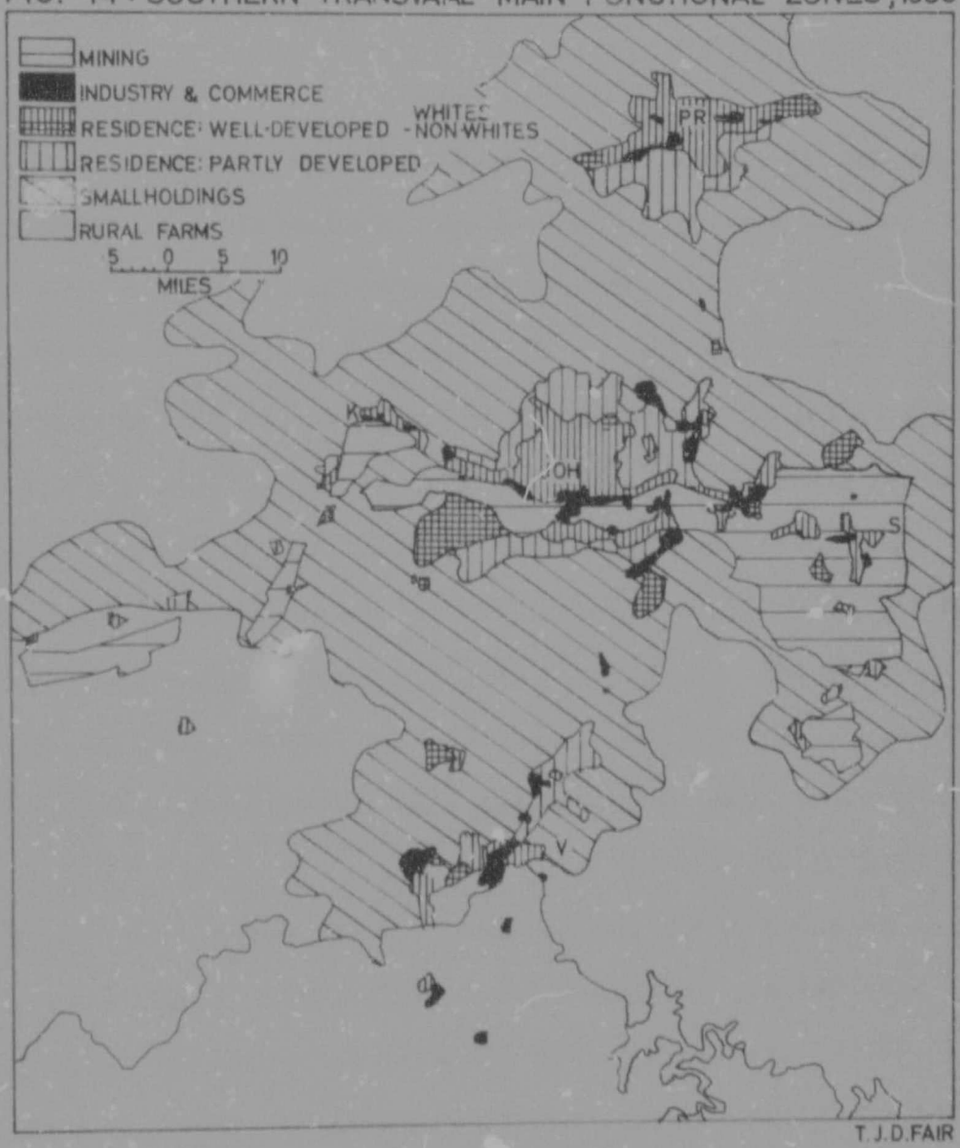
FIG. 14 : SOUTHERN TRANSVAAL - MAIN FUNCTIONAL ZONES, 1958



to relate the findings to the theoretical distribution of land uses as outlined by Olof Jonasson (1925).

In the Southern Transvaal five distinct zones are identifiable within the land-use structure of the region (FIG. 14). Of these only the semi-rural zone of small holdings will be discussed as well as the true rural zone lying beyond it.

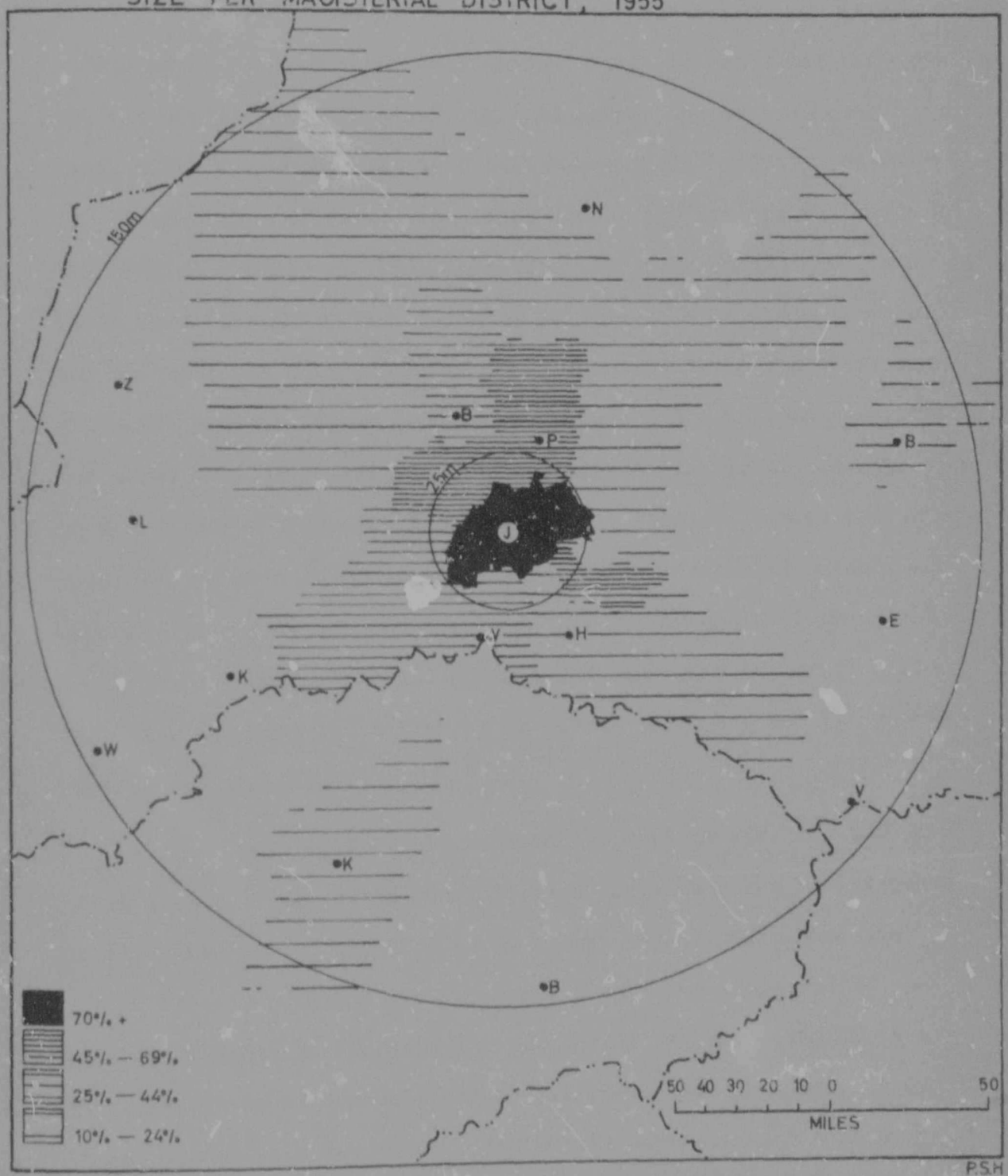
1. FARM SIZE:

On the fringes of most large cities a type of land-use evolves which is a "transition between well-organised urban land uses and the area devoted to agriculture"(Wehrwein 1942 p217). This urban -rural fringe is a zone of intensive agriculture with market gardening, horticulture and dairying being of prime importance. The tendency in South Africa is, however, for this zone of small holdings[1] (i.e. small farms and agricultural holdings) to become a zone of "mainly large residential plots[2] with food production for the market no more than a minor side-line" (NRDC 1957 p44). The income of the occupants is mainly earned in the nearest urban centre. Although the above situation normally prevails one does find that in certain agricultural fields these small holdings make vital contributions to the city, especially as regards milk production, as in the case of the Witwatersrand and in particular of Johannesburg. In 1955 the Transvaal had the largest number of small holdings, namely 57,721, of which 48% were found on the Witwatersrand, including 11% on the Central Rand (NRDC 1957). This concentration of small holdings surrounding the main urban area of the Witwatersrand, represents one of the important impacts which the Witwatersrand, including Johannesburg, has on the rural surroundings. In FIG. 15 the percentage of White owned farms with sizes less than 20 morgen, that is small holdings, within a radius of 150 miles from Johannesburg

.../are

1. Sizes vary mainly between 2½ and 20 morgen.
2. The population density is generally less than 40 persons per square mile.

