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TOWARDS THE INTEGRATION OF ECONOMIC PROGRAMMING
AND PHYSICAL PLANNING IN EAST AFRICA:
INDUSTRIAL LOCATION AND URBAN GROWTH PROSPECTS
A Methodological Perspective.

Note

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The Argument.

The 'new nations' of Africa, Asia and Latin America have in varying degrees embarked upon the shaping of their corporate future by means of comprehensive planning for economic growth and social change. As the complex nature of the processes to be directed and the problems to be resolved have been revealed, the importance of integrating different parts of the planning effort has emerged. One outstanding problem which faces these developing countries is that of the extremely rapid growth of their urban populations and the tendency for this growth to be focussed on their major cities. This has resulted in severe strains on what are becoming the emerging 'metropolitan areas' in terms of their ability to accommodate a large inflow of migrants from rural areas as well as the natural increase of their resident population: large and growing slum areas, a lack of basic utilities, congestion and poor transport facilities, and other physical and social ills are the outcome. At the same time other areas of the country remain at a low level of development with most local initiative drained away to the capital cities.

Many of these countries are experiencing and trying to encourage industrialisation, with manufacturing consequently becoming a more important source of income and employment. Once again however, the bulk of large scale enterprise in this sector appears to favour location in the largest urban areas, where its contribution to easing the situation does not seem sufficient to accelerate progress in solving the major problems of these cities, and at the same time, other areas are relatively 'starved' of industrial expansion. Any policy to decentralise manufacturing is however at present open to question on the grounds that it may fatally weaken the developmental momentum achieved in at least one or two places, without being effective in stimulating the necessary critical minimum of expansion elsewhere. The known preference of industrialists for the major cities and the experience of great difficulty with encouraging 'small industry' over a wider area support this view of things.

It is my contention that the problem and its preferred solutions are usually seen and recommended in a context which is at once too wide and too narrow. By analysing the problem as one of how to integrate local physical and social development and planning efforts into the overall picture and the national effort, and its solution as necessarily based on a better understanding of the relationships of aggregate growth and change to its 'spatial organisation', and a better operational framework for bringing together economic and physical programming, these inadequacies can be overcome. It is shown that, while the development process will lead to a greater degree of interrelatedness in industrial and urban growth, and a greater degree of regional differentiation in levels of progress, the emergence of a growing 'urban industrial system' does not imply the necessary dominance of a single centre of expansion.

The determinants of a general pattern of urban industrial regional concentration are derived from the nature of the development process and from the cumulative feedback inherent in urban industrial growth. An area of indeterminacy as to the specification of urban industrial centre location is pinpointed and shown to arise from as yet little known factors in the local interaction of industrial firms and the urban environment. An approach to a more systematic evaluation of potential alternative patterns of distribution for urban industrial growth is suggested, and a research programme directed at making this more feasible is presented.

In this way a case is made for restricting the area to be considered in regard to policies of sharing out industrial growth, but within this 'narrowed' area 'widening' the appraisal of alternative urban sites on the basis of assessing on a comparative level the situational advantages and constraints of a number of places by way of a 'distributional calculus'. The assessment includes the 'primate' centres, for which there are often physical plans in great detail, but still lacking in attention to the provision of a sound economic base, as well as other centres which have received less inclusive treatment, now to be provided with the aid of a sufficiently specified regional breakdown of the national planning strategy. It is hoped the methodological perspective here provided will aid the advancement of the capability to match people and job opportunities, necessary to the realisation of surely legitimate aspirations on the part of a majority of mankind.

Introduction.

This paper presents a position. It sets out to argue a case in support of a methodological recommendation, that is, a recommendation about how a problem may best be approached and a way found to its possible solution. The problem to be dealt with can be stated in two different but related ways, one theoretical and one practical. The theoretical problem is to find a connection between the processes of economic growth and cultural change and the processes by which the geographical distribution of population and production is altered in an underdeveloped area as development takes place. The practical problem is to create a framework within which national economic programming and local physical and social planning can be joined together in a mutually supporting manner. The recommendation made is that the problem should be treated as involving the identification and interrelation of a set of systems and sub-systems of activities and of their spatial arrangement. The solution is then to be found in the use of an analysis of system behaviour to specify the pattern of interaction between activities and spatial arrangements, and to suggest the points at which the integration of economic and physical planning are to be made to their mutual advantage.

The thoughts expressed in this paper have been arrived at as the result of several years spent in trying to deal with questions of the geography of development and of the place of regional analysis in development planning. Though there are incorporated in the paper some results from previous research, this nevertheless is not intended to be a summary of findings. Equally, though the paper addresses itself to a particular set of policy issues, it is not concerned at this point with the elaboration of specific proposals, excepting those relating to further research. Further, although in the body of the paper there will be found reference to certain concepts and techniques, the argument put forward is not primarily about the relative advantages of ideas and methods as such: it is rather concerned with the way in which we look at the world, and the means by which we try to influence our part of it. In particular, the recommendation for which I am here arguing the case, is founded upon an appreciation of two important ways in which our understanding of a situation is increased and our powers of control in that situation strengthened. On the one hand, the sureness of our knowledge may be seen in the extent to which it is possible to relate different kinds of phenomena by means of systematic derivation rather than by the use of 'ad hoc' assumptions. On the other, the extent to which we can manage a situation is in large part dependent upon our ability to identify crucial variables and calculate magnitudes of effect, even if only approximately, as against having to rely upon some 'a priori' conventions. The aim of what follows is to suggest how both these kinds of improvements can be introduced in the context of the problem at hand.

The first part of the paper deals in more detail with the nature of the problem of relating national to local developments, illustrating the widespread concern with, and movement towards, a better integration of economic and physical planning. The second part describes the nature of the approach to the problem in terms of the factors and interrelationships involved in connecting economic growth and cultural change and population and production distribution, set within the framework of systems analysis. The third part illustrates the preferred approach by applying it to the case of one developing area, East Africa, using materials from the recent past, the two decades 1945-1965. The last part carries the argument one stage further, by turning to the question of predicting future developments and designing a research programme to improve the basis of such predictions and the foundations of integrated economic and physical planning in the same area over the next two decades 1965-1985.

The Problem: Integrating Physical Planning into the Economic Development Process.

Attempts at the purposive encouragement and rational management of economic development and cultural change are by now common to a large number of developing countries in Asia, Africa and Latin America. Such attempts are now accepted as a reasonable response to the social situation in these countries and to the historical circumstances in which they find themselves. Partly as the result of academic research and partly of practical experience, the difficulties of organising for growth and change have become steadily more apparent. 'Development' in short, has come to be recognised for what it is - a multifaceted phenomenon, a complex process with multiple interconnections between its constituent parts. The successful achievement of a potential for self-sustaining and cumulative advances in material welfare - rising standards of living for the bulk of a community - involves a wholesale shift in patterns of population and production that entails complicated alterations in the continuing interaction of technological, economic, demographic, social, political and cultural variables.⁵

To deal at all adequately with this situation, it has been necessary to constantly widen the scope of plans and programmes intended to direct or influence the speed and direction of change in the developing areas. Sometimes the expansion in coverage has come about through an enhanced awareness of interrelationships, like those that evolve among the different sectors of a developing economy. At other times it is the result of learning from past mistakes or oversights, such as the failure to match needs of professional or other 'high-level' manpower and the strategy of educational expansion. In general, the evolution of development planning has followed the course of obvious need; the most obviously apparent possibilities have been followed up first, and more and more has been added as the dimensions of the task have successively been revealed. Thus 'Planning' in most then underdeveloped countries twenty years ago consisted in the main of co-ordinated medium-term capital expenditure programmes for the 'public sector' of the economy. Today, in a number of cases, not only are attempts made at the comprehensive programming of an entire national economy, but in the compass of the usual five-year plans come such things as land reform and resettlement, the mobilisation of rural labour, the adoption of new forms of productive organisation such as the co-operative or the 'para-statal' corporation, and the re-orientation of administrative bodies for the purpose of encouraging growth and change, - things which unequivocally extend the frontiers of planning beyond the 'strictly' economic sphere⁶ into what may be termed broadly the cultural 'context' of development.

The attempt to introduce purposefulness and rationality in managing large-scale and widespread changes in the fabric of a society is, prima facie, an improvement over unplanned ad hoc adjustments, in that a more complete and ordered account can be taken of all relevant circumstances and a more concerted effort can be mounted on all fronts to achieve an increased mobilisation and the effective utilisation of all available resources. This is especially the case where very big alterations in the existing situation are being hoped for, which have many ramifications needing attention, and where the many problems likely to be thrown up by radical social change are being collapsed into a very short period of time.⁷ At the same time however, as plans and programmes and projects continue to multiply, the more important it becomes to ensure that the connections between them are firmly based. Faulty assumptions in their interrelation, or faulty procedures for their integration into the overall picture may result in the unintentional 'overloading' of a programme or a scarce resource, or conversely, failure to realise available potential. Thus for example a programme of agricultural development may contribute to the overloading of a planned expansion in marketing and distribution facilities but might at the same time fail to take account of potential opportunities for the manufacture of fertilisers. The more comprehensive the planning, the greater the need for the means of integrating more 'dimensions' of the overall effort in a systematic fashion to ensure the maximum benefit.⁸

Individually, both attempts at national economic planning and at local physical and social planning in the developing countries have been faulted by inappropriate assumptions built into their make-up, perhaps reflecting the experience of the now developed areas uncritically transferred, or by a breakdown in the implementation or evaluation of 'paper excercises'. In particular, comprehensive economic programming at the national level is still regarded as often too 'abstract', while physical and social planning at the local level is still thought to be too concerned with 'concrete' considerations. Economic programming may be technically elegant, aim at internal consistency, but fail to take sufficient account of real-world conditions giving rise for example to quite unreliable data, and of real-world constraints other than purely economic ones, such as group reactions to new kinds of institutions or environments, seen for example in the introduction of mechanised farming. Physical planning may similarly be technically sound, orderly and exhaustive within its domain, but is generally too small-scale and bound up with a limited concern for land and building control, ignoring alternative possibilities for the development of the 'settlement pattern' to make the most of local initiative.

Here, it would seem to me, is a classic case of the problem of integration in planning for development. To a significant degree, over-abstractness in one case and over-concreteness in the other are joint products of a lack of mutual comprehension. On the one hand, aggregate economic model building and planning projections are not sufficiently specified in terms of programme or project location, and the likely effect that may arise therefrom. The result may be quite inaccurate forecasts of what the overall ratio of capital investment needed to produce a given rise in output may be, since activities planned for different parts of an under-developed country may encounter gross differences in the provision of complimentary facilities and services. On the other hand, individual physical 'master plans' for emerging metropolis or municipality are not sufficiently specified in terms of the mixture of activities that are likely to be located in the locality as part of the overall development strategy, or in terms of the possible contribution of local initiative to the comprehensive effort. The result may be quite inaccurate forecasts of what the rate of in-migration may be into differently situated urban or rural areas, or demands for specific categories of land may be as the result of employment generation from locally attracted investment.

The stated aim of most economic programming is to achieve the fastest possible rate of economic growth and the most extensive changes in economic and social structure needed to ensure greater productivity, within limits set by availability of different resources such as capital, foreign exchange or skilled manpower. To achieve this involves the maximum possible mobilisation of different resources wherever they are found or can be induced. The stated aim of most physical planning is to achieve the most optimal distribution of land-uses, bearing in mind their various interactions, so as to create the best possible framework for people and activities to fit into a 'built environment' within the limits of a given area and its physical characteristics. To achieve this involves the most complete assessment of the mix of people, activities and movements which has to be accommodated. In the context of a developing country, to make these aims compatible and mutually supporting needs a degree of re-orientation in both. Economic programming should be framed in such a way as to take account of the possible contributions arising from the different possible distributions of people and activities among localities. Concurrently, physical planning should be framed in a manner conducive to the realisation of potential contributions that may be made by different localities, given an appropriate local strategy to match and enhance the national one.²

What this means in effect is a sufficient disaggregation in national planning to encompass the pattern of differences between areas in a country, and a sufficient perspective in local physical planning to encompass the relative position and expectations of a given locality in relation to the rest of the country. Neither of these desiderata can be accomplished without a corresponding advance towards the other.

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Two things are required for the systematic and precise inter-connection of overall resource allocation and the specific spatial disposition of activities: building up a body of ideas about how to derive implications for one from the other in both directions, and building up a framework within which relevant information is produced and interchanged between the two. The first of these requirements poses the problem in its theoretical form, that is in terms of the present adequacy of our understanding in the social sciences about the variables and relationships involved in connections between activities and their locations during the development process. The second poses the problem in its practical form, that is in terms of the present adequacy of the connecting links passing between national economic programming and local physical planning.

