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GROWTH POLES AND GROWTH CENTRES IN NATIONAL AND REGIONAL
DEVELOPMENT - A SYNTHETICAL APPROACH

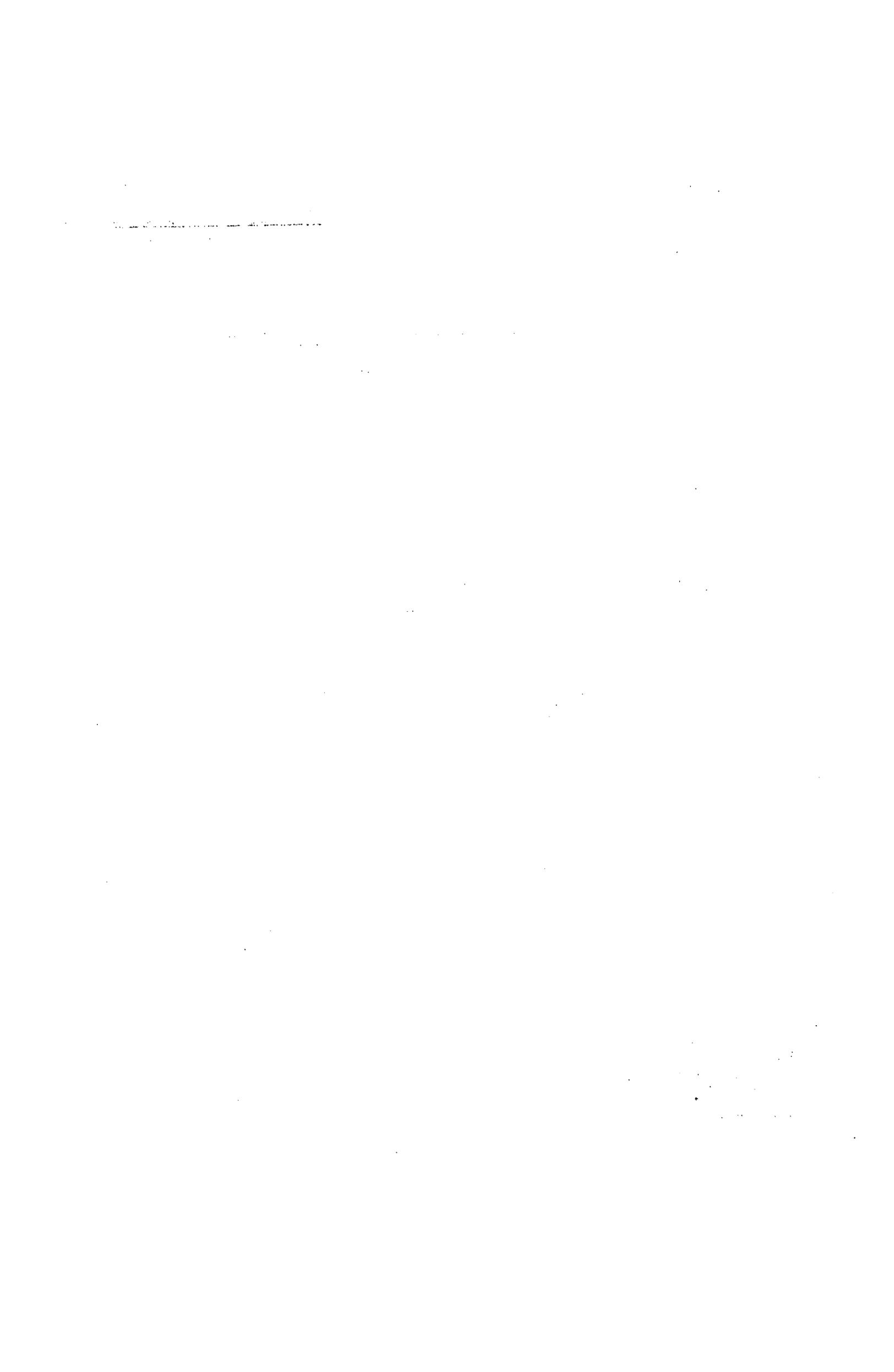
Part 1.

A Survey of Concepts, their Origin,
Development and Application

by

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(i)

COVERING NOTE

The concepts of development poles and development centres are at present being given increased attention in the search for tools to resolve problems of national and regional development both in industrialized and less industrialized countries. Consequently, related theories of the spatial incidence of growth, of polarized development and of transmission of development impulses in space constitute an increasingly important field of research in regional development. Although originally the concepts of poles of growth were developed as a tool to study the anatomy of economic growth in abstract economic spaces, during time its scope has been considerably broadened so that it now can be said to be a synthetical concept oriented towards problems of socio-economic development - as opposed to economic progress - in a simultaneous sectorial - spatial - temporal setting.

This paper, which is a part of the Institute's activities in the field of development poles, aims at giving a brief survey of the substance of this synthetical concept, its roots of origin, how it has developed and how it has been put into use in policies and planning for national and regional development.

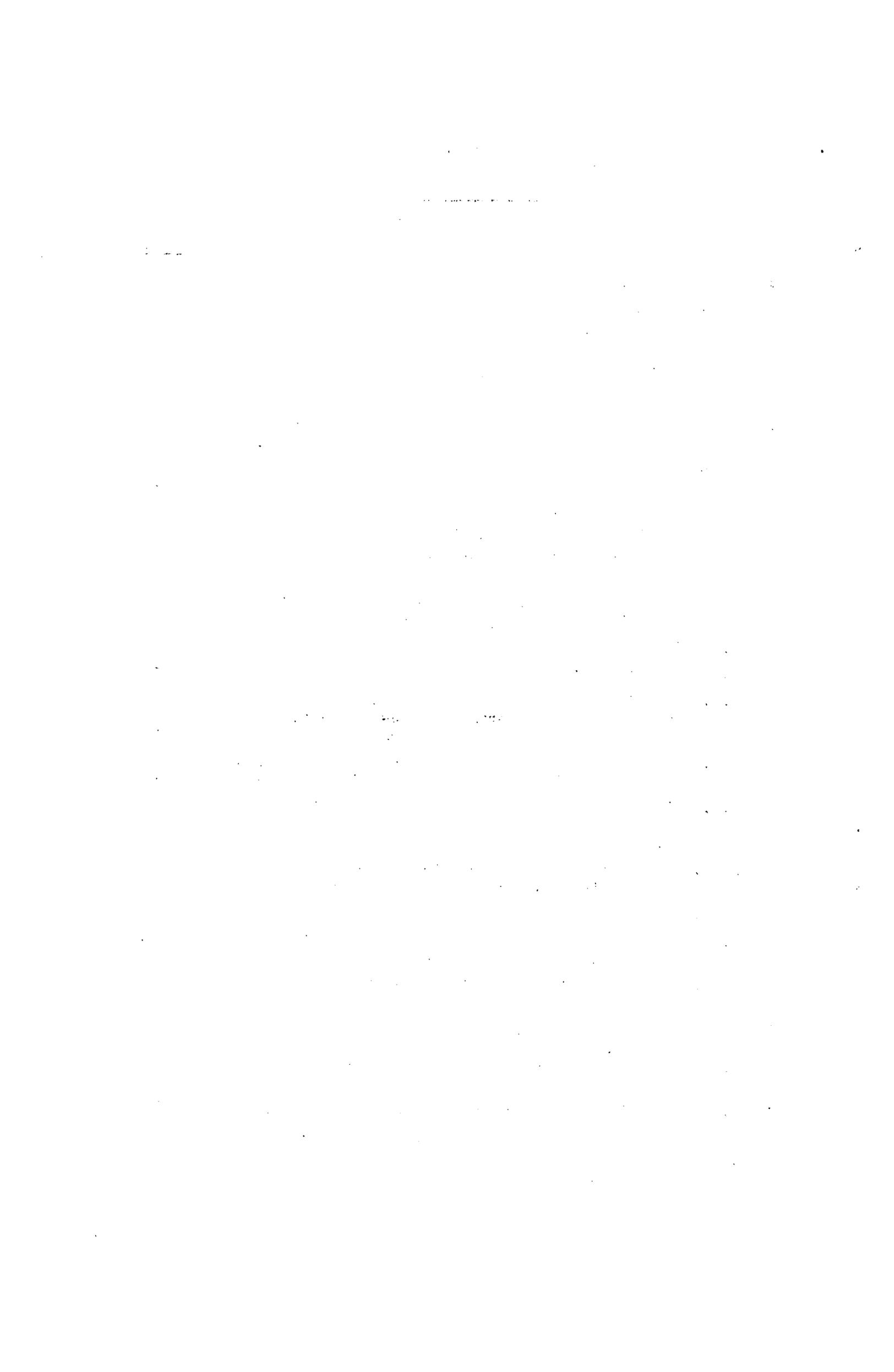
The paper reports on the first part of a comprehensive study of the synthetical concept and approach to development poles. It confines itself to a description of the aspects mentioned above. Therefore, the survey presented is not intended to include all contributions to the field, nor is it meant to undertake thorough evaluations of the approaches, conceptual frameworks and theories either from the point of view of their validity or from the point of view of their usefulness in policy-making. Such evaluations will be undertaken in the second part of the study.


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I INTRODUCTION

1.1. The notion and study of development

1.1.1. The notion of development is a very complex one. It involves descriptions of states and changes of economic and socio-cultural variables, conceptions of explanatory interrelations between them and value judgements of the directions and qualities of changes, as well as interventions aimed at speeding up and steering the process. Although the notion of development includes, as an essential aspect, economic growth, it goes far beyond this to encompass the interrelated changes in the society as a whole, and thus involves social, cultural and political aspects as well.^{1/} Hence, any study of development - as distinguished from economic growth - must deal with all these aspects.

1.1.2. However, it seems useful to draw a distinction between global and partial studies and theories of development depending on their focus. Theories and studies aiming at mapping all main aspects and their interrelations on an equal footing are termed global. Theories and studies are partial if they focus only on one of a limited set of aspects, i.e. economic developments, social developments, political development etc., and take stock of interrelations with other aspects only to the extent that it is necessary to arrive at a coherent picture of the particular aspects under study. Therefore, partial studies are of a less generalized nature, but on the other hand, they are of considerable value inasmuch as they enable the subject to be analysed in more depth.^{2/}

1.2. Development in time and space

1.2.1. By its nature, development is to be conceived of as a dynamic process. The time dimension is therefore a most important one, and any study of development requires a dynamic ~~frame~~ frame of reference. However, development takes place not only in a definite time setting, but also in a definite spatial or geographical setting. Corresponding to the problem of when to undertake development projects, i.e. their location in time, there is the problem of where to locate them in geographical space.

