Humbach Papers

5A.

THE FUTURE DEVELOPMENT OF JOHANNESBURG.

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SECOND INTERIM REPORT.

THE ECONOMIC STRUCTURE OF THE WITWATERSRAND METROPOLITAN REGION.

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THE FUTURE DEVELOPMENT OF JOHANNESBURG.

SECOND INTERIM REPORT.

THE ECONOMIC STRUCTURE OF THE WITWATERSRAND METROPOLITAN REGION.

INTRODUCTION.

1. For reasons given in the introduction to the first interim report, it has been necessary to narrow considerably the scope of the enquiry outlined in the original Plan under the heading "Part A, 2. Economic Structure" (see Appendix A to the first interim report). To do so, certain sections of the Plan have had to be jettisoned and a reasonable criterion established for that purpose.

2. The criterion chosen has been shaped by three important considerations. In the first place, the first interim report concluded by stating, "The key to the future development of the Witwatersrand lies in its transition from a mining community to a metropolitan and regional society". It added, "There are signs that the Witwatersrand metropolitan region has now passed its period of most rapid growth and has entered a phase of consolidation ..... but a relatively large proportion of its population is young, and this holds great potentiality for development. Whether or not this potentiality is exploited depends to a high degree on the regional repercussions of changes in the gold-mining industry".

3. In the second place, the Council resolved on 4th December, 1956, to contribute towards the cost of a planning report to be prepared by an Interim Committee of the Natural Resources Development Council, and "that the Town Clerk arrange for the necessary liaison between Dr. L. P. Green and the members of the Interim Committee during the preparation of their report". This liaison was soon transformed into membership of the Committee, whose terms of reference are:

To investigate what progress can be made towards the preparation of a regional plan for the Southern Transvaal -

(a) By further examination in greater detail of the problems set out in the First Report (of the N.R.D.C. entitled "A Planning Survey of the Southern Transvaal" and to be published in 1957) on pp. 103/4 with regard to the decline in gold-mining, industrial development, white and non-white residential areas, urban development generally and communications.

:- (b) ....

(b) By making proposals for closing the gaps in knowledge shown by the more detailed examination set out in (a).

(c) By proposing machinery and action for solution of the problems and for the preparation of a regional plan for the area.

4. The First Report referred to in these terms of reference is an indispensable background to the investigations now being undertaken by the Interim Committee, and forms an important complement to this survey into the future development of Johannesburg. It is therefore appropriate to acknowldege here the considerable debt owed by the second interim report to the Natural Resources Development Council, through its Planning Survey and the unfinished work of the Committee. Not only has some of the statistical material been gathered from these sources, but the contacts with mining, industrial and commercial interests envisaged when the Plan of Enquiry was first drawn up have all been made through the Interim Committee.

5. In the third place, the central theme of the Johannesburg survey is the future development of a rapidly-evolving metropolitan region whose structure and growth are functions of contemporary economic and technological revolutions. The problem is thus basically dynamic and urgent, and a broad indication of its major facets is preferable to a thorough but protracted study of its economic detail.

6. For these reasons - that attention should be focussed on the transition from gold-mining, that an interim committee is simultaneously examining and reporting on the economy of the Southern Transvaal in connection with regional planning, and that local authorities on the Witwatersrand are confronted with a dynamic and urgent situation - the second interim report is confined to an economic base study. The field of study is defined in paragraphs 11 and 12 of the first interim report as follows:

> "The economic activities of a metropolitan region can be classed as either basic or non-basic. The basic are those activities performed for people mainly outside the region, such as steel-making or mining, where the product is not so much consumed locally as exported to earn regional imports. The wealth and prosperity of the region depend finally on the earning capacity of these basic economic activities. Should their earning power decline, the region must lose its viability and face economic distress; unless it can replace them with other exportable activities of an extractive, manufacturing or even service nature.
>
> The non-basic economic activities are performed for people mainly within the region, such as the running of department and provision stores, whose supplies are not normally exported. Without such services the region could not exist as a complex whole, and its boundaries thus tend to coincide with the service-areas of its non-basic economic activities."

- 7. ....

7. The study of the region's economic base as defined in these paragraphs was in fact the primary intention of Part A, 2. of the original Plan, as may be confirmed by reference to Appendix A of the first interim report. It entails omitting most of sections (ii), (vi) and (vii) of the Plan, and concentrating on sections (i) Economic Pattern, (iii) Industry and Commerce, (iv) Employment, and (v) Income and Value of Production. This curtailment of the enquiry is unfortunate but, as stated in the first interim report, it is the prime function of the modern city to serve the needs of industry and commerce. To concentrate on these economic activities is therefore to concentrate on fundamentals. As will become clear in the following pages, the growth of a city depends on the extent to which it can command income from beyond its borders, and this in turn depends almost wholly on its industrial and commercial development.

I. THE ECONOMIC PATTERN.

8. The metropolitan framework established in the first interim report is summarised in Maps II and V. These are repeated here as they assemble in convenient form information on gold-mining, secondary industry and commerce contained in Work Tables 1 - 7 of Appendix B. They in fact portray the essential economic pattern of the Witwatersrand metropolitan region to-day, and together provide a convenient background to the analysis of trends in its mining, manufacturing and commercial activities to be made in sections II and III below in terms of employment, value of production and wages and salaries. They are also a valuable introduction to this section.

GOLD-MINING.

9. In Map II, the gold-bearing reef stands out as the region's geological backbone, stretching from its eastern to its western rim, and beyond. But, whereas at the beginning of this century over 90% of the gold produced within these boundaries was won from what is now the inner metropolitan zone (see Map V), to-day less than 30% comes from the latter's mines and the outer metropolitan zone has increased its share from 10% to over 69% of the total. At the same time, the region's aggregate share of the Union's total gold production has fallen from 100% to 64%, and its own production reached an all-time peak in the early 1940s. In fact, all the forty-two major mines within the Witwatersrand metropolitan region have now passed their optimum in terms of output and employment, and fifteen are marginal producers showing an estimated working profit of less than 5/- per ton of ore milled in 1956. Of these fifteen mines, six (out of thirteen extant) lie within the inner metropolitan zone, and nine (out of twenty-nine) lie in the outer metropolitan zone, all of which are to be found in the eastern portion of that zone (which has twenty-two mines extant).

SECONDARY INDUSTRY.

10. Secondary industry is developing as gold-mining begins to decline. While the value of gold produced in the Union as a whole increased by 25% between 1940 and 1953, private industrial undertakings expanded the value of their gross output by 458%. In the case of gold, the Witwatersrand contributed virtually nothing to this percentage increase, and the output and employment of its mines dropped by 30% and 33% respectively. In the case of secondary industry, however, the Witwatersrand was a key factor in the Union's rapid expansion, and accounted for over 30% of the increase in national employment.

11. The distribution of this industrial growth to-day by metropolitan zones, is sketched in Maps II and V. The overwhelming importance of the inner metropolitan zone is immediately apparent. In fact, 89% of the region's industrial workers are employed in this zone

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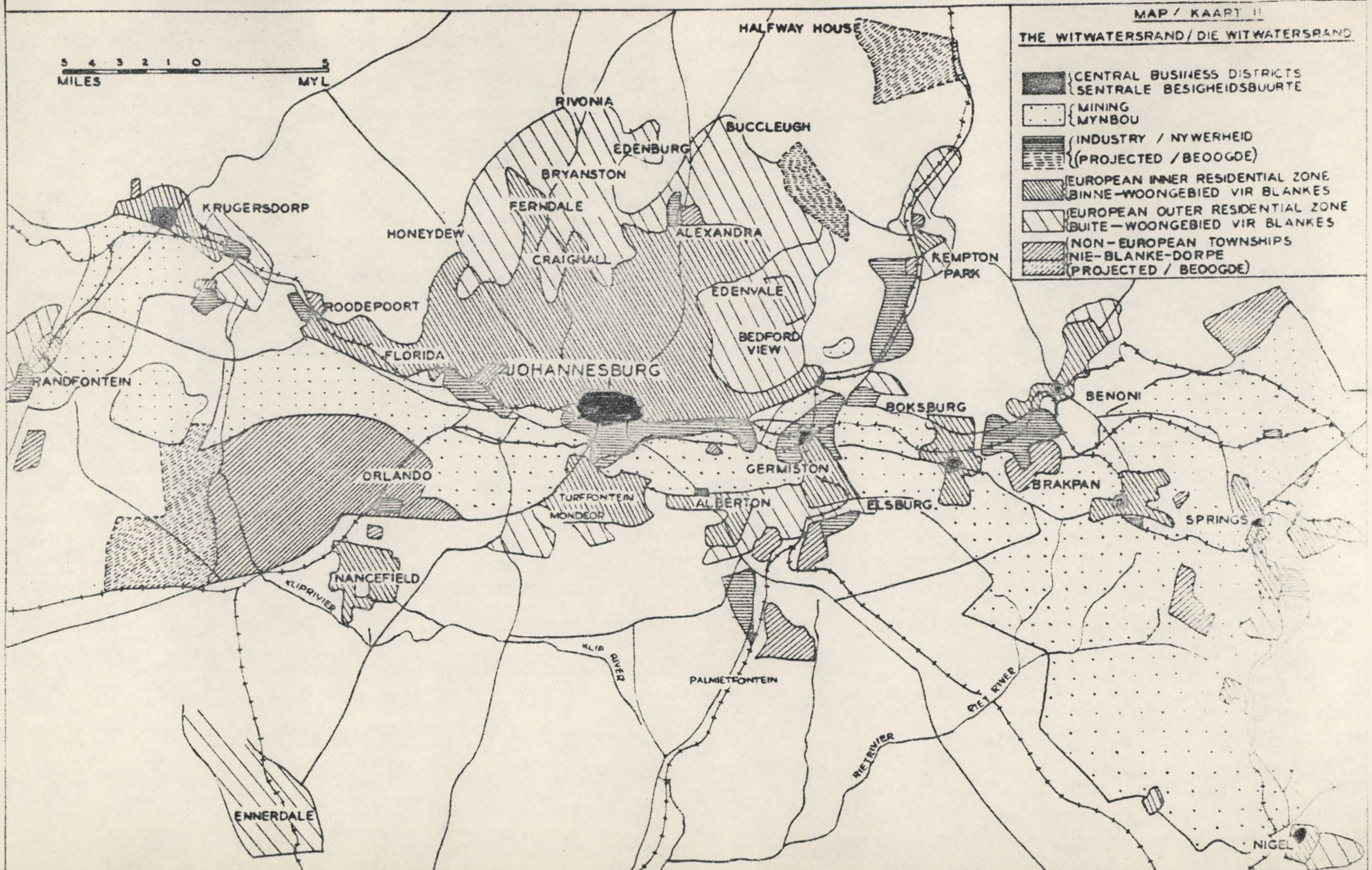
MAP / KAART II
THE WITWATERSRAND / DIE WITWATERSRAND
CENTRAL BUSINESS DISTRICTS
SENTRALE BESIGHEIDSBUURTE
MINING
MYNBOU
INDUSTRY / NYWERHEID
(PROJECTED / BEOOGDE)
EUROPEAN INNER RESIDENTIAL ZONE
BINNE-WOONGEBIED VIR BLANKES
EUROPEAN OUTER RESIDENTIAL ZONE
BUITE-WOONGEBIED VIR BLANKES
NON-EUROPEAN TOWNSHIPS
NIE-BLANKE-DORPE
(PROJECTED / BEOOGDE)
5 4 3 2 1 0 5
MILES
MYL
HALFWAY HOUSE
RIVONIA
BUCCLEUGH
EDENBURG
BRYANSTON
FERNDALE
KRUGERSDORP
HONEYDEW
ALEXANDRA
CRAIGHALL
KEMPTON
PARK
EDENVALE
ROODEPOORT
BEDFORD
VIEW
FLORIDA
JOHANNESBURG
RANDFONTEIN
BENONI
BOKSBURG
GERMISTON
ORLANDO
TURFFONTEIN
MONDEOR
ALBERTON
ELSBURG
BRAKPAN
SPRINGS
NANCEFIELD
KLIPRIVIER
KLIP
RIVER
PALMIETFONTEIN
PIET RIVER
RIETRIVIER
ENNERDALE
NIGEL

as against only 11% in the outer zone (1949-50 census). Of this 11%, the eastern portion of the outer metropolitan zone, i.e., Springs and Brakpan, accounts for over 7%. From west to east, the main types of industrial employment in each magisterial district are as follows: Randfontein, metal, and engineering; Krugersdorp, metal and engineering, building and contracting; Roodepoort, metal and engineering, and stone and clay processing; Johannesburg, metal and engineering, textiles, building and contracting, and food processing; Germiston, metal and engineering, building and contracting, chemicals and textiles; Boksburg, metal and engineering, and stone and clay processing; Benoni, metal and engineering, and textiles; Brakpan, metal and engineering; Springs, metal and engineering, stone and clay processing and printing.

12. Thus, throughout the metropolitan region, industrial development is very much dependent on metal and engineering and this group accounts for roughly 33% of the total employment in secondary industry. However, its importance varies greatly between the outer and inner metropolitan zones, employing only 31% of the total industrial workers in the inner zone but as much as 56% in the outer zone. In the inner zone, the remaining 69% of industrial employees are engaged in all classes of work, especially in the Johannesburg magisterial district. The main employing groups are building and contracting (14%), clothing and textiles (13%), food processing (6%) and chemicals and paints (5%).

COMMERCE AND ADMINISTRATION*

13. As stated in para. 17 of the first interim report, however, commercial, administrative and service activities as there defined* are normally the largest group of employers in economically - mature metropolitan regions. As far as the European population is concerned, the Witwatersrand is no exception to this general rule. Work Tables 6 and 7 show that out of a total of 254,000 Europeans gainfully employed in the chief municipal areas of the Witwatersrand in 1951, approximately 20% were managers, administrators, officials, and professional workers; 31% were office workers and salesmen; 7% were miners and quarrymen; 32% were industrial workers (including craftsmen, factory operatives, manual workers and labourers); and 7% were workers in transport and other services. Thus, while mining and industry employed 39% of all Europeans gainfully employed, commerce and administration as defined* accounted for about 51% (excluding government employees).

