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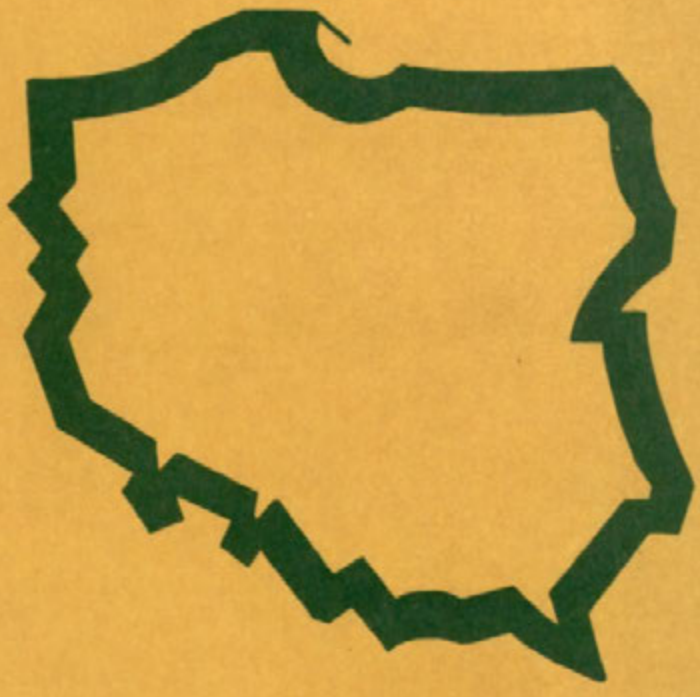

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National Settlement Systems
Comparative Topical Studies

Edited by

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## FOREWORD

The Commission on National Settlement Systems of the International Geographical Union was established in August 1976 by the General Assembly of the Union, gathered in Moscow during the 23rd International Geographical Congress. Its genesis and background were presented in vol. 39 of *Geographia Polonica* together with its terms of reference and programme of activities as well as the guidelines for national reports to be prepared by its members.

After four years and in view of the fact that the mandates of the Commission and its Chairman, Professor K. Dziewoński were renewed for another four-year period, i.e. till 1984 by the General Assembly gathered this time in Tokyo during the 24th Congress – it seems proper to review its activities during the period 1976 to 1980.

By 1980 twenty six national reports analysing the settlement systems of Australia, Austria, Belgium, Brazil, Canada, Czechoslovakia, Denmark, the Federal Republic of Germany, Finland, France, the German Democratic Republic, India, Ireland, Italy, Japan, the Netherlands, Poland, Portugal, Spain, Sweden, the Soviet Union, Tunisia, the United Kingdom, the United States, Venezuela and Zambia had been prepared. Several more are promised. Most of these reports are to be published in shortened and up-dated versions by Oxford University Press. However, since 1979 the Commission has moved in its studies and discussions away from national reports to global, topical comparative analyses on the development of national settlement systems.

During the Paris General Meeting of the Commission (July, 1978), 14 problems were identified. They were the following:

(1) Basic administrative units (communes) as an element of settlement systems;
(2) Hierarchical structures and centrality in the settlement systems;
(3) Urban functions and living conditions and their impact on city size;
(4) Relations between federal and national or macroregional settlement systems;
(5) Differentiation of settlement systems on the basis of population densities and level of development;
(6) Growth of subsystems of main urban centres;
(7) Settlement systems as labour markets;
(8) Internal changes and reconstruction of urban agglomerations;
(9) Settlement systems in the conditions of growing, stable and diminishing populations;
(10) Political and administrative divisions and organization of settlement systems;
(11) Formation of national settlement systems (a) by integration of regional systems, (b) out of the former colonial systems, and (c) in the frontier developments, on virgin land;
(12) Development of international linkages between the national settlement systems;
(13) Distortions in the national settlement systems;
(14) New phenomena and the future of national settlement systems.

The first topical studies were presented and discussed during the 3rd General Meeting in Szymbark, Poland (June, 1979) and later during the 4th General Meeting in Sapporo and Sendai, Japan (August, 1980). Part of them are now published in this volume to

allow wider discussion of the concepts and terms as well as the suggested interpretations and future projections. Others are still to be discussed in the coming years. The programme for further work of the Commission is presented at the end of this volume (Cf. Epilogue).

Papers now published may be roughly classified as theoretical, methodological and historical. The first by K. Dziewoński attempts to present the state of the art, i.e. the concepts applied and methods used in studies concerned with the settlement systems. The following by B. Cori; F. Ventura and O. Wärneryd; P. Scholler, and K. Dziewoński deal with specific problems – starting with the description of lowest administrative units (communes) as elements of settlement systems, and continuing with differentiation of settlement systems on the basis of population densities and level of development, hierarchical structures and centrality in these systems and finally subsystems of main urban centres. In this way the most significant aspects of elements and structures in the existing settlement systems are reviewed. Next come two papers on the historical development of national settlement systems on virgin land and out of the former colonial systems. Unfortunately another paper necessary for the full analysis of such development, one on evolutionary growth of national settlement systems out of the earlier regional systems is not yet available.

Finally the collection contains two complementary papers by L. S. Bourne, P. Korcelli and O. Wärneryd and R. Sinclair on recent structural changes and spatial trends in the settlement systems at the national, regional and metropolitan levels.

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# SETTLEMENT SYSTEMS: THEORETICAL ASSUMPTIONS AND RESEARCH PROBLEMS

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## 1. ON CONCEPTS AND TERMINOLOGY

The work of the Commission on National Settlement Systems of the International Geographical Union is based on the tacit and implicit assumption that there is such a phenomenon as a settlement system. What does it mean? How is it defined? To answer such questions more precisely some of settlement processes and development is necessary. To develop such a theory is an aim, indeed, one of the reasons for the creation of the Commission. The following reflections try to summarize the present state and position on the problem reached through the research and discussions carried out within the four years of its existence.

In general, the term 'system' has various, only partly related meanings. It is (or was) a fashionable term, often used rather loosely. It is ambiguous. In a certain way, as with all more basic terms, it has to have more meanings – it is derived from some wide generalizations and formed by the integration of various concepts. In addition behind the present vogue of the term there are two different scientific theories: one called 'general system theory' and another known as the 'theory of information'. In the first a system is used for describing such phenomena in which elements forming a certain whole are not related solely in a simple additive or mechanical way but are mutually interdependent. The interdependence is one of their basic and objective characteristics. In mathematical terms functions describing such relations are of a higher order than linear, and are always differential. In the second case the term is used to describe a specific analytical approach in research. The stress is again on interrelations but this time they serve as analytical tool only. As a result such an approach allows a very loose use of the term. In speaking of settlement system I would therefore prefer to follow the first approach. A settlement system is not only a way to analyse the settlement and its processes in space and/or in time, but it is a specific form of settlement phenomena. In describing such systems: different ways may be and are followed. In some the attention is at first concentrated on the internal problems of a system: identification of its elements, their interrelations and interactions, eventually on its subsystems, i.e. groupings of its elements. In others the external relations, i.e. the position of a system within its environment are taken at once into account: whether and to what extent the system is closed. To what degree? In what matters? And to what degree it is open? As a result the identification

of the entrances and exits to and from the system become important. The whole system is treated here as a 'black box'.

Usually settlement systems are negentropic, i.e. they take more from the external world than they give out. Negentropy (opposite to entropy) is in general systems theory one of the most important characteristics of a system, decisive for its identification and existence. It seems unnecessary to remind the reader that so far in studies of settlement systems the first way was mainly used. As a result relations between the settlement and its various environments especially economic and social are really not well known. The only exception here is the relation between settlement and the natural environment which in certain periods in the past were main objects of research in urban geography.

## 2. ON SETTLEMENT UNITS. STRUCTURES. SUBSYSTEMS AND THEIR CLASSIFICATION

In settlement systems the identification of its elements – units of settlement – is not as simple and easy as it first appears. The initial question: what is a settlement? cannot be answered in a straightforward way.

With middle-sized settlements, i.e. with traditional towns and cities – it is easy. They are clearly recognizable, economically and socially integrated and spatially well-defined. However with the modern urban settlement characterized by a highly mobile population, the boundaries even of such urban settlements become diffuse and disintegrated.

With large scale settlements – big urban agglomerations the same question becomes very acute, raising doubts about where an agglomeration ends and a rural settlement begins. Also the relation between territorial, administrative division and settlement units becomes rather involved and the direct connection is lost, creating serious difficulties in amassing statistical data.

With small settlements the problem becomes very acute indeed, and so far has not been seriously faced and even in theory not yet solved. Is a single isolated farm or rural homestead already a settlement? The answer is important, involving an additional question: are all solitary houses included in one or other settlement or are there a number of such houses remaining outside any settlement? With an assumption that some houses are outside, their number varying from one region to another could be used as one of the statistical indices characterizing settlement systems. The relation between small settlements and the territorial division is also very complex. The basic and smallest administrative units (whether a parish, commune or *gmina*) are of necessity much larger than a single rural settlement and there is a definite tendency now to enlarge their size (e.g. in Sweden and Poland). The amassing of statistical data becomes here very tedious, usually involving their direct collection in fieldwork. Also their handling, at least at the national or regional level, is because of their number practically impossible. As a result there is a tendency to cut off the analysis of settlements at the lowest level of administrative unit, leaving the detailed study of the smallest settlements to microscale research outside the comparative large-scale studies. Such an approach has several negative aspects: one of them being the neglect of wider formulations on the formation and evolution of rural settlement. Such neglect leads to an inability to interpret current and predict future changes in rural settlement. The inevitable necessity to study rural settlements not by units of settlement but by administrative or even larger areas involving not single settlements but their complex networks introduces the problem of local settlement systems (less integrated with the national and regional settlement systems forming specific subsystems). A similar approach but on a regional scale may be adapted in the study of the internal structure of large urban agglomerations, considered as subsystems of the national system.

The concept of settlement subsystems (of various scales) may be extended and generalized to cover all subdivisions in the structure of national (or still larger) settlement systems, structures which express more stabilized or even permanent links and interactions between units. There are two basic sources of such links and interactions: the specialization of functions (i.e. social, economic, cultural and political) between settlements, based on and expressing the territorial social division of labour and the hierarchical structures developing out of such functions for the location of which the distance decay function is decisive. There is a tendency towards standardization of such functions and an important factor in the growth of various hierarchical types and levels of settlement is the division of human activities into daily, weekly or – less clearly – monthly, annual or other seasonal activities. The mutual relations between the standard and the specialized or central and non-central functions and their joint impact on the formation of settlements and settlement systems is still theoretically not very clear.

Recently a proposal was made (Boudeville, 1971, ed. 1978) to divide all regions into two classes or types connected with the character of their settlement. These are urbanized and polarized (into urban and rural areas) regions. Personally I do not think that such a division is really complete, indeed, total. Surely there are intermediary, mixed areas. In fact the transformation processes are continous and there are no clearly out divisions until we compare the settlement at the beginning and the end of the whole transitory series. This implies that polarized settlement regions have emerged earlier and the urbanized later but it should be remembered that the polarization into urban and rural settlement is also a rather late development in the history of human settlement.

The hierarchical structure leads to the emergence of regional settlement systems but cases of such systems derived from functional specialization are also known. Naturally regional systems are based on higher level hierarchies and this reintroduces the problem of relations between settlement systems and territorial administrative divisions (this time – regional). In cases of stabilized (over longer periods of time) regions, such relations may be very deeply rooted and well developed, leading to an identical structure and area. With radical changes in administrative as well as political divisions, relations are disrupted and structures dissociated. It takes a long time for the identity to be fully reestablished.

The observation of changes in settlement systems caused by alteration to the organization of territorial administration, underline the fact that the settlement systems are not only spatial but also a temporal phenomena – they emerge, develop, transform and either break-down or fade away. They are part of the whole societal set-up of population distribution, its structures and stratifications, social and economic formations, culture, politics and policies. The understanding and explanation of their nature and character and of changes in the settlement systems, should be an integral part of the whole theory of settlement.

## 3. ON SETTLEMENT THEORIES

As stated in the beginning there is not one, integrated and coherent, well-developed theory of settlement systems but this does not mean that there are no such theories or that no effort has been made to formulate them. However these are partial, sometimes contradict one another and usually deal with and explain only a few (and not always the same) phenomena connected with the existence and changes in the settlement and its systems. Within the framework of this report (necessarily limited in size) it is impossible to deal with all of them. Only a few – the more significant and the best developed – shall be described here shortly.

The most general one is of course the well-known although often criticised, misunderstood and misapplied 'rank and size' rule. It is often called the 'Zipf rule' but as

Zipf was not the first to formulate it and in fact his interpretations were both mistaken and misleading, the name is unjustified. The rule declares that the size distribution of cities and towns in a region may be identified by specific mathematical functions. Different functions were approximated by various authors for different regions, in particular: linear, second order – power, exponential, log-normal, loglog-normal or even of a still higher order. These functions involved either one, two or three parameters. Some of them may be identified with specific characteristics, other (when callibrated) seem to be purely numerical. Various interpretations and various uses were proposed but none have gained universal support. The rule was even described as without any intrinsic value. After critical analysis of the literature and proposed explanations, I, personally (Dziewoński, 1975; Karsch, 1977) tend to agree with the view that it describes and measures the state of the settlement system: whether it is stable, steady or disturbed, the role that is played by the concentration or dispersal of settlements in the system, the dynamics of the system and other similar questions. In other words it expresses the entropy (or negentropy) of the system. It implies that the settlement system, although it has evolved from the interdependencies of its elements is a stochastic phenomenon. It seems to me that if the interdependence and stochastic assumptions are rejected the rule loses its power of explanation. On the other hand if the settlement distribution in a certain region does not show any regularity – such assumptions cannot hold for its settlement system. This may explain why the regularity of distribution is highly correlated with social, economic and political stability in a given area.

Another statistical rule – well known, although at least so far connected only with single monocentric units is the density gradient function, usually called the Clark rule. It describes the density of development (whether measured by population, employment, land use building and investments or similar) as a function of distance from some kind of centre (usually the city centre). Mathematically it is by now well developed and even sophisticated. There are general models with two or three parameters (March, 1971) into which others may be interpreted as representing particular cases. With the more general model there is some difficulty in interpreting the third parameter while with two parameters their interpretation is clear and presents no special problems. The essential weakness of the model in its wider applications is its monocentricity as well as the necessity to generalize from microscale data to macroscale, eliminating in the process the local differences and smoothing out the mosaiclike structure of space. The elimination of its monocentric character or rather the introduction of a polycentric one is possible but this rather simple model then becomes a very complicated one, extremely difficult to handle.

There also exists possibility of integrating together both models i.e. of the rank-size distribution and of the density gradient. This would involve expressing the size of cities by density gradients and distances from city centres which in turn would imply the necessity for establishing some system of coordinates covering all cities. The result would also be extremely complex and would involve probably the use of spectral analysis to tackle the resulting enormous array of data.

A different mathematical approach in studying settlement systems lies in the use of the gravity and potential concepts. In reality a map of population potential for specific areas clearly describes socio-economic space and in particular the basic system of largest urban centres and especially urban agglomerations. Interesting results and additional insights are obtained by the application of trend surface analysis. The gravity and potential concepts may be also considered as an alternative statement of the density gradient rule. It should be remembered here that the gradient effects considered in general introduce an additional extension of the settlement systems approach (Bartels, 1978). Usually such systems are considered as sets of interrelated but discrete points – single settlements (eventually as groupings of smaller but still discrete sets). Introducing gradient effects allows us to treat settlement systems as spatially continuous phenomena.

Turning from mathematical descriptions of settlement systems to specific concepts and theories of urban development there is – first of all – the theory of urban economic base and functional structure of cities (Dziewoński, 1967, 1971). It represents a well-developed body of concepts, of analytical empirical studies and even some deductive generalizations. Its starting point: the division of urban activities into exogenous and endogenous activities is very simple and is often considered to be too simplistic, schematic and rather misleading. On the other hand the whole concept is easy to apply and very operative what cannot be said of alternative, more developed and sophisticated approaches. In its application some care should be taken not to ascribe to one of two; exogenous and endogenous sides more importance than they really have, especially in endowing them with specific precedence in time (cause and effect relations) without careful study of particular, historical development. A useful extension of the concept is obtained by introducing the supplementary notion of normal – standard and specialized functions, of which the first under the impact of transport costs is decaying with distance while the other is relatively less dependent on transport costs and distance. In addition it should be remembered that the whole concept of economic base contains a strong assumption that a settlement, a city, forms in reality an economic region or territorial socio-economic system. It interacts in a partly closed and partly open internal system and is significantly dependent on the external world, its environment.

Another important approach to the study of settlement system lies in the theory of central places as formulated and developed almost fifty years ago by Christaller (Christaller, 1933). But it should be clearly understood that there is not one but a large number of central place theories differing one from another by specific basic assumptions. Even in the original statement of the theory Christaller proposed not one but a multitude of models and patterns, evolved from three different principles of network formation i.e. determinated by marketing, by traffic and transport or by social organizations and administrative division. The first principle creates essentially only one pattern of settlement network, the second – several but the third – a large number. Later Lösch (1939, 1944) showed that similar patterns may represent a variety of functions in settlements (towns) belonging to the same hierarchical level and class. It is not necessary to describe here in detail the differing basic assumptions of varies central places and other hierarchical models and theories, contained in the original formulation of Christaller and other authors. A good review and classification of these theories up to 1970 is contained in the study by J. Parr published in vol. XXV of the RSA Papers. However one important question should be raised here. There is a significant disagreement between all hierarchical theories and the rank and size rule. While the size distributions are represented in the latter by continuous functions, in the former they form a steplike pattern. Several efforts were made to prove that stochastic processes may account for the continuous distribution within hierarchical settlement systems but in conclusion it has to be said that although central places may be considered as special cases within the rank and size rule, it is not possible to reverse the procedure by treating rank and size rule as a special case among central place patterns. The rank and size rule seems to express more general phenomena (Parr, 1970).

An important step forward was made in the sixties by J. V. Medvedkov (1963), when he classified distributions of settlements, forming nodes in socio-economic space into: uniform, clustered and random settlements and by use of the entropy concept and other specifically techniques for their disaggregation within an existing settlement system. Such an approach demonstrates the necessity for interpreting settlement systems in terms of a time-space framework.

Originally dynamic aspects of central place theory were not very consistently developed in spite of the efforts of its creator but the proposals formulated by Parr (1977, 1979) seem to overcome this weakness of the whole theoretical approach.

Recently another addition to the central place theories has been made by the intro-

duction of new concepts of labour market regions and functional urban regions (see review of concepts by Korcelli, 1976).

In addition to the central place theories several other theoretical constructs should be mentioned here as important for the final formulation of the general settlement systems theory. According to Bartels (1978) these are: various migrational models, growth centre concepts together with the diffusion of information theory and contact and organization theories.

The migratory models were recently integrated by W. Alonso (see several papers by Alonso, 1978; Dziewoński, 1979, Anselin and Isard, 1979; Ledent, 1980) into the theory of movement, very beautifully and elegantly constructed, extremely generalized (which means that individual migration theories are included as special cases with specific parameters but as a result inoperative). Its importance for the theory of settlement systems lies in the fact that its application makes possible the analysis of interactions between elements of the system in terms of flows between these elements and the power of attraction.

In the sixties the growth centre concept, first formulated by Perroux (1961) and then applied as the basis for regional development projects and policies had an enormous popularity. Later some disenchantement set in. However the concept is certainly of value, especially when it is recognized that the concept should be disaggregated into several different although usually closely connected or even spatially integrated centres such as the regional capital centres of specialized industries, information and innovation diffusion centres, centres introducing and integrating regional communities and economies into larger national bodies. For a theory of settlement system such concepts may be used in a dynamic approach, especially in defining the growth and development of these systems.

Finally, contact and organization theories may be used for describing linkages within the different systems, especially those which cannot be expressed in form of persons and goods interaction. However they are still inoperative and in general rather vague.

In research carried out under the auspices of the IGU Commission on National Settlement Systems F. Grimm has proposed and is developing the identification of two separate systems (subsystems) within the integrated national settlement systems. These are – according to this author's terminology – E-systems (*Ekonomie Systeme*) and B-systems (*Bedürfnisse Systeme*) i.e. settlement systems which are evolving in connection with processes of production and services, in order to increase their effectiveness and efficiency – and settlement systems which are developed to provide for and to implement better the social goals as well as to satisfy people's needs and requirements. Characteristically within the national settlement systems the E-systems are usually based on specialization and dominate at the macroscale i.e. at national and sometimes regional levels, while at present the B-systems are more evident and crystallized in mezzo- or microscale i.e. on local, regional and only to a limited extend at a national level. Usually they also possess a clearly hierarchical structure. In my opinion there is some evidence that the main points of contact and integration between these two systems will be found to be either among the national and regional capitals or in the system of main urban centres.

## 4. ON THE HISTORICAL DEVELOPMENT OF SETTLEMENT SYSTEMS – DESCRIPTIVE INTERPRETATION

Within this review of the main problems connected with settlement systems it is impossible to present the historical development of settlement both in the region and in the world. For the present purposes it should be sufficient to describe the emergence and vicissitudes of some of the more important settlement systems (local, regional, and global) leading to the formation of national settlement systems, the proper aim and subject of this report.

The first to emerge in the prehistoric and early historic periods were the local settlement systems based on large families and tribal communities, first social divisions of labour and primary forms of political organization. With the integration of such communities into larger political units, the regional systems began to develop. The establishment of successive empires in some cases possessing the character of a commonwealth led to the formation of global settlement systems. Of these the best known case and most important was the Roman imperial system. It was not fully integrated – formed by the superposition of the network and system of provincial governments, military and trade centres upon varied regional and local settlement systems. Such a form of global settlement system survived and persisted in Europe till the 16th, 17th and 18th centuries, in other areas lasting till the present time. It is interesting to note that such global systems preceded the emergence of national ones and were able to survive even the fall of political organization which had formed them as, for instance, in Europe by some hundreds years after the decline and fall of the Roman Empire. The origin of the present local and regional systems lies in the tribal organization and feudal domains distorted later by the subsequent loss of territorial coherence and frequent changes of political boundaries. However in certain areas the local and regional systems were strengthened and specific hierarchical and functionally specialized structures were introduced by the supraregional trade political organizations such as Hanseatic League (Scholler, 1973) or Venetian Republic. The final stage in the formation of regional systems was reached when as a result of the emergence of centralized national states, the uniform administration of state territories was introduced and in a series of successive reforms, fully developed. However there is often some distinct hiatus between administrative division and settlement systems where changes usually emerge and crystallize only slowly in time. Originally regional and local specialization was reflected only in the density of settlements and in some elements of their functions as well as in internal social, economic and technical structures and patterns.

The national settlement systems started to develop late, only in some countries in the 17th and 18th centuries, and in the majority of cases as late as in the 19th and 20th centuries. The reason here seems to lie in the fact that the development of such systems was more connected with the emergence of integrated national economies and economic policies than the establishment of states as fully autonomous, sovereign bodies, integrating only slowly former feudal domains. In reality the development of national settlement systems seems to be dependent largely on the emergence of capitalist and at present also socialist societies.

The phenomenon of the first industrial revolution, of the population explosion and the subsequent population transition as well as the processes of modern industrialization and urbanization were primary factors in the emergence and evolution of national settlement systems. Their growth consisted first in the development of multi (two, three or even four) level hierarchical structures and patterns, based on polarization of settlement into urban and rural sectors – to which later on, the urbanized areas (sometimes even urbanized regions) were added. Such a division seems to be the most characteristic feature of the present changes in the national settlement systems although in scientific analysis this is not yet fully conceptually recognized and mastered. This is not surprising if we remember the fact that central place theory was formulated only in the thirties i.e. less than fifty years ago.

The processes of change and transformation in the developing countries are similar, the variances being due mainly to the different duration of successive stages in the development of settlement systems and the emergence of national ones. As a result in the large majority of cases, the regional networks and systems are underdeveloped or sometimes practically non-existent. The only exception here is found in those countries which have already intensively developed agriculture and have a long history of political and cultural development, as for instance, in India or China.

Also the differences in the duration of successive stages in the development of settlement systems have a specific and significant influence on the settlement structures. This is well illustrated by certain similarities of settlement systems among all late developing countries and extensive economy whether well developed although recently settled or less developed and achieving independence after passing through the colonial stage.

Those processes of polarization which may be described as vertical and horizontal or by differences in development either in time or in space or by stage and by intensity of development lead to the general division of all national settlement systems into four basic types: developed countries with an intensive economy, developed countries with an extensive economy, developing countries with an intensive economy and developing countries with an extensive economy.

These short comments on the historical development of settlement systems bring out very clearly the importance of socio-economic interpretation of present-day systems, the next step in analysing theoretical and methodological problems.

## 5. ON SOCIO-ECONOMIC INTERPRETATION OF SETTLEMENT SYSTEMS

With socio-economic interpretation, attention is moving away from research into the genesis and causes of the present state of settlement systems or why they are what they are? – to the analysis and critical estimation of their value for the community and its activities whether economic, social, cultural or political, in what the settlement systems are and what they should be. The current social aims therefore determine the advantages and disadvantages of various existing and possible or proposed systems.

At present the national state is the best integrated and organized as well as the most dynamic and dominant community – therefore the present state of national settlement systems comes in the analysis to the fore.

The welfare of its citizens seems to be a common aim of all modern, national states. In present times it became closely connected, even integrated with the concept of constant economic growth based on unlimited technological progress. Only recently have some doubts about the validity of such belief been raised, when the environmental limits to technological advance began to be visible and indeed recognized. In addition the costs of some technological developments has started to become prohibitive.

As already stated, the settlement system is deeply related to and influenced by socio-economic development, especially the transformations from one to another: feudal, capitalist or socialist formations. The different mechanisms by which various formations realize their general (mostly and superficially resembling) and particular (usually very diverging) aims are either helped or hampered by existing settlement systems and from this point of view their value may serve as a measure in estimating their current advantages and disadvantages as well as of the necessity of making adjustments to them. At the same time another measuring stick for the existing systems may be found in the concept of ideal systems i.e. the best related – in the opinion of ideologists – for the given formation. However each of these two methods may lead in evaluation to very divergent results. The conclusions reached may easily turn out to be opposite to one another.

The first approach, being more realistic, is also easier to apply and more common but the second should not be entirely forgotten. Even very unrealistic utopian concepts may influence very strongly not so much plans as technicians and planners. There are not very many studies available on the history and development of such utopian, idealistic concepts and in the field of settlement systems there are none. Therefore the only possibility here is to mention some of the concepts which in the future should perhaps be studied in detail.

One of such studies may deal with standard technical models proposed or imposed for settling newly discovered or conquered regions. Modern examples include: Spanish regulations for settling the New World from the 16th century (they formed the basis on which many settlements – urban and rural – in Latin America have been established),

regulations followed in settling new lands in North America, especially in the United States (some of them are said to be prepared under the guidance of Thomas Jefferson), Russian regulations of the 18th and 19th centuries, used im developing the European part of Russia and in settling Siberia, settlement concepts followed by the British in India and in Africa, by the French in Northern Africa and in Indonesia. Here perhaps may be added, in spite of their ideological inspirations, the concepts of settlement networks workes out under the Nazi government both for the eventual reconstruction of settlement in Germany itself and in the conquered territories in Eastern Europe but never carried out. After all both Christaller and Lösch were against their will involved practically in their preparation.

The second direction of studies of this kind should deal with concepts developed by representatives of various social sciences. However these were briefly dealt with when the theories of settlement systems were discussed.

The third direction in research of this kind should be concerned with the concepts of great social reformers such as utopian socialists (Owen, Fourier, Cabet and others), radical reformers of the late 19th century (Howard, Geddes and others), theoreticians of mature socialism (in particular F. Engels) althought all of them were concentrating on the form and pattern of single settlements rather than on their systems. However the development of their views on relations between urban and rural settlement should be – I think – a subject of some very interesting monograph, especially when confronted with present developments in the form of urbanized regions and areas.

The fourth and last direction should deal with concepts of settlement systems forming an integral part of contemporary governmental policies, especially in the field of economic and physical planning. Such a study should be carried out on a comparative basis. In research undertaken in these four directions we should remember that the same or at least similar concepts may be found developed and used simultaneously by technicians (technocrats), scientists, social reformers and ideologists as well as by practical, every-day politicians. Nevertheless the distinction between them seems to be valid, at least for the purposes of classification.

Comparison between what should be (at least what is desirable or considered to be better) and what in reality is and/or is possible shows the distance to be covered in policies and actions, in striving for the improvement of the present settlement systems. But there are evidently two-way feedbacks between reality and idealistic aims. Their study is of great importance in the analysis of settlement systems. Of special significance are the relations between spontaneous trends of change and the socio-economic ends and ideals. To simplify a very complex situation these may be either divergent, convergent or mixed – partly divergent, partly convergent. Convergence of 'natural' trends with 'ideals' is obviously the most advantageous situation. Divergences hamper and may even make the implementation of social aims impossible but in any case they create confusion. From this point of view the correct analysis of trends and their full consciousness together with full and clear formulation of aims are essential for the success of any policies aimed at specific transformation and development of settlement and settlement systems. Such analyses shall be rather difficult for geographers, perhaps they should be undertaken as interdisciplinary, together with sociologists, economists, historians and representatives of other sciences.

## 6. ON REGIONAL SETTLEMENT SYSTEMS AND THEIR ROLE IN ECONOMIC GROWTH AND SOCIAL DEVELOPMENT

Discussing the relation between settlement systems and social and economic policies and the possibilities of influencing and steering transformations of such systems it should be remembered that very often these policies aim at the social and economic development of the given area – a single region of the whole country through specific changes in the

settlement system. This raises the question what is the position and role of settlement and their systems in the social and economic set up – life.

Regarding the settlement, settlement systems may be considered in two ways: representing the distribution and territorial organization of the people and as the basic national infrastructure of socio-economic space.

The role and the importance of people's distribution and organization does not really nead any commentary. In policies they are usually considered from the point of view of their relation with the proposed location of production and services – their modification involves direct efforts to encourage and to organize migration at a local, regional or national scale. Sometimes problems of population concentration (or dispersal) in general are considered to be of the greater importance whether they are too large or too small. These are thought to be socially disruptive and economically ineffective. As already mentioned, in all these cases, adjustments through migration is necessary but they also involve changes in the technical (social and economic) infrastructure.

In the country as a whole the settlement system represents almost totally the technical infrastructure (the communication lines outside the settlement areas being practically the only exception). It is rather paradoxical that settlement areas and their patterns are looked upon usually only as dwelling places. Very rarely they are considered as work-places (in industry and services; agriculture, forestry and sometimes mining being the main exceptions), in spite of the fact that work-places are more concentrated than dwellings and that their influence on settlement, in particular urban space and organization, is decisive. The characteristic of the settlement network as well as of internal settlement structures and patterns in terms of work-places is a very important direction of research to be followed in the coming years. Such analyses will involve further development in studies of settlement functions enlarged by a study of patterns – cerainly comparative in local, perhaps regional scales but perhaps also comparative on an international basis.

The transformation – reconstruction of the settlement system as representing technical infrastructure always involves policies of new investments and for them the mobilization of resources whether human, material or financial. In the programming of settlement investments the use of the already described concept of growth centres is indicated. However in view of some negative experiences and strong criticisms, care should be taken to fulfil certain conditions. First it should be always remembered that growth centres have to be polyfunctional (the basic functions of these centres were defined earlier). If it is impossible to develop all functions in one city within the region then the growth centre should be considered to be a grouping of several cities or towns which together will represent all the functions involved. The new industries and services which are to serve as factors encouraging general socio-economic growth and regional development have to be sectors with significantly increasing employment, technical skills and generating the diffusion of information. They should be connected with regionally traditional industries or its resources. Finally it is essential to realize that in any system, in our case in the socio-economic regional system, there exists a tendency (which in chemistry is known under the name of 'Le Chatelier principle') to absorb any factors or elements disturbing or transforming its equilibrium and to return as far as possible to the former state. This implies that new impulses, new elements, new investments which are to transform the settlement system and to initiate the regional growth and development should be lasting in their propulsive function or repeated and extended at least several times.