1/ See the following definition in A. Papandreou The Political Element in Development, Stockholm, 1966, p.11: "Development is planned structural change on a national scale aimed at achieving a sustained rate of national, social, economic and cultural growth which would otherwise be unattainable."

2/ Global theories and studies of development are very rare. As an example it can be referred to chapter V in R. Parsons and N.J. Smelser Economy and Society. With respect to partial studies, there are a rich variety of studies and theories of economic, social, cultural and political development, some of which will be referred to in this paper.

1.2.2. For many problems of development, the spatial dimensions are equally important as the time dimension. It is a well known observation that "development does not appear everywhere and all at once; it appears in points or development poles with variable intensities; it spreads along diverse channels and with varying terminal effects for the whole of the economy." ^{3/} Therefore, development planning cannot escape the problems of geographical locations. On the contrary, the very nature of development requires that the questions of what, when and where are considered simultaneously in a planning framework that gives explicit recognition to the time as well as the geographical dimensions.

1.3. Subject and focus of the study

1.3.1. The subject of this study is the spatial dimension of development in developing countries. The study is a partial one in that it is confined to economic development, and explores social, cultural and political aspects only to the extent that it is considered necessary in order to describe and explain the spatial dimension of economic development.

1.3.2. The focus of the study is the mechanisms and role of spatial concentration in economic development, the nature of the spread effects generated, and the eventual role of development poles and development centres as vehicles for national and regional development.

1.4. The purpose and aim of the paper

1.4.1. The purpose of the paper is to serve as an introduction to the study of the spatial dimension development, focussing on the role of spatial concentrations and development poles, as mentioned above. Since such an introduction should lead into the main issues involved and the basic terminology, it was considered useful to present a survey of theories, theoretical approaches, and terms and concepts that are relevant to the subject of the study and have proved useful in their application.

1.4.2. The aim of the paper is therefore to provide such a survey, with particular emphasis on the origin of the various theories and conceptual frameworks, their interrelations, and to indicate how they are applied to problems of policy-making and planning for national and regional development. Following from the synthetical approach in the study as a whole, the survey covers a wider set of theories and approaches, some of which may seem to have rather weak relations. However, the guideline for the selection has been more the relevance of the particular theories to the subject of the study as such rather than their

^{3/} F. Perroux La notion de pole de croissance, *Economique Appliquée*, Nos. 1 and 2, 1955. Here quoted from: N.M. Hansen Development Pole Theory in a Regional Context, *Kyklos*, 1967.

mutual interrelations. Finally, it should be made clear that no attempt will be made at a thorough critical evaluation of the various theories, either from the point of view of their validity or their usefulness for policy-making. Such an evaluation will be undertaken in a second paper.

2. THE CONCEPTS OF GROWTH POLES AND GROWTH CENTRES: ORIGIN, THEORETICAL APPROACHES AND RELATED CONCEPTS

2.1. Development poles and growth centres as synthetical concepts

2.1.1. The concepts and theories of development poles and growth centres have quite recently been introduced in theories of development and regional economics. The concepts employed are somewhat ambiguous and still far from being well established. As pointed out by HANSEN, "the theory is badly in need of a thorough semantic re-working; the concepts and the language which characterize it need more precise definitions and more consistent usage." ^{4/}

2.1.2. In the following, a brief summary of the origin and development of the concepts is given, aiming at indicating the content of the concepts and the theories and ideas beneath. It will be shown that the concept of development poles - as it is employed in a regional context at present - ^{5/} is a synthetical one that has emerged from an originally purely analytical-tool. During time it has been put together with similar concepts from related fields and modified under their impact. The common denominator of these concepts, theories and ideas is that they all relate to the long-term process of development and are concerned with the notion of spatial clustering and industrial unbalance as a concomitant to economic growth. ^{6/}

4/ N.M. Hansen, op.cit.

5/ Cf. for example, Regional Policy in EFTA. An Examination of the Growth Centre Idea, Geneva, 1968, also published as Occasional Paper No.10, Social and Economic Studies, University of Glasgow, by Oliver & Boyd, Edinburgh, 1968; M.A. Taborg: Growth Centres: Potential Focal Points for Development Policy, Economic Development Administration, Washington, D.C., 1967; The Role of Growth Centres in Regional Economic Development, report prepared for the Office of Regional Economic Development, U.S. Department of Commerce, Washington, D.C., 1966, by the Department of Economics, Iowa State University, Ames, Iowa, 1966; M. Penouil: An Evaluation of Regional Policy in the Aquitaine Region, paper prepared for the Conference on Backward Areas in Advanced Countries, Varenna, Italy, 1967; and J. Paelinck: Systematisation de la Théorie du Développement Régional Polarisé, Cahiers de l'I.S.E.A. série L, No.15, March 1965.

6/ K. Allen and T. Hermansen, Economic Growth-Regional Problems and Growth Centres, Part II of Regional Policy in EFTA, op.cit.

2.2. Perroux's concepts of economic spaces and functional poles of growth

2.2.1. The concept of growth poles was originally introduced and put into systematic use by PERROUX in his classical article of 1955.^{7/} The concept of growth poles suggested is closely related to his particular notion of abstract economic space as a field of forces consisting of centres, poles or foci "from which centrifugal forces emanate and to which centripetal forces are attracted. Each centre being a centre of attraction and repulsion has its proper field which is set in the field of other centres."^{8/} From the outset, it is important to note that PERROUX originally was concerned with economic growth, and primarily with firms and industries and their interrelations, and not with the geographical pattern of economic activity, or the geographical implications of economic growth and intra- and inter-industrial shifts. To PERROUX, geographical space appears to be only one, and a rather "banal" type of space. He maintains that it is possible to distinguish "as many economic spaces as there are constituent structures of abstract relations that define each object of economic science."

2.2.2. It is among the centres of this field of forces - working in the various economic spaces which could be defined - that PERROUX identifies his growth poles in which economic growth occur and is spread throughout the rest of the economy. Thus, PERROUX's concept of a growth pole is a highly abstract one.^{9/} It was introduced as a tool to explore the process by which economic activities, i.e. firms and industries appear, grow and, as a rule, stagnate and sometimes disappear. Hence, the process of economic growth is conceived of as essentially unbalanced involving a succession of dynamic poles through time.

^{7/} F. Perroux, op.cit.

^{8/} F. Perroux: Economic Space: Theory and Application, Quarterly Journal of Economics, February 1950, also reprinted in J. Friedman and W. Alonso Regional Development and Planning - A Reader, Cambridge, Mass. 1964.

^{9/} It should be noted that Perroux and the French school of regional economics use the terms pole and polarization in a way different from that usually used in English. To Perroux a pole simply means a clustering or a concentration of elements in abstract - but also in geographical space - so that a pole is sticking up as a peak in a more or less plain density surface. The term polarization is used to mean the process by which poles - as defined above - are created and enlarged. However, since the creation and/or enlargement of one pole may imply stagnation and even decline of other existing poles, the term polarization is used as a general term referring to the enlargement as well as the decline of poles, i.e. as the process by which poles succeed each other during time. On the other hand, the English meaning of the term polarization is that of the process by which two extremes opposing each other attract the elements in between them. Thus, according to this meaning there will normally be two poles, while according to the French meaning there can be more than two at the same time.

2.2.3. PERROUX developed his theory of development poles in search of a coherent explanation of how the modern process of economic growth deviates from CASSEL's stationary conception of equilibrium growth. ^{10/} In doing this he based his argument heavily on SCHUMPETER's theories of the role of innovations and large scale firms (big business). ^{11/} Also to PERROUX, entrepreneurial innovations are the prime causal factors behind economic progress. He argues, like SCHUMPETER, that most innovating activities take place in the large economic units, which are able to dominate their environment in the sense of exercising irreversible and partially reversible influences on other economic units by reason of their dimension, negotiating strength, and by the nature of their operations etc. ^{12/}

2.2.4. The close relationship between scale of operations, dominance and impulses to innovate appear to be a most significant feature of PERROUX's theory which leads him to the concepts of propulsive firms and propulsive industries. Although PERROUX is far from clear in his conceptualization, and in the application of his theory, ^{13/} it seems to be evident that the most remarkable characteristics of a dominant propulsive firm are that it is a relatively large one, it generates significant growth impulses to its environment, it has a high ability to innovate, and, finally, that it belongs to a fast growing sector. The features of a leading propulsive industry are quite similar; they appear to be relatively new ones, operating at a technically advanced level in markets with high income elasticities of the products. Moreover, such industries exert a considerable influence on their environment through inter-industry linkages. ^{14/}

2.3. Application of the functional concept of growth poles in geographical space

2.3.1. Although PERROUX was primarily concerned with economic growth as manifested in organizational and industrial spaces, i.e. the appearance,

^{10/} F. Perroux, op.cit. refers to G. Cassel Teoretische Sozial Ekonomie, Leipzig, 1927.

^{11/} J.A. Schumpeter The Theory of Economic Development, Harvard University Press, 1949. First German edition 1912.

^{12/} F. Perroux L'économie du XX ieme siècle, Paris, 1961, here quoted from N.M. Hansen, op.cit., see also The Domination Effect and Modern Economic Theory Social Research, 1950.

^{13/} For a very strong criticism see H. Blaug, A Case of Emperor's Clothes: Perroux's Theories of Economic Domination, Kyklos, 1964.

^{14/} Cf. N.M. Hansen, op.cit., and J.R. Lousen On Growth Poles, paper delivered at the Conference of the Southern Economic Association, Washington, D.C., 1968. Lasuen gives particular emphasis to the innovation aspects of leading firms and sectors.

growth and stagnation of firms and industries, the mutual interrelations between poles prevailing in these spaces, and the motive forces and mechanisms behind the changes taking place, the development pole theory has come to be applied mainly in a regional context, i.e. in geographical space. There are several reasons for this. To start with, inasmuch as all economic activity necessarily takes place in geographical space, changes in functional space (organizational and industrial) occurring during economic growth can be projected into, and, as a matter of fact, manifest itself in geographical space. Therefore, for the same reasons why the concept of growth pole can shed light on the ongoing transformations in functional spaces, it can equally well shed light on the transformations taking place in geographical space during economic growth.