14. The distribution of European employees under the latter category differed markedly between the inner and outer metropolitan zones. In the outer zone, approximately 42% of the total were employed in commercial

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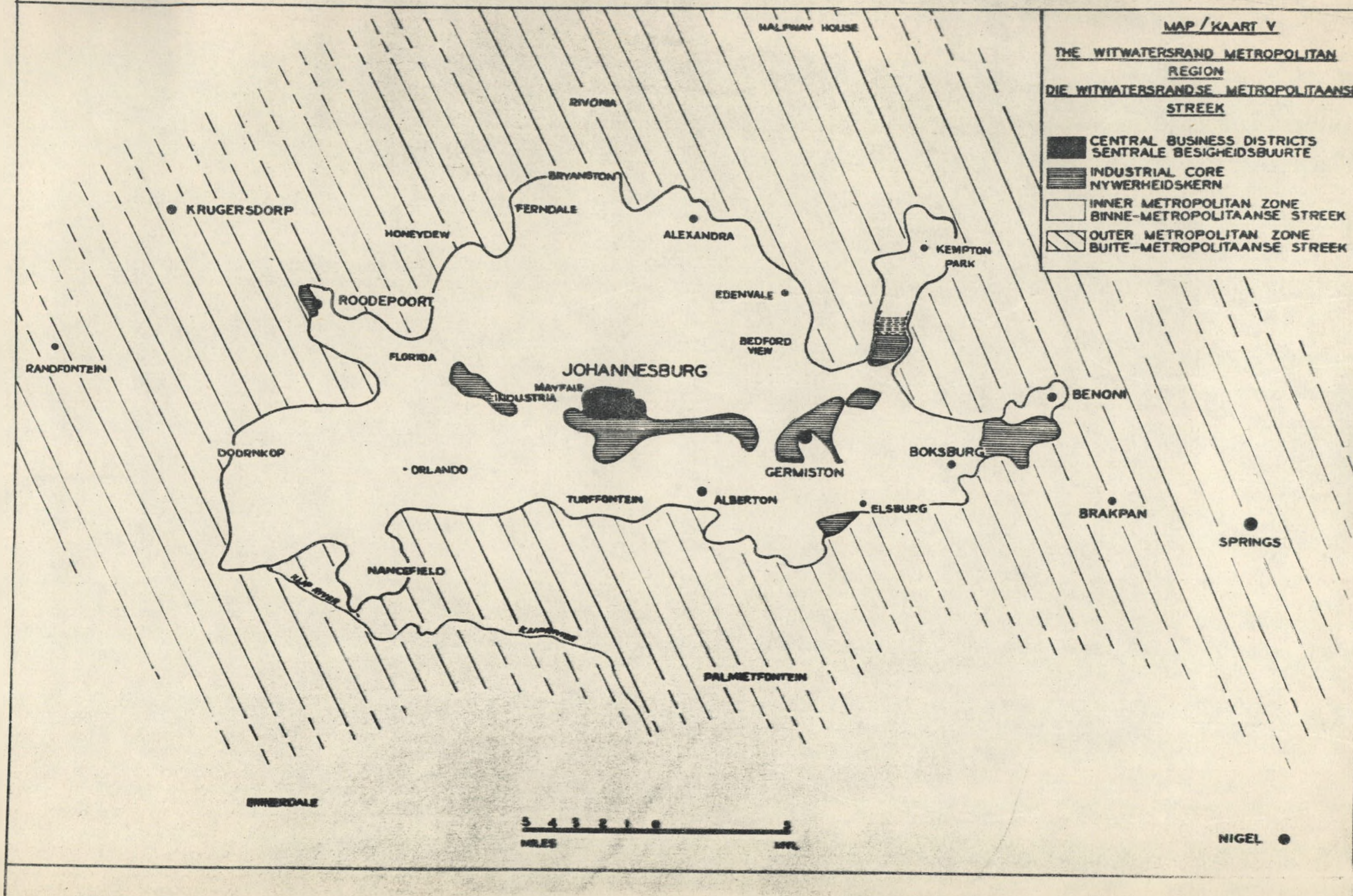
*Wholesale and retail trading of every kind; banking, insurance, accounting, and other financial activities; estate, transport and travel agencies; the administrative headquarters of large industrial and commercial businesses.

/- and ....


MAP / KAART V
THE WITWATERSRAND METROPOLITAN REGION
DIE WITWATERSRANDSE METROPOLITAANSE STREEK
CENTRAL BUSINESS DISTRICTS
SENTRALE BESIGHEIDSBUURTE
INDUSTRIAL CORE
NYWERHEIDSKERN
INNER METROPOLITAN ZONE
BINNE-METROPOLITAANSE STREEK
OUTER METROPOLITAN ZONE
BUITE-METROPOLITAANSE STREEK
HALFWAY HOUSE
RIVONIA
BRYANSTON
FERNDALE
KRUGERSDORP
HONEYDEW
ALEXANDRA
KEMPTON PARK
EDENVALE
ROODEPOORT
BEDFORD VIEW
RANDFONTEIN
FLORIDA
JOHANNESBURG
MAYFAIR
INDUSTRIA
BENONI
DOORNKOP
BOKSBURG
ORLANDO
GERMISTON
TURFFONTEIN
ALBERTON
ELSBURG
BRAKPAN
SPRINGS
NANCEFIELD
PALMIETFONTEIN
5 4 3 2 1 0 5
MILES
MYL
NIGEL

and administrative activities as against 53% being employed in mining and industry. In the inner zone, the position was reversed, some 55% being employed in commercial and administrative activities and only 37% in mining and industry. Moreover, as might be expected at the centre of the region, Johannesburg had the highest percentage of all employed in commercial and administrative activities, namely, 61% as against only 32% in mining and industry.

15. Comparable statistics for 1951 are not available in the case of non-Europeans, but Work Table 31 shows that, on the basis of official statistics published for the period 1946-51, the approximate relationship for the whole of the metropolitan region in 1950 was gold-mining 33%, secondary industry 27% and commerce and administration 22% of total employment (all races, and excluding government, educational, domestic and other service activities which accounted for a further 17%). These ratios suggest that, seven years ago, the Witwatersrand had still to emerge from the gold-mining era in its economic history; but a comparison between the outer and inner metropolitan zones reveals marked differences in the stages reached at that time. The approximate relationship in the inner zone was gold-mining 19%, secondary industry 34%, and commerce and administration 27% of total employment (excluding a further 19% employed in government, educational, domestic and other service activities). In the outer zone, the order was reversed, namely, gold-mining 69%, secondary industry 11%, and commerce and administration 8%.

16. In short, therefore, and particularly as some of the non-European statistics used above are for 1946 only, the inner zone is already beginning to exhibit the essential economic characteristics of metropolitan growth. In fact, if government, educational, domestic and other service activities had been classed with commerce and administration, this category would have employed more people than gold-mining and secondary industry combined in 1951. But it is almost certain that the outer zone remains dominated by gold-mining to an extent sufficient to place the entire regional economy at only the threshold of its metropolitan phase to-day.

AGRICULTURE.

17. While the region yet stands at the brink of a new era in its economic history, it is clear from the above statistics that, taken together, secondary industry and commercial and administrative activities already form the backbone of the Witwatersrand's employment. Indeed, agriculture accounted for only 1.2% of the total employment in 1951. Although much market gardening and considerable dairying are carried on near the main centres of population, and the rural portions of the outer metropolitan zone are characterised in particular by the development of small-holdings, the Witwatersrand is overwhelmingly an importer of agricultural porducts.

18. For example, the Newtown produce market handles some 350,000 tons of food supplies annually, of which roughly 70% comes from beyond the regional boundaries. Some 72% of the produce received is consumed

:- in ....

in Johannesburg itself, and a further 12% is distributed to the rest of the region. Secondly, the Newtown abattoir receives an average of 232,000 head of cattle, 732,000 sheep, 34,000 calves and 152,000 pigs a year for slaughtering, which represents from 70% to 80% of the regional requirements. Only a negligible proportion of this originates from within the Witwatersrand. Thirdly, in 1950, Johannesburg's inhabitants consumed over 72,000 gallons of milk daily. The majority of the dairy farmers operated within a thirty-mile radius of the city, but an increasing proportion of milk was already being supplied from an outer area extending along the main lines of communication for as much as 200 miles. The bulk of the production came from the south and southeast of the city - from the Klip River valley in the southern portion of the outer metropolitan zone and, increasingly, from areas such as Volksrust, Ermelo and Bloemfontein which lie far beyond the outer regional boundaries.* It is not surprising, therefore, that in section II below agricultural produce is computed to represent over 97% of the region's net imports.

CONCLUSIONS.

19. The prime determinant of the economic pattern of the Witwatersrand metropolitan region to-day is a belt of mining, industry and commerce running as a central axis from the western to the eastern edges of the region. As shown in Maps II and V, this belt reaches its greatest depth and complexity in the inner metropolitan zone between Industria in the west and Germiston in the east, and industrial off-shoots are growing to the north and south of the latter city. In this inner zone, industry has for some years been taking the place of mining as an employer of labour, and commercial and administrative activities as a group are now providing rapidly expanding avenues of employment. Nevertheless, while the analysis of the economic pattern formed as the metropolitan region emerges out of the old mining community is of great importance as a first step towards an understanding of the factors determining that pattern, it remains only a first step. The next step is to gain as clear a picture as possible of the relative contributions made by such factors to the continued prosperity of the regional economy; as it is vital to know on what the region's earning capacity depends, and in what proportions. Only an economic base study can give this vital information.

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* See Monica M. Cole, "The Fresh Milk Supply of the Witwatersrand and Pretoria", South African Journal of Science, vol.51, February, 1955.

II. THE ECONOMIC BASE.

20. Basic and Non-Basic Economic Activities.

A metropolitan region represents the most advanced stage in urban development to-day. Its economic base consists of those activities of the region which are engaged in the export of goods, services and capital to other regions and to nations beyond its borders. It is these exports which pay for imports into the region and represent its earning power as a social and economic unit. Within the regional economy may also be identified activities which can be classified as non-basic rather than basic. Non-basic activities do not enter into the region's export trade but sell their produce or capital to local basic undertakings, basic employees, other non-basic activities and their employees, and to members of the community who are not gainfully employed. As it is a vast urban concentration, the region's prosperity and continued growth depend especially on the extent to which its basic economic activities command, and continue to command, income from beyond its boundaries.

21. So far, six different units of measurement have been used or suggested in studies of the economic base, namely, jobs, wages and salaries, value added, value of production, physical production, and income and expenditure accounts for the region as a whole. In metropolitan regions, the best of these indices are jobs, wages and salaries, and value of production; and the most easily available and applicable measuring rod is usually jobs, or employment statistics. Such a measuring rod is used in this section of the interim report to identify the basic and non-basic activities of the Witwatersrand metropolitan region at a certain point in time; but its use will be supplemented by reference to wages and salaries and value of production, especially in the subsequent section where trends in gold-mining, secondary industry, and commerce and administration over a period of time will be investigated.

22. Having collated the relevant employment statistics, the next step is to establish an index by means of which the various economic activities undertaken in the region may be ranked and compared in order of importance as exporters and earners of regional imports. One outstanding method is called an "index of 'surplus' workers," and has been developed by Mattila and Thompson* from the original "location quotient" of Sargent Florence. The latter wished to indicate the importance of an industry to a locality relative to the importance of the industry to the nation. For if the importance of an industry to a locality is greater than its importance to the nation, it is almost certain to be a local exporting industry that produces more than can be consumed locally. The amount exported can most easily be measured in terms of employees "surplus" to local requirements (assuming that national and local patterns of consumption are identical).

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* J.M. Mattila and W.R. Thompson, "The Measurement of the Economic Base of the Metropolitan Area", pp. 215 - 228, Land Economics, University of Wisconsin, August, 1955.

23. The refined index of Mattila and Thompson gives each local industry a weight in direct proportion to its size, and has a clear advantage over the location quotient as a measure of the "basicness" of an industry to its locality. It is as follows:

$$S = \frac{ei - \frac{et}{Et}\,Ei}{et} \qquad \text{OR} \qquad S = \frac{ei}{et} - \frac{Ei}{Et};$$

Where S = "surplus" workers;

ei = the regional employment in the industry concerned;

et = the total regional employment in all industries and economic activities;

Ei = the national employment in the industry concerned; and

Et = the total national employment in all industries and economic activities.

24. The alternative form of the index, which is called the total employment index of "surplus" workers, shows quite clearly that it measures the difference between the local and national degree of economic specialisation. If the denominator et is removed from the first form of the index, the result gives the absolute number of "surplus" employees locally engaged in the industry concerned, i.e. the <u>net</u> export workers. It is important to note that both indices yield <u>net</u> export workers in the industry concerned, thus making allowance for imports into the locality or region in that industry, and providing a means of measuring the relative <u>net</u> earning capacity of the industry in terms of employment. It should also be noted that the number of "surplus" workers will differ from the actual number of export workers in the locality or region to the extent that the local consumption pattern differs from the national consumption pattern, owing to differences in taste, relative price structures, income or cyclical business activity. No allowance is made for these differences in the following pages, except in the case of building and contracting.

25. <u>Basic and Non-Basic Employment : The Witwatersrand Metropolitan Region, c. 1951.</u>

Using the indices to distinguish quantitatively between the basic and non-basic economic activities of the Witwatersrand metropolitan region, and to establish the relative strengths of its basic activities as earners of imports, the following results emerge over the period 1946 - 1951 from Work Table 3. Full and final statistics for 1950/51 are not yet available, and those for 1946 have therefore been used where stated in the Work Table, with a slight adjustment in the figure for commerce and administration as explained there. The margin of error, however, is negligible.

:- TABLE I. ....

TABLE I.

THE ECONOMIC BASE OF THE WITWATERSRAND METROPOLITAN REGION, c. 1951.

ECONOMIC ACTIVITY.	ACTUAL EMPLOYMENT.		ABSOLUTE NO. OF NET "SURPLUS" WORKERS.	TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS.	
	No.	%	No.	No.	%
Gold-Mining	290,772	39.96	226,545	25.68	54.43
Secondary Industry.	241,383	27.36	119,057	13.49	28.59
Commerce and Administration.	192,241	21.79	70,634	8.01	16.98
TOTALS:	724,396	82.11	416,236	47.18	100.00
Agriculture	10,314	1.17	- 405,084	- 45.92	- 97.33
Other *	147,551	16.72	- 11,152	- 1.26	- 2.67
TOTALS:	157,865	17.89	- 416,236	- 47.18	-100.00
GRAND TOTALS:	882,261	100	—	—	—

* Including government, educational, domestic and other service activities.

26. It is clear from Table I that, in about 1951, the region's basic activities were gold-mining, secondary industry, and commerce and administration in that order. But gold-mining was twice as basic to the regional economy as secondary industry, and three times as basic as commerce and administration. And whereas gold-mining employed only 33% of the total number of persons gainfully employed within the region, its export potential was so high that it accounted for over 54% of the net regional earning capacity in terms of employment. Secondary industry and commerce and administration combined to employ 49% of the total gainfully employed, but accounted for only 46% of the region's net earning capacity. Nevertheless, the latter two groups were significant factors in the regional economy, and without their net "surplus" the proportionately large net import of essential foodstuffs could not have been maintained.

:- 27. ....

27. All told, over 82% of the persons gainfully employed in the region were engaged in the three major categories of gold-mining, secondary industry, and commerce and administration. This immediately confirms the observation made above in the introduction that the fundamental purpose of the modern city is to serve the needs of commerce and industry. But, as might be expected from these comparisons, the "basicness" of the work done by the employees in each of the three major economic categories varied considerably - 78% of the workers employed in gold-mining were earning regional imports, as against 49% employed in secondary industry and 37% employed in commerce and administration. In fact, to replace 100 employees in gold-mining without reducing the region's basic employment actually required either 158 employees in secondary industry or as many as 212 employees in commerce and administration. However, neither secondary industry nor commerce and administration are homogeneous categories. They both comprise a multitude of activities, and this basic relationship should therefore be examined in more detail. While this is impracticable in the case of commerce, it is possible to breakdown employment in the region's secondary industry into sixteen divisions, as in Table II.

TABLE II.

BASIC EMPLOYMENT IN SECONDARY INDUSTRY, THE WITWATERSRAND METROPOLITAN REGION, c. 1951.

INDUSTRIAL DIVISION.	ACTUAL EMPLOYMENT.		ABSOLUTE NO. OF NET "SURPLUS" WORKERS.	TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS.		RANK ORDER.
	No.	%	No.	No.	%	
Metal and Engineering.	80,592	9.13	49,158	5.57	11.81	1
Clothing and Textiles.	31,791	3.60	18,703	2.12	4.50	2
Building and Contracting	35,430	4.02	16,444	1.86	3.95	3
Chemicals and Paints.	11,637	1.32	6,543	.74	1.57	4
Furniture.	6,790	.77	4,343	.49	1.04	5
Books, Paper and Printing.	8,799	1.00	4,342	.49	1.04	6
Heat, Light and Power.	8,709	.99	4,329	.49	1.04	7
Processing of Stone and Clay.	12,282	1.39	4,246	.48	1.02	8
Vehicles.	10,327	1.17	3,198	.36	.76	9
Miscellaneous.	4,877	.55	3,039	.34	.73	10
Food, Drink and Tobacco.	16,752	1.90	1,748	.20	.42	11
Working in Wood.	6,954	.79	1,707	.20	.41	12

:- Jewellery ....

TABLE II (CONTD.).