## 7. ON MODELLING AND EVALUATING SETTLEMENT SYSTEMS

Both for cognitive and planning purposes the quantitative approach in the form of mathematical modelling (and evaluation) seems to be appropriate and may be useful. In modelling of this kind several successive phases in procedures may be distinguished. First,

specific relations pertaining to the phenomena – in our case the settlement system, its structures, patterns and dynamics have to be identified, then these should be expressed in terms of mathematical functions with some variables considered as independent and others as dependent. This division of variables usually is based on specific assumptions and very often, especially if there are some feedback effects these may be reversed – dependent variable may be treated as independent and vice versa the independent ones may be changed into the dependent. In addition the proposed models contain a number of parameters, which in a given situation are considered as constant. The following phase in modelling consists of model calibration, i.e. measuring of parameters. This is done by substituting specific empirical values for all variables and treating parameters as the variables to be calculated. At this moment a difficulty often arises – the number of equations (functions) contained in the model may be smaller than the number of parameters. To overcome this difficulty the usual procedure is to assume specific values for sufficient number of parameters arbitrarily and to calculate the remaining ones from the equations. Other methods, perhaps better but more labour consuming are also available. The calibrated model fits the situation represented by empirical data used in the calibrating procedure. Models calibrated in this way have usually only a descriptive value and only exceptionally they may be used for prediction. This is because the parameters in the model were treated as being abstract quantities. To obtain a predictive model it is necessary to introduce and to base our model on some theoretical constructions in which parameters would represent specific conditions. The changes in conditions would be reflected by changes in values ascribed to parameters. They should be considered and defined as functions of those conditions. There is another important factor to be taken into account in predictive modelling. Simulations in the model should not represent summarily heterogeneous phenomena – each part of the model should correspond to a single, specific one and all parts should be joined together into a model in a way corresponding to their relations in reality. In such a way even when it is impossible to predict all parameters, it shall be possible to predict – conditionally – some of its parts. For such purposes the concept of a system is well fitted and this is one of the main reasons for efforts to develop the theory of settlement systems. Without such theory no predictive model of such systems may be successfully constructed.

The understanding of the nature and role of parameters in models of settlement system is needed not only to ensure their predictive power but also for their evaluation from the point of view of their social and economic efficiency and effectiveness. Just to remind us of the differences between these two last nations let us say that efficiency represents the ability to reach given goals, effectiveness – the economic way of such achievement.

## 8. ON METHODS OF RESEARCH

To round up the whole review contained in this report a few reflections on methods of research are needed. Obviously it is not feasible to describe or even to classify all methods which eventually may be used or applied in research on settlement systems. Any method guaranting some result may be and indeed should be used. Nevertheless a few general comments on the subject seem to be indicated.

First in such research, an effort to quantify elements, characteristics, flows, interactions seems to be advisable. Without quantifiable and quantified data no comparison is really possible and any classification or typology shall be nothing else but vague and classes or types involved will remain difficult to identify.

With larger inputs of data the use of computerized techniques will become unavoidable. With numerical transformation (basically mechanical) one difficulty does exist. All transformations will not produce any more information or facts than those which were originally fed into the computer. For this reason original choice of data used, is decisive for

the final results. This should be constantly remembered. When necessary and indicated by critical review of the preliminary results a return to the starting point for inclusion of additional information is needed it should never be neglected.

As in all geographical research some phenomena will remain unquantifiable. However it should be mentioned here that statements such as "this is greater or better than that" represent a certain kind of quantification. In some cases with full data unobtainable partial or substitute data has to be used. Such procedures are valid but their limitation should be constantly held in mind. Each analytical method possesses its basic assumptions, conditions of correct application and specific limitations. There is a real necessity for these to be constantly and explicitly stated in the beginning, before the given method is applied. This is too rarely done although most of misunderstandings and mistakes have their sources in trying to apply analytical methods in situations where they cannot be correctly used. Because of these conditions and limitations no one method of analysis is really sufficient – several should be used attacking the given problem or phenomenon from several, different points of view, trying to analyse its different aspects. This is especially true in the case of such complex phenomena as settlement systems. Here methodological plurality is essential.

Another guestion in analysis, partly epistemological arises often in the study of settlement systems (and indeed is characteristic for all cases of complex phenomena developing in time and in space). This is whether they really exist or – in a weaker form – whether they already exist? Such questions only rarely may be answered directly and in my opinion they are really futile. The correct form for such questions, which by the way is comparatively easy to answer, is whether the application of the systemic concept and methodology in analysis is useful – both in the search for a better understanding and for an improvement of the present state.

In reflecting generally on research into settlement systems it is well to remember that after analysis of the present situation (descriptive phase) it is necessary to look into its genesis (explanatory phase), next to forsee its future (prospective phase) and eventually to estimate its advantages as well as to propose measures for its improvement (evaluative phase). An orderly procedure in analysis of settlement systems would be to study successively: elements – flows – interactions – structures and patterns – subsystems – stability and durability – finally environmental positions and external relations. Such a procedure is not the only possibility. It may be easily reversed starting with the environmental problems and external relations. Such an approach is called sometimes 'of the black box' but in the case of settlement systems it will never be totally satisfactory and it has to be supplemented by the analysis of the internal problems of our systems.

So far in reflexions on methodological problems the attention was concentrated on studies of single settlement systems but the whole work organized within the framework of the International Geographical Union, for which the Commission on National Settlement Systems was established is to carry such studies on comparative basis, which in the end would lead to the formulation of the full theory of settlement systems based on some theoretical generalizations from empirical data. In studies undertaken one, very important methodological decision was made and should be repeated here. The comparison to be made is between the various national systems as such. In such work similarities and differences – variations of these systems should be identified and classified to form basis for their typology. Such typology should be dynamic, taking into account emergence and succession of types in time and their regional differentiation due to specific geographical and historical conditions.

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# BASIC ADMINISTRATIVE UNITS (COMMUNES) AS AN ELEMENT OF A SETTLEMENT SYSTEM

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One of the first problems and tasks presented in the study of any system is to identify the basic element, the cell of the system. Only an accurate knowledge of the elements of a system will enable the study of their attributes and mutual relationships.

Singling out a basic unit in national settlement systems is therefore both a conceptual and a practical problem, one of obtaining and using statistical data. It is also a starting point for the arrangement of classifications, for a taxonomy of the elements of the system. On the other hand, the problem is not merely one of defining a valid cell, tested for this or that national system, but rather finding, as far as possible, a cell with a fairly universal validity, which at least enables comparisons between different national systems; as Hansen and Korcelli observe, the choice of a unit of analysis tends to have a considerable influence on the results of any spatial reasearch, and hence the choice of a common or comparable unit is essential for the uniformity of research studies and the possibility of comparing national results.

If we reflect specifically on those units which have been considered in settlement studies so far, we can easily observe that researchers have focused their attention, according to the cases, on two categories of basic elements.

On the one hand, they have taken into consideration a built-up physical unit: the house, the hamlet, the village, the town, the city... Of course, their attention was not only concentrated on the physical and topographical aspects of this unit, but also on the community living in it (the family, population...) and its activity (see Palomäki); however, the subject of research has, in a way, been focused on one 'point' of the topographic or geographic map.

In some countries, even statistics are available for point-units, e.g. in Finland and Sweden for centres with more than 200 inhabitants, in Czechoslovakia for localities with more than 350 inhabitants, in the United States for all 'incorporated places' and for 'unincorporated' ones with more than 1000 inhabitants. Census in India – as pointed out by Alam and Parthasarathy – supply data for 'hamlets', 'villages', 'towns' etc.; when 'urban agglomerations' were introduced in 1971, they included areas outside the municipal borders of the town, but not the rural fringes of suburban municipalities. As is well known, the village is the fundamental socio-economic unit not only in India, but also in other Third World countries, especially in most of Africa, where the commune has absorbed the willage only in French-speaking countries. Only in a few cases, is it identical with an elected local administration where quite a few communes are flanked by hundreds

of villages.[1] Moreover, in their study on the Spanish system, Ferrer Regales and Precedo Ledo purposely choose as their basic unit the *entitad de poblacion* and not the *municipio* (which includes several *entitades*), owing to the variety of settlement types in Spain and to the fact that their subdivision into communes does not take into account this diversity.

In other cases, the element taken into consideration is extended to include not only the built-up physical unit, but the unit plus its space of relationships: by this we mean, for example, the farm-house and farm, the village and field, the town and its area of influence or hinterland. To limit ourselves to two examples that directly concern our studies on national settlement systems, Ferrer Regales and Precedo Ledo describe the *cabecera comarcal* as a service centre controlling a certain surrounding area or *comarca*; they point out that the true basic functional unit in the Spanish system would be the *comarca*, had it not been for the lack of statistical information in this field. Dalmasso states that the term *zone de peuplement industriel et urbain* is used in France to define a more extensive geographical unit than a town or an agglomeration, not only considering the criterion of continuity of the houses but also functional criteria, such as that of commuting to work places.

It is in this second conception of the basic settlement unit, typical of the functional attitude to the settlement theme and the fusion of urban geographic methods with those of regional geography, that the minimum or basic administrative unit is introduced and established as a fundamental element: the Italian *comune*, the French *commune*, the *municipio* of Spanish-speaking countries, the Portuguese *concelho*, the German *Gemeinde*, the Slav *obcina* or *gmina* etc. The *commune* – a French word now used to define the phenomenon in international literature – not only forms the current statistical base in many countries,[2] but originally represented in most nations the administrative consolidation of an elementary functional area (land owned or cultivated by the inhabitants of a village, and therefore gravitating on it) as well as of a local community having stronger internal than external sociological links. So here we have an essential feature for being considered an element of the system.

These features of the commune can be confirmed by taking a rapid glance at the sizes of the communes. They are usually fairly small – both in area and population – in European countries with a high or medium population density and strong traditions of community living, while they have a larger area in European countries with similar traditions but a lower population density, and have become much larger – also in population – in countries such as those of Latin America where both density and relations of community living are weak.

In figures, the average commune has an area of 10 – 40 $km^2$ and a population of 1500 – 7000 inhabitants in countries like France, Switzerland, Italy, the two Germanies, Czechoslovakia and Hungary (thus including also some socialist countries), while there are increases to 700 $km^2$ in Norway and Finland (population 8–10 000) reaching 1200–2000 $km^2$ with 15–30 000 inhabitants for the average *municipio* in countries such as Nicaragua, Panama, Venezuela and Brazil. However these differences tend to diminish with time for – as we shall discuss – several high density countries have achieved or are still continuing a process of rearranging the communal mosaic with the purpose of broadening its tesserae.

Yet the concept of the commune is relatively foreign to the Anglo-Saxon world. We know that the English *parishes* and American *townships* only have some elements similar to the communes, but they do not enjoy the same extensive administrative func-

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[1] For Tunisia, for example, see Fakhfakh. In English-speaking countries the administrative structure, based on area-units for higher levels (provinces, districts, tribal territories) turns to point-units for the basic level such as that of the village. See the case of Zambia examined by Nag (1977).

[2] In Czechoslovakia, for example, data are collected for *obce* and localities, but only the former are published.

tions nor the sociological and perceptive 'popularity' of the latter. The functions of parishes are limited to the management of many secondary local structures and services, and townships are practically exclusive to the North East of the United States and almost unknown, apart from a few exceptions, in the States of the West and South. As Morrill and others point out, settlements are conceived by Anglo-Saxons as places rather than as areas, as agglomerations of people and not as territorial subdivisions. Both from the administrative and from the perceptive point of view, the most important territorial units in Great Britain, Ireland and most of the United States are the counties: obviously too large to be considered the cells of a settlement system.

Moreover, this view of the commune as a functional organic cell, as an elementary mesh in a network of different scales, is not entirely satisfactory in all settlement models. Not all settlement systems have reached this situation, but some have already gone beyond it. We are interested in examining the latter cases, as they are probably indicative of the future.

In several countries – as Pivovarov observes – we have gone from point-towns to an *open* settlement pattern, that does not take into consideration the autonomy of the traditional administrative units. It is therefore no longer a question of studying or examining the physical unit of the 'town' in itself, or as an integrated part of a functional area: it is the point-town itself which is becoming an area-town, a city-region.

In Germany, for example, the *Ballungsgebiete* (agglomerations of at least 500 000 inhabitants, with a territorial density of at least 1000 inhabitants/km$^2$) and the *Verdichtungsräume* (at least 150 000 inhabitants, same density) have become, as Buchholz reminds us, the usual, indispensable units for the study, administration and planning of the settlements. In the Soviet Union – as reported by Lappo – the 1970 census identifies 63 'urban agglomerations' consisting of 459 towns clustered together by fairly intense influxes around poles of at least 250 000 inhabitants each; in theory Russian geographers go even further, they plan, for example, a future pattern, named *yedinnaya sistema rasseleniya* (unified settlement system) that should almost eradicate differences between the town and the countryside (Khodzhaev and Khorev). In England, one does not only refer to agglomerations or conurbations christened by Geddes in 1915; on the basis of studies made by Hall, one now speaks of a 'Megalopolis England' not very different from that identified several years ago by Gottmann in the United States. Besides, in this latter country 'urbanized areas', including many 'incorporated places', and large 'standard metropolitan areas' have long become the statistical units currently used in census, while the concept of the 'city' is widely overcome by the 'urban field', better able to express the complex reality of metropolitan areas connected to one another. Yamaguchi informs us that Japan is now being transformed into one immense metropolitan area, the Tokaido megalopolis with focal points in Tokyo, Nagoya and Osaka (57 million inhabitants). This has been extended in recent years as far as Fukuoka, thus including nine of the ten million-towns of the country. Lastly, megalopoli is now the current term (Muscara *et al.* 1978) to define the urbanized region of the Po Valley in Italy, and in Venezuela Chaves is now speaking of a megalopolis stretching from Puerto Caballo-Morón to Guatire-Guarenas.

Therefore, from a qualitative point of view, settlement types have become highly differentiated. On a map of England and Wales, Carter clearly distinguishes three models: the peripheral model of 'normal' urban hierarchies, that of industrial conurbations or metropolitan areas and that of the central megalopolis stretching from Manchester-Liverpool to Sussex. Generally speaking, Pivovarov states that in its traditional form, the town is the basic element of the settlement system in the initial stage of urbanization, while the urban agglomeration is the more characteristic form of the medium level of urbanization, and more complex forms mark the more advanced stage of it. Some years back, I also advanced the hypothesis of three types of territorial organization corresponding to three stages of economic development: the underdeveloped model of a pure and simple opposition between town and country, the model of hierarchic urban networks, the 'metropolitan' model.

The variety is bewildering. Which are the units we should use, for example, if we want to study an urban system with one of the classical quantitative methods, such as the rank-size rule? Obviously, results can change radically according to whether we use the data of metropolitan areas, or those of towns, or those of communes.[3]

Administrative subdivisions have a viscosity that is easily understandable: they form a 'discrete' system and are easily outgrown by continuous topographic expansion and growing functions of the towns. These phenomena are visible in all the developed countries, from the Soviet Union to Ireland. On the one hand, the area of gravitation around one centre – that should, by definition, be the territory of the commune – has become multi-communal owing to most of the types of gravitation and above all to commuting: we only have to glance at the map of Denmark by Illeris, or at the situation illustrated by Dziewoński for Poland, where 29% of the active non agricultural population commutes to work outside a commune. This figure is increased to 1/3 in Eastern Germany and to 1/2 in Czechoslovakia, depending naturally on the different sizes of the communes: but it should be pointed out that a large-meshed administrative mosaic (counties) does not eliminate the phenomenon.

On the other hand, large agglomerations, and sometimes also medium-sized towns, now usually include several basic administrative units. In Finland, not only 'greater Helsinki' but also other towns have encroached upon and occupied the area of neighbouring rural communes. In Ireland, the administrative boundaries of the city of Dublin have been extended three times this century, but urban growth has rapidly exceeded the new boundaries every time (Bannon). The city of Brussels *stricto sensu* consists of 15 communes, but the *agglomération opérationelle de Bruxelles* comprises of 43 communes and the *région urbaine de Bruxelles* of 108 (van der Haegen and Pattyn). The agglomeration of Paris includes the extraordinary number of 279 communes. Many American cities cross the boundaries of their own county and in several cases, even those of the state to which they belong, proving once again that even countries with larger administrative units than the communes are not exempt from this phenomenon. Also several Australian cities (see Logan and others), which one would think were able to avoid this phenomenon because of their recent foundation, have also been confronted with it. Lisbon and Porto, which are by no means enormous cities, even though they are situated in a country with fairly broad communal meshes, not only occupy space in the surrounding communes but also in other districts (2nd rank administrative units; see Simões Lopes and others). One could continue to give examples, but it would be appropriate at this point to mention the exception that confirms the rule: Rome, this *métropole sans banlieue*, is perhaps the only large city in the developed world that has remained entirely inside the boundaries (however very extensive) of its commune.

All these cases – which are now more the examples of a general rule which is valid for almost all centres above a certain level – surely interfere with commune=town equation, now valid only for small and medium-sized towns. Nonetheless, this does not totally remove the value of the commune as a settlement unit. It is indeed quite evident that the afore-mentioned large towns are in any case *composed* of communes; generally speaking, large towns are inevitably too large to be a concrete representation of a settlement cell, and end up by being split up into a series of neighbourhoods, quarters, subcentres, each with its own functional validity (gravitation mainly around service centres

[3] E.g. in Italy the town of Venice (108 000 inhabitants) holds the 32nd place in the demographic hierarchy of Italian towns, but the commune of Venice, which includes the vast industrial area of Mestre-Porto Marghera (363 000 inhabitants) is the 10th Italian commune. The commune of Rome with 2.8 million inhabitants exceeds by far that of Milan (1.7) and that of Naples (1.2), but the metropolitan area of Milan has more than 5 million inhabitants, that of Naples more than 3.5, and therefore that of Rome – which is almost the same as that of its commune – has to be contented with the 3rd place (data of 1971 census).

and at times also around local work places) and a formal one (name, feeling of belonging, uses, traditions etc.). Hence *neighbourhood units* and *community centers* are formed spontaneously in large American towns, *mikrorayon* at several levels are planned in Soviet towns, *wards* gain a certain significance in Great Britain, and *quartiers* in France or *quartieri* in Italy are deeply rooted in the urban structure and population perception of these two countries.

Whether they coincide with ancient communes or basic administrative units or not, these subdivisions inside the town tend to reproduce the cell structure of the settlement in a context which has grown too large, taking on a function similar to that of the communes in a rural or slightly urbanized context.[4]

However, attempts have been made by administrative units to adjust themselves to the development and transformations of the settlement. Administrative reforms have been carried out in several countries to reduce the number of communes – which evolved in an agricultural era – so as to increase their size and make them more similar to agglomerations. This is the case of a reform now being applied in Finland: through a series of mergers the number of communes is being diminished from more than 500 to 327. A similar phenomenon is also taking place in Federal Germany: as Scholler states, the 24 500 communes existing in 1961 become 10 700 in 1976, and an attempt has thus been made to create functional units organized in a rational way. The same situation applies to Poland, where the 1973–75 reform reduced the communes from 4300 to 2200, in Belgium (from more than 2500 to 596 communes) and in Denmark (from about 1400 to 275).

In some countries, instead of unifying the communes, the establishement of administrative units of a higher rank has been prefered, to which certain functions delegated by the communes are given. As an example of this we can mention the *comprensori* in Italy, created to deal with the administration of an economically homogeneous area, namely an area specialized in industrial production (especially in light industries: leather and footwear, furniture, clothing etc.); or the *Gemeindeverbande* in East Germany, associations of communes which, as Grimm says, are principally aimed at improving the realization of social goals; or the *pays* in France, units formed – according to Dalmasso – by a certain number of communes, that stipulate a contract with the State aiming at carrying out some planning and development operations. Owing to the high degree of fragmentation of its communal administration, France has been particularly imaginative in this field, conceiving and creating a large number of intercommunal bodies and organizations having single or multiple functions.

There are however, in the settlement systems of some countries, cases of small centres, and consequently also of small communes, showing signs of recovering a certain vitality. By this, I do not imply small or medium-sized towns but really small communes situated reasonably close to towns; they can be revitalized either by a spontaneous centrifugal movement of the population of these same towns (Sweden) or encouraged, to a certain degree, by the authorities (Denmark).

Some signs in this direction can be seen in the field of planning too: settlement plans, which have a limited significance and vary from one country to another, but are nonetheless an important instrument of territorial planning, come under the competence of the communes in Italy (*piani regolatori*), in Sweden ('structural settlement plans': see Wärneryd and Persson), in Poland etc.; even if they are just as frequent as the intercommunal major plans.

[4] Sometimes, interurban subdivisions are also used as statistical units, e.g. the Italian *circoscrizioni*; but more frequently urban statistics employ conventional or geometric type units, such as 'grid squares' and 'census tracts' recently introduced in English and Japanese census respectively, and the *sezioni di censimento* in Italy. These last units are evidently not settlement units but conventional subdivisions worked out on paper; the Czechoslovak 'urban districts' seem to be somewhere in between.

The communal administrative unit therefore tends to reestablish its own validity emphasizing its significance for statistical information and planning and trying at the same time to absorb the growing new forms in which the settlement systems are now developing.

The problems presented are therefore conceptual, statistical and practical; they can be summed up as follows without any claim to clarify problems common to all countries, but to indicate some points that have emerged from the discussion on national systems:

– on one side the communes seem to be too small: that is to say that the large agglomerations now include, as we have already seen, a number of communes; and that even the communes of not very urbanized regions are too small – in case of lack of administrative reforms – to guarantee a rational and functional organization for scattered settlement, hamlets or small centres; all this presents functional, administrative, financial and planning difficulties;

– on the other side the communes – and this is not a paradox – seem to be too large for statistical and reasearch purposes: they include several *entitades* in Spain, several *centri* in Italy and even several *agglomérations* in France (although in this last case the problem is much more limited).

We are therefore confronted with a very conflicting issue that only theoretically can be solved by making settlement and administrative boundaries coincide.

A secondary problem, though by no means a negligible one, arises from the former discussion: to bring the administrative boundaries closer to the urban context is desirable from the conceptual point of view, even if these variations have to remain continuous; but what use are administrative boundaries to statistics and research which cannot be compared in the course of time? Should we try to obtain the uniformity in the space and at the same time make it impossible as time passes?

From the above discussion, I think we can see both a strong distrust of the assimilation of the commune (or, more generally, of the basic administrative unit) to the concept of the basic settlement unit, and a certain acceptance of the value of the commune. For practical reasons (the prevailing official statistics) and conceptual ones (the absence of a definition of the settlement unit equally valid in theory and widely accepted) the commune is a unit which is difficult to replace.

Another small element opts for the utilization of the commune cell: the possibility offered by this unit of making classifications that would otherwise be impossible. The value of taxonomic classifications in a discipline such as geography has been widely criticised, but we cannot deny their value as an instrument of study.

One could object that the traditional distinction between urban and rural communes is losing much of its singificance, at least in developed countries: of course, the documents obtained in this field are numerous and come from countries which differ greatly from one another. But if the rural and urban sub-systems no longer seem to play a decisive role, the fact remains that other sub-systems, closely linked to the size of the agglomerations and above all to their functional structure, can be usefully identified and studied anly by resorting to these basic units.[5]

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[5] E.g. in Italy, in recent years a settlement classification has been proposed and applied with excellent results:

– small non urban communes: all having less than 5000 inhabitants;

– non urban communes: those with more than 5000 inhabitants but without any special service functions;

– small towns: communes endowed with facilities covering at least three of the five main urban services (trade, banking, administration, education, health);

– medium-sized towns: communes endowed with facilities for all five main urban services;

– large towns or regional metropolises: communes with extensive functional facilities, a vast area of influence and considerable predominance over other towns.

Classifications of this kind, but based on the number of inhabitants rather than on functions, exist in several countries: e.g. for Czechoslovakia see Blažek and Rysavy.

In those countries where the commune exists as a body, it, besides being endowed with certain State functions, has the 'general' competence for all the affairs of the local community. The same cannot be said for the minimum administrative units of Anglo-Saxon countries, as the authorities of parishes and town-ships do not have general but 'specific' competences; but it should be observed, as Carter does, that as far as the counties and districts in England are concerned, the 1974 reform appointed new administrative areas less adjusted to the physical settlement and much more related to functional areas, for an effective government based on functional regions. Progress has therefore been made towards the conception of settlements as territorial areas or subdivisions, typical of continental European countries.

As Rysavy points out, the administrative unit has the advantage of continuity, and differs from the physical settlement unit, in that it covers the entire territory. It does not overlap, it has well defined boundaries, it has determined attributes (properties) in the administrative, financial and social field. Between communes there are relations, e.g. influxes of population that are calculated by registrations and cancellations. Each territorial unit, each building, each inhabitant belongs to a commune and only one, and this belonging is deeply 'felt' in many countries.

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# DIFFERENTIATION OF SETTLEMENT SYSTEMS ON THE BASIS OF POPULATION DENSITIES AND LEVEL OF DEVELOPMENT. 'REGIONALIZATION' NOW AND IN THE FUTURE

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## INTRODUCTION

There exist numerous studies on the differentiation of settlement systems both historically and in the nearest past. Conditions are well documented and described particularly in the case of the most industrialized countries. The trends, planned or not, also seem to be like each other and in many respects be valid for the eastern countries. The capitalistic system in the West (originally developed in England) with highly developed labour division forced the technological development into a certain fixed rut. Machines, installations, etc. only reinforced and developed further the labour division but, at the same time, they were calling for concentration in space. Capitalism and industrialization strengthened each other in a spiral development. The only possible (yet at that time impossible) alternative would have been 'handicraftization', where small communities produced both their own machines and the products according to need.

The urbanization process and the problem of mutually imbalanced regions have made up the fundamental theme since the 1950s against the background of differences in population density and level of development. These factors have given rise to innumerable theories of imperialism, growth-centres, development poles, etc. They have also caused numberless troubles in the regional planning and inforced formulations of alternative goals by governmental agencies in several countries. The Italian model has been put beside the French with pole alternatives in south Italy and south France respectively, whereas the English have preferred the alternative of decentralization. In this respect Sweden seems to have had a more realistic version practising its model of central place hierarchy.

We are of the opinion that a knowledge of the present conditions does not suffice for us to understand a differentiation of the settlement system. Nor is a historical analysis and description sufficient of the events in the past. What is needed to complete the understanding is a bit of far-sightedness, a look into the future. As we have been more and more 'target fascinated' the causes of the development today are founded in the future. The question "What will be the end of this?" justifies to us the perhaps unexpected subtitle "Regionalization now and in the future". The industrialization is not finished, the urbanization is going on though in other ways, the regionalization has just set in. They are all processes leading somewhere, overlapping in space, interwoven in

history, paradoxically bent into each other, but going on: Towards what? Their destruction, their desintegration, their metamorphosis or enew their changed nature?

Is it possible to get into a position to predict the future? Most viewers into the future are in the habit of delineating different alternatives in something that may be like a scenario, between two contrary extremes. All ways between these extreme alternatives are possible. In reality, if one draws a lesson from the historical development, there are historical, social, economic and physical obstacles that reduce the possibilities to only a few alternatives. This view may be understood by many people as a highly deterministic one. As a matter of fact, the western (capitalist) system is deterministic by its nature as are most other systems. The system itself can not make itself free from its internal contradictions. It will continue to alternate between tendencies towards competition and monopoly. The mixed economy is breaking through more and more but it also leads to strengthening of current trends in the form of concentration of both power (of multi-national firms) and physical units.

This paper tries to elucidate these problems by focusing on the concept of 'regionalization'. Since the 1950s the idea of creating viable regions has been an important political means in West European countries of balancing rationalization and structural change.

## WHAT IS REGIONALIZATION?

Regionalization means mostly the division of a country into regions or by some other classification. We prefer to use the concept of regionalization for the changes taken place in time and space. It is a process-oriented concept comparable with industrialization and urbanization.

Some distinctive features of the regionalization are the increased requirements of space, an expansion of the regional landscape (where the region is a clearly discernible economic, physical and social unit) and a split-up of space into functional units. Besides these physical properties the regionalization is also characterized by demographic and social properties, such as a different policy and way as far as mobility is concerned, a spreading of clustered densities as well as increased segregation. From an economic point of view there still prevails a concentration of resources for the production that is tending towards specialization.

Within the sphere of production one can note an increased need of space especially within the light refinement industry, for working places and store rooms, etc. Within the sphere of circulation there arises an increased need of space for transportation of components (sub-contracting work) that are to be assembled, for transportation of the finished products, for truck centres, parking grounds, for large department stores, etc. The increasing claime of the non-productive spheres on space can be exemplified by a rising number of office buildings, schools, recreation centres, service centres, large hospitals, etc.

The 1960s and the beginning 1970s show a very rapid expansion of the densely built-up areas within certain regions. In addition to the development in the central place itself there is going on in these areas a more and more obvious removal of the residential function to surrounding smaller communities. There had been dormitory suburbs, satellite towns, residential communities, etc. but in this period the development becomes particularly obvious within the larger urban areas. In recent years this process has been characterized by a certain deceleration of the expansion of the typical urban environment at the same time as the growth within surrounding smaller communities has become more and more well-marked (see Table 1).

At the same time as the geographic and demographic development is characterized by a concentration in the inhabitants' settlement pattern to a smaller number of densely urban regions there is going on a successive split-up and profiling in the functional respect. The regional landscape is segregated, e.g. with regard to land utilization for

TABLE 1. Rate of population growth in the densely urban regions in 1960s

| Urban regions | Urban places with satellites.[a] Increase in % 1960–70 | Urban places. Increase in % 1960-70 | Satellites. Increase in % 1960-70 |
|---|---|---|---|
| Stockholm | 19 | 0 | 113 |
| Goteborg | 20 | 9 | 110 |
| Malmo[b] | 27 | 14 | 53 |
| Vasteras | 33 | 30 | 42 |
| Uppsala | 37 | 27 | 116 |
| Norrkoping | 13 | 6 | 53 |
| Orebro | 22 | 20 | 28 |
| Helsingborg | 19 | 8 | 29 |
| Jonkoping | 20 | 13 | 57 |
| Linkoping | 25 | 17 | 85 |
| Borås | 17 | 10 | 40 |
| Eskilstuna | 27 | 21 | 46 |
| Gavle | 15 | 11 | 22 |
| Sundsvall | 23 | 22 | 24 |
| Karlstad | 22 | 22 | 22 |
| Halmstad | 23 | 19 | 34 |
| Umea | 44 | 47 | 32 |
| Trollhattan | 25 | 31 | 18 |
| Vaxjo | 49 | 58 | 34 |
| Karlskoga | 12 | 18 | 6 |
| Lulea | 40 | 23 | 141 |
| Uddevalla | 12 | 8 | 29 |
| Borlange | 15 | 18 | 14 |
| Kalmar | 20 | 14 | 41 |
| Karlskoga | 19 | 1 | 49 |
| Nykoping | 41 | 30 | 61 |
| Other urban places with more than 200 inh. | | 21 | |

[a] In the three largest cities are included all built-up areas within a radius of 40 km from the centre, in the others are included built-up areas within a radius of 25 km.

[b] Malmo excluding Landskrona with surroundings which is included in Helsingborg.

dwellings, for industrial purposes, for leisure time activities, etc. The residential areas are graded by prices, site, seclusion, etc. The great mobility that among other things the motorism maintains creates pre-requisites and possibilities for this process.

In earlier periods land was exploited not only for work (industrial sites) but also for dwellings. At the same time the organization developed by a specialization of land for different kinds of work (concentration and big scale). During the regionalization also land for dwellings was specialized. Space or the land was exploited in a very definitive way, in an organized and systematic way. We can speak of created space.

There in an essential difference between the organization of space and specialization of space. In the first case one speaks of a materialization. Space becomes a market commodity and follows the same market laws as other commodities. In the other case space becomes a standard commodity and thereby it receives certain specific environment-related functional aspects. The land can only be used for one purpose, e.g. according to prices it can be associated only with one social group, etc.

As for mobility one has to make a distinction between migration and commuting. Both these phenomena change in this period. If we had both short-distance and long-distance migrations from the countryside and small communities to large towns in earlier days, the today's population movements are increasingly characterized by migration between growth poles, between the big-city regions and within these. The commuting pattern is strongly dependent on the time/space organization of the society. More and more people experience commuting, a situation which is very problematic if the energy supply will go down or perhaps ceases to exist, e.g. the oil production.

