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Johannesburg's sphere of influence

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2015-01-26
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activities in the magisterial district becomes non-basic. Included in "others" are agriculture, transport and services, all non-basic in that order of importance, as well as electricity and construction, both slightly basic and unemployed workers.

Johannesburg cannot be considered as an individual city, but must be seen as the focus of the metropolitan area of Johannesburg (as defined by Bureau of Census), as the focus of the Witwatersrand with its inner and outer metropolitan zones and as the major focus of the Southern Transvaal. It is, therefore, not only for comparative purposes that several of the tables include the other regions as well, but because "one cannot regard the position of Johannesburg and its place in the economy of the Republic as divorced from the rest of the Southern Transvaal any more than one can view the region without taking account of Johannesburg" (Fair 1965 p33).

TABLE 6 indicates Johannesburg's regional and national significance in 1960 using employment as criterion and compares Johannesburg with the Cape Peninsula, the next largest metropolitan region. The data will be analysed firstly, to show Johannesburg's economic character and secondly to show its importance to the other regions listed.

Johannesburg's economic structure conformed to that of the Southern Transvaal and South Africa in that manufacturing was more important than commerce when all gainfully employed workers were considered, but when only the Whites are taken into account the pattern of Johannesburg was reversed. This illustrates clearly the relative importance of the Non-White industrial workers and the White commercial workers. About 30% of the total South African workers were employed in commerce, manufacturing and mining as compared to the 45% in Johannesburg, thereby stressing the latter's importance in these three activities.

.../

TABLE 6: Johannesburg's Economy in its Regional and National Context, 1960

		Johannesburg			Witwatersrand			Southern Transvaal			South Africa		Cape Peninsula.		
		No.	%	%S.A	No.	%	%S.A	No.	%	%S.A	No.	%	No.	%	%S.A.
Commerce:	W	53,327	30.3	22.8	75,569	24.2	32.3	92,868	21.9	39.7	233,896	20.5	36,747	29.6	15.1
	T	100,159	18.6	21.8				171,094	12.0	37.4	457,950	8.1			
Manufacturing:	W	43,678	24.8	19.1	79,128	25.3	34.5	110,515	26.1	45.6	229,106	20.1	25,162	20.2	10.1
	T	109,360	20.3	16.1				282,194	19.9	41.6	679,113	11.9			
Mining:	W	5,507	3.2	8.8	29,485	9.4	47.4	29,737	7.0	47.8	62,171	5.5	190	0.2	0.3
	T	33,969	6.3	5.6				271,318	19.1	44.8	606,000	10.6			
Others:															
Agriculture	W	840	0.5	0.1	3,188	1.0	0.3	5,599	1.4	0.5	117,599	10.3	1,420	1.1	0.1
	T														
Construction	W	11,664	6.6	1.0	20,099	6.4	1.8	27,132	6.4	2.4	72,103	6.3	6,161	5.0	0.5
	T														
Electricity	W	2,155	1.2	0.2	3,260	1.1	0.3	4,405	1.0	0.4	10,405	0.9	1,095	0.9	0.1
	T														
Transport	W	12.573	7.2	1.1	28,708	9.2	2.5	38,667	9.1	3.4	121,731	10.7	14,543	11.7	1.3
	T														
Services	W	37,665	21.4	3.3	59,623	19.1	5.2	98,778	23.3	8.7	252,146	22.1	33,567	27.0	2.9
	T														
Unemployed	W	8,451	4.8	0.7	13,553	4.3	1.2	16,143	3.8	1.4	41,312	3.6	5,413	4.3	0.5
	T														
Totals	W	73,348	41.7	11.9	28,491	41.1	20.9	190,724	45.0	32.0	615,296	53.9	62,199	50.0	10.9
	T	295,407	54.8	7.5				695,999	49.0	17.6	3,952,997	69.4			
Grand Totals	T	175,860	100.0	15.4	312,673	100.0	27.4	423,844	100.0	37.2	1,140,469	100.0	124,298	100.0	10.9
	W	538,895	100.0	9.5		100.0		1,420,505	100.0	24.9	5,696,060	100.0		100.0	

W = Whites, T = Totals Source: Population Census 1960.

This value was less than the 51% of the Southern Transvaal because of the emphasis on commercial activities in Johannesburg.

Seen in their national and regional context, commerce and manufacturing in Johannesburg figured very prominently, since almost 22% of all commercial workers in South Africa and 58% of the commercial workers of the Southern Transvaal were employed in Johannesburg. The corresponding figures for manufacturing were 16% and 39%. These figures clearly indicate how indespensible Johannesburg is economically to South Africa. As for mining the values in Johannesburg were low because of the decline of gold mining here, but the importance of the Witwatersrand was obvious.

Johannesburg's superiority as the major urban centre in South Africa is indisputable when compared to the Cape Peninsula, since the former, in all cases, with the exception of White workers in transport, employed more people in the various economic activities, especially in commerce and manufacturing in 1960.

Considering total employment, about 10% of all South African workers and 38% of the Southern Transvaal's workers were engaged in occupations in Johannesburg, a truly remarkable position for one city to hold. It is probable that by 1980 between 45% and 49% of all gainfully employed Whites will be in the Southern Transvaal (Viljoen 1963 p50).

TABLE 7 indicates Johannesburg's role in its regional and national context in terms of gross geographical product. In all economic activities, with the exclusion of the two primary activities, namely mining and agriculture, forestry and fishing, Johannesburg's superiority in 1959-60, was obvious. The city's contribution, excluding the primary activities, was not less than 57% of the Witwatersrand totals. Although Johannesburg is not a centre for heavy industry it was nevertheless responsible for

.../one

one fifth of the country's manufacturing activity. "It thus appears that Johannesburg's position as an economic centre depends partly on the physical presence of industries, partly on the managerial and commercial relationship with industries in other parts of the country, but preponderantly in the Southern Transvaal (and in the case of mining industry also in the Northern Orange Free State)" (Van Waasdijk 1965 p46).

TABLE 7: Economic Activity in Johannesburg, the Witwatersrand and the Southern Transvaal (Van Waasdijk - 1965 p48).

Gross Geographical Product[+] - Percentages of National Total 1959-60.

Economic Activity	Johannes-burg.	Witwaters-rand[++]	Southern Transvaal	Republic S.A.
Financial Institutions	35.1	40.3	52.1	100.00
Trade	26.6	33.4	55.0	100.00
Private Services	21.0	30.0	38.8	100.00
Industries, Electricity, Gas and Water	20.1	34.3	49.6	100.00
Home Ownership	16.5	27.1	35.6	100.00
Transport and Construction	15.1	21.7	29.4	100.00
Government Services	11.9	18.8	35.1	100.00
Mining	2.8	36.7	37.9	100.00
Agriculture, Forestry and Fisheries	0.3	1.5	3.1	100.00
Geographical Product	15.6	27.4	36.6	100.00

[+] Based on magisterial districts; the figures include depreciation on assets.

[++] Including Oberholzer.

B. ECONOMIC FUNCTIONS:

The general economic and functional pattern has already been indicated and it is now necessary to examine the various activities more closely. Mining is discussed first, since this activity was responsible for the initial development of the area. Commercial and manufactured activities will then be analysed since both these activities have surpassed mining in "business" to the economy of Johannesburg, although not in the rest of the Witwatersrand.

/1. Mining...

1. Mining:

(a) Location: The Witwatersrand gold mining area stretches in an arc from Heidelberg through Springs and the towns further westwards to Randfontein and south-westwards to Carletonville, a distance of about eighty miles though the gold mining belt in South Africa extends further eastwards and southwards into the O.F.S. This "Golden Arc" may be divided into seven mining areas, namely Evander, the East Rand, The Central Rand, the West Rand and the Far West Rand, Klerksdorp and the O.F.S. as depicted in FIG. 2. Attention will be fixed primarily on the Central Rand, since it includes gold mining activities in the magisterial district of Johannesburg but also in the districts of Germiston and Roodepoort.

