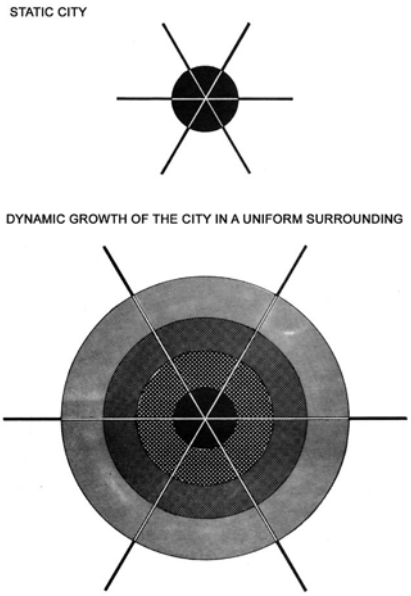


Figure 9a

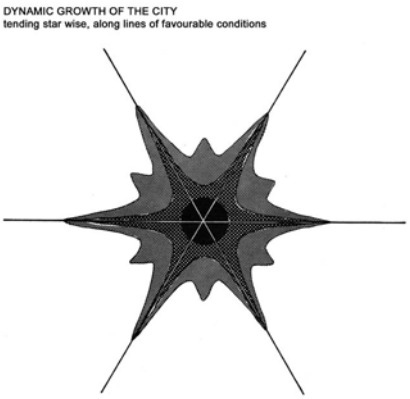


Figure 9b

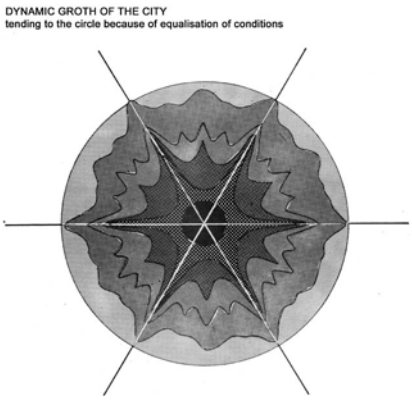


Figure 10

27. If the surroundings were not uniform, if there were lines of much easier transportation at much higher speeds, then the dynamic growth of the city would take place first along the axes of easier and faster transportation (Figure 9b).

28. As long as there was a much better system of transportation along some axes, then the city expanded along them. For practical reasons, though, it was impossible to continuously develop systems of speedier transportation always along the same lines. Since the gaps left in this star – like expansion had had a greater attraction for people, there was a tendency for new projects of transportation to be created within the areas left between the developing radii. As a result of this we had a gradual development of axes of minor importance in between the axes of major importance until gradually the gaps of the star were filled in and the star took the shape of a circle (Figure 10).

29. This was a natural development. A breakthrough in technology cannot happen every day. The railways had meant a development along certain lines only, but gradually people tended to fill the gaps by using cars. Thus a city which took a star-like shape because of the railway system imposed on it, tended naturally to the circle again when people could use buses and private cars. The fact now that a new transportation system can be created, that a new highway system can be superimposed on the existing one, leads first to development along certain directions, along the directions of the new lines of transportation. But this is a phenomenon limited in time, as very soon after the creation of these new lines of transportation, people tend to fill the gaps.

30. This happens in every type of economy. If it is a capitalistic one, if land is privately owned with no government control, the private speculator, the private landowner of these areas, is interested to develop his land in an urban way in order to have the extra profits that will accrue from such a development. But even when we are thinking of a communist society where all land is solely owned by the government, the basic rules of economics applied to the function of the city lead to the same desire for the exploitation of the land which is closer to the centre; after all, it should be remembered that the closer the land is, the easier it is to use it, provided we create the same opportunities and the same possibilities for investment, for the connection of this land with the centre in question.

31. The conclusion is quite clear. The star-like configuration can only be temporary. It tends to re-form and re-shape the city and gradually mould it into a circle.

32. If later, at a new stage of development, new means

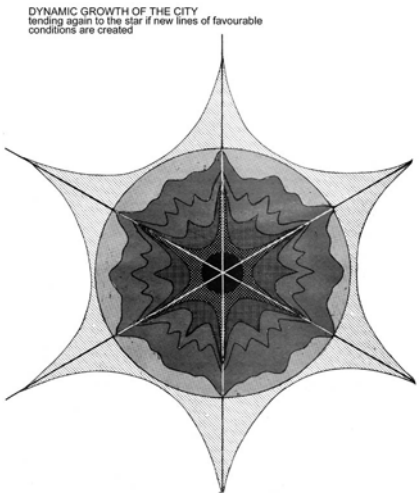


Figure 11

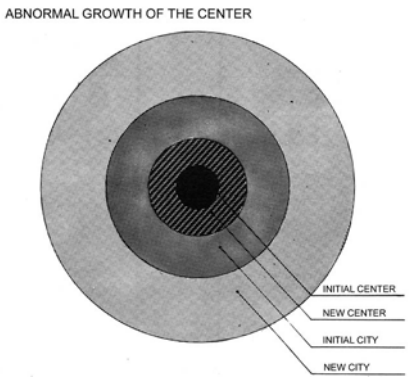


Figure 12

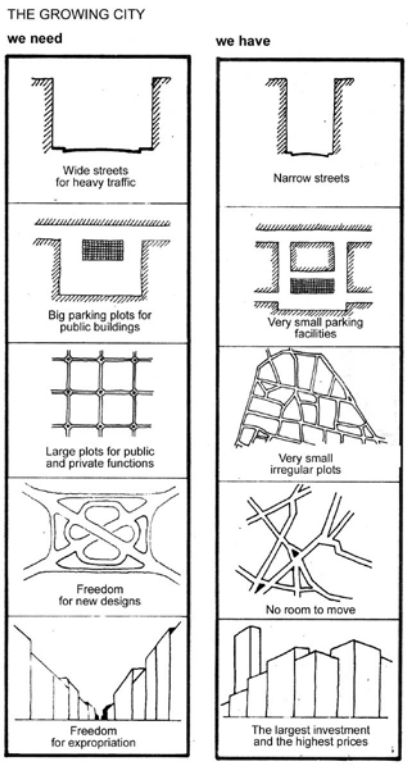


Figure 13

of transportation re-shape the circular city into a star-like one, this again can be only a short-term development as the next phase will be dominated by the desire of the people to fill the gaps which exist between the developing radii of the stars (Figure 11).

33. The result of such a continuous expansion of the city is that the centre, which was small in the initial phase, is now developing into a much larger one; this is clearly a quite abnormal development since the centre has to grow within built-in areas. This is a unique case of an organism which has to let its heart grow within areas already occupied by other functions. When the heart grows in the body of the young child, this looks to us normal because also the cavity around the heart is growing; the same is true of every animal. In the city, though, we have a completely abnormal phenomenon of a heart growing within areas occupied by other functions. Thus we meet the major problem of the dynamically growing city: the unnatural growth of its centre. The result is to have a city which cannot function properly as no organism can function properly if its centre does not function in a way corresponding to the demands of the whole organism (Figure 12).