With a certain simplification the regionalization can be summarized in the following pattern:

Increased monopolization of the capital in the productive sector → Fewer and fewer people mass-produce more and more

↓

The Government's "intervening" role develops rapidly in order to save the outcompeted companies and mitigate the crisis → Growth of the improductive sector in order to convert the capital and sell the production

↓

Packing, separation and segregation in space (Regionalization)

## REGIONALIZATION AS A HISTORICAL-DEMOGRAPHICAL PROCESS

We choose to exemplify the mentioned facts by mirrowing the development in a Swedish city region, the Malmö region. If the population development in different areas of a region (the parish is the chosen areal unit) is seen in a historical perspective one can identify certain processes. The 'chronological' population development characterizes in both social and economic aspects its own age in the same as it mirrows its history. In Fig. 1 five different development courses are shown:

1. Continuous depopulation has reference to the pure rural parishes and early industrialized' parishes, which are characterized by a successive population decrease during a period of a little bit more than 100 years. These parishes (14 out of 36) represent more pronounced farming areas which lack larger urban places. They constitute an example of the depopulation of the rural areas (a process which started during the urbanization period) in the surroundings of a growing large town or city.

2. Delayed depopulation reminds of the first one but the depopulation process begins at a later time. The origin and growth of small urban places during the end of 1880s and the beginning of the 1900s out in the pure rural areas around smaller fabrics, railway stations etc., experience now in many places a slighter population growth. When the process of closing down smaller fabrics and railways starts the basis for the existence of these places is deprived and the depopulation sets in (9 parishes out of 36).

3. The invasion of the 1930s and 1960s takes place in pure rural and industrialized parishes which during the 1930s change their role into areas dominated by villas. From the beginning it is an out-migration of more well-paid people from Malmö and Lund and in the first hand it is a question of summer dwellings. During the 1960s these parishes (2 out of 36) experience a new stronger invasion of new population groups.

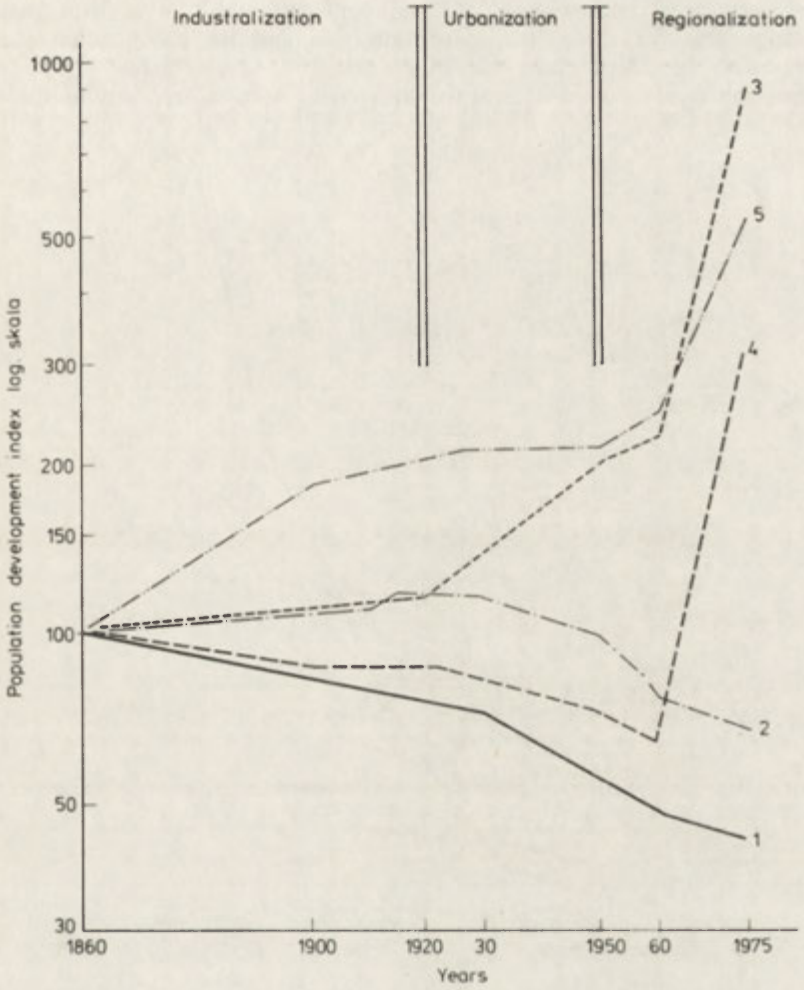


Fig. 1. The population development of the parishes in the Malmö region, 1860–1975. The parishes are grouped according to different courses (see the text)

4. The 1960s invasion characterizes the development of the pure rural parishes and the villa and suburb parishes. They show a relatively constant population decrease up to the 1960s (depopulation process) but after that an invasion of new groups starts. These parishes (5 out of 36) become centres for the out-migration and a very fast small house building in the Malmö region.

5. The growth at the turn of this century and the 1960s invasion show the development of all industrialized urbanized parishes and of some industrialized rural parishes. The nucleus of these parishes (6 out of 36) are earlier industry places, which made up the basis of the population growth during the period at the turn of this century. In most cases the growth stagnated during the 1930s and 1940s (when only the city and the summer dwellings grew) but in the 1960s this was changed into a fast increasing population of new groups.

These five different tendencies give to a great extent content to the concepts of industrialization, urbanization and regionalization in the Malmö region. The differences between

urban and rural areas became more and more pronounced (not at least that concerns the population density) during the industrialization and the urbanization periods. The pattern was only here and there broken by smaller industry atolls in the pure rural areas. When the regionalization starts the differences were blotted out in the larger city

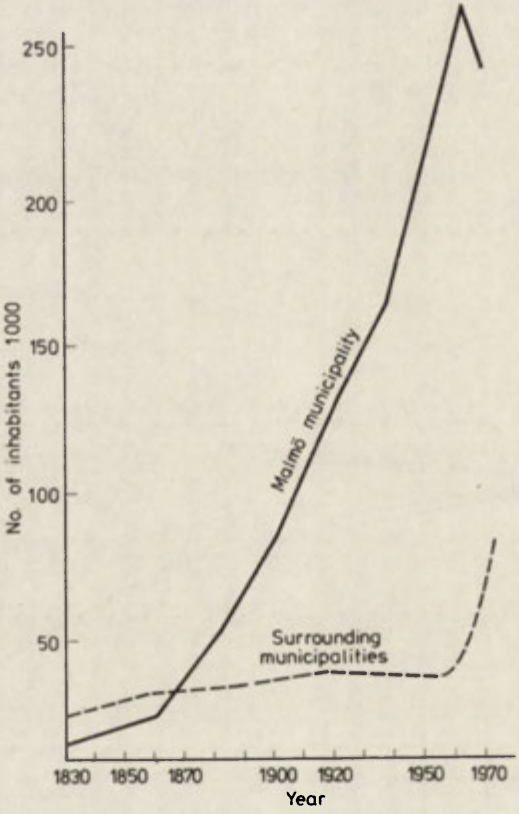


Fig. 2. The population development in the Malmo region, 1830-1975

regions in order to give room for an urbanized landscape with a 'reserve' of not yet exploited land. In this pattern a conurbanization process starts. The population of the city decreases and the surrounding parishes grow (see Fig. 2).

## THE REGIONALIZATION AS A GENERAL PROCESS

The resulting physical and social processes which are generated by the world wide-spread economic changes are general in their character in the highly industrialized countries not at least concerning the settlement pattern. However, they part what the forms of resident concern depending on the economic system and thereby the social structure. The general characteristics are also more pronounced as closer you come the economic poles in the expanding big-city regions.

The geographer's approach is still in many ways ahistorical. Sometimes one can get the impression that at least the European geographer has locked his thoughts to the beginning of the 1900s and to Zipf's and Christaller's normative theories. These theories

built on the necessity of the national state and on a hierarchical structure, which was relatively less accentuated earlier than the case is now. Still one speculates on the influence of the cultural and administrative centre (Rome) versus the influence of the materialistic and economic centre (Milano) on the territorial development in Italy. Still more and more plans are taken form to give a solution to the regional problems of the underdeveloped South Italy. Plans like 'Proghetto 80' are made to give a more balanced regional development without taking full attention to the fact that the centres are neither Rome or Milano but are to be found in Bruxelles, London, Zürich, New York, etc.

There are two movements which are historical, contradictory and complementary in the same time; the movement towards the general pattern and the movement towards the unique pattern. Independent on the regional and national plans, independent on the choice of the means of production, on the degree of intervention from the State, of interdependence, of time and space, there is amongst the developed countries the same process towards the same pattern – a split up and separation in space of functional units. This is marked just as well in Italy divided into the developed North and the underdeveloped South as in Australia, where the colonial dependence on foreign capital since the beginning has played an important role. It is to be found in West Germany in its role as an advanced economic pole and in Canada with its dependence on US's capital and on export (raw material and semi-manufactured) to more advanced economic centres such as US and Japan. Poland and Finland show the same development even if industrialization and urbanization started later they have experienced a faster pace. Besides perhaps Poland all of the above mentioned countries also show a common feature of out-migration of the middle class from the city centres to the more peripheral parts of the region.

The differences which result in the unique pattern are also visible, e.g. as for that the spread or the concentration of the settlements, the type of regional unbalance, the rate of development, etc. These differences are depending on the local historical and physical development. The earlier materialistic and ideological phases of the historical development have left traces in space as well as in the social and cultural life. These traces are not deleted at once. They live side by side with recent formations, contradictory and delaying. They are adjusted to and changed by the new features but at the same time they deprive the original pattern its genuine character. Two obvious examples may be depicted, the Polish and the West German regional unbalances. These two cases give the settlement pattern and the functional location their respectively distinctive character. In Poland the historical heritage has left traces. In West Germany has since the World War II the lack of the original capital city given rise to a spread of the functions of a capital city to many regions.

## REGIONALIZATION IN THE FUTURE

Figure 3 can serve as a means not only for describing movements in space but also for analyzing movements in time. Communications (i.e. movements of goods, people and information) have always been important in geographic research. The emphasis have varied, however, depending on the particular historical situation. At the time of the large migrations the movements of people were most important, while the subsequent increase in trade increased the importance of the movement of people. These two aspects of communication have alternated with each other.

In the later history of capitalism and industrialism it is possible to distinguish three phases in the development. In the first industrial phase people were tied to the local *place*, while raw materials and finished goods were moved from the production sites to the cities; 'person communications' tended to be local, while the 'material communications' extended over a much wider space. During the urbanization phase, on the other

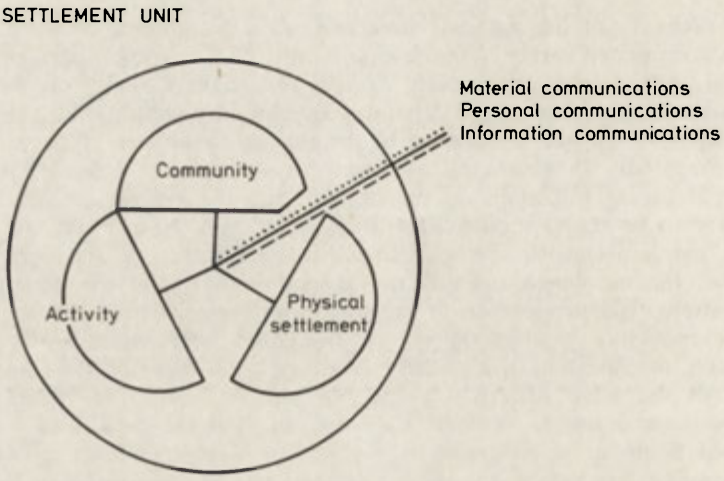


Fig. 3. A scheme of the concepts to describe one basic unit of settlement structure (after M. Palomäki, 1978)

hand, 'person communications' became more important as the migration from rural to *urban* areas increased. In the regionalization phase, the emphasis has again shifted, this time to the 'information communications' without which the service society can not function. The connections are between *regions* and cover a much larger physical space then ever before. Through the increase in information communication space has got a new dimension which totally neglects all previous concepts of distance. At present, however, we are on the threshold to *automated and computerized information society*. Here it is possible only to indicate very briefly some of the traits of that new society.

ECONOMIC PROCESSES:

– The importance of computers and robots increases both in production and in administration. The relation people /machines is replaced by the relation electronics/ machines.
– Machines produce machines.
– Production increases but variation decreases.
– Some regions rule over other regions. Administration expands and becomes more differentiated. Some regions absorb and change information (brain regions), others distribute information (managing regions), others receive information (managed regions).

Regional roles become more and more specialized. Underdeveloped regions emerge both within and between countries. Sweden now has to choose the Australian model (total dependence on foreign capital but highly developed production) and the Canadian model (dependence on foreign capital and production specializing in raw materials and intermediary goods). Economic imperialism as opposed to the older political imperialism is increasing.

SOCIAL PROCESSES:

– The service society is developing rapidly in the industrialized countries. White collar jobs will dominate in the labour market. The social differences between different levels will increase and reflect the needs of the machines. Information administrators, programmers, analysts, senders, receivers, sorters, supervisors etc. will form a hierarchical pyramid from the highest managing unit to the lowest managed unit.

– One important distinction will be between the groups which own, manage or are managed by the computers. In this sense, the class distinctions within (but not between) regions will be depersonalized.

– The labour force becomes more differentiated and new life styles are developed.

PHYSICAL PROCESSES:

– A spatial hierarchy develops but this is not of the Christaller contiguity type.

– Regional satellites develop special roles independently of the distance to the governing centre.

– Increased spatial separation of functional units within regions. Settlement units are becoming more differentiated in terms of status, location, standard, energy, service, income, etc.

– Through the computers the impact of distance will be decreased. The control of information becomes crucial in the power struggle.

Much of these conditions are already here. But as far as we can meet the changes by increased individual mobility, both physically and socially, we don't experience the time-compact society. The interesting thing is if we adjust our life, i.e. by chosing a living, where the negative effects are minimized and the positive ones are maximized, by which means a place with all kinds of possibilities built in. From a settlement point of view it is interesting to notice the strong movement of very well-paid people to the city centre areas. Is this the next phase in the national settlement system?

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# HIERARCHICAL STRUCTURES AND CENTRALITY IN SETTLEMENT SYSTEMS

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Hierarchy and centrality are two basic pillars of settlement systems. Their importance is emphasized in all reports on national settlement systems. Both are principles of general validity underlying the network of settlements through all centuries and in all continents, and both are partially influenced by the modern social order and by the present economic conditions of society.

Under normal conditions, hierarchy and centrality work together, but there are differences in the nature and the effect of the two principles. Hierarchy refers to the vertical pattern of settlement elements and describes sizes, functions, and structures of settlements. Centrality relates to the functional approach, i.e. the spatial pattern in vertical and horizontal dimensions.

There may still be doubts about the number of functional levels that exist at different times and in different societies, but the existence of a scale of urban hierarchy is outside the remit of this paper. The hierarchy of functional centres and their integrated hinterlands is not only the result of economic functions: but is also based on the organizational structures of societies and the whole complex of social interrelations and interactions. Any existing power structure requires distinct levels of delegation, located in subordinate centres.

The political principle of administrative organization demonstrates the pattern of settlement hierarchy most clearly. Very often, however, this system of administrative structure is not identical with the systems of economic, cultural, and other functions. In addition, there are differences in the density and intensity of the functional relations within each system as well as differences with regard to the leading forces and the gap between primate cities and the lower urban levels. Due to the high degree of logical complexity, the empirical validity and last not least the integration into the practice of spatial planning the theory of central places became the most important hierarchy model of spatial organization. Thus, up to now, geographers mainly analyzed the organization of urban systems through hierarchy of central places. However, fascination for this model must not result in neglecting those organizational structures, which are not ordered hierarchically, such as the interdependence between centres of the same order or the interactions of sectors which surpass their own spheres.

Thus it is very important to analyze urban functions and functional specializations. Because, linked with the increasing integration of the urban system, the urban specialization is growing and this fact may explain the size and further developments of many

towns and cities. Besides the strictly hierarchically structured model there exists an urban system with supplementing and interacting functions on the inter-regional level. This one is not characterized by hinterland areas, which are composed of spatial complexity and hierachical order. but by inter-regionally entangled interactions. This pattern is for example created, when goods are produced in only one or a few locations.

Even more important is another characteristic of urban systems, which can be described in terms of polarization. Here an extremely polarized urban system is contrasted by a decentralized system. A characteristic of the first type is the fact that a great many of the institutions and activities of many sectors and categories can be found in only one centre. As a rule such a structure is linked with many disparities in regional development and is characteristic for many developing countries, but can also be found in Europe.

A decentralized structure is on the other hand characterized by the lack of a single leading centre and by the distribution of top level functions among a group of centres of about the same order. Of course this does not exclude that one of these centres, which is on the same level as the other centres, plays a leading role in single categories or even in a whole sector.

Between these extreme types of organization a hierarchically organized system of central places takes a middle position. It is true that as opposed to the decentralized type there are clear differences in rank between the centres, but in contrast to the extremely polarized type all ranks are fully represented.

Some specific problems may be summarized as follows:

1. In the present situation and the modern development of settlement systems the historical heritage is quite substantial and still more important than modern planning concepts. The urban network in large areas like West and Central Europe was formed during the Middle Ages. It was modified by industrialization, traffic revolutions and urbanization, but basically it remained stable.

With the extension of European colonial power in the nineteenth century the great primate city emerged to dominate the urban pattern in former colonial territories until the present day. Basides the leading main centres and ports, the proliferation of the smaller urban centres during this time should not be ignored: the railway junction town, the small coastal port, the mining settlement, the district headquarters. While the primate cities were largely orientated to the West, these smaller urban centres played an intermediary role between the traditional rural life and the rapidly urbanizing societies.

2. Market economies are very flexible in adapting the hierarchy of urban settlements and the attractiveness of central places to the changing circumstances. There, retail and service activities play the leading role within the spectrum of central functions. In many cases, the hierarchical structure remains very changeable and less distinctive than in countries with a planned economy. In several regions of early developed countries we find a continuum in the functional order and the sizes of settlements.

3. Socialist planned economies tend to establish a clear and distinct hierarchy of functional levels according to administrative standards. But not in every case the administrative hierarchy remained static. New concepts of territorial organization – like in Poland during the last years – are influencing the diversification of settlement structures; in such a way, administrative functions, which formerly were a stabilising factor in the growth of regional centres introduce now dynamic changes and transformation into the settlement system.

As much as the industrial production is integrated within the planning of settlement systems, the sizes of different settlement types are also controlled more strictly in socialist than in capitalist economies.

4. Developing countries show distinct forms of dualism in the settlement system, with colonial traditions surviving in many cases such as in dominating primate cities in coastal areas versus inland systems with market centres and local exchange places. The provin-

cial towns have closer links with their hinterlands and the population of these towns is more stable than in the metropoles. Trade and commerce are still dominated by local groups. Religious functions, festivals and celebrations are partly as important as market activities and administrative contacts. The provincial town is also the disseminating centre of national information and some innovations. Thus the local centres play a vital role in the urban network.

On the other hand, urban centres with single functions like mineral resources exploitation are isolated from the surrounding settlement network, linked only to the port, from which the resources are exported.

5. The number of functional levels and the degree of hierarchical differentiation reflect in many cases the stage of socio-economic development of countries. Often, the transformation of agrarian societies started from a simple model with 2 levels of central places. With the change to industrial and urban structures 3–5 ranks of settlement functions emerged.

However there may be different hierarchical sub-systems within one country, influenced not only by different socio-economic development but also by different degrees of centralization.

6. The importance of capital cities and the number of their functions are continuously growing. Of 134 countries reviewed, 88 have a monocentric, 24 a dualistic, 4 trialistic and 13 a polycentric pattern of their national urban centres. The tendency towards centralization is growing even in federal states. New emerging metropoles and national capital cities show exceptionally rapid growth of their population since independence along with the growth of government, commerce and industry in the main centres.

The growing unity and integration of a national settlement system is based to a large extent on the force and the functions of the capital city. Capitals with regional functions promote more integration, step-by-step migration and social stability than specialized capitals without such regional links and roots.

7. Several countries try to decentralize by removing functions from the overcrowded capitals and to reduce the national imbalance by promoting regional capitals. Examples show that the quantitative growth of large capitals can be slowed down by consequent decentralization policy measures, but the qualitative dominance of the capitals seems constantly to increase despite all efforts towards decentralization.

In several developing countries government economic development policies favour centralized investments, arguing that only the largest urban centre can induce economic growth. The capital is seen as a huge growth pole for the whole country. In most cases, the growing integration can not stop the acceleration of spatial unbalances.

8. In nearly all countries the lowest range of the settlement hierarchy, – the small local centres – have become unstable. After the last World War the rapid modernization affected primarily this group of lowest centres in a very complex way. In the West, this unstability was caused by the increased motorization and the changing way of living; in socialist countries the change is also due to reforms of rural communes and the re-planning of production-units.

9. The growing tendency towards urban specialization within conurbations and agglomerations is changing the degree of simple hierarchical structures in settlement systems. Especially modern industrialization can be evaluated as a pacemaker for urban specialization without fixing an overall hierarchy of settlements.

Whereas in the cities of the Western world, the growth of a large tertiary sector has been generally taken as a sign of increasing specialization in urban centres, the result of a developing economy, in the context of the Third World, this excessive concentration in the tertiary sector represents in many cases an unbalanced trend with unemployment.

10. Even if capitals and metropoles become the pioneers of urbanization and industrialization, it may be still questionable whether these cities can serve as points of de-

parture for a change in social structure and as a key for socio-economic differentiation. For the diffusion of innovations to all parts of the country, the question arises whether the patterns of diffusion coincide with the hierarchical pattern centres.

In general, there is a fundamental lack of knowledge about urban interactions, a lack of adequate concepts and systematic categories.

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# SYSTEMS OF MAIN URBAN CENTRES (FUNCTIONING WITHIN THE NATIONAL SETTLEMENT SYSTEMS)

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While reviewing the comparative basis for various studies and reports on national settlement systems there emerges and is easy to develop the concept of a system of main centres which is obviously a subsystem. Since practically all theoreticians of general systems theory do agree that there may be and are systems within the systems, it is simpler to replace the term of a "subsystem" by a "system". Such concept seems to be theoretically well founded and practically useful both in research and in planning.

The concept implies, that main urban centres, at least in larger countries, form a set which may be considered not only as representing a separate and specific type or class of urban settlement but also as a system in which its basic elements – main urban centres of such countries – are characterized by special kind of relations and interactions, different from those which link them with other cities not belonging to the set. Their relations with outside world – their environment – may be also specific, represented for instance by their functions within the nation-state, national economy or settlement system.

However, in order to use such concept, to claim that it corresponds in reality to some important phenomena and facts in settlement, it is necessary to develop and define it in greater detail. In such procedure the examples found in the available studies and reports should be used as checking points. In the Commission of National Settlement Systems (of the International Geographical Union) we possess now (i.e. in June 1980) twenty seven national reports; some information may also be obtained from the materials gathered by the former IGU Commission on Processes and Patterns of Urbanization, on additional seventeen countries.

The first question to be answered in the more developed analysis of our concept is what cities are to be defined as the main urban centres. As we deal with the whole set or a system of such centres, it may be easily assumed that such centres are as a rule quite distant from one another, it is evident that their identification is rather important while their delimitation is not, with the exception of such cases as a gathering of statistical data both to form time series and for comparative purposes.

The easiest way would be to define a city as a main urban centre within the national settlement system of a country by the sheer number of its inhabitants, but this method seems rather unimaginative and might be even misleading. Moreover, the measurement by the size of population would reintroduce the question which we have just decided to by-pass, i.e. one of the identity of urban area – a question which in case of urban agglomerations clearly presents some difficulties.

A better way, already mentioned in discussion of relations between the system of main urban centres and its socio-economic environment, would be to start from the studies and knowledge already obtained about the economic base and functions of cities tentatively included in the discussed set. It is obvious that from that point of view the national capital has to be always included into the set, especially when it is considered within the framework of the national settlement system.

In some countries where functions of the capital are split between several cities all these cities have to be included as the main urban centres. Such is the case of Federal Republic of Germany, where at present Bonn is the main political centre but Hamburg is the dominating centre for trade and maritime transport, München for culture, and Frankfurt for economic organization as well as for land and air transport. Similar structure has developed in the United States but on a much larger scale. However, the additional cities with some functions of the national (federal) capital are more difficult to enumerate there. Beside Washington D. C., New York – as the economic capital – naturally belongs to the system, but what about the others: Los Angeles, Chicago, Detroit, Boston, Philadelphia or New Orleans. The definition of their particular functions demands much more detailed analysis of their economic base.

Special cases may be found in those countries where the transfer of the capital, or sometimes the creation of the new one has taken place: Australia (Melbourne and Canberra), the United States (Philadelphia and Washington D. C.), Canada (Quebec and Ottawa), the Soviet Union (St. Petersburg and Moscow), Turkey (Istanbul and Ankara) or Brazil (Rio de Janeiro and Brasilia). There – at least for a certain period after the change – the old capital has to be included among the main urban centres but in the large majority of such cases the position and functions of the old capital fade out fairly quickly. Such systems should be therefore considered only as transitory ones. However, in few cases special stabilized relations and shared functions do emerge, as for instance in the USSR after 1918 between Moscow and Leningrad (the new name for St. Petersburg).

On basis of the theory of central places the system of main urban centres could be defined, to include along with the capital all hierarchical central places of the next rank; however, such a system would have a low level of coherence – the basis of its existence depending on an accepted territorial division of labour. It would be a system arising out of friction in space (as expressed by the costs of transport) and in modelling of relations between those central cities, linear functions would be probably sufficient which in turn would not justify the use of the systemic concepts and analysis. To avoid such limitations, including the dilution of the concept itself, the system of main urban centres should be – in my opinion – defined not only by the territorial division of labour but by the social division of labour in general. Also, the inclusion of a city into the system should be based mainly on the unique, specialized functions. We return here to the situation where the functions of a capital were or are split between several cities. Perhaps it would be better to identify these functions as urban ones at national level and not as the capital functions. The situation is now reversed – the concentration of all such national functions in the capital city may be considered as an exceptional, special case, leading up to strong dominance of the capital city. In such countries the system of main urban centres would be reduced to one element and could be considered as non-existent.

Such definition of the system as discussed here does not exclude the possession by the main urban centres of regional central functions of the highest rank along with their specialized national functions. These may strengthen their role and position within the nation-state.

With such assumptions and definition it is obvious that the size of the country itself as well as the level of the obtained social and economic development have a very important, even decisive impact on the growth and transformations of the system. With bigger and more developed countries their systems of main urban centres become larger, more

numerous and more complex. From the reports prepared for the countries largest in territory: the Soviet Union, Canada, the United States, Brazil, Australia as well as India (and probably China), one conclusion may be drawn. All of them have a well developed, complex and easily identifiable system of main urban centres.

It is interesting to note that all these countries (with the notable exception of India) possess large reserves of land only very extensively used if not completely uninhabited. Indeed, their history is one of successive growth and transformation of the whole system with new urban centres of national importance emerging and added on the moving settlement frontier and with constant adjustment in functions and social division of labour between the cities forming such system. These processes are especially well described in the reports on Australian and Canadian settlement systems although the successive developments are different in each case. In Australia, the development of a coherent national system takes place in the form of progressive integration into a system of the existing macroregional urban centres (state capitals) while in Canada the new centres are added and the national functions readjusted as the whole nation grows and transforms.

The case of India is different. There, the system was developed earlier but with the gain of independence the unity and integration of the system are increasing. At the same time the passage from typically colonial pattern to unified internal one may be easily distinguished.

It is interesting to trace certain similar phenomena in countries of smaller territories – such as are found in Europe and among other more developed countries in general. Clearly not all countries of this scale possess equally developed and integrated systems of main urban centres. The easiest ones for identification are in those countries where the political unification out of smaller feudal states and domains was historically late. Such was, for instance, the past of Italy, Germany or Czechoslovakia and Yugoslavia. The case of Poland was only a little different – the country being divided first politically and later economically between three political empires throughout the whole 19th century. In this case the system is growing by integration out of a series of macroregional capitals and reestablishment of the former national capital. At present, the dominance of the capital is strong only in its political functions, with economic, social and cultural ones playing only a subsidiary role. Similar, though not identical structure (already described earlier) is found in the system of main urban centres of the Federal Republic of Germany, as well as in Italy (Rome against Milano, Naples, Firenze, Torino and Palermo), Czechoslovakia (Prague, Bratislava, Brno and Ostrava) and Yugoslavia (Beograd, Zagreb, Ljubljana and capitals of other federal republics). Opposite case is represented by France where at the first glance only Paris may be ascribed to the system, perhaps with a weak addition of Marseilles and Lyons unless – by lowering the standards – we shall include the regional capitals, especially the so-called 'métropoles régionales' or 'métropoles d'équilibre'. The argument is rather strong – disparities in size and functions are really large; the system would become more as one intended or planned than as it really is.

Another basis for the development of the system of main urban centres in smaller countries is strong differentiation and diversification of geographical, natural environment, especially where such differences create obstacles to free movement or transport and, generally speaking, in the diffusion of people, goods and information. Along with such regional differences derived from the geographical environment there are others created by man. Such are those resulting from national, cultural and religious divisions. Very often these are subtly intertwined together with the natural ones. Cases of Spain, Italy, Yugoslavia, Czechoslovakia may serve here as examples of systems derived and persisting because of just such divisions. These may be resolved either by the coexistence of several, competing urban centres with similar national functions or by the diversification and specialization of various centres within the national or state framework. With greater social and economic integration the second form seems to prevail.

In the later stages of social and economic development, with polarization of the national space specific forms and structures develop within the system which J. de Boudeville (1974, publ. 1978) called 'polarized regions' (i.e. internally divided into urban and rural areas) and 'urban regions' (i.e. great areas more or less continuous with urban and high population densities and with large employment in industry and services). When several of the main urban centres are located within this last kind of 'urban regions' their integration is much stronger and they tend to coalesce and to transform into a settlement complex which in the lack of other term may be called the core area of the system of main urban centers. Such core is internally polynuclear but as it usually strongly dominates other main urban centres it forms a separate urban subsystem, which externally, i.e. in relation to the whole system, is mononuclear.

In developing or less developed countries a system of main urban centres usually emerges and transforms differently. Again there are differences between countries whose territories are already fully and intensively used and those who still possess large tracts of uninhabited or only sparsely inhabited land. However, on the whole, at least at present, there already exist some elementary forms of the system of main urban centres based on the main nodes of transport and closely connected with the political and administrative organization of the country. As already mentioned, such systems are weak because they represent nothing more than the highest levels of the hierarchical system of central places. When the process of economic and social change begins to take momentum the importance of national capitals is so quickly increasing that the whole balance of the system is heavily taxed and the dominance of the capital becomes very heavy indeed. It is only in later phases that the strength and growth of secondary, macroregional centres increases, sometimes too late to counterbalance the overgrown capital. It is really only through the emergence of specific, industrial regions, growing due to processing of local or regional resources, usually the mineral ones, that such additional centres are able to establish their claim to the participation in the national system. Such development forms clearly the basis for the functional social division of labour between various centres and regions increasing in this way the possibility and the need for a system of main urban centres. Obviously this last system may be totally or partially different from the original system based on transportation and administration. The continuous raise in the living standard, consequent to the social and economic development, exercises some additional impact on the formation of the system. Certain services which so far were unique and closely cennected with the capital have to proliferate and to provide for larger number of inhabitants – they multiply and divide. This devolution of services increases the functions of lower hierarchies of central places, particularly of other main urban centres. The establishment of new universities and colleges is in many countries a good example of such phenomena.