(b) Production: The Central Rand dominated gold production in South Africa till 1923, and was responsible for 55% of the total South African output since the industry's initiation up to 1936, and about 35% up to 1964. The highest production, 6.6 million fine ounces, was obtained in 1912 and since this date production has decreased steadily, despite the phenominal increases in the industry as a whole, to 1.3 million[1] in 1946. TABLE 8 indicates the tendency for the output to decline and the percentage the Central Rand produced of the South African total.

TABLE 8: Gold Production in the Central Rand (Chamber of Mines and Cole 1961 p 293).

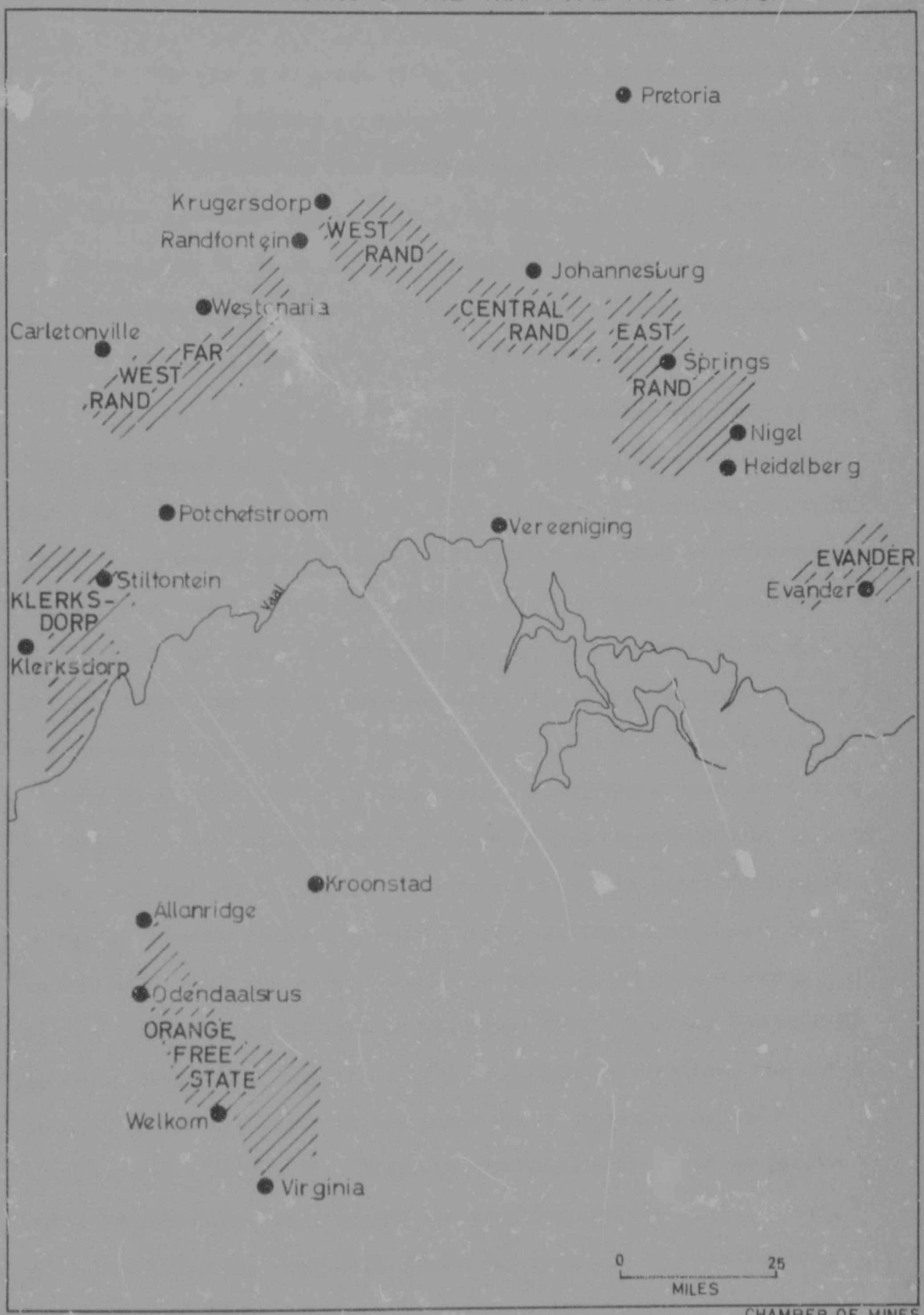
Period	Output ('000,000 fine ounces).	South African Total	% of South African Total.
1887-1896	28.0	9.2	87
1897-1906	25.2	26.5	95
1907-1916	50.5	79.5	64
1917-1926	44.1	85.9	51
1927-1936	42.1	105.4	40
1937-1946	43.9	123.6	36
1947-1956	33.3	151.5	22
1957-1964+	15.0	177.2	8

+ Members of the Transvaal and O.F.S. Chamber of Mines only.

..../Of

1. Output is only that of members of the Transvaal and O.F.S. Chamber of Mines.

FIG. 2 : GOLD MINING AREAS OF THE TRANSVAAL AND O.F.S.



Of the nine mines which are members of the Transvaal and Orange Free State Chamber of Mines on the Central Rand, three are located in the municipal area of Johannesburg. These three, City Deep, Crown Mines and Robinson Deep, produced about 45% of the output of the nine mines in 1964. Crown Mines has produced more gold than any other mine in South Africa, about 35 million fine ounces, but work is now limited to "cleaning up" operations.

The fate of a declining and disappearing gold mining industry is shared by the old Witwatersrand between Randfontein and Nigel in the foreseeable future, that is, total disappearance by 1981 (FIG. 3). Farquharson states: " 1) that if no other development takes place, the impact of declining mine production and employment on the Reef towns must be severe; 2) that the gravest blows will fall on those areas which have comparitively little secondary industry to cushion the impact" (Farquharson 1963 p63). As far as the Central Rand, that is the Johannesburg - Germiston - Roodepoort area is concerned, the disappearance of gold mining is not thought to will have any major effects as may be inferred from the above discussion on the employment structure, since this activity is no longer basic in the economy of the area, notably in the case of Johannesburg. However, this cannot be said of the other Reef towns and "if nothing is done, there is a likelihood of a long unhappy decline, the outer areas bleeding to death and the inner areas partially choking" (Farquharson 1963 p45). Although the Central Rand and in particular Johannesburg, will remain the economic and commercial focus, the outer areas may very well effect the focus as they decrease in economic importance.

Associated with gold mining is the extraction of uranium. Although an integral part of mining operations on the Witwatersrand no uranium is produced in the mines of the Central Rand.

.../(c) Employment

(c) Employment: It is not only production and value of gold which may be used as a yardstick to measure the importance of gold mining activities, but employment also provides a means of measurement. Unfortunately recent statistics dealing solely with the Central Rand or Johannesburg are not available but TABLE 9 does give some indication of the decline in the industry on the Witwatersrand. The tendency for gold mining as a whole for the period 1954-63 has been a change of -9.5% in the Transvaal and 14.3% in the O.F.S. for White employment and 7.5% and 21.0% respectively for Non-White employment in the two provinces.