2.3.2. All economic activities, also the dominant and leading firms and industries have given locations at a given point in time. Since the growth of these firms and industries and of the activities linked to them create cumulative differentiation and clusterings in functional spaces, a similar cumulative differentiation and clustering may take place in geographical space in accordance with the locational interrelations between firms and industries. Therefore, growth poles can also be identified as localized in geographical space. As LASUEN has put it in a recent paper, "in brief, the net contribution of PARROUX to the basic SCHUMPETERian argument was that he took SCHUMPETER's toolbox of concepts and hypothesis from its original sectoral-temporal setting and applied it to a sectoral-temporal-geographical universe. He was able to do it, thanks to his concept of topological space. He viewed the changes in the system of industries as transformations in 'sectorial' space, and asked which form they would take in 'geographical' space. The geographical pole is the geographical image of the newly innovated industry and its linked activities." ^{15/}

2.3.2. Therefore, far from being a theory of location in geographical space for firms, industries or cities, the growth pole concept when applied to geographical space has to rest on the traditional theories of location and theories of external economies of agglomeration etc. Although there may have been some confusion at this point, the matter should now be clear. According to PAELINCK, the growth pole theory when applied to geographical space should be regarded as a conditional theory of regional growth that established conditions under which accelerated regional economic growth may occur. ^{16/} The more intricate problem of establishing both necessary and sufficient conditions for regional economic growth seems, however, to remain unsolved.

^{15/} J.R. Lasuen, op.cit.

^{16/} J. Paelinck, op.cit.

2.4. Boudeville's geographical interpretation of economic space and poles of growth

2.4.1. The application of the growth pole concept and theory in a specific geographical and regional context is first of all owing to BOUDEVILLE, who, as opposed to FERROUX's abstract conception of space, emphasized the regional character of economic space. To BOUDEVILLE, economic space is tied to geographical space through a functional transformation which describes the relevant properties of economic processes. These transformations can be considered from three different points of view, in accordance with which economic space can be defined as homogeneous, polarized and planning space.^{17/} Furthermore, BOUDEVILLE distinguishes between space and region. A region is characterized by being a continuous area localized in geographical space, while economic space is not.

2.4.2. Homogeneous space is defined in terms of uniformity of relevant properties of elements localized in geographical space. The definition of homogeneous regions then requires, first, that relevant elements are selected and classified according to useful properties, and secondly, that geographical space is divided into sub-areas or regions in a way that the internal homogeneity and the external heterogeneity of the areas with respect to the selected properties of the elements considered are maximized. Polarized space is studied in terms of interdependencies between elements. The concept of polarized space is closely related to the notion of hierarchy. It is particularly well suited to the study of urban centres and their interrelations and, thus, provides a link to one of the other foundations of the synthetical concept of development centres, viz. the central place theory of CHRISTALLER.^{18/} A polarized region can then be defined as a heterogeneous continuous area localized in geographical space, whose different parts are interdependent through mutual complementary and interplay relations centred around a regional centre of gravity. Finally, BOUDEVILLE introduced the concept of planning space and planning regions to mean localized elements and continuous areas respectively, depending on a common decision-authority aiming at attaining definite goals.

^{17/} J. R. Boudeville Les espaces économiques, Paris, 1961. See also his Problems of Regional Economic Planning, Part 1, Edinburgh, 1966.

^{18/} W. Christaller, Central Places in Southern Germany, Englewood Cliffs,

2.4.3. The geographical interpretation of growth poles as localized functional growth poles, appears to be somewhat more difficult than the original functional concept in that it involves polarization in geographical as well as in functional spaces. Therefore, not all centres of nodal regions qualify to the denomination growth pole. Only those in which there are located propulsive firms, i.e. large scale, technically advanced, innovating and dominating, working within propulsive industries (industries with a strong capability to induce growth in linked industries) which exert a strong influence on their environment and are capable of generating sustained growth over a prolonged period of time should be interpreted as geographical poles of growth. In short, the notion of regional centres as poles of growth localized in geographical space in the sense of PERROUX and BOUDEVILLE is based on the assumption that economic growth is polarized in all spaces, i.e. in organizational and industrial as well as in geographical. ^{19/}

2.5. The Soviet concept of industrial complexes

2.5.1. Within the framework of planned economic development - particularly in the USSR - there has emerged a concept related to methods of industrialization with a certain resemblance to the French concept of poles of growth in organizational and industrial spaces. In spite of its strong connexion to centrally planned economies, this concept of industrial complexes ^{20/} appears to have a potentially much wider applicability, especially as a means of implementing regional schemes of industrial development. ^{21/} An industrial complex

^{19/} Boudeville appears, however, to be somewhat loose in his definitions. In op.cit., 1966, p.11 he states that "a regional growth pole is a set of expanding industries located in an urban area and inducing further development of economic activity throughout its zone of influence." While this definition stresses the functional pole aspect, his definition on p.112 seems to give most weight to the geographical aspect when he says "it would be preferably to describe poles as geographical agglomeration of activities rather than as a complex system of sectors different from the national matrix. In short, growth poles will appear as towns possessing a complex of propulsive industries."

^{20/} The following summary is based on A.E. Probst Industrial Territorial Complexes in the USSR, paper prepared for the UNIDO Interregional Seminar on the Role of Industrial Complexes in Economic Development, Tashkent, 1964.

^{21/} Similar concepts have been employed in a study of regional development and promotion of industrialization in Southern Italy, undertaken by the EEC Secretariat, 1966, and in a study of industrialization of Puerto Rico. See E.E.C. and Italconsult Study on the Promotion of an Industrial Development Pole in Southern Italy, Brussels, 1966, and W. Isard, E.G. Schooler and T. Vietorisz Industrial Complex Analysis and Regional Development: A case study of refinery-synthetic fiber complexes and Puerto Rico, New York, 1959.

may be defined - in a very wide sense - as an ensemble of technologically and economically interconnected industrial units usually located on a given territory. Such a complex is normally a planned one, based on common physical infrastructure and developed around one major industry which forms the core of the focal point of the complex. The core appears often to be a heavy industry.

2.5.2. The concept of an industrial complex should not be confused with those of industrial estates and industrial zones. The industrial units composing the latter may not be interconnected over and above their sharing of some infrastructural and auxiliary facilities, while the intimate technological and economical interdependencies are the basic characteristics of the former. Although to a certain extent, the concept of industrial complexes is an engineering one, the core unit may well be compared to the concept of dominant firm of the growth pole theory, around which there tends to grow up a set of interrelated units based on backward and forward linkage effects. The essential difference is that in an industrial complex these interconnections are directly planned in order to ensure an optimal composition of the entire complex involving also the economic and socio-cultural infrastructure, auxiliary and servicing plants, and plants working for the local consumer market. Consequently, also the setting up of the complex, i.e. the time sequence of establishing the various units, are planned.

2.5.3. It should be noted that the concept of industrial complexes is basically functional. In French terminology, it belongs to the sphere of organizational space. It should therefore be distinguished from concepts referring to geographical space such as industrial centre or economic region. Although the problem of optimal composition of complexes and that of their location are closely related and, in principle, should be solved simultaneously, they belong to different spaces. For example, an industrial centre may contain more than one complex or the complex may be geographically divided among more than one centre.

2.5.4. Because of the engineering approach and its background in central planning, the concept of industrial complexes may seem somewhat static. The dynamics of technological progress, inventions, innovations, and of those relating to income elasticities and changed tastes are obviously very complicated to master in the stage of planning. Although the successful complexes by their own strength will develop a social and economic environment conducive to innovations and technological progress, the complex planned as an entity may be so rigid that the introduction of new methods and means may be hampered. Solutions to this problem are obviously difficult, but seem to involve both the setting up of new complexes, the running down of old ones and, above all, planning for flexibility and adaptability.

2.6. Christaller's theory of central places

2.6.1. In modifying the original theory of FERROUX to be applicable to geographical space, arriving at the concept of geographically localized poles of growth, BOUDEVILLE provided a bridge over to another set of theories vital to the understanding of the synthetical concepts of growth poles and growth centres, namely, the theories of the geographical patterns of human settlements and of urban systems. The basic concepts of these theories were developed by CHRISTALLER. ^{22/} The underlying assumption is that man tries to organize his activities over geographical space in an efficient manner. Central place theory seeks to explain what such an efficient organization may be. CHRISTALLER's contention was that the number, the size-distribution and the spatial patterns of centres within an area could be deductively derived and explained on the assumptions that some ordering principles governed the formation of these structures.

2.6.2. The basic assumption of the central place theory is that the economic distance gives all goods a characteristic range. The conflicts arising from the producers' attempt to expand their market, and the consumers' attempt to minimize their transportation outlays would, according to CHRISTALLER, result in an hierarchical system of central places with corresponding trade areas. There will be a large number of places at the bottom of the hierarchy supplying a limited set of goods of a low range to small market areas, a smaller number of centres with a larger output, including those of the subsidiary centres, but also some with a higher range to a larger market, and so on until the top of the hierarchy. There the capital centre supplies all types of goods and distributes them over its market area which consists of all other centres and related market areas corresponding to the range of goods and the spatial division of labour within the system. ^{23/}

2.6.3. On the basis of the very idealized assumptions upon which CHRISTALLER developed his theory, i.e. uniform distribution of population, purchasing power, terrain and agricultural resources, and equal transportation facilities in all directions, he could show that the horizontal arrangements of centres at each level in the hierarchy would be regularly spaced in triangular lattices, and each centre would be located within hexagonal market areas. Although

^{22/} W. Christaller, op.cit

^{23/} The very brief description of the central place theory attempted here is based on T. HÄGERSTRAND Tal Till Walter Christaller på Vegadagen Den 24 April 1967, Rapport och notiser No.2, Institutionen för Kulturgeografi och Ekonomisk Geografi, Lund, 1967

the market principle, implicitly referred to above, is the most commonly applied version of the central place theory, CHRISTALLER also modified his theory to take account of certain deviations from the market principle. The first important deviation was the one created by significant transportation costs. According to the interpretation of BERRY and PRED of the transport route principle, this arrangement enables "... as many important places as possible to be on one traffic route between larger towns, the route being established as cheaply as possible, and gives rise to linear patterns of trade areas at right angles to traffic routes."^{24/} The second important deviation is the one stemming from the administrative decisions. According to CHRISTALLER, the real world central place systems would emerge as compromises between his three principles of ordering.