The impact of industrialization and the role of industries in the emergence, growth and existence of systems of main urban centres have already been mentioned several times. It is quite obvious that in the early stages of modern economic development industrialization is the major if not the only really important factor in the urban growth. It is also clear that main urban centres (considered in their total territory as urban agglomerations), together with more important mining areas, are the most attractive places for industrial locations. They represent the best transport and communication links, very large markets of labour force, especially of qualified labour, an easy access to research institutions as well as the largest – in their countries – centres of consumption. It is only when the cost of land and technical infrastructure in very large and highly concentrated agglomerations cancel such advantages that the movement away from these centres begins. Even then the most advantageous locations are still in their vicinity, leading only to the enlargement of their territory. As a result the main urban centres are the strong points in the industrial concentration. The question whether there exist some specific linkages between the industries located within the system of main urban centres

has not been studied in detail so far. The position is not clear whether the very large transfers of products and goods existing between these centres (in fact the majority of flows are taking place between the transport nodes associated with such centres) is only a reflection of the structure of transport network, a statistical, stochastic consequence of their high economic and social potential or a reflection of characteristic relation in production and consumption. In some fields (e.g., in publishing) such relations in form of specific patterns are known and may be easily demonstrated – for others the full information is simply lacking.

Another observation should be made here. The main urban centres serve as the collection and distribution points for their macroregional hinterlands. To a certain extent they represent their whole regions in the outside world.

Even this short review of the industrial impact on the system of main urban centres indicates the need for a different approach to its definition. The main urban centres are in fact places where the national economic and social processes change into the regional ones and vice versa, the regional processes transform into the national ones. In such a definition their functional unity at the national level is well expressed as well as their position and role in relation to the economic and social environment of the whole country – nation and for the state.

This definition also well expresses the observed interdependence between the size of the national territory and the existence, complexity, integration and the stage of development of such systems.

So far discussing the systems of main urban centres we assumed that the number of such centres is clearly and univocally established and they may be identified by an analysis of their functions and linkages. However, in reality these systems are widely open and change continually over time.

There are even cases when individual cities are on their way either into or out of the systems. This creates specific difficulties in analysis, especially in time analysis of such systems. Some authors raise doubts on this basis about the usefulness of the concept itself. For me this implies solely that the concept should be considered as a dynamic one and it should be used dynamically. The system should be treated as continually evolving. After all, the whole national community, its economy, social life and development, its culture are in a permanent flux.

The acceptance of such approach and of the concept of evolving systems introduces the possibility of identification of specific, successive stages or phases in the development or evolution (a better word) of such systems. In fact we have already discussed several times such stages, tacitly assuming what now is stated explicitly. Let us try now to bring some kind of formal systematization into the so far haphazard comments.

Obviously, the growth and transformations of a system may involve changes in the number of main urban centres (e.i. elimination of the existing and/or addition of the new ones) as well as in their functions. They may represent the progressive concentration of functions in fewer centres or involve devolution – spreading of such functions among larger numbers of cities. They may be simultaneous and sudden, therefore revolutionary, or successive and evolutionary.

Simultaneous, sudden changes are usually a result of some historical event of great general significance: gaining of independence, break of an empire, change of the national territory; the evolutionary changes are usually connected with processes of socio-economic development, in our times with industrialization and urbanization as well as with the technological progress.

To define the historical stages or phases in the growth of a system of main urban centres, some theoretical approach to the general settlement system, and to its development are needed as naturally such stages may be defined only within the framework of a wider theory.

If we assume – there are no special objections or difficulties in doing this – that

human society progresses through the ages socially and economically, that such progress implies also the growing intensity and complexity of settlement in general and of urban setlement in particular and that growth of settlement and its various patterns are closely associated with successive socio-economic formations, then it is easy to state that the emergence of systems of main urban centres takes place in later stages of the social development, within the framework of the prevailing socio-economic formations. In fact, if we omit the early systems representing solely the political and administrative organization of the older states – it may be said that the widely spread existence of such systems is characteristic for the modern times and developments. It seems that a prerequisite condition for the emergence of such systems is the establishment of national, strongly integrated states. A system of main urban centres is born out of and is superimposed on the pre-existing general settlement, particularly on urban system, only in countries nationally well defined and unified.

On basis of the reports received and information gathered in the work carried out within the Commission of National Settlement Systems of the International Geographical Union it is possible to define several distinct ways in which such systems are historically formed. Either there exist a number of cities of similar size and functions whose interactions converge towards the formation of a system or there is one city – the capital – which by devolution enters into systemic relations with other cities. And there are also special cases when the birth of a system is parallel to the extenstion of the frontier settlement, i.e. to the colonization of new, so-far only sparsely inhabited and developed territories. There the system is developed by implanting the new centres either in an evolutionary way or by planned, simultaneous effort. But in such cases the creation of a system is not superimposed on but precedes the growth of other cities and settlements.

The first way seems to be one taken by Australia, Italy, Poland, Western Germany, Yugoslavia, India; the second by France, Hungary, Sweden, Denmark, perhaps Spain and Portugal, and the third one by the United States, Canada, the Soviet Union and Brazil. The ascriptions are tentative – I would like them to be supported by geographers knowing the problems of these countries much better than I do.

So far this analysis tried to describe solely the first stage – the genesis of the present-day systems of main urban centres. The next and later stage is concerned with changes taking place in already well-developed and defined systems. The main changes are then connected either with growing integration, i.e. with the increasing division – allocation of national functions between the individual cities or with the development of new additional functions and changes in the allocation of national tasks between various parts of the whole country – various regions. This does not mean that there are not active forces working for the retraction and stronger concentration but that so far as the systems of main urban centres are concerned in the great majority of cases, devolution and dispersal are now prevailing. Naturally, changes due to the new investments and developments make the strongest impact. The reports received from such countries as Canada, the United States or the Soviet Union present in this field some extremely interesting and impressive materials.

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However, the basic question: how to analyse and how to measure these systems of main urban centres still remains to be discussed. In my opinion such analysis should not differ very much from analyses carried out for any other settlement systems although probably it should be more limited in scope but at the same time more concentrated on the leading, essential aspects of the problem.

It seems that there are three basic directions of research to be followed: (1) studies

of the functions of main urban centres with special stress being laid on those functions which are considered to be characteristic for the centres belonging to the system; (2) studies of linkages between such centres – especially in form of transfers of people, goods and information; and (3) studies of population structures and dynamics. The first two are obvious – they deal with elements of the system and their interrelations; the third one is different. Its importance lies in the fact that in this field we have comparatively easily accessible, very rich statistical data, viable even for more sophisticated methods of analysis and comparison, although often only indirectly pertaining to the general aims of research into the systems of main urban centres.

The methodology of studies on functional structure of cities is well developed and there are some established, standard ways of analysis. In particular, the methods for the identification of specialized functions were formulated and tested in research carried out in the Institute of Geography and Spatial Organization of the Polish Academy of Sciences. They may be easily applied to the cities considered to be the main urban centres. However, such specialized functions once identified have to be analysed further whether they are of national importance and scale or closed within the system of main urban centres. In such analyses data on employment were mostly used but in some cases other data (although more difficult to obtain) such as value of production surplus, value added were also used – the latter being limited to the field of productive functions. The whole problem of population statistics versus other data is one in which the choice has to be made between what is easily accessible and fairly dependable and what is theoretically much better but is usually difficult to obtain and turns out to be very often extremely unreliable (e.g, question of prices – artificially fixed and changing under strong influence of continuous inflation).

As far as the linkages are concerned again the population statistics provide the best materials, especially in countries in which data from the well-organized population registers may be used. With transfer of goods, measurement becomes again rather complicated and difficult. Easily accessible transport data are concerned usually only with the weight of goods transported, with their value completely omitted in most cases. Then the statistics are available only for certain means of transport (by rail and by air) and for others (i.e. road haulage) they are practically non-existent. With rapid growth of transport served by road traffic the problem becomes very serious.

The study of population structure and dynamics is in the end the easiest to carry on and in large number of cases the only one really possible. Rather detailed studies carried out for Poland have shown that the structure and dynamics of a system of main urban centres comes out in such studies fairly clearly. This is partly due to the fact that flows of population to and out of those centres are characteristic and significantly different in directions and structure from flows generated both by other urban centres and in rural areas.

In consequence these studies, although they to not cover all aspects of the problem for an active and developing system (some of them are hardly touched on and most of them only indirectly), nevertheless give a good insight into the structure, dynamics and problems of those systems. An important improvement in their implementation would be to widen them by including relations between age and sex, profession and education. Recent studies indicate large variations in the directions of migrations deriving from the education and professional status of migrants.

The already mentioned approaches to the studies are not the only possible ones. Many other suggestions for research have been or may still be made. Some of them deserve a mention here as they introduce new vistas and areas for studies. For instance, the role of scientific institutions of a given country in the diffusion of scientific information and technological know-how should not be forgotten. Usually they are concentrated in few places, enjoying the advantages of common location. On basis of the European

experience it may be concluded that in majority of countries – with some notable exceptions – these institutions are located in the main urban centres. Therefore their location may be used for the identification of these centres.

Another such question is the importance of main urban centres in generating and receiving the tourist movements. Although the position that it is not the proper function of main urban centres only but of all largest concentrations of population (in form of urban agglomerations) may be defended but the national importance of the main urban centres still plays here an important role. Again certain Polish studies suggest that the majority of tourists coming in search of physical recreation to tourist and resort areas are recruited among the inhabitants of the largest cities and – a surprise – that the volume of tourist flows to and between the main urban centres is much higher than one to the mainly rural recreational areas. Of course this traffic is not connected with the physical recreation but with cultural activities and sightseeing. In addition the data both for the tourist movements and for the scientists' migrations indicate that a very high mobility is a significant characteristic for the inhabitants of those centres. In this case an analysis of tourist movements may illustrate the role of main urban centres – the meeting places for the inhabitants of the corresponding regions in forming together a framework for the cultural life of the whole nation.

This review of concepts pertaining to and problems connected with main urban centres seem to show convincingly that the system of such centres represents well an important phenomena in the national settlement systems of numerous if not of all countries. The concept itself is useful for its analysis as well as for the further development of the theory of settlement systems and – in particular – of urban geography.

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# THE SETTLEMENT SYSTEMS OF VIRGIN LANDS

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The settlement process is enormously complex. A very broad approach to the topic, extending across all the continents through the recorded past, would embrace all of human geography. Even a limited empirical comparison of settlement systems would require several volumes. The discussion to follow is simply a series of hypotheses, drawn from the geographic literature, about the recent development of settlement systems in previously unsettled (virgin) territories. It is arranged into five sections: the definitions which constrain the discussion, the motives for settlement, the spatial imprint of development within the virgin lands, the impact on the source region, and some of the future trends and issues.

## SOME DEFINITIONS

Virgin lands, or frontier regions, lie outside the ecumene or intensively settled areas of a country. If there is an indigenous population, the population density is very low, less than one person per square kilometre, as compared to a typical agricultural density (in North America) of five to ten persons per square kilometre. It is assumed that the spatial pattern of infrastructure in the form of transportation routes, settlements, military and administrative centres is essentially unfixed. In the context of this paper and indeed in the North American usage of the term 'frontier' there is also an assumption of process – of development or becoming. The frontier is not a passive periphery, marginal to the main thrust of the nation's development, but is itself the scene of significant change and evolution, and in some instances the frontier plays the central role in national growth.

As one goes back in time the number and diversity of examples of frontier settlement process grows. For instance, it is possible to describe the initial invasion of the Americas across the land bridge from Asia, over the last 15 000 years. Wallerstein (1976) has written brilliantly of the simultaneous outward expansion and internal specialization of the Europe-centred world economy in the sixteenth century. Meinig (1969) describes the international expansion of the European nations into other continents since that time.

In this paper, however, the discussion is restricted to the settlement processes of the last hundred years. From the middle of the nineteenth century frontier expansion in all continents has shared a common technology – rail, mechanization, high energy consump-

tion, similar forms of national and international economic and political organization, and large, well-integrated world commodity markets. In addition the prevalence of national census organizations and annual indicators of economic growth has provided some well-documented examples of the settlement process.

The necessary collorary to these definitional restrictions is that the areas concerned be either inhospitable (in climate and for agriculture), or inaccessible, or both. Recently settled frontiers are areas which were unable to attract or support a high density subsistence economy and as will be argued below, are largely dependent upon a particular technology or a single commodity. As a result they are vulnerable to nature, to changes in technology or in market conditions. Perhaps the ultimate example of a contemporary frontier development is Las Vegas in the United States – a city of 300000 people located in the desert almost 500 kilometres from Los Angeles, made viable only by means of a massive hydroelectric development (Hoover Dam) to provide water and power for air-conditioning, and maintained solely by a political fluke – the limitation of legal gambling in the United States to the State of Nevada. Las Vegas illustrates the dependence and the uncertainty that stem from the limited advantages of frontier areas. While it lasts Las Vegas is also a symbol of wealth, power, and consumption – the triumph of man over nature.

A continuing example of the imposition of a new settlement pattern on virgin territory is provided by North America. The overall development of the urban settlement system in the United States is described by Borchert (1967) while the expansion of the Western frontier has been summarized by Bowman (1931), and Billington (1967). In each study the emphasis is placed on the continuity of the settlement expansion over three centuries. Canada proceeded on a parallel course. The urban growth is evaluated by Simmons (1974), the Westward movement is detailed by MacIntosh (1934), and Spelt (1955) has written a fine case study of early frontier settlement. In the last three decades mining activities have extended the frontier far beyond the limits of agriculture.

The development of the Australian settlement system is not unlike North America, as Mikesell (1960) suggests, and as documented by Meinig's (1962) case study.

The settlement of South America has been somewhat more complex, extending over a long period, involving well developed empires of indigenous peoples and proceeding with major temporal discontinuities. No single reference pulls it all together, but Morse (1962, 1971), Friedmann (1965), Beyer (1967) and Katzman (1977) provide an introduction. A central theme in South America is the domination of frontier development by urban nodes. "The Latin American city was the source of energy and organization for the exploitation of national resources" (Morse, 1962). Frontier development in Africa is more limited in space and time because of the significant pockets of pre-colonial population, and the diversity of colonial administrations.

The USSR provides examples of almost every variation of frontier settlement – agriculture expansion into nomadic regions, northern colonies imposed on stark landscapes, as well as the extension and expansion of activities practiced by indigenous populations (Armstrong, 1965; Hooson, 1966). What is most remarkable, though, is the magnitude of recent expansion in the post-war period, and the agricultural basis of that expansion. The 'virgin lands' projects involves an area as large as the entire Canadian ecumene. Only Brazil can approach the magnitude of this recent expansion.

## THE SETTLEMENT MOTIVE

The expansion of settlement into an unattractive and inaccessible area requires initiative and capital which can only come from previously settled regions. The incentive comes in large part from the demand for a single primary commodity or staple which provides the basis for organizing the settlement process. Occasionally frontiers are settled for mili-

tary reasons, for national prestige, or as a sop to internal population surpluses, but by and large these goals cannot generate the capital required to impose a settlement pattern upon a large and inherently hostile region.

The essence of a frontier region is its relationship with the source or previously settled region. This relationship defines the rate and direction of growth, and the specialization of production: in fact, virtually every settlement attribute stems from this dependency. The main element of the relationship is the level of demand, defined as the price and/or quantity required of the staple product. Demand is notoriously erratic in both the long run and short run. Over the centuries virgin lands have been explored and developed (or abandoned) for the sake of gold, fur, timber, grain, petroleum and uranium and many other commodities. Even within the complex world economy of the present, violent fluctuations in commodity prices occur, creating considerable risks in frontier settlement. Price changes, on the one hand, and the uncertainties of the productivity or exhaustion of the local resource base on the other, require a high level of expected return on investment.

Who is the investor? On the one end of the spectrum we have the almost mythical frontiersman pitting human capital against the wilderness – more as a way-of-life than in hope economic gain. The uncapitalized individual is most characteristic of 19th century agricultural expansion, but is also recognizable in the solitary prospector and the seasonal woodsman. But as other commodities replace agriculture, and agriculture itself evolves through time, the corporate investor replaces the individual. The settlement process is rationalized; and profitability in a world market becomes a major consideration, albeit within certain institutional constraints. The ability to manage a political situation, stability of supplies and markets, and controlled expansion are also significant factors in corporate decisions as Galbraith (1967) has argued. The saga of "the seven sisters", the major international oil corporations (Engler, 1977) displays these characteristics clearly. The absorption of individual producers into an oligopolistic structure, the rapid expansion into international cartels, the careful alliances with political systems, the manipulation of prices, sources, and taxes are characteristic of the corporate settlement process throughout the non-socialist world. For instance, it has been pointed out that these oil companies in their forecasts of world energy supplies have simply dismissed potential sources to which *they* (the companies) did not have access. Corporate settlement decisions are still the mojor factors in virgin land development throughout the world – in fishing, in mining, in energy exploration and in expansion of the agricultural margin – the agricultural counterpart of the oil companies are *the Merchants of Grain* (Morgan, 1979). In many cases these corporations alone have the requisite expertise and capital for investment.

Currently, their main competition comes from the nation state itself (Table 1). Both the individual settler and the corporation have depended in the past on the implicit (political, military) and explicit (transportation infrastructure, economic aid to settlers, tax write-offs) support. Today in socialist countries, and increasingly in other countries, the geopolitical and social implications of commodity flows are so great that national goals have been superimposed on the economic motives. To the extent that nations participate directly in the frontier development process, or intervene in corporate actions new sets of uncertainties due to political instability are introduced. In America frontier expansion at various times has been closely tied to particular political parties, or individuals – to be accelerated or repressed according to the fortunes of politics. More recently we observe the expansion and contraction of commodity production with changes in political leadership in Africa, China, the USSR, South America and the Middle East.

Technological change frequently tips the balance in the equation of investment costs and development returns. Borchert (1967) has described the frontier expansion of the United States in terms of transportation and of the new staple demands due to industrial growth. More recently the impact of new exploration techniques in the Arctic and on the Oceans are apparent. Fogel (1964), in contrast, points out the possibility of substituting different technologies within a frontier region. Perhaps the major overall

TABLE 1. Implications of settlement initiatives

| | Motive | Source of capital | Ultimate subsystem aspiration | Characteristic staple | Spatial pattern | Settlement system | Timing |
|---|---|---|---|---|---|---|---|
| Individual Settler | Life style | Human capital, reflects alternative opportunities | Regional autonomy | Agriculture (low capital), gold | Coterminous diffusion, reflecting accessibility variations | Hierarchical, reflects access to source | May be exactly out-of-phase with growth of source region |
| Corporate Investment | Profit, growth, control | International financial markets, internal profits, depends on potential returns | 'Colonial' specialization within world economy | Mining, energy, forestry | Nodal, single purpose | Primate, with minimal intermediate nodes | Reflects market expansion, corporate goals |
| Nation | Growth, self-sufficiency, military goals | Taxation, borrowing; fluctuates with national economy | Integration into national economy | Any of above | Multipurpose, builds on preexisting administrative structure, prefers complex networks | Decentralized in concept, primate in execution; preference for new urban sites | Five year plans; changing public priorities |

importance of technological change is to add to the uncertainty in the timing and location of frontier expansion. Suddenly a whole new region becomes accessible or a resource deposit becomes viable; even more suddenly a resource discovery or technical innovation elsewhere in the world makes a planned development untenable.

## THE PATTERN AND PROCESS OF SETTLEMENT

The frontier region develops through time, in what can be termed stages; despite their essential continuity of process and their erratic temporal sequence (Table 2). *Exploration* is the prerequisite to investment. It leaves little physical imprint on the landscape because of the low levels of capital and labour involved, but the distorted impressions that emerge from this stage may affect development decisions for generations afterward. For instance, the initial impressions of the American West have been documented in Blouet and Lawson (1975), and Allen (1975) has written a fascinating account of the process of exploration itself (the Lewis and Clark expedition) in

TABLE 2. Dimensions of frontier settlement variation

*Scale*
- Absolute size
- Relative to national system

*Stage*
- Exploration
- Development
- Integration

*Spatial Distribution*
- Concentrated/Dispersed
- Coterminous
- Permanent/Temporary

*Links to Source Region*
- Number
- Magnitude of Multipliers

*Locus of Control* (see Table 1)
- Individual Settler
- Multinational Corporation
- State

*Economic Specialization*
- Number of Primary Products
- Degree of Forward/Backward Linkages
- Spatial Production Function
- Enduring/Transient

*Source of Population*
- Nearby Regions
- Immigration
- Transient

*Dependency*
- Colonial
- Integrated
- Autonomous

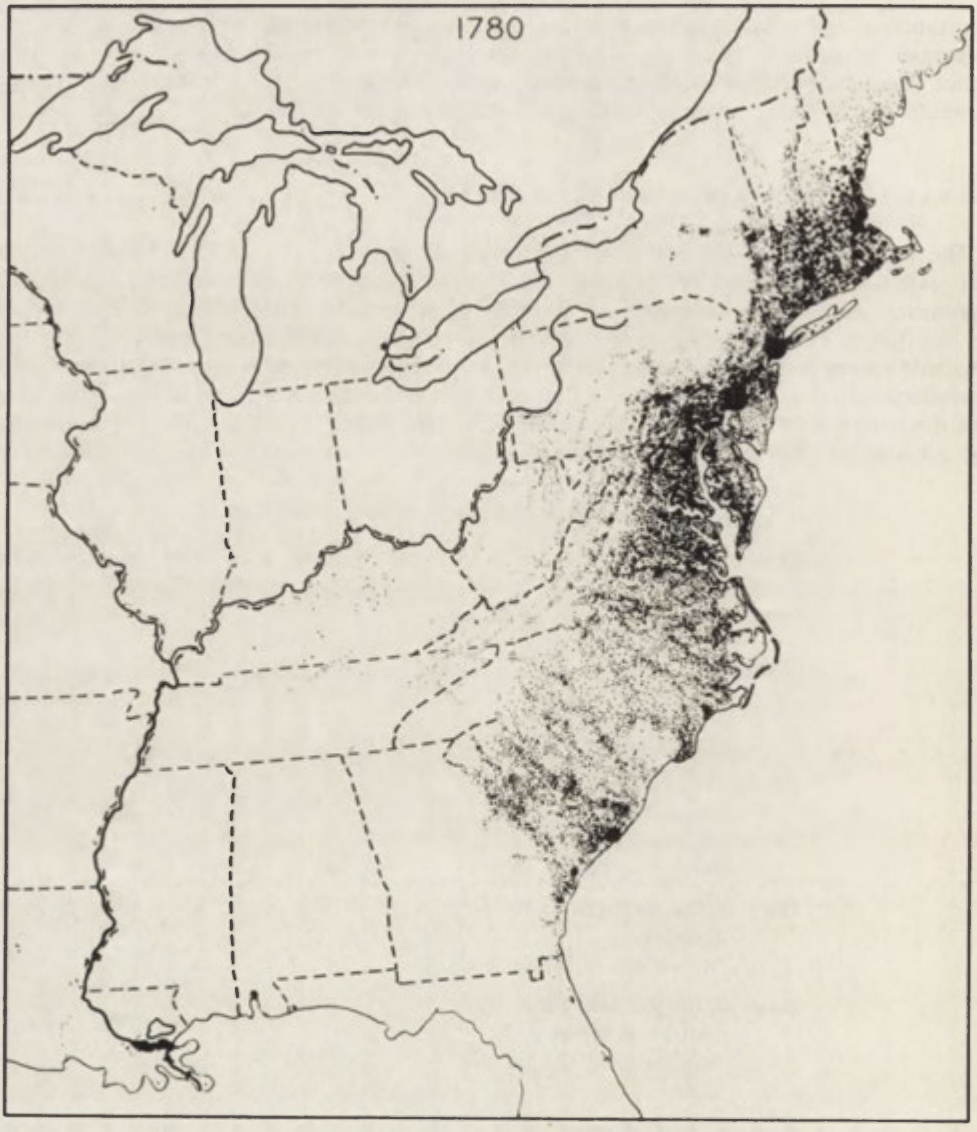


Fig. 1. Patterns of individual settlement: The U.S. until 1780
Source: Friis (1940)

the face of great uncertainty. In the last fifty years the airplane, the sophisticated survey instruments of geophysics, and more recently, space satellites, have accelerated the pace of exploration and reduced the bias due to variations in human observation and interpretations. The simple physical characteristic of accessibility which dominated frontier exploration a century ago has now lost its relevance.

In a frontier created by individual settlers, the line between exploration and the *development* initiative is almost invisible; some individuals push ahead, others follow. The spatial sequence of settlement follows the contour of accessibility along the coasts and up the rivers and valleys (Figure 1). Only the desperate pursuit of gold can overturn this spatial logic. In California, the Canadian Yukon, Australia, New Zealand, and

South Africa, the discovery of gold has generated almost instantaneous settlements in highly improbable locations.

The major development thrust, characteristically lumpy in space and time, is more typical of corporate initiatives. The goals are limited to the success of a particular scheme, without necessary connections with previous or future developments (which may

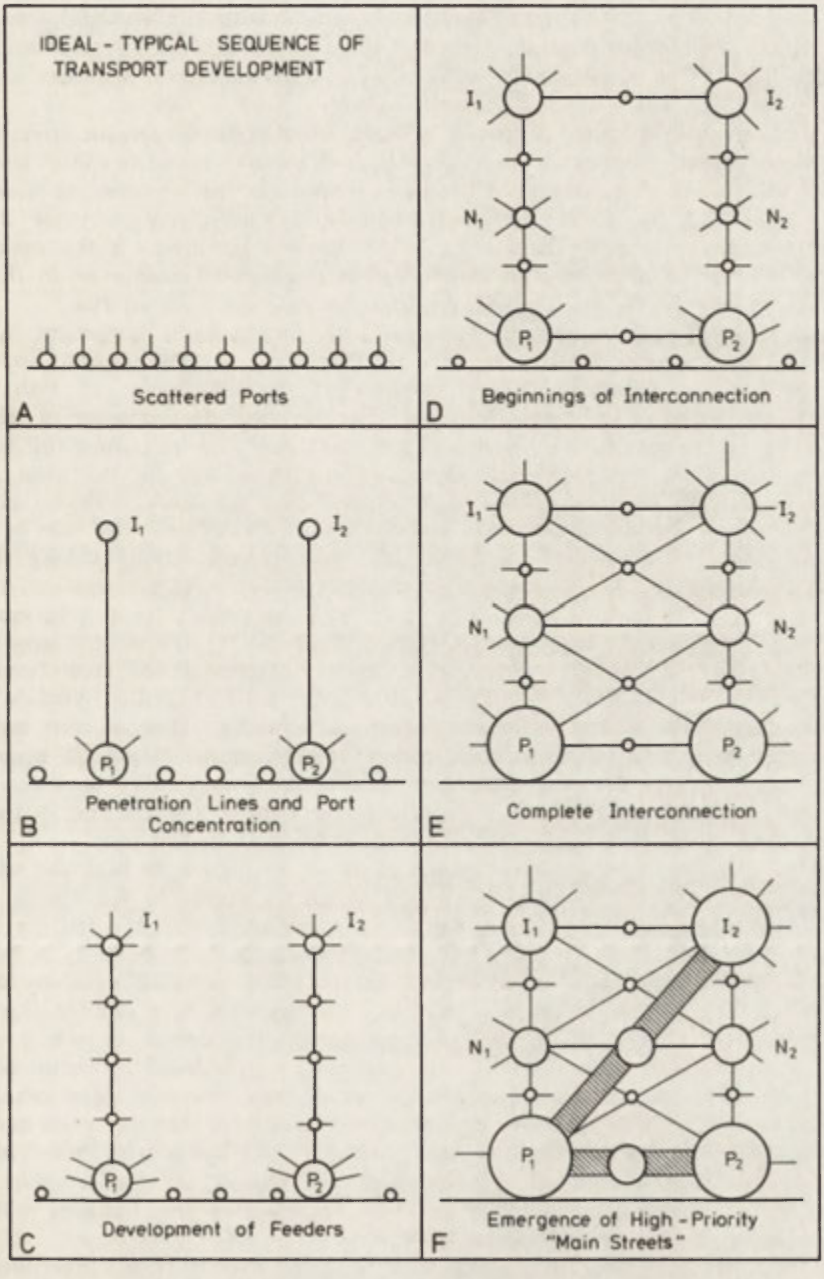


Fig. 2. The sequence of transportation development
Source: Taaffe, Morrill and Gould (1963)

belong to competitors): for example, the canals, the railroad companies, the mine with its associated infrastructure. In a frontier dominated by these initiatives the path of development is particularly uncertain. A sequence of projects and complementary activities can lead to diversification and perhaps integration with the national system, but equally probable is an uncoordinated sequence of similar but competitive investments, or even abandonments. The bleached bones of failed developments are evident everywhere in North America. The sequence leading to integration with the national economy is portrayed by the well-known generalization of Figure 2, from Taaffe, Morrill and Gould (1963). The diagram is based on African colonial sequences, but also duplicates the observations of Spelt (1955) in 19th century Ontario.

National development plans, on paper at least, usually emphasize the diversification and integration of the frontier as part of the development initiative. One investment should lead to another in a systematic fashion. In practice such plans are more often abandoned than not, as political goals evolve and prestigious activities are preferred to the merely practical. The essence of all frontier initiatives is the uncertainty: the vulnerability to the unanticipated, either within the frontier region or in the larger market which it serves. All development decisions in such areas entail risk.

The final stage of full economic *integration* with the national settlement system is not inevitable. We observe frontier regions at all stages of development, and lasting for indefinite periods. Gilmour (1972) has recorded the integration of 19th century Ontario in some detail, as the staple resource – in this case the sequence of lumbering and agriculture – generates forward and backward linkages, and leads to a full hierarchy of service centres. Over time, the basic thrust of growth is transformed from a single external market for a single product, to a largely local economy, able to evolve in conjunction with the world economy and technology. In the process the rate of growth becomes less erratic in time and in space, and the interconnections among locations and sectors multiply.

What of the urban subsystem in this sequence? In most recent frontiers urban centres have led, rather than lagged development. Wade (1959) and others have pointed out that even in the 19th century agricultural frontier the capital and institutional (land registration, justice) requirements of independent settlers were sufficient to generate sizeable urban places before the actual settlement advanced very far. This is even more true of larger corporate investments with their higher capital inputs, based on major ports and "jumping off" points. National initiatives place a particular initial emphasis on the administrative hierarchy of cities; but often attempt to impose new centres, in the hopes of redefining the spatial structure of the frontier, or at least its life style.

The characteristic frontier urban subsystem is shown in Figure 3a with the subsystem dominated by one or two primate centres, determined by access to the source regions. Flows of labour, capital and supplies move down the urban hierarchy, and the product is returned by the same route. Innis (1936) traces out the peculiar patterns of economic diversification which can build on an imbalance in trade or transportation capacity.

The process of economic integration may lead to any one or a combination of the patterns recorded in Figure 3b, c, or d, depending on the degree to which a stable staple producing economy such as agriculture emerges, or is replaced by industrial capacity; or moves back and forth with a succession of new resource developments and technological renewals. In Canada, for instance, the evolution into an integrated industrial economy as recorded for Ontario by Gilmour (1972) has simply never happened in the West – much to the dismay of that region – and in the Eastern part of the country an incipient industrial development was reversed as the linkages with more efficient producers in Ontario were strengthened.