FIG. 15: WHITE OWNED FARMS — PERCENTAGE LESS THAN 20 MORGEN IN SIZE PER MAGISTERIAL DISTRICT, 1955



are shown (Bureau 1958). The tendency for farm sizes and their frequency of occurrence to increase with distance from Johannesburg, as the focus of the urban complex, is obvious. The largest concentration of small holdings occurs close to Johannesburg i.e. within a radius of 25 miles but the same concentration is not found throughout the Witwatersrand. Adjoining this inner zone to the north-west, north and south-east is a belt where small holdings account for between 45% and 69% of the total number of farms in the various magisterial districts. This zone lies within a radius of 40 to 60 miles from Johannesburg. Fringing on this zone in the north-west and on the inner zone in the south-west and south lies a third zone where the small holdings account for 25% to 45%. Whereas the first two zones owe their existence to proximity to the urban concentration on the Witwatersrand, the influence of the Rand is less in the third zone, for examole in Brits where large scale irrigation schemes are found. Irrigation schemes are conducive to intensive farming and small farms. Between Johannesburg and Vereeniging the small holdings are, however, indicative of the urban influence and lie within 50 miles of the focus.

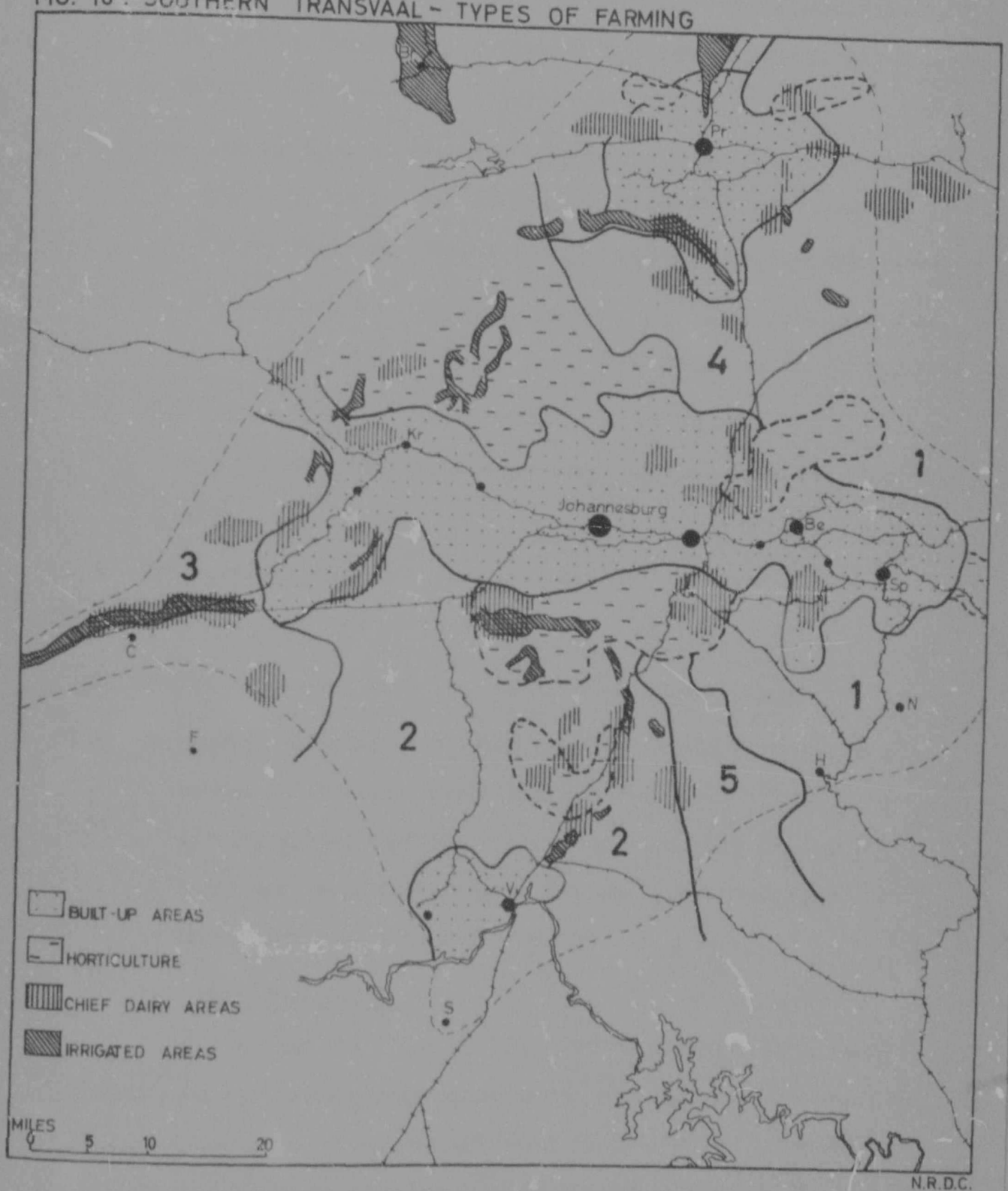
In the light of the pattern depicted in FIG. 15, the conclusion is that the urban concentration definitely has an influence on farm size within a radius of 50 miles beyond which zone the effect is less noticeable. The smaller size and frequence of occurence of small holdings is further partly an indication of an intensification of agricultural activities. This intensification is not necessarily due to more favourable environmental conditions, but may be ascribed to the presence of a large urban concentration such as the Witwatersrand.

2. THE LANDUSE PATTERN.

As has been stated the urban complex of the Witwatersrand provides an economic stimulus to agricultural activities in its rural

.../surroundings,

FIG. 16 : SOUTHERN TRANSVAAL - TYPES OF FARMING



surroundings, but soil types are also important. The resultant pattern is "a basic natural farming pattern over-lain by a secondary intensive pattern of horticulture, dairying and market gardening" (NRDC 1957 p56). The Natural Resources Development Council recognises several farming zones (FIG. 16):

1. The Eastern Zone is the most important farming region in the Southern Transvaal. Potatoes and beans are secondary to maize, while dairying and cattle rearing are also practised.
2. In the Southern Zone maize is the most important crop and other significant activities are dairying, cattle and sheep rearing.
3. The Western Zone is also an area of mixed farming, where stock rearing and dairying are important, but maize is less significant.
4. The Northern Zone is a poor agricultural area where mixed farming is carried on in different degrees.
5. The South-Eastern Zone is a zone of low productivity.
6. Horticultural Zones, including the cultivation of fruit, vegetables and flowers, occur mainly north-west of Johannesburg as well as south of the city. Such zones are dependent on sufficient supplies of water and are therefore located in the Jukskei and Klip River valleys.

3. MILK PRODUCTION.

Although the types of agricultural pursuits in a particular area are largely determined by the physical environment, the dairying industry is one pursuit which is located to a certain extent by the presence of a large urban concentration. FIGS. 17 A and B illustrating the percentage of cows milked and the percentage of milk sold as fresh milk respectively, portray the important role of the Southern Transvaal in the field of dairying.