2.7. Lösch's theory of the economic landscape and the relation of central place theory to real world patterns of settlements

2.7.1. Certain aspects of the central place theory have been modified by LOSCH, ^{25/} who also extended the theory into a more complex one, characterized by being less rigid than the original version. The flexibility stems from the assumption that, as opposed to CHRISTALLER, LOSCH leaves the number of centres at a given level in the hierarchy, to be served by a central place at the next higher level, free to vary and be determined within the model. Thus, CHRISTALLER's models can be regarded as special cases of the more general LOSCH model.

2.7.2. LOSCH derives what he claims to be an "optimal" pattern of settlements - the one in which aggregate transportation costs are minimized - by rotating all feasible patterns of hexagonal market areas with varying numbers of centres served by the central place next above around the same central point. Assuming that this is the highest order central place of the area, it is possible to derive a pattern in which there are six sectors with many and six with few centres. In this "optimal" economic landscape, the settlements are concentrated into a set of densely and less densely populated sectors. In the densely settled sectors, the size of the centres increase with the distance from the capital centre, but with small centres being located about half-way between two larger ones. Although LOSCH asserts that the vertical arrangement of centres is hierarchical, it is quite clear that the hierarchical structure of his economic landscape is much less clearcut and rigid than the one resulting from CHRISTALLER's model.

^{24/} B.J.L. Berry and L. Pred Central Place Studies: Bibliography of Theory and Application, Second edition, Philadelphia, 1965.

^{25/} A. Lösch, The Economics of Location, New Haven, 1954. First German

2.7.3. The theories of CHRISTALLER and LOSCH are both developed on the basis of very idealized assumptions which rarely are fulfilled in the real world. Largely they reflect the agricultural economies on which they historically were developed. Central place theory should therefore not be regarded as a general theory of the spacing and size distributions of cities. It should be seen rather as a theory of location of one of the city-creating types of activities, viz. the service sector.^{26/} Since the rendering of services to the spread agricultural population is the historical origin of most cities, and certainly the cities forming the lower levels in the hierarchy,^{27/} it is not difficult to understand why CHRISTALLER and LOSCH attributed to their theories more general validity than they have in industrialized countries. However, not only are the uniformity assumptions as a rule not fulfilled, which, of course, casts doubts on the possibilities of finding the geographical regularities proposed by the pure theory realized in the real world. However, more important is the fact that the spatial patterns of settlements and the size distribution of centres are considerably affected by the location of other economic activities, such as industry, mining, tourism, fishing, harbours etc. Such activities are not likely to be distributed in geographical space according to the same principles as activities producing immobile services which have to seek their location as close to the buyers as possible. Hence, they generate other interrelations between centres at the same and different levels in the central place hierarchy than those embodied in the spatial division of labour in the service sector.^{28/} This, of course, explains also the difficulties encountered in empirical research attempting to test central place hypothesis on material referring to cities.

^{25/} (cont.) edition Die räumliche Ordnung der Wirtschaft, Jan. 1940. Excellent summaries of the theories of Lösch and Christaller are provided by B. Bardner in R.J. Chorley and P. Haggett, Models in Geography, London London, 1967, Ch. 9.

^{26/} See for example R.L. Morill Migration and the Spread and Growth of Urban Settlement, Lund, 1965, Part II.

^{27/} Cf. e.g., G. Sjöberg The Preindustrial City, American Journal of Sociology, 1955. Also reprinted in P.K. Hatt and A.J. Reiss (eds) Cities and Society, Glencoe, 1957.

^{28/} For further discussions of the deviations between the central place theory and the real world patterns of urban areas, see A. Pred, Behaviour and Location: Foundations for a geographical and dynamic location theory, Lund, 1967, Part 1, pp. 97-104.

2.8. Complementarities between the central place theories and the theories of geographical growth poles

2.8.1. In spite of the lack of evidence supporting the geographical regularities suggested by the theories of CHRISTALLER and LOSCH, they are nevertheless of considerable interest in relation to the problems of geographical growth poles. As it is pointed out by BOS, ^{29/} these theories were the first global theories of location, attempting a simultaneous coherent explanation of the spatial pattern of human settlement including the location of production and consumption to spatial clusters of different locations, size and functional structure. Although both theories are partly positive, attempting to explain actual patterns on the basis of behavioural assumptions, and partly normative - attempting to determine optimal patterns - they have contributed considerably to the understanding of spatial interrelations and to the evolving view of "cities as systems within systems of cities." ^{30/}

2.8.2. The central place theories can be considered as complementary to BOUDEVILLE's theory of localized poles of growth. While BOUDEVILLE's theory explains the impact of the existence of localized functional growth poles in geographical space, it is not by itself a theory of location which explains where the functional growth poles are or where they will be localized in geographical space. To explain this, the growth pole theory must rely on theories of location, of which the central place theory is the only global one which takes stock of the interdependencies among service activities resulting from their spatial division of labour. Therefore, as it has recently been pointed out by HERMENSEN, the theory of central places, and in particular the functional interrelations suggested, disregarding the lack of spatial regularities, may well serve as a point of departure for analysing the impact of growth in a given centre on the other centres in the interconnected system of centres, and problem of steering changes in the system and controlling urban growth. ^{31/}

2.8.3. On the other hand, central place theory does not explain growth phenomena. It is a static theory which only aims at explaining the existence of certain patterns of centres, not how this pattern has gradually come

^{29/} H.C. Bos, Spatial Dispersion of Economic Activity, Rotterdam, 1965, Ch. 1

^{30/} B.J.L. Berry, Cities as Systems within Systems of Cities, RSA Papers, Vol. 13, 1964, also reprinted in Friedmann and Alonso, op.cit.

^{31/} T. Hermansen, Service Trades and Growth Centres, Part IV of Regional Policy in EFTA - An Examination of the Growth Centre Idea, op.cit.

into being, and it says nothing about how it may undergo future changes. However, this is a critical question because, as it has been stressed recently by HILHORST, "the spatial structure of a region does not come into being at once, but is a result of a process of time, in which certain things come first and depending upon their configuration determine other things".^{32/} In order to explain these dynamic phenomena it is necessary to look at growth theories among ^{which} BOUDEVILLES'S modification of the growth pole theory to be applicable to geographical space seems a most promising one. In this way, the French developed growth theory and the German theory of location appear to supplement each other in a fruitful way.

2.9. Hirschman's hypothesis of the geographical incidence and transmission of economic development

2.9.1. A first attempt to synthesize a theory of geographical incidence of growth with hypothesis of the mechanisms for geographical transmission of development impulses was made in HIRSCHMAN'S now classical study of economic development strategies.^{33/} Taking it for granted that economic progress did not appear everywhere at the same time, and that once development had appeared, powerful forces would make for a spatial concentration of economic activity and growth to the initial starting points, HIRSCHMAN argued that "there can be little doubt that an economy to lift itself to higher income levels must and will first develop within itself one or several centres of economic strength".^{34/} The argument was based on his theory of economic development as an essentially unbalanced process which is propagated through chains of disequilibria.

2.9.2. The similarities between HIRSCHMAN'S theory - developed mainly with reference to the underdeveloped Latin American countries - and the French theories of economic growth generated by growth poles, are many, in spite of the different conditions and levels of development on the basis of which they are developed. This can, however, be explained by the fact that they both were

^{32/} J.G.M. Hilhorst, Regional Development Theory: An Attempt to Synthesize. The Hague, 1967

^{33/} A.O Hirschman, The Strategy of Economic Development. New Haven 1958, Ch.10, Interregional and International Transmission of Economic Growth.

^{34/} Ibid. p.183. It is interesting to note that Hirschman uses the terms growing points and growing centres, and not the French term pole. Furthermore, although Hirschman uses the terms polarization and polarization effects, he does not use these terms in the same way as the French School, but in the usual English meaning of widening the gap between two extremes namely, between rich and poor areas.

developed as reactions to the balanced growth theories originally developed by CASSEL ^{35/} and furthered by NURKSE, ^{36/} LEWIS ^{37/} and ROSENSTEIN-RODAN ^{38/}.

Although both HIRSCHMAN and the French school view economic growth as unbalanced and occurring in certain leading firms and industries which induce growth in related industries through forward and backward linkages by means of investment incentives resulting from disequilibria, there is one essential difference which reflects their different background. While the French theory is primarily a theory of economic progress and growth, HIRSCHMAN's theory can be denominated as a theory of economic development in that it includes not only economic variables but also the interrelations between these and certain social and cultural variables, particularly those which determine the emergence of entrepreneurial talents and the ability of entrepreneurs to take investment decisions.

2.9.3. The similarities between the two theories are, however, apparent in that both are relatively vague when it comes to explaining why economic growth and development occur in some centres and not in others, and how growth is transmitted to other regions and centres. Taking points of departure in the belief that development necessarily is geographically unbalanced, and that in every country there is a need for the emergence of some growing points in which industries can benefit from localized external economies - technical as well as pecuniary - and the creation of an "industrial atmosphere," HIRSCHMAN contended that economic operators are inclined to systematically overestimate the importance of these factors and neglect equally good or even better investment opportunities elsewhere in the country.

2.9.4. Despite exaggerated space preferences of economic operators, development occurring in geographical growth points will nevertheless set in motion forces which will induce development in the backward hinterlands. These trickling down forces work particularly through interregional trade and transfer of capital to the backward regions. Their effect depends largely on the existence of complementarities between the industries in the growth centre and the hinterland.

^{35/} G. Cassel, op.cit.

^{36/} R. Nurkse, Problems of Capital Formation in Developing Countries, Oxford, 1953.

^{37/} W.A. Lewis, The Theory of Economic Growth, Homewood, Ill., 1955.

^{38/} P.N. Rosenstein-Rodan, Problems of Industrialization of Eastern and Southern Europe, Economic Journal, 1953.

In addition, migration from the hinterland to the growth centre may absorb some disguised unemployment and raise the marginal productivity of labour and the income per capita of the hinterland. However, the progress of the growth centre may also -- and particularly in the case of weak complementarities -- have unfavourable polarization effects on the hinterland. The industries of the hinterland can be depressed as a result of the competition from the growth centre, particularly as the transportation facilities are improved. Due to better opportunities in the growth centre, the hinterland can be drained not only of the most able parts of its labour force, but also of a significant share of what savings there can be. ^{39/}

2.9.5. The polarization effects generated in the growth centres may well -- in spite of HIRSCHMAN's optimistic view that in the long run external diseconomies of the growth centres together with complementarities will assure a spontaneous spread of development -- turn out to be stronger than the trickling-down effect. Then a lasting dual society may be created in which industrial and geographical backwardness coincide.