INDUSTRIAL DIVISION.	ACTUAL EMPLOYMENT.		ABSOLUTE NO. OF NET "SURPLUS" WORKERS.	TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS		RANK ORDER.
	No.	%	No.	No.	%	
Jewellery.	1,641	.19	1,207	.14	.29	13
Surgical, Dental etc.	301	.03	167	.02	.04	14
Leather and Leatherware.	3,796	.43	- 44	- .005	- .01	15
Treatment of Agricultural Products.	705	.08	- 73	- .008	- .02	16
SECONDARY INDUSTRY:	241,383	27.36	119,057	13.49	28.59	-

Source: Work Table 4.

28. Table II, reveals both wide differences in the "basicness" of the various industrial divisions and the extent to which secondary industry relied on eight out of the sixteen divisions for its net regional earning capacity in 1951. These eight divisions were, in rank order, metal and engineering; clothing and textiles; building and contracting; chemicals and paints; furniture; books, paper and printing; heat, light and power; and the processing of stone and clay. Between them, they accounted for 81% of actual employment in secondary industry and 91% of its net earning capacity in terms of employment. Even so, the first four divisions alone represented 76% of that earning capacity, and the relatively fluctuating nature of the building trade renders it suspect as a basic activity. In 1951, its rank order was undoubtedly influenced by an abnormal building development on the Witwatersrand relative to that of other urban centres such as Cape Town, Port Elizabeth and Durban. In short, secondary industry depended for its continued "basicness" on mainly three rather than four major industrial occupations, namely, metal and engineering, clothing and textiles, and chemicals and paints.

29. These three industrial divisions accounted for over 51% of actual employment in secondary industry and over 62% of its net earning capacity in terms of employment. Their "basicness" to the regional economy was naturally greater than that of secondary industry as a whole. For example, 61% of the employees in metal and engineering, 59% of the employees in the clothing and textiles division and 56% of those engaged in the chemicals and paints division were earning regional imports - as against 49% in secondary industry as a whole.

:- Likewise ....

Likewise, while 158 employees in secondary industry as a whole were required to replace 100 employees in gold-mining if the region's basic employment were not to be reduced, only 128 employees in the metal and engineering division were needed, 132 in clothing and textiles, or 139 in chemicals and paints. Out of the first eight divisions, only furniture had a more favourable ratio, but its total employment was less than 3% of secondary industry's and the lowest of the eight leading basic activities.

30. Before firm conclusions about the regional economic base can be drawn from these statistics, however, it is necessary to pursue the analysis one step further and distinguish between the economies of the inner and outer metropolitan zones as established in the first interim report. The differences between these zonal economies are in fact more striking than might be supposed from the brief description given in section I above. It is also necessary to take into account the value of production, wherever statistical information is available.

31. <u>Basic and Non-Basic Employment : The Witwatersrand Inner Metropolitan Zone, c. 1951.</u>

Using the same statistical sources as for Table I, Table III below gives the primary breakdown of the economic base of the inner metropolitan zone.

TABLE III.

THE ECONOMIC BASE OF THE WITWATERSRAND INNER METROPOLITAN ZONE, c.1951.

ECONOMIC ACTIVITY.	ACTUAL EMPLOYMENT.		ABSOLUTE NO. OF NET "SURPLUS" WORKERS.	TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS.	
	No.	%	No.	No.	%
Gold-Mining.	123,532	19.27	76,871	11.99	26.14
Secondary Industry	215,658	33.65	126,788	19.78	43.11
Commerce and Administration.	172,604	26.93	84,256	13.15	28.66
Other *	121,444	18.95	6,146	.96	2.09
TOTALS:	633,238	98.80	294,061	45.88	100.00
Agriculture	7,727	1.20	- 294,061	- 45.88	- 100.00
GRAND TOTALS:	640,965	100	—	—	—

* Including government, educational, domestic and other service activities.

Source: Work Table 3.

- 32. ....

32. It is immediately apparent from Table III that the relative "basicness" of the primary groups of economic activities in the inner metropolitan zone in 1951 was almost the reverse of that of the Witwatersrand metropolitan region as a whole. In strong contrast to the regional positions, the rank order was secondary industry first, commerce and administration second, and gold-mining third. The elevation of commerce and administration to second place reflected the importance of the service activities of the Johannesburg central business district, not only to the inner zone itself but as "exports" to the outer metropolitan zone.* As for secondary industry, it was one-half times as basic to the zonal economy as commerce and administration, and over one-and-one-half times as basic as gold-mining. Moreover, although secondary industry employed only 34% of the total number of persons gainfully employed within the zone's boundaries, it accounted for 43% of the zone's net earning capacity in terms of employment. The whole of the net imports consisted of agricultural produce.

33. Nevertheless, gold-mining still held sway in the "basicness" of its employees' work, if not to the same extent as in the region as a whole: 62% of the workers employed in gold-mining were earning zonal imports, as against 59% in secondary industry and 49% in commerce and administration. Moreover, to replace 100 employees in gold-mining without reducing the zone's basic employment required either 106 employees in secondary industry or 127 in commerce and administration. These ratios varied appreciably from those obtaining over the entire region, however, and the breakdown of secondary industry made in Table IV below is particularly interesting in this regard.

:- Table IV ....

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* Had the "other" service activities been included with commerce and administration, a group would have been formed employing 293,387 persons which could have been legitimately called a service group. But it would not have had so close a connection with the central and suburban business districts of the towns and cities within the metropolitan region, and would have held less meaning for both the social and the economic structure of the region than the one chosen, which is thus used throughout the first and second interim reports.

TABLE IV.

BASIC EMPLOYMENT IN SECONDARY INDUSTRY, THE WITWATERSRAND INNER METROPOLITAN ZONE, c. 1951.

INDUSTRIAL DIVISION.	ACTUAL EMPLOYMENT.		ABSOLUTE NO. OF NET "SURPLUS" WORKERS.	TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS.		RANK ORDER.
	No.	%	No.	No.	%	
Metal and Engineering.	66,140	10.32	43,295	6.75	14.71	1
Clothing and Textiles.	31,311	4.88	21,785	3.40	7.41	2
Building and Contracting.	33,298	5.19	19,430	3.04	6.61	3
Chemicals and Paints.	11,637	1.82	7,919	1.24	2.69	4
Heat, Light and Power.	8,709	1.36	5,564	.87	1.89	5
Furniture.	6,790	1.06	5,005	.78	1.70	6
Processing of Stone and Clay.	10,467	1.63	4,622	.72	1.58	7
Books, Paper and Printing.	7,473	1.17	4,235	.66	1.44	8
Food, Drink and Tobacco.	14,930	2.33	4,087	.64	1.39	9
Vehicles.	9,118	1.42	3,939	.61	1.34	10
Miscellaneous.	3,968	.62	2,627	.41	.90	11
Working in Wood.	5,457	.85	1,639	.25	.56	12
Jewellery.	1,641	.26	1,354	.21	.46	13
Leather and Leather work.	3,713	.58	913	.14	.31	14
Surgical, Dental etc.	301	.05	235	.04	.08	15
Treatment of Agricultural Products.	705	.11	139	.02	.05	16
SECONDARY INDUSTRY:	215,658	33.65	126,788	19.78	43.11	—

Source : Work Table 4.

:- 34. ....

34. Table IV shows that the inner metropolitan zone was less dependent than the region as a whole on a relatively few basic industries, and that at least ten divisions were fairly important contributors to its earning capacity. These ten divisions were, in rank order, metal and engineering; clothing and textiles; building and contracting; chemicals and paints; heat, light and power; furniture; the process of stone and clay; books, paper and printing; food, drink and tobacco; and vehicles. In slightly different order from that of the region, these divisions together accounted for almost 93% of actual employment in secondary industry and nearly 95% of its net earning capacity in terms of employment. Nevertheless, in spite of the more mixed nature of its economy - which was reflected particularly in the extremely varied character of the central industrial belt running from Industria in the west to Germiston in the east - the inner metropolitan zone still relied mainly on the first four divisions, namely, metal and engineering, clothing and textiles, building and contracting, and chemicals and paints.

35. For reasons already given in connection with the regional economy as a whole, the inner zone likewise depended for its continued "basicness" on largely three of these four divisions, namely, metal and engineering, clothing and textiles, and chemicals and paints. These accounted for 51% of actual employment in secondary industry and 58% of the zone's earning capacity in terms of employment. Their "basicness" to the zonal economy was in fact even greater than in the case of the region. For example, 65% of the employees in the metal and engineering division, 70% of the employees in clothing and textiles, and 68% of those employed in chemicals and paints were earning zonal imports. These proportions were considerably higher than those for the region and, naturally, the earning capacity of workers in secondary industry generally was higher in the inner metropolitan zone, 59% of the total being "surplus" to net local requirements.

36. This greater "basicness" of employment in the three main divisions of secondary industry is also indicated by the fact that to replace 100 employees in gold-mining without reducing the zone's basic employment required not 106, as in the case of secondary industry as a whole, but no more than 95 employees in metal and engineering, 89 in clothing and textiles, or 91 in chemicals and paints. In short, the zonal earning capacity of employment in gold-mining in the inner metropolitan zone was actually smaller than that of employment in the three major industrial divisions, which together accounted for more than one-half of the total number of workers in secondary industry. On the basis of employment, therefore, there is every support in these statistics for the view that, while the inner metropolitan zone may not have developed the full characteristics of a metropolitan economy in 1951, it had nevertheless already begun to enter a new phase in its economic history.

37. Basic and Non-Basic Employment: The Witwatersrand Outer Metropolitan Zone, c. 1951.

The outer metropolitan zone exhibited entirely different basic characteristics, as Table V indicates.

:- TABLE V ....

TABLE V.

THE ECONOMIC BASE OF THE WITWATERSRAND OUTER METROPOLITAN ZONE, c. 1951.

ECONOMIC ACTIVITY.	ACTUAL EM-PLOYMENT.		ABSOLUTE NO. OF NET "SUR-PLUS" WORKERS.	TOTAL EMPLOYMENT INDEX OF NET "SUR-PLUS" WORKERS.	
	No.	%	No.	No.	%
Gold-Mining.	167,240	69.31	149,671	62.03	100
Secondary Industry.	25,725	10.66	- 7,731	- 3.20	- 5.16
Commerce and Administration.	19,637	8.14	- 13,622	- 5.65	- 9.11
Agriculture.	2,587	1.07	- 111,020	- 46.01	- 74.17
Other *	26,107	10.82	- 17,298	- 7.17	- 11.56
TOTALS:	74,056	30.69	- 149,671	- 62.03	- 100
GRAND TOTALS:	241,296	100	-	-	-

* Including government, educational, domestic and other service activities.

Source : Work Table 3.

38. Thus, as far as the primary groups of economic activities were concerned, the outer metropolitan zone was in fact wholly dependent on gold-mining to earn its net imports. Gold-mining accounted for 69% of the zone's gainfully employed population, and over 89% of its employees earned zonal imports. Secondary industry and commerce and administration both joined agriculture as net importers.

39. Nevertheless, as Table VI below indicates, not every division of secondary industry failed to enter the ranks of basic economic activities.

:- TABLE VI. ....

TABLE VI.

BASIC EMPLOYMENT IN SECONDARY INDUSTRY, THE WITWATERSRAND OUTER METROPOLITAN ZONE, c. 1951.

INDUSTRIAL DIVISION.	ACTUAL EMPLOYMENT.		ABSOLUTE NO. OF NET "SURPLUS" WORKERS.	TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS.		RANK ORDER.
	No.	%	No .	No.	%	
Metal and Engineering.	14,452	5.99	5,863	2.43	3.92	1
Miscellaneous.	909	.38	412	.17	.27	2
Books, Paper, and Printing.	1,326	.55	107	.04	.06	3
Working in Wood.	1,497	.59	68	.03	.05	4

Source : Work Table 4.

40. Undoubtedly, the metal and engineering division's contribution to the economic base of the outer metropolitan zone in 1951 was by no means negligible. It employed 56% of the workers in secondary industry, more persons than chemicals and paints in the inner zone, and proportionately more than building and contracting in that zone. Yet its number of "surplus" workers represented less than 41% of its total employment, and so high was the relative productivity of employment in gold-mining that, to maintain basic employment at the same level, as many as 221 employees in metal and engineering would have been needed to replace 100 employees engaged in mining. The remaining three industrial divisions contributed very little towards the aggregate net "surplus" workers and accounted for only 14% of the total actual employment in secondary industry. But they were likewise basic economic activities that did help to lessen the dominance of gold-mining, whereas all other industrial divisions were non-basic, net importers from the inner metropolitan zone - allowing for imports into the outer zone from outside the region, and for cross-hauls within it.

41. In spite of the efforts of these four divisions, therefore, the "surplus" workers in gold-mining constituted 90% of the "surplus", in all economic activities broken down to the detail of Table VI, in strong contrast to its total of only 26% in the inner metropolitan zone. Moreover, this almost complete dependence on gold-mining in the outer zone was sufficient to render it in terms of employment more basic than secondary industry to the regional economy as a whole. In terms of value of production, however, this conclusion must be somewhat modified.

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42. Value of Production.

So far, the economic base of the Witwatersrand metropolitan region and its inner and outer metropolitan zones has been analysed in terms of employment, mainly because value of production statistics are not available for commerce and administration. Nevertheless, the relative contributions of gold-mining and secondary industry to the regional and zonal earning capacities can certainly be weighted by reference to the value of goods produced, and the results are significant.

43. In 1951, the realised value of gold mined within the Witwatersrand metropolitan region was approximately £133,800,000,* or £460 per person employed in gold-mining. The value of articles produced by secondary industry, not including work done, was approximately £200,200,000, or £829 per person employed in secondary industry (ignoring the fact that Government-owned industry is included in the employment statistics but excluded from the value of production statistics). Weighting the total employment index of net "surplus" workers appearing in Table I above by the consequent ratio of 1 : 1.80 in favour of secondary industry, the relevant indices become, in the case of gold-mining, 25.68 and in the case of secondary industry, 24.28. Thus, in terms of value of production as well as employment, gold-mining remains more basic to the regional economy as a whole in 1951 than secondary industry, but by no means twice as basic. In fact, it becomes less than 1.06 times as basic as secondary industry.

44. The relative "basicness" of the leading three industrial divisions in Table II above, omitting building and contracting, is also modified. In 1951, the metal and engineering industry produced goods to the value of some £53 million within the metropolitan region, which represented approximately £658 per person employed in that division. Weighting the total employment index of net "surplus" workers appearing in Tables I and II by the consequent ratio of 1 : 1.43 between gold-mining and metal and engineering, the index becomes, for gold-mining, 25.68 and for metal and engineering, 7.79.

45. In the same year, the clothing and textiles division produced goods to the value of some £260,100,000, or £818 per employee, and the chemicals and paints division aggregated approximately £17,800,000, or £1,520 per head. Their weighted indices thus advance from 2.12 and .74 to 3.77 and 2.44 respectively. The general results are summarised in Table VII below.

:- TABLE VII. ....

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* Including silver.

TABLE VII.

WEIGHTED TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS, THE WITWATERSRAND METROPOLITAN REGION, c. 1951.

ECONOMIC ACTIVITY OR DIVISION.	TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS.	VALUE OF GOODS PRODUCED PER EMPLOYEE.	WEIGHTED INDEX OF "BASICNESS".
Gold-Mining.	25.68	£ 459.42	25.68
Secondary Industry.	13.49	£ 829.28	24.28
Metal and Engineering.	5.57	£ 657.84	7.97
Clothing and Textiles.	2.12	£ 818.29	3.77
Chemicals and Paints.	.74	£1,520.01	2.44

46. Thus, taking into account the value of goods produced in 1951, only 88 employees in secondary industry were needed to replace 100 employees in gold-mining, and not 158. In mining and engineering, the equivalent number drops from 128 to 89, in clothing and textiles from 132 to 74, and in chemicals and paints from 139 to 42 employees. In spite of these drastically changed ratios, however, gold-mining still remained slightly more basic to the economy than secondary industry, and over three times as basic as metal and engineering, because almost the whole of its production was destined for the regional export market.