As 'Planning' has become more extended and sophisticated, it has generally become more attuned to and dependent upon the more articulate concepts and methods formulated within the social and physical sciences. In many cases however, the more powerful the concept or technique, the more finely tuned to a particular issue or more specialised it is. Part at least of the problem here being discussed, arises from the fact that 'orthodox' economic programming and physical planning (as practiced in developed countries) have evolved their own disciplinary cum professional contexts of work, their own traditions of enquiry and their own codes of practical expertise on which to draw for their elaboration. In contrast, between the two there exists a field in which both enquiry and experience are scarce and scattered, where contradictory clichés - about for example the 'optimum' size of cities - compete with incomplete inferences - about for example the inherent tendencies 'known' to operate in industrial location from evidence of enterprise preferences - for the attention of policy-makers faced with decisions about resource allocation in space. As will be argued in the next section, a possible solution can now be offered however, by drawing upon the results of research in interdisciplinary studies focussing on aspects of what may most usefully be referred to as the 'spatial organisation' of population and production, combining the interest in economic and demographic variables of the national planner, with the concern for distribution and functional relation of people and activities in areal units of the physical expert.³

Such systematic derivation as can now be attempted must in practice be sufficiently precise to be operational, in the light of what is needed if a continuous iterative adjustment process is to be carried on between economic and physical planning, each feeding to the other reactions to projected developments. The process may be indicated as incorporating, *inter alia*,

- given an economic programming formulation of a projected overall growth rate in gross national product, a set of magnitudes to be achieved in the various producing sectors, a set of investments in the various kinds of productive asset and in social overhead, and some ideas on population and employment growth;
- derive one or more firm initial estimates of likely changes in patterns of population and production distribution over an area, sufficiently disaggregated to allow the physical planner for city, town or rural area to arrive at an approximate conclusion as to the likely 'impact' on his locality of the overall strategy or alternatives;
- assess the magnitude and direction of the 'impact effect' for a place in terms of income and employment generation, population increase, possible land-use requirements and demands for as against planned provision of physical infrastructure and community services; then,
- given the existing size of population, type of activity, utility and service provision and physical arrangement of these in an area, resource and production factor availability and likely constraints;
- derive one or more initial estimates of likely 'discontinuities' to be experienced as growth proceeds in an area: either in the way of a particular addition to the set of established activities the location of which is likely to exert a disproportionate effect on the relative developmental momentum of the place, or in the way of a particular item of expansion involving increases in population and activities necessitating new or modified physical lay-outs and the extension of the infrastructural base;

assess the relative magnitudes and directions of potentially induced expansion and potentially incurred costs for alternative dispositions of activities and employment between different areas and places, and correct initial strategy accordingly.

The above sequence is of course an ideal one, unlikely to be attainable in all its parts, but the fact remains that something approaching such a sequence has to be provided if physical planning is to be successfully integrated into the overall picture. Without some indication 'from above' of the relative situation of a place in the national context, there can be little improvement in the asserted parochialism and lack of initiative in localised planning efforts. Equally, without some indication 'from within' an area as to the particulars of its potential strengths and limitations, there can be little improvement in the asserted abstraction and negligence of overall planning in respect of locational considerations.

In almost every underdeveloped country (and in a good many developed ones too), critical problems have to be faced in combining resource allocations with allocations in space. The crucial question may be put in the form of to what extent can the decentralisation of economic, especially industrial, activities, and the spread of social overhead facilities, be 'afforded' in the early stages of growth, in response to equity considerations or political pressures. Or it may be framed in the form of to what extent is the disproportionate growth of certain 'primate' urban centres to be considered unbalanced, in need of some corrective action in order to stimulate local expansion elsewhere and relieve the pressure of social disorganisation mounting in one or two overcrowded areas. At the present time, the basis upon which decisions are taken in respect of such burning issues is made up in many instances of a compound consisting of one part received doctrine, one part political reaction to the pressure of events, and one part acceptance of the acceptance of a minimally effective role for location policy. The argument here is that these problems have yet to be fully grasped for what they are, that is, as problems of the possible and desirable forms of 'spatial organisation' for the development process. The integration of physical planning into the overall picture is needed above all to allow the 'opening up' of such issues to the scrutiny of what I shall call a 'distributional calculus' based upon the combined operation of national and localised analyses as set out above. The next section deals with how such a calculus might be approached. 4

The Solution: The Concept of Spatial Organisation and the Method of Systems Analysis.

The first part of a possible solution to the problem posed lies in the establishment of some systematic interrelations between 'development' and 'spatial organisation'; the second part in the use of a systems analysis approach to indicate the precise way in which the integration of economic and physical planning can be achieved based upon the knowledge of these relationships. The two parts are separated for ease of exposition but are closely intertwined in producing the sequence of argument.

During the last dozen years a very considerable amount of theoretical speculation and empirical investigation has been devoted to analyse the connections between processes of overall economic growth and social change and processes which alter the locational distribution of population and production over an area where development is taking place. What has been established in effect is that in so far as the process of development can be characterised by some invariant attributes wherever it takes hold or is deliberately induced, so far can alterations in the spatial organisation of people and activities also be identified as in progress in all cases. What this means is roughly as follows. Development can be characterised as a process which works to transcend the limitations of a purely subsistence economy and a purely traditional pattern of social relationships, throwing up types of social and economic structure capable of supporting self-sustained growth in incomes and wealth. As an economy and a society become more 'developed', a larger scale of activity and a greater range of individual contacts become the norm, a higher degree of specialisation and consequently of interdependence become established in all spheres of life, and new mechanisms of holding the larger and more complex society together arise.

Conversely, it can be said that an underdeveloped country is one where small-scale, simple and isolated economic structures and social groupings are the norm, with a lack of the technological and institutional basis underpinning the accretion of capital and its investment in improved ways of creating more wealth. The broadly based movements here mentioned operate on the many facets of social and economic organisation, modifying or transforming individual motivations, interpersonal relations, patterns of production and consumption, the distribution of incomes and employment, the variety of social roles and status, the basis of political authority, the scope of governmental functions, and the foundation of cultural values. Changes in any of these things affect in some measure, and are in turn affected by, changes in others, in an ordered manner which is being slowly rendered more coherent through the efforts of social scientists and others.⁵

These basic developmental attributes of an enlargement in scale, and increase in specialisation, and a finer mesh of controlling mechanisms, can also be observed in the sphere of spatial organisation. As a country develops there occurs a general expansion in the area over which a single economic and social system operates, the evolution of different kinds of activity and settlement pattern in different parts of the country and their progressive interlinkage into a new network of exchanges, and the creation of new foci of population and activity which serve at different levels to articulate and service the enlarged, complex 'space economy' and more mobile society concomitantly brought into existence. These changes affect the volume and direction of movement for people and commodities, the distribution of production and the pattern of trade, the transport network and the density and disposition of settlements, the intensity of land-use and the assemblage of different elements that go to make up a landscape. Once again all these changes hang together in an ordered fashion, being revealed through the efforts of geographers, ecologists, 'regional scientists',¹⁶ 'ekisticians' and other species of investigator and classifier.

One outstanding feature about economic development and cultural change is central to this analysis. The action of the group of forces or tendencies which constitute development is not additive but cumulative, feeding upon their own momentum to a point where sufficient mass movement is achieved to secure self-sustained further progress independently of the initial specific conditions in which development first began. Underdeveloped countries are held in the grip of what have often been referred to as 'vicious circles'; once alterations in the structure of an economy and a society have gone so far there appears to be some kind of 'ratchet effect', with subsequent movement sometimes deflected sideways but rarely down again. While there can be little doubt however about the significance of 'cumulative causation' as an element explaining the nature of development, the key factors and exact sequence involved in initiating and reinforcing the process seem to be generally indeterminate: that is from case to case a different set of factors operative in an irregular sequence may be equally conducive to cumulative progress.¹⁷

There is a parallel feature in the alterations induced in the distribution of population and production over an area during development. There occurs a decisive and irreversible shift from one basis of spatial organisation to a more effective one, from a basic dependence upon the advantages of a particular locality to a reliance upon the inherent advantages of 'localisation'. The dominance of natural advantages is superseded by the dominance of the acquired advantages arising out of agglomeration and enhanced accessibility, independent of initial position. Once again however the fact of 'cumulative concentration' is associated with some considerable indeterminacy in the locational pattern which arises in a particular case: except as before, that the longer a particular pattern remains the more important are the inertial forces securing its continuation.¹⁸

The problem of linking together development and spatial organisation, and through them, national and local progress, can be reduced in large part to the problem of further understanding the forces bringing about cumulative accumulation on the one hand, and cumulative concentration on the other. An approach to such understanding is offered by focussing upon one primary element common to both in the majority of developing countries which

are at the same time emergent colonial, now independent, territories. The element referred to is the emergence of the 'urban industrial centre', defined here as a place where there are concentrated some significant fraction of a country's industrial output and urban population.

Many developing countries, prominent among them those in Africa, are currently moving, or attempting to move, from a situation in which industrialisation and urbanisation were but incidental manifestations of their main stream of economic growth and social change, to a position in which they take on a very much more important role, contributing jointly to the enlargement of scale, increased specialisation and strengthened integration that are the hallmarks of progress. In the context of 'colonial-type' development, industrial and urban growth appear as parallel but separate elements in an essentially merchantilistic, externally-orientated economy and society. As growth and change begin to gather some initial momentum, albeit from a low level, there occurs over time what amounts to a quite decisive shift in the relationship of industrial activities and urban populations, such that they come increasingly into conjunction, forming one of the main underpinnings of a more diversified and internally cohesive economic and social structure. There is a concurrent shift in spatial organisation. At low levels of development, such manufacturing establishments and urban places as exist are, on the whole, little related. Industrial activity is largely tied up with processing primary produce and maintaining or repairing capital goods, machinery, vehicles and so on. Urban places are largely tied up with the functions of servicing the distributive network, gathering in export commodities and disbursing received imports. In general, proximity between the two was a matter of locational co-incidence not founded upon any functional concurrence. As growth and change get under way the factory and the city are brought progressively together, setting of a process of mutual interaction that eventually gives the urban industrial centre some measure of autonomy from its proximate surroundings. 9

The tendency for industrial and urban growth to become progressively more congruent in their spatial organisation as they become progressively more central to economic transformation and social change, has important implications for relating national and local progress and planning. Inasmuch as an analysis of urban industrial growth processes will enable us to derive a systematic connection between overall development and its locational expression, it enables us to introduce some notions of order into an otherwise largely disordered field. A further refinement of ideas about the factors which are the main determinants of the pattern underlying urban industrial evolution holds out the promise of being able, independently of ad hoc assumptions, to point the possible outcomes of some overall strategy upon local situations - and vice versa - and the prospect of being in a position to advance the 'distributional calculus' balancing the relative merits of making large-scale alterations and extensions to the physical lay-out and plant of a given centre so as to accommodate further localisation as against investing in the latent potential of a new focus of growth.

A refinement of ideas of the kind just mentioned needs a framework within which can be accommodated a series of separate groups of variables, which however have outcomes that affect each other in a certain manner, and within which it is possible to deal with groups of variables which evolve in such a way as to alter their initial relation to other groups as a function of their own interaction. For the understanding of the kind of complex phenomena that are involved in development neither methods derived from physical or statistical mechanics will suffice alone: urban industrial centres do not grow and behave like gaseous masses or billiard balls. The answer is to be found in the enlisting of 'systems analysis'.

Briefly put, for the purposes of the present discussion, a system may be defined as a group of elements having amongst themselves sufficient interconnections producing sufficient interactions as to form a coherent structure exhibiting an ordered behavioural response to the impact of forces or energy existing outside but in contact with it. It responds as a whole to 'inputs' from its 'environment'. A system may be regarded as an entity, when the attention of the investigator is focussed upon its internal mechanics and/or its external limits or boundaries: as one among a number of

such entities, when attention is focussed upon their multiple interactions in terms of 'inputs' and 'outputs': or as one overarching entity encompassing within itself a series of interlinked 'sub-systems', when attention is upon deriving the patterning of such links and the impact of changes in the sub-system arrangement on the whole. Here, for₂the moment, I am mainly concerned with this last aspect of systems. ⁰

An outline of a systems model to be used in the integration of physical planning into the development process via the systematic connection of industrial and urban₂ growth in their spatial aspect is presented in diagrammatic form as Fig.1. ¹ A starting point is provided (at the top left of the diagram) with the overall 'system' of economic growth and social change, which here appears as a kind of shorthand for the numerous kinds of sub-system within development not explicitly indicated on the diagram. Certain tendencies which are manifested in the behaviour of the system as a whole, which have been previously described as basic attributes of development, have an impact upon, or are the source of energy 'inputs' for the various sub-systems presented. Thus planned and unplanned changes in the overall 'structure of production' and 'social system', supply the subsystems of industrial and urban growths with inputs in the form of both resources and guides to appropriate response. Increases in population and in gross domestic product, and in the specialisation and complexity of the economy as a whole feed impulses for growth into the emergent industrial structure, which reacts by enlarging and diversifying its 'output', in particular shifting away from processing and simple consumer goods towards more 'complex' types of manufacture intended to meet not only a more diversified private and public demand, but also an increasing need for intra-sector 'intermediate' semi-manufactures needed as component inputs for other final demands. The reaction of the industrial structure is to raise its level of internal subdivision and interdependence, increase the size, investment to output ratio and productivity of individual establishments, and spread₂the influence of managerial organisation among its constituent firms. ²

The same 'environmental' influences are at work on the emerging urban system. Similarly, the reaction combines an increase in the size of the system in terms of numbers involved with a widening spectrum of more specialised economic and social functions, and with a refinement in the reactions of individuals and groups in the urban 'environment'₂ to impulses for further expansion generated within the subsystem itself. ³

As development continues, there will tend to be a disproportionate amount of energy focussed on those parts within the whole which express in themselves the major developmental attributes. Both the industrial and urban subsystems will as a result tend to outpace in their growth that of the overall economic and social system, becoming thereby more significant to its functioning and direction of change.

