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The Metropolitan Imperative

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INAUGURAL LECTURE

by

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INTRODUCTION

A major problem about urban and regional research is the vast arena within which one has to work and the numerous directions in which one can be drawn — physical, social, economic and political. An indication of this is the number of new disciplines and new branches of old ones that have arisen in the field — urban and rural sociology, urban and regional economics, urban geography, urban and regional planning, local government and administration, regional science, ekistics and others. The present Urban and Regional Research Unit in this University arose out of the former Urban Studies Committee whose main objectives were “to initiate, encourage and co-ordinate research projects which have a special bearing on the problems of the municipalities of the Witwatersrand”. The main emphasis in the Unit has been on research for physical planning, i.e., town and regional planning, and this has been directed mainly to the Southern Transvaal which, as South Africa’s largest urbanized region, gives a small body of researchers more than enough material and problems to grapple with.

Life in developed countries is becoming increasingly metropolitan in scale and at the same time inequalities in the distribution of wealth as between rich urban regions and poor rural regions, and between congested cities and an emptying countryside have forced governments everywhere to intervene on a substantial scale in the workings of the economic system in an effort to reduce the imbalance.

The blame for the ills arising from the unbalanced patterns of human activity and welfare is in nearly every case laid at the door of metropolis which is regarded as the villain of the piece; on the one hand, becoming congested, polluted and socially dysfunctional by virtue of its unmanageable size, and, on the other, being responsible for the disparities in levels of income as more and more wealth and economic activity piles up in these areas presumably at the expense of depressed areas elsewhere in the nation.

There are three aspects of metropolis and its growth that as South Africans we can profitably examine:

1. What is happening overseas in connection with the growth and planning of large urban population clusters?
2. What is happening in this country in the same regard and what

lessons, if any, we can learn from the more developed countries of Europe and from the United States?

3. What new approaches, and what methods are now available to analyse, predict and plan our growing metropolitan regions?

AMERICAN AND EUROPEAN EXPERIENCE

THE METROPOLITAN PROCESS

Philip Hauser (1971) comments on the results of the 1970 United States Census that "the massive metropolitanization of the American people" continues. As in the 1950s so in the 1960s the metropolitan areas in the United States continued to grow considerably faster than the rest of the nation. The entire population increase of 24 million in the past ten years was taken up by the cities.

The reasons for urbanization in the Western world are well known and lie mainly in the industrialization of the nineteenth and early twentieth centuries, but the increased scale of the process — metropolitanization rather than urbanization — is now associated with the workings of the post-industrial society (Friedmann, 1964). In the United States, 1953 was a crucial turning point for in this year manufacturing attained its highest proportionate level accounting for 32 per cent of the gross domestic product. Since then its relative contribution has steadily declined as the economy has shifted from one based mainly on primary and secondary activities to one in which the dominant contributor, now, to national wealth are the tertiary and quaternary sectors — finance, business, professional services, education, research and development, government, recreation, and in general the dissemination of ideas and innovations.

In consequence, white collar, urban-oriented employment in the United States now not only exceeds that in blue collar employment but it is also growing annually three times as fast.

Thus, a production economy which took people westwards across the United States in search of raw materials for its factories and thus settled the interior, is now superseded by a services and consumption economy which is causing population to pile up in the agglomerations of the coastal areas of the north-east, the east, south and west. The process has advanced so far that metropolitan centres

are now coalescing into megalopolitan or urbanized regions, characteristic not only of the United States but of Europe as well.

It is not surprising therefore that 70 per cent of the American people now live on 2 per cent of the surface area of that country — a phenomenon described not as a population explosion but rather a population implosion — more and more people packing into less space although dispersing outwards into suburbs at the same time.

POLICY

Government reaction to this concentration and the social troubles it has brought to American cities has been such that the Federal Government and the States are committed to national, regional and town planning on a scale unheard of even five or six years ago.

A recent American commission commented “that it would be a hideous — and expensive — mistake to force the next 100 million Americans to live in the nation’s present cities” (Fischer, 1970) — “the discouraging vision of gargantuan megalopolis and rural desolation” as President Nixon termed it in his first State of the Union message.

The Barlow report (Great Britain, 1940) in Britain as far back as 1940 and all the planning legislation that followed stemmed from the basic viewpoint that the continued concentration of population in Greater London and in south-east England was bad on social, economic and strategic grounds, while the French, of course, were complaining of Paris and the French desert.

This is one side of the problem — government concern for the sheer physical concentration of people and economic activity in metropolitan areas.

The other side of the problem is government concern for the plight of distressed areas and the highly unequal patterns of income distribution that they display *vis-à-vis* metropolitan areas. All the more is metropolis blamed for this when it has been shown quite convincingly in the United States and Europe that one of the key variables in determining levels of regional economic health is the degree to which regions have access to the national centres of production and consumption. It is not coincidental that in the United States the depressed areas are those that lie beyond the commuting influence of its metropolitan centres in what is termed the inter-

metropolitan periphery (Berry and Horton, 1970, p.53). Similarly in Britain the depressed areas of Scotland, the north of England and Wales lie peripheral to the Greater London core. Consequently legislation in Britain and in the United States aimed at relieving the economic problems of the depressed areas have really sprung from motives of equity — that is to reduce serious differences in the levels of living and welfare of different regions. By contrast, policies aimed at reducing metropolitan congestion have sprung from quite different motives — those aimed at improving the quality and efficiency of city life itself.