47. The effects of such weighting on the economic base of the inner metropolitan zone are summarised in Table VIII below.

TABLE VIII.

WEIGHTED TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS, THE WITWATERSRAND INNER METROPOLITAN ZONE, c. 1951.

ECONOMIC ACTIVITY OR DIVISION.	TOTAL EMPLOYMENT INDEX OF NET "SURPLUS" WORKERS.	VALUE OF GOODS PRODUCED PER EMPLOYEE (W.M.R.)	WEIGHTED INDEX OF "BASICNESS"
Gold-mining.	11.99	£ 459.42	11.99
Secondary Industry.	19.78	£ 829.28	35.40
Metal and Engineering.	6.75	£ 657.84	9.65
Clothing and Textiles.	3.40	£ 818.29	6.05
Chemicals and Paints.	1.24	£1,520.01	4.09

48. It follows that, taking the value of goods produced into account, secondary industry was not merely one-and-one-half times as basic as gold-mining to the economy of the inner metropolitan zone in 1951; it was three times as basic. Moreover, only 59 employees in secondary industry were needed to replace 100 in gold-mining, 67 in metal and engineering, 50 in clothing and textiles and 25 in chemicals and paints. But, although gold-mining is thus rendered much less basic than secondary industry, and although the replacement value of employees in the zone's leading industrial divisions becomes much higher than in the case of the unweighted index, gold-mining as an industry still remained the most basic of all in 1951 because of its great export potential.

49. This important aspect of the mining contribution to the economic prosperity of the region and its inner metropolitan zone must not be underestimated. Their continued expansion depended as in past years on the export potential of their major economic specialities. In spite of the decline of the inner zone's mines, gold-mining was still its main exporting industry. In the region generally, gold-mining remained more basic to the economy than the whole of secondary industry. Thus, on the basis of value of production as well as employment, it appears that the transition to a new stage in the economic evolution of the Witwatersrand was well under way by 1951, but had not yet been completed. Whether or not it has been completed since then depends on recent developments in the three major spheres of gold-mining, secondary industry, and commerce and administration, and these will be investigated separately in the next section. Before doing so, however, certain significant conclusions must be drawn from this section.

50. Conclusions.

A study of the regional economic base would be incomplete without an attempt to measure its importance to the region's social development. For example, in 1951 the total population (all races) of the Witwatersrand metropolitan region was 1,707,426 persons. Its inner metropolitan zone comprised 1,369,515 persons. The "surplus" workers were 416,236 and 294,061 respectively. Thus, for every 100 persons engaged in basic employment or export activities in the region as a whole, there were 400 inhabitants. Of the 100 basic or "surplus" workers 54 were employed in the gold mines, 29 in secondary industry and 17 in commerce and administration. In the inner metropolitan zone, the relationship was 100 basic employees to 500 of the zone's inhabitants, and of every 100 "surplus" workers, 26 were employed in gold-mining, 43 in secondary industry and 29 in commerce and administration.

51. It is instructive to compare these ratios between basic employment and total population with similar ratios recently arrived at in the United States of America. To do so, basic commercial and administrative employment on the Witwatersrand must be excluded from the above figures, in which case the ratio between total industrial net "surplus" workers and the population becomes 1 : 5 in the case of the region, and 1 : 7 in the case of the inner metropolitan zone. In 1950, the following ratios obtained in certain American standard metropolitan areas, Table IX.

:- TABLE IX ....

TABLE IX.

RELATIONSHIP BETWEEN INDUSTRIAL BASIC EMPLOYMENT AND TOTAL POPULATION, THE WITWATERSRAND METROPOLITAN REGION AND CERTAIN AMERICAN STANDARD METROPOLITAN AREAS, c. 1951.

METROPOLITAN REGION OR STANDARD AREA.	TOTAL INDUSTRIAL NET "SURPLUS" WORKERS.	TOTAL POPULATION.	RATIO BETWEEN NET "SURPLUS" WORKERS AND POPULATION.
Witwatersrand Metropolitan Region.	345,602	1,707,400	1 : 5
Witwatersrand Inner Metropolitan Zone.	203,659	1,369,500	1 : 7
Detroit S.M.A.	377,743	2,973,000	1 : 8
Pittsburgh S.M.A.	227,550	2,205,500	1 : 10
San Francisco S.M.A.	222,228	2,214,000	1 : 9
Cleveland S.M.A.	155,179	1,453,600	1 : 9
Boston S.M.A.	220,146	2,354,500	1 : 11
Baltimore S.M.A.	121,356	1,320,800	1 : 11
St. Louis S.M.A.	138,469	1,673,500	1 : 12

Source of American Statistics: Official U.S.A. Census, 1950 and Mattila and Thompson, op cit., p. 226.

52. Clearly, both the Witwatersrand metropolitan region and its inner zone had a proportionately larger economic base than their American counterparts in 1951. This difference may have arisen in part from a lower productivity of labour, or a less favourable price ratio between agricultural and industrial products, or relative differences in transport costs, which tend to favour agriculture in the Union. But it may also have arisen from the fact that the Witwatersrand as a whole had still not left the gold-mining stage in its development, for the inner metropolitan zone's ratio closely approximated to that of Detroit, and, in fact, exceeded the ratios of some large American cities which were as low as 1 : 6.

53. These comparisons again tend to confirm conclusions already reached regarding the nature of the regional and zonal economies, and to complement those drawn in the first interim report in regard to the more advanced metropolitan character of the inner zone. Indeed, the economic base study shows that there is every economic as well as social reason for concluding that the latter zone now exhibits truly metropolitan characteristics, and should be included in the world's

:- growing ....

growing list of metropolitan societies. In the final analysis, its political, administrative, economic and social problems have become their problems.

54. There is one other conclusion. In order that the economic base of the Witwatersrand might remain unimpaired as gold-mining declined after 1951, the above statistics suggest that, taking the value of production into account, at ruling prices secondary industry would have had to have provided employment for only 88 workers to replace every 100 stood-off by the mines, although it would also have had to have expanded its regional exports on just over a pro rata basis (1.06 : 1). One of the main reasons for this decreased demand for labour may well have been that the ratio of European to non-European workers in the gold mines was 100 : 725, whereas in secondary industry the ratio was no more than 100 : 189.

:- 55. As ....

III : TRENDS IN BASIC ACTIVITIES.

55. **The Witwatersrand Metropolitan Region.**

Gold-Mining. In 1936, the Union of South Africa produced over 11,333,000 ounces of gold to the value of £79,498,200, and accounted for over 34% of the estimated world output. In 1956, it produced 15,986,700 ounces of gold to the value of £198,499,400 and accounted for 56.5% of the estimated world output. In 1953, the corporate members of the Transvaal and Orange Free State Chamber of Mines made a working profit of £1,828,000 on the production of uranium. In 1956, this profit had risen to £24,662,000. Thus, although working costs reached their highest peak in that year, shareholders benefitted by a record distribution of dividends and the annual production of gold climbed to a new level.

56. Although contributing just over one-half of the national gold output in 1956, the Witwatersrand has had a far different story to tell in recent years. It is summed up in Figures I and II, and by the statistics in Table X below.

TABLE X : GOLD-MINING STATISTICS : THE WITWATERSRAND METROPOLITAN REGION : 1936-1956.

Year	Gold Produced ozs. fine.	Value	Employment in Service *		
			European	Non-European	Total.
1936	10,627,627	£74,536,437	34,953	295,742	330,695
1941	13,631,091	£114,501,164	44,795	359,869	404,664
1946	10,807,796	£93,217,240	38,267	273,310	311,577
1951	9,576,667	£118,870,379	36,508	256,088	292,596
1956	8,720,461	£108,891,080	32,013	228,479	260,492

* The employment figure for 1951 differs slightly from that used in section II.

N.B. The price of gold per fine ounce rose from £7.01346 in 1936, to £8.4 in 1941, £8.625 in 1946, £12.4125 in 1951, and £12.486849 in 1956.

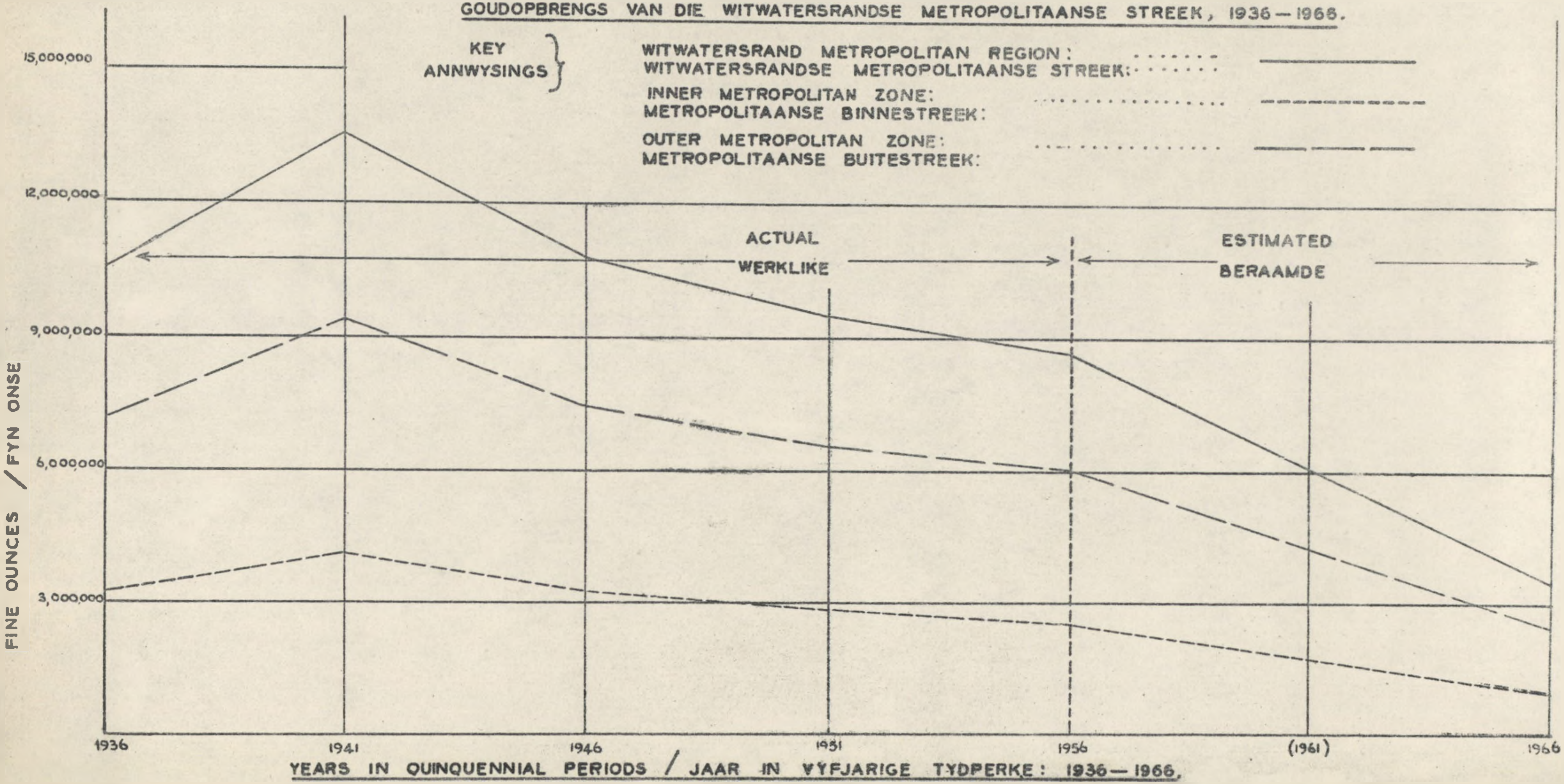
Source : Government Mining Engineer.

57. In his address to the annual meeting of the Transvaal and Orange Free State Chamber of Mines in 1956, the Chamber's President remarked particularly on the "sadder but inevitable picture of the older field of the Witwatersrand". "Here", he said, "we find a contraction in the scale of operations, a dimunution in the tonnage milled and in the ounces of gold produced. ...... Two factors have caused the contraction of output on the older Witwatersrand. These are, first, the working out of the ore within the finite boundaries of some of the mines; and secondly, the inexorable rise in working costs which has excised large tonnages of ore from the payable

:- category". ....

FIG. /TEK.1

GOLD OUTPUT OF THE WITWATERSRAND METROPOLITAN REGION, 1936 – 1966.
GOUDOPBRENGS VAN DIE WITWATERSRANDSE METROPOLITAANSE STREEK, 1936 – 1966.



category". Of the fifty-six mines in production, eighteen were more than twenty-nine years old, and nine of these had been producing for sixty years. "Some of these mines", the President added, "will close soon because their ore is almost exhausted, and neither an increase in the price of gold nor a decrease in working costs can materially affect their continued existence. In other mines, although there are still large quantities of marginally payable ore, even relatively small variations in economic conditions may either hasten their closing or prolong their lives to a greater or lesser degree."

58. For these reasons, it is difficult to forecast the future of the gold-mining industry on the Witwatersrand with any great accuracy. Three mines in fact closed down in 1956, and twelve others operated on the margin of production. But these twelve might continue to produce gold for a considerable number of years should its price rise. Nevertheless, the President held out little hope of an increase in price in the near future, and an official estimate being published by the Natural Resources Development Council in its Planning Survey of the Southern Transvaal shows an expected drop from 9.6 to 4.7 million ounces in the gold output of the Witwatersrand mines (including the far west Rand) between 1955 and 1965. Their share of the Union's gold production is expected to fall from 56% in 1956 to only 8% in 1975.

59. Thus, given no great change in the price of gold during the next decade and no substantial deep-level development outside the far west Rand, it seems reasonable to predict a reduction of output to some 3.5 million ounces in 1966 within the metropolitan region (excluding the far west Rand), and a pro rata fall in employment. This is a key estimate, and it is supported by the fact that it would merely project forward to 1966 the decline already experienced between 1941 and 1951, during which time the price of gold actually rose from £8.4 to £12.4 per fine ounce. Work Table 2 has been constructed on this basis and the result in terms of employment is depicted in Figures I and II. Within the Witwatersrand metropolitan region the output of gold is estimated to fall between 1956 and 1966 from 8.7 to 3.5 million ounces, and employment in service to decline from 32,013 Europeans and 228,479 non-Europeans to 24,000 and 101,000 respectively, or 125,000 workers all told. In sum, therefore, employment will probably decrease by 135,500 workers of all races, or 52%; at the 1956 price of £12.49 per fine ounce, the value of gold produced will fall by £65,176,000, or 59%, to an aggregate of only £43,715,000; and, at 1956 rates and prices, salaries and wages paid to labour in service will decrease from £44,162,000* to some £21,196,000, i.e. by £22,966,000 or 52% - the European wage bill falling by 25% and the non-European by 55%.

60. The gold-mining industry is thus not only likely to decline at and increasing rate within the Witwatersrand metropolitan region over the next decade but, in all probability, it will be faced with a less than proportionate decrease in its wage bill. This is an additional and important trend whose significance is already being felt, according to the President's 1956 address to the Chamber of Mines. These

/- circumstances ....