34. How unnatural the phenomena created because of this abnormal growth are, can be seen in Figures 13 and 14 where we compare the demands that we make upon the city centre with the possibilities it presents to us. If, for example, we merely superimpose a plan showing the widths of the streets throughout the metropolitan area, upon one showing the traffic volume, we can see how unreasonable it is to have highest traffic volume where we have most narrow streets.

35. At this point we must consider satellites for a moment. Many people think that the creation of satellites may solve the problem of the city. This might have been so in the era of static cities. But at present when we are dealing with dynamic cities we have to look at satellites only as a partial escape from the inevitable, which is the continuous growth of the city that finally incorporates all its satellites within its body (Figure 15). As a result of it, we can draw the conclusion that satellites do not offer any relief from the problems of the growing city as they are:

a. Incorporated in time into the main city body and are no longer independent.

b. Irrespective of when this happens, the satellite begins to impose pressure on the city centre from the moment it is founded, thus, the city faces the same difficult problems in relation to its centre.

36. We arrive at the inevitable conclusion that the manner in which our cities are now dynamically growing

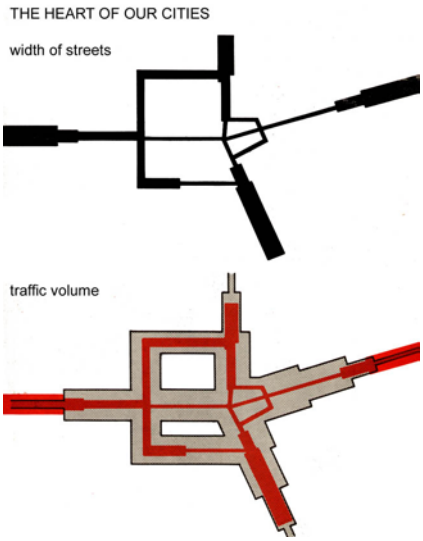


Figure 14

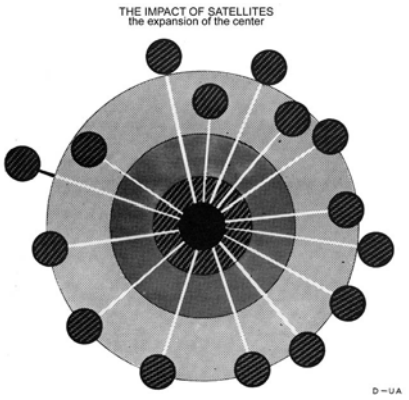


Figure 15

does not give the centres any chances to adjust to their new roles.

37. This adjustment has to be seen in two ways: first, as an adjustment in dimensions and, second, as an adjustment in functions.

38. Regarding dimensions, the centre has to be continuously re-adjusted as it has to serve an ever-growing area. The growing centre does not always need to grow in direct relationship to the growth of the population or to the growth of the economy. This is due to the fact that there is no necessity for the centre to provide all the services to the growing city as it was providing earlier. Centres of secondary and tertiary importance are playing this role. The new functions, though, are not by necessity always proportionately smaller; sometimes they are much larger than expected. We have not enough experience up to now to relate the functions of a growing centre to the total dimensions of the city.

39. This requires some explanation. What do we mean by the growth of the centre? Do we mean the surface covered by it? The surface does not always necessarily grow at the same rate as the city. This may well be due, however, to the limitations imposed on the centre, which is so to speak surrounded, besieged, by the city itself. It may also be due to the fact that it seems natural to grow much more in height in the centre. Therefore the growth in two dimensions may not look as important as the growth of the overall city.

40. Limiting our study of the growth of the centre to its physical dimensions, however, is not enough. We have to think in terms of the real functions of the centre, and these functions we have in turn to express in numbers of people who are working in it, numbers of people who are visiting it, numbers of cars, machines and other means of transport that have to approach it.

41. Seen in this way, the centre grows very often much more than the city itself, because if the city's population grows by 2% per year, we may well discover that the people visiting the centre of the city are increasing by more than 2% per year and that the machines going into the centre of the city are creating an even greater demand for space than the one created by the growth of population, or even the increase of the city-centre visitors, etc.

42. The second problem, which is related to the centre of the city, is a problem of functions. The very fact that the city grows means that the centre is growing, but it does not mean at all that the functions, which remain at the centre, are the same. Actually, we always have new functions added but at the same time some of the older

functions need to get out of the centre. As a result of that, even if we have enough space for the centre, we must think of the fact that its physical shell may have to be changed in order to accommodate different types of functions. As an example we can mention the traditional square in front of the city hall. In a small city, it may be visited every day or every Sunday by the citizens who would like to visit the monumental square and enjoy the facilities provided by it, be they the city hall, the museum, the cathedral, coffee houses, etc.

43. In a growing city, its centre cannot play this role any more, it is too far away from the people and it has to take care of so many other functions, mainly of traffic, that it is no longer the place which people would like to visit to enjoy themselves. On the contrary, it is turning into a traffic centre, which people try to avoid.

44. It has to be understood that we are dealing with a growing and changing centre of the city. The more the city grows, the more the centre grows and the more its functions change. There is a necessity for a different approach,

45. We should remember in this connection that the growing centres of which we are speaking were centres growing in a natural way without being guided in any direction. We have now to recognise that there is a necessity to guide the centre in order to avoid all the problems which are being created because of its unguided growth.

46. The study of such a situation proves that the technique we have to employ to cope with the problems of the growing Centre is the same one which a besieged army uses in order to break through, that is the technique of breaking through in one direction, in the direction of minimum resistance. This is the only technique which allows us to express in physical terms the fact that our cities are now four dimensional, with the factor of growth having a much greater importance than the other three physical dimensions.

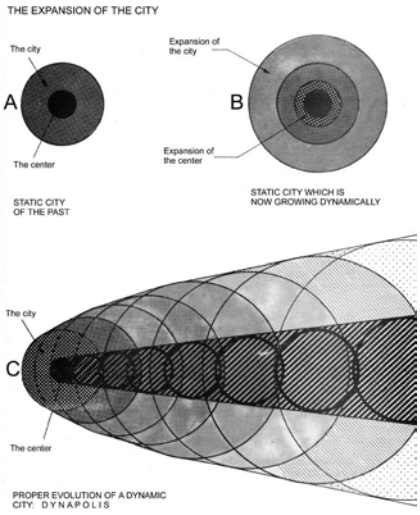


Figure 16

47. If we break through the point of weakest resistance, then we can create a new centre for the expanding central functions. Thus, we avoid breaking the best areas of the city around the centre and break through the weakest area. This we do not hesitate to reform in order to accommodate these new functions whilst the old functions remain in the old centre. The result is that the city in now expanding around the new centre. If this process is continuous, we are led to a parabolic city where centre and periphery are created on new virgin ground and thus are led to a city which is growing in a guided way, a city growing in one direction and taking a parabolic form (Figure 16).