STRATEGY

In Europe, which has the longest history of attempts to tackle both problems, and where metropolitan concentration seemed to be the underlying cause in both instances, policies and strategies were adopted which clearly set out to kill two birds with one stone — to curb metropolitan growth, on the one hand, and to channel investment and economic activity instead to the depressed areas. In this way it was believed that at one and the same time, apoplexy could be cured at the centre and anaemia at the periphery.

But this strategy has had limited success. The depressed areas in Britain have to a large extent received some injection of life over the past twenty-five years but the weight of wealth and economic activity still remains in the south-east and the gap in employment opportunities and in income levels is still very large (Rawstron and Coates, 1966).

At the same time, Hall (1966, p.234) in his survey around the world finds no case where attempts to curb the growth of dominant metropolitan centres and their associated regions has met with any sure success.

The Abercrombie plan of 1944 for Greater London (Abercrombie, 1945) together with restrictions on industrial and, later, office development imposed by government has succeeded in reducing levels of employment and population in London itself, but the potential for growth of the metropolitan area has been such that expansion has simply been transferred to the south-east as a whole (Hall, 1970, p.72), which overall has maintained a consistently high rate of growth over the past 150 years.

Moreover, a very considerable proportion of the growth of industry and of offices in the wider region has been due to short distance decentralization from central London and this has been sufficient to achieve much of the decongestion in London without losing the advantages of nearness to it and of a location within Britain's fastest growing and most prosperous region, which is destined to grow even more rapidly should she join the Common Market since access from London to the capitals of Western Europe is as easy, if not easier, than to the centres of northern England and Scotland.

Accepting the role of London and the South East in national development and therefore the inevitability of its growth, government now seeks *not* to stop it but to plan for it (S.E. Joint Planning Team, 1970). A second generation of large cities of up to 1 million inhabitants each is now planned to comprise an urbanized region of 21 million people towards the end of the century (Figure 1). This region is 25 000 square kilometres (10 000 square miles) in extent. This is equivalent to locating the total present population

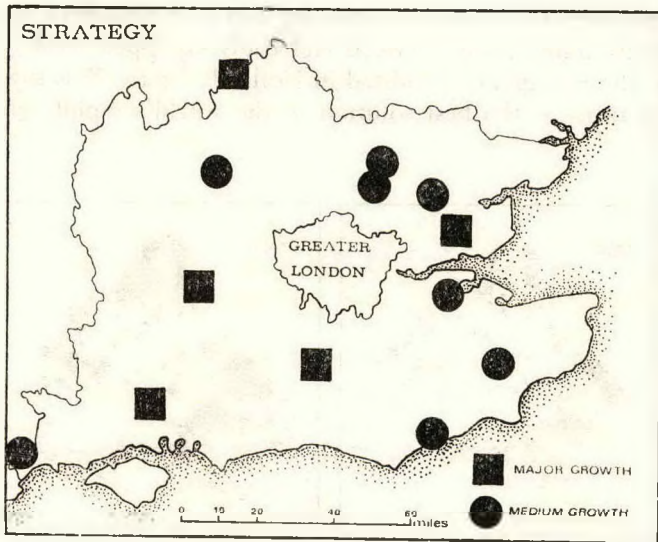


Figure 1

A Strategy for the South East (after South East Joint Planning Team, 1970)

of South Africa in an area from Rustenburg to Witbank to Bethal to Potchefstroom.

A similar plan to curb the growth of Paris in 1960 was abandoned as untenable in 1965 (Rodwin, 1970, p.192). It was accepted that the built-up area of the metropolis would double by the year 2000 and the new plan seeks to develop, like that for the English South East, a more aerated, less congested structure of regional proportions based upon decentralized nodes arranged along two corridors north and south of Paris. The length of the corridors is about 80 kilometres (50 miles) — the same as from Krugersdorp to Nigel.

Further, beyond the immediate Paris region the most successful decentralization of industry from the city has been short distance decentralization to a ring of towns within 200 kilometres (120 miles of Paris itself (Hall, 1970, p.89).