Within the frontier region itself Baldwin (1956) and North (1961) have noted the variety of settlement patterns which derive from the various staples, in particular the contrast between the plantation-based cotton economy of the Southern United States;

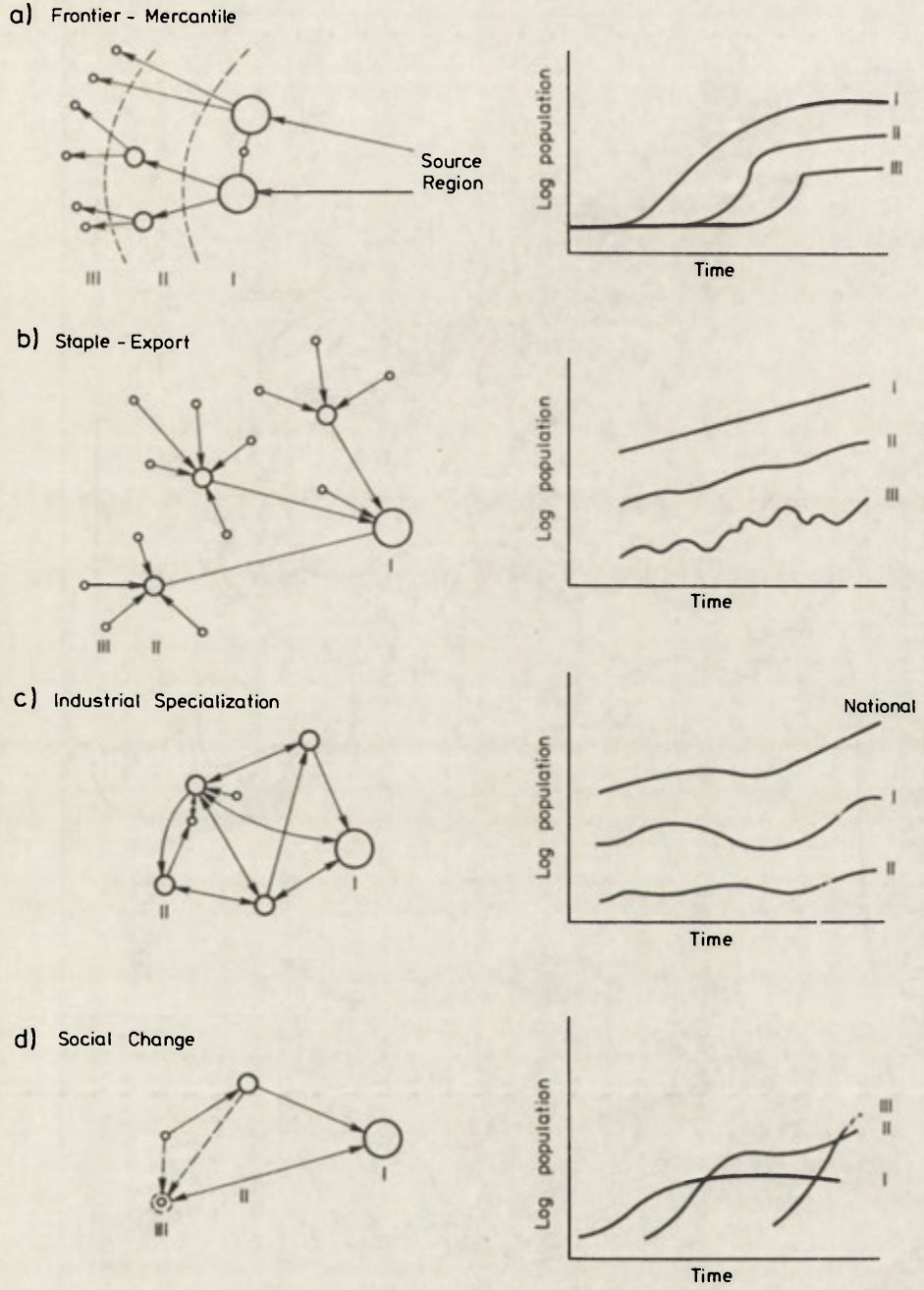


Fig. 3. The organization of urban systems
Source: Simmons (1978)

and the mixed agriculture of the Mid-West (see Fig. 4, from Borchert 1967). In the first instance, virtually no cities emerged during the settlement period beyond the ports which shipped the product. In the latter case a full range of Loschian settlements arose.


Fig. 4. Alternative urban subsystems
Source: Borchert (1967)

One could further contrast a coal-mining region, with its accompanying industrialization, and an oil field which leaves relatively little imprint. The amount, quality and distribution of labour differ; as do the allocations of returns to factors of production, and the spatial distribution of resource activities themselves. Meining (1972) and Warner and Fleisch (1977) also emphasize the layers of cultural variations that can occur within the general process of development.

## THE IMPACT ON THE NATIONAL SETTLEMENT SYSTEM

Turner (1920) attempted to interpret the whole path of American historical development as a response to the continuing existence of a frontier, and Webb (1952) has extended the theme to other continents. The demands of the world economy and the various colonial adventures have frequently played a prominent role in national development (Brookfield, 1975). At least four considerations affect the relationship between frontier and national urban system: the magnitude of the frontier region and its development relative to the nation as a whole; the source of the labour, capital and technology inputs; the nature of the resource base itself and the 'track' it leaves enroute to market; and finally, the spatial dispersion of the resource.

The size of the frontier region relative to the rest of the country does not simply refer to the relative level of population or economy but to the importance of the growth or change stimuli occurring there relative to the whole range of growth processes going on in the nation as a whole. Although a frontier region may contain less than one per cent of the population, it can absorb fifty per cent of the population growth, perhaps eighty per cent of the immigration, or sixty per cent of the new capital investment. New energy developments – as in the North Sea – can potentially reverse the growth trends of a national or even international economy. Historians dwell on the way that the frontier and its symbols – the man-land struggle, or the individual (U.S.) or collective (Israel) life style – can dominate a culture. Again this is more likely to be the case for a small country with a simple economy.

If the frontier activity is relatively large, and significantly different in character from the rest of the national system the differences may be amplified as the region grows and is partly integrated into the urban system. Often the development of the frontier requires immigrants from outside the urban system. North American frontier regions are marked by concentrations of various immigrant groups depending on the time of settlement and the flow of migrants from Europe. Famine in Ireland, repression in Central Europe, and religious persecution have altered the national cultures of Canada and the U. S., Australia and South America.

The impact of foreign capital/technology is less visible but often more lasting. An American oil firm or a British plantation can modify life styles and alter political structures, leading to permanent modifications of the political organization and economy of the nation. Sometimes the results are chosen by the host country; more often they are enforced; occasionally they are unexpected. The effect of gold in California, oil in Iran and copper in Chile are only three examples of frontier developments with far-reaching implications for the rest of the urban system in space and time.

North (1961) and Innis (1957) have traced the role of the frontier economy, the staple, as the leading edge of the expansion of a national economy. In the United States the cotton economy of the early 19th century; in Canada the wheat trade of the early 20th century (Bertram, 1963) stimulated the growth of the nation as a whole. Trade expanded as the rest of the country produced agricultural machinery, and foodstuffs for the frontier, and shipped the product to market. Financial concentrations emerged in the largest cities to absorb the profits of staples, to smooth over the seasonal rhythms and year-to-year fluctuations, and to fund the extension of the frontier itself.

A particularly important facet of the staple is the path that it takes to its final market. Frontier exports often lead to significant investments in the transportation systems of the previously settled area, and there are many examples of rearrangement of pre-existing urban networks due to differential access to a frontier. To the extent that other inter-regional multipliers exist, such as in staple processing or the provision of consumer services, the impact is heightened. One of the most important recent frontier resources – energy – leaves relatively little spatial impact, however. Instead much of the economic return is recycled through the political system in accordance with the priorities of the preexisting settlement system.

The frontier defines the characteristics and location of the growth of the national urban system. If the frontier lies to one spatial extreme of the nation the whole urban system is pulled in that direction, as has been observed in the westward orientation of the expansion of settlement systems in the new world. If the frontier growth is compact and concentrated around a single node the national settlement system adjusts to the growth of that node; if frontier growth is widely dispersed many different cities in the national system respond (Figure 5). In Canada, for instance, the thrust of agricultural

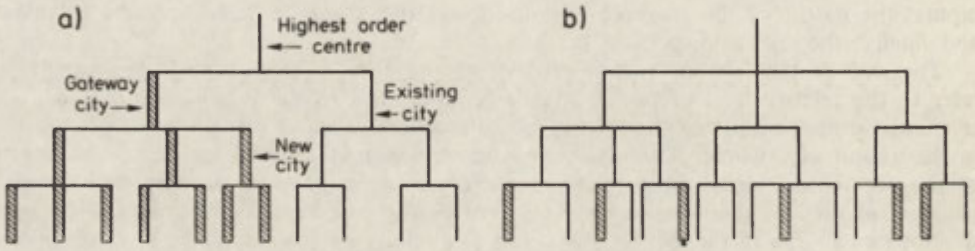


Fig. 5. Linking the frontier to the urban system a – Concentrated development, b – Dispersed development

expansion westward led to an identifiable urban subsystem linked through Winnipeg (the Gateway, in Burghardt's, 1971, term). In contrast, the more recent northward expansion of mining and pulp and paper activities has stimulated many different urban centres across the whole country. In the Western United States, before the introduction of the railroad, New Orleans was a significant gateway; thirty years later a number of urban competitors, and especially Chicago, had taken over this role.

## THE FUTURE

As under-development appears to be the inevitable accompaniment of development (Brookfield, 1975), the resource frontier appears to be an inherent feature of an evolving technology and an expanding world population. Events of the last decade have re-emphasized the significance of primary activities, and their development, in the continuing evolution of the world economy. Substantial shifts in the terms of trade towards energy and agricultural products have occurred. Although these changes tend to emphasize the resource base of geographic regions at the expense of agglomeration (accessibility) technical variations which control industrial development; they have also made explicit the significance of political/institutional structures. In Canada, at least, the frontier development decisions are influenced by native land claims, by constitutional responsibilities of different levels of government, by international agreements, by fiscal decisions about direct or indirect taxes and depreciation allowances, as well as a long sequence of environmental impact evaluations. In this sense the initiatives of the corporation and the state are becoming

more and more closely interwoven. Corporations dance to the music of governmental regulations; but the tune itself is called by corporate investment.

In the long run frontier regions create the basis for conflict among states, and help to define the institutional context within which the state itself operates. A threat of war, a colonial relationship, or a particular structure of federal relationships are fundamental factors in the development of a national settlement system. Each can grow out of a frontier expansion.

Frontier settlements as a means of extending national settlement systems may well be a thing of the past, however. The most recent areas of resource development – in the high Arctic, or on the continental shelves – or ultimately on the deep ocean floor – will not lead to permanent settlement. The ratio of on site employees to output is declining as well. It appears more likely that small groups of workers will commute to the resource sites from established settlements. The major thrust of frontier settlement expansion in the future will come from recreation – the exploitation of sun, beaches, and mountains to meet the demands of a growing afluent middle class, and to fill the leisure time of miners, fishermen and farmers who work in the inhospitable regions.

## CONCLUSIONS

The frontier region as a region of change, often feeding back to alter permanently the character of the source region, is quite different from the image of Friedmann's (1966) periphery, in which a similarly underdeveloped landscape is continually exploited by the core or colonial state which absorbs all of the increases in income and labour. The central difference between the two models is the lack of a large indigenous population within the 'virgin' land of the frontier. In the latter case there are fewer people to share in the returns; as a result the impact of new technology or cultures is magnified, and changes in transporation networks and other linkages are more dramatic. Even when Friedman's periphery is changing or growing in economic activity it often cannot match the growth in indigenous population, or the ability of the pre-existing population and social system to absorb the returns to growth.

If we look at a world atlas we can still identify large regions of the world which qualify as potential frontiers. Something like one quarter of the land surface has a population density less than 1 person per square kilometre; and the ocean is one of the most active resource frontiers at present. For these regions we can state the following propositions:

1. Frontier regions are low in population density, relatively unstructured in terms of transportation or other organizing principles, and in the process of becoming developed.
2. All facets of this development – rate, structure, specialization – are determined exogenously by relations with the source region.
3. The main motive for development is the demand for a particular primary product.
4. The character of the investing institution – settler, corporation, or government – affects the development path and the ultimate degree of integration of the frontier region.
5. Technology and public sector interventions increase the inherent uncertainty of development returns due to commodity prices and natural conditions.
6. Given these uncertainties, there can be no simple sequence of development. It is a stochastic process.
7. The spatial production function of the commodity shapes the settlement pattern.
8. Urban places play an increasingly large role in the settlement sequence.
9. At some point the frontier characteristics may feed back to alter the settlement system as a whole – economically, culturally and spatially.
10. The spatial impact on the source region depends on the number, location and magnitudes of links with frontier, and on the degree to which the frontier differes –

socially, economically, politically, and spatially – from the rest of the settlement system.

11. Frontiers continue to be significant, in a politically and economic sense; but the chances of a frontier developing a full-fledged settlement system are increasingly remote. Modern frontiers are characterized by permanence. The one exception is the leisure frontier.

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# FORMATION OF NATIONAL SETTLEMENT SYSTEMS OUT OF THE FORMER COLONIAL SYSTEMS: THE CASE OF LATIN AMERICA

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As a theoretical framework this paper makes several assumptions regarding: 1) the historical character of national settlement systems, 2) the historical character of settlement systems in general. 3) the historical character of the sedentary life of the human population. Historically there were: 1) unsettled or non sedentary populations, 2) settled populations in which settlements were not organized into systems, and 3) settled populations in which settlements were organized in non national settlement systems.

There is a general recognition that, in the process of the transformation of the settlement system, changes in the control of the production of raw materials, intermediate products and unproductive goods have been essential.

In mature underdeveloped countries, the economy has became subjected to the decisions of three main organizations: the multi-international corporations, large national oligopolistic groups and the state. However the largest part of national capital is not concentrated in these groups.

The accumulation of capital has become geographically differentiated at levels which, although defined in terms of political economy (that is, as levels of capital accumulation), appear also in the sphere of microeconomics (that is, in terms of the spatial differentiation of the demand for goods and services).

The way in which accumulation levels become articulated in the different settlement types (metropolises, specialized urban settlements, central places in which either economic or social and administrative functions are more important, etc.) should be considered in any study of settlement systems. It is equally important to define the flows between the levels as well as between the various components (within each level).

## 1. SETTLEMENT SYSTEMS OF THE UNDERDEVELOPED CAPITALIST COUNTRIES

At the period of Discoveries in the regions being in contact with the Europeans (traders or colonizers) some radical and significant changes in the settlement forms were introduced.

As stated by Lacoste (1963, p. 83), the characteristics resulting from the contact depended not only on the characteristics of the dominated societies but also on the pecu-

liarities of the colonizing or dominant power as well as on the time of contact.

Simplifying, two basic types of colonial spaces can be recognized; the first one mirrors the economic, social and spatial structure of the colonizing countries. It develops its own types of agriculture and manufacturing and attains financial autonomy. The process of settlement of the interior mirrors the economic and social characteristics and the spatial organization of the earlier colonized areas.

The second type is that of underdeveloped countries. The economy exports agricultural products and raw materials and there is a sharp financial dependence. The economy is originally developed on the basis of enslaved labour. Another trait is the concentration of settlements resulting from the first contacts established in the peripheral areas of the given country (very often on the coast). In America the first type is characteristic for the United States, the second for Latin America (Morse, 1975).

Considering historical-cultural factors, Lacoste (1963, pp. 83–84) has systematically classified the underdeveloped countries. His classification is as follows:

A. Underdeveloped countries where the capitalist system was introduced within a 'traditional' society by foreign action.
   It comprises the following types:
   1. Colonization by settlement (as in North and South Africa).
   2. Colonization by cadres (as is the general case in Black Africa and South and South-east Asia).
   3. Colonization by estates: large farms where the labour force is more or less reduced to serfdom (as in the Andes, Mexico, Eastern Europe and Eastern Africa).
   4. Mining and manufacturing economies within a colonial framework (as in Katanga, Rhodesia, South Africa and Manchuria).
   5. Mercantile penetration without direct political domination (as in China).
   6. Modern exploitation of mineral deposits without direct political action (as in semi-feudal structured societies such as Arabia and Iran).

B. Underdeveloped countries with colonailly structured societies with autochtonous population absent, the introduction of the capitalist system has coincided with the beginnings of permanent settlement.
   With the exception of areas of strong Indian settlement, the following types may be identified in South America:
   – Older type plantation economies either based originally on slavery (West Indies, North Eastern Brazil) or a more modern type (Cuba, Guatemala);
   – Cattle grazing *latifundios*: the Brazil interior;
   – *Latifundios*, originally cattle grazing, more recently devoted to speculative agriculture: the São Paulo region in Brazil, Argentina;
   – Mining economies (Peru, Venezuela, Chile).

C. Underdeveloped countries in which the capitalist system was imposed within an existing national framework:
   – A semi-feudal society based on village communities (Turkey);
   – A pre-industrial society of the West European type (Spain, Southern Italy);
   – Devolution from an industrializing society still based on feudalism towards underdevelopment.

In Lacoste's scheme the deminating modes of production and their mechanisms of articulation with the prevailing capitalist mode of production are emphasized. The inclusion into the category of 'underdeveloped' countries or states with backward forms of capitalism which did not form their own national space as a derived space and are financially dependent from other foreign countries without an economy oriented to the international market might be questioned.

On the other hand within the same country several types can co-exist. For instance, in Peru the colonization by estates with a village type of society is dominant in the mountain (*Sierra*) region but a different type of plantation economy prevails in coastal

areas, and the mining economy in some areas of the *Sierra*. Therefore geographers should not limit themselves to a description of these differences but they should emphasize the articulation of different economies within the framework of an underdeveloped capitalist settlement system.

Finally, a classification of underdeveloped countries should not be static because underdeveloped spaces change with time and the forms which originally emerged from contact with capitalist countries have evolved with time.

The existence of sharp differences between countries as well as the scarcity of national case studies do not allow at present a full comparative study to be made. It also means that the establishment of a paradigm of the settlement systems in the underdeveloped countries is extremely unlikely.

Due to these limitations this study is based on the Latin American case only. The extension of the research is by no means completely discarded. In the future it may well include other underdeveloped areas of the world.

## 2. HISTORICAL VIEW OF THE LATIN AMERICAN CASE

In general terms the history of the settlement phenomena in Latin America may be divided into two main periods: 1) Pre-Columbian, up to 1492, and 2) Capitalist, from 1520 to the present day. A transition period, between 1492 and 1520, corresponding to the initial contact or circumcaribbean stage could also be recognized (de Solano, 1977, pp. 90–92).

In the Pre-Columbian period the American societies and their settlement forms evolved autonomously. In the following period the evolution of settlement systems occurred as a function of the evolution of the capitalist mode of production. Due to factors such as the breaking with the fragmentation of the Middle Ages, enlarging the local markets, the commercial part of the bourgeoisie spurred by the search for new markets, became dispersed throughout the world. The commercial network became universal, embracing all nations by ties of interdependence (Marx, 1949, pp. 74–76). The bourgeoisie constrained all the nations either to embrace its productive system or to perish.

Various authors frequently recognize within the process of settlement development in Latin America three periods (or sub-periods of the larger capitalist period): 1) the colonies, corresponding to the stage of capitalist development known as primitive accumulation and dominated by the mercantilist economic doctrine (Sunkel and Paz, 1973, pp. 272–273; Castells, 1973, p. 17; Rofman, 1977, pp. 46), 2) institutionalization of the national states (Sunkel and Paz, *idem*), corresponding to the climax of the development of competitive capitalism (Castells, *idem*), when the liberal economic doctrine became dominant, 3) integration with the world market (Rofman, *idem*), corresponding to the implantation of monopolistic capitalism and imperialist domination (Castells, *idem*) and followed by the crisis of liberalism (Sunkel and Paz, *idem*), and then by a stage of industrial integration and rupture with the domination forms (Rofman, *idem*). In this stage emerged neocapitalist types of economy (Sunkel and Paz, *idem*), characterized by a powerful state capitalism associated with the international corporations and national monopolies in a new domination form. A change to the socialist economy has so far occurred only in one country (Cuba).

The chronology of periods and stages is approximately as follows:

0. Pre-Columbian period (up to 1492)
0–1. Initial contact
   A. Circumcaribbean stage (1492–1520)
1. Colonial period (1520–1750)
   A. First continental stage – Conquest and institutionalization (1520–1572)

Second continental stage – Climax (centripetal tendencies) and crisis (centrifugal tendencies: formation of subsystems:1572–1750)

1–2. Antecedents of free trade and independence (1750–1820/25)
- A. Third continental stage - Antecedents (1750–1810)
- B. Independence (1810–1820/25)

1. Institutionalization of the national states (1820/25–1870)

3. Integration with world trade (imperialistic domination: 1870 to the present day)
Initial impact. Climax of development based on the open economy. Crisis of handicrafts (1870–1890)
- B. Stage of simple growth (1890–1914)
- B–C. Stagnation of growth based on the foreign sector (1914–1930)
  - a) First World War (1914–1918)
  - b) Crisis of English hegemony (1918–1925)
  - c) World crisis (1925–1930)
- C. Substitution of imports. Beginning of the urbanization processes (1930–1945/50)
- C–D. a) Transition (1950–1960)
  - b) Transnationalization of the economy; crisis in the industrialization model due to import substitutions, neo-capitalism and socialism (since 1960).

*Sources*: Castells, 1973; Sunkel and Paz, 1973; de Solano, 1977; Cordova, 1973; Guimaraes, 1977).

The pre-Columbian period will be not discussed here in detail. In the initial contact a series of enclaves were established. Later on the penetration into the continental interior spread from them. In this first stage in the Antilles the colonizers met with people without urban traditions. Urban settlements then established, on the coast or nearby, were foci of colonization and bases for adoption to new conditions and supply. Although the traditional cultivation systems (*conuco*, *milpa* or shifting cultivation) supported only sparse settlement, the concentrated village settlements of the Indian population (*pueblos de indios*) were promoted by the Spaniards for purposes of indoctrination and production (de Solano, 1977, pp. 89–91).

Colonization transferred to America the strong opposition of rural and urban areas. The city was an ethnically mixed settlement, organized on the model of the Spanish *municipio*. The conquerors built settlements based on the community of urban land (*ejidos*, *propios* – own lands – pastures, woodlands and vacant lands of the towns).

The communities of the conquerors had their own government, the *ayuntamiento*, which was giving the power to rule over the ramaining groups (*castes* or *estaments*) of the colonial society living either in the city or in the surrounding countryside.

The native population was concentrated in *pueblos de indios* which, according to Solano, were the rural complement to the urban core. The *pueblos de indios* possessed some degree of autonomy, were governed by their own authorities and had their own communal lands.

Starting from the city, colonists established their dominance over the countryside. Some of them took over lands through *repartimientos* (distribution), *composiciones* (payments to the Royal Treasury) and *mercedes reales* (royal mercies), while others obtained a surplus product from the native communities through the *encomiends* or the *mita*.

In the first continental stage (1520–1572) Europeans encountered the high pre-Spanish cultures. Settlements were created at that time which had the function of dominance and exchange, "connecting with zones already conquered and with Spain (Veracruz, Puerto Caballos, Santa Maria, Cartagena) or ensuring economic and functional land (Puebla, San Gil de Buenaventura) or sea (Coro, Cumanâ) routes" (de Solano, 1977, pp. 93).

In the following stage (1573–1753) a true offensive of the rich landlords occurred to monopolize the cultivation of lands which they had taken over by rather irregular procedures. For the expansion of colonial agriculture and for the purchase of slaves the commercial capital to be used for financial purposes was needed. Some authors have

pointed out that the development of commercial capital and the strengthening of the bourgeoisie as a social class in Europe has freed the labour forces while in the New World it led to the implantation of slavery. K. Marx wrote in his letter to P. V. Annenkov that slavery "has made the colonies valuable, colonies have created the world trade, and world trade is the necessary condition for the big mechanized industry ...; before the traffic of Negroes, the colonies did not give anything to the ancient world but a few products and had not visibly changed the earth surface" (Marx and Engels, 1952, vol. 2, p. 421).

Towards the end of the second continental stage, the penetration of capitalism (within the framework of the centralized economic policy of the Spanish Crown), based on trade monopoly, protectionist tariffs and colonialism, had led to the growth of the colonial predominance in the character of the economy. The movement toward decentralization was then initiated. The expansion of capitalism brought in the advancement of the colonial frontiers through the empty territories of the interior (in Venezuela, for instance, colonization advanced to the Llanos, the East and the Orinoco). The space became sharply specialized leading to the development of inter-regional flows.

In analysing the regionalization of space Sunkel and Paz point out the existence of four types of economy (1973, pp. 282–289): colonial centres (as in Mexico and Peru) (C), subsistence economy (VI), unsettled areas (V), and agro-exporting plantation economy (SP). The initiatives for further growth came from the overseas metropolis or from the colonial centres and submetropolises. The main instrument used was commercial capital.

On basis of the theory exposed by K. Marx in the second volume of his book *Das Kapital* and the model of Sunkel and Paz it is possible to construct a capital circulation model integrating three sectors: trade (1), agro-exports (2), and subsistence economy (3).

Within the circular flows of trading capital (1) the capitalist invests in the acquisition of a capital-merchandise produced by the agro-exporting sector ($M_1$) by money payments ($D_1$). In the process of the realization of merchandise they are increased by an excess or surplus value ($m_1$ equal to $d_1$ in money terms), which is included in the final value of the merchandise $M_1' = D_1'$. The process of transformation of $D_1$ into $D_1'$ may be expressed by the general capital formula $D$-$M$-D′ (Marx, 1964, vol. 1, p. 111).

In the circle of agro-exporting capital (2), the landlord invests money ($D_2$) in the acquisition of slaves as mechandise ($E_2$) and other production means ($Mp_2$). A part of the product ($P_2$) is feed back into the productive process as subsistence means for the slaves ($S_2$). The other part goes to the market ($M'_2$) obtaining there a surplus ($m_2$ or $d_2$ in monetary terms).

The agro-exporting sector forms the basic sector in an agricultural economy through with monetary capital ($D_1$) enters the system feeding back the productive process ($D_2$) and additionally giving a surplus ($d_2 - m_2$) which in the scheme of enlarged reproduction may be invested in the enlargement of the productive system. As may be seen, the scheme of capitalist production is not substantially affected by the use of slaves instead of free workers.

The basic or exogenous sector of the economy leads in its turn over to changes in the so called 'subsistence' sector which becomes a non-basic sector when incorporated into the economic system. The function of such subsystem was to furnish to the agro-exporting sector inputs such as mules and implements for production or food transportation. In some economies (Chile, Venezuela) this sector led to some flows of capital into the economy. The capital was invested later on in the export sector.

In the circle of capital for agricultural services ('subsistence' sector – 3) the principal mean of production was the land, concentrated in hands of the bourgeoisie through *composiciones*, or occupied by the Indian communities subjected to the spoil of their surplus product by an *encomendero*.

In this sector the capitalist invested money ($D_3$) in the acquisition of land (by *composicion* purchased or any other way) and in other means of production ($Mp_3$). The landlord (capitalist) obtained, by means of the Indian work, a product. A part of this was set apart for the Indian's subsistence ($S_3$), while the other part was transformed into the rent ($M_3$) which was gathered by the landlord in the agro-exporting sector market. A part of the rent was re-cycled into the productive process ($M_3 = D_3$), while the other part was designed for his enrichment ($m_3 = d_3$).

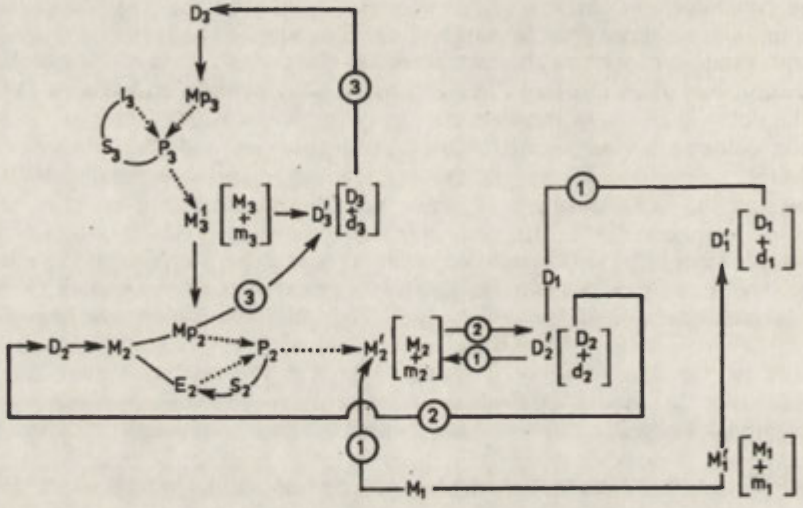


Fig. 1. The colonial economic system (agricultural economy)

1 – commercial capital cycle, 2 – agro-exporting ('basic'), 3 – service agricultural capital M – capital-merchandise, D – capital-money, P – capital-product, Mp – means of production, E – slaves, I – Indians, S – subsistence-means, m – surplus value-merchandise, d – surplus value-money, M' – increased capital-merchandise, D' – increased capital money Subindices show the participation in a given cycle

When the colonial economic system (case of an agricultural economy: Fig. 1) is analysed, we realize that:

1) The incorporation of the whole system into the capital circulation originates from the trading capital ($D_1$), and

2) The value of the exported merchandise in the market ($M_1'$) expressed in money terms ($D_1'$) equals the addition of the invested means of production in the export and service sectors ($Mp_2 + Mp_3$) with the surplus value of capitalists in these two and the trading sector added. In colonial exploitation the capitalist does not buy labour force, he buys the slave who serves as his labour force. The slave himself must obtain his means of reproduction (at least to a large degree) with the products cultivated on his small plot inside the landlord's holding.

The agricultural economies as a whole were related to the central colonial and the overseas metropolies economy. From them the former received the necessary capital for the reproduction and enlargement of the capitalist mode of production. Then the capital was returned to them through the profits. It should be noticed that, in variance with European conditions, where capitalism developed as an endogeneous process resulting from the expansion of manufacturing and commercial capital, in the area presently known as Latin America the most dynamic sector in the stage of primitive accumulation, i.e. the commercial sector, was implanted from outside. The whole colonial superstructure

was organized in such a way that it would guarantee the dominance of metropolitan capital in trade (monopolies, concessions to metropolitan companies, etc.). Although in some periods the agro-exporting capitalist landlords organized their own fleets, the progress of such commercial monopolies led to the stagnation of autochtonous commercial development.

In the last colonial stage a structure led to the crisis in which the colonial, slave owning aristocracy tried to eliminate the hindrances to free trade and obtained some concessions including the opening of new ports and the possibility of trade with other states. At the same time (second part of 18th century) the last demographic extension of the frontier has occurred. Certain areas left earlier aside by the colonizing effort were then colonized with some help of the missionaries.

In difference from Europe, within the colonial economies no feudal settlement systems were formed because (except the conquest period) the community was never more important than the market. The colonial economies were born as open economies. Moreover, the opening of the economy was always greater in relation to the external markets than to the internal ones. For this reason, the formation of settlement networks and its hierarchy were not possible, a fact that was mentioned by A. von Humboldt at the beginning of the 19th century (vol. 2 of the *Voyage aux regions equinoctiales du Nouveau Continent*). In the agricultural colonies the agro-exporting sector was concentrated on the coast, and the service sector in the interior. The development of transport, particularly inland navigation, permitted later the location of some agro-exporting areas in the interior. However this was not the case of the colonial centres – seats of the viceroys.

In every colony there existed certain links with the interior, but there were few such links between the colonies, even when belonging to the same *audiencia* or captaincy general. The agro-exporting sector sent its products to the metropolis and submetropolises, receiving manufacturing products and capital. Arcilia Farias (1946, p. 95), Sunkel and Paz (1973, p. 285), C. Furtado (1970, p. 29), and others have pointed out the role of the markets of Mexico (in the case of Venezuela) and of Peru (in the case of Chile, Ecuador and the Argentinian northwest) as sources of monetary capital. In our scheme this means the reproduction of the productive circle in the agro-exporting sector ($Mp_2$) and its enlargement through that part of the surplus value ($d_2$) which was neither consumed nor hoared. Then through the growth of agro-exporting sector impulses were transmitted to the service sector ($Mp_3 + d_3$).

The *colonial settlement system* emerged as a projection of the *national settlement system* in peripheral spaces. In both cases commercial capital served as the integrating force in the economy. In the national systems integration was achieved within the interior system through the bourgeoisie. When it gained the hegemony, the conquest of the world market began. In the colonial periphery integration came from the outside and was directed toward the outside system, i.e., toward the world market. The integration in the production system of elements which were not included in the market system and were due to the survival of productive relations based on slavery (*encomienda*, *mita*, etc.) within a specific mode of production based on free work (capitalism) caused not only the integration divided to the outside but also stimulated the excess consumption – among the dominant classes (superfluity and waste). The absence of a national market prevented the development of national manufacturing and the consumption needs of the dominant classes were satisfied through the imports of luxury goods.