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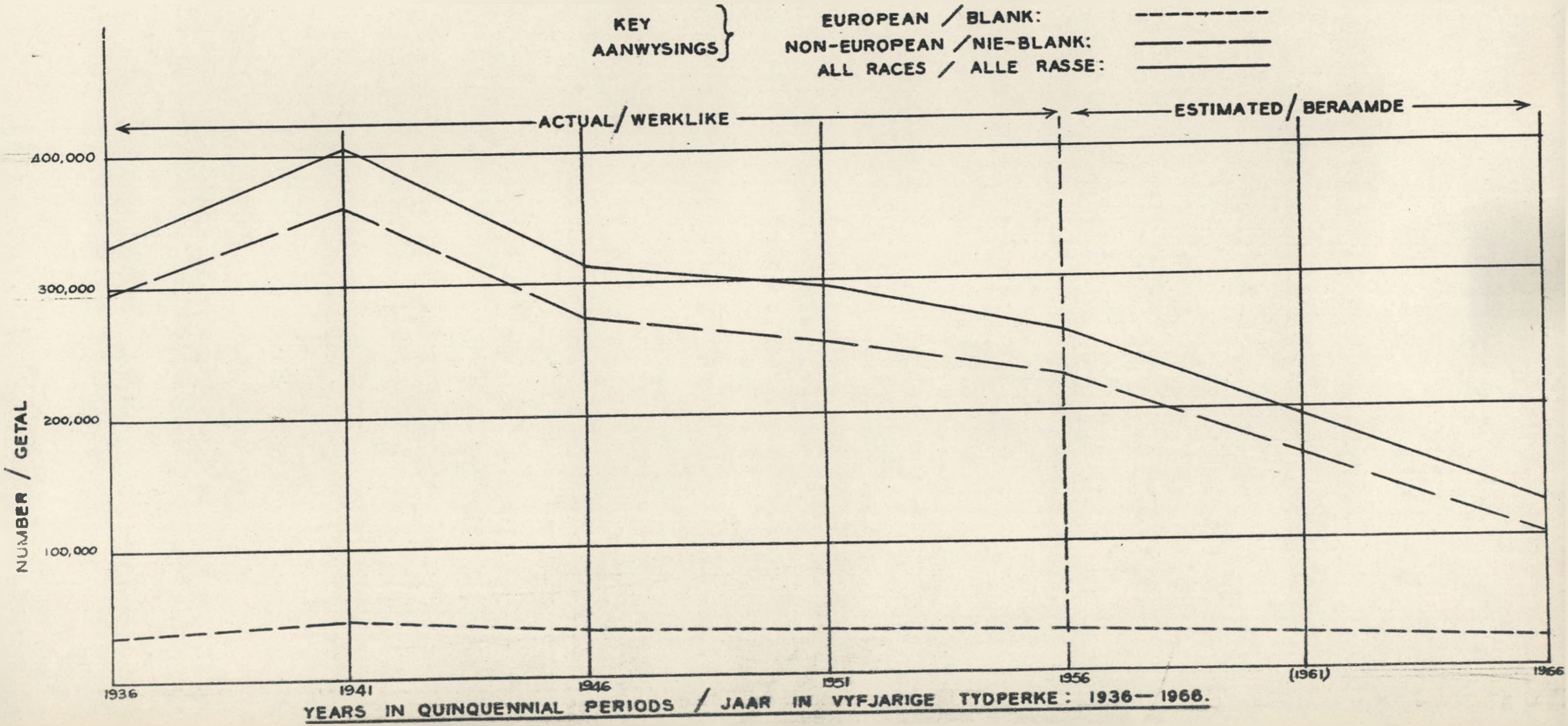
* Chamber of Mines statistics.

FIG./TEK II

EMPLOYMENT IN GOLD-MINING: THE WITWATERSRAND METROPOLITAN REGION, 1936—1966.
WERKNEMERS IN DIE GOUDMYNE: DIE WITWATERSRANDSE METROPOLITAANSE STREEK, 1936—1966.



circumstances must undoubtedly hasten the industry's decline on the Witwatersrand, in spite of the bolstering effect of uranium production from 1953 onwards. Since that year, the working profits on uranium made by members of the Chamber of Mines have increased from £1,828,067 to £24,662,054 in 1956. But only £14,487,898, or 59% of the latter total, (representing an output of some £22 million), were accounted for by mines within the Witwatersrand metropolitan region, and the Minister of Economic Affairs has recently stated that the Union's future share of the uranium market will probably be limited to little more than its present production. Thus, receipts from uranium cannot be expected to offset substantially the estimated fall in the value of gold produced on the Witwatersrand, and by 1966 the region's mining industry will most probably show at current prices a decrease in the annual value of its output over the decade of some £52 million, or 40% of its present income from gold and uranium (if the value of uranium rises to some £35 million).

61. In sum, therefore, recent developments in the gold-mining industry within the Witwatersrand metropolitan region strongly suggest that in 1966 it will be employing 135,500 fewer workers of all races (6,000 Europeans and 127,500 non-Europeans); that at current rates and prices, it will be paying out £22,966,000 less in salaries and wages; and that at 1956 prices its regional income will have fallen by approximately £52 million.

62. Secondary Industry. An industrial revolution has been transforming the social and economic structure of the Union during the last quarter of a century. Employment in secondary industry throughout South Africa increased from 303,557 persons of all races in 1936 to 799,658 in 1953, or by 163%. In 1936, the gross value of the output of all classes of secondary industry, private and government-owned, amounted to £150,378,000. By 1953, it had risen to £1,165,224,000 - an increase of £1,014,846,000. Discounting by the average rise in the wholesale and retail price indexes over this period to allow for changes in the purchasing power of the £ (see Work Table 17), the comparable aggregate value of production in 1953 becomes £456,951,000, and the increase over 1936, £306,573,000, or 206%.

63. In contrast to its recent gold-mining history, the Witwatersrand metropolitan region has played a full part in this rapid economic growth. In 1936, 130,447 workers of all races were employed in secondary industry within its boundaries. In 1953, some 300,200 were so employed, an increase of 193,500, or 130%, in the seventeen years. As the Witwatersrand was more industrialised than the rest of the Union in 1936, this increase is remarkable when compared with that of the Union. In fact, the rest of the Union outside the Southern Transvaal decreased its proportion of the total national employment in private secondary industry from 53.2% to 52.4% between 1936 and 1953.

64. The gross value of goods produced by private secondary industry in the Southern Transvaal increased over this period from £59,806,000 to £498,498,000. Correcting for changes in the wholesale and retail price indexes, the comparable total for 1953 becomes

:- £195,489,000 ....

£195,489,000 - a corrected increase of £135,683,000, or 227% compared with the Union's 206%. Between 1936 and 1953, therefore, the nation's industrial centre of gravity slowly but surely moved northwards towards the Southern Transvaal, and its major nucleus the Witwatersrand metropolitan region.

65. These developments augur well for the industrial future of the region, whose employment trends from 1936 to 1946, and estimated trends from 1946 to 1956 and 1966, are given in Work Tables 8 and 9 and depicted in Figure III. In order to obtain the most accurate statistics possible for the region and its main zones, the Work Tables have been constructed on the basis of the Occupational Censuses for 1936 and 1946 (which give figures for all industries for the major municipalities and their suburbs), of statistics for 1950 prepared from official sources by Dr. F. W. Quass of the Natural Resources Development Council on a magisterial basis for all industries, and of statistics for private industry compiled by magisterial districts for the years 1933, 1943 and 1953 by Dr. H. Brookes of the University of the Witwatersrand. Although these three sets of statistics are not strictly comparable, it has been assumed that the rate of increase in employment in secondary industry as a whole between 1943 and 1953 was the same as that in private industry, and that the increase experienced by secondary industry as a whole between 1943 and 1953 was proportionately equal to that experienced between 1946 and 1956. In addition, the 1946 and 1950 statistics have been used to estimate employment according to sex over the following sixteen years.

66. It has also been assumed that, other things being equal, the rate of development of secondary industry now taking place, and most likely to take place within the region during the next decade, will not be greater than the rate of development obtaining between 1946 and 1956, nor less than the rate obtaining between 1936 and 1946. The mean of these two rates has therefore been taken in order to forecast the most probable employment in 1966 with the least possible error.

67. The resulting estimates of employment in secondary industry within the Witwatersrand metropolitan region in 1956 and 1966, compared with the actual figures for 1936 and 1946, are given in Table XI below (and in Figure III).

:- TABLE XI ....

FIG./TEK. III.

EMPLOYMENT IN SECONDARY INDUSTRY: THE WITWATERSRAND METROPOLITAN REGION, 1936–1966.
WERKNEMERS IN SEKONDÊRE NYWERHEID: DIE WITWATERSRANDSE METROPOLITAANSE STREEK, 1936–1966.

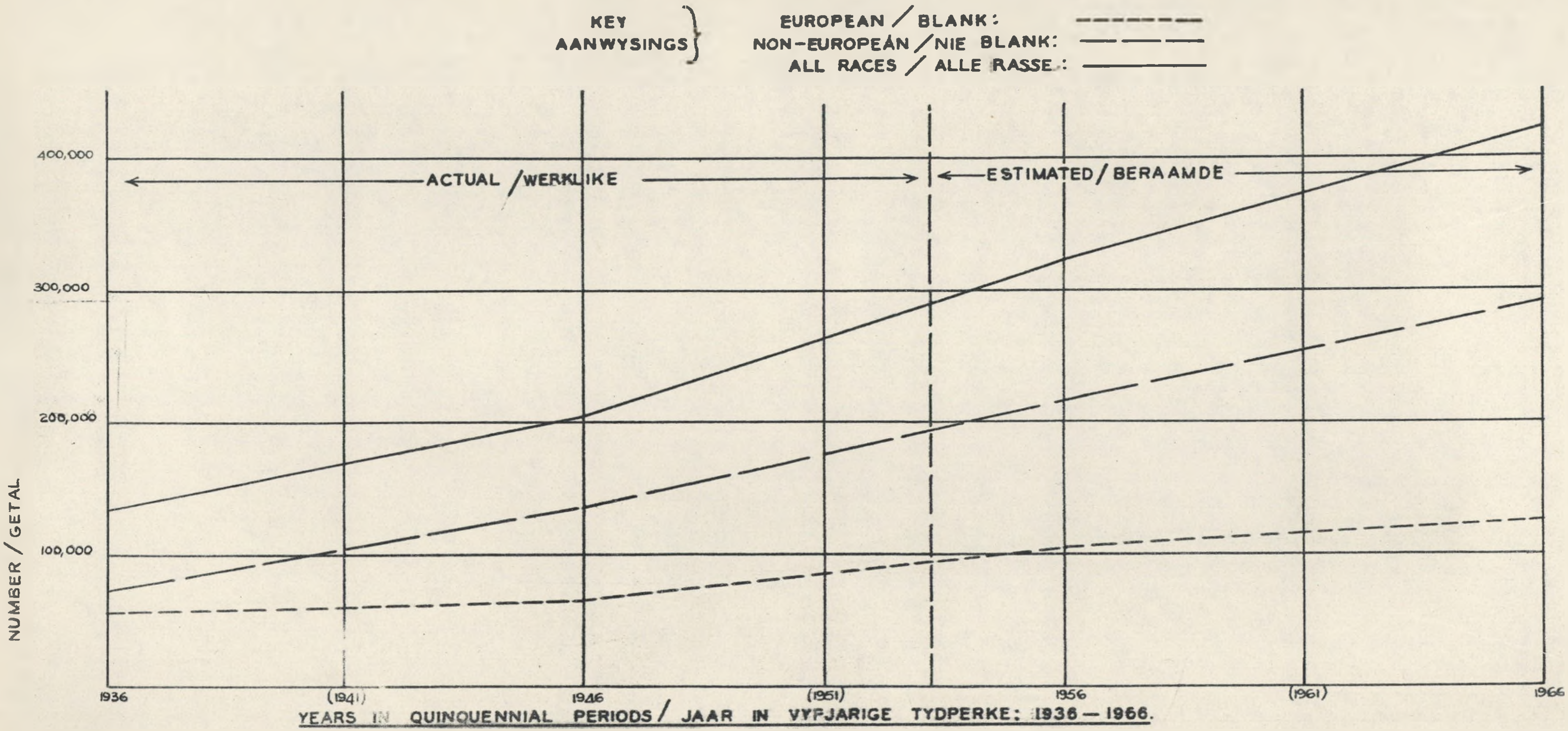


TABLE XI : ACTUAL AND ESTIMATED EMPLOYMENT IN SECONDARY INDUSTRY : THE WITWATERSRAND METROPOLITAN REGION : 1936 - 1966.

Year	Employment in Secondary Industry								
	European			Non-European			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1936	49,105	8,437	57,542	72,226	679	72,905	121,331	9,116	130,447
1946	58,349	9,143	67,492	128,077	7,356	135,433	186,426	16,499	202,925
1956	74,000	31,000	105,000	210,000	9,000	219,000	284,000	40,000	324,000
1966	84,000	44,000	128,000	283,000	10,000	293,000	367,000	54,000	421,000

Source : Work Tables 8 and 9.

68. The trends from 1936 to 1966 revealed by Table XI can be expressed as follows:-

(a) Total employment in secondary industry is estimated to increase by 290,500 workers, or 222.6%. This increase is made up of 70,500 Europeans and 220,000 non-Europeans, and the ratio of European to non-European employment falls from 1:1.27 to 1:2.29. At present, the ratio is 1:2.09.

(b) Amongst the European group, the proportion of male workers tends to decrease from 85.4% to 65.7% over the thirty years. Amongst the non-European group, the female workers also tend to increase proportionately - from 0.9% to 3.4% - but in both cases the estimates are hypothetical and based only on the rates of change between 1946 and 1950.

(c) Taking all races together, male employment increases by 245,700 workers and female employment by 44,900; but the proportion of male workers drops slightly from 93.0% to 87.2% of total industrial employment. This trend is probably correct, although the magnitudes are based on the changes between 1946 and 1950 only.

69. As regards the gross value of production, and wages and salaries paid, in all industry, at 1956 prices the apparent trends are as follows, Table XII.

:- TABLE ....

TABLE XII : COMPARATIVE TRENDS IN THE GROSS VALUE OF PRODUCTION AND WAGES AND SALARIES PAID IN SECONDARY INDUSTRY : THE WITWATERSRAND METROPOLITAN REGION : 1936-1966 : AT 1956 PRICES.

Year	Gross Value of Production.		Wages and Salaries Paid.	
	£	Index No.	£	Index No.
1936	156,203,000	100	43,689,000	100
1946	253,978,000	163	74,320,000	170
1956	516,000,000*	330	112,300,000*	257
1966	644,000,000	412	146,000,000+	334

* The 1956 estimated values are based on the average values per employee in 1951, 1952 and 1953, corrected for 1956 prices. + At 1956 rates.

Source : Work Tables 8, 9 and 17, and Industrial Censuses for 1936, 1946 and 1951-53.

70. Making due allowance for probable errors in forecasting, the index numbers in Table XII clearly indicate an unprecedented industrial development in the last twenty years. Moreover, at prices and wage rates ruling in 1956, it is well within the bounds of possibility for the gross annual value of the output of secondary industry on the Witwatersrand to increase still further by £128 million by 1966, and for wages and salaries to increase by just under £34 million. The ratio between the annual gross value of production and the industrial wage bill remains at roughly 4:1, although tending to increase in favour of the gross value of production. Since these estimated increases are in fact the mean of the increases between 1936 and 1946, and 1946 and 1956, the totals forecast for 1966 are not unrealistic; provided no important changes in national and international economic conditions take place during the next decade, and there is a gradual rise in the general level of prices. It is true that the index numbers show a tendency for wages and salaries to lag behind the gross value of production, but this trend was already apparent in the actual returns between 1946 and 1953. For example, in the Southern Transvaal, the gross value of industrial output at constant prices rose from an index of 100 in 1936 to 187 in 1946, and 288 in 1953. Wages and salaries rose from 100 in 1936 to 189 in 1946, but to only 229 in 1953. It is not possible to comment on these changes without further analysis, however, as so many possible factors must be considered.

71. Commerce and Administration. It is impossible to measure the value of commercial and administrative activities as defined in this section, either from the standpoint of output or as wages and salaries. Moreover, the only available census statistics relate to the years 1936 and 1946, except in the case of Europeans in 1951. Even in this case, however, the figures have been compiled on a different basis from that used in previous years. Nevertheless, some attempt can be made to chart the most probable course of development between 1946 and 1956 within the Witwatersrand metropolitan region in terms of employment.