2.10. Myrdal's theory of geographical concentration through circular and cumulative causation

2.10.1. The tendency for the polarization forces to be stronger than the trickling down forces was the main conclusion of MYRDAL when he studied the problem of geographical coincidence and spread of economic development at the same time as HIRSCHMAN. ^{40/} His spread and backwash effects coincide with HIRSCHMAN's trickling down and polarization effects. MYRDAL bases his more pessimistic view of the possibilities for spontaneous spread of development in space on his theory of circular and cumulative causation. He maintains that movements of labour, capital and goods, contrary to what is believed in equilibrium theory, are precisely the "media through which the cumulative process evolves -- upwards in the lucky regions and downwards in the unlucky ones."

^{39/} The use of the term polarization by Hirschman must not be confused with that used by Perroux, Boudeville and others, as discussed in footnote 34. Perroux appears to use the term "effets de stoppage" in the same sense as Hirschman uses polarization effects.

^{40/} G. Myrdal, Economic Theory and Underdeveloped Regions, London, 1957.

2.10.2. The spread effects which operate mainly through trade via interregional complementarities, set up opposite counteracting forces to the backwash effects, and will in some regions balance them. But, according to MYRDAL, this balance is of a temporary character and should not be confused with stable equilibrium, as any change induced will generate a cumulative movement up or down. Regions in which spread and backwash effects generated by the main growth regions are in balance will, as a rule, be stagnating. In reality, expanding, stagnating and regressing regions tend to be arranged in a fairly continuous pattern. MYRDAL finds, furthermore, that the higher the level of development and the higher the rate of growth of the economy, the stronger the spread effect as compared to the backwash effect. And, the other way around, the gradual neutralization of the backwash effects as a country develops can by itself be seen as an important factor to speed up development. Therefore, lasting interregional unbalance in less developed countries represents an impediment to development and a part of the "interlocking relations by which in the cumulative process poverty becomes its own cause."

2.10.3. To sum up, it appears that MYRDAL and HIRSCHMAN agree that development makes for more efficient spread effects. However, while HIRSCHMAN argues in favour of the need for initially geographical unbalance through the creation of development centres, MYRDAL takes the opposite stand and argues that the mechanisms for spread effects should be strengthened from the outset.

2.11. Pottier's theory of development axes

2.11.1. This survey of conceptual frameworks and theories related to the synthetic concept of geographical development poles has so far touched on three vital aspects and has revealed a gap in theory with respect to a fourth. Central place theory, as founded by CHRISTALLER and LOSCH can be seen as a theory of the geographical pattern and hierarchical structure of urban centres and nodal regions. Despite recent development, it remains still static and suffers from rigidity and oversimplification. ^{41/} The growth pole theory founded by PERROUX as a tool to study the process of unbalanced economic growth in abstract economic space and modified by BOUDEVILLE to be applicable to geographical space, suggests an explanation of the process by which urban areas and regions develop and stagnate. This theory is essentially dynamic. However, it confines itself to the anatomy of development processes of areas localized in geographical space and has little to contribute to the explanation of why the process starts some

41/ Cf. B.J.L. Berry and A. Pred, op.cit., and B.J.L. Berry, Geography of Market Centres and Retail Distribution, Englewood Cliffs, N.J., 1967, Ch. 3-4.

places and not in others and of the mechanisms of spatial transmission of development.^{42/} It is to these latter problems that the theories of HILSCHMANN and YRDAL are of particular relevance. Despite their profound disagreement when it comes to choice of development strategy, the two theories appear coincidental in identifying the basic reasons for why development is apt to occur in a limited set of urbanized regions and be concentrated there and in exposing the nature of the mechanisms through which development impulses are propagated throughout the rest of the country. However, although these theories deal with questions of location, they remain fundamentally non-geographical and they have little to say about the geographical location of the growth centres and the geographical manifestation of the development impulses propagated from the centres.

2.11.2 A synthetical approach to geographical development centres therefore has to take stock of the already established body of theories of industrial location,^{43/} but in addition to that also rest on some theories or notions of how development impulses are propagated and are apt to manifest themselves in geographical space. As opposed to the rich variety of contributions to industrial location theory,^{44/} the latter subject has been largely neglected by geographers as well as economists. There is, however, one relatively recent contribution by POTTIER which stands out and deserves to be mentioned.^{45/} His main contention is that economic development normally tends to be propagated along the main transportation routes which link the most important industrial centres and, therefore, manifest themselves in linear geographical paths. POTTIER's theory which, to some extent, was anticipated by CHRISTALLOER's transportation principle, has been developed mainly on the basis of the French historical experiences. Nevertheless, it would seem to have a more general value, particularly inasmuch as it contributes to the integration of theories of the effects of the transportation network with the theories of urban hierarchies and geographical development poles.

^{42/}Cf. P.F. Hansen, op.cit.

^{43/}For example this is strongly argued by J. Friedmann in his Regional Development Policy: A case Study of Venezuela, Cambridge, Mass.1966, Ch.2

^{44/}See, for example, B.H. Stevens, C.A. Brackett, Industrial Location - A Review and annotated bibliography of theoretical, empirical and case studies, Philadelphia, 1967

^{45/}P. Pottier Axes de communication et developpement economique, Revue Economique, 1963 No. 1. The very brief summary presented here is based on a similar summary in P.F. Hansen Regional Planning in a Mixed Economy, The Southern Economic Journal, 1965.

2.11.3 According to POTTIER, there are several factors working together in a process of circular cumulative causation which explain the strong tendency for economic development to concentrate itself along the original national transportation channels during the initial stages of industrial growth. When traffic increases along a transportation route as a result of interregional trade economies of scale leading to lower unit costs of transportation can be exploited. Since lower transportation costs stimulate trade and generate increased traffic, the transportation infrastructure and the modes of transport could be steadily improved by means of capital investments and the introduction of new techniques. A cumulative process would be started which would tend to concentrate transportation demand and facilities along the original axes. Then, industry, commerce and population would be attracted and, in turn, create easily accessible factor and product markets likely to attract more industries. This cumulative process would be particularly strong in the points where two routes crossed each other and create junction effects. Also agriculture in close proximity to such axes and junctions would benefit, partly by the improved accessibility to larger markets, but also because they would be more exposed to agents disseminating information or technological and cultural innovation. This in turn would induce impulses for social change and make the areas more conducive to modernization and progress.

2.12 Theories of the role of the cities in economic development.

2.12.1 Although the students of development discussed above agree that development when left to itself tends to be geographically concentrated they do not undertake a thorough analysis of the fundamental reasons for this, i.e. the role of the cities in economic and socio-cultural development. However this question appears to be crucial for a proper understanding of the relations between development and urbanization processes, and for the formulation of a settlement policy conducive to development.^{46/}

^{46/}See e.g. L. Roavin "Metropolitan Policy for Developing Areas" ch.10 in J. Isard and J. Cumberland (eds) "Regional Economic Planning", Paris, 1960.

and J. Friedmann "The Strategy of Deliberate Urbanization" Santiago, 1967 (mimeo)

Theories aiming at answering this question therefore provides an additional cornerstone for the synthetical concept of development centres. However, such theories are rare and of a rather descriptive character; a fact which may be explained with reference to the historical character of the urban-industrial revolution. As it is put by PYE.^{47/}

"Urbanization is a critical process in the development of the modern nation state. Historically all complex and advanced civilizations have sprung from the city and in the contemporary world urban life is a dynamic basis for most of the activities and processes we associate with modernity and economic progress. Therefore any systematic effort to transform traditional societies into modern nations must envisage the development of cities and modern urban societies."

2.12.2 The first attempt to take a comprehensive view of the role of the city was made by LAMPARD,^{48/} as late as 1955, who regarded the modern urban-industrial development as a cultural process through which modes of life, values, customs and socio-economic relations were gradually transformed. Historically, the emergence of cities could be seen as a synthesis of economic, administrative, defense and religious requirements, their spatial setting being determined partly by natural conditions and partly by the existing network of communication and transportation facilities. The modern city, however, can according to LAMPARD only be understood in its relation to the emergence of industrial technology and organization. Industrialization is essentially a process of technological innovations which leads to improved organization, specialization and division of labour and which has strong inherent impetuses to foster continuous and cumulative progress.

^{47/}L. V. Pye "The Political Implications of Urbanization and the Development Process, Social Problems of Development and Urbanization". US Conference on the Application of Science and Technology for the Benefit of the Less Developed Areas. Vol VII, p. 84 Washington DC, 1963.

^{48/}E.E. Lampard "The History of Cities in the Economically Advanced Areas". Economic Development and Cultural Change, 1955, Jan. Also reprinted in Friedman and Alonso op.cit.

2.12.3 The roles of the city in this process are several. Firstly, the increasing specialization of functions imposes an increasing degree of interdependence among all the differentiated parts. Such interdependences can only be efficiently established when the friction of space is overcome, i.e. when the functions are clustered together within spatial concentrations. In other words, cities provide a spatial organization of interdependent activities which are conducive to their further development. Secondly, due to its complex composite character with a high internal accessibility the cities develop external economies which to a large extent are spatially immobile, and therefore can be utilized only within and close to the cities. These external economies are particularly tied to the labour force and the local service sector but include also what can be called social and cultural urbanization. What is implied here are changes in values, habits, beliefs, etc., and in social institutions and mobility patterns which together with the development of higher level of education and skills make for an urban society with a much higher degree of flexibility and capability to utilize opportunities and adjust to changes, than the traditional rural society. Because of the high level of internal and external accessibility, cities are particularly conducive to innovations, and to the spread of adoptions of innovations, not only within the city but also throughout their spheres of influence.

2.12.4 Furthermore, as it is particularly stressed by FRIEDMANN^{49/} cities are the main agent for spatial integration of the social economic and cultural systems of a nation. This integrationability is due to their functions as centres of trade and of religious, administrative and political activities, to their innovative strength in economic as well as in social and cultural fields, and to their geographical arrangement in a hierarchical system of central places which provide mutual relations of interdependence and interplay throughout national space.