.../FIG. 17

FIG. 17 : FRESH MILK PRODUCTION, 1955

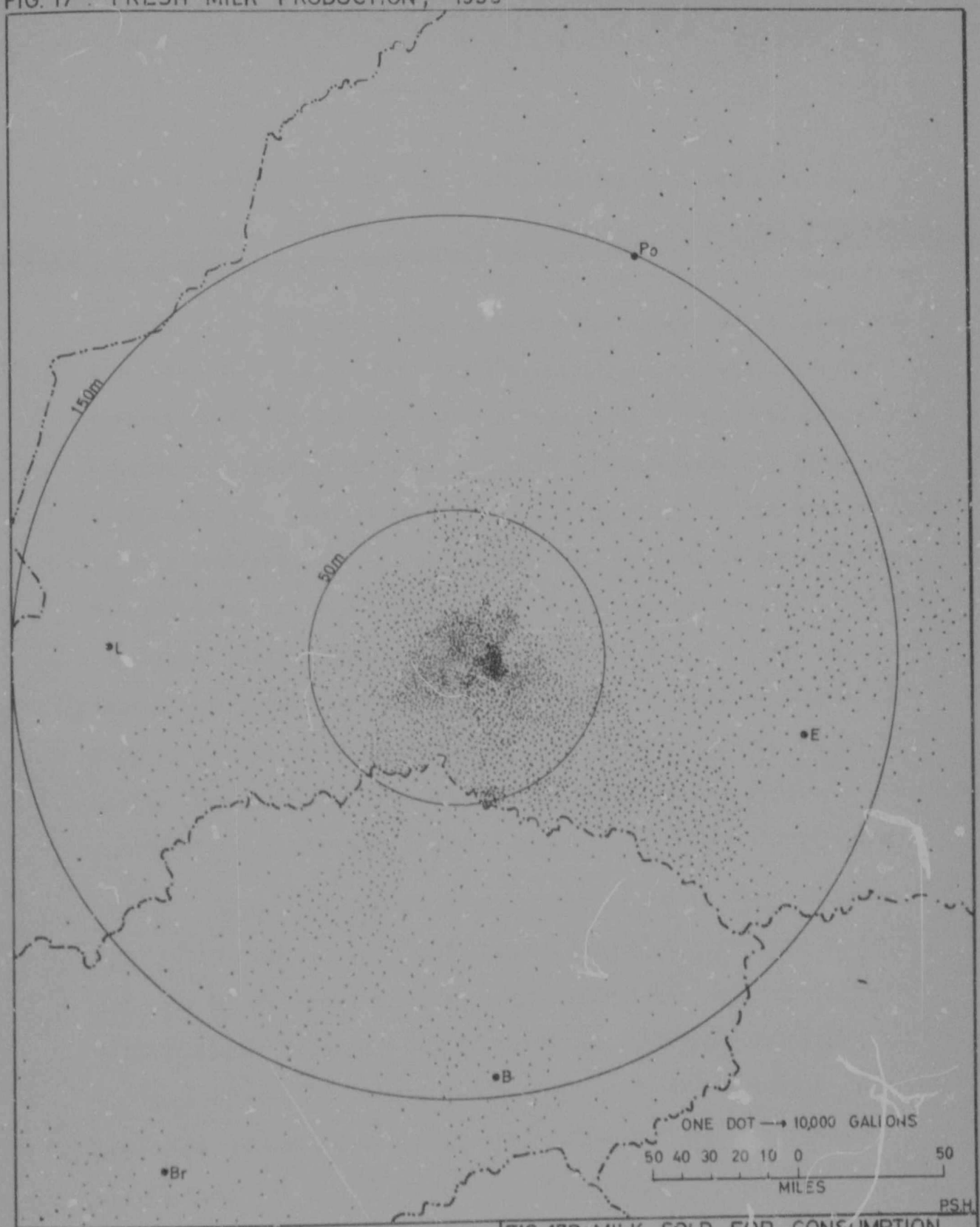


FIG. 17A: COWS MILKED, 1945/6

PERCENTAGE OF ALL EUROPEAN-OWNED CATTLE

40%-50%

20%-40%

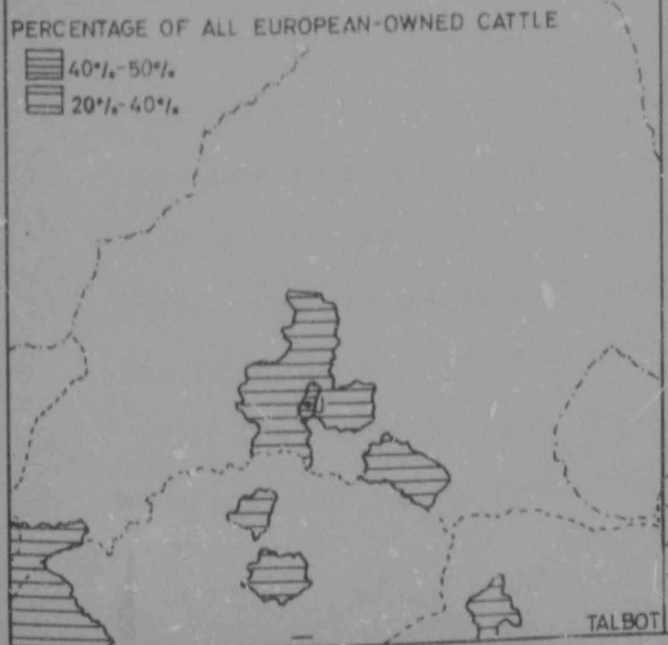


FIG. 17B: MILK SOLD FOR CONSUMPTION AS FRESH MILK, 1945/6

PERCENTAGE OF TOTAL MILK PRODUCTION

90%-100%

80%-90%

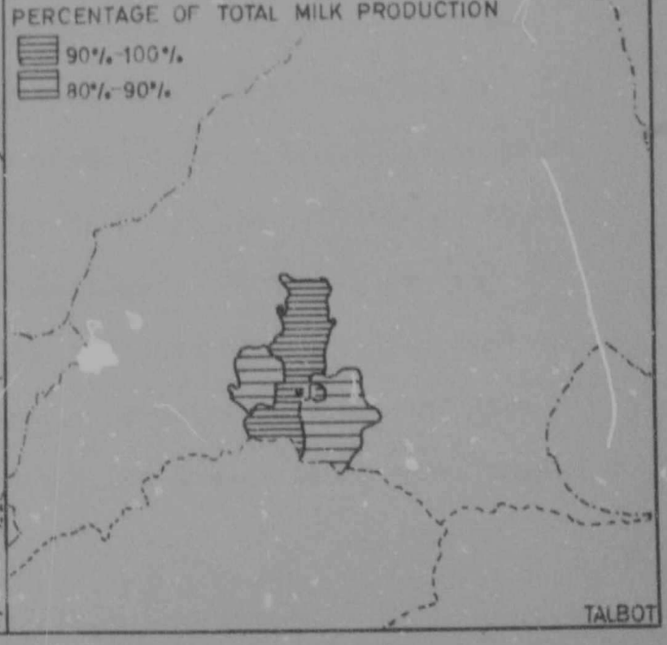


FIG. 17 shows the fresh milk production for 1955 within a radius of 150 miles from Johannesburg. Milk production has already been dealt with with reference to Johannesburg, but where the total production of fresh milk for consumption in the various magisterial districts are depicted. Despite this the concentration, especially in the Central Rand, and the importance of this area is unquestionable. The intensity of production decreases with distance from the focus although not at a regular rate as is clearly seen from the continuation of high production to the south-east. Since speed is essential in the marketing of fresh milk, one finds that as the distance increases especially where transport routes are not of the best, the environmental factor becomes more prevelant in the location of dairying. This is clearly indicated by the relative low production in the north. This area, is however, of more importance to Pretoria. In the O.F.S. only the more suitable areas are utilized for dairying.