Change in the overall structure of production and in the social system will at the same time be influencing the prevailing pattern of spatial organisation. As development progresses, its impact upon the 'spatial system' will be reflected in the alterations in its structure and functioning. Regional differentiation becomes more marked with respect to the distribution of population and production, the extent and intensity of movement, the form and density of the transport and communications net, and other components making up the system. The 'output' appears in the form of a 'regionalisation' of production and trade in which areas with good local resources, large numbers of people, extensive infrastructure and a high market potential become also the areas with maximum access to the resources and markets of the country as a whole. Accompanying this, there also appears a differentiation of behavioural responses and institutional arrangements such that responses to new opportunities are quickened₂₄ in the more advanced areas and made more difficult in those less fortunate.

The evolving system of spatial organisation in turn provides the 'environment' for the locational disposition of the urban and industrial subsystems. Industrial growth, with its concomittant structural changes, is orientated increasingly towards the agglomeration of linked activities,

utilities and services, and towards maximum access to resources, markets and factors of production for large scale operations. The spatial system feeds in the relevant inputs for the locational specification of the appropriate conditions, and the output appears in the form of a progressive localisation of industrial activities in the most advanced regions. Urban growth likewise, increasingly orientated to the provision of specialised services for both local and nonlocal consumption, is affected in the same manner, with the result that the most extensive system of urban places is to be found in the same regions.⁵

The patterns of industrial location and of urban places which thus arise, in turn give rise to the new and crucially important subsystem in the developmental environment. The induced changes in industrial structure, in the technical and organisational attributes of its constituent plants, and in the behavioural responses of its decision-makers, all have the effect of introducing a progressive urban orientation into industrial location propensities. This results in the increasing significance of manufacturing in the nonlocal basis of urban expansion, expressed in the contribution of industrial investment and entrepreneurial initiative to income and employment generation in the urban economy and population. The outcome is that the growth-rate for urban industry outpaces that for industry as a whole, while industrial employment and income generation outpaces other sources of growth in the urban system. Those urban areas most affected by industrial growth, and those manufacturing sectors most attracted to urban centres, are found increasingly concentrated in the most advanced areas. A significant connection in the internal mechanics of growth and change is made, and is found embodied in a form of concurrent localisation of people and activities within a given area.⁶

The establishment of a systems of urban industrial centres, even in its initial stages of growth, already posses the necessary developmental potential to positively affect its environment by the impact of its emergence upon other systems more or less proximate to itself. Firstly, it exerts a considerable pressure upon the subsequent distribution of any given set of industrial activities, as well as upon the subsequent expansion of a given set of urban places. Its impact lies in its ability to attract to its constituent parts a disproportionate share of overall industrial and urban growth, increasing its own autonomy and momentum in so doing. As the system gains in strength, it will produce a second round of 'feedback' in the form of an impact upon the structure of industrial and urban growth. Its inputs will tend to produce further differentiation in the existing structure of manufacturing and further diversification in urban functions, in particular the creation of nascent industrial complexes in what begin to emerge as predominantly manufacturing centres.

As industrial and urban growth assume a more significant place in total production and population increase, their locational disposition will exert a more considerable effect upon the prevailing system of spatial organisation. Regional differences will tend to be based more on non-primary production and non-rural settlement expansion, the outcome being the continued capitalisation upon aquired advantages of the more advanced localities. Since the balance of overall distribution of people and activity will in turn affect the possible costs of future development strategies and the relative oportunities for local resource mobilisation, in an indirect fashion, the urban industrial system will ultimately have an impact on overall growth and change. Circular causation is complete.⁷

The spatial allocation of urban industrial activities may now be seen as the joint product of the three subsystems distinguished and the three sets of feedback relations indicated on Fig.1. A 'general equasion' can be written to this effect, viz.

$$UI_1 = f(Is, Ua, Rd, + UI(iI, iU, iR)) \quad \text{where,}$$

UI_1 - the locational disposition of urban industrial growth at time t.
 Is^+ - a combination of size and sectoral composition of manufacturing, technical and organisational attributes of firms, behavioural and perceptual biases of entrepreneurs.

- Ua - a combination of the size differential attractiveness of urban areas
variety of activities and relative accessibility,
physical lay-out and infrastructure provision.
- Rd - the pattern of regional population and activity/income distribution.
- UI
- iI - the extent and disposition of induced industrial growth in the system
- iU - the extent and disposition of induced urban expansion in the system,
- iR - the extent and disposition of induced regional development around
the system,
in period t-1.

A more disaggregated form of the 'model' implicit in this equation will be found specified in the appendix to this section, but even when set out in this foreshortened form, the equation points to the most significant result of a systems analysis approach to the problem under review.

The problem of relating national and local developments is usually seen as necessary to the attempt to deal with certain 'imbalances' which arise in the distribution of production and population under development. It is often felt on the one hand that the growth of urban industry acts for the most part to reinforce the position of the so-called 'primate' cities, which both appear to suffer internally from severe social and physical malfunctioning and are inhibiting influences externally on the spread of growth and change over a wide front. It is felt on the other hand however, that any deliberate attempts at decentralisation are likely to have both adverse effects on whatever measure of growth momentum has been achieved in one or two emergent metropolitan areas, and little or no impact on the ability to initiate sustained growth elsewhere.

From the discussion in this section it should be clear that the usual issue as stated here is conceived of both too widely and too narrowly at the same time. It is apparent that urban industrial growth is unlikely to be spread over a wide front; when found at all, it is found in relative concentration. Equally however, this does not imply concentration in one, or in any particular place, for the conditions for urban industrial growth are derived from system interactions increasingly independent of initial situation. It is here that a crucial element of indeterminacy enters in, for the proximate interaction between industrial enterprises and urban centres is still largely an unknown placed under the convenient umbrella of what are usually referred to as 'external economies'. The relative rate of growth of individual urban industrial centres will depend to an increasing degree upon the inducement effects on further expansion of initial concentration. The approach here adopted pinpoints the system relationships which remain to be specified before it is possible to pronounce on the nature of an 'imbalance' perceived in a given situation, and the possibilities of doing something constructive about it. As usual, systematic analysis uncovers the relevant gaps in knowledge and deficiencies in information, yet, as I hope to show, it is both possible to go some way towards a solution of the problem in a particular case and indicate a practicable programme of investigation into the unknown factors likely to yield the needed observations that are now lacking. The following sections are devoted to an elaboration of these claims. 8

Appendix.

Towards the Specification of a Model for the Spatial Allocation of
Urban Inds. Growth

Set out below is an extended and disaggregated version of the 'general equation', with some suggested 'proxy' variables introduced in lieu of more direct measures of the required magnitudes. The basic method of deriving the model was to take each of the elements in the overall equation and explore the nature¹ of the 'proximate' and the 'contributory' factors in its determination.

$$\begin{aligned}
 UI_1 &= f(IS, UA, RD, + UI(iI, iU, iR)) \\
 IS &= f(Io, Ip, Ie) \quad \text{where } Io = f(Gnp, Pci, Fds) \\
 & \quad \quad \quad Ip = f(Mks, Tch, Pdm) \\
 & \quad \quad \quad Ie = f(Fmo, Ldm) \\
 UA &= f(Us, Ua, Ue) \quad \text{where } Us = f(Pop, Pci, Uds) \\
 & \quad \quad \quad Ua = f(Cml, Acc, Pds) \\
 & \quad \quad \quad Ue = f(Auc, Sst, Piv) \\
 RD &= f(Gnp, Pop, Pci, Rbs, Trn, Pds, Fds) \\
 UIiI &= f(Ilk, Esp, Buc, Mks) \\
 UIiU &= f(Iiv, Emp, Siv, Mkt) \\
 UIiR &= f(Cml, Tch, Ent, Cpa)
 \end{aligned}$$

Variables:

Acc - accessibility (to Mks,Rbs)	R/RD- Regional Development
Auc - age of urban centre	Rbs - resource base
Buc - basic utility costs	Siv - investment in service provision
Cml - extent of commercialisation	Sst - social structure
Cpa - comparative advantage (i)	Tch - technology
Emp - employment (i)	Trn - transport network
Ent - local enterprise (i)	U/UA- Urban Area Advantages
Esp - economies of scale in the provision of services	Ue - urban environment
Fds - structure of final demand in the national economy	Ua - urban activity mix
Fdo - firm organisation (private, public, family)	Us - urban size
Gnp - gross national product	Uds - urban service demand
I/IS- Industrial Structure	UI ₁ - location of urban inds. growth
Ie - industrial enterprise	(i) - 'induced'
Ip - industrial plant structure	
Io - industrial output mix	
Iiv - industrial investment (i)	
Ilk - inter industry linkage (i)	
Ldm - location of decision-makers in industry	
Mks - size of market	
Mkt - market threshold	
Pci - per capita income	
Pdm - product mix	
Pds - production structure	
Piv - investment in physical plant and facilities	
Pop - total population	

1. No attempt has been made at this juncture to specify parametric values in any of the equations, although many of these could be introduced from published sources and estimates by the present author and by others in the field for E.African circumstances.

The Case: Urban Industrial Growth in East Africa 1945-65.

In the three now independent territories of Uganda, Kenya and Tanzania which together constitute modern East Africa we have three cases of developing countries all of which are affected by and are concerned with major issues related to the integration of physical and economic, national, subnational and even supra-national planning. The period 1945-65 witnessed both the emergence of urban industrial growth as a significant phenomenon set within a continuing tendency to interterritorial and intraterritorial differentiation, and the advance from public sector capital expenditure programmes towards a more comprehensive and refined type of development plan in each case, while continuing efforts were made to secure E.African²⁰ co-operation on the basis of the existing common market arrangements.

The area has considerable interest for the purposes of applying the previous argument since the problems of relating aggregate development and its spatial disposition and of introducing physical planning more fully into the planning strategies of the three territories have been the subject of some little debate; some first attempts at a 'regional planning' approach to location and growth have also been made. Nevertheless, in regard to both the distribution of industrial growth on an interterritorial basis and the distribution of urban growth on an intraterritorial basis, there appear³⁰ to remain considerable problems of assessment and policy reaction.

As in most developing areas, it is not easy to compile reliable and comparable statistics for a large number of variables over any considerable period, so as to provide a suitable data base from which to extract time trends for relevant magnitudes. Nevertheless, it has been possible to sketch in the main lines of development in E.Africa over the past two decades, bringing out the relationships between overall growth and change and the formative pattern of population and production distribution over the area. In Tb.1. are presented sample figures which can be used as indicators of the operation of₂ system interaction as portrayed in Fig.1. in the context of E.Africa. ¹

The area is at the present time in the early stages of development with a correspondingly low level of ave. per capita income, characteristically simple and 'open ended' economic structure, and a social system very much 'in transition' from traditional to modern bases of operation. In terms of total population and size of gross national product, the individual territories are not large by comparison with other developing nations, but when taken together they present a more impressive bulk. Though development has not been spectacular over the period under review, definite increases in a number of significant magnitudes testify to substantial progress, from which it is not unreasonable to draw the required inferences. Within this spectrum of movement moreover it is already possible to discern the kind of shifts indicated in the previous analysis as likely to occur as between different components of aggregate expansion and related distributional patterns. These can be seen even more clearly if regard is given₂ to a cross-sectional comparison as well as to the time-period data as such. ²

The evolution of industrial and urban subsystems within the broad environment of economic and social transformation is illuminated by the figures in lines 4 through 8 and 9 through 14 on Tb.1., which indicate that inter alia,

- output and employment in manufacturing are growing more than proportionately to output and employment as a whole.
- output in manufacturing is outpacing employment growth, representing an increasing productivity in the faster growing industrial sectors,
- a shift to larger scale units of production and a higher value added ratio has accompanied the above movement,
- population, production and employment in urban areas are growing more than proportionately to population, production and employment as a whole,
- urban population growth appears to be outdistancing output, and even more employment expansion,
- the pre-eminant position of the 'primate' city is continued, though the hierarchy of urban places is steadily expanding as new growths occur.