The system was functionally heterogeneous. Its elementary cells were integrated in cities and towns, as opposed to rural areas (Indian villages, missions and slave operated farms). In the areas of agricultural production the towns fulfilled the role of central places, sometimes isolated, sometimes grouped in clusters (in Venezuela, for instance the Western High Llanos and the valleys of Aragua and Garabobo). Some missions and Indian villages lost, afterwards, their original character and also became central places. It is doubtful if these central place *clusters* could evolve into central place

*systems.* In the case of Venezuela, for instance, the towns of the Aragua valley were of evenly small size, no hierarchy was evident.

Another type of central places is that of the capitals of *audiencias*, colonies directed by viceroys, captaincies general and provinces, hierarchical subspaces and structures through which political power and the colonial administration was exerted. In case of the higher ranks of hierarchy the administrative and economic centres such as the seats of viceroys formed at the same time economic poles of development. Rofman (1978, pp.77–81) suggests that typical characteristics of these subspaces were accessibility, central location and important flows of people and goods. Very often these central places were located in strategic points of the intersecting long-distance, as well as of dendric access roads. The non central places included mining settlements, like Zacatecas, Guadalaiara, Durango, Guanajuato, and San Luis Potosf in Mexico and Potosf and Oruro in territory presently belonging to Bolivia.

The transport oriented settlements which connected together other settlements were linked with roads of dendric pattern forming regional or local systems different from the national system which was organized as a network.

The dendric system included the main ports, basically serving the intra- and inter-continental connections (overseas transport ports) as well as minor ports and cities in the interior (intermediate transport points, points of good transfer as well as resorts and spas).

Towards the end of the colonial period (from the middle of 18th century up to 1820 or 1825) a large part of population had been concentrated in the cities and a large proportion of land passed into the hands of landlords. The political centralization in the metropolis was challenged by the increasing power of the Latin American landlords (*criollos*), which utlized the *cabildos* or *ayuntamientos* as the instruments of their power. The emerging conflict led in some cases to concessions by the metropolitan monarchy, but the general tensions ended finally in the Independence Wars.

In the states emerging from the Independence Wars, the colonial, urban based aristocracy was frequently substituted as the dominant class by a warrior, rural aristocracy organized around the military chiefs (*caudillos*) of the Independence Wars, these *caudillos* having obtained land as payment for their services in the wars. In some countries a commercial or agro-commercial and urban bourgeoisie, progressive and liberal, formed an opposition to the rural aristocracy. The predominance of one or other class depended upon several factors, including the characteristics of the struggle for independence. In some countries the struggle destroyed productive forces (losses in lives and destruction of farms and production tools) as well as settlements. The armed groups, under the direction of *caudillos* became masters of the rural lands and later masters of the cities. Such was the case of Venezuela. In Argentina the urban bourgeoisie defeated the rural *caudillos*. In the countries in which the regional chiefs (*caudillos*) became dominant a tendency to form federal politico-territorial organization was evident. On the other hand the urban bourgeoisie prefered the centralized administration. In all countries there was a retrenchment of municipal power, the expression of a social class which had lost its dominant position. Moreover there was a strong development of trading houses. A process of the labour liberation began. Abolitionist movements triumphed in most countries. The abolition of slavery and the expropriation of small producers due to wars or mortgaging strengthened the land owning oligarchy whose posessions rose in value. In addition the landlords were freed from maintaining a class of population whose productivity was decreasing.

The national governments became involved in the construction of roads and ports. The utilization of steam navigation led to the development of inland navigation. Transportation absorbed then a part of the pauperized population (dockers, carters, etc.). Moreover some small craft industries were developed (vehicle construction, etc.) as well as related services (hotels, boarding houses, etc.).

Also the production of certain goods such as coffee at least in some countries and regions grew on the basis of free wage earners. Some of the former slaves remained in the land estates maintaining semi-feudal relations with the landlord (*colonato*, *peonazgo*, *vecinazgo*, *aparceria*, *medianeria*, etc.).

The development of roads and ports strengthened the integration of the peripheral economies of the world markets. On the other hand, the dendric structure of road networks was accentuated. In individual cities (especially in the case of the ports) division of land and differentiation of its utilization was increasing.

Almost all authors agree that this change occurred around the seventh decade of the 19th century. For the central capitalist countries that was a period of transition from competitive to imperialistic and monopolistic capitalism. In the peripheral capitalist countries this implied a transition from commercial to imperialist domination (Castells, 1973). The imperialism at this stage, according to the classical scheme of Luxemburg 1967, p. 284) consisted of: a) natural wealth appropriation; b) 'liberation' of labour force and its subjugation in the service of capital; c) the introduction of a commercial economy (with the larger part of production sold in an open market), and d) separation of agriculture from manufacturing. In Latin America the integration with world trade (Rofman, 1977) was characterized by a strong expansion of exports (Furtado, 1973). This led to the growth of the railroad network.

In Venezuela railway expansion was characterized by short lines from the productive areas to the ports. In Chile short transversal lines were predominant, although later on these lines became integrated. In Argentina a radial network converged on Rosario and Buenos Aires. In Brazil two networks converging on Rio de Janeiro and Sao Paolo were merged together later on. In Mexico, the transcontinental lines went across the capital city (Rofman, 1977, pp. 107–108). Generally speaking, the railway networks or railway-road networks of that time conserved or even reinforced the dendric structure of functional space.

The counterpart of export growth was the increase in imports. The latter led to the crisis of handicrafts and local manufacturing (Singer, 1975; Guimaraes *et al.*, 1977).

Cordova (1973, p. 123) has defined this stage of underdevelopment of Latin America as a stage of the initial impact of foreign investments. Its duration was variable. In Costa Rica the beginning of the next stage (of simple growth) may be placed about 1890 with their most conspicuous characteristics being the break of British hegemony, emergence of the dominance of the United States, the development of large scale banana plantations and an increasing proletarization of the population (Guimaraes *et al.*, 1977). Cordova places the stage of simple growth in Honduras between 1902 and 1930 (1973, p. 143), in Cuba between 1900 and 1925 (*idem*, p. 144). In Chile it began earlier (1879–1919; *idem*, p. 143) and in Venezuela in 1920–1945 (*idem*, p. 140).

In the simple growth stage foreign investment turned from infrastructure (railways, ports, channels, etc.) and transport to direct productive activities (oil, mines and plantations). The transfer of the political and economic hegemony from England to the United States became common feature, especially in the Caribbean countries. This stage was defined by Cordova as a 'non cumulative' (in the statistical sense of the world) growth. According to him this means that "the increase in income was not the result of the development of internal productive forces but of intensive exploitation, using foreign capital and experience, of one only productive factor: natural resources which not only did not induce an accumulation of capital but led to 'disaccumulation'.

With the First World War the import participation of the developed countries decreased (Furtado, 1973). This led, in some countries, especially in those in which the simple growth stage was nearing its end (Chile) or was sufficiently large for the development of the internal markets to the beginnings of industrialization (Furtado, *idem*; Sunkel and Paz, 1973; Singer, 1975). The liberal economic policies started with a crisis lasting till 1950 or 1955 (Sunkel and Paz, *idem*). The period following the World Crisis (1930)

brought about a substantial decline of imports from the developed countries. A well defined policy of import substitution emerged in most of the average sized Latin American countries.

In the states emerging after the Independence Wars some important changes in the settlement system occurred. The most important one was the breaking up of Indian communities in a process that, in Venezuela, took somewhat more than half a century. The communal lands were divided into small plots, called *minifundic* which led to the proletarization or semi-proletarization of the Indians. The Indian villages (*pueblos de indios*) evolved into low ranking central places. The administrative centralization allowed some spatial hierarchization, more important in the countries politically centralized than in those in which the power was decentralized. The urbanization and the urban-rural polarization with urban dominance were more important in states politically decentralized. In the Venezuela the rank-size distribution curve for 1864 was slightly tender the normal line for the first to six cities and much lower for the other ones. In Argentina however the curve in 1869 had a higher slope for Buenos Aires and Córdoba, a near normal slope between Córdoba and Salta, and lower for the remaining cities (Rofman, 1977, p. 119). In addition Venezuela was characterized by an intermediate distribution with a rank-size distribution for the cities of intermediate sizes distinct from an almost undifferentiated stratum of small cities (of 8000 to 15 000 inhabitants). In Argentina this pattern was further distorted by the primacy of capital being at the same time the main commercial and transport centre.

Although the dendric circulation continued to be dominant in such countries as Venezuela, in others, such as Argentina and Brazil, radial and circular or polarized networks emerged in which the main flows originating from or addressed to the exterior followed radial or partly dendric lines, while secondary flows followed circular routes. This development resulted from an increase in the interior flows.

In the stage of simple growth in foreign investments the spatial effect was diverse, depending on such factors as amount of investment and capital return rate. In banana producing countries (Honduras, Costa Rica) some ports (as Limon) were developed while others were founded. Banana camps as well as dendric railway systems were also constructed. An agricultural proletariat emerged as well as a class of small and middle-sized farms selling their product to the fruit companies.

In Venezuela there were two stages. In the first, from 1920 to 1941 or 1945, the characteristics of spatial changes were similar to those for Costa Rica, with one exception – the proletariate was more urban in character (oil workers, sailors, etc.). The intermediary bourgeoisie (*concessionaires*) was similarly urban.

Generally speaking, the foreign investors created new settlement types: oil, banana or ore exporting ports with dendric transport lines converging on them. Mining or manufacturing camps, some of which grew to urban settlements, were also built. These settlements were characterized by their segregation from the surrounding areas. The camps were encircled by high fences contrasting with other open 'civil' cities.

The foreign companies obtained concession for the operation of ports and railways. At their expiration the companies returned ports and railways to the state in almost derelict condition.

Some authors have described the space affected by foreign investment in this stage as 'enclaves'. Such an interpretation represents only a part of reality, i.e., the strong economic connection with large centres of capitalist investment and the export orientation of production. The strong dependence, which includes the non durable consumption goods marketing (commissariats) supports such interpretation. However a deeper analysis favours the interpretation of Luxemburg: companies extracting the oil, saltpetre and iron or producing bananas turned the population into a proletariate while the other part was forced to poduce for the international market (for instance, the 'independent' banana

producers of Costa Rica). Some 'independent' producers affected later by the crisis also joined the local proletariate.

The multiplier effect of such economy on other sectors of the national economy is more important: the markets for products and services were created, the newcomers were attracted with the formation of 'marginal areas' (shanty towns) inhabited by immigrants not absorbed into the new settlements, labour markets, etc.

In the years following the Great World Economic Crisis during the stage of import substitution in most countries some development of the national market has taken place accompanied by tendencies to centralize the political and administrative set-up. Towards 1946 networks of modern highways centred on the national capital began to be developed. The sanitary conditions in tropical lowlands in the stage of simple growth devastated by malaria and other endemic diseases were improved as a necessary prerequisite for investment in oil extraction, banana cultivation, etc. This allowed the continuation of the frontier pioneer advance. The new settled lands became quickly incorporated into the capitalist mode of production, working either for the international market or the growing national market. In Costa Rica, for instance, the capitalist growth at this time was essentially based in new land settlements. It was an extensive growth, predominantly based on the accumulation of absolute surplus value (Guimaraes *et al.*, 1977).

At some time between 1950 and 1958 the present stage has began (Sunkel and Paz, 1973), characterized by industrial integration within the neo-capitalist stage of imperialism and the ruptures of the domination structures through socialist undertakings (Rofman, 1978). Industrial integration started a crisis of the growth model based on import substitution and this led to stagnation (Furtado, 1973).

In this stage there was a change in international economic relations in the sense that capital internationalization was substituted by capital transnationalization. The creation of branches of transnational companies strengthened the peripheral industrialization and a new international division of labour emerged in which the peripheral countries became strongly dependent upon technology in metropolitan countries.

The adoption without adaptation of the labour saving technology of the central countries by the underdeveloped countries and the crisis of the traditional sector, followed by the bankruptcy of the small producers created a sector marginal to the productive process but different from the traditional. Although included as a subsector of the endogenous sector of urban economy, it differs from it in the sense that the marginal sector is caused by the inability of the exogenous sector to extend its multiplying effect into the remaining part of the urban economy. This is because: a) the small capacity of invested units to generate employment, b) the drainage of capital through profit re-export and the import of technology, raw materials and capital goods.

Associated to the transnational corporations as they were extending their activities to various countries, a bourgeoisie was concentrating large amounts of money in its hands.

The third essential development factor was at this stage, the position of the state as an investor, economic referee and regulator of social tensions.

In some countries the deepening of the crisis led to socialist take overs (Cuba), defeated in some cases by the use of counterrevolutionary forces (Chile) or, in other case, by the return to less radical solutions (Peru).

The most conspicuous characteristic of the countries in Latin America situated in the capitalist periphery was at this stage the tendency of total spatial metropolization (the so called 'hyperurbanization'), a metropolization full of contradictions if the inability of urban economies to absorb the so called 'mariginal' sector of the economy is considered. This fact, together with the speculation characteristic for the oligopolistic property of urban land, regressive income distribution and spread of unemployment and underemployment increased the class segregation and the chaotic growth of cities.

## 3. STRUCTURE OF THE SETTLEMENT SYSTEM IN THE UNDER DEVELOPED COUNTRIES

The settlement system in a mature underdeveloped country, i.e., a country which attained the stage of industrialization by import substitution, had traits of a national system (as there is a national market and a 'national bourgeoisie') and of a colonial system (as it is subjected to conditions of dependency to the big economic poles of the exterior). The system is polarized towards the exterior (exports of raw materials and profits obtained by the transnational corporations through exploitation of raw materials, investment in substitution import manufacturing or sale of technology, half-finished goods and capital goods). In the opposite direction, the underdeveloped economies receive technology, half-finished goods and capital goods. There are capital flows in both directions, although with the maturity of capitalism, profit flows going to the central capitalist countries tend to become higher than investments in the peripheral countries.

Within an underdeveloped settlement system, as within any other settlement system, there are divisions corresponding to the social division of labour. In first place there is a rural-urban contradiction, expressed in the existence of rural and urban settlements.

Among the urban settlements there is also a functional specialization of vertical (functional hierarchization) or horizontal (regional specialization) character.

In the underdeveloped economies we are considering the economy as subjected to the decisions of three main groups: transnational corporations, oligopolistic national groups and the state. They possess the largest percentage of national fixed assets.

Capitalist development occurs at several spatial accumulation levels which represent specific technical structures (expressing the development of productive forces) and class structures. Generally speaking these levels are: supranational or national, i.e. 'central', regional, urban and rural.

The 'central' level may be characterized by the highest development of productive forces and the largest diversification of economic sectors. At this level the most dynamic manufacturing branches as well as the so called activities of the 'upper tertiary' or 'quaternary' sector (planning, administration and control, scientific research and higher education, etc. plus the financial activities supporting the development of the whole productive system) are concentrated.

From the 'central' level come the spatial actions of the state as well as of transnational companies and conglomerates and the national oligopolies.

At the simple growth stage the growth impulses are originated in the peripheral regions (mining, oil producing or agro-exporting) and from there they are spred to the centre. The state transmitted the growth impulses from the periphery to the centre through the appropriation of a part of the surplus value. Very often, together with the transnational corporations the state contributed to the latter stagnation of peripheral regions through the overexploitation of natural resources.

Later on, in the stage of growth by import substitution, the state takes control over extractive and intermediate manufacturing industries which had been essential for industrial development. Then centrifugal capital movements do emerge. These capital movements have the purpose of developing energy complexes, steel mills, refineries, petrochemical and electrochemical plants, etc. But the national and international labour division favours again the transnational corporations and national monopolies. In fact no true industrial complexes are created and the power resources and raw and intermediate materials either become exported or are incorporated in the productive process of those points of national space in which the investment decisions of transnational corporations and national monopolies or oligopolies are decisive.

Therefore the 'central' level should be interpreted as a set of functions under the control of transnational corporations, national monopolies and the state. There the strongest capital accumulation of the national economy is found. These functions are fre-

quently found in settlements specialized horizontally in the exploitation of natural resources or vertically as functions of urban agglomerations whose size is due to the growing complexity of services, especially for the concentration of finance and administration. Simultaneously, the struggle to locate in proximity of the power centres and big markets leads to solutions in which the inverse of distance to the capital and the size of cities are positively influencing locational decisions. The development of modern roads and the increasing density of the road network near the urban nodes where the motor car traffic is concentrated as well as the emergence of external economies contribute to the accentuation of the centralization (Rofman, 1977, pp. 148–151).

However, it has been proved that spatial concentration in the strict sense of the word is only a transitory characteristic of underdeveloped space. Rofman points out that the emergence of scale diseconomies leads to the market enlargement through the diffusion process of manufacturing and services location. Such diffusion is the result of a policy promoted by the state. It is expressed in the formation of growth poles in strategic points located far from the coastal urban agglomerations. Cordoba, in Argentina, the Northeast, Belo Horizonte and Brasilia, in Brazil, and Conception, in Chile may be given as examples.

Rofman (*idem*, p. 235) himself points out some traits of transnational corporation behaviour relating to location decisions. The departure point of recent behaviour would be the existence of conditions in which "large production units with monopolistic power in their respective markets (units) depend upon decision centres external to the country and the extent to which they are supported by politico-institutional structures in force which allow the internalization of abundant external economies". Within the underdeveloped economy the different constituent units of the enterprise become separated. The managerial unit is generally located in the national decision centre, the productive unit in the area possessing the best comparative advantages. When there are subsidiary plants producing parts or raw materials other locations may be found besides the three basic locations (main office, national managerial unit, processing plant). The division is made easier by the development of transport and communication means which are favourable to the unit management by remote control. The decentralized locations are supported by tax and credit incentives and by reductions in input costs (Rofman, *idem*, pp. 236–238).

At the regional level the fundamental factors of the economy are the agro-commercial capital and the state. The emergence of the central place as the average type and of settlements specialized in agro-commercial and agro-manufacturing as well as in political and administrative functions as only deviant types was caused by the concentration of capital at the regional level. Some of the central places tend to have more relevant agro-commercial or agro-manufacturing functions, in others the political and administrative or social functions are more important (regional capitals). In the former the agro-commercial and agro-manufacturing bourgeoisie plays the dominant role; in the latter this role is played by the bureaucracy of the state which, in democratic countries becomes identified with the bureaucracy of the governing party.

The regional level plays an important role in the mobilization of agricultural capital, in the state's financing of the manufacturing sector and in the transfer of such financial resources to the urban economy. Through the exogenous sector of the urban economy it makes possible the exchange with other levels of the national economy, gaining additional profits from the comparative advantages of the concrete region. A part of the agro-commercial and agro-manufacturing bourgeoisie is organized in oligopolistic groups.

The regional level, at least in the initial stage of urbanization fulfills the function of ensuring the development at the urban level. This is expressed in the language of urban economists as the dependence of the growth of the endogenous sector on the growth of the exogenous one.

At the urban level the growth of capitalism is based on the oligopolistic ownership of urban land. The origin of the oligopoly is the private appropriation of the land,

originally declared by the conquerors to be a commonwealth of the city as well as the acquisition of the land from the petty owners by the richest urban families (urban aristocracy). The growth of the urban economy through the development of the agro-commercial or agro-industrial economy or the political and administrative or social functions, implied the growth in demand for the labour force leading to the quick growth of urban population). This led to the emergence of the increased demand for land and housing. The increase in the demand for land associated with oligopolistic supply unchains land speculation.

At the same time a group of house-constructors (in Venezuela they were mainly immigrants) has the opportunity to profit by the construction of villas and other housing for the people from higher social strata; in this way they accumulate capital. Some of such capitalist become associated with the urban landlords and the richest local merchants forming the strongest element in the urban economy. They are the so-called *fuerzas vivas* (living forces) of the city. In the process of growth transmission from the exogenous to the endogenous sector of the urban economy this group obtains the largest part of capital.

However in urban economy there is a cycle or sub-sector served by a very small part of capital. It is known as the 'informal sector' or 'lower circuit' of the urban economy (Santos, 1972, 1975). A mass of small merchants, drivers and artisans, as well as people working in personal services and unqualified workers without permanent employment are here included. Its relative importance is smaller in the large and specialized cities with stronger participance of the 'central' sector (in the extraregional exogenous sector). About 40% of families may be included in this sector. In the smaller cities this sector may include even more than two thirds of all families.

The 'informal sector' arises from the inability of the underdeveloped dependent economy to give employment to the masses coming from the countryside. The highly organic structure of capital at the 'central' level (labour saving industries), as well as the high qualifications required for employment at this level and the low possibility for expansion of the demand for manufactured products (to a large degree luxury goods) displace large amounts of labour at the 'urban' level. The latter, limited in its development by the oligopolistic nature of the real estate market is not able to absorb all the labour force, displacing the surplus to the 'informal sector' or 'lower circuit'

At the rural level capitalist growth is based on the substitution of the natural economy by the mercantile and in the subsequent growth of the capitalist sector at the expense of the simple mercantile one.

The settlement system may be considered as the expression of the articulation of the levels of capitalist development in a concrete socio-economic temporal-space: each urban settlement has at least an urban sector with its upper and lower or informal sub-sectors. Both sub-sectors define the city as a region, i.e., as a partially closed economy, but the informal sub-sector defines the so called 'marginal areas' as sub-regions with their own market of goods and services relatively closed regarding the remaining part of urban economy.

In addition to the urban level responsible for the system closure characteristics, there is at least a level warranting the relations of the subsystem with the remaining system components. In the central places the regional level is dominant, in the non central places the horizontally specialized sets of functions of the 'central' level may be found. The metropolises put together the regional and 'central' levels, the latter in two sets, vertically and horizontally specialized. The vertically specialized set defines the metropolis as such.

The crystallization of the capitalist accumulation levels within a given settlement and within the system implies the existence of class relations within each settlement and between the settlements. The system as a whole tends to maintain the dominance within the productive system of the transnational capital and of big national capital to develop

the state establishment and organization as to ensure the objectives of the capitalist society and to guarantee the diffusion of such forms of social consciousness which tend to preserve the existing order. In this process capital flows, positive (investments) and negative (profit remittances) factors are included. Population flows follow the capital flows and the growth of the labour force reserves. The regional division of labour leads to flows of machines, equipment and raw materials (production means) as well as of consumption goods.

## 4. FUNCTIONING OF THE SYSTEM IN THE UNDERDEVELOPED COUNTRIES

For specific spatial areas treated as reference units the spatial levels function autonomously. The rural level for the homogenous rural regions, the urban for urban areas, the regional for functional regions and the 'central' for the whole national economy. The regional level integrates urban and rural economies but it is more than a simple addition of them. In the same way the central level integrates various regional ones but is is not the sum of them. At each level, however, the integration comes through these functions which do not exist at the lower level. However they are loosely associated with their activities.

There are intermediary areas of activity between the different levels. The basic components of the system (the productive forces) as well as the goods produced by these forces (transformed in merchandises within the capitalist circulation) interact through such intermediary areas.

Thus, between the central and regional levels the capital flows go through regional banking; from the central and the urban level they go through mortgage banking. In the area of public investment the intermediary area may be formed in regional development agencies and in agencies created for the implementation of policies of urban zoning and for housing development.

The function of the regional trade is to circulate production input (raw materials for agro-manufacturing, fishing and timber industries) and output, i.e. finished products (consumption goods) at the regional level and to the national market.

The rural exodus, a result of the poverty among peasants and rural semi-proletarians favours the flow of labour from the rural to urban areas while the dominance of transnational companies and national monopolistic groups in the production activities shifts the labour force to the lower urban level.

The concentration of the labour force at the lower level, together with the land monopoly and the speculation in housing markets causes the growth of squatter settlements and shack building by the poor. This in turn leads (among other things) to the deterioration in the life conditions. Acute poverty creates specific forms of production and life conditions ('culture of poverty'), in particular the household patterns differing from the nuclear family and characterized by unstable family groups, high proportions of unmarried couples and matriarchate families.

Within each level there exist specific types of flows. The capital flows from commerce and banking to the directly productive sector are essential at the 'central' level. Financial capital, representing the fusion of different forms of capital occupies the central position in the process of capital mobilization, accumulated by the transnational companies and the national monopolistic capital. At the same time the state creates its own financial institutions. While the transnational companies and monopolistic capital are oriented toward the industries with highly developed technologies, i.e. having a higher proportion of investments in machines, semi-finished raw materials and complex (generally speaking imported) technologies, the state is mainly interested in the development of basic industries (extractive and intermediate manufacturing). A part of capital accumulated by the state is transferred, through regional banking and financial organisms, to the urban and regional levels for the acquisition of land and the house construction.

At the urban level the accumulation source is the monopoly of urban land. The land becomes capital as the city growth forms an urban land market. The capitalist development at different levels is uneven creating a sharp income stratification, especially in form of purchasing power. This, associated with the oligopolistic land supply, leads to speculation in real estate: the land market for the building of 'high class' housing expands even more (leading, among other things, to the emergence of the already described phenomenon of 'marginalism'). Such speculation leads to farther concentration of capital in the hands of the urban landlords. At the same time, the construction of 'high class' dwellings, ensuring high profits to the builders and constructors, contributes to accumulation of capital in the building sector.

Later on builders and landlords from together the joint companies. The real estate agents and managers are only minor partners in the business.

In the capital transfer to the urban building groups an important role is played by mortgage banking and the saving and lending institutions. The municipal administrations, for political reason, sometimes in result of bribery, undertake planning measures (zoning or rezoning, etc.) which increase the profits obtained by the aforesaid groups.

Capital concentration in the rural level is favoured by the agricultural credits opened by the state. This allows for: a) transformation of landlords into capitalists, b) creation of modern enterprises by professionals and technicians, and c) transformation of subsistence exploitation into mercantile exploitation. Such substitution of the natural economy by the simple mercantile economy is one of the first steps in the penetration of the backward economies by capitalism.

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# EMERGING SPATIAL CONFIGURATIONS OF URBAN SYSTEMS: A REVIEW OF COMPARATIVE EXPERIENCE

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## INTRODUCTION

At the beginning of the 1980s we can now look back on a series of complex and substantial changes in economic and social conditions which dramatically altered the evolution of urban systems during the 1970s. In almost all developed (western) countries the directions of these changes are now well-known; although they are not as yet particularly well documented nor analyzed. The most important of these changes included massive sectoral adjustments and increased uncertainty in national and international economies; a major demographic transition as reflected in slower rates of population growth, changes in average household size and composition as well as in labour force participation rates; shifs in traditional patterns of migration flows; the widespread improvement in transportation and communication and the diffusion of technological innovations downward through the urban size hierarchy; an apparent decline in the relative importance of historically strong agglomeration benefits in large cities; and changes in the attitudes to and perceptions of different cities and regions as places to live and work.

Less well known and understood perhaps are the consequent but slower transformations that have taken place in the spatial organization of national (and regional) urban systems. Most industrialized countries, for example, have witnessed sharp declines in the growth rates of their largest urban centres during the 1970s and an accelerated rate of spatial deconcentration of population, income and productive capacity. In addition, some peripheral regions have undergone renewed growth, through new investment, upward price shifts for their export products, and a reversal in the traditional net outflow of

migrants. Many smaller cities and towns have also witnessed relatively higher growth rates, while some older industrial centres have actually lost services, functions, employment and population in absolute terms. In contrast, within many growing regions, a continued centralization of population and jobs in the principal metropolitan areas has taken place, while within the urban areas of such regions decentralization (suburbanization) from core to hinterland has continued, often extending new growth in the outer margins of the urban field. Morrill (1979) has illustrated the simultaneity of these trends at national, regional and local levels for the United States.

This combination of diverse trends has not only altered wellestablished spatial patterns of urban growth, but it has substantially rearranged the relationships between the correlates of growth. No longer does city size or even the accessibility of an urban centre provide a strong predictor of that centre's rate of growth. Nor does a particular shift in economic mix or in net migration flows necessarily produce the same expected outcomes in terms of the growth or decline of other sectors.

Moreover, it now seems evident that roughly the same combinations of factors can produce very divergent patterns of change within the urban system in different countries, even those within the highly developed post-industrial world. This coincidence of complex, divergent and often unanticipated changes, added to our obvious inability to predict the form and directions of changes in urban systems during the 1970s. This mis-match between theory and empirical reality also calls into question much of our conventional wisdom on the underlying processes of urbanization and the policies built on that wisdom.

The purpose of this review paper is essentially empirical: to document and assess recent changes in the spatial structure of national urban systems in a comparative international context and to pose a series of questions for subsequent reasearch and theoretical analysis. What types and spatial configurations of urban systems are emerging? Does the trend towards a spatially-decentralized urban system represent a short-term perturbation in the spatial development of capitalist economic systems or is it a long-term process of adjustment in the settlement pattern of all advanced economies? Does this adjustment process accelerate or decelerate under conditions of slow (or zero) population growth? What happens to the variance of urban growth rates under such conditions? Will the trend be reversed as some observers argue, if and when the current recession ends? What types of modifications to existing concepts, theories and metrics of urban systems appear to be needed? What are the potential implications of these trends for public policy? Finally, has there been a convergence or divergence in the structure of urban systems among industrialized countries – both in market-based and socialist economies – and between those countries and the Third World? These are the kinds of questions addressed in an admittedly preliminary fashion, in this paper.

The following discussion draws heavily on a richly varied and rapidly expanding body of literature on the comparative analysis of urban growth, on the theory of urban systems and on the empirical documentation of recent changes in urban settlement patterns. In particular, many of the assertions are based on a series of scholarly papers produced for the Regional Science Summer Institute in Siegen, West Germany (see Bühr and Friedrick, 1980), and for the Commission on National Settlement Systems of the International Geographical Union in Poland (see Dziewonski *et al.*, 1979), which document the changing spatial organization of urbanization in several different countries. Additional comparative research is also available from continuing studies undertaken in Austria by IIASA and the Vienna Centre for the Social Sciences (see Swain and MacKinnon, 1976; Hall and Hay, 1978; Kawashima and Korcelli, 1980) and at the O. E. C. D. in Paris. In addition many of the ideas reflected in this paper are drawn from our continuing analyses of the rather unique urban system which has developed in Canada. Reviews of some of the competing theoretical stances are also available in a number of parallel reference volumes (see for example, Berry, 1976; Thompson, 1977; Harvey, 1978; Bourne and Simmons, 1978; Dunn, 1980; Berry and Silverman, 1980).

## CONCEPTS AND MEASURES

### THE DETERMINANTS OF SPATIAL REORGANIZATION

Initially it is necessary to identify the basic parameters and the exogenous variables which have acted to undermine the conventional wisdom on how urban systems are organized and how they are changing. At the risk of extreme over-simplification, five major sets of explanatory variables have been suggested in the literature:

1) *economic adjustments*: including slower overall growth, greater uncertainty and the massive and relatively rapid shifts in the growth fortunes of individual sectors of national (and international) economies; specifically, the relative decline in manufacturing and the growth of resource sectors, and the shift of some manufacturing activities to developing regions.

2) the *demographic transition*: including slower rates of population growth – in some countries leading to an absolute decline in national population – a continued aging of the population, a marked reduction in average household size, substantial shifts in the size of different age cohorts, and large fluctuations in the number of new entrants to the labour force.

3) an apparent decline in the importance of large-city *agglomeration economies*, due in part to the diffusion of technological innovations down the urban hierarchy, and in part to the sectoral decline of industries which traditionally have been dependent on the economies flowing from urban agglomerations, and to the continuing reduction in the friction of distance (in time and money terms).

4) changing social *attitudes* and preferences as to what are or are not desirable and attractive environments in which to live, work and retire, resulting in considerable locational shifts among a number of population groups and economic sectors.

5) government *policies* and programs, at both national and international levels, which have intentionally or unintentionally contributed to the processes outlined above, and/or which have themselves set in motion processes designed to reorganize urban systems toward some 'normative' spatial patterns and urban characteristics.

Each of these sets of factors exhibits its own momentum, but all are interdependent. The first set focusses on the nature and changes in the means of production, and on the spatial restructuring which follows from those changes. The second set suggests that demographic change has its own internal logic, thus demanding its own theoretical models, while at the same time suggesting that urban growth is at least partly led by demand. The third set draws more specifically on locational explanations and on relative changes in the kinds of local environments which either attract or repel economic growth. The fourth set argues for the importance of social change in determining urbanization and rests on the principle of relatively unconstrained choice in household location decisions. The fifth set invokes a 'designer' principle in which governments, or more generally the state, act to articulate a new pattern of urbanization either inadvertently or through concerted planning efforts. Of course the proponents of these different sets of arguments include some unusual bed-fellows, in both methodological and ideological terms, who would naturally object to this classification.