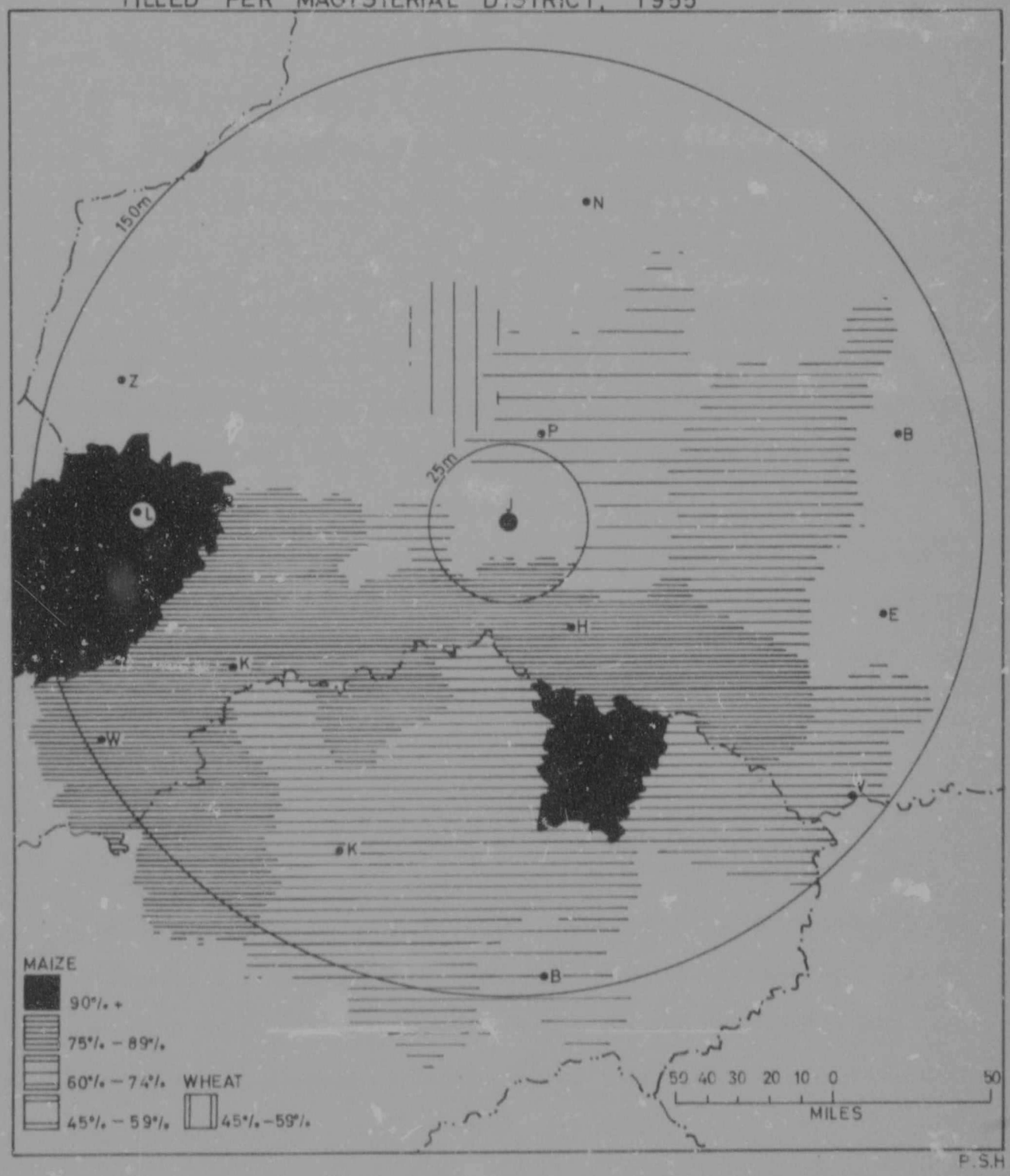
Comparing the map of the distribution of small holdings (FIG 15) to that of milk production a coincidence is found to exist, not only in the areas close to Johannesburg, but also beyond the 50 miles radius. This is proof of the intensification of dairying in the zone of small holdings, and is indicative of the impact which the urban concentration has on the landuse pattern of the area surrounding it.

4. MAIZE.

In FIG. 18 the area sown to maize (and wheat) is mapped in terms of the percentage of tilled land which it occupied in 1955. This aspect was mapped because it immediately indicated the importance of maize as a crop in relation to other crops, although these other crops are not specifically mentioned. Those magisterial districts where maize occupies 75% and more of the tilled land is really the northern rim of the so-called maize triangle and lies west and south of the Witwatersrand. The lowest percentages mapped

.../lie

FIG. 18: MAIZE AND WHEAT—AREA SOWN AS PERCENTAGE OF TOTAL AREA TILLED PER MAGISTERIAL DISTRICT, 1955



lie north-eastwards of the Rand. With the exclusion of the western and eastern extremities the Rand is an area where other crops are responsible for more than half of the tilled land. In Johannesburg for example, maize occupies only 23% of the tilled land. The highest milk production occurs within this area where maize occupies less land than the total occupation of other crops, though it is still the most important single crop. Beyond this inner zone with about a 20 mile radius, maize and milk production are found in combination.

Since maize is a product which is not dependent on rapid transport for reaching the market, it would primarily be found in areas which fulfil the necessary physical requirements of the plant. However, in areas which are suitable for production of maize but which lie close to a large urban centre, the crop is ousted by agricultural activities which do require locations near to the centre and which are more remunerative. Further, small holdings because of their limited size are not suitable for maize cultivation under South African conditions where the yields are small in comparison to yields in other countries.

5. WHEAT.

Although wheat is cultivated on a large scale in this part of the country, that is within about 150 miles from Johannesburg, it is only in the Brits area (FIG. 18) where it features more prominent than maize, thereby almost closing the gap which maize has left to the north-west of Johannesburg, thus making the Witwatersrand surrounded by a zone of crop cultivation.

6. THEORETICAL PATTERN OF LAND-USE (JONASSON).

Olof Jonasson (1925) summarized the theoretical pattern of land-use trends around the great European cities. His zones of land-use are given below (Dickinson 1964):

.../Horticulture:

Horticulture:

Zone 1: City, plus greenhouses and floriculture.

Zone 2: Truck products, fruits, potatoes and tobacco.

Intensive Agriculture with Intensive Dairying:

Zone 3: Dairy products, beef cattle, sheep for mutton, veal, forage, crops, oats, flax.

Zone 4: General farming - grain, hay, livestock.

Extensive Agriculture:

Zone 5: Bread cereals and flax for oil.

Extensive Pasture:

Zone 6: Cattle (beef and range), horses (range), sheep (range), salt, smoked, refrigerated and canned meats, bones, tallow and hides.

Forest Culture:

Zone 7: Outermost peripheral areas. Forests.

From the investigation of the supply areas and the land-use around the Witwatersrand the existing pattern of land-use agrees closely with that outlined by Jonasson. The boundaries are not sharply defined thereby separating the land-use types, but the zones can be determined in terms of the intensity of the agricultural activities. One should also keep in mind the differences in the physical environment, since soil, climate and the availability of water for irrigation all act as determinants, but in areas very close to the urban concentration the economic factor is of great significance.

Zone 1. Because of the differences in climate between Europe and Johannesburg and its surroundings, greenhouses do not feature prominent in the latter. Floriculture, including nurseries are found close to and inclosed within the built up area but do not form a distinctive zone.

.../Zone 2:

Zone 2. With the exclusion of tobacco this zone also exists around Johannesburg.

Zone 3. As in Zone 1 the difference in climate effects the pattern as regards the crops which are cultivated. A fodder crop such as teff is especially important to the south-east of Johannesburg where it occupies at least 15% of the tilled land.

Zone 4. Surrounding Zone 3 is a zone of mixed farming, the division being one of intensity of farming.

Zones 5 and 6. Maize farming is very important south of the Witwatersrand (Maize Triangle) while cattle is emphasized to the north and west and sheep to the south and south-west.

Zone 7. Because of climatic conditions forestry is located along the South African escarpment and cannot be regarded as part of the land-use pattern.

7. Conclusion.

Although the whole country does assist in meeting the agricultural needs of the Urban complex of the Witwatersrand and in particular Johannesburg, it is the areas closest to it where the city's influence is portrayed best, that is, in the intensity of activity and in the mixed character of the land use. As the distance increases from the focus farming activities are less centred on the focus and are reorganised as to agree best with the physical environment.