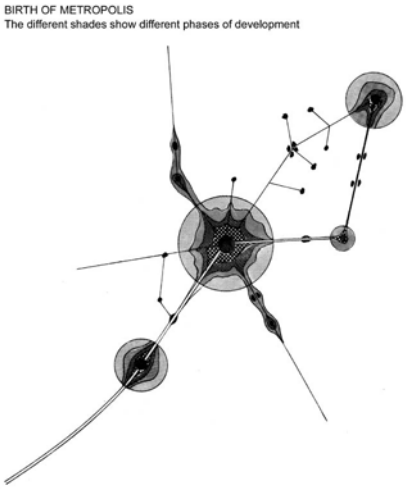


Figure 17

Figure 18

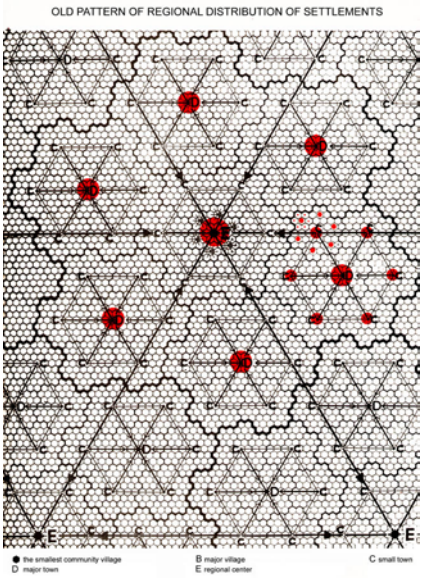


Figure 19

2. The Changing

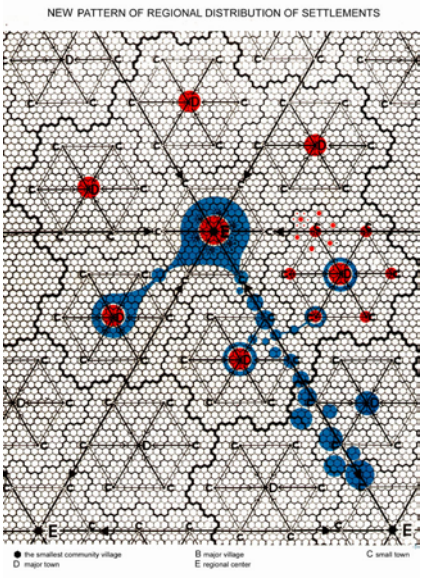
48. In the previous examples we selected one isolated city. We have shown how this city grows dynamically into a form which is unreasonable for its centre, if it follows the concentric pattern of growth, or into a reasonable form, if it turns into a parabolic city.

49. In practice, we seldom deal with single cities. The reason is that we seldom have such isolated cities; more often they are cities within an area which has also other settlements. It is useful therefore, to notice how the city grows within an area in conjunction with these other settlements. If we follow the gradual evolution of a small city in an area with other cities and villages, we can see that a small central city begins to grow mainly along the lines connecting it with other cities (Figure 17), that gradually the city may tend to fill the gaps existing between the growths along lines of transportation and thus the initial small city may turn into a major urban area which has incorporated several of the minor settlements around it. However, with the process continuing for many decades this city is gradually connected with other cities into one urban system, and this composite city takes several shapes in different phases of evolution, but in the long run tends again towards a major circle (Figure 18).

50. The metropolis, which consists of several cities that have grown into each other, has been born. It is the result of a dynamically growing city.

51. But this process continues and several metropolises may expand even more, growing into each other and forming the *megalopolis,* as the area consisting of several metropolises has been termed recently by geographer Gottmann. Such a phenomenon can be seen not only along the East Coast of the U.S.A. but also in such areas as the Greater London Area, Belgium/Netherlands area, the Eastern Coast of China and elsewhere. The city has changed into the dynamic city, into Dynapolis, and this again led to the Metropolis which is not a static city but is developing in Dynametropolis which leads to the Megalopolis which again is a dynamically growing human settlement. We do indeed live in the era of continuously growing and changing human settlements.

52. How this phenomenon takes place within a region, we can follow in Figures 19, 20, 21 and 22, where we can see how an area with cities and villages of several sizes gradually developed along certain lines of communications which are slowly becoming interconnected, finally forms a continuously changing, growing, spreading pattern which, although it may look irrational, is simply following lines of easier development along major transportation facilities.



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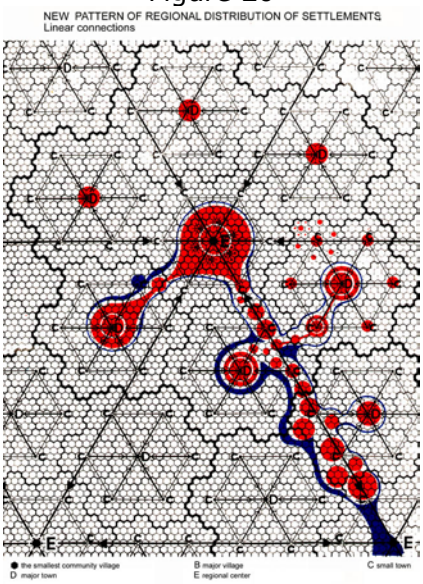

Figure 21

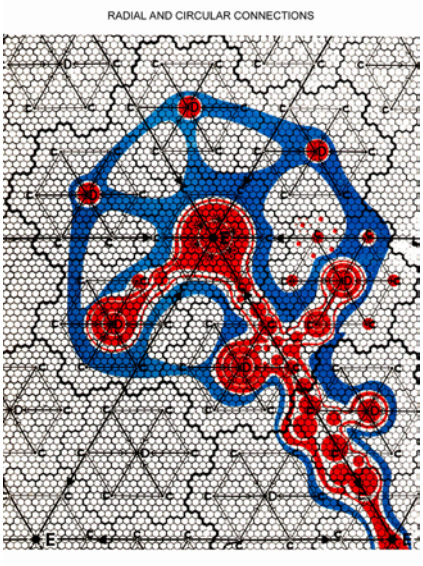

Figure 22

3. Towards the Universal City

53. Where are these trends leading? This is a question which we have to ask ourselves and give a reply to. A study that we have carried out in the Athens Technological Institute proves that there is no prospect that present population patterns and economic growth will change for several generations to come. It is quite probable that there will be changes in these trends of evolution after a few generations perhaps towards the middle of the next century but not before that. For about the next hundred years we are going to witness a continuing growth of population, of economy of land use, of the employment of the machine.

54. Under these conditions, we have to be prepared for the phenomena to come. We cannot avoid some basic issues by preparing plans for the next ten or twenty years only, if we know that population will continue to increase and that other forces will continue to exert their pressures on our cities.

55. Such projections into the future prove that we are going to have a continuous network of cities, which will cover whole continents and the whole earth. There is no possibility of avoiding such an evolution. Our challenge is to face it, and to face it in a constructive way.