^{49/}J. Friedmann "Cities in Social Transformation". Comparative Studies in Social and History 1961, July. Also reprinted in Friedmann and Alonso op.cit. See also his, "Integration of the Social System: An approach to the Study of Economic Growth". Diogenes 1961.

2.13 The notion of optimum size of cities.

2.13.1 This survey of the theoretical background and sources of origin of the synthetical concept of growth centres should not be completed without a reference to the thinking which has been devoted to the problem of optimum size of cities. As it has been pointed out above, CHRISTALLER and LOSCH were concerned partly with this problem when they analyzed the pattern of cities. However, the problem of optimum size of cities, which for a long time has engaged city planners and to an increasing extent also geographers and economists, has traditionally been posed with reference to the single city, not to the system of cities.

2.13.2 The first statements on this problem appears to be those of the founder of the "garden city principle", the famous city planner HOWARD^{50/} who contended that beneath all realistic city planning and setting of planning standards, there were, explicitly or implicitly, some broad consensus as to the most desirable size of the cities planned for. HOWARD's suggestion that this size was about 30,000 to 50,000 inhabitants was, however, soon challenged by another outstanding city planner, Le CORBUSIER,^{51/} who suggested that three million people would be the most preferable size. What was characteristic of this early thinking on the problem - beside the limitation to the single city - was that the conclusions drawn rested heavily on the subjective feelings and evaluation of the planners, to which scarcely any scientific investigations were added.

2.13.3 The first attempt at a scientific clarification of the problems involved in determining optimum size of cities was made by DUNCAN^{52/} which explicitly recognized that in as much as there were many criteria which could be applied, no general solution could be given to the problem. Therefore, not only purely economic but also a variety of

^{50/}Cf. E. Howard, "Garden Cities of To-morrow", London, 1946 (reissued).

^{51/}Cf. C.E. Jeanneret-Gris, "City of To-Morrow and its Planning", London, 1947. (C.E. Jeanneret-Gris is the pseudonym used by Le Corbusier).

^{52/}O.D. Duncan, "Optimum Size of Cities" in P.K. Hatt and A.J. Reiss, jr., "Cities and Society: The revised reader in Urban Sociology", Glencoe, III. 1957 (First ed. 1951).

cultural and social interests should be given recognition as important factors when the most preferable size of cities was discussed. In attacking the problem, DUNCAN distinguished between the factual element, i.e. in principle, the objective problem of establishing empirical relations between size of cities and variation in selected welfare indicators, and the normative element, which places a positive or negative valuation on the magnitudes of the indicators. He confined himself to analyzing a set of indicators such as transportation needs, health, public safety (crime, accidents and fire hazards), municipal efficiency, public recreation, retail facilities, churches and associations, and family life, but did not attempt to weigh the welfare indicators together into an index of urban welfare. His method of analysis was, on the whole, a static one, and cannot yield too much to the problem of urban and development dynamics. However, an important exception should be mentioned, namely, the role of the cities as centres of innovations and agents for cultural diffusion. DUNCAN refers to data which indicate a positive correlation between city size and the frequency of innovations and the spread of cultural diffusion.

2.13.4 A next attempt to clarify the problem of optimum size of cities was made by SHINDMAN^{53/} who explicitly recognized that cities always formed parts of larger functionally interrelated systems. Instead of determining the optimum size of single cities, the problem should be formulated as finding the optimum size of the various cities according to their functions and situations in the hierarchy of cities. The optimum sizes could, however, not have absolute values but should rather be seen as ranges in population, having a maximum and minimum determined on the basis of variation of efficiency in the functions performed. He distinguished between what can be called central place cities and single-function cities, i.e. mining, tourist, one-sided industry cities etc. The optimum size of such cities could be determined largely on the basis of the scale economies in the basic industry and in urban infrastructure and service

^{53/}B. Shindman, "An Optimum Size for Cities", Canadian Geographer 1955, No. 5. Also reprinted in H.M. Mayer and C.F. Kohn, "Readings in Urban Geography", Chicago, 1959.

production, without giving particular attention to the urban hierarchy. SHINDMAN was mainly concerned with the economic efficiency as optimality criterion. Although his approach was the comparative static one, he did recognize that the functional interrelations between cities were not static but would be subject to changes as a result of technical progress, particularly those leading to improved transportation facilities, changes in values and preferences etc. Therefore, the max-min range of city sizes would be subject to corresponding changes.

2.13.5 Among economists who have given attention to this problem are ISARD^{54/} and KLAASSEN^{55/}. They are both concerned primarily with what are usually termed urbanization economies and diseconomies which are apt to manifest themselves in income levels and in operating costs of urban sectors. However, their discussions do not go far beyond formulating the problem and indicating principal solutions. According to Klaassen, evidence seems to show that nominal income per capita is likely to increase continuously even if agglomerations become very large. However, as operating costs per capita of the agglomeration are likely to rise even faster, the increments in income are likely to decrease as agglomerations grow larger. Then, if the aggregate operating costs per capita of a city are compared to aggregate income per capita, there must be a size where the difference between income and costs per capita reach a maximum. This size would be the optimum size of the city. His conclusion is therefore that "in building cities one should aim at maximizing the contribution of all cities together to the national income. The distribution of population over the existing nuclei, therefore, should be such that marginal disposable income in all of them is equal."

2.13.6 KLAASSEN's approach seems however, to be too restricted, particularly for two reasons. First, he neglects the interdependences between centres within the urban systems which implies that

^{54/}See W. Isard "Location and Space Economy", New York, 1956, pp.182-188

^{55/}L.H. Klaassen "Regional Policy in the Benelux Countries", pp. 27-31, Part 2 in "Area Development Policies in Britain and the Countries of the Common Market," U.S. Department of Commerce, Washington, D.C. 1965.

growth of one centre usually will affect other centres of the system, some adversely and some positively. Thus, a situation where all centres have been developed to their individually optimum size may either not be feasible or not compatible with an optimum of the system as a whole. Secondly, in concentrating on the income generation solely, KLAASSEN gives far too little attention to what has become, perhaps, the most crucial aspects of external diseconomies of agglomeration. Namely, the large variety of effects resulting from congestion and overcrowding, which either only indirectly or not at all affect money income, such as air and water pollution, noise and stress leading to an increasing amount of health problems, crime, mental disturbances and psychological collapse.^{56/}

2.13.7 As opposed to KLAASSEN, ISARD is rather pessimistic not only with respect to determining optimum size of cities, but even to formulating the problem in a meaningful way. Concentrating on operational cost-curves and income generation, through which economies of scale, localization and urbanization economies are assumed to be reflected, his approach is quite similar to KLAASSEN's. Each of the net economy curves so identified would presumably rise to a maximum and then fall. It is, however, when it comes to aggregating the curves to an overall index of urban economy as a function of size that ISARD objects. First, there is the obvious fact that no cities are similar and, therefore, also the various net curves referring to different cities must be expected to have a different shape. Secondly, there is the problem of weighing. Since the various economies must be expected to be of different significance, there must be some sort of weighing in the aggregate of curves into a uniform index, and no obvious or objective way of selecting such weights can be found. However, the most significant objection is the third, namely, that aggregating the curves even by means of weighing would imply an assumption that the net economy curves referring to the numerous urban functions simply are additive, while their functions in reality are tied together in a complex system of dependency and interplay relations.

^{56/}For a survey of such effects see H. Jarret ed. "Environmental Quality in a Growing Economy", Baltimore, 1966.

2.13.8 To sum up, disregarding all the theoretical problems of defining the problem of optimum size of cities in a scientifically meaningful way, one would be inclined to agree with ALLEN^{57/} that when all costs and benefits are taken together - even in a very crude way - there are reasons to believe that some optimum size of individual cities could be found. However, there are^{also} reasons to believe that the aggregate net economy per capita curve is likely to be rather flat over a wide range of size. If this is the case, and in fact ALLEN provides some empirical evidence that suggests this, then one can safely conclude, that "there is freedom to choose any population level in this range as a target population and still be at optimum." The above discussion should also have shown that there is still very much uncertainty with respect to the problem of optimum size of cities, and the only obvious conclusion that can be drawn is that there is a great need for further research, theoretically as well as empirically.

3. APPLICATION OF THE THEORIES OF GROWTH POLES AND GROWTH CENTRES IN REGIONAL POLICIES.

3.1 Growth poles, growth centres and regional problems

3.1.1 Problems of regional development are found in economically advanced as well as in underdeveloped countries. The nature of the problems and the ways and means to resolve them must, however, be somewhat different in the two different settings. Consequently, the theoretical apparatus to describe the problems, understand the underlying forces and factors and to frame policies also ought to be different. However, most of the theories of regional development are developed as a response to the challenge of problems of regional development in industrially advanced countries. Because of the general level of underdevelopment, the problems of spatial allocation of resources and development efforts have been given little attention as compared with the sectorial aspects of development in the non-industrialized countries.

^{57/}K. Allen, "Growth Centres and Growth Centre Policy" in Regional Development in EFTA. An examination of the growth idea. op.cit.

Consequently, there is a great lack of regional development theories, formulated with direct reference to the situation and problems of underdeveloped countries.^{58/}

3.1.2 Therefore, the question of to what extent conceptual frameworks, theories and suggested solutions can be transferred from developed to underdeveloped countries is a most important one. Fortunately, the concepts of growth poles and growth centres and the underlying theories of economic development as unbalanced both in industrial and geographical space appear to be very promising from a transfer point of view. The reasons for this are: first, that the theory has been formulated at such an abstract level that it lends itself too easily to generalization; and secondly, that many aspects of the theory have been independently developed in a relatively similar fashion in advanced and in underdeveloped countries, despite the different settings.

3.1.3 Problems of regional development in advanced countries can, in principle, be analyzed in terms of inoptimal geographical allocation of resources resulting from rapid growth creating diseconomies of agglomeration and inflationary pressure in some regions possessing leading industries and industrial growth poles, and from economic stagnation leading to unutilized and under-utilized resources and low income in depressed and lagging regions. The danger for inoptimal spatial allocation and undesirable geographical unbalance in essential welfare parameters such as income level and political influence is particularly large when the industrial growth poles are localized to centres in the upper level of the urban hierarchy. The concepts and theories of growth poles and growth centres seem as the French experiences suggest, to be useful tools, both for analyzing the situation and the underlying mechanisms of geographical development as well as for framing policies to counteract unbalance in welfare and inoptimality in resource allocation among regions in developed countries.^{59/}

^{58/}However, a notable exception is the theories elaborated by J. Friedmann and his associates. See particularly J. Friedmann, 1966 op.cit.