:- 72. ....

72. Work Table 10 and Table XIII below have been constructed by comparing the rates of increase in employment in secondary industry and in commerce and administration (as defined) between 1936 and 1946 in the main municipal areas and adjacent suburbs. The difference between these rates has been added to the rate of increase computed for secondary industry between 1946 and 1956, so that a fairly accurate forecast has been made for the latter year. Reducing this difference proportionately to the estimated slower trend of industrial development between 1956 and 1966, to reflect a generally slower tempo of evolution, a final less accurate but reasonable forecast has then been made for 1966. Such a close linkage between the development of secondary industry and commerce and administration is in fact realistic, and the resulting estimates are sufficiently reliable for present purposes, which are to indicate trends rather than magnitudes.

73. As depicted in Figure IV, the trends are as follows, Table XIII.

TABLE XIII : ACTUAL AND ESTIMATED EMPLOYMENT IN COMMERCE AND ADMINISTRATION : THE WITWATERSRAND METROPOLITAN REGION : 1936-1966.

Year	Employment in Commerce and Administration								
	European			Non-European			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1936	49,918	21,740	71,658	23,893	441	24,334	73,811	22,181	95,992
1946	66,053	35,187	101,240	50,645	1,998	52,643	116,698	37,185	153,883
1956	93,000	57,000	150,000	95,000	5,000	100,000	188,000	62,000	250,000
1966	114,000	76,000	190,000	131,000	7,000	138,000	245,000	83,000	328,000

Source : Work Table 10.

The most significant features of this Table are as follows:-

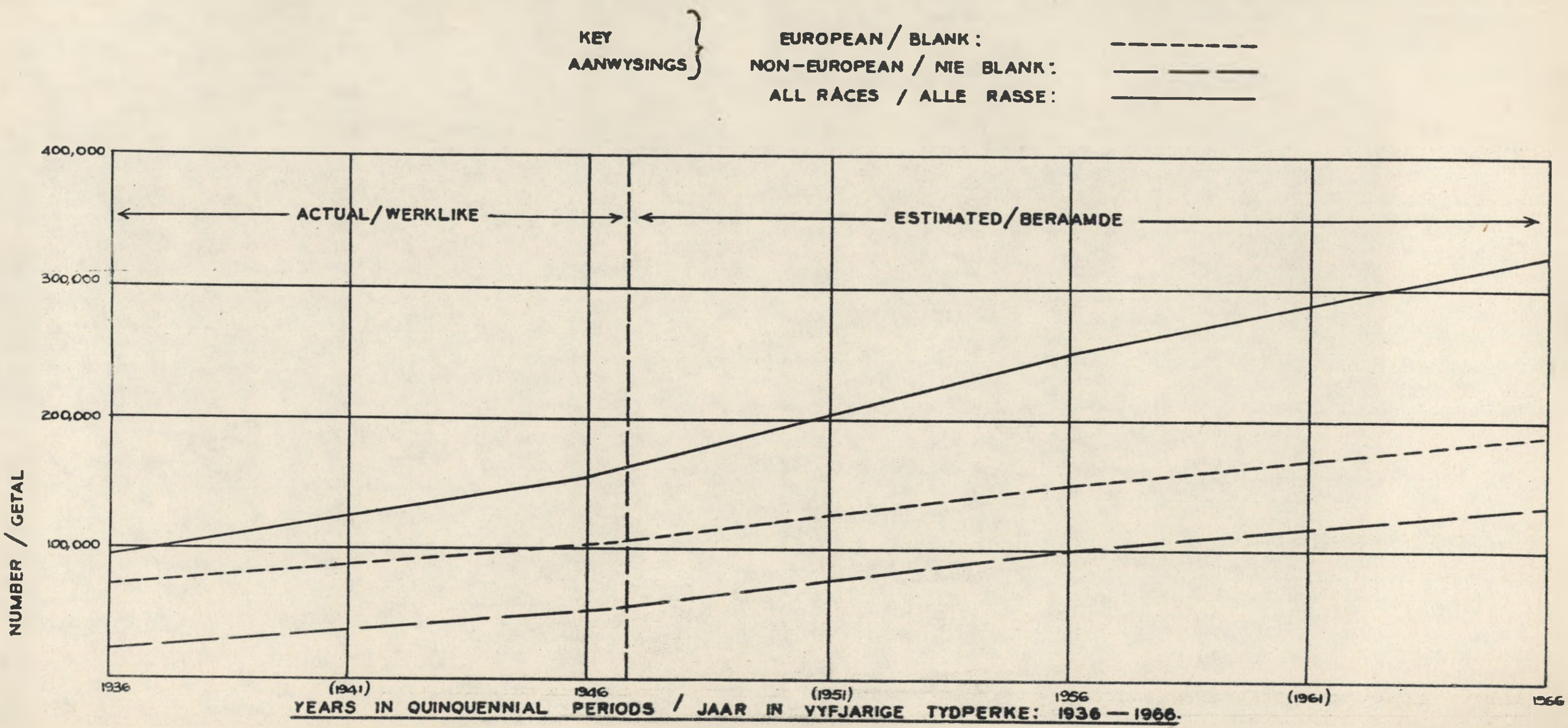
(a) Unlike gold-mining and secondary industry, employment in commerce and administration is predominantly European, and the number of female employees is almost twice that of secondary industry.

(b) Total employment in this activity is estimated to increase by 232,000 workers between 1936 and 1966, or by 242%. This increase is made up of 118,300 Europeans and 113,700 non-Europeans, and the ratio of European to non-European employment falls from 1:0.34 to 1:0.73; but the estimated European increase is one-and-one-half times that forecast in secondary industry, and the non-European increase is only one-half of that expected in the latter activity.

:- (c) ....

FIG. /TEK. IV.

EMPLOYMENT IN COMMERCE AND ADMINSTRATION: THE WITWATERSRAND METROPOLITAN REGION, 1936 — 1966.
WERKNEMERS IN HANDEL EN ADMINISTRASIE: DIE WITWATERSRANDSE METROPOLITAANSE STREEK, 1936 — 1966



(c) The estimated increase in total employment is proportionately greater than that estimated for secondary industry, in spite of the rapid development allowed for in the latter's case. In short, although commerce and administration will still take second place to secondary industry in 1966 as an employer, it will most probably be slowly catching up on the latter.

(d) Amongst the European group, and in contrast to secondary industry, the proportion of male workers tends to fall between 1936 and 1966 from 69.7% to 60.0%. Amongst the non-European group, the proportion of male workers also tends to fall, but only from 76.9% to 74.7% .

74. Before any firm conclusions can be drawn as to the aggregate effect on the regional economy of these various developments in gold-mining, secondary industry and commerce and administration, it is necessary to examine tendencies within the inner and outer metropolitan zones, as there are some striking differences in their probable employment trends.

75. The Witwatersrand Inner Metropolitan Zone.

Gold-Mining. The past and probable future trends in gold-mining in this zone are summarised in Table XIV below from Work Table 2. The method of forecasting has already been explained in para. 59 above.

TABLE XIV : GOLD-MINING STATISTICS : THE WITWATERSRAND INNER METROPOLITAN ZONE : 1936-1966.

Year	Gold Output ozs. fine.	Value	Employment in Service		
			European	Non-European	Total
1936	3,364,601	£23,557,119	12,980	105,015	117,995
1946	3,344,233	£28,844,010	14,014	88,366	102,380
1956	2,598,717	£30,449,787	10,390	78,234	88,624
1966	1,000,000	£12,487,000*	9,000	43,000	52,000

* At the 1956 price of gold.

Source : Work Table 6.

76. Table XIV only too clearly illustrates the erosion of the old core of the Union's mining industry. Only by increases in the price of gold greater than those experienced between 1946 and 1956, and by new and costly deep-level mining wherever possible, can the zone hope to bolster up its former leading basic activity. The remarks made by

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the President of the Chamber of Mines in 1956 apply with greatest force to the inner metropolitan zone, where the oldest mines are situated, and there is at present every indication that in 1966 the gold-mining industry will probably have a zonal income for the year of only £12,487,000. This will be over £18 million less than its 1956 income, and it will have no uranium profits to draw upon. Employment will, in all probability, decline to the low figure of 52,000 workers; a decrease of nearly 1,400 Europeans and 35,200 non-Europeans, or 36,600 all told. At 1956 rates and prices, this will mean a drop in wages and salaries of £5,120,000 - from the present level of £13,936,000 to approximately £8,816,000. In effect, the gold base of the zonal economy will have almost disappeared in ten years' time, and the transition from gold-mining to secondary industry will thus have been completed for all practical purposes.

77. <u>Secondary Industry</u>. The pace of this transition is forcibly illustrated by reference to past trends, and future estimated trends, in employment in secondary industry summarised below in Table XV.

TABLE XV : ACTUAL AND ESTIMATED EMPLOYMENT IN SECONDARY INDUSTRY : THE WITWATERSRAND INNER METROPOLITAN ZONE : 1936 - 1966.

Year	Employment in Secondary Industry.								
	European			Non-European			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1936	41,311	8,174	49,485	63,149	645	63,794	104,460	8,819	113,279
1946	49,099	8,575	57,674	114,482	7,022	121,504	163,581	15,597	179,178
1956	63,000	28,000	91,000	195,000	8,000	203,000	258,000	36,000	294,000
1966	71,000	40,000	111,000	265,000	9,000	274,000	336,000	49,000	385,000

Source : Work Table 13.

78. The main features of Table XV are as follows:-

(a) Subject to a fairly wide margin of error, total employment in secondary industry is estimated to increase between 1936 and 1966 by 271,700 workers or 240%. This estimated increase is proportionately more rapid than that of the region as a whole (222.6%) and is made up of 61,500 Europeans and 210,200 non-Europeans. The ratio of European to non-European employment drops from 1:1.29 to 1:2.47, which is lower than that in the region generally.

(b) Amongst the European group, the proportion of male workers decreases from 83.5% to 63.9% (which is about the same as in the region generally, and as hypothetical). Amongst the non-European group, the proportion decreases from 98.9% to 96.7% (which is

:- less ....

less than for the region generally). These changes probably reflect the varying influences on the inner zone's working population of its three leading industrial divisions. On the one hand, over 97% of the employees in metal and engineering and chemicals and paints are male. On the other hand, over 48% of the employees in clothing and textiles are female.

(c) Taking all races together, male employment increases by 231,500 workers and female employment by 40,200. The proportion of male workers drops from 92.2% to 87.3%, but this fall is subject to a wide margin of error.

(d) Comparing Tables XV and XI, total employment in secondary industry in the inner zone advances from 87% to 91% of the total for the region.

79. As regards the gross value of production, and the wages and salaries paid in all industry, at 1956 prices the trends appear to be as follows, Table XVI.

TABLE XVI : COMPARATIVE TRENDS IN THE GROSS VALUE OF PRODUCTION AND WAGES AND SALARIES PAID IN SECONDARY INDUSTRY : THE WITWATERSRAND INNER METROPOLITAN ZONE : 1936-1966 : AT 1956 PRICES.

Year	Gross Value of Production		Wages and Salaries Paid	
	£	Index No.	£	Index No.
1936	135,647,000	100	37,940,000	100
1946	224,255,000	165	65,622,000	173
1956	468,200,000	345	101,900,000	269
1966	590,000,000	435	133,500,000	352

For the source and method of calculation see Table XII.

80. A comparison with Table XII emphasises that the rate of industrial development in the Witwatersrand metropolitan region since 1936 has been greatest in its inner zone - where the Johannesburg magisterial district accounted for 60% of total employment in secondary industry in 1950 - and that the inner zone's preponderance is increasing. At current prices and wage rates, it is quite possible for the gross value of its industrial output to increase between 1956 and 1966 by £122 million, and for wages and salaries in its secondary industry to increase by over £31 million.

81. Commerce and Administration. The trends in zonal employment in this group of economic activities are summarised in Table XVII below on the same basis as for the region generally. They reflect developments in Johannesburg even more directly than the trends in secondary

:- industry ....

industry, as over 70% of the employees concerned find their work in this city, and especially in its central business district.

TABLE XVII : ACTUAL AND ESTIMATED EMPLOYMENT IN COMMERCE AND ADMINISTRATION : THE WITWATERSRAND INNER METROPOLITAN ZONE : 1936-1966.

Year	Employment in Commerce and Administration								
	European			Non-European			All Races		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
1936	45,438	19,844	65,282	20,876	407	21,283	66,314	20,251	86,565
1946	59,676	31,376	91,052	47,441	1,814	49,255	107,117	33,190	140,307
1956	83,000	51,000	134,000	91,800	4,200	96,000	174,800	55,200	230,000
1966	102,000	66,000	168,000	127,000	6,000	133,000	229,000	72,000	301,000

Source : Work Table 13.

82. The main features of Table XVII conform to those of the region as a whole appearing in Table XIII above. Subject to a fairly wide margin of error, total employment is expected to increase between 1936 and 1966 by 214,400 workers or 241%. As in the region, this rate of increase is a little faster than that for secondary industry. It is expected to add 102,700 European and 111,700 non-European employees during the thirty years, so that the ratio of European to non-European employment tends to fall from 1:0.33 to 1:0.80. Amongst the European group, the proportion of male workers shows a decrease from 69.6% to 60.7%, and amongst the non-European group the proportion of male workers tends to fall very slightly from 76.6% to 76.08%. All these percentages are almost identical to those of the region as a whole, except in the case of the decrease in male non-Europeans. Even here the difference is negligible considering the possible margin of error.

83. <u>The Witwatersrand Outer Metropolitan Zone.</u>

This survey would not be complete without some reference to the outer metropolitan zone. Although economically integrated with the inner zone from the standpoint of the region as a whole, it nevertheless does display certain individual characteristics sufficient to distinguish it from that zone. For example, in section II its only basic activity, other than certain divisions of secondary industry, was found to be gold-mining. The zone's trends and estimated trends in employment from 1936 to 1966 underline this fact, as Table XVIII shows.

:- TABLE ....

TABLE XVIII : TRENDS AND ESTIMATED TRENDS IN EMPLOYMENT : THE WITWATERSRAND OUT METROPOLITAN ZONE : 1936-1966.

Year	Gold-Mining			Secondary Industry			Commerce and Industry		
	E	N-E	Total	E	N-E	Total	E	N-E	Total
1936	21,973	190,727	212,700	8,057	9,111	17,168	6,376	3,051	9,427
1946	21,982	145,477	145,477	9,818	13,929	23,747	10,188	3,388	13,576
1956	21,623	150,245	171,868	14,000	16,000	30,000	16,000	4,600	20,600
1966	15,000	58,000	73,000	17,000	19,000	36,000	22,000	5,000	27,000

Source : Work Table 16.

84. The most striking feature of this Table is the strong probability that the outer metropolitan zone will have lost the greater part of its basic economic activity by 1966, if current estimates are at all reliable. The ratio between employment in gold-mining and in secondary industry and commerce and administration combined is expected to fall drastically from 8:1 to a little over 1:1. Moreover, at current rates and prices, the annual wages and salaries paid in the mining industry can be expected to drop from £30,226,000 to £12,900,000 by 1966, and employment in secondary industry is tending to develop more slowly than in the region as a whole.

85. On the other hand, while the annual income of the zone derived from gold-mining is expected to fall (at the 1956 price) from £78,441,000 in 1956 to £31,228,000, or by £47,213,000,. the whole of the region's uranium output comes from the outer metropolitan zone. This means that the estimated annual income from both sources in 1966 will be some £66,000,000, and the decrease only £34 million. Moreover, both the eastern and western portions of the zone are not so far distant from new gold-mining activities outside the metropolitan boundaries that they cannot benefit commercially. The relatively rapid rate of increase in employment in commerce and administration forecast for the next decade may well reflect benefits which Springs will derive from new mines in the Kinross area, fifty miles to the east, and which Randfontein and Krugersdorp can derive from developments on the far west Rand between Ventersspost and Klerksdorp.