These overall movements have been matched by parallel alterations in the spatial organisation of population and production over the area. Regional development differences are by now well established, while the concentration of growth and change in the most advanced areas has remained pronounced, if somewhat less so in the case of Tanzania. Even there however, as lines 15 through 20 of Tb.1. illustrate, both industrial growth and urban expansion show a more pronounced tendency to be located in the leading area than population, production and employment growth in general.

Part, though at present not a very large part, of the explanation for the above-mentioned tendency is provided, as is to be expected, by the fact of at least an initial connection having been made between industrial and urban growth. The emergence of an incipient urban industrial system is illustrated in lines 21 to 30 of Tb.1. showing,

- a substantially faster growth of manufacturing within the larger urban areas as compared both with manufacturing growth as a whole and with urban employment as a whole (a trend likely to show up even more in terms of income generation),
- a disproportionate propensity for urban locations in intermediate and capital-goods manufacturing, fastest growing parts of the system, that is reflected to some extent by an ave. plant size and value added ratio in urban industry slightly larger than for industry as a whole,
- a varying proportion of urban industrial growth being located in the most advanced area of each territory, reflecting different patterns of concentration in spatial organisation within which both established and new centres are expanding.

Notwithstanding its still relatively low level of development, E.Africa is already characterised by the process of system interaction and evolution leading to the establishment of a linked array of urban industrial growth points. A first approximation to seeing the causes of this pattern of growth can be had, as here, with the aid of the kind of aggregate data employed by the national planner. In this manner however, only the first half of the general expression on p.9-10 is covered; to 'close the circle' it is necessary to analyse the specific geographical expression of the linked outcomes obtained thus far, and to explore the circumstances of individual centres which will have some bearing upon the results deriving from the second half of the equation. Here we enter more the sphere of the physical planner on regional and local level, where maps tend to replace tables, and where the very considerable degree of indeterminacy in the situation enters the picture.

An approximate picture of the spatial organisation of development in E.Africa is displayed in the pattern of regional differentiation shown on Fig.2. Here in a crudely but well enough defined form is the range in regional advancement from Uganda and Central Province, Kenya at the top to the northeast of Kenya at the bottom. Of more interest however is the disposition of the different levels, with a pronounced arc of development extending through the adjacent areas of south-central Uganda and western and central Kenya, combined with a secondary belt of advance on the coast of central and northern Tanzania and southern Kenya, linked together by areas of lesser developmental status across northern Tanzania to L.Victoria. This gross outline is somewhat further refined in Fig.3., which shows in greater detail those localities with the most advantageous intra- and inter-regional positions. Here can be distinguished three types with differing implications for the evolution of an urban industrial pattern. First and foremost localities combining a good local resource-base, infrastructural provision and market potential with a high degree of access to the resources and markets of E.Africa as a whole: south-central Uganda and the adjacent Nile area, parts of southeastern Uganda, western Kenya and the adjacent rift highlands, and the southern half of Central Province. A number of other areas similarly have a good resource-base, infrastructure and local market, but lack the same degree of overall accessibility: the Lake Victoria and northern coastal zones of Tanzania being cases in point. The same is true of the areas surrounding the two major ports of E.Africa, located on the coasts of southern Kenya and central Tanzania respectively. Finally there are those areas which lack the magnitude of local develop-

ment of the previous categories, but are compensated by being more central in relation to the overall distribution of development: such for example ³³ as areas in eastern Uganda, west-central Kenya and north-eastern Tanzania.

This pattern of regional differentiation from an overall base forms the 'environment' in which urban and industrial growth react to their respective locational propensities. In Fig.4. is shown the distribution of manufacturing that results, especially those kinds that have a disproportionate tendency to settle in larger urban areas or near to them. As expected these appear to be found either in the case of those which are 'urban based' exclusively in the most developed regions and in the major port areas, or in the case of those which are 'urban centred', more widely spread but with a disproportionate representation in the more advanced areas. In Fig.5. is shown the distribution of urban 'central places' that similarly results from a combination of their basis in population, purchasing power and the demand for basic services, and the regionalisation of people and activities. Once again, the most advanced areas include a disproportionate number of those urban centres with 'higher order' functions, reflecting overall accessibility, and a higher density of central places reflecting local levels of development.⁴

The linking together of urban and industrial growth under the conditions of regional development just described has produced the system of urban industrial centres depicted on Fig.6. Fifteen such centres can be distinguished on the variable basis of each contributing some 'significant fraction' to the total of urban industrial activities in the area. Far the largest of the places marked is Nairobi, which besides being the capital of Kenya, has been to varying degree the focus of communications and of commercial, financial and intergovernmental activities encompassing much larger portions of E.Africa as a whole. In 1950, it was the one place with more than 100,000 people and more than 10,000 workers in Industry; in 1961, with a population exceeding a quarter million, if a number of satellite centres of which Thika is easily the most prominent, are added in, this single city region encompassed over a quarter of all the inhabitants and over a third of all the industrial employees claimed at that time by the major centres as shown on the map. Three other cities with populations now exceeding 100,000 - the area's major port of Mombasa, and the capital cities respectively of Uganda and Tanzania, Kampala-Mengo and Dar es Salaam - together with the one other urban place then boasting more than 5000 employees in industry - Jinja in Uganda at the source of the Nile - accounted between them for another half of all residents and employees in the centres taken as a group. The remaining ten municipalities and townships included share between them the residual proportions of the two magnitudes.

This markedly skewed size distribution of the largest centres of population and production is embodied in a locational configuration whose most marked feature, following closely the base of regional development, is an incipient clustering of centres about an axis which roughly parallels the 'line of rail' from Nairobi to Kampala, nine out of the fifteen centres marked on Fig.6. being found in this approximate area. Between them they include above half of all the residents, and no less than threequarters of all the manufacturing employment numbered by all the marked places. In the presence of such a degree of marked concentration, the remaining places, though two are individually sizeable, look somewhat scattered and isolated.

This exact locational specification of a set of urban industrial centres allows the inspection of the inherent and derived advantages possessed by each individually and in relation to all the others. In Tb.2. is presented some sample data relating to the two different sides of the system interaction at the heart of the process of urban industrial growth, an interaction which acts to induce further growth in a manner increasingly autonomous to initial conditions but rather dependent on its own powers of creation in relation to those of other places. It is here that the element of indeterminacy enters in, for case studies of each centre serve only to dramatise further what is apparent from the table: that as between industrial growth and structure on the one hand, and urban size, local and overall accessibility, and infrastructural provision and costs on the other, there appears no invariant relationship, but a subtle and complex connection.

The pattern of urban industrial growth shows overall a definite tendency to concentration over E.Africa as a whole based apparently in the combination of inhering attributes of the urban industrial system and the evolving structure of spatial organisation. Within this pattern individual centres earn their places on the basis of different kinds of comparative advantage: Nairobi enjoys a position of large size and maximum overall access, Mombasa the position of a major entry point for all imported materials, Kampala the position of focal point for a richly endowed surrounding region, Dar the combination of port and capital city, Jinja the combination of well-developed infrastructure and active local entrepreneurs, Thika a position of proximity to Nairobi, and so on down the list. Each also has its limiting factors unlike each other; a scarcity of suitable industrial land in one case, high cost utilities in another, lack of supporting services or a pool of skilled labour in a third, distance from the more advanced areas in a fourth. No one advantage or limitation alone however will serve to ensure further growth or necessarily inhibit future possibilities.

Even in the period just past there have occurred some interesting changes in the position of individual centres, which also throw some light upon the extent of the reactive impact of urban industrial growth on urban growth in general. An unchanging pattern of urban growth would show up in the absence of shifts in the 'rank-size' distribution of urban centres, each one growing at a rate proportional to its size, maintaining its 'rank' among the group as a whole. On Fig.7. are plotted the upper portions only of the territorial rank-size distributions for the period 1950-61 in the cases of Uganda and Kenya, and the periods 1950-61-67 in the case of Tanzania. Inspection of the figure reveals quite definite signs of a process of 'substitution of rank' in each territory, more marked over a longer time period. Though as yet there has been but little impression made on the relative positions of the highest ranked places, in particular the three capital cities, the emergence of places having a growth rate disproportionate to their rank traceable at least in part to increased industrial activity has already made an impact a little lower on the scale. Thika in Kenya, Tororo in Uganda and Arusha in Tanzania provide the most outstanding examples in this connection, and serve also to demonstrate the advance of new urban industrial centres at a pace not matched by others already more established.

What this exploration of the past experience of E.Africa helps to bring out in terms of actual happenings, is the need to separate sharply what can be safely generalised about the spatial organisation of an urban industrial system and what must be avoided as unwarranted inference. What it is safe to say is that the locational pattern of growth will be one of relative concentration becoming more pronounced as development continues. From this however it is a step in the wrong direction to infer that the pattern of concentration is itself locationally specified in any rigid manner. Within certain limits any given place can be, or be made to be, a potential centre for urban industrial expansion provided the presence of some comparative advantages and not too many limiting factors. The relative rate of growth of a given centre of interest cannot be specified without simultaneously assessing the position of all other centres; the impact of a general policy for growth will have a different impact on different places depending on the configuration of their particular strengths and weaknesses. At the centre of the systems interaction which produces urban industrial growth there is a dynamic flux.

It is this which gives the problem of integrating physical planning into development strategy its greatest significance, for if it is not possible to specify the course of urban industrial growth in a particular place 'from the outside', it becomes important to be able to assess the internal interrelation of manufacturing and the urban 'environment'. If our concern is to understand and evaluate the phenomenon of urban industrial centres, as against the phenomenon of individual enterprise location in a given set of places, the systems analysis approach directs attention to the evidence without which we can legitimately proceed no further, i.e. evidence about how groups of industries and groups of centres react in a given set of circumstances particular to each.

The Project: Urban Industrial Growth in East Africa 1965-85.

The question of establishing a more systematic interchange between aggregate economic planning and local physical and social plans, and in particular a way of dealing within such a framework with the prospects and possibilities for the evolution of urban industrial centres, has a continuing importance in the E.African situation over the next decades in view of two continuing problems that have to be faced, problems of distributional 'imbalances' between and within the three territories.

At the interterritorial level there remains the question of the distribution of industry. The recently concluded E.African Treaty of Co-operation, cornerstone of the new E.African Community, includes one more attempt to deal with the problem of inter-country shares in manufacturing expansion based on the common market, but by basically the same means as employed in the two previous attempts. In common with the Raisman Commission and the Kampala Agreements, the new Treaty includes a scheme for interterritorial fiscal redistribution and an arrangement for the more equitable sharing of industrial investment, this time involving a measure of protection for territorially fostered new enterprises. In the light of the previous analysis it can be questioned how far this combination of measures in attempting a solution is in reality an adequate response. What would appear to be needed is some more positive action, perhaps involving even a joint programme, to modify the present balance of advantage in favour of certain selected centres, preferably among those already growing and reasonably well situated, such that these attract and accommodate a rising share of urban industrial growth on the basis of a regionally concentrated and interlinked complex of manufacturing enterprises. 37

At the interterritorial level there remains the problem of primacy and investment in urban infrastructure. A number of plans have been or are being produced for the future physical and social development of certain regions and localities. In particular there have been or will be 'master plan' schemes produced for the emergent 'metropolitan areas' of Nairobi, Mombasa, Kampala-Mengo and Dar es Salaam, and attention is now being turned to other centres such as Jinja, Thika and Arusha where growth is expected. In several cases projections made carry some disturbing overtones of quite massive population growths and equally impressive needs for outlays on physical and social infrastructure, without being able to specify the possibilities for substantial growth in the 'metropolitan' economy, particularly in terms of industrial investment and its multiplier effects. Again, in the light of previous analysis, without taking account of growth prospects and needs elsewhere, there arises the possibility of over-investment in one or two places without lessening primate city problems, while at the same time resulting in a lack of resources for growth promotion elsewhere, styming the realisation of more appropriate solutions. Whether in a metropolitan centre or in a medium-sized township, the impact of industrial investment in larger and larger 'lumps' gives rise to more significant discontinuities, suggesting the need for more advance planning in the provision of facilities and the preparation of a satisfactory structure for accommodating continued expansion, based on some more detailed notions of expected industrial localisation. 38

The previous two decades have seen the emergence of a system of urban industrial centres arising out of systematic tendencies in the economy and society of E.Africa which were in turn the products of overall development. The magnitude and direction of urban industrial growth and its spatial allocation over the next two decades will be partly determined by the continuance of the same tendencies arising out of further development. Some idea of the shape of things to come can be gained from the extrapolation of present population and production growth trends coupled with an analysis of the modifications and alterations implied in the current comprehensive development plans of the three territories. From such an exercise what clearly emerges is the likelihood of further large increments in the overall significance of those subsystems within the whole that help to generate the conditions for further urban industrial expansion and regional

concentration. Large increases in industrial production, urban employment, infrastructure provision and regionally differentiated productive activities and services in general are postulated and/or to be deliberately encouraged.