TABLE 9: Declining Tendency of Employment in Gold Mining in the Witwatersrand Metropolitan Region, 1936 - 66 (Green 1957 p56)

Year	Employment in Service (Average for the Year)		
	Europeans	Non-Europeans	Total
1936	34,953	295,742	330,695
1946	38,267	273,310	311,577
1956	32,013	228,479	260,492
1966	24,000	101,000	125,000

1960 Statistics have it that there were 5,507 miners and quarrymen - Whites only - in the magisterial district of Johannesburg, that is 3.2% of the gainfully employed, which is about 18% of the Witwatersrand total employed in mining and quarrying. In 1951 the percentages were 3.09% and about 25% respectively. Johannesburg's importance has thus decreased by 7% for the nine year period.

(d) Labour Sources: Whites are employed on a permanent basis on the mines, thus a true source of labour is difficult to determine since the miners live permanently near the mines. Non-Whites, however, are employed for short spells only and are thus drawn from various parts of South Africa and its neighbouring territories. Unfortunately only statistics dealing with labour on all the gold mines are available and are not related to specific

.../areas

areas or individual mines. TABLE 10 gives the percentages of the total Non-White labour force as they are drawn from the various countries and areas, while FIG. 4 indicates the attraction, expressed as numbers of persons, exerted by the gold mining industry, with about 23% of the workers going to the O.F.S. and 77% to the Transvaal.

TABLE 10: Territorial Analysis of Non-White Labourers on Gold Mines, Members of the Transvaal and O.F.S. Chamber of Mines, as at 31st December, 1963 (Chamber).

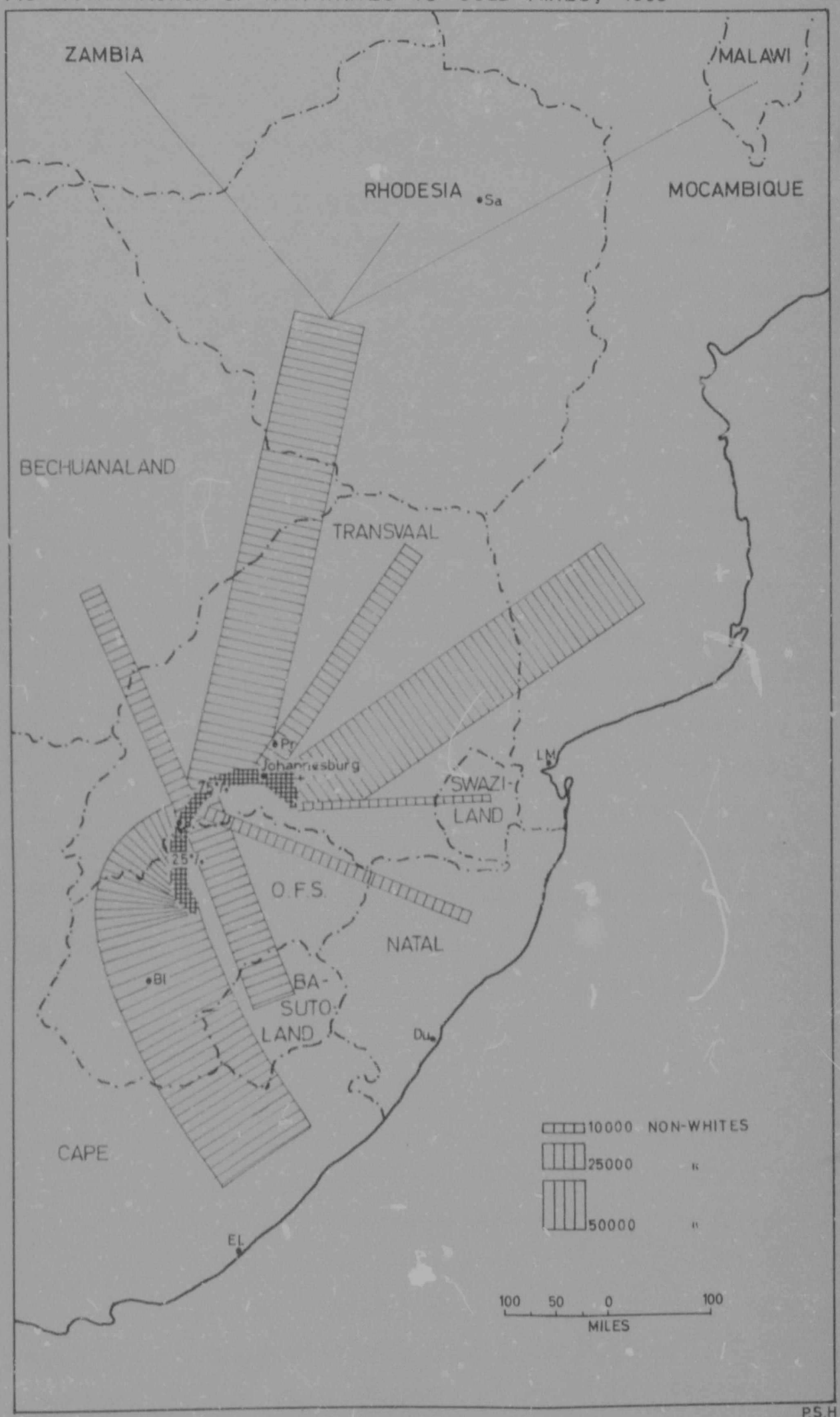
Territory		Percentage
South Africa:	Eastern Cape	29.3+
	Transvaal	6.2+
	Rest	3.5+
		39.0
Mocambique		20.7
High Commission Territories:	Basutoland	11.8+
	Bechuanaland	6.0+
	Swaziland	2.0+
		19.8
Tropicals		20.5
		100.0

+ Estimates based on information prior to 1963.

It is apparent from this table that the majority of non-White labourers in the South African gold mining industry comes from beyond the Republic's borders, thus stressing the important influence which this economic enterprise exerts not only nationally but on an international level as regards its position as a source of work.

.../Commerce

FIG. 4 : ATTRACTION OF NON-WHITES TO GOLD MINES, 1963



2. Commerce and Administration:

Commercial institutions are taken to include wholesale and retail institutions and financial institutions. Wholesale and retail activities are discussed at length in Chapter VI as city serving functions and will therefore not be elaborated on here.

The Witwatersrand accounts for more than a third of the Republic's mining activities when expressed in terms of national income. Despite the decline of gold mining in the Johannesburg area, the city houses several head offices of the mining finance institutions. This "assures it in indirect form the continued benefits of the gold mining industry not only on the Witwatersrand, but also in the Orange Free State, as well as much of the benefits of diamonds, coal and base metal mining throughout the Republic and South West Africa" (Van Waasdijk 1965 p47-8). Further, many banking, insurance and other financial institutions have their head-quarters in Johannesburg. This results in 35% of the Republic's income accruing to financial institutions and their employees being earned in Johannesburg. The importance of Johannesburg is obvious when compared to the Witwatersrand's 40% and the Southern Transvaal's 52% (Van Waasdijk 1965 p48). Of Johannesburg's gross product, trade and finance are responsible for 41%.

Administration will be discussed in Chapter VIII.

3. Industries:

It has already been indicated that gold mining is declining or will be declining in the relatively near future on the Witwatersrand and it is obvious therefore that the loss of secondary industries must be prevented and it is especially "basic industries, such as metals and engineering, clothing and textiles, and chemicals and paints (that) must be retained in the Witwatersrand area, having regard to the 'basicness' of these types of activities..... and that these three main industrial divisions ..... must remain very much

.../engaged

engaged in the regional export drive because of their high diffusion rate" (McGregor 1963 p18-9). It has also been indicated that in Johannesburg manufacturing is the most "basic" function and that gold mining is already "non-basic". Since industry is at present of such great importance to Johannesburg and the increasing importance which is attached to it with the future of the Witwatersrand in mind, it is necessary to investigate this activity more closely.