56. Speaking of the single city, I have tried earlier to explain how by guiding its growth we can lead towards Dynapolis towards the parabolic city, and thus avoid all the weaknesses which are created by a concentrically growing city. Let us now see why a similar necessity exists for the universal city, which is now in its initial phase of growth, the city of which Copenhagen will become one small part.

57. Some simple projections for the whole earth show the following:

a. The population of the earth will be more than doubled by the end of the century more than four times the present one after the first quarter of the next century and more than eight times after the middle of the next century.

b. In very simple terms we can say that in a century from now the population of the earth may be of the order of 24 billion people as against 3 billion today.

c. It is quite probable that from then on the growth will slow down. Actually this slowing down will be apparent earlier if present political systems still prevail.

d. The mere fact, though that the population of the earth is going to be eight times larger should not mislead us in

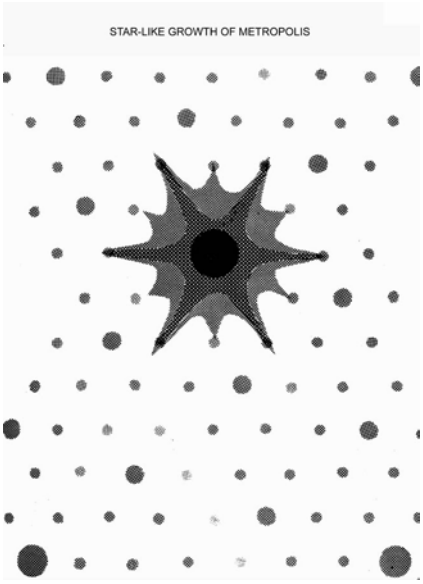

Figure 23

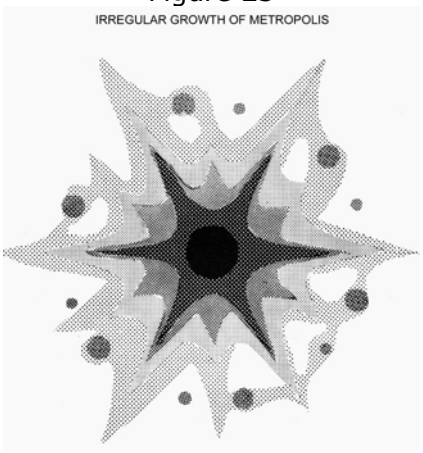

Figure 24

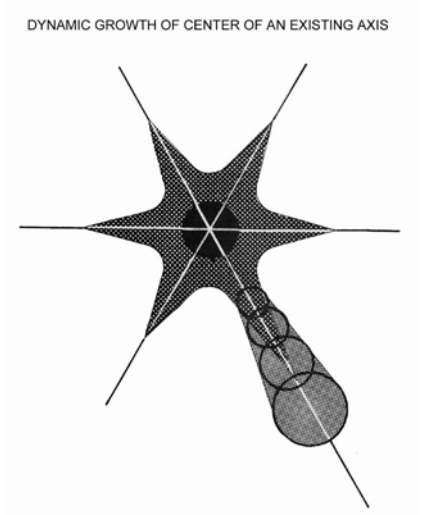

Figure 25

relation to the urban areas. It is quite probable that even by then, out of 24 billion people, more that 2 billion people will be the rural population which is necessary to feed the 24 billion. This means that the urban population of the earth will be 22 billion people compared to today's half a billion, which means an increase of 44 times.

e. If this is the increase of the population and if we have to reckon with an increasing income, with an increasing use of machines and cars we can confidently expect that the pressures to be exercised on the existing centres of cities will be something over 100 times the present pressures.

58. Thus, we can draw a very simple conclusion. If we let the urban population grow around the centres of the existing cities, we will have for average city of the future or for the average centre of the future, as all cities are going to be inter-connected, a pressure equal to 100 times the present. It is quite clear that no city which exists at present can stand such overwhelming pressures.

59. We have, then, to devise a solution to relieve the present centre pressures to come. This can be done, as in the case of Dynapolis, by creating new centres, but it cannot be done by the creation of satellites; the satellites are subordinate centres, which do not relieve a central area of the main pressures exercised on it.

60. How this works in the case of a present-day metropolis is shown in a series of plans (Figures 23-28).

61. Let us take a present-day metropolis which has grown out of the traditional hexagonal patterns as shown in earlier plans. Let us take this metropolis at a phase when it looks star-like, because of certain transportation patterns (Figure 23). In the next phases it will look quite different, it may have grown along some directions much more than others and some of the radii of the star may have become inter-connected because of the settlements that lie in between and the lines of transportation which these settlements are going to create (Figure 24).

62. If this continues, the centre of the metropolis cannot be relieved and it will gradually die and the whole area will suffer from increasing pressures and difficulties.

63. In order to avoid this, we have to understand that we need to create a centre of higher order and not of lower order. If this centre of higher order is created properly, it can relieve the whole metropolitan area of pressures and let the existing city survive with its present functions.

64. If we follow the idea of a growing centre along one of the existing axes (Figure 25), we are gradually led to a dyna-metropolis, (Figure 26) the new centre of which is going to take off the increasing pressures, and will mean

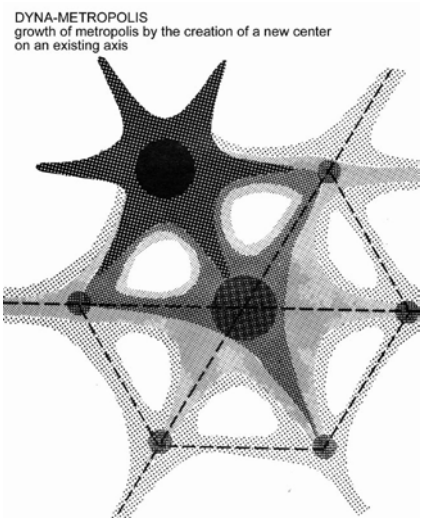

Figure 26

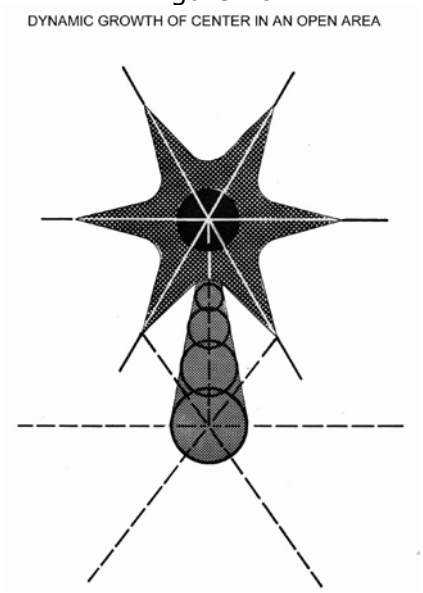

Figure 27

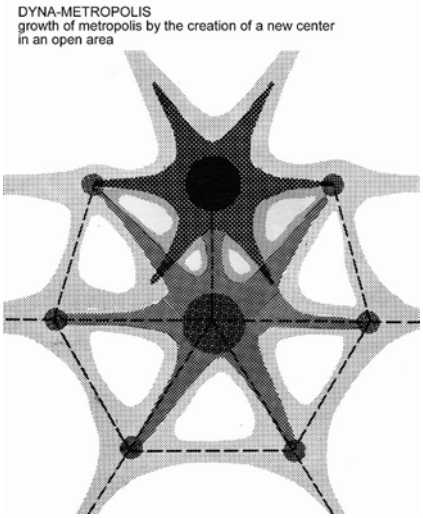

Figure 28

the creation of several centres around it. In this case, the old metropolis suffers only from small pressures as it does not become the centre of a population of, say, five or ten times larger, but only of its own population plus some small additions which will not overcharge the existing heart and will allow it to function and to readjust gradually to the increasing demands. This increase in demands, though, is now under control and the growth of the metropolis is guided.