At least in the published plans for development and related papers³⁹ however, there appear to be no articulate conceptions of either the expected or desired pattern of regional differentiation and urban industrial concentration, nor is there a sufficient degree of locational specification to enable an analysis of prospects for individual centres. On the other hand there are the detailed plans for the largest urban areas and some others, elaborated without the needed perspective in which to place their situation in any overall pattern. Here₄ is the gap that remains to be filled between national and local efforts. 0

In this situation what appears to be needed is an investigation of the factors and circumstances which will lead to significantly different outcomes in terms of the disposition of urban industrial growth, as a basis for joint planning efforts by economic and physical programmers. The aim of the projected research is to examine the complex system interactions which on the one hand impose definite limitations on the areas within which any significant scale of expansion in urban industry can be expected, and on the other help to determine what is most needed in order to create an efficient urban structure with a sound economic base in manufacturing in a given centre. In essence, the project is a kind of 'pre-investment survey' exploring a range of alternative possibilities and limitations in order to pinpoint where time and money might most advantageously be spent on more detailed planning work. This is particularly necessary when large-scale expansion is being contemplated but with no specified information as to where.

The outcome of the research proposed should be an improvement in the integration of economic and physical planning in terms of the contribution of each to the other. On the one hand, more precise alternative projections of industrial investment and employment in a place, when coupled with different population projections, forms the basis for assessing likely industrial and residential land requirements, employment centres and traffic movements, infrastructure and service needs, etc, and thus the 'accommodation capacity' that needs to be built in to the physical framework within which future expansion can most suitably take place. On the other, more precise alternative physical planning strategies emphasising the situational advantages and taking account of possible directions of expansion in a particular place, can provide an environment where entrepreneurs are not simply required to conform to some preconceived 'master plan', but are encouraged to positive action following a pattern of strong inducements created by public investments and by a fuller knowledge of the₄ total situation in which autonomous investment decisions are being taken. 1

The research procedure is divided into two related parts corresponding to the acquiring of information about the variables in the two halves of the 'general equation' on p.9-10 and to the division between determinate and indeterminate system interactions as explained on p.10 and 14. The first part of the work relates to the construction of a 'projected T₀.1.' for a number of years in the next decades, based on a great deal of material that is already available in different published sources, academic, governmental and international, in particular the development plans, the E.C.A. papers on industrial growth in East and Central Africa, the various U.N. regional and urban planning reports, and so on. The sequel is to derive from this the general implications for the regionalisation of overall development, industrial activities and urban places, using where practicable and appropriate tools and techniques developed in regional and interregional analysis, industrial location and urban growth studies. 2

The second and more extensive part takes the investigation on from the above into the specific situations prevailing in each of a selected small number of centres chosen in conjunction with the planning authorities. The object of this is to probe in a strictly comparable fashion further into the interrelation of industrial structure and urban environment and position.

This can only be accomplished satisfactorily by means of residence, a form of 'participant observation' and fieldwork plus interview in the places concerned, if data are to be systematically accumulated with which to match up the two sides of an extended version of Tb.2. The process of gathering and assessing such data is quite considerably aided by the possession of information on the same lines and many of the same places gathered in a previous enquiry. The evaluation of structural attributes and behavioural responses is made easier by previous acquaintance, but also by the possession of at least an approximation to the overall situation, within which individual centres and individual industries can be placed.

The result of these enquiries is to be plotted in the form of a 'cross-sectional' analysis of centres on the basis of a number of ranking variables corresponding to factors thought to be significant in determining the rate and structure of urban industrial expansion, such as size, access, level of service provision, infrastructure costs, length of period of industrial localisation, extent of local enterprise, and so on. Together with other information collected, this should make it possible to separate out in some measure the general factors explaining the relative position of a place and the peculiar attributes not repeated elsewhere which can be said to have conditioned local expansion. ⁴ 3

The two parts of the study taken together provide a basis for the elaboration of that 'distributional calculus' needed as a corrective to ad hoc policy-making and as a way of doing for whole patterns of urban industrial location and growth what comparative cost-benefit studies do, when employed, for individual project selection and siting. Even without attaining a fully-fledged instrument of this kind however, the investigation will procure information of a kind indicating the scope for different kinds of policy instrument to be used in directing and encouraging a desired pattern of urban industrial concentration.

Over the next decades E.Africa will very likely experience a continuing acceleration of population movement towards the cities and towns. The provision of urban activities and employment cannot do more than meet a part of the aspirations of the total population as this continues to increase, but even if a significant contribution is to be made at all it will need the most careful foresight and preparation to avoid the situation common to many developing countries where urban expansion has been unmatched by the creation of a viable economic base. All available resources will need to be mobilised for the task, and scarce public funds will need to be spent in ways that will encourage the greatest of autonomous response. It is these considerations that have prompted this excursion into the methodological domain, in order that there might be brought to bear all the power of available ideas upon the problem of enhancing the efforts of all concerned with these conditions in a manner that is likely to yield some operational improvements in time to affect the handling of an imminent challenge.

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1. 3. 68.

References.

1. The present paper concerns itself more with the practical than the theoretical aspects of the 'problem'. For some elaboration of some theoretical issues see 'The Urban System in Africa: Patterns of Disjunction and Integration', African Urban Notes, Vol.2.No.3.May 1967.
2. On the use of 'methodological' examinations to clear the ground for problem-solving in a different context see R.Crawshaw-Williams 'Methods and Criteria of Reasoning', London.1957.
3. For an alternative approach to much the same issues, laid out at much greater length for another developing area, see J. Friedmann 'Regional Development Policy - a Case Study of Venezuela' M.I.T.1966.
4. An analysis of the historical trend towards greater government involvement in planning for development is provided by T.Parsons 'Some Reflections on the Institutional Framework of Economic Development' in A.Bonne Ed. 'The Challenge of Development', Jerusalem.1957.
5. On the scope and ramifications of 'development' see especially Aurthur Lewis 'The Theory of Economic Growth', London.1957., and Benjamin Higgins 'Economic Development', 2nd.rev.edit., N.York.1967.
6. For an exposition of the character of contemporary comprehensive development planning see Jan Tinbergen 'Development Planning', London.1967.
7. On the possible contributions of planned development see the arguments in J. Friedmann 'Introduction to the Study and Practice of Planning', the International Social Science Journal, Vol.11.Oct.1959., and A. Cairncross 'Development Programmes as Instruments of Co-ordination' in his 'Factors in Economic Development', London.1962.
8. The conception of planning as essentially concerned with organising the integration of various component programmes is set out in 'Planning and Systems Concepts', a chap. of R. Johnson et.al. 'The Theory and Management of Systems', N.York.1963.
9. The adequacy of orthodox economic programming and physical planning are discussed in A.Watson and J.Durham 'The Impact of Underdevelopment on Economic Planning', the Quarterly Journal of Economics, Vol.79.May.1965., and W.Alonso and F.Ledger 'The Education of Town Planners in Developing Countries', the Journal of the Town Planning Institute, Vol.51.June 1965.
10. The question of relationships between different 'levels' of planning is considered for a developed country in W. Lean 'National, Regional and Physical Planning', the Journal of the T.P.I., Vol.53.June 1967.
12. The question of the appropriate 'level' for national-local planning interaction is discussed in J. Friedmann 'The Concept of a Planning Region', Land Economics, Vol.32.Feb.1956.
13. For some indication of the extent and variety of work in the field of spatial organisation see the collections of papers in N. Ginsberg Ed. 'Essays in Geography and Economic Development', Chicago.1960., and in J. Friedmann and W.Alonso Eds. 'Regional Development and Planning', M.I.T.1961.
14. What is being argued here is the need for some means of dealing with the spatial dimension in the same way as orthodox investment criteria deal, or attempt to deal, with the time dimension. See for example O. Eckstein 'Investment Criteria for Economic Development and the Theory of Intertemporal Welfare Economics', the Quarterly Journal of Economics, Vol.71.Feb.1957., and T. Reiner 'Sub-National and National Planning: Decision Criteria', the Papers and Proc. of the Regional Science Association, Vol.14.Dec.1965.
15. See the account of 'development' given by N. Smelser 'Mechanisms of and Adjustments to Social Change' in B. Holselitz and W. Moore Eds. 'Industrialisation and Society', Chicago.1964.
16. See for example the accounts of different aspects of change in spatial organisation given in E. Taaffe et.al. 'Transport Expansion in Underdeveloped Countries', the Geographical Review, Vol.53.Oct.1963., and R. Vinning 'An Outline of a Stochastic Model for the Study of the Spatial Structure and

Development of a Human Population', Papers and Proc. of the R.S.A., Vol.13. Jan.1964.

17. On the question of cumulative causation and key factors in development see Gunnar Myrdal "Development and Underdevelopment", Cairo.1957, and A. Hirschman 'Obstacles to Development... a Classification and quasi-Vanishing Act', Economic Development and Cultural Change, Vol.13. July 1965.

18. For accounts of the development of localisation and of spatial organisation under development in general see especially E. Ullmann 'Geographic Theory and Underdeveloped Areas' in N. Ginsberg, op.cit., H. Perloff et.al. "Design for a Worldwide Study of Regional Development", report by the staff of Resources for the future Inc. for the U.N., Baltimore.1966, and G. and M. Wilson "The Analysis of Social Change", London.1945.

19. For a parallel account of the same phenomenon at roughly the same stage in the development of a now advanced country see A. Pred 'Manufacturing in the American Merchantile City 1800-40', the Annals of the Ass. of American Geographers, Vol.56. June 1966.

20. On methods needed to deal with 'complex' phenomena and the possibility of analysing system entities in terms of cumulative causation mechanisms see W. Weaver 'Science and Complexity', Annual Report of the Rockefeller Foundation for 1958. N.York., and M. Maruyama 'The Second Cybernetics', the American Scientist, Vol.51. Sept.1963. On the concept of 'system' itself see in particular A. Hall and R. Fagen 'The Definition of System', General Systems Yearbook, Vol.1. Dec.1956.

21. Please note the explanation given in the Notes to Diagrams and Data which accompany the figures and tables at the back of the paper.

22. For accounts of industrial development see H. Chenery 'Patterns of Industrial Growth', American Economic Review, Vol.50. June.1960., and F. Sargent Florence "The Economics and Sociology of Industry", London.1964.

23. For accounts of urban development see B. Berry 'Cities as Systems within Systems of Cities' in Friedmann and Alonso, op.cit., and the papers in F. Pitts Ed. "Urban Systems and Economic Development", Oregon.1963.

24. For an account of regional differentiation and the forces that maintain it see J. Friedman 'Regional Economic Policy for Developing Areas', Papers and Proc. of the R.S.A., Vol.11. Dec.1963.

25. For a more extended treatment see the U.N. 'Economic Survey of Europe for 1954 - Problems of Regional Development and Industrial Location', Geneva 1955.

26. For a closely parallel account see A. Pred 'Industrialisation, Initial Advantage and American Metropolitan Growth', the Geographical Review, Vol. 55. Apr.1965.

27. More detailed coverage of the general case can be found in H. Perloff et.al., op.cit.

28. For an interesting examination of the evolution of an urban system and attempt at explanation see J. Williamson and J. Swanson 'The Growth of Cities in the American Northeast 1820-70', Explorations in Entrepreneurial History, Vol.4. NS. Oct.1966.