The most difficult questions still remain unanswered, however. Can we translate this essentially descriptive listing of determinants into a single cohesive and systematic set of arguments? How can we assign weights to the relative importance of each of the components of change? How do we know which if any of these variables are the dependent variables and which are the independent variables? How do these interrelationships vary over space and time and between countries?

One of the purposes of the research on which this paper is based is precisely to assess the relative contributions made by these factors in creating alternative spatial configurations of urban systems, as they are evident in the diverse experiences of urban

development at the international scale. In this context the dependent variable is the organization of the spatial system itself. The input variables then are drawn from concepts relating to production, demography and social preferences, with an overlay of public sector (design) policies and a localized element of agglomeration economies and diseconomies. This approach has the danger of remaining at what is an essentially eclectic level, but it also holds out the challenge of integrating a diverse body of competing theories and propositions.

There has also been considerable debate on the extent to which these processes are new and different. Are they inherently different from – in other words, do they reflect a 'clean' break with – the past? Or are they essentially continuations of long-standing historical processes whose relative scale and impact may have changed but not necessarily the processes themselves (Vining and Strauss, 1977; Vining and Kontuly, 1978; Gordon, 1979; Morrill, 1979; Bourne, 1980). The search for explanatory variables will obviously differ depending on which of these interpretations (if any) the researcher ascribes to.

In our view, neither interpretation is appropriate. The particular result will depend on which specific bodies of data, measurement scales, units and countries are under discussion. Instead what we need is a unifying framework which sees these trends both as continuations and as revisions to past trends. A convenient concept which may be used in support of this interpretation is the notion of polarization reversal (Richardson, 1979). When applied to the context of urban systems, this concept purports that at a certain point in time the net inflow of population and other growth-inducing factors towards metropolitan areas turns into a net outflow, as a result of both exogenous economic adjustments and the increasing disadvantages of locating within large urban areas. More generally, it is possible to look at such a pattern of temporal change as representing an extension of the traditional S-shaped growth curve, but with the addition of a contraction phase following the earlier phases of rapid growth, tapering off to slow growth and stability. This contraction is most likely to lead to a new but lower equilibrium or steady state as the urban system adjusts to the new conditions. According to this perspective, the urban trends for the decade of the 1970s should not really be seen as divergent from those observed during the 1960s. This indeed is what many authors have been suggesting (see, for example, Koch, 1979; Illeris, 1979; Korcelli, 1980).

The lack of consistency in the empirical findings, however, is further complicated by the overlap of many individual processes, as well as by existence of temporal and spatial lags among the individual variables. At any point in time, structural adjustments within urban systems reflect the outcomes of a complex integration of both short-term and long-term processes, some of which are gradual (e.g. aging and obsolesence) others are catastrophic (e.g. oil price increases); some represent regular or frequently recurring events (e.g. household relocations), while others are relatively infrequent occurrences (e.g. the opening of a frontier, a new industrial innovation or the discovery of a new mineral resource). Some also have an impact on settlement patterns which is both direct and measurable (e.g. the growth of a new town or specialized retirement centre), while others have impacts which are indirect and often unmeasurable (e.g. government transfer payments).

## METRICS OF SPATIAL REORGANIZATION

Given this empirical complexity, and the lack of conceptual clarity, it is perhaps not surprising that there is so little consistency in the literature in how one defines of measures growth and change in urban systems (see Klaassen and Paelinck, 1979; Bourne and Simmons, 1979; Dunn, 1980). Aside from such obvious measures as changes in the size and economic functions of individual cities in the system, and the changing pattern of interactions between them, there is no agreed-upon set of criteria by which structural reorganization in its broadest sense can be measured. Without such consistency there is continual misunderstanding and confusion in the theoretical debate, and very little pros-

pect of achieving consistent empirical observations on what is actually happening to national urban systems in a comparative context.

Among the various measures which might be brought together as useful descriptive metrics of structural reorganization within urban systems are the following:

1) the degree of *hierarchical* centralization or decentralization, of population, jobs, income and political power within the urban system. One might begin here with such simple measures as the degree of primacy (based on the rank-size criterion) or of metropolitan concentration (based on criteria of proportional distributions of population), or more refined indices based for example on corporate control (Warneryd, 1968; Pred, 1977; Borchert, 1978; Goddard and Smith, 1978); or strictly statistical measures of the form of urban population distribution (entropy).

2) the degree of *spatial centralization* or *decentralization* using indices similar to those in 1) above.

3) the relationship between average rates of urban *growth* and decline) and *city size* (population) or size classes; and the *variance* of urban growth rates by region or city-size class) with respect to the system-wide average growth rate.

4) the changing patterns of *migration*, particularly the relationships between urban size (or hierarchical level) and in/out-migration rates.

5) other system-wide *interaction* effects, including the changing network configurations of interactions between urban places in relation to their size, functional characteristics and location; and overall measures of changing patterns of spatial accessibility (such as population potential).

6) the extent of *regional differentiation*, including the changing degree and pattern of regional specialization, in economic structure, population composition, income levels and investment patterns.

7) *sub-system effects*, including the extent to which national urban systems are becoming more or less compartmentalized (as measured for example in interorganizational links) into distinct and relatively interdependent regional sub-systems, or whether national linkages are continuing to dominate.

8) the range and *intensity* of daily (weekly, seasonal) travel patterns, measured by number of commuters, business and/or recreational trips; average distance (in time, cost) travelled; and the relations of these metrics to urban size and hierarchical level.

9) temporal or *lead-lag* effects, in terms of the relationship between economic growth (e.g. jobs, income) and population growth and migration.

Each of these traditional indices picks up only one particular dimension of the changing 'spatial' form and internal organization of urban systems. What remains to be explored is whether these same indices can be applied systematically to a number of diverse countries without losing too much of the interesting variation between different urban systems, and whether this listing of factors can be linked back to the determinants of change outlined earlier.

## THE EMPIRICAL BASE

What has in fact happened to the spatial organization of urban systems in reseponse to the above determinants of change? Do these trends indicate that a fundamental transformation of those systems is taking place? Is this transformation the outcome of gradual or evolutionary processes or a series of revolutionary events? What directions might we anticipate future changes will take?

In responding to these questions one must first differentiate between countries or groups of countries in terms of their stage or level of economic development, their relative size in population and geography, and their internal cultural heterogeneity and of course the type of political and economic system. These four attributes serve as

the broad parameters within which urban systems evolve. We know, for example that a country's stage of economic development is closely related to the level of urbanization and to the degree of integration of the urban system. The size of country and its physical topography directly shape the form of its urban system, much as does the cultural landscape. Further, the type of political structure (federal vs. unitary states) and the prevailing modes of production (capitalist vs. socialist; industrial vs. service industries), condition the geometry of the urban system which results.

This section of the paper examines how these conditioning factors combine with the specific determinants of change discussed above to create both parallel and divergent patterns of urban development. Initially reference is made to trends in the 'mature' or heavily industrialized countries of Western Europe and North America. Secondly, concurrent trends in the centrally-planned economies of Eastern Europe are examined and then briefly contrasted with those in the developing world.

## RECENT TRENDS EXPLORED: MARKET ECONOMIES

In most of Western Europe and North America, with a few notable exceptions, the decade of the 1970s witnessed a number of complex but remarkably similar structural changes in national urban systems. As previously noted, it is widely acknowledged that there has been a continued decentralization of population (and in most instances of jobs) downward through the urban size hierarchy and outward from the core industrial regions towards previously non-industrial areas and the rural/recreational periphery. Rates of urban growth in aggregate now show, almost universally, a zero or negative relationship with city size and with the degree of local economic specialization in manufacturing. Traditionally wide regional differences in occupational and employment mix appear to have been reduced as formerly non-industrial areas become more industrial and as smaller urban places have assumed an increasing importance in the provision of higher order goods and services.

At the same time the degree of intra-regional integration – which serves as a crude index both of the level of maturity of the regional economy and of the extent of decentralization from the national core region – has increased. This is particularly true in those countries with relatively decentralized political systems. In Canada, for example, those cities with public sector employment (e.g. provincial capitals) have shown the highest growth rates. The long-standing historical process of an increasing concentration and orientation of interaction networks in and around one or a few major metropolitan centres, has ceased if not been reversed.

These trends in turn have elevated regional urban sub-systems to greater prominence as components in national urban systems (Bryce, 1977). Through increases in the number, frequency and diversity of linkages among cities located in close proximity to each other (but not part of the same metropolitan region), such cities collectively have been able to achieve many of the same returns to increasing scale in the provision of a diversity of services, achieved by the very large metropolitan centres. This configuration is not unlike, although on a somewhat larger geographical scale, the regional system of cities concept proposed by E. Howard and several generations of regional planners in both eastern and western countries. Regional urban integration has also been advanced, as previously noted above, by the rapid spread of contemporary communications technology into almost all regions of the economically advanced nation, and by the relative growth of small and medium size urban centres through changes in their economic base and/or in life style and environmental preferences.

The importance of demographic, environmental and life style changes – that is, shifts in consumption patterns – in this urban transformation are the most difficult to substantiate empirically. Clearly, rising real incomes throughout the 1960s and 1970s have allowed a larger proportion of the populations of almost all developed countries to select places

of residence and work with and increasingly greater emphasis on their personal whims, life-style needs and preferences. In study after study, residential preferences have been shown to favour small, non-industrial cities and those regions which are warmer, unpolluted and amenity-rich, over the older, larger and more congested industrial centres (Berry, 1977). Equally important, retirement populations have grown and for those with substantial discretionary incomes and portable pensions comes the opportunity to move to (what are preceived to be) less stressful, perhaps lower-cost and often more familiar locations.

One further consequence of the combination of rapid economic adjustments and migration as a response to life-style preferences, is that the traditional relationships between economic growth, net migration, population growth and income generation have been altered. Simmons (1980) has clearly demonstrated this point for the Canadian urban system with data for the 1971–76 census period. Growth in the urban economy, and in population, employment and income do not necessarily go hand-in-hand, at least in the short-run. For example, substantial increases in employment in particular cities in the Canadian urban system were absorbed not through an increase in in-migration but by altering rates of labour force participation and unemployment. Similarly, considerable increases in total community income were achieved in some urban places without a significant increase in the rate of in-migration, the number of jobs created or in total population, often because of relative increases in the prices of local products produced by these places. Equally diverse responses were recorded in those areas which underwent a substantial decline in employment, population or income. These results in part reflect the difference between short- and long-run perspectives, but there is much more to it than that. One obvious implication of these trends and changing relationships is that our models of urban and regional growth now appear to be increasingly dated and in need of revision. Some of these models were ill-considered initially, while others have simply been by-passed by recent events.

## RECENT TRENDS EXPLORED: PLANNED ECONOMIES

In the case of the socialist countries of Eastern Europe, the urbanization patterns of the 1970s have been characterized by a number of new phenomena, or at least by a considerable modification of trends established in earlier decades. These trends have not, in fact, been uniform among the individual countries concerned, due to wide variations in their inherited settlement system, economic structure, and demographic momentum. The present section looks at three interrelated aspects of these trends, namely urban population growth, changing migration patterns, and the development of interurban linkages, using selected empirical evidence for Poland, Hungary, and the German Democratic Republic (GDR).

As in previous decades, the highest population growth rates during the 1970s have generally been *characteristic of middle size urban places*. Within this size group, however, and in contrast to the urban systems of the market economies, the peak growth rates have shifted in recent years towards either the larger or smaller size cities. In Poland, for example, the former trend has been true, with the highest population growth rates recorded in those urban regions having shifted from the 50–100 to 200–500 thousand size group between the 1960s and early 1970s (Korcelli, 1979). Even the largest urban core areas (of one million population and over) have shown an accelerated rate of population growth, although their respective rates remain much lower than those typical of the smaller urban areas.

In Hungary, on the other hand, population growth has increasingly shifted downward to cities of smaller size, generally those cities below the provincial capital level. Such variations are largely attributable to alternative spatial allocation policies, designed to achieve more balanced urban development, but these policies can in turn be traced back

to the characteristics of the existing settlement structure. Thus, the extreme primacy of Budapest, combined with the prevalence of a relatively sparse urban network in Hungary, have precipitated government measures aimed at a rapid expansion of five middle-size cities which would serve the role of provincial centres as well as countermagnets with respect to the growth of the capital region. During the most recent time period (i.e., the 1970s) the development of tertiary activities and the deconcentration of industry in Hungary have encouraged spread effects, the main beneficiaries of which became urban places in lower hierarchical levels, e.g., towns of between 20–50 thousand inhabitants (Lacko *et al.*, 1978).

In the case of Poland, with its relatively well-balanced urban hierarchy, the large-city growth limitation policies applied by the government during the late 1960s were primarily justified by the limited service and infrastructural facilities available in the large urban areas, rather than by more explicit long-term spatial objectives. Post-1970 spatial policies, for a variety of reasons, have instead emphasized the productivity benefits of large cities, and thus have supported the development of major urban agglomerations, along with some forty middle-size cities. As a result, the spatial deconcentration trends evident in Poland in the previous decade have been replaced during the 1970s by a moderate trend toward concentration. Nevertheless, more recent physical development plans provide for the more rapid growth of smaller places when compared with large urban agglomerations. Indeed, both the changing distribution of the labour force, and the newly-organized (in 1975) spatial administrative structure (with 49 upper-level units replacing the former 22 regions), will likely contribute to the acceleration of such a decentralization tendency in the early 1980s.

Migration flows during the 1970s have generally been characterized by a decline in the relative magnitude of the flows and of the distances involved. The trend towards lower mobility levels has also been documented for Hungary (Bies and Tekse, 1978), as well as for the GDR (Mohs, 1979). In Poland, mobility rates, when adjusted for changes in the spatial units of measurement, were actually somewhat higher in the 1970s than during the late 1960s, but this modest increase seems to be largely of a temporary nature. The predominantly interregional scale of migration flows has been a feature common to all three of the countries under discussion. The large-scale movements of population towards industrializing regions (such as to the southern part of the GDR), which prevailed during earlier time periods, have come to an end.

Both demographic and economic factors have contributed to the observed patterns of urban change. The former included the declining numbers of new entrants into the labour force (in Poland – from the late 1970s on), and the shrinking (absolute) numbers as well as the evolving age composition of the remaining rural population. The latter trends are often referred to as reflecting declining interregional disparties in socio-economic indicators (Lüdemann and Heinzmann, 1978). Hence, migration decisions are increasingly dominated by pull factors (e.g. the characteristics of the migration destinations, rather than those of origin areas). Among these factors the availability and quality of housing, in a country in which there is still a severe national housing shortage, play a very important role.

Still, population migrations continue to be primarily oriented towards cities, with an increasing proportion of total flows accounted for by urban-to-urban moves, as has been the case for some time in western countries. Interurban migration flows also tend to follow the hierarchical organization of cities by size, but this trend too may be subject to alteration over the next decade or so, as a consequence of the changing patterns of movement between middle-size and large cities noted above, as well as by continued suburbanization and the spatial deconcentration of urban agglomerations.

Another major trend of the last decade in most of Eastern Europe has been the growing unity of national settlement systems (Dziewoński *et al.*, 1979). In particular, the degree of integration seems to be advancing at two distinct spatial levels: (a) among

the major urban centres, and (b) between large cities and their surrounding hinterlands. At the former level, there is evidence of an increasing specialization of functions among cities in both the secondary and quaternary sector, together with a concomitant growth in the magnitude and diversity of flows between these cities. Migrations among urban agglomerations, although not very large in absolute terms, or relative to local migrations, tend to involve highly skilled and professional groups. The evolution of intraregional linkages, on the other hand, is primarily expressed in the growing numbers of commuters, and in the evolution and consolidation of extensive commuting zones around the large and medium-size cities.

## RECENT TRENDS EXPLORED: LESS DEVELOPED COUNTRIES

During the 1970s the less developed countries (LDCs) for the most part have experienced a continuation of the urbanization patterns established during previous decades. A number of those earlier trends, for example the very rapid expansion of large cities, have even accelerated in some countries, thus contributing to a *divergence* of observed urban trends between the more and the less developed worlds. Demographic factors, of course, have been heavily but not exclusively responsible for what can be described as a polarization of urban growth change patterns. Although interrelated with the stage of economic development and level of urbanization, the rapid growth of national populations in the LDCs has produced enormous population pressure in the rural regions, which seek relief through large-scale out-migrations. Here the logic of the production process and the need for labour become critical. Due to scarce infrastructure and the relatively limited availability of capital nationally, economic growth and employment opportunities tend to cluster predominantly in large cities. No doubt multi-national corporations add to these pressures for concentration. Hence, these cities attract the lions share of all rural migrants. Moreover, since a considerable percentage of these migrants fall into age groups with the highest levels of fertility, the rates of natural increase in the large urban areas for some time remain at least as high as their respective national rates.

This web of interdependence has produced very high rates of urbanization and a massive scale of urban growth. This generalization is true not only of those countries situated at the bottom of the pyramid of economic development (as measured in GNP per capita), but also in the relatively more developed countries of the Third World, such as Brazil. The metropolitan agglomeration of Sao Paulo, for example, with a total population of close to 12 million in 1978, has continued to grow at 5 percent annually, with approximately one-half of the total net increase (i.e., 300 000) accounted for by in-migration.

A large body of literature has accumulated on the deepening urban problems of the less developed countries, specifically on such basic issues as urban slums, regional inequalities and poverty (see, for example, Laquian, 1979). The consequences of the rapid expansion of large cities for the structure of settlement on a national scale, particularly in terms of the inequalities created, has also been extensively discussed on both empirical (Abu-Lughod, 1976) and theoretical grounds (Richardson, 1979). The increasing degree of urban primacy has been generally regarded as a serious hindrance to the balanced development of national urban systems and the economic advancement of peripheral and rural regions.

Considering both demographic structure as well as economic and technological imperatives it seems safe to predict a continuation of the prevailing urbanization trends, as already established, over the next two decades or so, at least until population growth pressures begin to subside and more balanced economic growth is achieved. If these assertions hold true, the unfolding dimensions of urban growth would likely surpass by far the scale of urbanization in todays developed world, and would also render most

of the available concepts of urban system structure and change as unfit from both the research and policy perspectives.

## ALTERNATIVE SPATIAL PATTERNS: AN OUTLINE

Translating these rather eclectic comments into concrete assertions regarding the emerging spatial patterns of urbanization – as measured by the spatial configuration of urban systems – is a much more complex task. The specific manner in which any given urban system responds to these trends is, as previously emphasized, slow and conditioned by many diverse factors. Two basic factors in the preceding discussion stand out as warranting emphasis here. One is the effect – both as an opportunity for and a constraint on change – of the extant urban system. The existing spatial configuration of urban places and the networks of linkages among those places, including the form of the transportation system, which represent the structural inheritance from past periods, act to shape subsequent patterns of adjustment. With the exception of those countries in which the national urban system is still expanding through the settlement of virgin lands (Dziewoński, 1978; Simmons, 1978), the majority of settlement changes involve rearrangements within existing networks of urban places.

Second, is the important role of the socio-political system and specifically of planning and spatial development policies in shaping patterns of urban growth and decline. This consideration goes well beyond the obvious dichotomy in planning powers between centrally-planned and market (or quazi-market) economies, to include the entire spectrum of government powers and their distribution among different agencies and levels of government. Even if the underlying logic and the general objectives of these various agencies and levels of government are similar, the specific objectives and implementation of policies are often in conflict. In relatively decentralized political systems, for example, even the national settlement system is shaped as much by decisions of the provincial, state and local government levels as by those made at the national (or international) level.

A third consideration, and one of increasing research interest, is the important role played by the production process in shaping urbanization. Boisvert (1978), for example, has demonstrated the close correspondence between the economic base and the form of urban development in each of Canada's regions. Simmons (1978) has argued that each type of staple product necessitates its own network of centres for production and distribution, its own system of transportation needs and institutions. Others have focussed on the importance of technological innovations and product life cycles in redistributing urban growth (von Böventer, 1978; Rees, 1979). Still others have attempted to extend the approach into a deterministic theory in which changes in the form of the urban system are a logical outcome of the mode of production, in this case the capitalist mode of production, and of the conflict between capital and labour. Thus far, most such analyses remain incomplete or indeterminate.

Although beyond the scope of this paper in detail, it is possible to contrast the principal directions of change which follow from the above considerations. The most decentralized urban systems are emerging in those countries with high levels of technological development, decentralized political systems, large resource-based economies, well-developed transport and communications systems, and in those exhibiting intense regional and urban economic specialization. The latter factor, part of the extent urban system cited earlier, lays the basis for one of the core problems under discussion here: namely, under what conditions does a vide differential in the growth performance of individual economic sectors result in a corresponding differential in the spatial pattern of growth within the urban system? Since decentralization is a relative measure, it also implies that those systems with geographical concentrations of out-moded industrial plants or depleted resource areas are most likely to witness substantial regional shifts.

A GRAPHIC SUMMARY

One attempt at bringing together some of these components for illustrative purposes, and as a basis for subsequent research, is provided in Figure 1. Here we contrast, assuming a certain degree of over-generalization, measures of the form and organization of urban systems under what may loosely be called 'urbanizing' and 'post-urbanizing' stages of development. To a considerable extent these two ideal types are equivalent to the common images of developing of 'industrial' and 'post-industrial' or developed societies. The first example (a) in the post-urbanizing state indicates a decline in the degree of urban primacy, as an outcome of the relative growth of medium-size urban places, and thus a flattening of the traditionally steep rank-order distribution of cities by size. The second (b) and third (c) examples reference the reversal of the traditionally positive correlation between rate of population growth and size of city. As part of this shift note the shift in net migration from a bias in flows upward within the urban hierarchy to a reciprocal if not a downward bias in the flows. At the same time, horizontal or interurban movements, among cities of similar size, have increased in relative terms. Fourth (d), it is also assumed that the standard deviation of urban growth rates has declined – also reflecting a spatial smoothing process – and that the entire frequency distribution of growth rates has shifted downward to the left (lower rates) and closer to a mean of zero. As expected, a much larger proportion of urban places now show zero or negative growth rates. At the same time levels of foreign immigration have generally declined, as unemployment increased throughout the developed world, and the smaller remaining immigration flows have also shifted downward within the urban size hierarchy although to a lesser extent than those for internal migrants.

Yet another example argues that the spatial expression of these trends is toward a more decentralized urban system, particularly within the western quazi-market economies but also increasingly within the socialist countries. Medium-size cities have grown and increased both the geographic extent of their hinterlands and the intensity of their network of dependent smaller places. Some new centres may also have been added to the urban system, either through 1) the physical extension of urban development into rural areas or a new frontier (growth outside the system) of 2) the fact that existing small cities have grown and passed the minimum threshold population size for inclusion in the system (growth within). Often, both types of centres develop within the sphere of influence of medium-size rather than larger metropolitan complexes and thus become part of the network of places dependent on those of medium-size. This in turn has contributed to further decentralization tendencies within national urban systems.

At the same time, as the fifth example (e) in Figure 1 suggests, the relationships between the components of urban and regional growth have also changed. Clearly they would have to change in order to produce the divergent spatial patterns noted above. Nevertheless not only have the relative contributions of various individual components of growth changed, but the signs of the relationships between these components have often shifted. The traditional assumption has been that of a relatively close temporal relationship between a growth in income, population and employment, for the urban system as a whole and for individual centres in that system. Recently, these components have shown a much less consistent relationship. A growth (or decline) in one component does not necessarily follow the growth or decline of any of the others. In particular, manufacturing employment is now seldom the principal priming factor in urban change, while the growth of the private service sector has slowed sufficiently that it too is not a necessary precondition for urban economic growth.

In addition, the spatial patterns or networks of organization linkages have become both more numerous and more complex (example f). Strict hierarchical dominance has been reduced, due to the changing division of service functions and production facilities

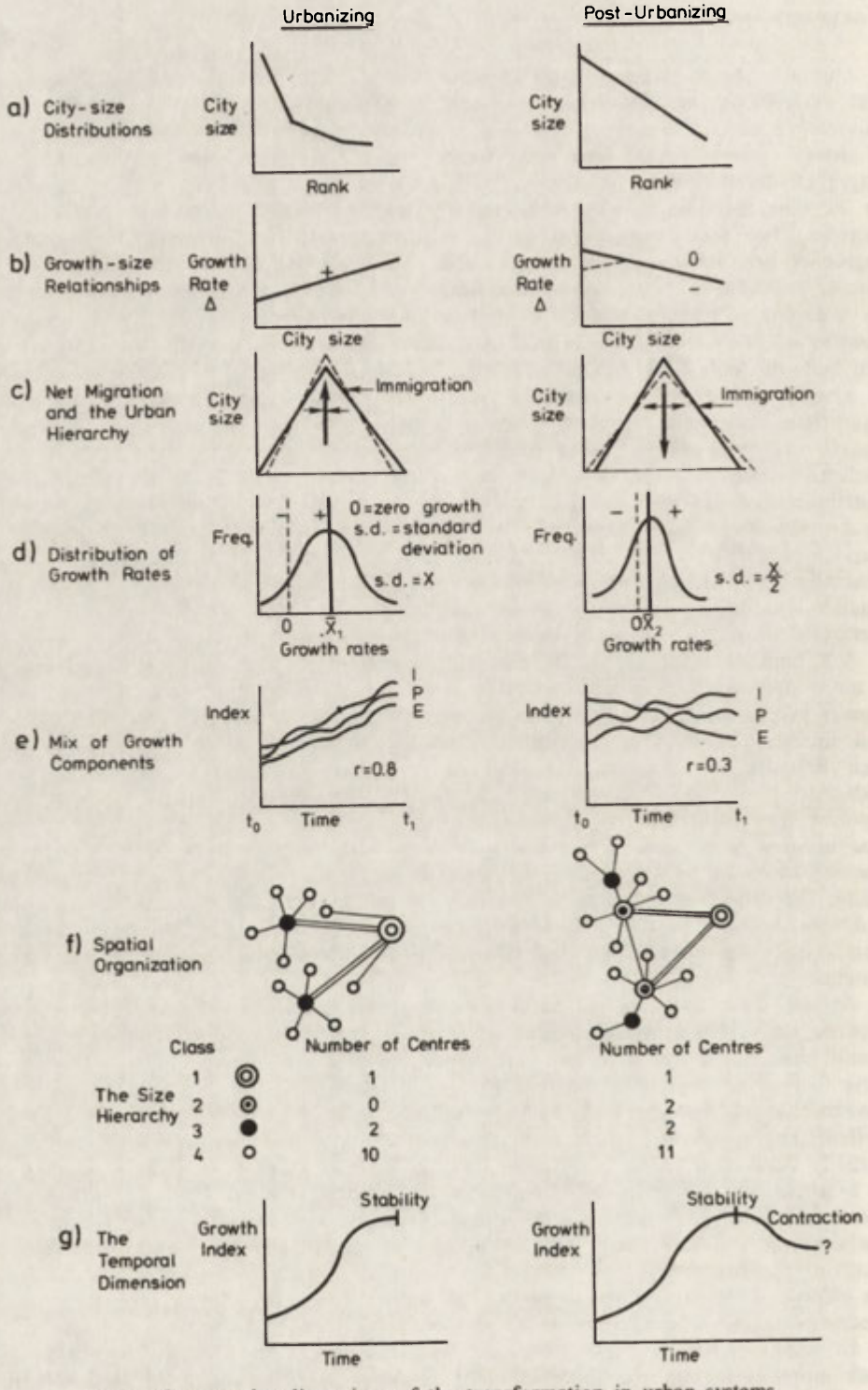


Fig. 1. Comparative dimensions of the transformation in urban systems

between large and medium size cities on the one hand and between urban core regions and hinterlands on the other hand.

Viewed in this way, the reorganizations of urban systems that we have seen in the last decade suggest that these adjustments are due less to the real decline of the very large cities, although there are some examples of absolute decline, than to the rapid growth of smaller cities and to the *replacement of dominance by interdependence* within urban systems. As Thompson (1977) has argued, the U. S. is not abandoning large cities as such, it is simply building new ones in different regions. In ten or twenty years, newer cities such as Phoenix, Miami, Atlanta and Houston will very likely become large metropolitan complexes rivalling the older centres of the east coast and Great Lakes regions. Yet they will not replace those centres in terms of creating new patterns of urban dominance. Instead, it is argued that if and when a new equilibrium is established in the U. S. urban system, it will be a much more decentralized system than that of the past. As the last two examples (f, g) in Figure 1 suggest, we may then have come full circle with the re-establishment of a new balance or equilibrium in urban development.

## CONCLUSIONS

These kinds of transformations, if they are signals of continued relationships rather than mere short-term 'disturbances', suggest that our existing array of urban and regional growth models may be increasingly bankrupt. To reach such definitive conclusions here, however, necessitates more thorough comparative studies of the growth patterns and relationships within urban system than are available at present. There is little doubt, nonetheless, that models of settlement systems based on data from the 1950s and 1960s are no longer appropriate as the basis for projecting future urban trends or for establishing new policy directions. These models were not only defined under conditions very different from those prevailing today, but they appear to have been mis-specified theoretically.

Comparative empirical studies of urbanization trends are particularly valuable because they stress the need for robust theories and because they highlight the importance of a country's physical geography, history and stage of economic development in shaping the spatial configuration of its contemporary urban system. In so doing they illustrate both the dynamic nature of all settlement systems and the difficulties inherent in any attempt at developing a deterministic theory of how such systems grow and change.

Finally, one must acknowledge the critical dimensions of spatial scale, timing and political in measuring change in urban systems. This paper has almost exclusively addressed recent settlement changes at the national level. Obviously quite different directions of change may be taking place at the same time at various other spatial scales. Although decentralization is the paramount spatial process within market-based urban systems, at the scale of regional sub-systems – particularly those in resource and agricultural areas – centralization is often still the dominant process. On the other hand, within centrally planned economies there is evidence that the largest centres are continuing to grow, although at a reduced rate. Thus, no single frame of reference is likely to capture the full complexity of change in what we have termed spatial configurations of national settlement systems.

The latter suggests the need not only for better theories and improved analyses but for data files on urban systems, files which are sufficiently flexible to permit aggregation and disaggregation across a range of spatial scales and for different time periods. Studies in several countries (summarized in Kawashima and Korcelli, 1980) have already confirmed the fascinating implications and challenging insights for both research and policy which flow from analyses of such data.

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# CHANGING SPATIAL TRENDS AT THE NATIONAL, REGIONAL, AND METROPOLITAN LEVELS OF THE SETTLEMENT SYSTEM IN DEVELOPED WESTERN COUNTRIES

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During the past decade, developed Western societies have experienced a series of significant demographic and economic shifts.[1] These include declining population growth rates, changing household composition and labor force participation rates, basic sectoral changes in the economy, dramatic changes in the size and organization of job providing organizations, a continuing revolution in communications' technology, reversals in some longstanding migration movements, re-assessments of the availability and cost of energy, and changing preferences and aspirations with respect to life-styles.

These shifts have been accompanied by changes within national settlement systems. In most developed countries these changes include relative decline (slow growth, no growth, etc.) in the largest urban centers, higher growth rates in medium-sized and smaller centers, and rapid growth in certain amenity-rich peripheral areas. These trends might be expressed in terms of: a spatial decentralization of the urban system; a decline in primacy; a negative urban size-growth ratio; a flattening of the rank-size distribution curve; and an expansion of horizontal-interdependent rather than hierarchical interaction patterns within the system. At the same time, these developments occur in various combinations, at varying rates, and in various stages among the different regions within the same national system.