C. WATER AND POWER SUPPLY.

1. Water.

(a) Supply. Water is the essential of life and without adequate supplies of water modern urban growth is greatly impeded. Water may be obtained from subterranean sources, or from surface supplies such as lakes and rivers. Because of its very position

... /astride

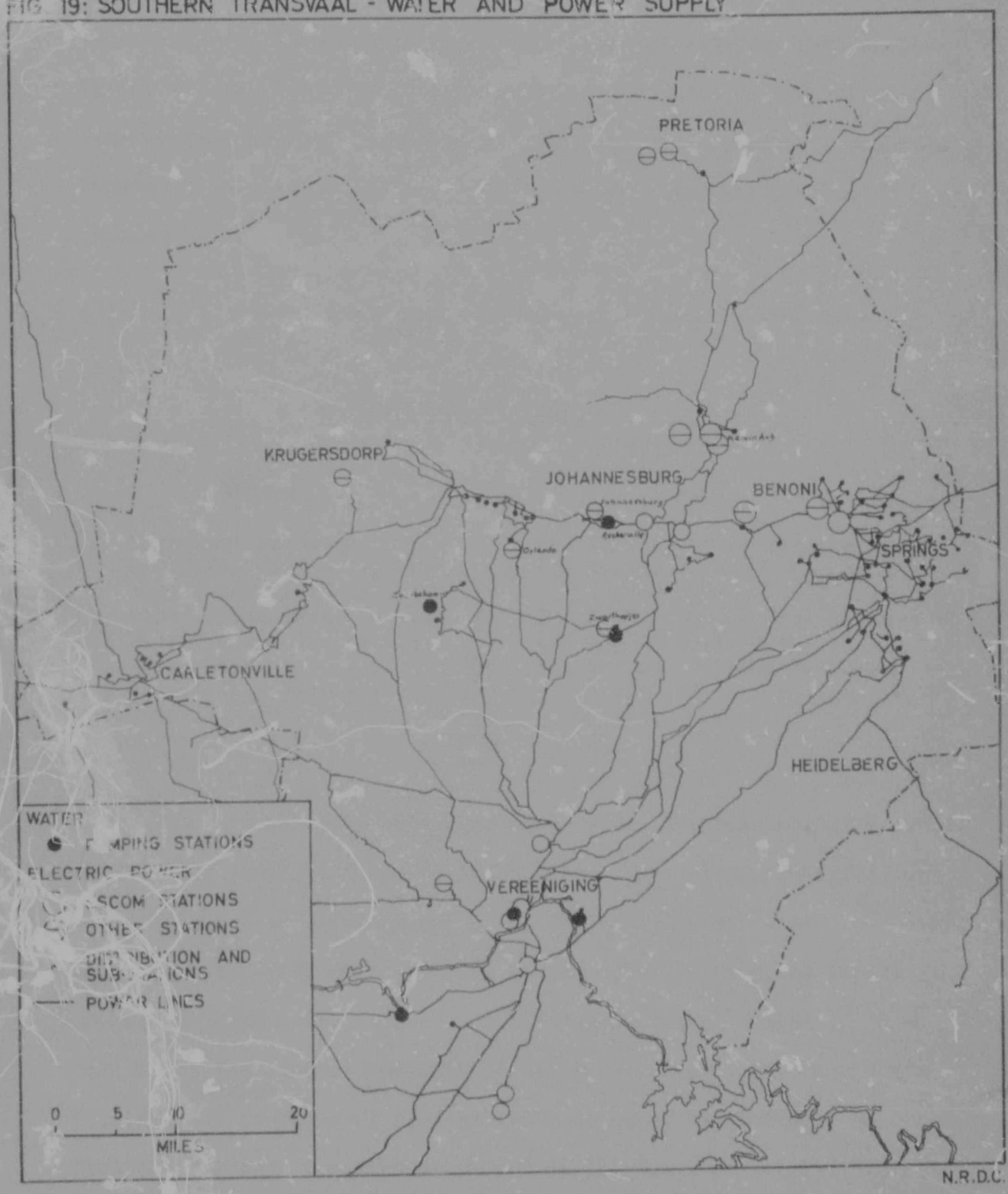
astride the Vaal-Limpopo watershed, Johannesburg has insufficient surface water. Initially sufficient supplies were available from bore holes in the dolomites at Zuurbekom, 17 miles south-west of Johannesburg, and at Zwartkopjes, 12 miles to the south of the city. In 1903 the Rand Water Board, a statutory body supplying water in bulk primarily to its constituent authorities, came into being, but by 1911 with the rapid development on the Rand, the Vaal River was turned to to augment the supply. With the completion of a barrage 23 miles below Vereeniging a supply of 20 million gallons per day (m.g.p.d.) was assured. By 1934 the supply became inadequate. The Vaaldam was constructed above Vereeniging, but subsequently the wall has been raised to make for a storage capacity of two million acre feet providing for a daily supply of 630 million gallons (Cole 1961), but rights of abstraction amounted to 230 m.g.p.d. in 1964. An inquiry (N.R.D.C. 1953) into the Vaal River's capacity predicts a shortfall of 206 m.g.p.d. by the year 2000 A.D. (TABLE 19).

In the light of this threat posed to the Southern Transvaal, decentralisation of industries has been advocated "but it is unrealistic to argue that inadequate local water supplies demand that the metropolitan economy be slowed down in sympathy. Water is a need to be satisfied wherever it is required and ..... it is in these (metropolitan) centres that the climate for continued economic expansion is most favourable and where capital is generated and markets built up for encouraging new growths in less developed regions" (Fair 1965 p33 & 35).

Various sources of water augmentation have been mentioned such as the storage of water in the dolomites near the Witwatersrand, the Schoemansdrift Dam near Bloemhof, and the Tugela, Caledon and Orange Rivers (Midgley 1961). "The supply from the Orange River appears the most suitable as the flow is in excess of

.../normal

FIG 19: SOUTHERN TRANSVAAL - WATER AND POWER SUPPLY



normal requirements, the works required to make the water available are likely to be reasonable both in capital and working costs and the supply would meet the future requirements not only of the Board but of all the large centres of population and industry between the Orange and the Vaal rivers" (Robinson 1962 p154). The proposed "Ox-bow Lake Scheme" in Basutoland has also been cited as a possible source of additional water for the Southern Transvaal Complex (Sunday Times - 1966).

TABLE 19: Demand and Supply in the Vaal Catchment, 2000 A.D. (Olivier - 1961).

MILLION GALLONS PER DAY.

Demand		Supply	
(a) Municipal areas including O.F.S. Goldfields, the Rand and Pretoria	325	(a) Vaaldam after raising ...	570
(b) Electricity Supplies	44	(b) Source in Pretoria and Suurbekom	40
(c) Mining and Industry	117	(c) Small dams on Vaal River.	60
(d) Agriculture	390	(d) Dam on Hartz River	35
(e) Evaporation losses	115	(e) Further raising of Vaal-dam	80
	991		785

In 1958-9 the Rand Water Board supplied 68.653 m.g.p.d. to the Reef municipalities of which total Johannesburg received for domestic purposes 43.473 m.g.p.d. or 39.6 gallons per capita per day, and 41.198 m.g.p.d. were supplied to the mines showing the demand placed on clean water supplies by the mines (Eklund - 1961).[1] Although not the largest consumer of water per capita, Johannesburg's significance in terms of mere quantity of water is obvious. In 1963 Johannesburg received about 32% of the total of 187.077 m.g.p.d. supplied by the Rand Water Board to its supply area. Of this grand total about 95% was extracted from the Vaal river and the remainder from boreholes.

1. During 1964/65 the Rand Water Board sold an average of 134.5 m.g.p.d. to twelve Reef municipalities, Johannesburg accounting for 63.7 m.g.p.d. (Rand Water Board 1965).

... /FIG. 19...

FIG. 19 shows the supply area of the Rand Water Board, the various installations and pipelines and the focal position occupied by Johannesburg in this supply area.

(b) Water Reticulation.

The water which is purchased from the Rand Water Board in Bulk is distributed by the responsible authorities and bodies. Johannesburg distributes its water from several reservoirs and tanks through 1,129 miles in White areas and 385 miles in Non-White areas in the Johannesburg metropolitan area (Mun. Yr. Book 1963).

2. Power.

(a) Electricity.

In 1891 the Electricity Undertaking was established for the purpose of supplying electricity to Johannesburg and additions were made as the load increased. At present Johannesburg produces the bulk of its electricity supply. The stations are: City Generating System capable of 110 MW (not in use but available for service), the Orlando Power Station having a capacity of 300 MW, the Kelvin 'A' Power Station at Kempton Park, completed in 1960, consists of six 30 MW sets and Kelvin 'B' Power Station planned for 60 MW sets initially (Mun. Yr. Book 1963) (FIG. 19). Further an agreement between the Johannesburg City Council and the Rand and O.F.S. Undertakings of the Electricity Supply Commission (ESCOM) provides for 88,000 volt connections between the two systems. The capacity of the three stations in operation is 540 MW, with a further 180 MW to be added as and when needed (Johannesburg 1963).