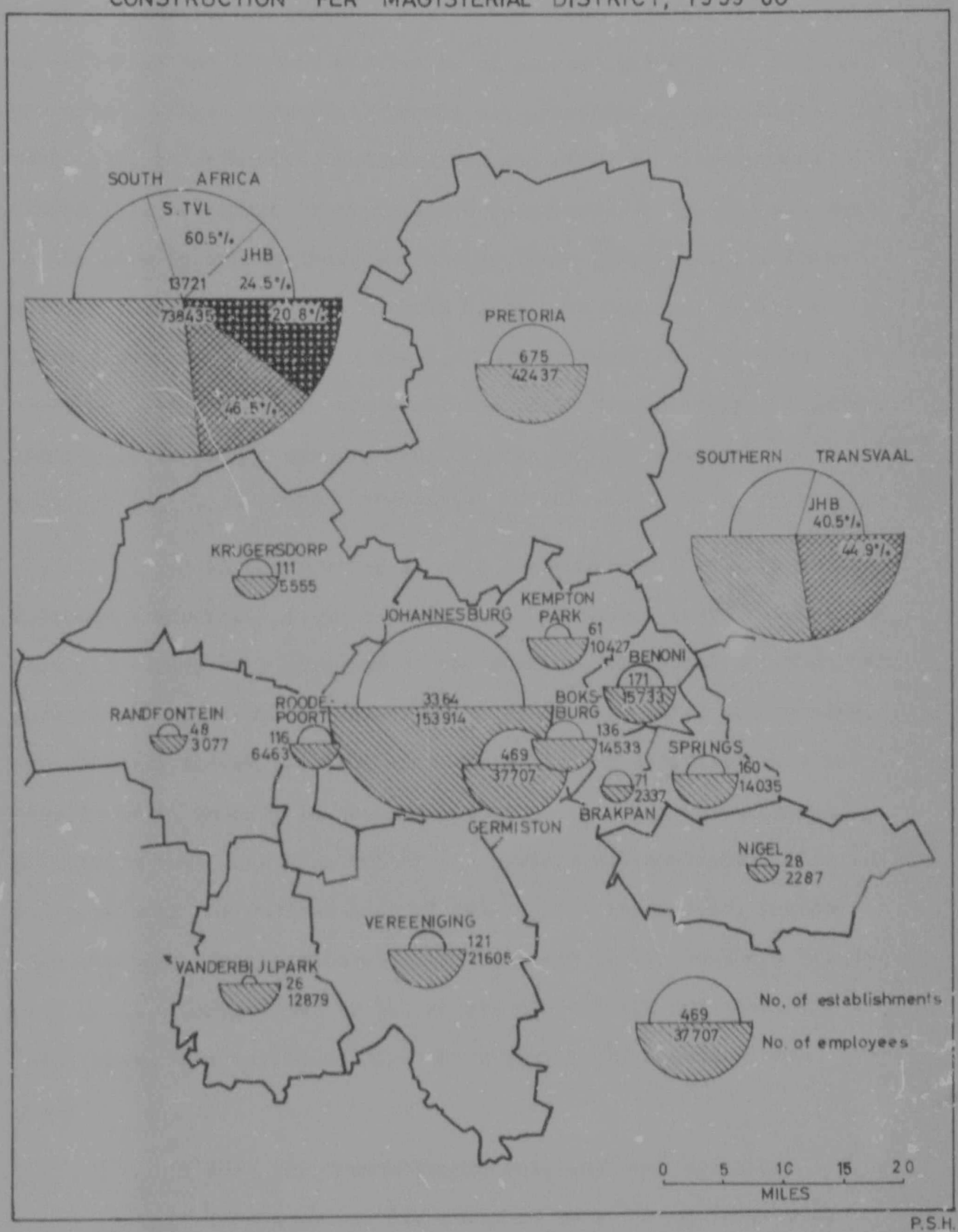
(a) National and Regional Importance: Gold mining was the initiator of industrial activity on the Witwatersrand, but the subsequent concentration of people led to greater numbers of industries being attracted to the Witwatersrand, in particular to Johannesburg as the metropolitan focus. The significance of Johannesburg in its national and regional setting is given in FIG. 5 in terms of the total number of establishments and employment in private manufacturing concerns for 1959-60.

Johannesburg's industrial importance is indicated by the fact that in 1959 about a quarter of the Republic's industrial (manufacturing and construction) establishments and a fifth of the industrially employed workers were concentrated in it. In relation to the Southern Transvaal Johannesburg accommodated about 61% and 45% of the industrial establishments and industrial employment respectively. The comparable figures for manufacturing were 67% and 42% respectively which indicated the importance of Johannesburg as the manufacturing focus of the Southern Transvaal and subsequently of the Republic. Construction in Johannesburg was relatively more important in comparison to manufacturing than in both the Southern Transvaal and South Africa.

The rate of increase of industry in the Southern Transvaal has been remarkable. In the period of 33 years from 1919-20 to 1952-53 the establishments have increased more than threefold while the total employment increased nearly sixfold

.../NRDC -

FIG. 5: SOUTHERN TRANSVAAL - DISTRIBUTION OF MANUFACTURING AND CONSTRUCTION PER MAGISTERIAL DISTRICT, 1959-60



(NRDC 1956 p16), of which Johannesburg accommodated the largest numbers of establishments and employees.

(b) Industrial Divisions: Johannesburg accommodates a large variety of industries. All twenty three industrial categories as listed in the 1959-60 statistics of private industries, are represented. Three industrial groups are prominent, namely metals and machinery, construction, and textiles and other wearing apparel (TABLE 11). Although their relative importances vary, the sequence is the same in Johannesburg and the Southern Transvaal. Of Johannesburg's total industrial worker 61.5% were employed in these three groups as compared to the Southern Transvaal's 62%. The number of establishments are 63.2% and 64.5% respectively. Values similar to these are also recorded in the NRDC's report on the Southern Transvaal (NRDC 1957 p17).

It is interesting to note Johannesburg's role in the Southern Transvaal. It is only in three instances that Johannesburg does not employ more than 50% of the Southern Transvaal's industrial workers in a particular industry, namely in the metal, non-metalic, and chemical industries, but when the number of establishments is considered it is only in the non-metalic and transport equipment industries that less than 50% of the workers are employed. This is indicative of the smaller size of some of the industries, though more abundant, in Johannesburg when compared to the Southern Transvaal as is clearly shown by the metal, non-metalic and chemical industries, that is, industries which frequently require large space.

In 1963 the Johannesburg municipal area contained 1,377 acres of developed and 804 acres of undeveloped industrial land (Johannesburg 1963).

The amount of space which an industry occupies may

.../also

TABLE 11 : Breakdown of Major Private Industry Groups, 1959-60 (Bureau of Statistics, 1965).