The belated recognition of many of these trends points up some frailties in our settlement methodology. These include (a) an over-dependence upon census data, which, inevitably, are 'after-the-fact'. For example, several long-term U. S. trends appear to have been detected, or at least made explicit, only with the publication of the 1974 inter-census tabulations (Sternleib and Hughes, 1975, p. 6), (b) our diverse and often contradictory 'metrics' for measuring growth and decline (Bourne, 1978), and (c) the inadequacy of our existing theories (Zelinsky, 1977). In tracing the threads of recent literature on the subject, it is possible to detect three different, though overlapping phases: (1) the 'initial realization' phase when the magnitude of recent changes began to be recognized. This phase was marked by talk of a rural renaissance in the press, by the

[1] The use of the term 'past decade' is common, but arbitrary. It is clear that the roots of some of these developments are to be found in earlier years.

appearance of new terms (counterurbanization, nonmetropolitan growth, etc.) in the professional literature, and by the inauguration of new debates (clean break versus non-clean break, etc.); (2) the 'balanced analysis' phase, as available data was analyzed and put into perspective. The phase was marked by a number of thorough and well-balanced publications, particularly in the United States (Levin, 1978; Sternleib and Hughes, 1975, 1978–A; McCarthy and Morrison, 1979; Dusenbury and Beyle, 1978); (3) the 'alternative explanation' phase, in which a variety of alternative hypotheses were, and are, being suggested as possible explanations (Bourne, 1980; Illeris, 1979; Klaassen and Paelinck, 1979). If such a break-down has some validity, the second phase is by no means over, and the third phase has hardly begun.

This paper is concerned primarily with the spatial expression of recent developments. More specifically, it attempts to synthesize a number of broad spatial processes, which appear to be common to virtually all market-oriented National Settlement Systems (Dziewoński *et al.*, 1979). Secondly, the paper attempts to incorporate and integrate the different spatial scales involved (national, regional, and metropolitan). The following questions are pertinent: Can spatial processes operating at one level of the settlement system be identified with those taking place at another? If so, do the resultant spatial patterns (at different levels) have similar attributes? Do changes taking place at one level of the settlement system bring on changes at another level? It would seem, for example, that if large urban areas are subjected to long-term population decline, not only their place within the national settlement system would be affected, but also their internal structure. If the preceding questions are relevant, are the dividing lines, conceptual and real, between the different levels becoming less meaningful? The breakdown into national, regional and metropolitan scales is essentially an arbitrary one. Are current trends making the dividing lines even fuzzier?

These questions are implicit (though not always made explicit) in the following pages. The approach will be to organize the discussion around a number of simple spatial concepts, which have been alluded to frequently in recent literature. Relevant aspects of those concepts will be discussed and where feasible, an attempt will be made to apply them to different levels of the national settlement system. Table 1 provides a framework for, and a summary of, the discussion.

## THE ZERO-SUM CONCEPT

Many writers have referred to recent demographic movements in the developed countries as a zero-sum game (Alonso, 1979; Berry, 1977; Korcelli, 1980; Phillips and Brunn, 1978). Briefly stated: in a situation of nongrowth for the system as a whole, growth in one part of the system inevitably means decline elsewhere in the system.

Two dichotomous factors make the zero-sum concept appropriate in discussing current population trends. One is the dramatic decline in population growth rates in developed countries. The second is the fact that there has been no accompanying decline in the dynamic spatial change processes (expansion, migration, development, relocation, shifts, etc.) that have characterized previous decades. Indeed, the propensity for geographic mobility has increased astronomically as a larger proportion of the population enters the 'mobile' age cohorts (young families 20–35, and older retirees), and as an increasing proportion of activities and institutions are counted among the locationally 'footfree' category.

The zero-sum concept can be applied at different levels of the settlement system. It is interesting to compare the following statement referring to national trends:

"Yet the nation's economic and demographic growth is slackening ... implying that we are approaching a zero-growth situation in which differential attractiveness to migrants is becoming even more critical. For small cities and nonmetropolitan areas to

TABLE 1. Spatial processes within the national settlement system

| Concept | Theme | Underlying causes | Related spatial concepts | Spatial scale | | |
|---|---|---|---|---|---|---|
| | | | | National | Regional | Metropolitan |
| Zero-sum | Growth in one place means decline elsewhere | Declining population growth-rates<br>*<br>Increasing mobility | Spatial redistribution<br>*<br>Re-location diffusion | "Southern" growth versus "Northern" decline<br>*<br>Nonmetropolitan growth versus Metropolitan decline | Nonmetropolitan growth versus Metropolitan decline<br>*<br>Smaller center growth versus Large center decline | Peripheral and selected inner city growth versus Center city – inner suburban decline |
| Expanding space demands | System wide expansion of settlement space | Rapid household formation<br>*<br>Multi-income families<br>*<br>"Post-shelter" society | Expansion diffusion | Settlement expansion<br>*<br>New settlements<br>*<br>Second home colonies | New settlements<br>*<br>Megalopolitan developments<br>*<br>Second home colonies | Metropolitan spatial expansion<br>tial expansion |
| Spatio-social segregation | Increasing spatio-social segregation within system | Expanding mobility<br>*<br>Diverse life-style motivations | Selective migration<br>*<br>Spatial segregation<br>*<br>Mosaic pattern | Selective migration streams<br>*<br>Interregional and intercity differentiation | Selective migration streams<br>*<br>Interarea and intercity differentiation | Social mosaic |
| System integration | More intensive system integration | Space-time convergence<br>*<br>Postindustrial economy<br>*<br>Declining agglomeration economies | Functional decentralization<br>*<br>Horizontal linkages<br>*<br>Polynodal spatial structure | Interregional functional shifts<br>*<br>Increasing number of control points<br>*<br>Expanding role of smaller centers | Increasing number of "activity" centers<br>*<br>Polynodal structure | Polynodal functional structure |

grow, other places must decline, and what are declining are the big cities of the old manufacturing belt heartland, which have lost their traditional position as centres of innovative leadership" (Berry, 1977).
with the following, referring to intrametropolitan trends:

"Two conclusions can be derived from these developments. First, overall population growth, which fuelled the metropolitan expansion processes of the suburban era, no longer is present. Second, and as a corollary, population expansion in one part of the metropolitan area takes place at the expense of another part. It was emphasized earlier that many institutions and processes associated with the expansion period of the 1950s and 1960s continue to operate, some with unabated intensity. If the zero-sum model is accepted, the continuation of these processes will bring inevitable decline elswhere" (Sinclair, 1979).

National and regional patterns of growth and decline have been well documented, and it would be redundant to describe them here (Berry and Dahmann, 1977; Sternleib and Hughes, 1978); U.R.P.G., 1978; Koch, 1979; Hall and Metcalf, 1978). Recent intrametropolitan patterns have been studied less intensively, but the broad outlines are clear. Population decline continues to characterize central cities and an everwidening arc of suburbia. The width of this arc varies from region to region, and in accordance with the maturity of the metropolitan area (Morril, 1979; Drewett, Goddard and Spence, 1976). Growth takes place, even in rapidly declining metropolitan areas, in newly developing suburbs, in the metropolitan periphery, and in selected parts (immigrant districts, renewal areas, 'gentrified' areas, etc.) of the older central cities. In other words, the intrametropolitan spatial pattern is being re-arranged (Sinclair, 1979).

This zero-sum concept can be related to nonmetropolitan growth, but the relationship is not as direct nor as clearcut as frequently is assumed. Commonly, generalizations about the phenomenon are based upon net figures, whereas the analysis of gross migration figures can lead to quite different conclusions (Alonso, 1978). Indeed, they can provide other hypotheses concerning the meaning of nonmetropolitan growth. Wardwell (1977), for example, views the present situation as the endproduct of a long historical process, rather than the onset of a new trend. According to his hypothesis, longstanding rural outmigration, as well as urban-rural differentials, gradually have balanced themselves out, so that we now have reached a population equilibrium between metropolitan and nonmetropolitan areas. Net figures (the residuals of two-way movements) might change from year to year, in accordance with some long- or short-term demographic change. At present, the scales are tilted in favor of the group more likely to favor nonmetropolitan locations (i.e. the enlarged proportion of retirement-aged population).[2]

These cautions do not deny the applicability of the zero-sum concept to nonmetropolitan growth. Rather, they point up that the concept is more complex than many studies, and many of our data bases, would lead us to believe. The spatial legacy of the zero-sum concept is a major spatial re-arrangement taking place at every level of the national settlement systems. Some of the most basic aspects of this re-arrangement process are not yet understood.

## THE EXPANDING DEMAND FOR SETTLEMENT SPACE

All developed market-oriented countries are experiencing an expanding demand for settlement space. The basis for this development has been well covered in the demographic literature, but the spatial implications, and the effect upon the settlement system, have

[2] Wardwell is careful to point out that he speaks here of 'undisputed' nonmetropolitan growth, and not the kind that might be interpreted as an extended form of metropolitan expansion.

received less attention. Yet this phenomenon probably has had a greater impact upon the national settlement system at every level than the factor of nongrowth itself.

Underlying much of this development is the bulge in the demographic profile of most developed countries, originated by the postwar 'baby boom'. Though varying from country to country, members of this bulge have reached the household-forming stage. Households today, however, tend to be small, a product of recent societal and attitudinal changes. Thus household size decreases, whereas the number of households increases. It is the number, rather than the size, of households which dictate present-day housing demands. Moreover, those housholds have expanding expectations with respect to dwelling space. These expectations are promoted by the high proportion of two-income famillies, reflecting high female labor force participation rates. Also, the incentive to purchase large homes is exaggerated, in that home and property ownership is regarded as security against rising inflation and increasing insecurity of our times, a situation indicative of the 'Post-Shelter Society' (Sternleib and Hughes, 1978).

The repercussions of these trends are to be observed in virtually all market-oriented countries. In the brief period from 1970–1975, the average household size in Phoenix, U.S.A. fell from 3.25 to 2.83 persons (Gober, 1980). In the more extended period 1960–1977, the average household size in urban agglomerations of Nordrhein-Westphalen, Germany fell from 3.5 to 2.5 (Moelle, 1978). As Moelle points out, this means that one-third of present housing stock does not serve as accommodations for additional inhabitants, but as improvements in housing quality. The repercussions are expressed in other ways. In the Detroit, U.S.A., SMSA between 1970 and 1977, whereas sixty-five communities (suburbs) were incurring population losses, only three showed a decline in the number of dwelling units (Sinclair, 1979).

An extension of these developments is second home ownership, which has expanded to such a degree that it is now an accepted part of the life-styles of large numbers of people, including more than ten percent of the households in large German cities, thirty percent in Scandinavian cities, and "most city families" in Finland (Lichtenberger, 1976; Palomaki, 1979). Lichtenberger, describing settlement trends for Europe as a whole, considers that the second home movement:

"Undoubtedly will constitute the most important process of urbanization in the years to come..... The ensuing transfer of land will bridge the traditional gap in property and capital between city and country north of the Mediterranean." (Lichtenberger, 1976, p. 87).

Palomaki considers it "an important subsystem in Finland's settlement system" (Palomaki, 1979, p. 19). The nature and location of second homes vary, from holiday homes in distant regions to weekend homes within commuting distance of major cities (or to workweek homes in the city, depending on view-point). But the impact upon the settlement system is clear. Settlements exist which cannot be measured by population figures. The demand for settlement space is increased, even though a large proportion of that space is not occupied at any one point in time.

The increasing demand for household space is paralleled by that for nonresidential space. The needs for production space (factories, storage, offices, etc.), service space (shopping centers, service centers, hospitals, etc.), and circulation space (arteries, airports, parking, telecommunications, etc.) have multiplied, in keeping with the changing requirements of a postindustrial society. Those needs bear no necessary relationship with population numbers.

The concept of increasing space requirements raises fundamental questions about the meaning of metropolitan decline. In the 1960s, population losses in the cores of many metropolises, particularly in the United States, led to crisis situations, including widespread housing abandonment, residential and commercial blight, and social deterioration (Adams *et al.*, 1976). Metropolitan population losses today do not seem to be accom-

panied by such circumstances. It is difficult to reconcile metropolitan decline in Europe with the statement:

"The expansion of urban agglomerations, which has characterized most European countries for many years, continues unabated. Individual cities as well as city regions, consisting of interrelated systems of large and small localities, cover ever larger areas" (ter Heide, 1979).

It is hard to reconcile metropolitan decline in the United States with one the greatest demands for urban housing in the country's history. It is difficult to call a city like South Bend, U.S.A. a declining metropolis, while it has had a one percent annual household growth rate since 1970 (McCarthy and Morrison, 1979).

One way of interpreting the above situation is to incorporate it into Klaassen and Paelinck's (1979) model of deurbanization. This model proposes that the decline of a city comprises three "deurbanization phases": (1) The stage of Population Decline; (2) The stage of Household Decline, where population decline is no longer compensated by diminishing household size (i.e. the number of households declines); (3) The stage of Land Decline, where the increased demand for land per household no longer can compensate for the decline in the number of households. Stage 1 of the model appears to depict quite closely the situation which has been described in this section. Whether or not our settlement systems are doomed to undergo the following two stages depends upon how accurately the model describes present and future demographic and social trends. In this respect, it is perhaps comforting to note that the model assumes its own final outcome:

"Let us suppose for a moment that the developments in a large town are inevitable and that the municipalities have to prepare for a gloomy future" (Klaassen and Paelinck, 1979, p. 1098). A further aspect of Klaassen and Paelinck's thesis might be mentioned. They point out that each stage of the deurbanization process imposes or reduces demands for certain services. This is significant in the present situation in that certain services (utilities, police, fire, etc.) are dependent upon the number of households, whereas others (schools, medical services, etc.) are dependent upon population. Thus, even if population contraction is counteracted by settlement expansion, changes take place in the internal functional structure of settlements, as the presence of empty clossrooms in many metropolitan areas attests. These changes, however, probably do not affect our overall theme, namely the increasing quantitative demand for settlement space.

The concept of expanding settlement space raises methodological questions concerning the use of population figures as a basis for analyzing settlement systems. In a recent statement on settlement methodology, Dziewoński (1979) suggests that:

"The study of population structure and dynamics is in the end the easiest to carry on and in a large number of cases the only really possible."

In market-oriented countries, this statement is perhaps questionable. The relationships between demography and settlement, between people and structure, and between numbers and quality are increasingly tenuous. Though practical in an operational sense, our dependence upon population figures is fraught with difficulties.

In sum, an expansion of settlement is taking place in advanced market-oriented countries, even though in many places and at various levels, there is a contraction of population. In essence, the former might be considered an 'expansion', the latter a 'relocation', diffusion process. The impact of this expansion process is marked at all levels of the settlement system.

## THE SOCIAL SEGREGATION PROCESS

The settlement systems of developed market-oriented countries appear to be undergoing an intensive segregation process. The process is well-known: Increased mobility leads to expansion of, and greater migration within, the system. Greater personal flexibility enables

this migration to be more selective. The cumulative result is a more segregated social pattern.

What is significant about present trends are: (1) Development of the segregation process at an unprecedented scale, in keeping with expanding mobility, and the wider diversity of motivations involved in the selective process; (2) Extension of the process at every settlement level, as the segregation model becomes regionalized, nationalized, and in some cases internationalized; (3) Decline in the relative importance of economic factors and an increase in the importance of life-styles, as determinants of the segregation process.

Underlying these trends is a number of recent demographic and economic developments. One is the larger proportion of the population entering the 'mobile' age groups. In the United States, between 1970 and 1976, more than half the net growth in numbers of households had occurred in those headed by persons under 35 years of age (those most willing and able to move long distances in search of economic opportunities and life-styles which meet their needs), while another 27 percent occurred among the elderly (households headed by persons over 65, with diminishing ties to jobs and families) (U.R.P.G., 1978). The flexibility of those households has been accentuated by greater wealth, and by the increased importance of transfer payments (pensions, investment returns, and social security) as sources of income.

This increasing mobility, and the resulting broad migration movements, have been well-documented (Sternleib and Hughes, 1978; U.R.P.G., 1978; Dusenbury and Beyle, 1978; ERIPLAN, 1978). Moreover, most writers recognize that these movements are multi-causal and differentially motivated (Bourne, 1980). What is important here is that each different motivation is tied to a respective locational goal, so that the movements become spatially differentiated. As Wardwell (1977) notes:

"The selection and attainment of migration destinations reflect in part the destination preferences of the population and in part the shifting and sorting process by which different types of places are attractive to different types of people." In the United States, it is simplistic to talk of a "movement to the sunbelt" when this movement incorporates such diverse elements as the return of blacks from northern industrial cities to rural areas in central Mississippi, the migration of elderly to retirement colonies in St. Petersburg, Florida and Phoenix, Arizona, the shift of skilled and technical workers to space and electronics industries of Houston and Dallas, Texas, the movement of pipeline welders to the oil-support industry of Coastal Louisiana, or the migration of college students (and ex-college students) to become ski bums in New Mexico and Colorado. In essence the sunbelt phenomenon is a vast macro-segregation process at a national scale.

Studies of migration streams in many European countries indicate that a similar selective process is taking place (ter Heide, 1979). After differentiating interregional movements by such measures as age levels, educational levels, and occupations, Koch (1979) describes the overall result as:

"An intensification of tendencies towards spatial division of labour between areas for production and consumption on the one hand and areas for recreation and consumption on the other hand."

The selectivity of the migration process often is hidden by the use of net rather than gross statistics. Essentially, net migration figures are the residuals of multidirectional movements, each of which is differentially motivated. For example, recent concern with net outmigration from large cities has tended to obscure the immigration into, and the concentration within, those cities of the foreign-born, both legal and illegal. This latter phenomenon is one of the more universal developments taking place within the national settlement systems of developed western countries (Dziewoński *et al.*, 1979).

Viewing recent population movements as a segregation process might help clarify the 'clean break' versus 'non-clean break' debate concerning nonmetropolitan growth.

Virtually every participant in this debate disaggregates nonmetropolitan movements into adjacent (to metropolitan areas) and nonadjacent categories, sometimes into (a) metropolitan spillover, (b) small towns with access to metropolitan areas, and (c) remote communities. It might be suggested that each category of destination is attracting a different type of people, and that a segregation process is taking place. Again, the process is intensified if gross movements are considered. Wardwell (1977) compared movements (a) within the same SMSAa, (b) between SMSAs, (c) SMSA to outside, (d) outside to SMSA, and (e) outside to outside, in terms of age levels, educational levels, income levels, and occupations of the participants. His study substantiates the selectivity of these respective movements.

The national and regional segregation processes have their counterpart at the metropolitan level. Within expanding metropolitan agglomerations, mobility is enhanced by freeways, private models of transportation, and telecommunications. Increasing personal flexibility, as well as decentralization of job opportunities, have lessened ties to any particular place. As a result, all but the most disadvantaged of today's metropolitan population are able to seek out, identify with, and attach themselves to their preferred part of metropolitan social space. Differentiating these parts not only are traditional socio-economic and cultural-ethnic factors, but also those of life-styles and attitudes. Metropolitan social structure is more and more characterized by a heterogeneous mosaic of social areas (Berry, 1977). Part, but only part, of that mosaic is the older central city. The central cities have their own patterns of life-style segregation, incorporating colonies of the poor and the aged, 'gentrified' areas of the wealthy, enclaves of unmarried and newly married adults, ethnic ghettos, colonies of foreign workers and immigrants, renewal areas, university districts, diplomatic colonies, and slums. The pattern is heterogeneous, rather than being determind by economic status, family status, or nearness to a job. It conforms less and less to traditional intraurban structural or migration models.

In sum, a spatial segregation process appears to be operating at all settlement levels in developed western countries. The process is close to what Ventura and Wärneryd (1979) recently referred to as 'regionalization' as opposed to 'urbanization'. Whatever the name, the process plays an increasingly important role in structuring the spatial patterns of national settlement systems.

## SYSTEM INTEGRATION

The national settlement systems of developed countries are characterized by an increasingly intensive functional integration. The more important spatio-functional properties of this integration are: (1) The steady incorporation of more places (and spaces) into the urban system; (2) The gradual replacement of dominance and primacy by interdependence; (3) An increasing number of control points; (4) The conformance of those control points to a specialized, rather than a central place structure; (5) The expanding role of information linkages, rather than material linkages, as integrating agents within the system; (6) Diffusion of impulses through the system in horizontal, diagonal, reciprocal, and other directions, rather than downward in a hierarchical manner.

These properties are underlain by the continuing communications revolution, and a series of social developments normally associated with a postindustrial society. Though too numerous to mention here, these developments are changing the spatial organization of society, in keeping with their respective locational demands. Such demands vary, but two overall locational characteristics can be pointed out. These are (a) greater locational flexibility, and (b) the declining attraction of the scale economies of large agglomerations.

The integration process occurs at all settlement levels. At the national level, three generalizations can be made. First, interregional functional shifts are taking place throughout

the system. Second, regional centers, medium-sized cities, and smaller centers are playing greater organizational roles. Third, those are in keeping with a specialized, interdependent framework, rather than a hierarchical one. However, the aggregate impact of these three trends is less easy to generalize. It varies from country to country, largely in accordance with the country's size (continental versus 'European'), political framework (federal versus centralized), and historical development (Dziewoński *et al.*, 1979). Moreover, attempts to analyze this impact are hampered by the lack of accepted metrics for measuring what is meant by 'organization'.

Even the use of a specific index like "control by major job providing organizations" (Pred, 1977; Törnqvist, 1973; Borchert, 1978) shows little similarity among countries. Goddard (1978) shows the increasing corporate control by companies with headquarters in southeast England, but not London. Logan *et al.* (1979) emphasize the continuing dominance of Australian provincial capitals. Koch (1979) points out that large European cities are not losing company headquarter functions to the same degree as in the United States. Borchert, in his comprehensive study of U.S. 'control points', emphasizes the conflicting forces of inertia, on the one hand, and disorder on the other:

"The wide variation among cities in their importance as control points is an expression of the instability of organizations, both individual and aggregate." (Borchert, 1978, p. 231).

Probably the simplest explanation for this diversity is that a specialization is taking place both in large metropolises and in smaller cities. As the largest cities lose some of their aggregate organizing role, they retain and even centralize certain functions (Richardson, 1978). In this respect, the expanding importance of certain functions in large cities is not a contradiction of the decentralization process, nor a complete contrast with the expanded functional role played by smaller, specialized centers elsewhere in the system.

The integration process at the regional level is influenced by the different kinds of regions involved. These include (a) regions organized around a regional or provincial capital, (b) regional subsystems, where once-independent neighboring towns, through multiplying linkages, turn themselves into a functioning subsystem (Bryce, 1977), and (c) megalopolitan regions, where agglomerations in highly industrialized countries coallesce with each other. However, in all cases, integration is associated with such developments as expanding communication technology (including freeways), decentralization of manufacturing and businesses, growth of airports and shopping centers, and incorporation of existing towns (government centers, university towns, service centers, etc.).

The result of these developments is a complex of centers and towns which tend to be functionally specialized. Their locations are peripheral to the main cities, or in metropolitan convergence zones. They themselves become the focal points in a polynodal regional (or megalopolitan) structure. It is significant that many U.S. planning agencies have found it practical to use the classification 'activity centers' in their planning maps. The term might be considered the regional counterpart of the 'control points' in the national system. Within the polynodal structure, the 'downtown' of the metropolis or regional center often becomes another, albeit larger, specialized activity center as it loses functions (retailing, professional offices, etc.) and specializes in others (finance, hotels, etc.).

Finally, aspects of an integrated polynodal structure are to be observed at the intrametropolitan level, as specialized functions tend to be spread more widely throughout the metropolis. The more random, polynodal structure contradicts many conventional models of urban functional structure.

In concluding this section, it might be noted that the four concepts discussed are themselves interconnected. Zero-sum population developments and expanding settlement space requirements are closely related, and both provide a background for the processes of social segregation and functional integration. All four concepts might well be part of

some broader overall process. This idea will not be pursued here. Rather, the remainder of this paper dwells upon some further relationships between the different settlement levels.

## PROBLEMS OF DIFFERENTIATION AND OVERLAP BETWEEN DIFFERENT SPATIAL SCALES

The different levels of the national settlement system are not independent of each other. Developments at one level might well be a reflection of events at another. Processes operating at one level might overlap into another level. Boundaries between the three levels are not always clearcut, even conceptually. These problems have been implicit in this discussion. Now they are looked at more explicitly. Three aspects are discussed.

### DIFFERENTIAL SUBSYSTEM DEVELOPMENT WITHIN THE SAME NATIONAL SYSTEM

In any national system, regional subsystems might be undergoing different developments or different stages of the same development at any one time. This is the theme of Morril's (1979) recent study of the United States, which hypothesizes that the degree of metropolitan concentration or dispersal is related to the stage of urban 'maturity' of the respective region. A similar theme underlies Klaassen and Paelinck's (1979) model of de-urbanization, based upon studies of European countries. They point out that: "Processes of suburbanization, deurbanization, and even urbanization, can be going on in a country at the same time." Such subsystem differences make it all the more difficult to describe developments in the national system.

### OVERLAP OF PROCESSES AT DIFFERENT SPATIAL LEVELS

Developments attributed to one level of the settlement system might well be a reflection of events taking place at another level. For example, the differing regional subsystem developments pointed out by Morril are overlain by (or occur simultaneously with) migration between those subsystems. As Morril recognizes:

"One must add a third component by suggesting that the decentralization of the advanced or mature areas may well spill over into still concentrating regions, adding a little more complexity to the model" (Morril, 1979, p. 55). The following are examples of this "little more complexity".

Medium and smaller-sized cities are growing throughout the United States. But the importance of these smaller cities in the settlement structure is, and always has been, greater in the South than in the Northeast (Morril, Sinclair and DiMartino 1979). How much of the national growth of smaller centers is due to the fact that so many of them are in the South? Other things being equal, a shift to the South entails a shift down the settlement size hierarchy. Is the motivation a settlement one (to a smaller city) or a regional one? When a company or a family moves from Detroit, Michigan to a medium-sized city in Texas, is this a regional shift or a decentralization process?

Any national statistics in the United States reflect the dominance of the northeast and northcentral metropolises, currently suffering from an ageing economic infrastructure, and a declining share of today's growth industries. To what degree is national metropolitan decline a reflection of conditions in, and migration from, those areas? Put in another way, might not national metropolitan decline mean partially that Houston, Dallas, Phoenix, Washington, Denver, etc. are not yet large and numerous enough to counteract the weight of eastern metropolises in the national statistics (Thompson, 1975)?

Many of Europe's largest conurbations are in economically stagnant regions (although the relationship is by no means universal). Does the decline of those agglomerations represent a metropolitan phenomenon or regional-structural problems? The practical

significance of these perceptual problems has been pointed out by Hall and Metcalf (1976) in their analysis of planning frameworks in Western Europe. They show that the problems of declining conurbations generally have been treated as regional economic development problems.[3] In a sense, significant settlement system developments were not recognized as settlement problems.

Figure 1 attempts to summarize the questions raised here. Horizontal arrows clearly are interregional shifts. Vertical arrows are movements between levels of the settlement system (with the net effect of decentralization). Diagonal arrows reflect the problems

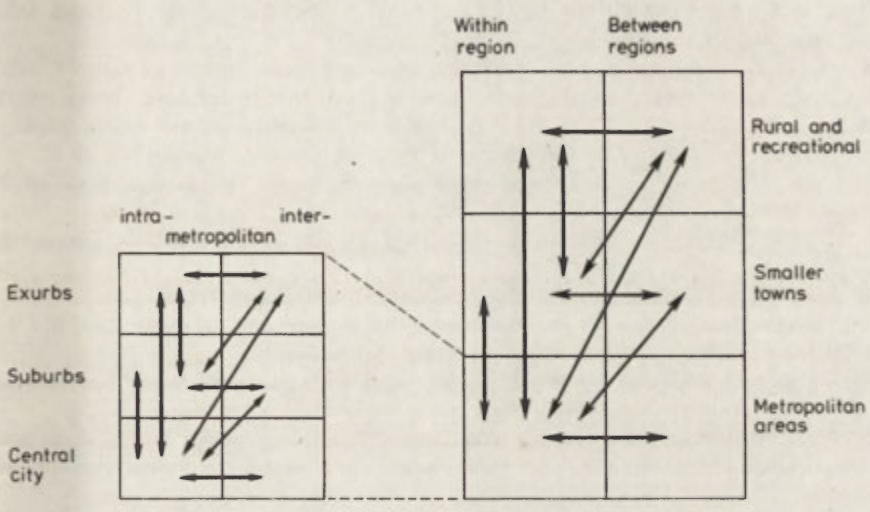


Fig. 1. Migration within the national settlement system

raised in this section. The overall importance of those diagonal links suggest (a) that national statistics can be less than satisfactory, when used to analyze national settlement system developments, (b) that it often is difficult to determine at what settlement level a particular development is taking place, (c) that it is sometimes difficult to determine whether processes are endogenous within the settlement system (centralization, decentralization, concentration, deconcentration, etc.) or part of exogenous developments.

## BLURRING OF BOUNDARIES BETWEEN DIFFERENT SPATIAL LEVELS

The levels, (national, regional, metropolitan) of the national settlement system are themselves not easily differentiated. The problem is most pronounced in distinguishing between metropolitan and regional. Metropolitan areas are spreading beyond defined boundaries, and coallescing to the point that they no longer are satellite systems, at least of any one metropolis. Are locations within this emerging system to be called intrametropolitan, intermetropolitan, or intraregional? In smaller European countries, are they not intranational?

Clearly our definitional abilities have not kept up with our conceptual abilities, and those in turn have not kept pace with the changing realities of the settlement system at all levels. It is not surprising that recent developments have led to ambiguous interpretations of scale. More to the point, if similar developments are taking place at different levels of the settlement system, it is not surprising that the dimensions of those are

[3] Urban planning, by contrast, has been concerned largely with metropolitan containment.

hard to distinguish. In this respect, the processes discussed in this paper (zero-sum, increasing space demands, social segregation, system integration) are themselves contributing to the blurring of the boundaries between the different levels.

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## EPILOGUE

As stated in the Foreword the Commission on National Settlement Systems of the International Geographical Union had its mandate renewed for another four-year period, i.e. till 1984. Its work is to be concentrated on:

(a) Future-oriented studies of the impact on existing national settlement systems of:

– population changes (quickly growing or declining populations, transformations in age and sex, professional and educational as well cultural structures);

– increased population mobility (horizontal and vertical);

– changes of the family models (size of family, evolving household preferences, cultural life style);

– development of mobile mass recreation;

– spread of new technologies in production and services (with its consequences for economy, social organization and life as well as for the natural environment);

– increase in international linkages and/or integration;

– necessity of more intensive and improved use of natural resources as well as of the preservation of natural environment;

(b) Research into trends towards either still greater concentration or towards devolution and dispersion as well as their consequences in national settlement systems;

(c) Analyses of policies – past, present and possible directions towards the implementation of postulated or planned models of national settlement systems.

The provisional programme and places for annual meetings were established during the 4th General Meeting in Sapporo and Sendai, Japan.

The topics for the 5th General Meeting in Lund. Sweden (June, 1981) were identified as follows: (1) Round-table discussion on settlement systems with general introduction by Professor D. Bartels (Federal Republic of Germany). A monograph paper on labour markets in West Germany by Professor Bartels shall be circulated earlier. (2) Round-table discussion on population changes and its increasing mobility within the settlement systems with a general introduction by Professors K. Dziewoński (Poland) and D. R. DiMartino (USA). A monograph paper by D. R. DiMartino shall be circulated earlier. (3) Round-table discussion on formation of national settlement systems by the integration of earlier regional systems to be introduced by Professor E. Dalmasso (France). His paper on this topic shall be circulated earlier. (4) Round-table discussion on theoretical and methodological problems of research into the settlement systems on basis of earlier papers by Professors D. Bartels, K. Dziewoński and F. Grimm (German Democratic Republic).

It was proposed that the 6th General Meeting taking place in 1982 in Toronto, Canada would be organized as a workshop on recent changes in the settlement systems in developed countries and their implications for the perspective of settlement systems in developing nations as well as the rational use of natural resources in and by the settlement systems.

The 7th General Meeting was tentatively fixed for Leipzig (German Democratic Republic) with discussions to be centred on national policies for settlements (to be intro-

duced by Professors G. M. Lappo from USSR and S. Illeris from Denmark) as well as on the development of international linkages between various national settlement systems (to be introduced by Professor J. Borchert from the Netherlands).

The 8th General Meeting is to take place in 1984, in Pisa, Italy. Its task shall be to review and sum up the research carried out by and for the Commission from 1976 to 1984.

An additional, final meeting is to be organized during the 25th International Geographical Congress in Paris to present the achievements of the Commission.

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