It would seem that at least in Britain and France, governments have come round to the view that the answer to metropolitan growth lies not in slaying the goose that lays the golden egg but in making the metropolitan environment, physically, socially and economically, more habitable. What is wrong with Paris says one of its planners is not that it is too big and over-populated but that it is badly built, badly serviced and badly equipped (Hall, 1966, p.84). The example of Randstad in Holland (Figure 2) is suggested now by many as the best solution to the world's rapidly growing

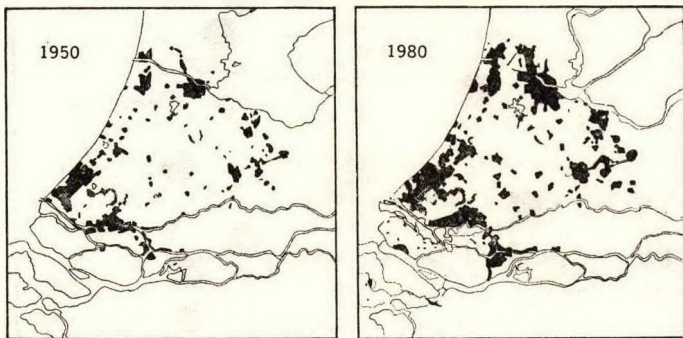


Figure 2

Randstad, Holland (after United Nations, 1967)

urbanized regions. The dominant single-centred metropolitan region should thus be superseded by the multi-nucleated megalopolis, each part within easy distance of the other parts and all regarded as entities in an interdependent city system. Such a structure, it is believed, allows for future growth in a way that the single-centred structure cannot (United Nations, 1967, p.102). The distance on the map from Amsterdam in the north to Rotterdam in the south is 65 kilometres (40 miles) — Pretoria to Johannesburg.

CONCLUSIONS

There are three major conclusions to be drawn from these experiences:

1. That while national goals aimed at equity — that is, spreading wealth as far as possible to poorer regions, is desirable and commendable, it is not likely to be achieved by stifling growth in the country's major growth centres and regions, and hoping as a result that it will be diverted to the distant periphery.
2. That the generation of wealth in the prosperous areas in order to foster as high a national growth rate as possible, that is, the efficiency goal, will provide a surer basis for investment in the poorer regions. More efficiency, more equity.
3. That the decongestion of the hubs of large metropolitan growth centres can best be achieved by short-distance decentralization to less congested areas within the surrounding metropolitan region itself, where the advantages of location are retained while the disadvantages of congestion and other external diseconomies are reduced.

Earlier strategies have therefore been substantially modified or abandoned in favour of planning metropolitan growth regions as growth regions in their own right.

Wilbur Thompson (Perloff and Wingo, 1968, p.62), the American urban economist, concludes that "at this time and vantage point it seems likely that American national policy will be directed more towards mastering the management of large population clusters than toward preventing growth".

SOUTH AFRICA

Turning to South Africa we might well ask what lessons, if any, may be learned from the developed countries of Europe and North America with regard to mastering the management of our larger population clusters or alternatively to curbing their growth. While some conditions are unique, certain universal processes are also at work.

POLICY AND STRATEGY

Government's attitude to concentration of population and economic activity in a comparatively few centres is well known. The report of the Water Commission of 1970 (South Africa, 1970, p.81) states that "unless drastically diverted, migration of the population to the large urban areas will continue unabated because of the magnetism of metropolitan growth". It states that to "obviate the disadvantages that result from over-centralization, the Government has adopted the policy of industrial decentralization. In this way an economic balance between the cities and the remainder of the country can be restored".

There are, of course, important differences in policy motivation here compared with the situation in, say, Great Britain, in that the policy of dispersal here is aimed primarily at underpinning the goals of separate development. But the broad strategy is not dissimilar. It clearly seeks to kill two birds with one stone — the restriction on African employment in the metropolitan areas, on the one hand, and its encouragement in the peripheral homelands, on the other.

METROPOLITAN CENTRES AND NATIONAL DEVELOPMENT

But in the process the role of the metropolitan centres in national development cannot be discounted. In a country such as South Africa with its comparatively small population, small internal market and large distances, one of the key variables in the economic health of its regions, even more so than in the case of the United States or Britain, is their degree of accessibility to the existing centres of production and consumption.

Figure 3 representing a straight line traverse from Cape Town to Durban indicates in the upper graph that gross domestic product

per square mile decreases substantially as we move away from the metropolitan centres, as one would expect. But the same applies to levels of welfare shown by the lower graph. These values represent a composite measure of income per capita, level of education and of employment, age structure and so on, and they, too, decline sharply from metropolitan peaks to intermetropolitan valleys. And similar patterns apply to traverses from Johannesburg to Durban (Figure 4) and from Cape Town to Johannesburg (Figure 5).

Translated to the map (Figure 6) from which they were derived the traverses are representative of a set of economic surfaces, much like topographic surfaces, indicating high levels of intensity of output and of economic welfare around the metropolitan centres and along corridors between them, declining to economic valleys in the outer periphery in which most of the Bantu areas lie.

Clearly, for any policy of industrial decentralization, appreciation of this metropolitan-dominated structure is critical and explains why those Bantu areas bordering on East London, on the Southern Transvaal, on Durban, and on the corridor between Johannesburg and Durban are generally the ones most likely to benefit from decentralization. Those most distant are least likely to, if at all, except where related to identified mineral or agricultural resources.

The question now arises as to what is the likelihood of the policy of industrial decentralization achieving a significant redistribution of population *vis-à-vis* the metropolitan areas. A little arithmetic is helpful here.