Johannesburg is the largest consumer of electricity in South Africa, the number of units for the year ended 30th June, 1963 being 1,688,636 million. This was supplied to 88,852 consumers.

Besides the three operating municipal power stations,

.../ESCOM's

ESCOM's Rosherville Station with a capacity of 34.4 MW also lies within the magisterial district of Johannesburg burning 77,496 tons of coal for 1962.

Taking the Southern Transvaal as a region one finds that besides ESCOM there are eight other suppliers of electricity, including Johannesburg. These eight suppliers supply less than 30% of the total electricity generated in the Southern Transvaal.

Since ESCOM is the major supplier of electricity and Johannesburg is inseparable from the rest of the Southern Transvaal it is necessary to indicate the regional pattern of electricity supply (FIG. 19). The Vereeniging area is the major generator of electricity. This is based on the availability of water supplies of the Vaal and local low-grade coal. FIG. 19 further indicates how the Southern Transvaal as regards electricity supply is bound together.

With the continued development of Johannesburg and the Southern Transvaal, the requirements for power will increase. It is thought that the demand by the mid 1970's will have increased four fold (N.R.D.C., 1957).

(b) Gas.

As the demand for gas, which was supplied since 1892, increased, a modern plant was erected at Cottesloe. The supply of gas in 1962 amounted to 2,227,052,000 million cubic feet while the daily capacity was 12 million cubic feet. The town gas was distributed along a distance of 575 miles for that year.

D. CONCLUSION.

In this chapter Johannesburg has been discussed as an urban complex which has needs, agricultural food stuffs for its inhabitants and water and power for its people and for its proper functioning as multi-functional metropolis. Its position as a

.../consumer...

consumer is unchallenged in South Africa. The Southern Transvaal's need for water is becoming too great for the existing sources to supply and as focus of this urbanised area, Johannesburg also faces this threat. This problem is, however, not of such a nature that it cannot be solved although its effect may be felt on the growth of the Southern Transvaal. The importance of the Witwatersrand including Johannesburg is seen in the extent to which it reaches out and will continue to reach out into the surrounding countryside for water sources and in the extent to which the ESCOM power grid has developed with a webb around it in the Southern and Eastern Transvaal and Northern O.F.S.

CHAPTER VII.

JOHANNESBURG AS ADMINISTRATIVE FOCUS.

A. INTRODUCTION.

Administration is most effective when carried out from a focal point. For this reason urban centres have as one of their more important functions, the function of administration. Administration manifests itself in two ways. Firstly, there is the physical manifestation seen in the buildings needed to accommodate the people and goods which are connected with the task of administration. These buildings representing the function of administration are found in one or other pattern fitting into the whole functional structure of the city. This physical manifestation of administration lies outside the scope of the present study. Secondly, there is the actual job of administration, an invisible manifestation or operation. This aspect lies outside the field of study of the geographer. Howe it is the result of this operation which interests the geographer, since this operation leads to the establishment of those services which are essential to the proper functioning of the city. These services include many aspects of city life, the bus and other transport services, reticulation, power supply, telephone services, fire protection services, medical and health services and a host of others. These services may be local, regional or national, but all are concerned with man's well-being and his organisation of space and it is the latter aspect which falls within the scope of geographic investigation. Such services operate outward from the city and the areas for which the services are provided have very definite boundaries. Services are therefore useful criteria in the determination of an urban centre's sphere of influence and its nodal significance and regional strength.

... / B.

B. JOHANNESBURG'S ADMINISTRATIVE SPHERE.

Green (1961), in the Third Interim Report on the future of Johannesburg, analyses the administrative structure of the Witwatersrand metropolitan region. The distinction is drawn between services provided by Departments of State, by the Transvaal Provincial Administration and by statutory bodies with national and local jurisdiction.

For the present investigation it is not deemed necessary to discuss the functions and aims of several of the administrative authorities. Such authorities will merely be dealt with in terms of the area over which they exercise jurisdiction, that is, in terms of their spatial properties.

1. "Direct Service" Departments of State:

(a) Incorporated in the Department of Social Welfare and Pensions is the Southern Transvaal Regional Welfare Board. The latter has jurisdiction over 31 magisterial districts (FIG. 20). The Department has created the Johannesburg Regional Office, one of eight in the country to administer its field services. This region corresponds to the Regional Board's area and includes a further three magisterial districts in the south-western Transvaal and Mafeking.[1] (FIG. 20)(S.Transvaal Reg. Welfare Board 1962).

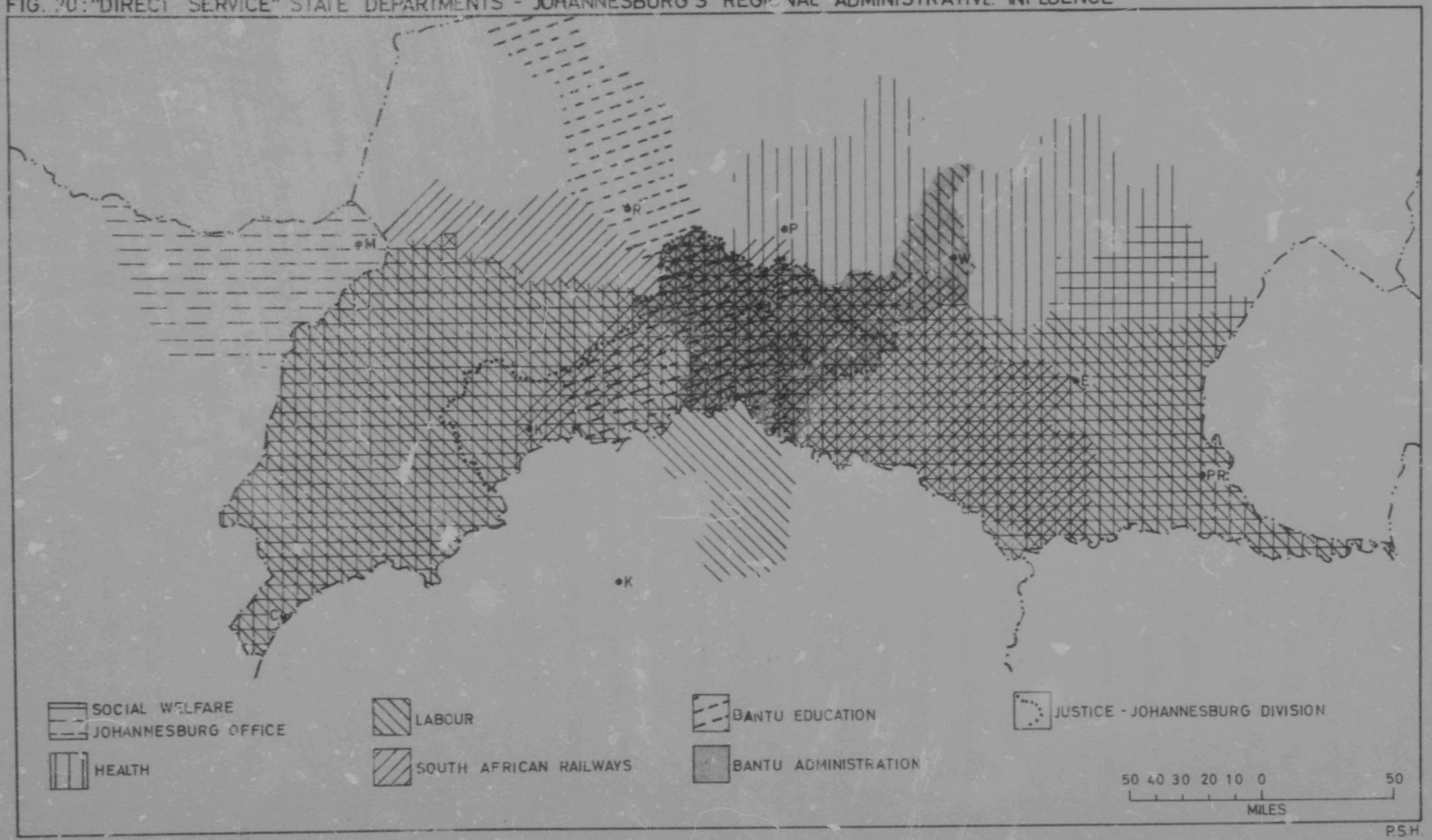
On 31st October, 1963, there were 502 separate welfare organisations within the area of jurisdiction, with 253 (50.4%) within the magisterial district of Johannesburg (S.Tvl. Reg. Welfare Board 1963), illustrating the importance of Johannesburg in this sphere of activity.