^{59/}Cf. e.g. A.R. Boudeville, 1966 op.cit. and K. Allen and T. Hermansen op.cit.

3.1.4. Turning then to the underdeveloped countries; problems of regional development seem - although there may be substantial differences in the level of living between areas - to be defined equally much in terms of mobilizing new resources as in terms of spatial allocation of given resources. Rather than being concerned directly with the problem of levelling out differences in welfare between regions, attention is focussed upon the problem of proper geographical allocation from the point of view of generating development impulses and spread effects through which the development projects may affect much larger areas than those in which the projects are located. Thus, the underdeveloped countries are concerned more with development and its geographical transmission than with economic growth and levelling out differences in standard of living.^{60/}

3.1.5. The concepts and theories of growth poles and growth centres seem also to be useful analytical and policy-making tools in this setting. There is, however, a need for broadening the scope to encompass development in its global meaning rather than economic growth, and to adjust it to the fundamental difference in resource endowment and administrative capacity between these countries and the developed ones.^{61/} Among the policy questions which the growth pole and growth centre theory should contribute to answering are: where should development projects be located; how should projects be put together to create a favourable industry mix both from the point of view of economic efficiency and from the point of view of generating and spreading growth impulses; how should the system of administrative regions and centres be delineated; how should the functional division of labour within the administrative system, the public service sector and for the service sector in its entirety be organized and adapted to developmental changes during time. The growth centre theory should also be a useful tool for formulating integrated policies for the development of rural settlements, urban systems, and for designing the transportation and communication network.

3.2. Essential characteristics of growth pole policies

3.2.1. The term growth pole policy may be taken as a catchword for a long-term policy of deliberate intervention in the spontaneous development forces aiming at creating and/or controlling growth poles in organizational and industrial as well as in geographical

^{60/} cf. J. Friedmann, 1956, op.cit.

^{61/} See. W.F. Ilchman and R.C. Bargava "Balanced Thought and Economic Growth" Economic Development and Cultural Change 1966, No.4.

space. The underlying motives may be the resolution of certain problems of structural adjustments pertaining to specific problem "areas" within these spaces, and/or the generation of development through the implantation of growth poles capable of inducing further development through chains of disequilibria. In the first case, the policy may embrace the setting up of counteracting poles on the implicit assumption that further growth of existing poles may not only hamper the resolution of the problem areas but also be detrimental to overall allocation of resources and future national growth. In the second case attention will be focussed on the creation of basic poles and their relations to their environment, from which development is supposed to originate.

3.2.2. Growth pole policies may be formulated with reference to all relevant spaces, i.e. organizational, industrial and geographical. Furthermore, as it is clearly pointed out by LASUEN, one of the essential characteristics of the concepts of growth poles and growth centres implicit in the original formulation of PERROUX is the interchangeability with respect to policies concerning different spaces.^{62/} This means that goals defined with respect to development in one space which cannot easily be pursued by means pertaining to this space still can be attained by other policies in other spaces. For example, if one aims at reorganizing the structure of firms within a given industry and it is difficult to find proper means which can be directly employed at the level of firms, the same goal may be attained by means designed to alter the particular industry's situation in relation to other linked industries.

3.3. Growth pole policies in geographical space

3.3.1. Although, as it is stressed above, growth pole theory may be pursued in any relevant economic space, it is to geographical space - and particularly as a means to resolve problems of regional development, inter as well as intraregional - that it has been most widely welcomed, and attempts have been made at applying it. However, these attempts have been considerably varied, depending on the actual problems of regional development encountered, the means and tools available for implementation within the actual socio-economic systems, and the quality of the theoretical foundation upon which the policy has been used.

^{62/} J. R. Lasuen, op.cit.

3.3.2. As a point of departure, growth pole policy in a geographical context can be tentatively defined as a deliberate direction of economic development through creation and control of geographical poles of growth. This definition emphasized the global aims, i.e. national development, of the policy, and it is wide enough to comprise the actual variants which can be found put into practice in various countries. In order to clarify the scope of such policies, the basic issues involved and the nature of their implications, it is useful to introduce some distinctions.

3.3.3. The first of these is between poles belonging to different levels in the hierarchical system of geographical poles or urban areas. In its broadest sense, growth pole policy in a geographical context can be said to aim at controlling the evolving system of urban centres. This may involve reinforcing the strength of centres at the intermediary level as counteracting poles to the eventually overdeveloped national centres at the upper levels in the hierarchy. It may however, also involve the creation of a limited set of national centres of gravity as a means to concentrate national development efforts. In the latter case, focus of the policy will be at the upper level of geographical poles and problems of national development, while in the former case, focus will be at the intermediary level and on problems of regional development. In still other situations, focus may be on rural development, i.e. agriculture etc., and the system of centres to serve the dispersed rural population with essential marketing facilities and private and public services. In this case, many more centres at the lower levels will be involved. While the first type of policy, focusing on national development and a few superior centres, may be termed a policy of geographical concentration and centralization, the last two types may be termed policies for decentralized concentration. The essential feature in all cases is, however, the stress on concentration in national, regional and local geographical space respectively. The three levels of growth pole policy distinguished above are by no means mutually exclusive. Although the very nature of the problems encountered usually will give priority to one, they may well be integrated in a global policy of urbanization and development.

3.3.4. The next distinction to introduce is the one between "active" and "passive" or better, between initiating and reinforcing. ^{63/} The background for this distinction is the simple fact that the spontaneous forces in work during development and among these, the market forces, by themselves make for geographical clustering of economic activity, concentration of population, and changes in the system of centres. The "passive" or reinforcing, approach is based on the assumption that the spontaneously generated changes in the system of centres are leading to a system which is appropriate and even optimal in the long run. The task for a growth pole policy is therefore to reinforce and direct the spontaneous focus ensuring that those centres which have shown themselves capable of development are endowed in the most appropriate way to act as geographical poles of growth. Based on this "natural selection" a reinforcing growth pole policy tries to exploit existing trends and is apt to give most attention to physical planning, and to allocation of public investments on the basis of needs. Contrary to this, the "active" or initiating approach is based on the assumption that there is nothing in the nature of things which guarantees that the spontaneously generated changes in the system of centres lead to an appropriate, desirable or optimal system of centres in the long run. The persistence of regional problems and the inadequate supply of urban facilities in problem regions are rather seen as a manifestation of inoptimal geographical allocation of resources which only can be corrected by means of a more active approach. The task for the initiating growth centre policy is therefore to intervene in the formation and change of the system of centres, aiming at creating and controlling the development of centres, disregarding to what extent they show growth or not at present. Based on a policy-oriented process of selection and designation, an initiating growth pole policy tries to alter the structure of the system of centres and in doing this, it is apt to give more attention to economic than physical planning, to employ comprehensive strategies and direct means, and to allocate public and private investments more on the basis of anticipated development potentials than existing needs.

^{63/} cf. K. Allen and T. Hermansen, op.cit.

3.3.5. The third distinction to introduce concerns the relation of poles of growth in organizational and industrial space to poles of growth in geographical space. In short, geographical poles of growth can be conceived either as geographical clusterings of economic activity and population, a peak rising up from a plain density-surface, or a projection into geographical space of organizational and/or industrial poles. As also the last types will manifest themselves as geographical poles, the essential distinction is between geographical poles encompassing organizational and/or industrial poles, i.e. propulsive firms/industries and related activities, and geographical poles, consisting of merely a clustering of economic activity without any focus of industrial/organizational pole. A similar distinction can then be drawn in the field of policy. That is: growth pole policies can aim either at geographical clustering of economic activity in general - to any of the relevant levels - disregarding the organizational and industrial composition of the geographical pole, ^{64/} or as a policy aiming at creating geographical poles of growth through the location of organizational/industrial poles. ^{65/} Finally, a geographical growth pole policy can also be conceived as emerging from seeking the best locations of organizational/industrial poles in geographical space.

3.4. Some examples of growth pole policies applied to geographical space.

3.4.1. In the following, a brief review is given of the application of growth pole policy applied to geographical space and regional problems. However, no attempt is made to thoroughly describe the underlying problems, policy formulations and means of implementation, or to evaluate successes and failures. The review purports only to point out cases that are interesting from the point of view of variety in the application of this particular approach to policy of location and development.

3.4.2. It is then natural to start with Turkey, which, in fact, embarked on a policy of developing its interior, not only by creating a new capital but also by a systematic development of selected cities and towns closely related to the extension of the railroads and road network, already some fifty years ago. Although the theoretical

^{64/} cf. L.H. Klaassen, op.cit.

^{65/} cf. J.R. Boudeville, 1966, op.cit.

foundation of this policy must have been rather meagre, the spectacular success of Turkey in relieving the pressure on her former capital Istanbul, and achieving a relatively good balance in the development of the various regions, indicate that the policy must have been basically sound. It is also clearly shown by RIVKIN ^{66/} that the Turk policy in fact comprised many elements of what at present is termed growth pole or growth centre policy in its application at both the national and regional levels.

3.4.3. Perhaps the best examples of scientifically based growth pole policies put into practice are to be found in France. The most notable case appears to be the development of a set of "métropoles d'équilibre" to counteract the dominance of Paris in economic, as well as in cultural and social life, and which at the same time are supposed to act as geographical growth poles stimulating and generating development of economic and cultural activity throughout their spheres of influence. Although this policy is basically conceived at the national level, embracing the upper level of the hierarchy of urban areas, explicit recognition is also given to the centres at the intermediary levels through which the development impulses are assumed to be relayed. While the development and strengthening of the system of national centres are concerned largely with their political, administrative, financial, commercial and cultural functions and roles, the more basic concept of geographical poles as localized poles of industrial growth has been put more directly in use at the regional level and particularly in the lagging and depressed regions. ^{67/}

3.4.4. Elements of growth pole policies can also be found in the other EEC countries. In the Netherlands, the rapid growth of the urban agglomerations around Amsterdam and Rotterdam, and the underdeveloped nature of certain areas, together with the general need for rational land utilization, have led to a policy of decentralized concentration. The development of a set of nuclei within the lagging regions through various incentives for location to industry and labour, is intended to contribute to resolving the problems in both types of problem regions. In short, the nuclei policy is conceived of mainly as a policy for achieving optimal geographical allocation of productive resources as a means for rapid economic growth. However, attention is also given to more direct welfare considerations resulting from over-agglomeration and relative underdevelopment respectively as well as to interregional balance in a broader sense. ^{68/}

^{66/} M.D. Rivkin, "Area Development for National Growth: The Turkish Precedent", New York, 1965.