At present some 25 growth points* both inside and on the borders

*Tzaneen (including Nkowakowa and Lenyenyé)	Ladysmith
Pietersburg (including Shesego)	Colenso
Potgietersrus (including Mahwelereng)	Estcourt
Phalaborwa	Empangeni
Babelegi	Richards Bay
Brits	Sitebe
Rustenburg (including Thlabani)	Hammarisdale (including Mpumalanga)
Delareyville	Harrismith
Zeerust	Umtata
Mafeking (including Montshiwa)	Butterworth
Newcastle (including Ozizwene and Madadeni)	Berlin
	Zwelitsha
	King William's Town
	Queenstown

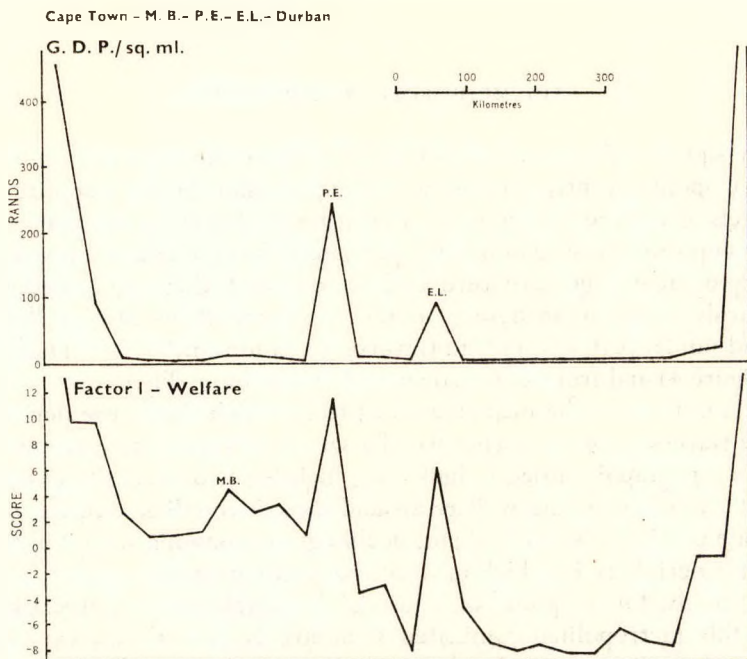


Figure 3

Traverse: Cape Town — Mossel Bay — Port Elizabeth — East London — Durban

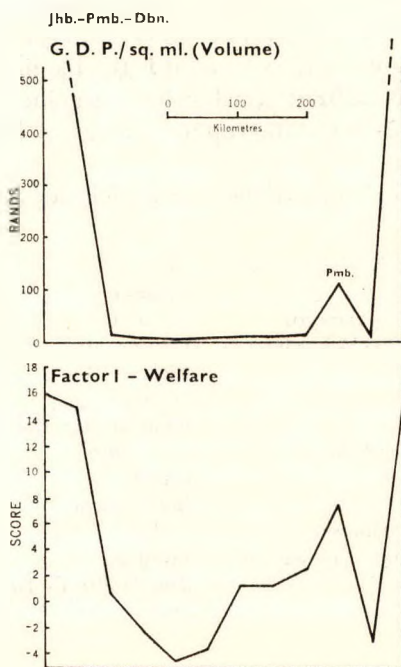


Figure 4

Traverse: Johannesburg — Pietermaritzburg — Durban

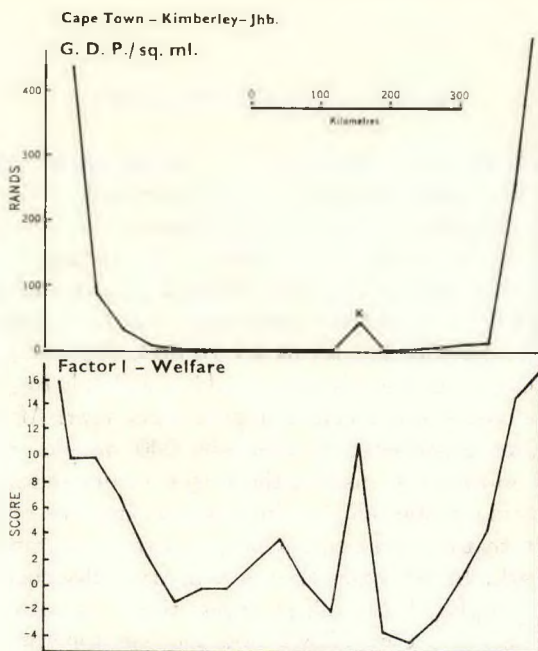


Figure 5
Traverse: Cape Town — Kimberley — Johannesburg

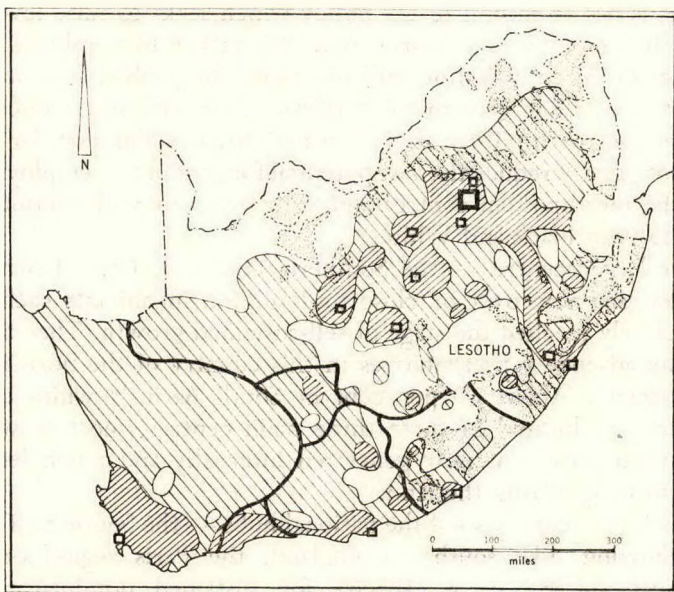


Figure 6

South Africa: Economic Surfaces of high, medium and low intensity of development. Illustrated also are the Witwatersrand and major metropolitan centres (open squares) and the Bantu Homelands (stippled) (after Board, Davies & Fair, 1970)

of the homelands have been earmarked for industrial development by government. These do not include places such as Ga-Rankuwa, Umlazi, and Mdantsane which though located in homeland territory, in effect lie within the confines of existing metropolitan centres where the bulk of their population is employed. The average population of the 25 growth points, some still to be established, is approximately 16 000, but let us say 20 000. Supposing the population of all can be sufficiently promoted immediately by government to grow at a rate of 6 per cent compound per year. After 10 years they will have absorbed a further 400 000 people. By contrast suppose the Southern Transvaal, the largest of our urbanized areas, with its existing 3 600 000 inhabitants continues to grow at only half that rate, that is 3 per cent, which is a little less than its current rate of growth. In 10 years time it will have absorbed a further $1\frac{1}{4}$ million people (1 235 000); three times as many, and the Southern Transvaal, Cape Town and Durban together, nearly 2 million or five times as many as the 25 growth centres. Whether the assumed rate of growth of the 25 centres can be promoted by government on the scale suggested is of course another matter.

This is not to minimize any policy which seeks to raise levels of living in the country's poorer areas but rather to emphasize that policies of decentralization will not cause the problems associated with metropolitan growth to evaporate. Nor will they reduce the role of the metropolitan region in national development for they will not greatly reduce the vast potential for productive employment that the metropolitan centres and their environs will continue to offer to both Black and White.

Our larger centres — the Southern Transvaal, Cape Town and Durban, are now over or close to 1 million inhabitants each and have clearly reached the stage of self-sustained growth. They are in fact the advance representatives in this country of the post-industrial society. About 60 per cent of South Africa's white collar workers are located in these three main centres, most of whose population growth is now generated internally and much less by drifts of people from the land.