(b) The Southern Transvaal Region of the Department of Health has jurisdiction over 42 magisterial districts, including Pretoria (FIG. 20) (Correspondence : 4/9/1964).

.../(c) The

1. Recommendations have been made to incorporate these four magisterial districts into the jurisdiction area of the Southern Transvaal Regional Welfare Board.

FIG. 20: "DIRECT SERVICE" STATE DEPARTMENTS - JOHANNESBURG'S REGIONAL ADMINISTRATIVE INFLUENCE



(c) The Department of Education, Arts and Science is concerned with various special edudational institutions, but its jurisdiction is completely local, though pupils are drawn from far afield.

(d) The Witwatersrand Division of the South African Police incorporates the magisterial districts of Johannesburg and portions of the the districts of Roodepoort, Pretoria, Kempton Park and Germiston (Correspondence : 21/10/1964).

(e) Associated with the Department of Justice are three areas: the Magisterial District of Johannesburg (Proclamation No.21 of 1902); the Johannesburg Division consisting of seventeen magisterial districts (FIG. 20); the Witwatersrand Local Division of the Supreme Court consisting of thirteen districts, from Randfontein to Delmas (Correspondence 31/8/1964).

(f) The Witwatersrand control area of the Post Office covers an area from Nigel in the east to Carletonville in the west and from Halfway House in the north to Klip River in the South. The Johannesburg Post Office Area includes the municipal area of Johannesburg and northwards to Fontainebleau and Rivonia, southwards to the Klip River, and eastwards to Bedfordview and Edenvale. (Green 1961).

(g) The Johannesburg Division of the Department of Labour has jurisdiction over 39 districts, including a portion of the northern Orange Free State (FIG. 20) (Correspondence: 25/9/1964).

(h) The jurisdiction of the Department of Bantu Administration and Development extends over an area covered by 17 magisterial districts (FIG. 20) (Green 1961).

(i) The Southern Transvaal Inspectoral Circuit of the Department of Bantu Education includes, apart from the magisterial districts of the Witwatersrand, the districts of Potchefstroom, Pretoria, Vereeniging, Vanderbijlpark and Rustenburg (Fig.20)(Green 1961)

... /(j)

(j) The Department of Inland Revenue is local and has jurisdiction only within the magisterial district of Johannesburg.

(k) The national headquarters of the South African Railways and Harbours is centred in Johannesburg. The Western Transvaal System is contained within an area bounded by a line linking Mafeking, Pretoria, Witbank, Breyton, Volksrust, Vrede, Vereeniging, Klerksdorp and Mafeking. This System, however, is sub-divided into four districts, the Central District including the railway lines linking the following stations: Braamfontein and President, Crown to India and India through Elsburg to Redan near Vereeniging (Correspondence 21/7/64).

(l) The only other State Departments are the Public Works Department and

(m) The Department of Water Affairs. The former has district headquarters in Johannesburg, while in the case of the latter the boundary between the Vaal River and Western Transvaal Circles passes along the Witwatersrand watershed.

2. Provincial "Direct Services".

(a) The Transvaal Education Department is concerned with primary and secondary education and with the training of teachers, Whites, Coloureds and Asiatics. The area of jurisdiction of the Central School Board includes the municipal area of Johannesburg, and extends northwards to Halfway House and southwards to the Klip River. The area excludes Sandringham and the Non-White townships (FIG. 21).

Many of the schools in Johannesburg offer boarding and thus cater for pupils from areas outside Johannesburg. The First Year intake of students at the Johannesburg Teachers' Training College gives some indication of the source of students. Of the 608 students applications in 1963, 23.7% came from eighteen English

... / Government

Government high schools within Greater Johannesburg, 39.5% from English high schools on the Witwatersrand (including Johannesburg) and 46.6% from the Southern Transvaal, while English private schools and institutions in the Transvaal and English and Afrikaans Government high schools in the rest of the Transvaal contributed 32.1%. 9.0% of the students came from outside the Transvaal. (Tvl. Educ. News, 1963).

(b) The Provincial Hospital Services Department administers several of the Hospitals. These hospitals are provincial owned and controlled, a Local Hospital Board being made responsible for each hospital's administration. Other medical services are also provided, both for Whites and Non-Whites, but all these services as is the case above, are operated locally.

3. "Direct Services" provided by Statutory Bodies.

There are several statutory bodies administering various aspects of the Johannesburg area. Two of these, the Electricity Supply Commission (ESCOM) and the Rand Water Board, are discussed in Chapter VI.

(a) The Bantu Resettlement Board undertakes the removal of Bantu from the townships within the magisterial district to areas beyond the district's boundaries.

(b) Several other administrative bodies also function within the Johannesburg area, but their headquarters or important regional offices are situated elsewhere. Such bodies are the Peri-Urban Areas Health Board (Pretoria) which controls the development on the urban fringe, and the Group Areas Development Board (Pretoria) which is concerned with Indians and Coloureds on the Witwatersrand.

4. Other Administrative Bodies.

.../ Several

Several bodies exist which do not provide Johannesburg with services. The administrative importance of these bodies vary greatly, with respect to Johannesburg. Some have headquarters in Johannesburg, e.g. the Local Transport Board. Others include the Livestock and Meat Industries Control Board, the control boards concerning agricultural products, such as the Citrus, Deciduous Fruit, Banana, Potato, Dried Bean and Lucerne Hay Control Boards.

5. Local Authority.

Johannesburg is a City Council and as such is endowed with certain administrative powers by Provincial ordinance and national legislation. The powers "extend to public health services other than hospitals, but including clinics and ambulances[1]; the construction and maintenance of roads, bridges, sewerage works and stormwater drainage systems; the supply of water, gas and electricity and public lighting; public transport and traffic control; fire protection; public parks, zoos, baths, recreation and sports grounds, camp sites, and cemeteries and crematoria; public libraries, museums and art galeries; public housing schemes, especially for non-Europeans, and slum clearance; all aspects of urban Native administration, including influx control and labour administration; town planning and building control; licensing of businesses, trade and dogs, motor vehicle licensing on behalf of the province, and driving licences; abbatoirs and wholesale and retail produce markets; refuse removal services and other sanitary services; and the making of by-laws in connection with these and many other matters" (L. Green 1961 p24). Several of the abovementioned aspects and activities are dealt with in other parts of this study.

C. CONCLUSION.

Though not the administrative capital of South Africa

... /a large

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1. Mention of complete take-over by the Provincial Administration in respect of medical services has been made.

a large number of State Departments are represented in Johannesburg and have regional headquarters in the city. These departments may be divided into two groups, those excercising regional jurisdiction, that is their area of jurisdiction extends beyond the limits of the Southern Transvaal, and secondly, those having local jurisdiction, that is jurisdiction within the Southern Transvaal. Provincial services are all local in terms of this definition.

The study has been limited to the administration areas of State, Provincial, statutory and municipal bodies. One should, however, keep in mind that many commercial, financial and industrial institutions have headquarters in Johannesburg and thus exercise jurisdiction on a national scale, thereby enhancing the importance of Johannesburg as an administrative focus. It is more within this field of non-governmental and non-provincial administration where Johannesburg's administrative importance is realised, since, as has been indicated, it is the focus of commerce, finance, mining and industry in the Republic.

C H A P T E R VIII.

JOHANNESBURG AS A TRAFFIC GENERATING NUCLEUS.