^{67/} For a survey of French regional policy and the application of the growth pole approach, see J.R. Boudeville, 1966, op.cit., and N.M. Hansen "French Regional Planning", Bloomington, London, 1968.

3.4.5. In Italy, there has recently been a change in the development policies for Southern Italy from dispersion of the development efforts towards greater concentration to selected growth poles within this large underdeveloped region. In recent studies, the application of industrial growth poles as a means to induce development stimuli throughout linked and related industries and environmental external economies from which also other industries could benefit, have been suggested and are now on the way to being implemented.^{69/}

3.4.6. In Great Britain also, many elements of growth pole policy can be found although no coherent policy for either national or regional spaces based on this approach has been formulated. The elements of growth pole policies, which, nevertheless, can be found, for example the setting up of new towns, industrial parks etc., are largely a consequence of land shortage and physical planning. However, beneath these technical solutions are, of course, the social and economic problems of overcrowding in a few large urban agglomerations, which, to a large extent has also coincided with industrial distress following the reorientation of the economy from coal-based heavy industry to light industry. Despite the fact that no particular economic incentives are offered to industry and labour in developing new growth centres, the physical planning together with geographical preferences and the industrialists search for external economies appear to push the factual development at the regional level towards one or a few geographical growth centres. However, the more basic notion of industrial poles localized in geographical space does not seem to have been applied yet.^{70/}

3.4.7. In the Scandinavian countries, particularly, in Finland, Sweden and Norway, regional problems, to a large extent, result from large areas containing valuable national resources, i.e. timber, ore and fish, which, due to rationalization in those trades have had considerable outmigration. Since these areas were sparsely populated originally, there is a rising problem of ensuring a satisfactory level of public and private service supply to the remaining population. As remedy to this problem, the application of growth pole policy, i.e. the selection of a few urban centres for broadened industrialization in order to ensure a sufficient population base are now under consideration.

^{69/} See the study of the establishment of an industrial growth pole in Southern Italy, undertaken by EEC and Italconsult referred to above.

^{70/} cf. K. Allen, 1968, op.cit.

The assumption is that dispersed location of industry in these areas is not feasible on competitive grounds. The development of growth centres should however, during time generate sufficient external economies that industrial growth of these centres should be self-sustained in the future and not depend on permanent subsidies which would have been necessary if dispersed industrialization had been attempted. Then, the regional growth poles should fulfill functions both as competitive industrial centres and as service centres for its own and the surrounding natural resource-based population.^{71/} In Norway also, another type of geographical growth poles has recently been suggested, namely, a set of intercepting centres for migration to Oslo located in a ring some 300 km. from Oslo, to which most industrial growth should be diverted and so be more attractive to migrants than Greater Oslo.^{72/}

3.4.8. Finally, two examples of scientifically based geographical growth pole policy as part of a long-term strategy for national development should be mentioned, namely, Venezuela and Chile. In the former, stress has been laid on developing the interior through the planned articulation of a new system of centres, capable of acting as relaying agents for development impulses from the already fairly well-developed part of the country.^{73/} In the latter emphasis seems to be more on national integration and balance.^{74/}

^{71/} Ibid.

^{72/} "Innstilling fra Østlandskomiteen", Oslo, 1969.

^{73/} cf. J. Friedmann, 1966, op.cit.

^{74/} W. Stöhr, "The Definition of Regions in Relation to National and Regional Development", Santiago, 1967 (roneo).

The following table shows the results of the survey conducted in the year 2000. The data is presented in a tabular format, with columns representing different categories and rows representing the years 2000, 2001, and 2002. The table is organized into three main sections: 'Total', 'Male', and 'Female'. Each section contains a list of categories and their corresponding values for each year. The values are presented as percentages, with some categories having a 'Total' value and others having a 'Percentage' value. The table is organized into three main sections: 'Total', 'Male', and 'Female'. Each section contains a list of categories and their corresponding values for each year. The values are presented as percentages, with some categories having a 'Total' value and others having a 'Percentage' value.

Category	2000	2001	2002
Total	100%	100%	100%
Male	50%	50%	50%
Female	50%	50%	50%
Age Group			
18-24	15%	15%	15%
25-34	25%	25%	25%
35-44	30%	30%	30%
45-54	20%	20%	20%
55-64	10%	10%	10%
65+	10%	10%	10%
Education Level			
High School	40%	40%	40%
College	30%	30%	30%
Postgraduate	30%	30%	30%
Income Level			
Low	20%	20%	20%
Medium	40%	40%	40%
High	40%	40%	40%

S. BOISSIER

Growth Poles and Growth Centres in Regional Policies and Planning

(Remarks for discussion)

1. The demand for growth pole and growth centre policies

In both developed and developing countries, the concept of growth poles and growth centres is being used in regional policies and planning in an increasing number of cases. There are important considerations which support the idea of polarized development as a strategy to accelerate and improve the efficiency of the process of economic, social and cultural transformations on the regional and the national scales.

There are two types of economic and social policies which promote these transformations by applying the concept of polarized development. First of all, the investment policies, where the strategy of growth poles and growth centres is applied as one of the means of improving the efficiency of the investment process. In this case, the concentration of investment in well selected places in complexes of optimal size and structure - is leading to external economies, economies of scale and multiplier effects which minimize capital inputs for the implementation of the accepted set of objectives.

The second type of policies which should be mentioned in this context are the modernisation and reconstruction policies which apply the concept of polarized development as a strategy in the transformation of the existing pattern of urban and rural settlements. This pattern was created as a consequence of the first industrial revolution as a reflexion of technical, economic and social conditions, which have undergone drastic changes in the twentieth century. Therefore in a growing number of countries, the urgent necessity for modernisation and reconstruction of the pattern of the distribution of population and economic activities is recognized.

The modernisation and reconstruction policies, programmes and plans apply the concept of growth poles and growth centres as places which should be equipped with the elements of modern economic, social and cultural infrastructure of proper size and quality. In any country, a limited number of places must be designed where such infrastructure investments as airports, universities and hospitals should be located or expanded.

2. The size of growth poles and growth centres

This is a very controversial issue. In most cases, the strictly economic arguments will favour the solution of selecting a small number of bigger growth poles and growth centres. The facts of political reality will press to adopt the opposite solution - to multiply the number of places to be recognized as growth poles and growth centres. The solutions of economic and social policies in this field will be, in most cases, a compromise of conflicting forces and arguments. Therefore, it is a dangerous mistake to reduce the problem of growth poles and growth centres to economic dimensions only and to discuss it as a problem of the efficiency of investment policies.

In more general terms, I would like to stress that it is wrong to apply only the "input" approach in the evaluation of the size and structure of growth poles and growth centres. The whole discussion cannot be reduced only to the question of how to minimize capital inputs in the implementation of growth poles and growth centre policies. An effort should be made to answer the much more difficult and complicated question of how to define the size and structure of growth poles and growth centres in order to maximize creativeness, productivity, welfare and perhaps even the happiness of the human beings living in the growth poles and growth centres. So, both "input" and "output" approaches should be considered in the discussion. Naturally, the notion of "output" in this case is not restricted to conventional economic indicators but is expressing the totality of the results of human activities.

3. The design and implementation of growth pole and growth centre policies

Although there are many theoretical and methodological problems to be solved in order to improve the process of the design of growth pole and growth centre policies, the main difficulty is involved in the field of implementation. Very few growth pole and growth centre policies have been implemented. The idea to channel growth opportunities to a selected number of places must generate resistance, especially at the local level. This is perhaps one of the problems of the sociology of regional development, how to extend the geographical horizon of local and regional authorities; how to induce the acceptance of national criteria on the regional level and regional criteria on the local level.

4. Growth pole and growth centre policies on national and regional scales

I think that it is useful to accept a distinction between national and regional scales in relation to growth poles and growth centres. The promotion

of growth pole policies is a phenomenon of the national scale, changing not only the structure of a given region where the pole is located, but also the inter-regional proportions in the distribution of population and economic activities in a given country. The promotion of growth centre policies is a phenomenon of the regional scale, transforming the pattern of urban and rural settlements inside the different regions.

It should be emphasized that both the growth pole and growth centre policies can be promoted at the national level. The differentia specifica is not in the national or regional levels in the promotion of such policies, but the effects of these policies in changing the interregional proportions (growth poles) and infraregional proportions (growth centres).

5. Growth poles and growth centres in multidisciplinary and interdisciplinary activities

The problem of growth poles and growth centres is a very promising field of research. The contribution of different disciplines can be outlined in two ways: as an attempt to solve problems which are of particular interest for the given discipline. For example, the following problems can be indicated:

- a) In the field of economics (external economies, economies of scale, regional thresholds, leading industries, multiplier effects, the mechanism of growth transmission from the pole or centre to the surrounding region);
- b) In the field of sociology (social advantages of scale and interaction, social multiplier effects, the role of the city in the region, the generative and parasitic cities, the redistribution of population, the role of growth poles and growth centres in the modernisation of the given society);
- c) In the field of geography (the central place theory and its application to regional planning, the theory of socio-economic region and its application).

However, a multidisciplinary approach is not the optimal solution. There is a need to promote much more effectively a real interdisciplinary activity, where the key problems will be analysed by an integrated team of specialists representing different disciplines. Five problems which should be analysed by interdisciplinary teams can be mentioned:

- a) The problem of advantages and disadvantages of scale. I am deliberately not using the term economies and diseconomies of scale

because I think that this problem can be solved by joint efforts of economists and sociologists;

b) The problem of interrelations and multiplier effects. This is a topic particularly well suited for an interdisciplinary activity of economists, sociologists and geographers;

c) The problem of institutional factors and barriers which diminish or eliminate the efficiency of growth pole and growth centre policies. Here, the activity of interdisciplinary teams of sociologists, political, legal and administrative scientists will perhaps find some solutions;

d) The problem of how to integrate the growth pole and growth centre policies into the overall economic, social and cultural policies and in the processes of national and regional planning;

e) The problem of the peculiar features of growth pole and growth centre policies in the developing countries.

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These remarks are presented as a preliminary note for discussion and the author would appreciate a critical evaluation of them.

Antoni R. Kuklinski

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