Industries	Southern Transvaal				Johannesburg					
	Establish-ments	%	Employ-ment	%	Establish-ments	%	% of S. Tvl.	Employ-ment	%	% of S.Tvl.
Basic Metals, Metal products, Machinery, Electrical Machinery, Apparatus, etc.	1,417	25.5	123,733	36.2	809	24.0	57.1	34,639	22.5	28.0
Textiles, Footwear, Other Wearing apparel, etc.	800	14.1	33,757	9.9	638	19.0	79.8	26,063	16.9	77.2
Non-Metalic Minerals	273	4.9	28,971	8.5	91	2.7	33.3	3,822	2.5	13.2
Food, Beverages, Tobacco	341	6.1	28,301	8.3	182	5.4	53.4	16,945	11.0	59.9
Chemicals, Chemical Products, Coal, Petroleum Products.	216	3.3	20,028	5.9	144	4.3	66.7	6,686	4.3	33.4
Wood and Cork Products, Furniture and Fixtures	437	7.9	17,985	5.3	279	8.3	63.8	10,635	6.7	59.1
Paper and Paper Products, Printing, Bookbinding, etc.	276	5.0	14,425	4.2	206	6.3	74.6	10,399	6.8	72.1
Transport Equipment	40	0.7	5,337	1.6	15	0.4	37.5	2,721	1.8	51.0
Leather, Leather Products and Rubber Products	53	1.0	3,131	0.9	42	1.3	79.2	1,850	1.2	59.1
Miscellaneous	337	6.1	8,265	2.3	277	8.2	82.2	6,415	4.2	77.6
Construction	1,366	24.6	57,622	16.9	681	20.2	49.9	34,009	22.1	59.0
Total	5,556	100.0	341,560	100.0	3,364	100.0	55.6	153,914	100.0	45.1

also be taken as a measure of that industry's importance. TABLE 12 once again points out the important role which machinery and metal industries occupy. Together their sizes amount to almost 30% of the total industrial acreage for industries occupying not less than fifteen acres. Taken in conjunction with TABLE 11, this table indicates that certain industries, although more important as regard their numbers of establishments and employment, do not occupy a correspondingly important position in acreage as is illustrated by the textile and chemical industries. The textile industry with its large number of establishments and employees requires a relatively small area, whereas with the chemical industry the situation is vice versa.

TABLE 12: Types of Industries occupying not less than Fifteen Acres in the Municipal Area of Johannesburg (Johannesburg 1963).

Type	Acres		Percentage.	
Machinery	206		17.9	
Metal	156	362	12.6	39.5
Food	95		7.8	
Chemicals	93		7.7	
Textiles	84		6.9	
Gas & Electricity	79		6.5	
Garage Cars	73	542	6.0	44.6
Others+		311		25.6
		1,215		100.0

+ Includes Drink, Electrical, Concrete, Furniture, Printers, Rubber, Paper, Building and Forging.

(c) Location of Industries: The general trend for industrial location on the Witwatersrand is also followed in Johannesburg, that is, industries favour a location which is readily accessible to the railway (FIG. 6). Since the railway line was initially constructed to serve gold mining, the line runs east to west and consequently industrial establishments are located in a linear pattern running east to west. Cole (1961) mentions that in the Central Rand industries were established after

.../residential

FIG. 6 : JOHANNESBURG - INDUSTRIAL DEVELOPMENT



residential development had taken place so that industries were confined to the narrow valley zone. Industrial development was unplanned. In contrast modern industrial development is planned and industries are frequently being established on abandoned mining territory.

As has been indicated above, a great variety of industries is situated in Johannesburg, each industrial type preferring certain localities above others.

Dickinson states, "Two fundemental processes seem to affect the spatial arrangement of industrial enterprises with respect to the urban focus. First, the stronger the interlinkage of a concern, the stronger does it seek for a place in an urban system; .... Second, industries that are concerned with the production of consumer goods tend to locate in accordance with the distribution of population" (Dickinson 1964 p249).

In Johannesburg heavy engineering locates in new sites along the railway line because of the need for good rail facilities, whereas light engineering remains in the original locations since the need for rail facilities is less. Textile and clothing industries are close to the core of the city because of nearness to the market and the availability of bus services for the workers.[1]

Industrial location near the labour source is indicated by the industrial areas fringing on Alexandra, a Bantu Township north of the Johannesburg Municipal Area.

Several industrial concerns formerly situated within Johannesburg have moved to new industrial townships elsewhere on the Witwatersrand where land values are less, more spacious and planning has proved to be more successful. Such townships are Isando and Wadeville, the former being intended more for light

.../industries

1. See Cole (1961 p627) for the distribution of industrial types in Johannesburg.

industries and the latter for heavy industries.

(d) Johannesburg's Industrial Sphere of Influence:

Industry as a criterion does not lend itself readily to the delimitation of a sphere of influence, especially since data pertaining to the distribution of industrial goods are not available. One may, however, safely conclude that since the Southern Transvaal, with greater emphasis on the Witwatersrand, contains the greatest concentration of people, of industry, commerce and of mining in South Africa it is the chief market for Johannesburg's industrial goods. Heavy industry is still mostly centred on mining (Cole 1961 p628). The textile industry caters primarily for the local population. Very few industries can, however, be regarded as local or regional only, but the whole of the Republic must be included in their spheres of influence, since industrialists will sell their goods to wherever a demand exists.

Industry does not only distribute goods, whether on a local, regional, national or even international level, but draws its raw and unmanufactured products from far afield and from nearby areas. Metal and machinery industries rely mainly on iron and steel which come from Pretoria and Vanderbijlpark. Industries, however, make use of a wide range of other products, both processed and raw. These products are obtained nationally and internationally. Examples of the latter are textiles, paper and leather. It is thus impossible to indicate in general where Johannesburg's industries obtain their materials for manufacturing, unless each industry is taken separately and analysed in detail.

Industries require power and water. These will be dealt with in Chapter VII.

The labour supply is obviously of great importance to an industry and this is one of the main reasons for the concentra-

.../tion

tion of industries on the Witwatersrand since it is here where the largest concentration of people are found in the Republic. In ChapterIX the movement of people is discussed. The limits of this movement also indicate the limits of Johannesburg's labour supply.

C. CONCLUSION.

After the discovery of gold on the Rand, Johannesburg obtained supremacy in the field of gold mining. With time the production has decreased so that gold mining is believed to disappear from the area within the next decade or two. Industrial development was initiated by the needs of the mines, and today secondary industry is varied and has surpassed mining in importance. It has been indicated that as an industrial centre Johannesburg has again achieved supremacy in the country and although some decentralisation of industries is taking place the city will remain unsurpassed in the industrial field. The industrial establishments draw their requirements from local to international sources and distribute the processed and manufactured goods throughout the country and beyond the Republic's borders. In so doing Johannesburg has built up a large sphere of influence of varying intensity - the Witwatersrand being the core market. Johannesburg has undoubtedly indicated its ability to be the major industrial focus of the Southern Transvaal and in fact of the whole of South Africa and its ability to remain in this dominant position.

CHAPTER V.

CITY SERVING FUNCTIONS.

A. INTRODUCTION.

"The city is the focal point of regional activity, with the hinterland carrying on functions necessary to the metropolitan community as a whole" (Dickinson 1961 p8). It is the activities carried on in the sphere of influence which centre on the urban focus thereby sustaining, directly or indirectly urban occupance. Town and surrounding region "are mutually interdependent, and never more so than today" (Smailes 1947 p151). This interrelationship extends beyond the political or administrative boundary of the city. The town has extended its range of services greatly because of present-day communication and has made urban life and activity readily accessible to the surrounding inhabitants. "Furthermore, there has been a great increase in the number of centralised services which by their nature find their locus in towns. It is the very essence of a town that it should be the seat of such centralised services. Thus the increasing range of urban services and the increasing directness of relations between towns and surrounding territory have contributed to the territorial compactness of our economic and social life" (Smailes 1947 p151).

To delimit the sphere of influence the criteria used must fulfil two conditions: (i) they must be so chosen as to reflect the functions of the centre, and (ii) they should "provide concrete and tangible data that are capable of being mapped" (Smailes 1947 p153). The criteria chosen must be indicative of the influence of the focus on its surroundings. Because it is man that establishes the focus, we must realise that it is the population that is the major influence factor, and that the other factors exerting influence are man-made. It is, therefore, as a result of

.../these

these influences that we find present day areal organisation.

The sphere of influence is a "....multiple nodal region of which the city is the focus" (Mayer 1954 p148) since each separate criterion establishes a single-feature region. It may happen that two or more boundaries coincide exactly or approximately, although this is seldom the case, thereby indicating the broad nature of the outer boundary of the sphere of influence.