This is particularly so of the national hubs — the Southern Transvaal showing, like south-east England, the Paris region or the American north-east, a capacity for sustained dominance and growth. The Southern Transvaal has steadily increased its share of

the country's gross output of manufacturing industry to 55 per cent in 1969 and its share of the country's total population to 18 per cent and of the White population to as much as 38 per cent in 1970.

It is essential that national development strategies link the needs of both the less and the more prosperous regions — this lesson from European experience is at least clear, for, as Mr H. Oppenheimer (1961) pointed out some years ago, "unless there is greater development in the metropolitan centres, where the climate for continued economic expansion is highly favourable and where capital for new growth is alone generated, it will not be possible to develop industry in the Reserves or on their borders on any appreciable scale".

Homeland development, therefore, throws a greater not a lesser strain on the metropolitan areas and their functional efficiency, and on government to cater for those needs whether they be improved water supplies, adequate labour, or better transportation facilities. We cannot stop their growth; we have to plan for it.

SOUTHERN TRANSVAAL

It seems logical, therefore, that in the 1971 White paper on decentralization, government (South Africa, 1971) has stated that it now seeks to evolve a development pattern for South Africa which will divert sufficient activity to the decentralized areas without harming the interests and needs of the existing metropolitan areas. But the fact remains that for its size and national importance, the country's chief urbanized region, the Southern Transvaal, must be among few of its kind in the developed world for which no single permanent agency exists to monitor, assess, co-ordinate and plan for its physical needs and growth.

Compared with the permanent and substantial Decentralization Board and its growth points committee to take care of the planning and implementation of the decentralization programme, only *ad hoc* committees of government and local authorities, very recently appointed, have been given the task of preparing a plan for areas as important as our larger metropolitan regions.

Certainly, our metropolitan problems, the physical if not the social, are still small by comparison with the world's largest cities. While in a relative sense the concentration of economic activity in

South Africa is high (81 per cent of manufacturing output is concentrated in four areas) in an absolute sense the degree of concentration and the diseconomies flowing from it are still small. All eight metropolitan centres (Southern Transvaal, Cape Town, Port Elizabeth, East London, Durban, Pietermaritzburg, Bloemfontein and Kimberley) together have a total population ($6\frac{1}{2}$ million) equal to that of Chicago alone, and to a little more than half that of Greater London. Or alternatively, in roughly the same physical space with a diameter of 120 kilometres (75 miles) are packed 13 million people in Greater London and less than 4 million in the Southern Transvaal.