A. INTRODUCTION.

As criterion in the delimitation of a sphere of influence transportation is important since it is "a measure of the relations between areas and, therefore, an essential part of geography" (Ullman 1954 p311). "Transport of people and goods by road, rail and air, by public and private means, is a basic necessity of city life, for its economic and social organisation would be impossible without traffic and other means of communication" (L.P. Green 1959 p19), and "the study of connections between areas and of spatial interchange can provide a new and deeper insight into the meaning of areal differentiation" (Ullman 1954 p311). This movement of people and goods in relation to the focus may be established by employing the concept of the "metropolitan region"[1]. Such a method of approach is permissible since, as stated previously, the sphere of influence of an urban focus incorporates many other types of areas and regions, which also indicate hinterland-relations and inter-dependences of the focus and its surroundings.

According to Green (1959) a metropolitan region consists basically of three parts: (1) A metropolitan hub (central business district and industrial core); (2) An inner metropolitan zone around the hub (10-15 miles radius) of close daily contact with the hub; (3) An outer metropolitan zone where the daily contact is less profound, although the effect of the journey to work is felt,

... /and

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1. L.P. Green uses the term after discarding the concepts of conurbation (Geddes and Fawcett), urban field (Smailes), metropolitan area (U.S.A. Census Office), and city region (Dickinson) and defines the metropolitan region as "... a region of intense movement of people, goods and services between residential areas and industrial and commercial centres, whose existence and structure are largely functions of communications and whose boundaries are determined by degree of human contact" (Green 1957 p27).

and the zone is dependent on the hub for many specialised functions. The boundary is a broad transitional one and forms a commuting, marketing and service watershed.

The task now is to examine the movement of people and goods within the metropolitan region as delimited by Green (FIG. 21) as well as within the Southern Transvaal or the Pretoria - Witwatersrand - Vereeniging (P.W.V.) complex.

B. ROAD TRANSPORT.

1. Cars and Trucks.

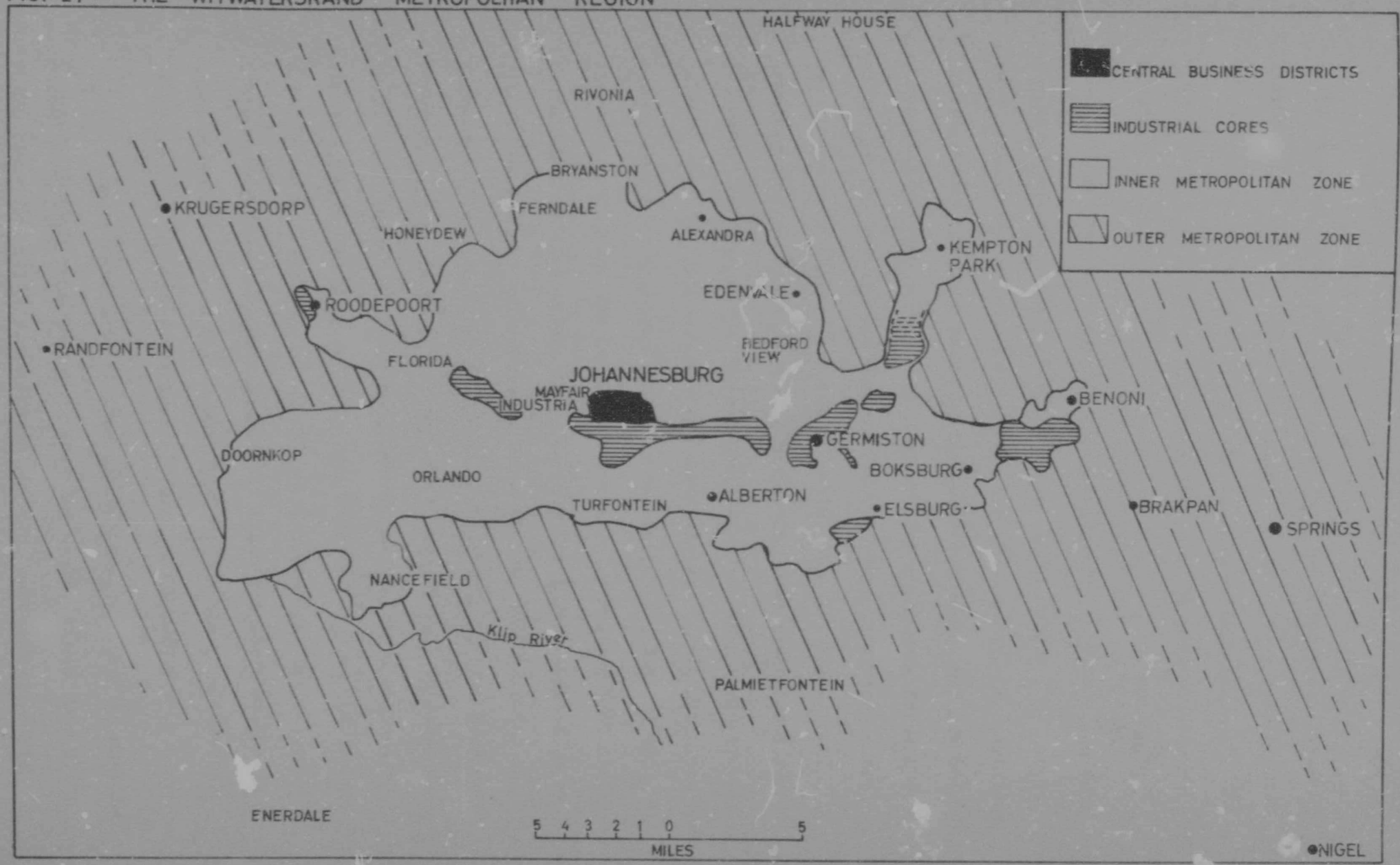
The daily movement of people can be measured by an origin and destination survey of road and rail traffic. Unfortunately surveys of this nature have not been carried out very frequently in the past and of those carried out some are not comparable. The data used for measuring motor vehicle (car and truck) traffic were obtained from traffic counts carried out in October 1954 (Johannesburg), May 1961 (Johannesburg), August 1961 (P.W.V.) and 1963 (Johannesburg perimeter). From these surveys it is, however, possible to gain a good impression of the very intense movement of vehicles taking place during a normal week day (6 a.m. to 6 p.m.), especially in the Johannesburg municipal area and on its perimeter. Motor vehicle traffic also forms an integral part of the movement of the daily traveller on his way to and from work, and together with the bus and train traffic aid the demarcation of the commuting area which is chiefly the basis for defining the inner metropolitan zone, as defined by Green.

To simplify the discussion of traffic movement, and for statistical considerations, the Johannesburg municipal area is divided into four zones (FIG. 22) based on direction. These zones are indicative of the varying intensities of traffic movement on the municipal perimeter and of the increase in volume of traffic

.../ within

FIG. 21: THE WITWATERSRAND METROPOLITAN REGION

FIG. 21: THE WITWATERSRAND METROPOLITAN REGION



within the municipal area before the vehicles enter the central business district (C.B.D.). The zones also make for a comparison of data and are thus pointers to the changes which have taken place over a period of nine years (1954 - 1963) and to possible future trends.

In 1963 more than 64,000 vehicles (TABLE 20) passed into the municipal area daily (6.00/7.00 a.m. to 6.00/7.00 p.m.) which is a phenomenal increase of 72% over the 1954 number. The greatest increase per zone took place in the north and south, 94% and 84% respectively, with a very much smaller, but still remarkable increase in the Eastern and Western Zones. These differences are due to the very rapid expansion of residential townships, e.g. Randburg, and the large number of peri-urban area townships beyond the municipal area north of Johannesburg. All these townships are part of what is known as Greater Johannesburg. In the south the increase is due to the development of townships like Mondeor and Linmeyer, etc., and the increasing amount of commuting from Alberton. Increases in traffic volume from the east and west have not been so great, 45% and 44% respectively, since the residential areas on Johannesburg's periphery, Germiston and Roodepoort, have been well developed for a longer period and are linked by rail to Johannesburg. The increase in all zones along the municipal perimeter are indicative of the increasing attraction of workers into Johannesburg and the tendency of establishing townships further and further away from the hub. Almost all these townships are, however, within the 10-15 mile limit, i.e. within the inner metropolitan zone or 30 minute isochrone (Green 1959 p28).

Out of the total number of vehicles entering the municipal area in 1963 from the noth, east and south, trucks made up 9.9%, 13.2% and 15.2% respectively[1]. These percentages stress

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1. Data from the Eastern Zone are unavailable.

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