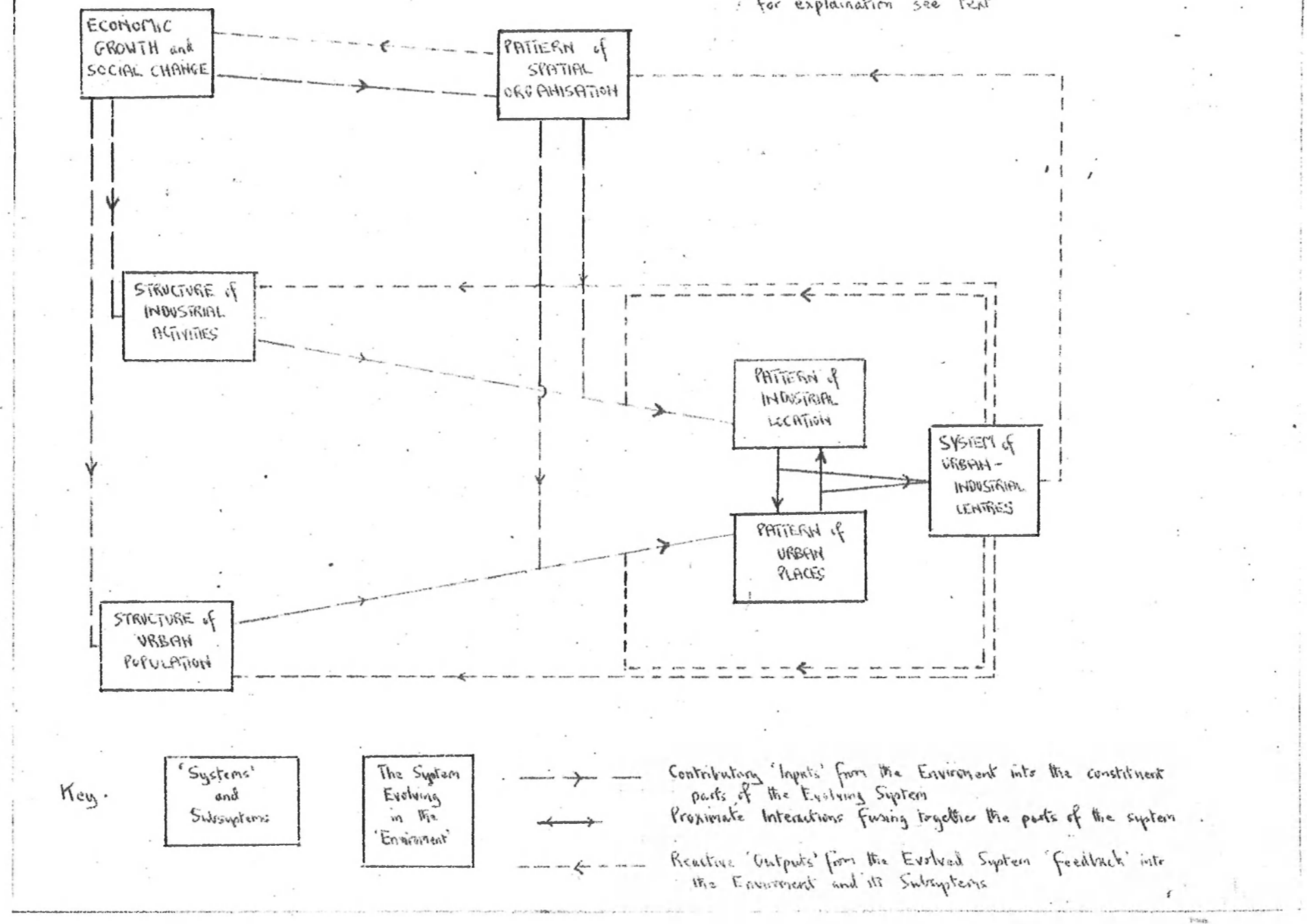
29. On the emergence of an urban industrial system in E.Africa see My paper 'Industrial Location and Economic Integration in E.Africa', Proceedings of a conference on 'Problems of Federation', Nairobi.1963. On the expansion of development planning see P. Clark "Development Planning in E.Africa", East African Studies No.21. Nairobi.1965.

30. On the problems of industrial location and urban growth in E.Africa see the 'Report of the Economic and Fiscal Commission' (the Raisman Report), London.HMSO.1961.(Cmd 1297) and the 'E.African Royal Commission Report', London.HMSO.1955.(Cmd 9475).

31. Please note the explanation given in the Notes to Diagrams and Data which accompany the figures and tables at the back of the paper.

32. In terms of stages of developmet such a 'cross-sectional' comparison puts Kenya ahead 'in time' of Uganda and the latter ahead of Tanzania. The comparison is however complicated by differences in structural charecteristics in economy, society and politics, on which see B. Van Arkadie 'The Sttucture of the Economies', Economic Development Research Paper No.61. Dec. 1964. Makerere Institute of Social Research, and M. Lofchie 'Patterns of Political Consolidation in E.Africa', paper read at the annual meeting of the African Studies Association. Philadelphia.Nov.1965.
33. For a similar analysis covering a wider area, and a more detailed case study of regional economic development and planning patterns see L. Green and T. Fair "Development in Africa", Johanasburg.1962.
34. For more detailed descriptions of industrial location patterns see R. Ogendo 'The Significance of Zoning to Rural Industry in Kenya', Cahiers D'etudes Africaines, Vol.7.June.1967., H. Pollock 'Industrial Development in E.Africa', Economic Geography, Vol.36.Oct.1960., and M. Safier 'Industrial Location...' op.cit. For more specific studies on central place functions see M. Ponzio and P. Kamalamo 'The Application of Central Place Theory..... in Uganda', Papers and Proc. of the E.African Inst. of Soc. Research ,Ser E. Jan.1966., H. De Blij "Dar es Salaam", Evanston.1964. and M. Safier 'Problems of Urban and Industrial Growth in E.Africa', paper read to a meeting of the Comm. for the Comparative Study of New Nations. University of Chicago. Jan.1966.
35. Rank-size distributions based on population must be complimented by analyses of the central place heirarchy as displayed in Fig.5. before a complete picture of alterations in the urban system can be drawn up.
36. Some suggestive comments on the question of urban industrial interaction in a general context are contained in J. Eddison 'Industrial Location and Physical Planning in Pakistan'Pakistan Development Review, 1961., M. Marcus 'Agglomeration Economies - a Suggested Approach' Land Economics, Vol.41.Dec. 1965., P. Holm 'Physical Planning and Local Economic Development' Papers and Proc. of the R.S.A., Vol.12.June 1963., W. Shankel 'The Economic Consequences of Industrial Zoning' Land Economics, Vol.40.Aug.1964., A. Ciboroswski 'Problems of the Construction of New Towns connected with Industrial Centres' paper for the U.N.C.T.A.D., Geneva.1964., N. Hansen 'Municipal Investment Requirements in a Growing Agglomeration' Land Economics, Vol.41.Feb.1965., and the first half of W. Thompson's "A Preface to Urban Economics", Baltimore.
37. For a further elaboration of this position see P. Lomax 'the Report of the E.African Economic and Fiscal Commission' the E.African Economics Review Vol.8.June 1961., and M. Wionczek 'Economic Integration and the Regional Distribution of Industrial Activities: E.Africa' the E.African Econ. Rev., Vol.3.NS.June 1967.
38. For a substantive picture of the planning situation in regard to metropolitan areas see the essays in W. Morgan Ed. "Nairobi - Regional Essays", Nairobi.1967., H.Dyer et.al. "Mombasa - Mater Plan", Nairobi.1963., A.Scaff et.al. "Recomendations for Urban Development in Kampala and Mengo", N.York. 1964., and the forthcoming report by a Canadian planning team on Dar es Salaam. For some thoughts on needed organisational extensions of the local planning function see S. Litherlands 'The Physical Planning System in Uganda' Research Paper No.16., Dept. of Sociology, Makerere College.Oct.1966.
39. For an overall appreciation see Chapters 5 and 6. in P. Clark op.cit.
40. ON the question of regional development strategies or the lack thereof, see the attempted discussions in J. Kakonge 'Regional Aspects of Planned Development' in R.Green et.al. "The Challenge of Ugand's 2nd. 5-year Dev. Plan", Kampala.1967., pp.75-7 in the "Development Plan 1966-70", Government of Kenya.Nairobi.1966., and G. Karmiloff 'Regional Planning Implimentation - Tanzania's Experience' E.African Econ. Rev., Vol.1.NS.June 1965.
41. See in particular the views expressed by O. Koenigberger in 'Action Planning', Architechtrual Association Journal, Vol.79.May.1964.
42. Some of these techniques are covered in W.Isard et.al. "Methods of Regional Analysis", N.York.1960., but many are in need of modification for use.
43. See the closely parallel resarch project indicated in the Stanford Resear-ch Institutes program to examine 'Costs of Urban Infrastructure for Industrial Development as related to Size of Urban Centres in Developing Countries', preliminary draft circulated 1966 from S.R.I. Stanförd. California.

Fig. 1. A SYSTEMS ANALYSIS FRAMEWORK Relating OVERALL DEVELOPMENT and URBAN-INDUSTRIAL LOCATION.^a
^a For explanation see text

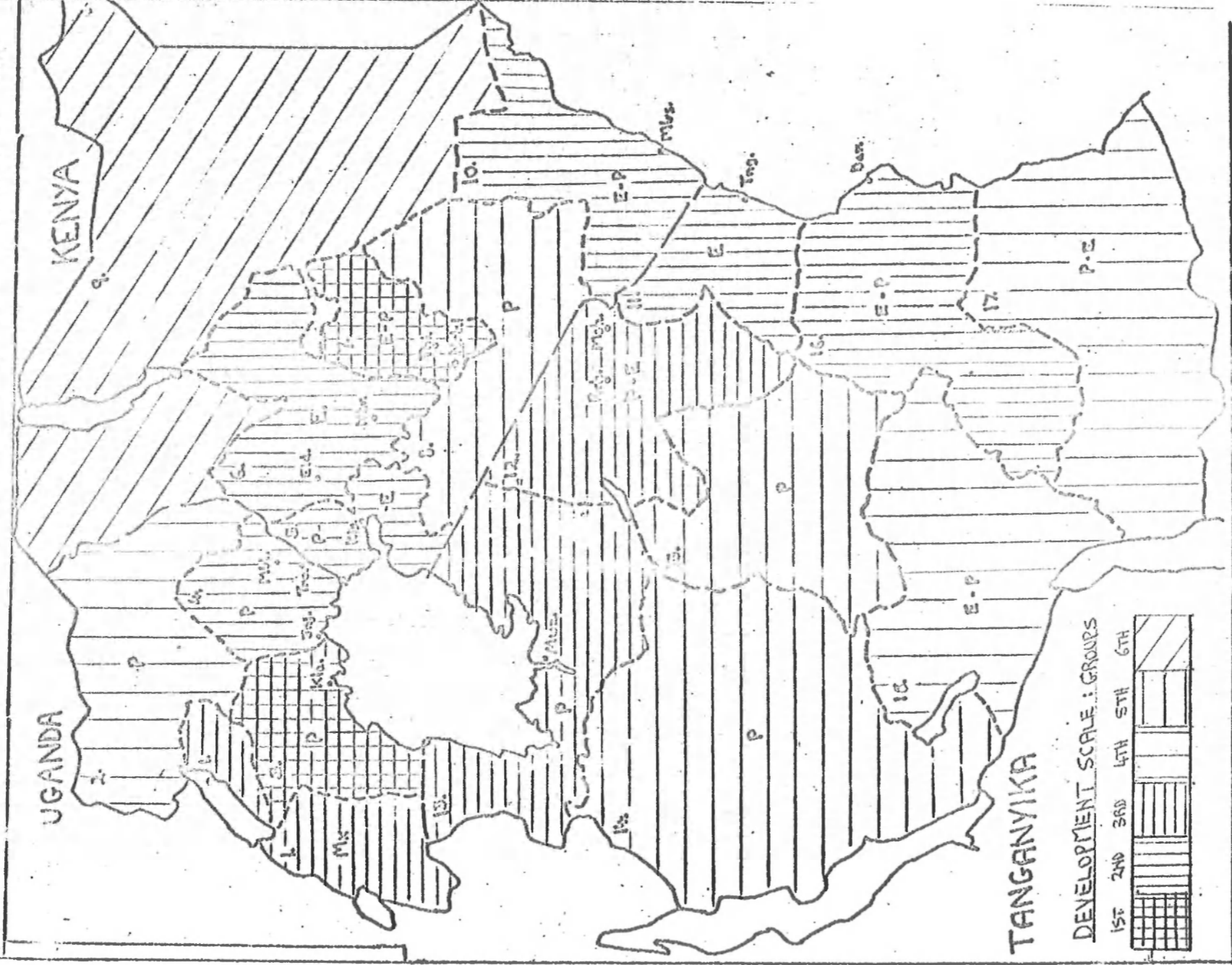


	UGANDA		KENYA		TANZANIA		E. AFRICA	
	1951	1961	1951	1961	1951	1961	1951	1961
OVERALL GROWTH PROFILES								
1. TOTAL POPULATION '000's	5,300	6,900	6,300	8,400	7,800	9,500	19,400	24,800
2. GROSS DOMESTIC PRODUCT '000's	62	112	73	177	51	115	186	404
3. TOTAL EMPLOYMENT '000's	170	220	460	570	350	380	980	1,190
INDUSTRIAL STRUCTURE								
4. MANUF. OUTPUT Percent	4	7	8	13	4	6	6	9
5. MANUF. EMPLOYMENT "	4	7	7	9	4	4	5	7
6. Non-Consumer Goods Industry "	9	27	25	42	5	20	17	34
7. AVE. PLANT SIZE No. emp.	16	25	23	37	12	20	17	30
8. VALUE ADDED PER PERSON	-	45	36	63	39	37	27	52
URBAN STRUCTURE								
9. URBAN POPULATION Percent	1.7	3.3	4	8	2	3.9	2.1	4.6
10. URBAN PRODUCT "	20	46	64	74	42	55	145	60
11. URBAN EMPLOYMENT "	50	63	50	58	40	47	47	54
12. CENTRES EXCEEDING 5000 POP	5	10	7	16	12	15	24	41
13. POP. OF LARGEST CITY, Percent	46	45	43	42	44	42	-	-
14. EMP. IN LARGEST CITY, "	52	48	50	49	-	-	-	-
REGIONAL DEVELOPMENT								
Percent of total national level found in leading region -								
15. POPULATION	26	29	39	36	12	12	-	-
16. GROSS INCOME	40	52	40	50	22	21	-	-
17. EMPLOYMENT	-	43	-	44	-	20	-	-
18. POWER CONSUMPTION	-	35	-	66	-	93	-	-
19. INDUSTRIAL OUTPUT	-	49	-	50	-	39	-	-
20. URBAN POPULATION	56	49	46	48	45	44	-	-
URBAN INDUSTRIAL GROWTH								
21. URB. IND. OUTPUT Percent	4	-	-	69	-	-	-	-
22. " " EMPLOYMENT "	10	51	47	13	36	62	-	-
23. Non-Consumer Goods Industry Percent	11	7	-	11	5	5	-	-
24. AVE. PLANT SIZE No. emp.	-	42	-	48	-	26	-	-
25. VALUE ADDED PER PERSON	-	46	-	65	-	38	-	-
26. URB. IND. OUTPUT in leading region	-	-	-	-	-	-	-	-
27. " " EMPLOYMENT "	-	-	-	-	-	-	-	-
28. " " EMPLOYMENT Percent	-	40	-	58	-	67	-	-
29. URBAN IND. CENTRES	3	40	5	48	4	5	12	15