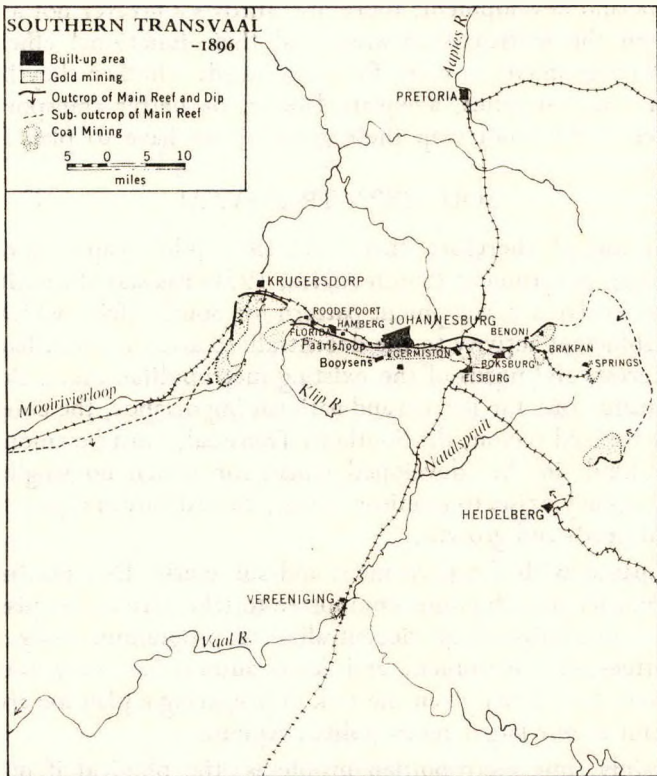


Figure 7

The Southern Transvaal, 1896 (after Fair & Mallows, 1959)

STRUCTURE AND GROWTH

Moreover, by historical accident we are fortunate in this region in possessing a fairly open-textured structure of disparate towns and cities and linking axes.

The foundations were laid some time ago as Figure 7, illustrative of the built-up area in 1896, shows. What it has grown to today represents an impressive performance (Figure 8).

Also fortunate is that nowhere else can there be found large areas of almost open land near a metropolitan centre which, freed from mining, can now be used for other purposes or be retained as

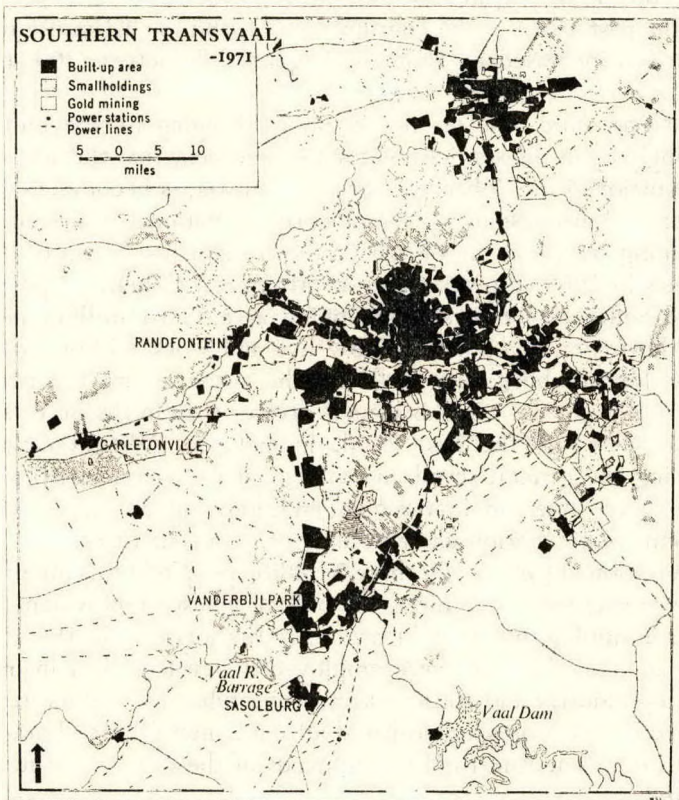


Figure 8
The Southern Transvaal, 1971

open space. In fact, the Southern Transvaal has begun life rather with the structure of a multi-centred mini-megalopolis than of a uni-centred metropolitan region; rather with the structure of a Dutch Randstad, than of a Paris or a London, which have their administrative, cultural, commercial and industrial functions largely concentrated in one centre. The challenge is to preserve the Southern Transvaal's rather rare inherited structure and to build wisely upon it.

Yet time and development do not stand still. The region's population has doubled in the past 25 years to $1\frac{1}{2}$ million Whites and $2\frac{1}{2}$ million non-Whites — and there seems no reason to believe that it will not double again to 8 million by 1995.

In the past 15 years the consumption of land for urban use in the region has increased by about 500 square kilometres (200 square miles).