65. Looking at Figure 26 we can see that the new centre is created on an axis which is already playing a certain role, and therefore we have superimposed the functions of a new centre on existing functions of lower order in relation to this centre.

66. It is, therefore, preferable to proceed to the creation of a growing centre for the metropolis in an open area between the existing transportation lines (Figure 27).

67. In such a case this centre starts without any difficulties, is modelled on the basis of future demands and can stand the pressures of a dyna-metropolis (Figure 28) in which we have the following characteristics:

a. The new centre which can stand pressures of much higher order than the existing centre.

b. This centre helps the creation of several centres around it, at first of minor order and gradually assuming equal order with the initial metropolis.

c. The initial metropolis has to stand only a very small part of the pressures which otherwise would have been exercised on it and thus it can survive, re-model itself, and serve its own population in the best possible way.

68. The previous analysis and examples show quite clearly that in order to save our cities from the problems created by their dynamic nature, we have to guide the growth not by creating centres of lower order but by creating centres of higher order which can achieve two basic goals:

a. Create a healthy pattern for the population to come.

b. Save the present population with its present habitat.

E. CONSIDERATIONS ON THE FUTURE

69. On the basis of the thoughts expressed on urban growth in general we can now proceed to some considerations on the future of Copenhagen. In order to better illustrate the need for them, I begin with some critical remarks relating the theory to the proposals already developed about Copenhagen.

Figure 29

Det fremtidige primaergadenet

Figure 30

Figure 31a

1. Critical Remarks

70. If we now consider Figure 29, we can see that the existing public transport system - which in some ways supports and in other ways does not support the five-finger plan - has not been the sole factor in the development of Copenhagen up to the present. Actually, two of the major lines of development along the northern coast and the southern coast are hardly served at all by the public transport system as shown in the plan with the 45-minute periphery. This may be explained as a deficiency in the existing public transport system; on the other hand, it s a proof that the city follows certain lines of development not necessarily based on the public transport system; this confirms the theory of urban growth previously described, which shows that even if development takes place mainly along certain lines, there are many other forces which tend to promote development along other lines and in between the main lines so that at the end the whole scheme tends to be more like a circle than a star.

71. Another confirmation of the previous principle is given again by Copenhagen's plan for the proposed systems of urban motorways. This system does not simply create radial highways, which is natural, but also creates ring streets, which shows clearly that in the long run, the one-directional projections of the city along certain radii tend to become interconnected by a ring system (Figure 30).

72. How this conception influences not only the central part of Copenhagen but also its future pattern, is shown in Figure 31a where the primary traffic net proposed is tending to connect the northern parts of the city with the proposed southern expansion by such roads that the growth of the city in other directions not only will not be limited but, on the contrary, will be strengthened, and gaps between the radii leading to the west and to the southwest will be filled (Figure 31a).

73. The above remarks tend to show the type of problems which may arise if the basic rules relating to the growth of urban areas are not consistently projected into the future.

2. Longer Projections

74. In order to avoid weaknesses which are so natural in planning for the future of cities in an era during which we do not know enough about the principles of their dynamic growth, we have to keep in mind several rules which will help us to avoid pitfalls and foresee future development as far as this is possible. In this section I give some thoughts and recommendations that may help Copenhagen to avoid some weaknesses in its future plans. The first is the necessity for longer-term planning.

75. I do know that people may be doubtful of the usefulness of attempting long-term projections once they have seen how difficult it is to predict even for 20 or 40 years. My answer would be that exactly because of our inability to project for longer periods we have had so many weaknesses in our plans for all cities during the 20th Century. The basic weakness was from the beginning that we did not dare to do anything for the future, we were only designing static town plans. Then some cities understood the necessity to plan ahead, to plan for a certain growth. Copenhagen was the most outstanding example of such an attempt. The fact, though, that these attempts to plan for the future were not connected with specific periods, were not based on exact estimates and even if they were, were limited to a very short period, has cramped our planning within such small dimensions that we did not recognise the true problem which lies ahead and, therefore, we could not hope to achieve more realistic solutions.

76. The second thought related to these ideas, is that we should not be afraid of the unpredictable. Much less should we use the unpredictable as an excuse to avoid predicting the predictable. In many ways we can predict what happens, what will happen. After all, the rules of urban growth do not change from one day to the next, if we do understand the real rules. Here we must speak again about the necessity of having a theory of urban growth which, in spite of technological changes, will remain valid and able to help us understand what is coming in the future.

77. As a conclusion, I think that we have to make our projections not for 40 but for 100 years, because in 100 years we may have a completely different situation we may reach again through the universal city, or Ecumenopolis, the phase of static settlements. For those who think that 100 years is too long, I have to remind them that if this article is read by young men graduating this year from the universities, not only will most of their grandchildren be alive in 100 years from now, but also, according to present vital statistics, 50% of their children will live in the city 100 years from now.

78. On the basis of such considerations, we may be able to say that the population of the Copenhagen area, by the year 2000, will be of the order of 5 to 5.5 million people, even if present rates are considered as valid and even if we do not witness higher rates of increase, which, as I have already explained, is quite probable.

79. Flats and houses within this area will number some 2.5 to 3 million and cars, if the present trends continue, will be of the order to 2.5 million.

80. By then, the built-up area will cover about 3,000 square kms. (Figure 31b). This, compared not only with

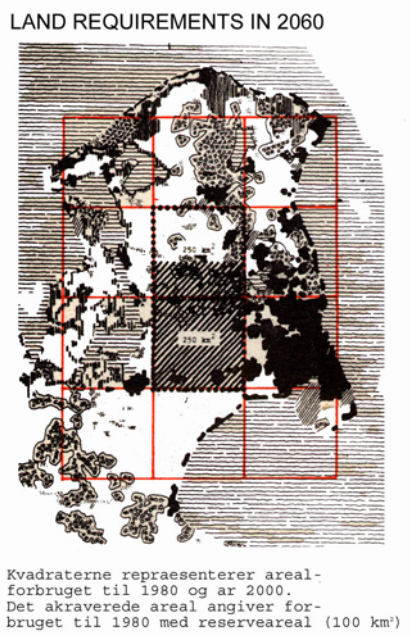

Figure 31b

the present area but also with the area foreseen for the year 2000, an area of 500 sq. kms, shows that we have to be prepared for the new forces and the new elements to be added in our area right from now. Such considerations confirm the necessity to look ahead in order to be able to incorporate our present proposals into the future plans.