Where possible, the single-feature boundaries will be derived by quantitative methods, and it will be endeavoured to indicate the two-way relationship between the focus and its surroundings.

B. CRITERIA.

TABLES 4, 5, 6 and 7, dealing with the economic structure of Johannesburg, indicate the functions of Johannesburg. In the light of the two conditions which criteria should fulfil if they are to be employed in the delimitation of a sphere of influence it is considered that the following are suitable:

1. City serving functions: Telephone calls, Newspapers, Wholesale and Retail (discussed in this chapter);
2. City supply area: Milk, Meat, Vegetables and Fruit (discussed in Chapter VI);
3. Administrative functions (discussed in Chapter VII);
4. Traffic (discussed in Chapter VIII);
5. Mining (discussed in Chapter IV, but not a typical urban function);
6. Secondary Industry (discussed in Chapter IV, but insufficient data).

It is apparent from the various studies carried out that these criteria are by no means exhaustive and have been selected because data were obtainable.

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C. CITY SERVING FUNCTIONS.

1. Newspapers.

It has become apparent from various studies (Fair 1949, H. Green 1955, Philbrick - 1957, Green and Fair - 1962) that have been carried out in different countries and regions, that newspaper circulation is of great value in delimiting the final sphere of influence of an urban centre. In several of these studies attention was paid only to the circulation areas of newspapers which have a local influence and which appear once weekly. Such newspapers, being important advertising agents, bind together the economic and social structure of the area which they serve, into a unit.

(a) Daily Newspapers: With daily newspapers, including morning and evening editions, the circulation areas increase in size, since such newspapers are only found, especially in South Africa, in the larger cities and metropolitan regions. Here they "reflect as satisfactorily as can any single index the extreme effective range of a city's regional influence as a community focus" (Smailes 1958 p139). By far the greater portion of the copies are sold in and around the city or metropolitan region, although the circulation area does stretch, often for many miles, beyond the core of circulation. This outer boundary indicates "in many ways a limit to the penetration of political and cultural ideas, interests and influences originating in the central town or city" and "a limit to its commercial sphere of influence" (Green and Fair 1962 p96).

In determining the circulation areas of newspapers, the problem arises as to what method is to be used to indicate the limit of the circulation area. H.L. Green (1955) in his study on the hinterland boundaries of New York City and Boston takes the 50% boundary line as the line of division. Such a method requires detailed statistics which are not available in South Africa.

.../Green

Green and Fair (1962) have determined the newspaper circulation areas for South Africa and indicate the areas of overlap but do not indicate the basis for the determination of the boundary lines but mention the existence of inner areas of distribution where at least 70% of the newspapers are sold and outer areas accounting for the remaining sales. The Johannesburg newspaper circulation area includes the whole of the Transvaal and the Northern Orange Free State. Another method takes the news and advertisements into account (L. Green - 1959).

By merely using a quantitative measure the interrelationship between distributing centre and circulation area is disregarded. A situation may arise where a specific area, although a very important sales area - in terms of the number of newspaper sales - for newspapers from one urban centre, has a ratio of sales per population which is surpassed by an area where the number of newspapers sold is much less. It would appear, therefore, that population should be considered in conjunction with the quantity of sales in the delimitation of the circulation area.

In South Africa the problem of delimitation is difficult, possibly more so than elsewhere, firstly because of the multiracial population - vast sectors of the population do not obtain newspapers, secondly, by the large rural areas which lie far from distributing centres and, thirdly, by the sparseness of population in many districts. A fourth problem is that statistics are not readily available, but where they are, they are only applicable to areas which include several magisterial districts known as Breakdown Circulation Areas.[1]

To delimit the boundary, and keeping the above factors in mind, the required relationships were expressed as follows:

.../ $\frac{m}{S}$, and $\frac{P}{S}$,

---

1. For Areas see the Breakdown Circulation Map of the Newspaper Press Union of South Africa (1:3,000,000).

$\frac{T}{S}$, and $\frac{P}{S}$, T is the sum of all the daily morning and evening newspaper sales from the distributing centre i.e. Johannesburg, P is the total urban population, White and Non-White, in the Breakdown Circulation Area for which the relationship is required, and S is the daily sales in that Breakdown Circulation Area.

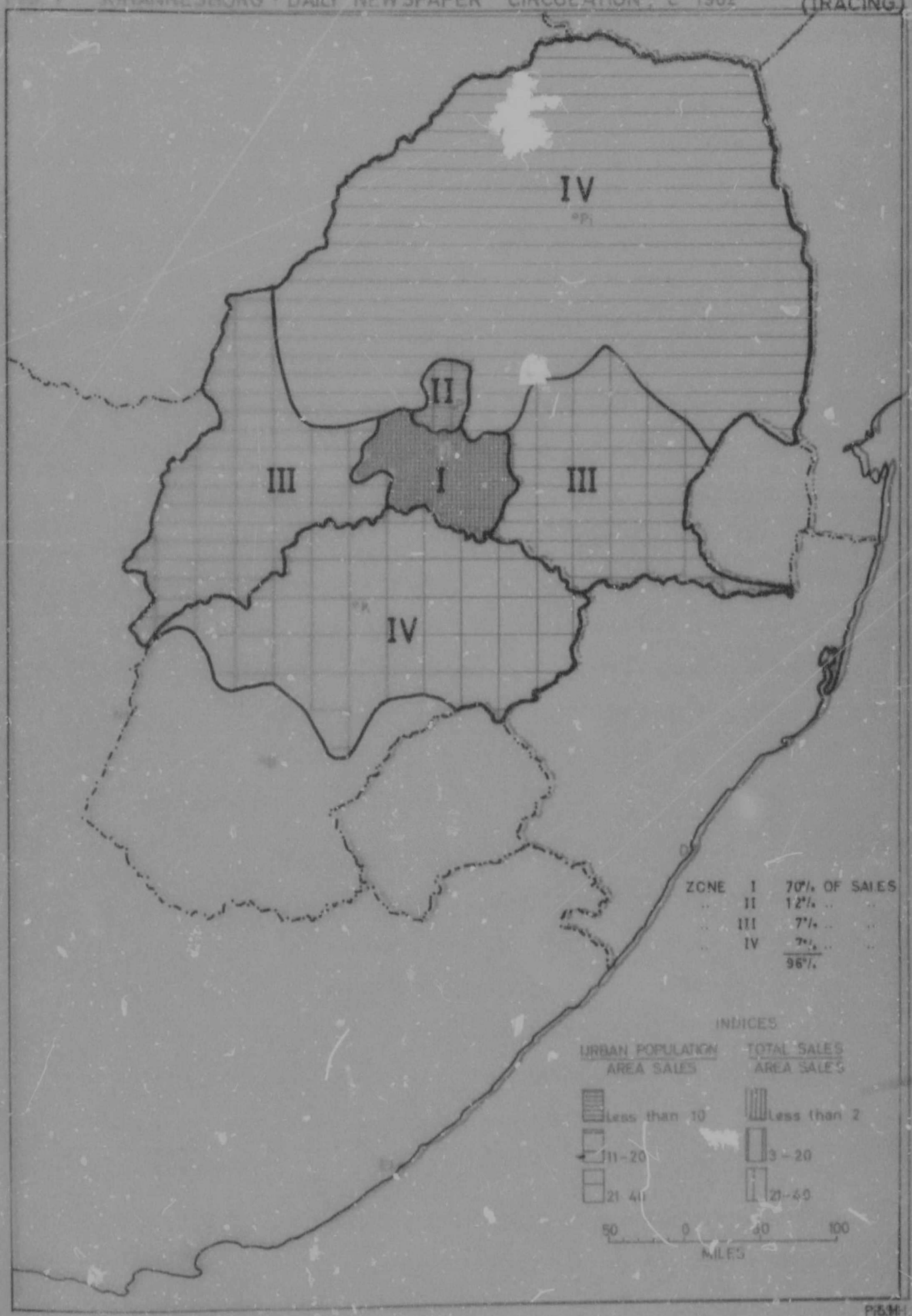
The lower the value, that is, the nearer unity the stronger is the relationship.