IV. 1 SYSTEMS ANALYSIS PRESENTATION OF SAMPLE STATISTICS FOR E. AFRICA^a

^a for explanation and details of sources see text footnote 39

Fig. 2. E. AFRICA: PROFILE OF REGIONAL DEVELOPMENT - PROVINCES 1961. ^a



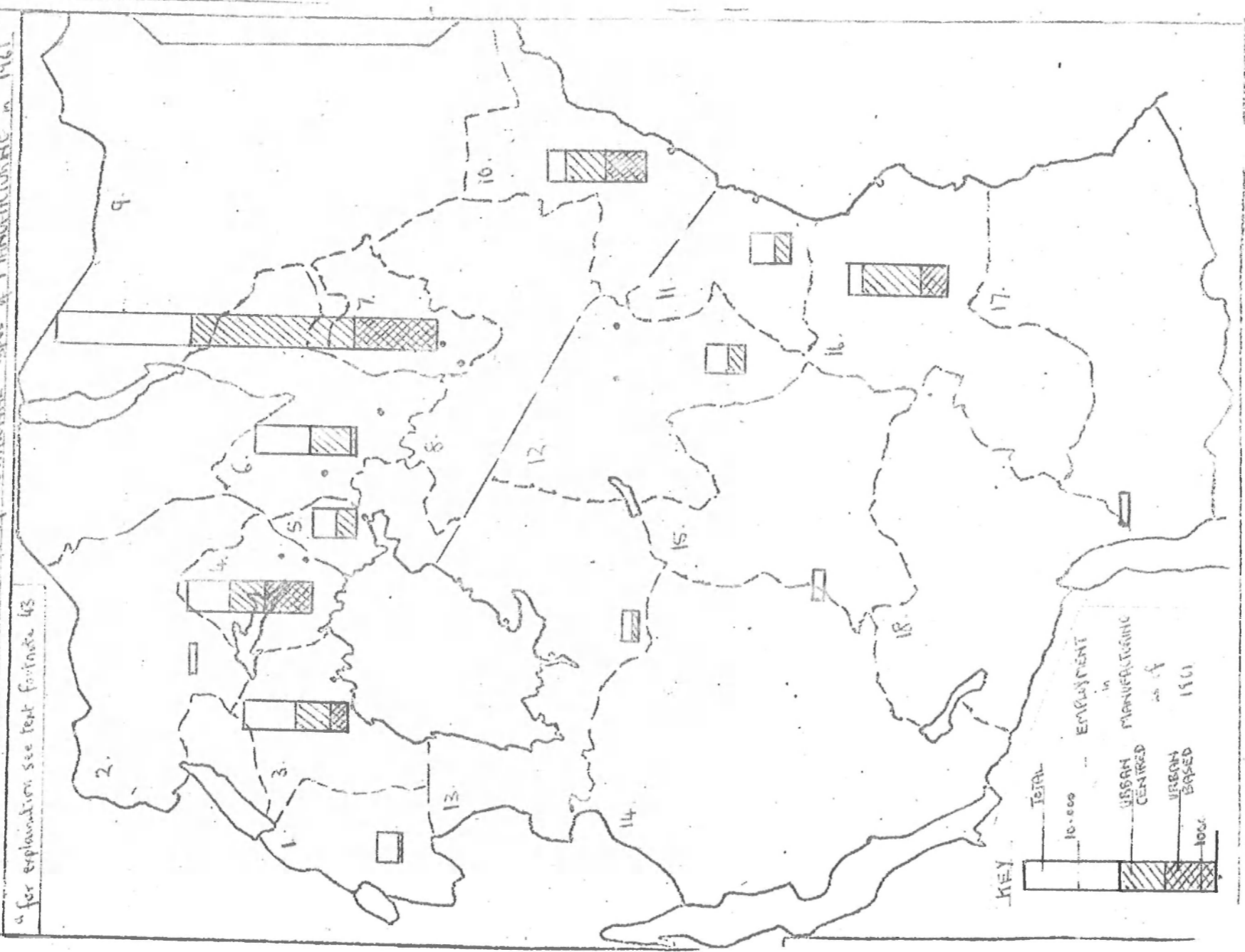
^a for explanation see text footnote 62.

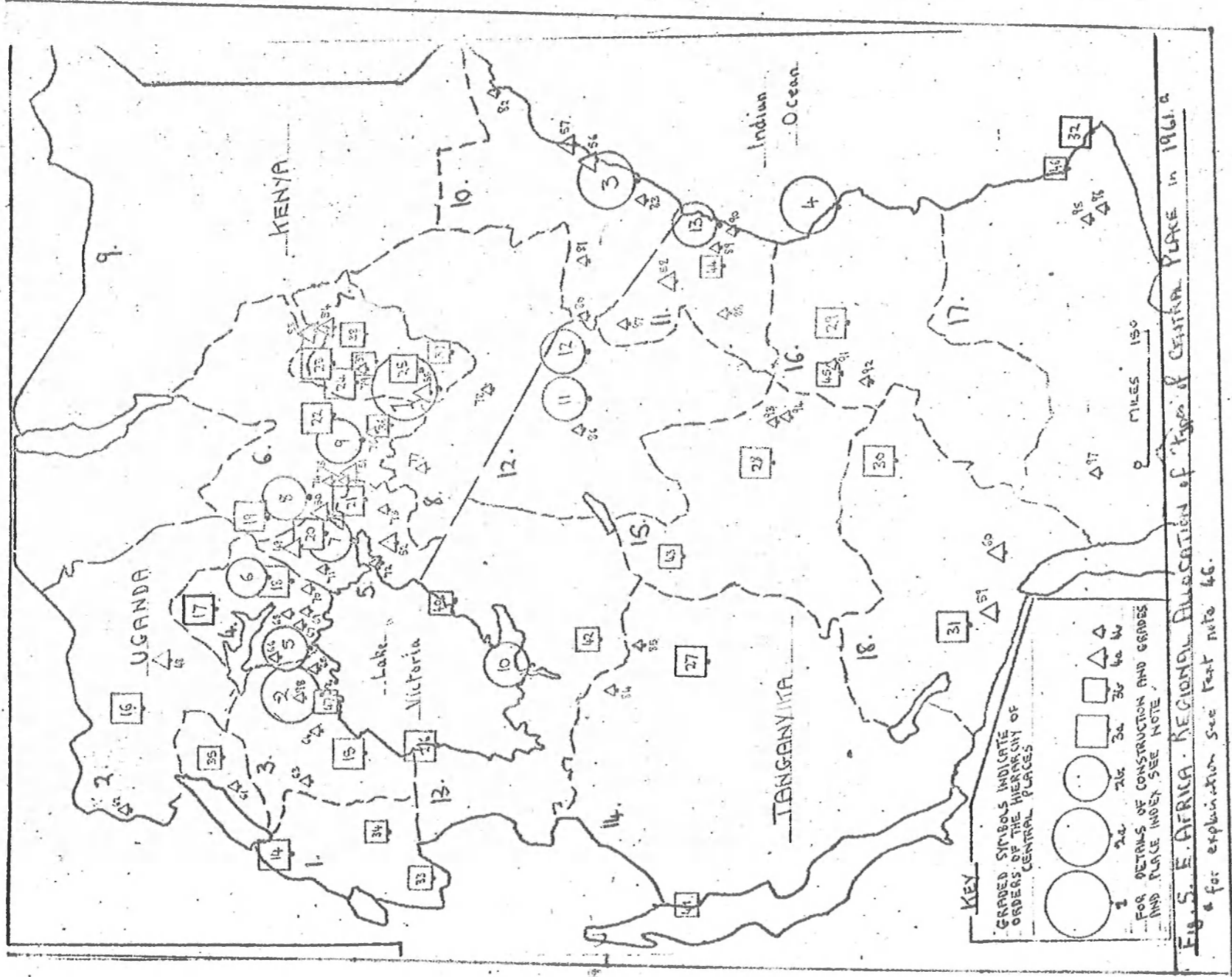
Fig. 3. E. AFRICA INTRAREGIONAL CONCENTRATION and INTERREGIONAL ADVANTAGE

for explanation, see text footnote 43



Fig. 4. E. APPELQ - Regional Association of Locations 'Types of Manufacturing' in 1961.
 * for explanation see text footnote 43