3. Faster Evolution

81. To reckon, though, over a longer period of years only, is not enough of a guarantee for our considerations of the future. We have to reckon also with a faster evolution than the one estimated for the present. As an example I would like to mention that we may witness an even larger population increase, a much larger number of cars and of many other forces which are going to have an impact on the Copenhagen of the future. For instance, the estimates of the population of the Copenhagen area for 1980 were prepared during the years 1958 to 1960, as mentioned in then Preliminary Outline Plan of the Copenhagen Metropolitan Region. Within that period of two years only, the estimated number of cars by 1980 rose from slightly over 200,000 (estimate prepared by a commission investigating the possibility of a bridge over the Great Belt in 1958) to close to 340,000 (revised estimate by a national motoring organisation which in 1959 had estimated the number of cars for 1980 to be lower than 380,000) (Figure 32a).

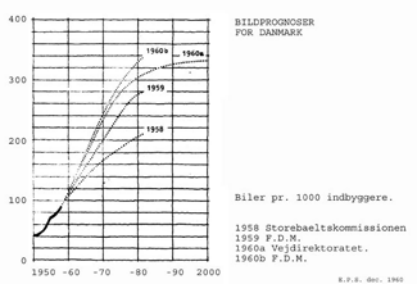

Figure 32a

82. We have to be prepared for the fact that we are at the beginning and not at the end of an era as many people tend to believe and, thus, the rate of change of many phenomena related to our life is becoming all the faster. It is quite important for us to understand that the curve of change in a diagram is rising and that we are unable to predict exactly when this rise is going to slow down. This is the reason why, whilst projecting on the basis of our present knowledge, we must take into consideration that the rate is increasing and therefore that projections should not necessarily be straight lines, as many people tend to assume, in fact, even having constructed better projections we should again be prepared for a yet faster evolution. In practical terms this means that although we may be designing projects for 20 years ahead, we should keep in mind that much more should be done within the 20-year period and, therefore, we should allow for very wide margins in our projections in order to accommodate even the unpredictable changes.

83. This is the place where I should mention some thoughts of an outsider on the future of Copenhagen, which suggests a faster evolution than the one we are accustomed to predict today. One of these thoughts refers to a much better system of transportation and communications throughout Europe. If this happens, and

we have every reason to believe it is coming, then the position of Copenhagen, as a connecting link to Sweden, will greatly speed up its evolution.

84. Another factor to reckon with is the increasing number of people travelling throughout the world. As fares become increasingly cheaper, incomes are rising and the desire for, and ease of mobility are becoming a fact of our present-day life, we should certainly expect larger numbers of tourists all over the world, of which Copenhagen will have a major share.

85. But it will not be only tourists. Copenhagen's key position, finally, will undoubtedly attract a large number of people moving as a result of increasing mobility and decreasing costs of transportation with the end result that the city's overall development will be speeded up.

86. These three considerations relative to transportation and communications show that we may expect many other similar changes, many of which will be of a greater magnitude than the ones for which we prepare exact projections. We have to be able to think in terms of a faster evolution, which is probably to come.

4. Broader Frame

87. These last considerations about transportation, lead us to the next principle of very great importance for our considerations of the future, the principle of the necessity of a much broader geographic frame.

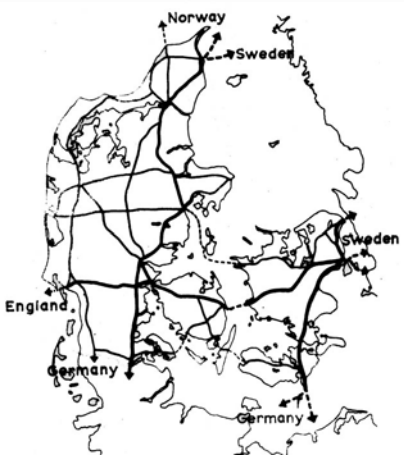

Figure 32b

88. The growth of the population, the growth of the economy, and the development of technology, clearly show that there is an imperative necessity to look into every problem of an urban area in the widest possible frame. It is only if we do so that we can evaluate the role of an urban area in the proper way. This, in the case of Copenhagen, shows that we have to understand its role within a growing Europe, a Europe breaking the national frontiers and which is, therefore, going to develop into a new pattern of human settlements. It is only within this frame that we can understand how important the position of Copenhagen is and where we should expect much larger concentration of people within the whole of Denmark (Figure 32b).

89. It is only if we can look ahead into longer projections that we can be prepared to face faster evolution and study the broadest possible geographic frame in which the functions and the forces of the future should be properly located. Thus we may hope to develop plans which will not disappoint us, which will not force us ten years from now to revise our thinking, which will enable us to create a frame that will be continuously modified, but never reversed.

Figure 33

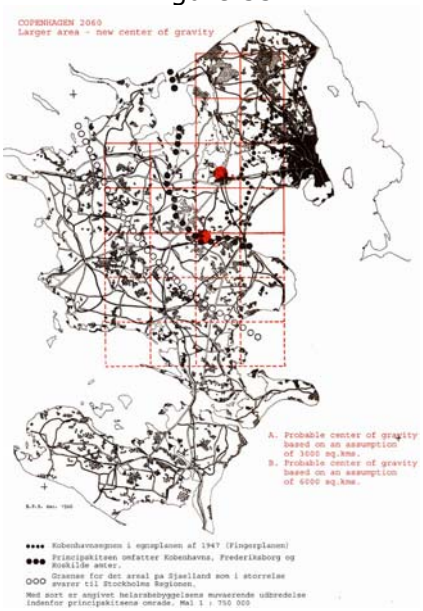

Figure 34

F. ABSTRACT CONSIDERATIONS

90. As I already said in the introduction, the value of these considerations and proposals is a value of ideas in the abstract and is based mainly on the general knowledge which we possess today about urban growth and much less on the knowledge of the specific case.

1. Larger Space

91. From the previous considerations it is now apparent that we must move in a much larger space. What we have at present, as shown in Figure 33, it is completely inadequate if we think in terms of such a long-term projection.

92. We have to think of an area six times larger than the one projected for the year 2000, we have to think of twelve squares of equal size in order to have the real dimensions of the problem to come.

93. Even if we assume that the twelve present squares (250 sq. kms each) can be located in the areas which I have shown, and this is rather improbable as several parts of these areas are covered by sea and lakes, and the squares have to be shifted southwards, we can see that the centre of gravity of the area to be created is completely outside the present area of Copenhagen.