The economic base of the region is changing to one built increasingly upon the services sector to the extent that the attraction of the major cities, Johannesburg and Pretoria, is becoming rapidly greater — Johannesburg pre-eminently a national office centre containing 51 per cent of the Southern Transvaal's white collar workers in 1960 and, according to Mr Aaron Cohen, 48 per cent of the Southern Transvaal's shopping area. Two million people (half the region's population) now live and work within 15 miles of the Johannesburg City Hall and the absolute and the relative growth of population in this zone is greater than in the outer zones of the West and the East Rand. In fact, the Witwatersrand is reversing the general trend and taking on the characteristics of a single-centred metropolitan region, and, looming, are the associated problems of congestion characteristic of such structures.

In addition, $1\frac{1}{4}$ million of these 2 million people in this inner zone (63 per cent) are non-Whites, the bulk of whose employment is no longer in mining, nor in industry but in the services. In 1960 three times as many Africans were employed in services than in manufacturing industry and construction in the Johannesburg metropolitan area — permanent urban-based jobs not amendable to homeland decentralization. And the housing needs of these people is steadily growing.

At the same time the White South African's demand for space and mobility is taking him further and further from his place of

work as residential sprawl expands in all directions and the journey to work for many becomes longer and longer on inadequate roads.

The location of jobs, the distribution of people and of land uses, and a transportation system — these are the four essential elements that call for integrated physical planning on a regional scale.

PLANNING

Fifteen years ago, in a report on the Southern Transvaal by the Natural Resources Development Council (Fair *et al.* 1957, p.75), we wrote that each problem was tackled as and when it arose — in 1943 the establishment of the Peri-Urban Areas Health Board to take care of undesirable developments on the borders of local authorities; in 1951 committees to locate and establish new Bantu residential areas; in 1957 a commission to investigate small holdings and the fragmentation of land in the urban fringe. This approach has persisted. The northern suburban sprawl was taken care of by the creation of two new local authorities, Randburg and Sandton; the traffic problem has been only partially met by the proposed freeway system; a regional recreational area has been finally approved in the Suikerbosrand, and so on. But there is still no over-all concept in the minds of government, local authorities and private enterprise as to what might be a generally accepted and desirable broad brush structural plan for the region, although the Johannesburg City Council through its Forward Planning Branch have consistently attempted to view their planning and development in metropolitan terms.

But we cannot think any longer in terms of combining the local plans of municipalities and calling the result a regional plan. Nor can we think in terms of a rigid master plan which, in a single document, attempts to present a blue print for some distant date. Thinking is now less in terms of ideal "end-states" and more in terms of continuously moving and redefined targets.

In addition, urban and regional planning is now more a matter of choosing, from a range of alternatives, those projected or simulated future patterns of the city or region which best meet the requirements set by the policy-makers or by the broad or specific goals of society. A process of successive reformulation and retesting of the alternatives enables one to find the best possible solution.

One of the first attempts at developing alternative strategies was that for Washington in the early 1960s (Washington, 1961). A number of concept plans were derived by setting up a series of alternative "physical-forms". These were, among others, a set of new independent cities around Washington; planned sprawl outwards from the centre; a pattern of dispersed cities; a ring of cities; a set of peripheral communities; a radial corridor plan.

In the light of the broad objectives for the region's future the advantage and disadvantages of each of the forms or hypotheses was evaluated and one indicated as the preferred concept. This was the radial corridor plan since this pattern offered clear advantages over each of the others, such as maximum opportunity to exploit public transport and its great carrying capacity with fast access to the centre. Further, development at the centre would not be inhibited and open space would take the form of accessible wedges between the corridors.

These concepts were recently embodied in a student exercise in this University's Department of Town and Regional Planning. Various physical-form alternatives were applied to the Southern Transvaal which, by virtue of its remarkably open structure still holds exciting challenges to the planner.

PLANNING METHODOLOGY

But one of the major problems in urban and regional planning in the past has been "the gulf between the conceptual apparatus and a knowledge of the technology required to turn theory into practice" (Cripps, 1969, p.187). But a new technology has emerged in recent years. A mathematical and statistical revolution has overtaken a variety of subjects which deal with spatial relationships. Regional science and a systems approach to planning, for example, are now deeply laid in quantitative foundations.

Planners have, of course, always been interested in investigating how land use and population patterns have evolved and what form future changes are likely to take and should take in the light of agreed social objectives. Intellectual development was more rapid in the former aspects of the discipline, that is, in developing a set of concepts, ideas and models that provided understanding of the behaviour of the existing urban system, but now it is becoming possible to develop a set of models that will permit experimentation

with urban form and structure so that the future operation of the city and the region and their spatial form can be predicted.

“We know”, says McLoughlin (1967), “that the city is comprised of a myriad of relationships, but if we have the vision to identify and describe these in the right way they can be expressed in mathematical terms. The way changes occur through time can be built into the equations, and the computer, handling the instructions provided, can in a matter of minutes enable us to observe decades of growth in a large city” — and enable us to seek the most optimum states.