It need be indicated that the total urban population was selected only after the White urban population and the total population, urban and rural were tested as values for P. Both, however, gave unsatisfactory results. The former gave values which were too small, so that the Johannesburg's newspaper circulation area covered too great an area, thereby indicating strong ties which obviously did not exist. The opposite was true if the total population was taken for P. Satisfactory results were obtained only when P was taken to indicate the urban population, thus seemingly solving some of the difficulties mentioned above.

The values for $\frac{P}{S}$ and $\frac{T}{S}$ could each be grouped with ease into three categories. The groups for $\frac{P}{S}$ consisted of values less than 10, less than 20, and less than 40, while for $\frac{T}{S}$ the first category included values less than 2 (Witwatersrand only), the remaining categories being the same as for the population - sales relationship. The categories were mapped, resulting in the pattern depicted in FIG. 7. The resulting six combinations were again grouped to form four zones of daily newspaper circulation (Tracing)(FIG. 7). Zone I, comprising the Witwatersrand Breakdown Circulation Area was responsible for 70% of the daily sales or more than 250,000 copies. Zone II is the Pretoria magisterial district with 12% of the sales (44,000 copies). The Eastern and Western Transvaal combined formed Zone III and was responsible

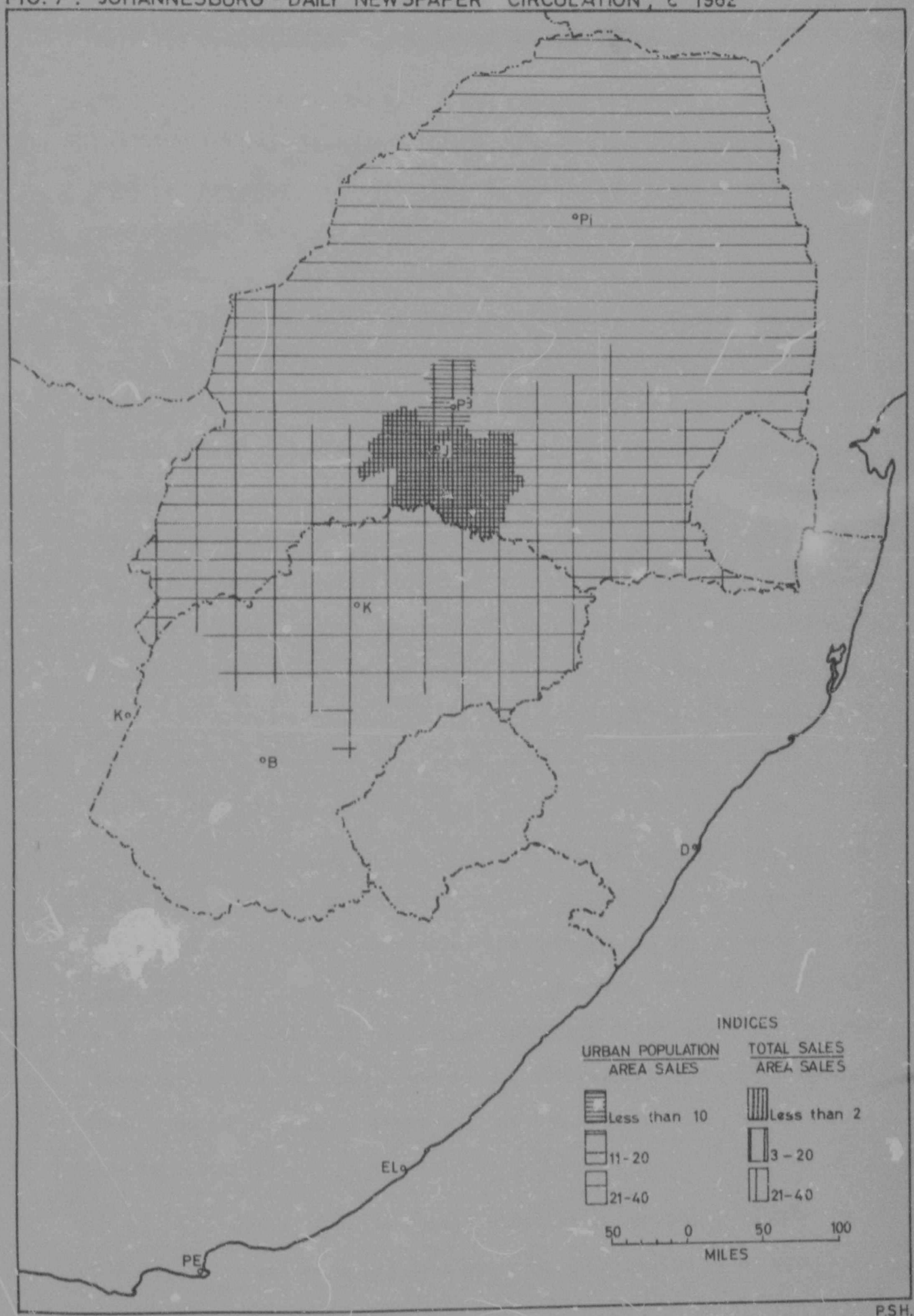
.../for

FIG. 7 JOHANNESBURG - DAILY NEWSPAPER CIRCULATION, c 1962 (TRACING)



P&M

FIG. 7 : JOHANNESBURG - DAILY NEWSPAPER CIRCULATION, c 1962



for 7% of the sales, a percentage equal to that of Region IV, the Northern Transvaal and the Northern Orange Free State.

Although the method followed was not that of the more familiar 50% sales boundary, the effects of other distributing centres were clear. To the south is Bloemfontein and to the south-east Durban. From the outer boundary the increasing importance of Johannesburg as a daily newspaper distributing centre became evident, illustrating well the focal significance of Johannesburg.

It is interesting to note the relationship of morning papers (The Rand Daily Mail and Die Transvaler) and evening newspapers (The Star and Die Vaderland). In the majority of areas the evening newspapers were more important than the morning newspapers, the latter being responsible for 41% of the total daily sales. It was also found that more copies of Afrikaans morning newspapers were sold to the east, north and west of the circulation core, but that within the latter and to the south of it English morning newspapers were sold in greater numbers. Further, Afrikaans evening newspaper sales were in excess of their English counterpart only in the Western Transvaal.