86. Yet, at 1956 prices, the gross value of output from secondary industry, and the aggregate of wages and salaries paid, increased, or are estimated to increase, only as shown in Table XIX below.

:- TABLE ....

TABLE XIX : THE GROSS VALUE OF PRODUCTION AND WAGES AND SALARIES PAID IN SECONDARY INDUSTRY : THE WITWATERSRAND OUTER METROPOLITAN ZONE : 1936-1966 : AT 1956 PRICES.

Year	Gross Value of Production		Wages and Salaries Paid	
	£	Index No.	£	Index No.
1936	20,556,000	100	5,749,000	100
1946	29,723,000	145	8,698,000	151
1956	47,800,000	233	10,400,000	181
1966	54,000,000	263	13,500,000	235

For source and explanation see Table XII.

87. Clearly, the development of secondary industry between 1936 and 1956 in the outer metropolitan zone cannot compare with that experienced in the inner zone, and cannot be expected to do so by 1966. At current prices and rates, the outer zone can hope for little more than an increase of £6,200,000 in its annual income by that date, and an addition of £3,100,000 to its wage bill. Subject to errors in forecasting, which may well be large, its total employment in 1966 in gold-mining, secondary industry, and commerce and administration combined, can be expected to fall short of its employment in gold-mining alone in 1936 by some 77,000 workers.

IV. GENERAL CONCLUSIONS.

88. The Witwatersrand Metropolitan Region.

The essential trends in the economy of the Witwatersrand metropolitan region from 1936 to 1966 are summarised in the following Table, Table XX, and in Figure VII, in terms of employment.

TABLE XX.

EMPLOYMENT TRENDS, ALL RACES: THE WITWATERSRAND METROPOLITAN REGION : 1936 - 1966.

Year	Sex	Economic Activity					Total Employment.	
		Gold-Mining	Secondary Industry	Commerce and Administration.	Agriculture.	Other*	No.	Index No.
1936	M	330,695	121,331	73,811	7,429	62,957	596,223	
	F	-	9,116	22,181	266	50,496	82,059	
	T	330,695	130,447	95,992	7,695	113,453	678,282	100.0
1946	M	311,577	186,426	116,698	9,767	65,836	690,304	
	F	-	16,499	37,185	547	87,637	141,868	
	T	311,577	202,925	153,883	10,314	153,473	832,172	122.7
1956	M	260,492	284,000	188,000	10,900	68,000	811,392	
	F	-	40,000	62,000	650	106,300	208,950	
	T	260,492	324,000	250,000	11,550	174,300	1,020,342	150.4
1966	M	125,000	367,000	245,000	11,800	69,100	817,900	
	F	-	54,000	83,000	800	119,700	257,500	
	T	125,000	421,000	328,000	12,600	188,800	1,075,400	158.5

* Including government, educational, domestic and other service activities.

Source : Work Table 12.

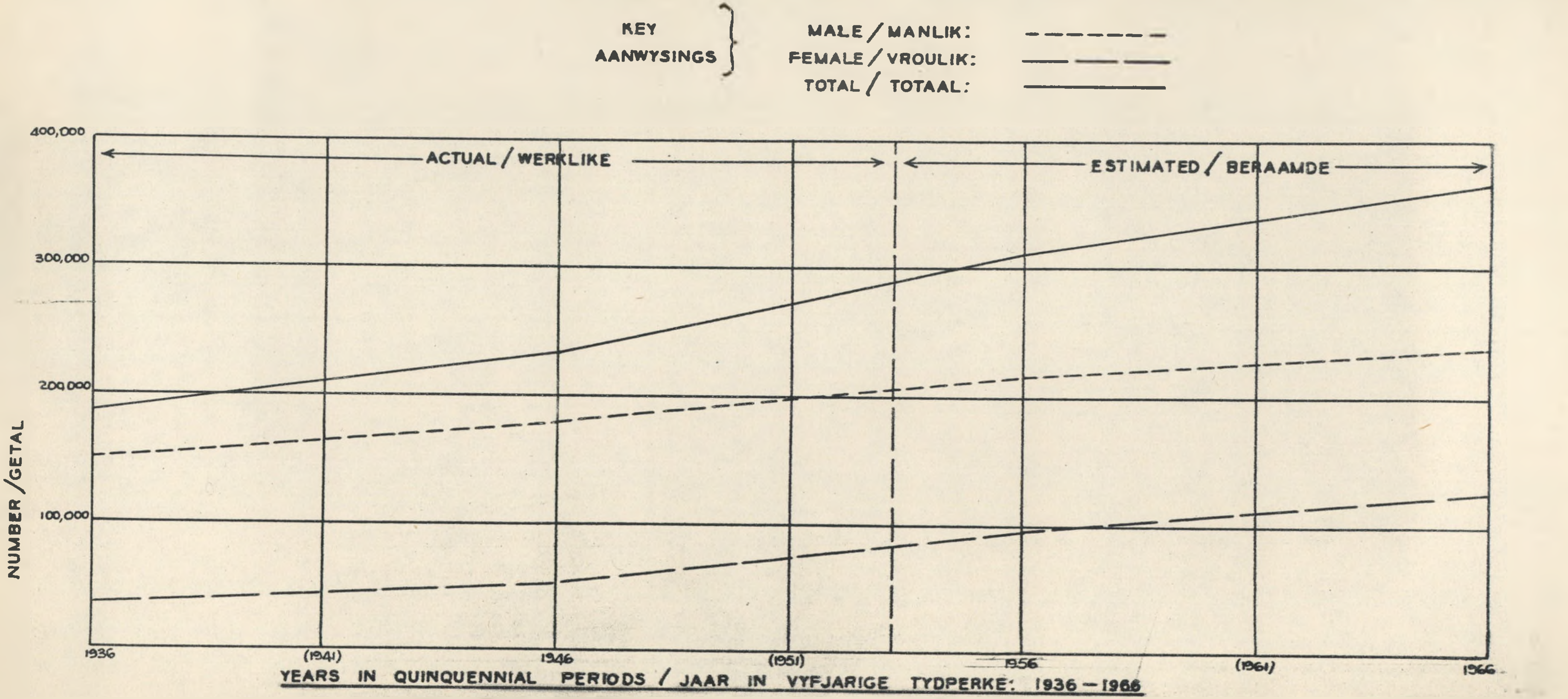
89. These statistics are subject to a substantial margin of error, particularly for 1956 and 1966, but they are considered to be sufficiently valid for the essential purpose of this section. From this standpoint, the first important conclusion is that between 1936 and 1966 total employment tends to rise at an increasing rate during the first twenty years, and thereafter to continue to rise at a decreasing rate. Between 1936 and 1946, it rises by 22.7 points in the index; between 1946 and 1956 it rises more rapidly by 27.7 points; and, thereafter, it rises by only 8.1 points - which is even slower than during the first decade of the thirty years under review.

90. The explanation of this differential expansion of the working population does not lie in the spheres of agriculture or "other" activities, where development is geared to changes in the 15-64 age group. It lies in the contrasting rates of growth being experienced in gold-mining, secondary industry and commerce and administration. Between 1936 and 1946, a decrease of 19,118 in the number of gold-mining employees is more than offset by increases of

:- 72,494 ....

FIG/ TEK. V.

EUROPEAN EMPLOYMENT, ALL ACTIVITIES: THE WITWATERSRAND METROPOLITAN REGION, 1936 – 1966.
BLANKE-WERKNEMERS, ALLE BEDRYWIGHEDE: DIE WITWATERSRANDSE METROPOLITAANSE STREEK, 1936 – 1966.



72,494 and 57,891 in secondary industry and commerce and administration respectively. Likewise, between 1946 and 1956, a much larger decrease of 51,085 in gold-mining is matched by even larger estimated increases of 121,000 and 96,100 respectively. But, between 1956 and 1966, the expected decrease on the mines is 135,500, and this is so large that the increases of 97,000 and 78,000 employees forecast in secondary industry and commerce and administration exceed it by only 39,500.

91. Here, then, is the economic background to the population forecasts made in the first interim report, where the trends showed very similar tendencies, and the beginning of a decreasing rate of increase was more exactly located between 1946 and 1951. But analysis can be taken one step further. Table XXI and Figure VI reflect changes and expected changes in non-European employment on the Witwatersrand between 1936 and 1966.

TABLE XXI.

EMPLOYMENT TRENDS, NON-EUROPEANS: THE WITWATERSRAND METROPOLITAN REGION: 1936-1966.

Year	Sex	Economic Activity					Total Employment.	
		Gold-Mining	Secondary Industry	Commerce and Administration	Agriculture	Other	No.	Index No.
1936	M	295,742	72,226	23,893	5,665	47,564	445,090	
	F	-	679	441	163	44,077	45,360	
	T	295,742	72,905	24,334	5,828	91,641	490,450	100.0
1946	M	273,310	128,077	50,645	7,182	51,011	510,225	
	F	-	7,356	1,998	335	80,670	90,359	
	T	273,310	135,433	52,643	7,517	131,681	600,584	122.5
1956	M	228,479	210,000	95,000	8,000	53,000	594,479	
	F	-	9,000	5,000	400	99,000	113,400	
	T	228,479	219,000	100,000	8,400	152,000	707,879	144.3
1966	M	101,000	283,000	131,000	8,500	54,000	577,500	
	F	-	10,000	7,000	500	112,000	129,500	
	T	101,000	293,000	138,000	9,000	166,000	707,000	144.2

Source : Work Table 12.

92. It will be seen that the annual increase in the non-European working group is slightly less rapid between 1946 and 1956 than between 1936 and 1946, i.e. 21.8 as against 22.5 points. Furthermore, the predicted rate of increase for the period 1956 to 1966 is very much slower, and the index number in fact tends to fall. The reason for this significant and long-term trend is quite clear, however. The total male non-European employment in 1966 is expected to be 17,000 workers less than in 1956. This trend parallels and confirms that forecast in the first interim report for the male non-European population as a whole, when a similar decrease of 17,000 was predicted between 1956 and 1955, and it was therefore concluded that a temporary optimum would be reached in the number of male non-Europeans towards the end of the period. Evidently, the explanation for

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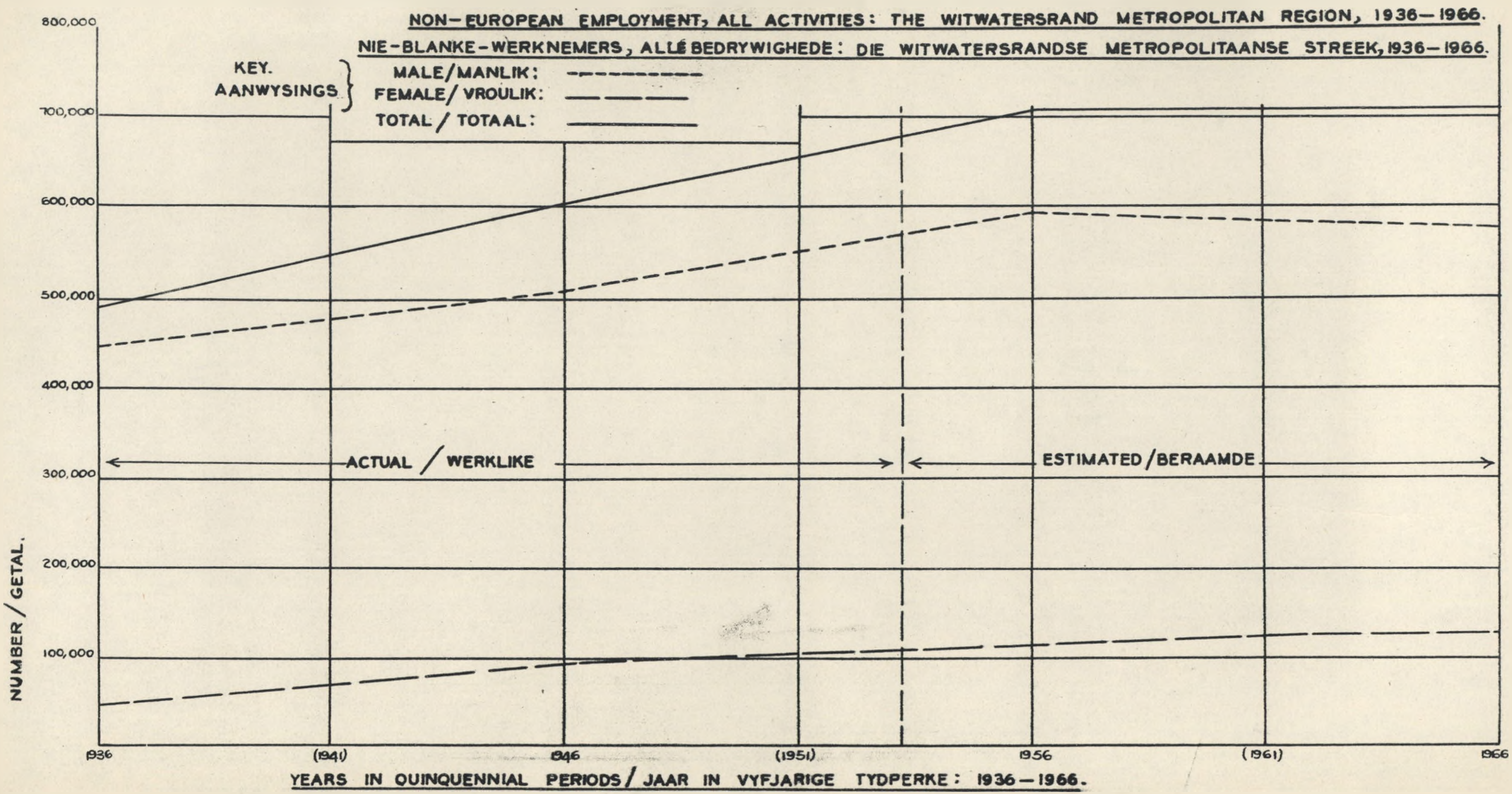
FIG./TEK. VI.



NON-EUROPEAN EMPLOYMENT, ALL ACTIVITIES: THE WITWATERSRAND METROPOLITAN REGION, 1936-1966.
NIE-BLANKE-WERKNEMERS, ALLE BEDRYWIGHEDE: DIE WITWATERSRANDSE METROPOLITAANSE STREEK, 1936-1966.
KEY.
AANWYSINGS
MALE/MANLIK:
FEMALE/VROULIK:
TOTAL / TOTAAL:
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
NUMBER / GETAL.
ACTUAL / WERKLIKE
ESTIMATED / BERAAMDE
1936
(1941)
1946
(1951)
1956
(1961)
1966
YEARS IN QUINQUENNIAL PERIODS / JAAR IN VYFJARIGE TYDPERKE: 1936-1966.

that trend lies mainly in the above Table. The primary cause is a large estimated decrease of 127,500 employees in the mines, which cannot be offset by an estimated increase of 110,500 male workers in all other activities combined. From the standpoint of local government, of course, the exodus of mine workers has no immediate repercussions on the administration of non-European affairs, and its chief concern is with the estimated increase of employment in other activities, which represents an increase of some 300,000 in the non-European population outside the mines.

93. The first interim report also concluded that the regional European population would not be greatly affected by changes in employment in the gold mines. This is borne out by the past and expected future trends in European employment, as shown in Table XXII below and in Figure V.

TABLE XXII.

EMPLOYMENT TRENDS: EUROPEAN, THE WITWATERSRAND METROPOLITAN REGION : 1936 - 1966.