The most recent approaches and methods now devised commence with the existing system and simulate a sequence of alternative states through which the city and regional system may pass according to how one varies the initial assumptions. These are assumptions regarding public policy on the one hand — relating to the type of public transport preferred; and the form of development required, centralized or decentralized, and so on; and on the other hand, assumptions regarding the private decisions of individual households, corporations or institutions (McLoughlin, 1969, p.231).

Variations in one or the other will yield a number of different trajectories or alternative paths as the evolution of the system is simulated over time (Figure 9). Moreover, it is particularly valuable that the interaction between different types of land use, and between land use and transportation can also be analysed over time.

Each of these trajectories can be tested, against the goals that have been set, in cost-benefit terms. The important thing is that one can experiment with the system and change the variables anywhere along the line — so much so that planning is now being defined “as the guidance of change in an evolving system” (McLoughlin, 1969, p. 245). The type of simulation used can vary from the use of more and less sophisticated mathematical techniques according to the nature and complexity of the problem, the results required from the exercise and the price one is prepared to pay.

A number of urban and regional plans are now being produced in Great Britain using these and other methods — those for Notts-Derby generating thirteen alternatives, for Leicester and Leicestershire (six alternatives) and for Bedfordshire, Southampton, Teeside and Humberside. All of these within the last five years. An organization such as the Centre for Environmental Studies, sponsored by

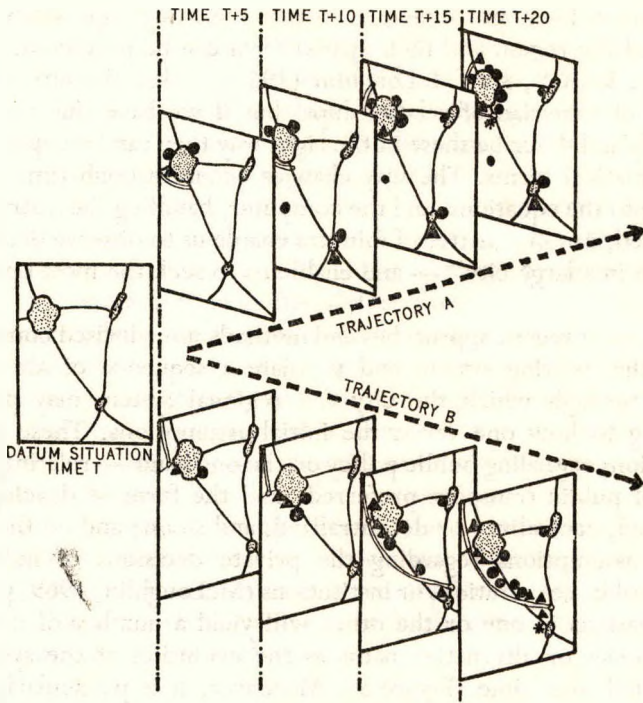


Figure 9
System Trajectories (McLoughlin, 1969)

government and the Ford Foundation, has been a force of tremendous importance in promoting the new field and now its spread to the Universities, notably Reading, Cambridge and Newcastle.

In South Africa these methods have been used in a limited way mainly for the analysis and planning of shopping centres and for traffic planning but their wider and more elaborate use in town and regional planning has yet to be undertaken. Professor G. F. Chadwick's recent visit to this University from the University of Newcastle-upon-Tyne was valuable in exposing a number of local planners to the use of these new techniques and the integrative systems framework within which they need to be used. This University with its range of expertise in the applied mathematical, statistical and computer science fields in association with the

planners and geographers and the local authorities could take a real lead in developing this aspect of the planning process in South Africa. In fact, it is being pointed out to planners that their traditional virtues must today be coupled to the expertise of the applied scientist who through operations research, systems analysis and management science is being increasingly called upon to solve many of the problems of town and regional planning today (Catanese, 1970).

I can only support the plea by Professor Mallows first in 1969 and again recently for the establishment, within some research body such as the Council for Scientific and Industrial Research, of a national planning research institute similar to the National Building Research Institute where the basic problems of planning our large cities can be thoroughly studied. Such a body or one similar to the Australian Institute of Urban Studies should be able to set national priorities, undertake and sponsor research for urban planning on the scale now demanded, and incidentally help make our work in university research units more effective.

CONCLUSION

But when all is said and done, we must not lose sight of the fact that the really difficult problems of South Africa's cities are its social problems. Webber (1968) has reminded us that the crisis in American cities is an issue in social and human development — that it is an issue in urbanization rather than in city-building; that if we fully understand the social needs of people and the social organization within which we live then the preparation of physical plans should be much easier. What urban and metropolitan planning is ultimately concerned about is the quality of life. Urban decay is much more than rundown housing and urban renewal is much more a social than a physical process.

What we are really concerned with in South Africa, are not only poor regions and rich regions but also with poor people, everywhere; both those living in the rich urban areas and those in the depressed Bantu homelands.

Again, if overseas experience means anything, then for poor people in prosperous metropolitan areas, investment in increasing their skills, productivity and incomes is a *sine qua non* if national

prosperity and security is to be assured. This it seems to many is South Africa's real metropolitan imperative.

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