94. It is quite probable though that 50% of the area will have to be saved and thus the total area required is of the order of 6,000 sq. kms rather than 3,000, which means 24 such squares and a centre of gravity that is even further out than present-day Copenhagen. (Figure 34). Actually, such an area covers in practice the whole peninsula and we have to take into consideration that the real centre of gravity in the year 2060 is in location B rather than A, B being the centre of gravity of the peninsula.

95. The conclusion of such a consideration is quite clear. In a century from now, Copenhagen will cover - with the free space which is indispensable for its survival - the whole peninsula and its centre of gravity, B is going to be far out in relation to the present city.

2. New Formations

96. The universal city is born, it is gradually taking shape. Looking now at the forces that will shape the settlements composing this universal city, we can classify them into three categories. (Figure 35)

a. Forces drawing the settlement toward better surroundings, usually to the coastal area and the area along lakes. We should expect a continuous settlement

Figure 35

Figure 36a

along the ocean shore and around the lakes. This is already happening and may be safely expected to continue at a faster rate. The only reason why it did not happen in the past was that these areas, although man's natural preference for his habitat, were difficult to reach.

b. Forces drawing settlements to develop along the main transportation lines along highways, railways, near harbours and airports or near the fields from which the space craft of the future will start their interplanetary voyages. This means that we will have to reckon with what can be called ribbon development in certain lines connecting Copenhagen with the whole of Denmark, with Sweden, with other parts of the world, and

c. Forces drawing more and more people closer to central locations. This means that the present nucleus of Copenhagen will exercise an extra attraction inviting greater and greater masses of people closer to it.

97. If we take into consideration these forces which exercise pressures on the peninsula, we should expect that they will fill the peninsula and several of these forces will have an impact on each other and create problems of density.

98. It is therefore reasonable to look not only at the closer peninsula but the broader area and this will help us to understand the wider spread of the city to come (Figure 36a).

99. A comparative study of these two last plans shows why it is imperative to think on a larger scale. It is only on a larger scale that we can properly conceive the system of transportation to come and the main forces shaping the settlements of the future and thus be able to understand the creation of a centre of transportation where the two axes, North-South and East-West, are crossing. It is quite probable that the centre of transportation will lie to the West of the first axis and South of the other, where the space is free for the creation of new nodal functions.

3. Better Surroundings

100. Let us now look individually at every one of the forces that create settlements within the universal city of Ecumenopolis. The force of better surroundings will create new major strips of settlements along the whole coastal area, along the shores of the lakes, but also in many scattered locations which have a beautiful view over valleys, lakes, the sea, etc.

101. In order of importance the largest of these developments is to be expected along the coast closer to existing settlements first, and later along the entire coastal area.

102. Continuous settlements of lesser importance generally, although of significance at certain places, will appear along the lakeshores.

103. Finally, we should expect many developments in scattered locations because of their specific importance.

104. As a result of these developments we should expect the centre of gravity of the whole peninsula to assume greater importance. The fact that we are dealing with a peninsula which will be surrounded by settlements suggests that the peninsula will assume a special central importance. This alone can serve equally all types of settlements to be developed on it. If the centre is created on the basis of such considerations we can be certain that it will not change in the future as geography is not going to change.

105. Also, predisposing to permanence is the fact that the centre of the settlement itself coincides with the centre of gravity of the peninsula. Thus, even if other patterns of settlements are developed for the whole peninsula, the centre of gravity will always keep its basic importance.

4. Main Arteries

106. The second major force to attract the settlement is the main arteries of communication. Basic economic rules show that we have to expect, as in the past, major urban development to take place along all the main arteries near all nodal transportation points.

107. More specifically, we can expect that the main highways of the country will be even more important in the future. If this is properly understood then we will have a tendency to design such highways with the idea of more direct connections, in order to avoid the built-up areas.

108. In addition to these highways we should expect main railway lines to be built along the main highways. This will strengthen the pattern of settlements along these main blood arteries.

109. Airports and, in the future, space-ports will have to be created near the highways and the railways because there will be a necessity of inter-connections allowing for the best use of all means of transportation. This means that the main airports and space-ports will have to be created very close to the main transportation lines. This speaks for their creation at the most important junctions. The more important the transportation centre to be created (airport or space-port) the closer it will be to the most important lines of surface transportation.

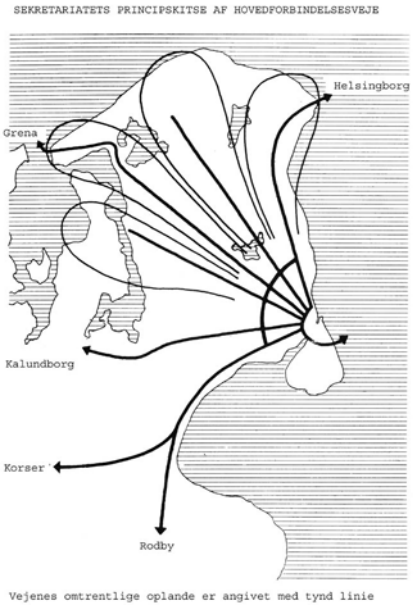

Figure 36b

110. Finally, we should expect the ports to spread all around the peninsula.

111. If we now take into consideration all these forces we will find that the result of the forces of highways, railways and airports, leads to the formation of one major centre of transportation within the peninsula. The fact that ports can be developed gradually around the peninsula in other locations also is strengthening the formation of a centre closer to the centre of gravity of the peninsula.

5. Central Location

112. Here we must expect a great force to radiate out of Copenhagen as at present. If the city is going to be left alone to develop along its own natural lines of force, then the space between the fingers will be filled and gradually many other types will be filled too (Figure 36b).

113. The result will be that Copenhagen will be choked to death; it will remain a dead shell with no functions as people will not be able to approach the centre, or if people do try to approach the centre by opening highways through the existing city body in order to reach it, then Copenhagen as such will be gradually eliminated, it will follow the fate of Los Angeles, 66% of the central part of which is now covered by cars (highways, parking, etc.). Copenhagen, as we know it today, will have no value any more. In both cases it will be useless. We should not forget that Copenhagen will have to bear the weight of 5 to 5.5 million people instead of 1.5 million at present and these people will have a higher income, will have higher demands, will use many more cars (2.5 to 3 million), etc.

114. It is reasonable to expect that when the population has grown by 4 times, cars by 10 and more times, wealth by 20 or so times, the total forces which will be exercised on the centre will be definitely more than 12 times and perhaps more, probably closer to 20 times the present ones.

115. Under the impact of such forces, Copenhagen will be lost; the conclusion is quite clear. In order to save Copenhagen, we need a centre which can bear the weight of this increasing demand of more people, of more economic forces, of more machines, of more functions. Copenhagen, as we know it at present, should remain a centre of lower order. This is the only way in which Copenhagen can keep the values it has for its own inhabitants, for the whole country for the whole world.