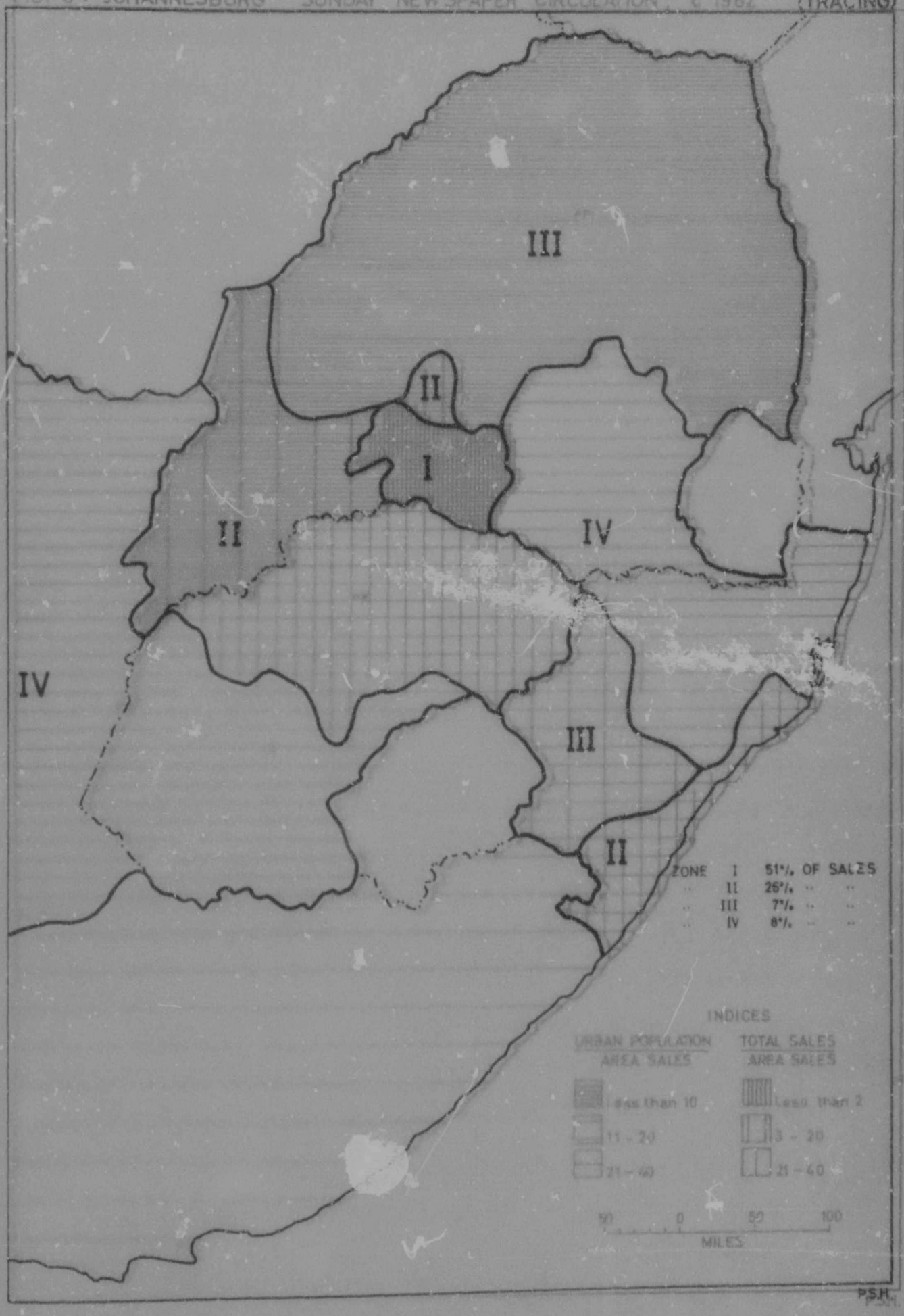
(b) Sunday Newspapers: The Sunday newspaper circulation areas (FIG. 8) were delimited by using the same method as for the daily newspaper circulation area, the former were far greater in extent because of the absence of Sunday newspapers from other centres - with the exception of one Durban newspaper which has a far smaller circulation figure. The Johannesburg newspapers, therefore, assumed the roles of national newspapers, but the Cape Province is relatively unimportant.[1]

Out of a total Sunday circulation exceeding 76,000 51% of the newspaper sales took place in the Witwatersrand Circula-

.../tion

1. A Sunday newspaper distributed from Cape Town has appeared only very recently (Oct. 1965).

FIG. 8 : JOHANNESBURG - SUNDAY NEWSPAPER CIRCULATION, c 1962 (TRACING)



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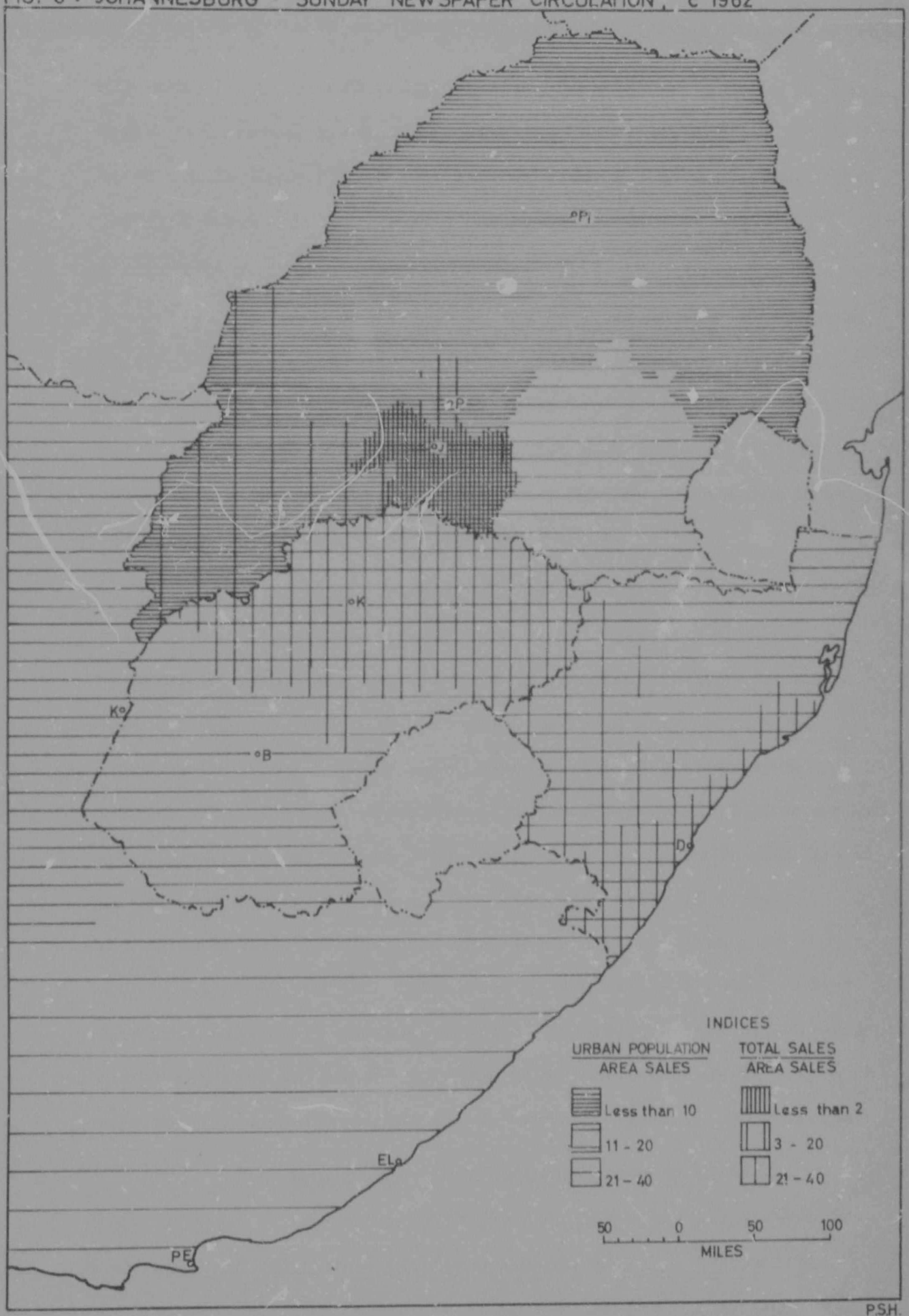

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Name of thesis Johannesburg's sphere of influence. 1966

PUBLISHER:
University of the Witwatersrand, Johannesburg
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