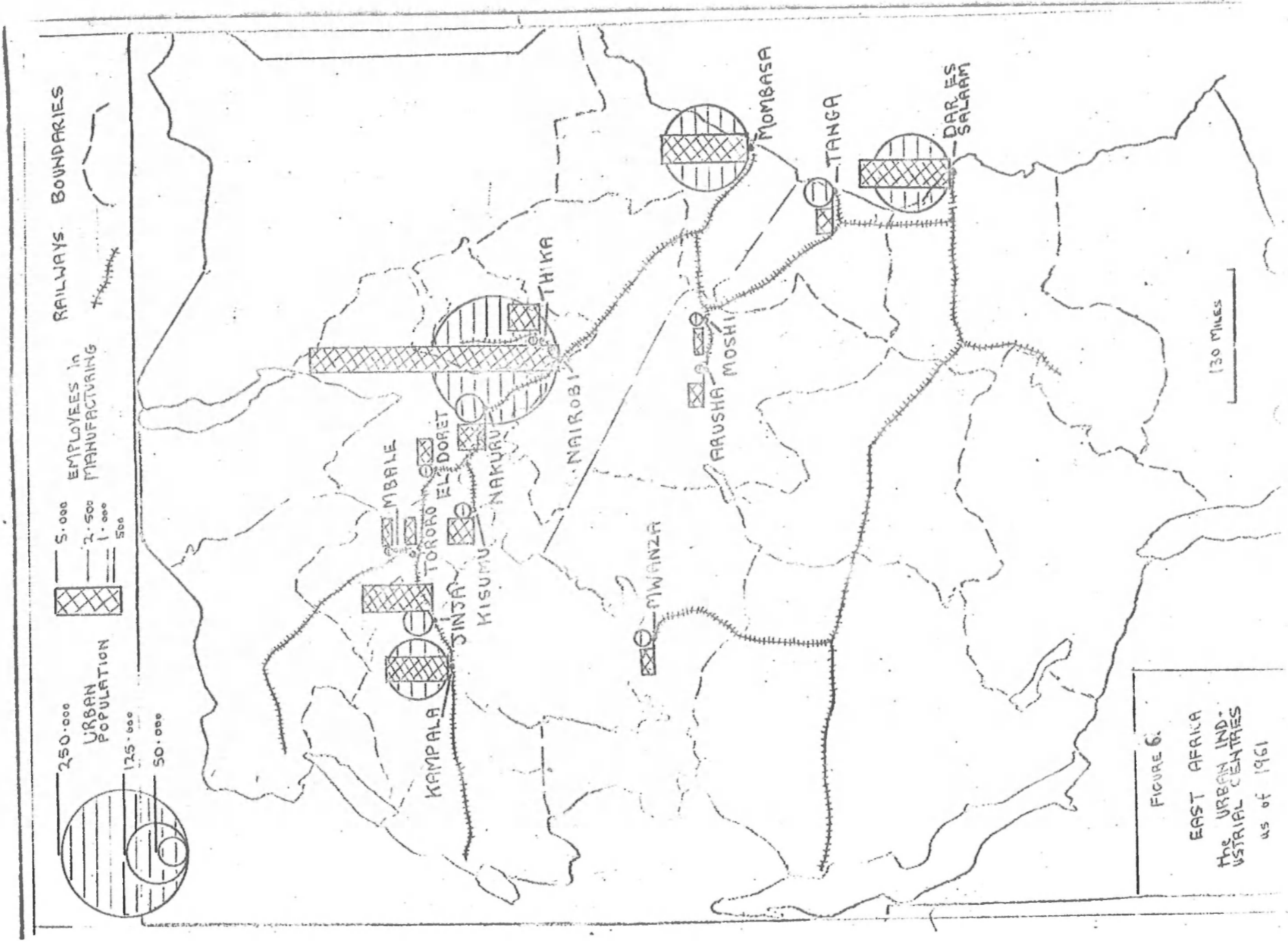
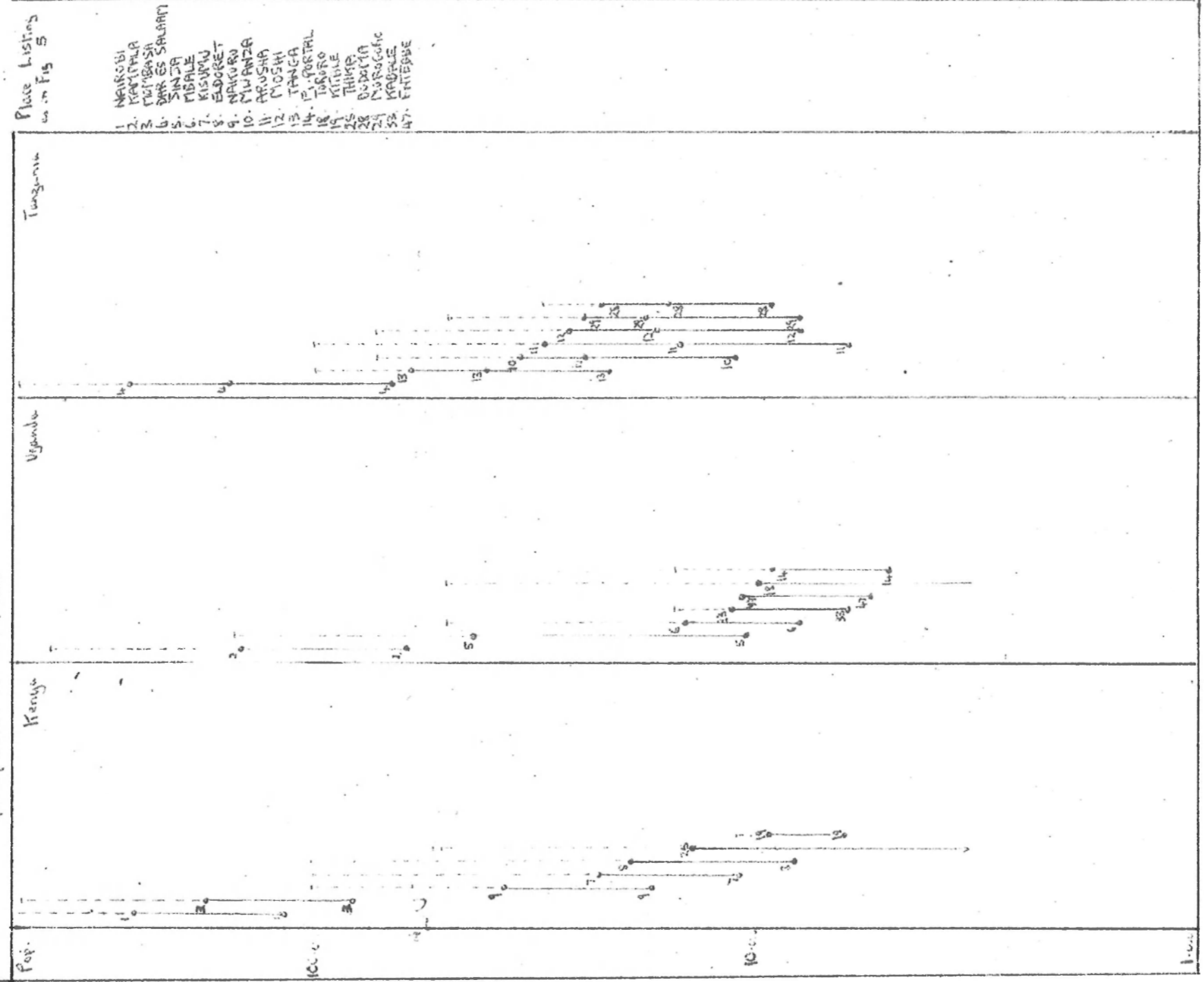


FIGURE 6.
 EAST AFRICA
 THE URBAN AND INDUSTRIAL CENTRES
 as of 1961

Fig. 7. E. AFRICA: TERRITORIAL URBAN RANK-SIZE RELATIONSHIPS
 IN EVOLUTION 1950 TO 1967 and 1980

* for explanation see next figure



Notes to Diagrams and Data.

Fig.1.

Though in relation to the general equation on pages 9-10, Fig.1. is referred to as a model, it is rather the skeletal structure of a model whose purpose is to draw together a number of partial models relating to different groups of factors in such a manner as to point out the ways in which the 'constants' of one such model can be translated into the 'variables' of another, enabling us to build upon available works to advance towards a more general understanding. Though again, there is no one model of economic growth and cultural or social change overall, there are a number of partial models which together help to define some basic attributes of the 'environmental' system, which are reviewed in B. Higgins and in Hoselitz and Moore, references 5 and 15 respectively to the main text (Rft).

Models relating to the various subsystems which have exerted most influence on the present argument are as follows -
the Structure of Industrial Activities:

United Nations "A Study of Industrial Growth" N.York.1963. &

F. Sargent Florence (Rft.22) Chapters 1,4 and 5.

the Structure of Urban Population and Activities:

W. Thompson (Rft.36)&

G. Sjoberg "The Pre-Industrial City" Glencoe.1960.

Patterns of Spatial Organisation:

J. Friedmann (Rft.3), Green and Fair (Rft.33) &

H. Perloff et.al. "Regions, Resources and Economic Growth" Baltimore.1962.

Patterns of Industrial Location:

I. Hamilton 'Models of Industrial Location' in R. Chorley and P. Hagget Eds.

"Models in Geography" London.1967. &

United Nations "Criteria for the Location of Industrial Plants" N.York.1967.

Patterns of Urban Places:

B. Berry "Geography of Market Centres..." N.Jersey.1967,

D. Duncan et.al. "Metropolis and Region" Baltimore.1961. &

R. Morrill "Migration and the Growth and Spread of Urban Settlement" Lund.1965.

These models enable the analysis of different parts of the situation leading up to and influencing the growth of a system of urban industrial centres. They also help to pinpoint the direction of input and output flows as indicated on the figure. The 'missing link' is the nature of the internal mechanics of that systems itself, to which my argument draws attention and the proposed research is intended to probe, having come as far as possible by means of the systematic interrelation of existing models to isolate the crux of the remaining indeterminacy.

Tb.1.

The data in the first three sections of the table are compiled, with modifications to improve comparability, from three main sources: the population censuses - all E.Africa 1948, Tanzania 1957, Uganda 1959, Kenya 1962 - and the industrial censuses/surveys - Tanzania and Kenya 1961, Uganda 1963; Chapter 2. of Clark (Rft.29); and Statistical Abstracts plus other miscellaneous sources for the earlier year. Consequently, some of the figures for 1951 must be taken as more 'approximate' than those for 1961., but this does not in my opinion invalidate the time trends indicated.

The figures in section four are derived from the data used to compile Fig.2. which see.

The figures in the last section are derived from the author's own data records, in particular from a 30x30 sector interindustry transactions matrix for each territory for 1961, a regional and centre by centre breakdown of industrial production and employment using the regions of Fig.2. and the 15 centres of Fig.6., and a sample survey of 100 large manufacturing enterprises plus library research on the history and structure of industry prepared for a thesis on "The Location, Structure and Growth of Urban Industrial Centres in E.Africa 1945-65 - the Evolution of a Spatial System" to be presented for the degree of Ph.D. at the University of London. The fieldwork was carried out in all three territories during the year 1963, and the preliminary findings set out in a previous paper (Rft.29).

Fig.2.

The pattern of regional development shown on the map is the result of taking a series of variables measuring different aspects of the level of economic and social transformation reached in an area, and combining them together using the statistical technique of factor analysis to produce one 'dimension' of overall growth and change upon which each region has a place or 'score' by which it has been grouped in one of five sections of the compound scale between which there are significant 'breaks' indicating greater between-group than within-group variance. The most advanced group is the 1st and the least the 6th. The data on which the scale is based was compiled by the author from official publications and fieldwork covering 13 of the 18 regions.

The variables taken into consideration included -

total population	total employment	est. cashcrop sales	road milage
non-african pop.	est. income from	purchasing power	density rail milage
population density	employment	power consumption	urban pop.
	industrial employment		

The regions distinguished on Fig.2. and on the subsequent maps are -

Uganda: 1.Western	Kenya: 5.Nyanza	Tanzania: 11.Tanga	
2.Northern	6.Rift	12.Northern	17.Southern
3.Buganda	7.Central	13.Lake	18.Highland
4.Eastern	8.Southern	14.Western	
	9.N.East	15.Central	
	10.Coast	16.Eastern	

Fig.3.

The pattern of localised development shown on this map is derived from combining the classificatory schemes provided by Green and Fair (Rft.33) and Perloff et.al. (see Notes to Fig.1.). The heavily-shaded areas are those with a high level of local development including a good infrastructural base, and a high level of overall accessibility. The medium-shaded areas have one or the other of the above advantages but not both together. The lightly-shaded areas are those of good potential on the variable basis of local resources but at present lack a high level of either local development or accessibility. The grid-squares are approx. 2500 sq. miles in area.

Fig.4.

The map shows the breakdown of industrial employment in the regions by sector categories related to locational propensities. The data used is the same as that underlying the last section of Tb.1. and described in the Note to that table. The industrial sectors that in 1961 were found in E.Africa almost or entirely located in the major urban centres included -

ISIC No. in brackets

Textiles (231/2)	Rubber Pdcs. (300)	Basic Metals (341/2)
Clothing (241)	Chemical Pdcs. (319)	Metal Pdcs. (350)
Pulp & Paper (271/2)	Cement & Glass (332/4)	Elec. Eng. (370)

Other sectors that were more widely distributed, but had a tendency to be urban 'centred', larger units being found within or near the main urban areas were -

those with a general distribution reflecting the location of natural resources		
Meat & Dairy Pdcs. (201/2)	Coarse Fibre Pdcs. (233/9)	Clay Pdcs. (331)
those with a general distribution reflecting the location of population		
Breweries (213)	Print. and Publ. (280)	Concrete Pdcs. (339)

Fig.5.

The map shows a first aprox. to the heirarchy of central places in E. Africa. The ranking of places in the different 'orders' of the heirarchy is based upon a numerical addition of 'scores' on a variety of variables related to the performance of certain retail, financial, administrative and other services. The 'orders' themselves are derived once again by significant 'breaks' in the scale of scores. The numerical values adopted for scoring are those used by Grove and Huzar in "The Towns of Ghana" Accra.1964. It has to be recognised however, that this method of assessment is crude in the extreme and in need of much further refinement for predictive purposes.

Fig.6.

This map shows the size and location of the fifteen places in E.Africa in 1961 which included both 1% or more of the total urban population of the three territories and 1% of the total industrial labour force.

Tb.2.

The data in the first part of the table are derived from the same source as the data in the last part of Tb.1. which are explained in the Note to that table. The data in the second part of the table concern, in order, the size of the place, its situation and accessibility, and its internal physical endowment and infrastructural elements. The figures have been compiled from published sources and from fieldwork undertaken in each of the places named with the aid of the local authorities. The E.African income potential index is derived from the normal formula, viz. the I.P.I. of a place depends upon the sum of total est. income at place concerned and at all other places, divided in each case by the distances from the place concerned to each other place. The results of the above calculation are reduced to index form using Nairobi as the base of 100. The technique is fully discussed in Isard et.al. (Rft.42). The numbers of the places match those of Fig.5.

Fig.7.

The scale shows the top portion of the rank-size distribution of urban places in the three territories in a comparative manner. The unbroken lines for each place included shows the extent of its population growth between the years 1950 and 1961 in the cases of Kenya and Uganda, and in addition between 1961 and 1967 in the case of Tanzania, with places in the order of their rank at the later date. The dotted lines give some indication of possible future growth based on a division into end-period size-classes. These are strictly 'gestimates' and to be used only as a basis for revision on the availability of new data. The numbers of the places are again those used on Fig.5.

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