116. If a new centre is created, then all new functions will be served by it and present-day Copenhagen will play the role of the old centre, with all the cultural and aesthetic values, which the new centre cannot serve. Copenhagen will remain what it is, the city of the past adjusted to the

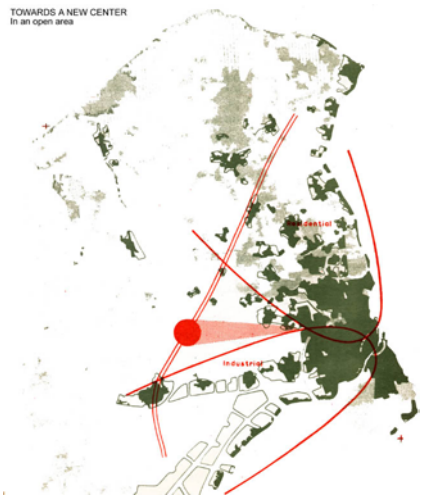

Figure 37

present, whilst the new centre will be the centre of the future to serve new conditions and new types of needs.

6. Towards a New Centre

117. The conclusion is unavoidable; Copenhagen, in order to serve the people to come, the functions to be created, will need a new centre which will be a centre of higher order adjusted to the needs of the future.

118. This new centre has to be located as soon as possible in order to allow Copenhagen itself to adjust all its plans to the creation of such a centre. Basic considerations for such a centre are the following:

a. It should be as close as possible to the centre of gravity of the peninsula for all the reasons mentioned above.

b. It should be as close as possible to the crossing of the main lines of transportation for the reasons already mentioned.

c. It should be created in an open, uncommitted area, where the acquisition of the land and the expansion of all the facilities will be the easiest possible and the most economic.


Figure 38

119. On the basis of such considerations we can look into the whole area of Copenhagen and we will find that if the growth of the residential areas is towards the North and the growth of the industrial areas towards the Southwest, we could expect a centre for the whole area to be created in between these two parabolic expansions (Figure 37).

120. Let us now see what will happen within the immediate surroundings of Copenhagen if the centre remains within the old city. The development of the coastal areas cannot be stopped and should not be stopped. The development along the existing fingers cannot be easily stopped; it is the natural trend. The development between the fingers is the next natural step; it is going to be completed sooner or later. Finally, if the present proposal is approved, we should expect a more organised development to the Southwest.

121. None of these developments will be so strong as to stop the other developments and, as a result, Copenhagen will be choked (Figure 38). If, instead of letting this happen, we can reckon on a centre as suggested in Figure 37, then the situation will be temporarily better, but then we are going to have also a new force drawing many functions around the same overly congested area and all these forces are going to draw too many functions very close to Copenhagen. The conclusion from these considerations is quite clear: there is a need for a centre now, because Copenhagen itself

cannot stand the pressures.

122. The closest location to present-day Copenhagen is the one suggested in Figure 37. This location will draw too many additional forces very close to Copenhagen.

123. If we look at the whole situation in a larger perspective, then the centre should be somewhere between the locations suggested in Figures 34 (centre of gravity) and 36a (centre of transportation).

124. It is between these three centres, which are the most probable locations that we must find where the real centre of the city to come should be located. This will require a more detailed, much less abstract study than the present one.

Figure 39

7. Transition

125. It is quite clear that the solution of satellite cities - which is at present contemplated - cannot relieve Copenhagen from the great danger of being choked to death. There is a necessity for a new centre. The study should be directed to finding where the new centre of the city to come, where the new centre of the whole peninsula, will lie.

126. When this centre is located and this will lie between the centres located in accordance with the previous analysis (Figure 39), we will have to work out a plan for the gradual transfer of central functions towards this new centre. The axis connecting the present centre of Copenhagen with the future centre of the future Copenhagen, will be the most important axis of the whole metropolitan area and it is along this axis that we should expect a gradual growth of new important central functions. It is along this axis that we should expect a plan for the transition from one major centre, which exists at present (Copenhagen), towards a system of centres allowing Copenhagen to retain its values and to transfer to the new centre all those functions which cannot be served and should not be served within present-day Copenhagen.

127. In the light of such considerations, the satellites that may be created along the southern finger of Copenhagen should not be seen as satellites to be directed towards the existing centre of the city only. Certainly, they should rely on this centre also but in the light of the future trends in Copenhagen, they should be considered much more as residential and industrial areas of the city to come. In this respect they should be conceived as the eastern parts of the new dynamic centre and not only as the south-western parts of present-day Copenhagen. Such considerations will bring any expansion of the city in the right perspective not only as regards the past but also, and this is much more important, in the right

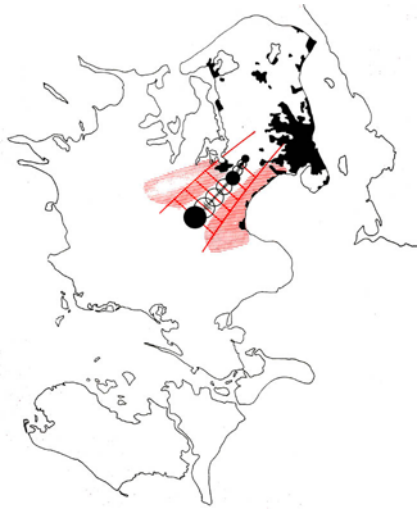

Figure 40

perspective vis-a-vis the future. Let us not forget that what is created now is going to last, we all hope, we all expect, for centuries and that the important centre of Copenhagen in the centuries to come will be an elongated dynamically growing one which starts from present-day Copenhagen and reaches at least the centre of gravity of the whole peninsula (Figure 40).

G. CONCLUSION

128. If the theory of urban growth is right, if the projections about the universal city to come are right, and to the best of my knowledge they are as close as we can come with our present-day knowledge, then the future of Copenhagen depends on the recognition of the following important facts:

a. Copenhagen cannot survive under the pressures to come. It will either be choked to death or gradually transform its central core with all its values, into an enormous meeting place of highways and cars.

b. In order to save Copenhagen, in order to serve the people to come, the functions to come, we need to conceive a plan for a much broader area and project it over a much longer period.

c. Such a plan, in order to really help Copenhagen, should not be a plan of satellites, no matter how well-conceived their form, dimensions and shape: these satellites can solve their own internal problems but never the problem of the centre from which they are getting their life, which they are serving. Satellites will not relieve Copenhagen from the enormous pressures which are coming upon it.

d. The only way to save Copenhagen is to conceive an overall plan with a new centre of higher order. If Copenhagen is a community of Class VII (assuming a classification of communities from the lowest order of neighbourhood or a community Class I), then the new centre to be created should be community Class VIII.

e. This centre will have new types of functions for which present-day cities are inadequate functions which are of greatest importance for a population of the order of several millions.

f. In the light of such considerations all new areas to be created for the expansion of the city have to be seen as functional parts of the city to come and not only of the city of the present, Although at the beginning they may be directly and strongly connected, with the present-day centre, in the future they will gradually become the appendices of the new centre, appendices which will be added to the centre of present-day Copenhagen only for such functions which will remain in that centre; these will

be functions which will serve and preserve the present-day centre instead of gradually choking and killing it.