Year	Sex	Economic Activity					Total Employment.	
		Gold-Mining.	Secondary Industary.	Commerce and Administration.	Agriculture	Other	No.	Index No.
1936	M	34,953	49,105	49,918	1,764	15,393	151,133	
	F	-	8,437	21,740	103	6,419	36,699	
	T	34,953	57,542	71,658	1,867	21,812	187,832	100.0
1946	M	38,267	58,349	66,053	2,585	14,825	180,079	
	F	-	9,143	35,187	212	6,967	51,509	
	T	38,267	67,492	101,240	2,797	21,792	231,588	123.3
1956	M	32,013	74,000	93,000	2,900	15,000	216,913	
	F	-	31,000	57,000	250	7,300	95,550	
	T	32,013	105,000	150,000	3,150	22,300	312,463	166.4
1966	M	24,000	84,000	114,000	3,300	15,100	240,400	
	F	-	44,000	76,000	300	7,700	128,000	
	T	24,000	128,000	190,000	3,600	22,800	368,400	196.1

Source : Work Table 12.

94. This Table shows a relatively small decline in European employment on the mines - 11,000 over thirty years - that has little depressive effect on the rate of increase in European employment generally. The index thus rises considerably more steeply after 1946 than before that year, and is still 6.4 points higher between 1956 and 1966. What is more important, however, is to compare these rates of increase with those of non-European employment. Because of the different effects of gold-mining on the two race groups, and because the ratio of European to non-European labour in secondary industry is only 1: 1.89 as against 1: 7.25 in gold-mining (1951), the trend is actually towards a more European labour force as the years pass. In 1936, 27.70% of all gainfully-employed persons were European; by 1946, the proportion had increased to 27.83%; by 1956, it had risen to 30.62%; and by 1966, it will in all probability have increased still further to 34.26%

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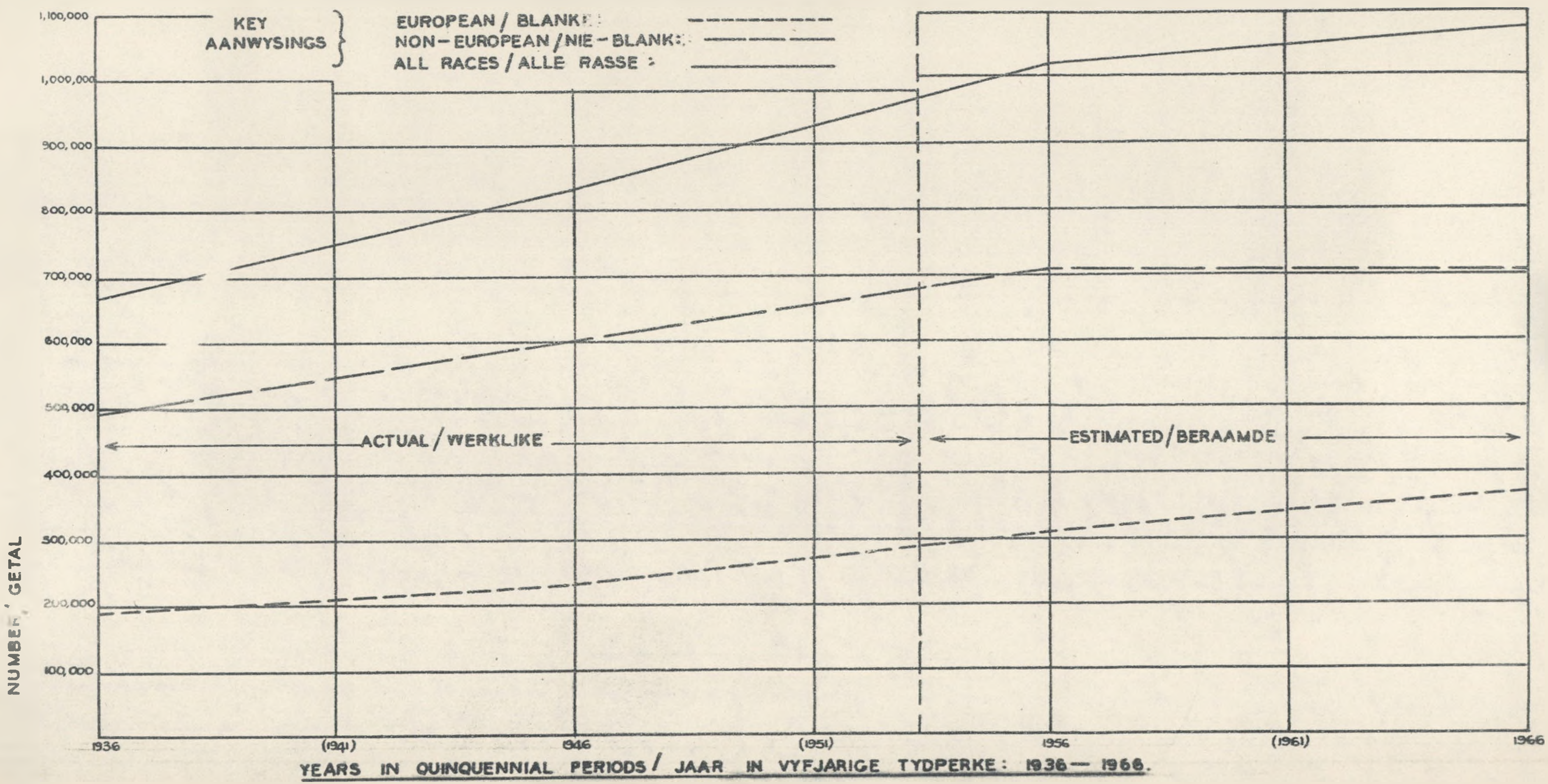
FIG/TEK. VII.

EMPLOYMENT, ALL RACES AND ALL ACTIVITIES: THE WITWATERSRAND METROPOLITAN REGION, 1936—1966.
WERKNEMERS, ALLE RASSE EN ALLE BEDRYWIGHEDE: DIE WITWATERSRANDSE METROPOLITAANSE STREEK, 1936—1966.



95. This conclusion may not agree with impressions gained from every-day experience in the Reef municipalities, but gold-mining is the key to the trends described. The non-European labour on the mines has been segregated from the population in general, and has been administered and controlled by the mines themselves. The growing labour force needed for secondary industry and commerce and administration is not so segregated, and the development of its non-European element, which is more rapid than the European in the case of secondary industry, is patently visible and directly affects local authorities. Moreover, because of its growing numbers of children and females, the non-European population as a whole is tending to increase at a slightly faster proportionate rate than the European population. Nevertheless, these circumstances merely confuse the issue, which is that, for the time being, the total labour force employed in the Witwatersrand metropolitan region is becoming more European as gold-mining declines. However, as indicated in the first interim report, conditions differ from one magisterial district to another and especially between the inner and outer metropolitan zones. What is true for the region as a whole may not be true for certain of its parts, and reference to changes in the inner metropolitan zone confirm that this is so.

96. However, before turning to consider this zone, reference must also be made to relative values of production and wages and salaries paid, as well as to employment statistics. The possible repercussions of the employment trends so far described should not be under-estimated. Nevertheless, if relative values are taken into account, there are grounds for believing that they need not seriously embarrass the regional economy. The values concerned can be summarised as follows:

TABLE XXIII

TRENDS IN THE GROSS VALUE OF PRODUCTION AND IN WAGES AND SALARIES PAID IN GOLD-MINING AND SECONDARY INDUSTRY : THE WITWATERSRAND METROPOLITAN REGION: 1936 - 1966 - AT 1956 PRICES.

Year	Gross Value of Production.				Wages and Salaries Paid.			
	Gold-Mining.	Secondary Industry.	Total	Per Head of Population.	Gold-Mining ∅	Secondary Industry.	Total	** Per Head of Employment.
	£1,000	£1,000	£1,000	£	£1,000	£1,000	£1,000	£
1936	132,706	156,203	288,909	266	60,766	46,689	107,455	233
1946	134,953	253,978	388,931	256	55,465	74,320	129,785	252
1956	130,891*	516,000	646,891	340	44,162	112,300	156,462	268
1966	79,000*	644,000	723,000	327	21,196+	146,000+	167,196	306

* including the value of uranium production.

** in gold-mining and secondary industry.

+ at 1956 rates.

∅ Chamber of Mines only.

Source : Tables X, XII and XX, and Work Table 17, and Work Table I of the first interim report.

97. While there is certainly no room for complacency in these figures, which are subject to a fairly wide margin of error, they do suggest that at 1956 prices the gross value per head of population of the combined output of the gold mines and secondary industry is likely to fall by very little during the next decade, in spite of an expected 40% decline in the value of gold and uranium production (at 1956 prices). Moreover, it must be remembered that commerce and administration is not only developing at least as rapidly as secondary industry, but is also an earner of regional imports.

98. On the other hand, if attention is focussed on this aspect of the regional economy, i.e. on the "basicness" of its major economic activities, it must be observed that, as shown in section II, gold-mining has a much higher export potential than either secondary industry or commerce and administration. The conclusions reached in para. 97 do not allow for these differences in the regional earning capacities of gold-mining and secondary industry, and must be modified to that extent. If the annual value of gold and uranium production should drop by £52 million as estimated, other activities must increase their regional exports by at least this amount if the region's economic base is to remain more or less intact. The burden will fall mainly on secondary industry, and in particular on its three leading divisions of metal and engineering, clothing and textiles, and chemicals and paints. It is on their development especially that the region must rely to meet the challenge presented by the decline in mining. And, in the final analysis, the decisive factor will be the expansion of their regional export trade. Should the metal and engineering industries tend to migrate to the new gold fields, the repercussions on the region's economic base will thus be serious; but present indications are that no such movement will in fact take place.*

99. As regards wages and salaries paid per head of employment in mining and secondary industry, Table XXIII suggests a persistant upward trend throughout the thirty years. The wages and salaries paid per head of population will, of course, tend to fall, because the 15 - 64 age group is forming a smaller proportion of the total population, and because employment is growing faster in commerce and administration than in secondary industry. Even so, the amounts in question for 1936, 1946, 1956 and 1966 are £99, £84, £82 and £76 per head respectively, and the estimated fall between 1956 and 1966 is less than one-half of that experienced between 1936 and 1946.

100. It seems, therefore, that, leaving aside the questions of re-absorbing unemployed European miners and of the efficiency of labour generally, wages and salaries lost on the gold mines should at least be made up by gains in secondary industry, and that the combined purchasing power of the employees in these two groups of activities should increase rather than decline.** On balance, therefore, the net effect on the wholesale and retail trades should be positive, in which case the forecasts for commerce and administration made above may prove to be too conservative. But much will depend on the ability of secondary industry to take the place of the gold mines in the regional export field, and on the availability of land, labour, finance and raw materials to

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* The direct links between gold-mining and secondary industry are being explored by the N.R.D.C. Interim Committee, but because mining is still developing in the Union as a whole, the Witwatersrand should continue to benefit either directly or indirectly, if no industrial exodus takes place.

** No allowance is made here, or elsewhere in this report, for savings out of earned income.

permit it to do so.

101. The Witwatersrand Inner Metropolitan Zone.

As far as the inner metropolitan zone is concerned, and therefore Johannesburg in particular (whose magisterial district accounted for some 65% of the zone's total employment in 1951), the trends described in section III can be summarised as follows:

TABLE XXIV.

EMPLOYMENT TRENDS, ALL RACES; THE WITWATERSRAND INNER METROPOLITAN ZONE : 1936-1966.

Year	Sex.	Economic Activity.					Total Employment	
		Gold-Mining.	Secondary Industry.	Commerce and Administration.	Agriculture.	Other*	No.	Index No.
1936	Male	117,995	104,460	66,314	5,764	54,068	348,601	
	Female	-	8,819	20,251	220	43,079	72,369	
	Total	117,995	113,279	86,565	5,984	97,147	420,970	100.0
1946	Male	144,118	163,581	107,117	7,328	54,817	476,961	
	Female	-	15,597	33,190	399	73,492	122,678	
	Total	144,118	179,178	140,307	7,727	128,309	599,639	142.4
1956	Male	88,624	258,000	174,800	8,000	55,500	584,924	
	Female	-	36,000	55,200	500	89,000	180,700	
	Total	88,624	294,000	230,000	8,500	144,500	765,624	181.9
1966	Male	52,000	336,000	229,000	8,600	56,000	681,600	
	Female	-	49,000	72,000	575	99,800	221,375	
	Total	52,000	385,000	301,000	9,175	155,800	902,975	214.5

* Including government, educational, domestic and other service activities.

Source : Work Table 15.

102. Making every allowance for probable errors in forecasting, it is at least evident that the employment trends within the inner metropolitar zone differ substantially from those of the region as a whole. Employment expands by 42.4 points between 1930 and 1946 (as against 22.7), by 39.5 points between 1940 and 1956 (as against 27.7), and by 32.6 points between 1956 and 1966 (as against 8.1). The initial decennial expansion is high because, unlike the

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region as a whole, employment in the mines increased between 1936 and 1946. The final decennial rate of increase falls off only slightly, because the estimated drop of 36,000 workers in gold-mining is not sharp, and secondary industry alone is forecast to increase by 91,000.

103. Table XXIV thus gives the economic background to the conclusion reached in the first interim report that the population of the inner zone is increasing at a faster rate than the population of the region as a whole. A second conclusion reached in that report is that the European population is increasing at its fastest rate in the inner metropolitan zone. The employment trends in Table XXV below emphasise this tendency and indicate the essential economic reasons.

TABLE XXV.

EMPLOYMENT TRENDS, EUROPEANS : THE WITWATERSRAND INNER METROPOLITAN ZONE : 1936 - 1966.

Year	Sex.	Economic Activity.					Total Employment	
		Gold-Mining.	Secondary Industry	Commerce and Administration.	Agriculture.	Other	No.	Index No.
1936	Male	12,980	41,311	45,438	1,481	13,078	114,283	
	Female	-	8,174	19,844	88	5,748	33,854	
	Total	12,980	49,485	65,282	1,569	18,821	148,137	100.0
1946	Male	16,285	49,099	59,676	2,086	12,677	139,823	
	Female	-	8,575	31,376	186	6,063	46,200	
	Total	16,285	57,674	91,052	2,272	18,740	186,023	125.6
1956	Male	10,390	63,000	83,000	2,300	12,800	171,490	
	Female	-	28,000	51,000	200	6,300	85,500	
	Total	10,390	91,000	134,000	2,500	19,100	256,990	173.5
1966	Male	9,000	71,000	102,000	2,600	12,900	197,500	
	Female	-	40,000	66,000	225	6,600	112,825	
	Total	9,000	111,000	168,000	2,825	19,500	310,325	209.5

Source : Work Table 15.

104. The most significant feature of this Table is the overwhelming and growing importance of commerce and administration. Accounting for 44% of the total European employment in 1936, it is estimated to account for as much as 54% in 1966. The growth of the Johannesburg central business district is undoubtedly the main factor in this commercial expansion, and the Table as a whole is

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a clear reflection of the increasingly rapid transition of the zone from the stage of a gold-mining community to that of a metropolitan society.

105. Although, taking all races together, Table XXIV shows that even by 1966 commerce and administration will not have caught up secondary industry as an employer of labour, its development as an employer of Europeans gives rise very largely to the physical, traffic, market and other metropolitan phenomena described in the first interim report, and indicates an advanced metropolitan character. Moreover, it is plain that commerce and administration is the major economic factor underlying the more than proportionate growth of the European population in the inner metropolitan zone. While regional European employment increases between 1936 and 1966 by 96.1 points, that of the inner metropolitan zone increases by 109.5 points - and commerce and administration provides the greatest avenues of employment. This differential growth also gives further grounds for the conclusion reached in the first interim report that European migration is tending to take place from the outer to the inner zone. Of more importance for local government, however, is the trend in the distribution of the non-European population, and the employment statistics given in Table XXVI analyse this aspect.

TABLE XXVI.

EMPLOYMENT TRENDS, NON-EUROPEANS : THE WITWATERSRAND INNER METROPOLITAN ZONE : 1936 - 1966.

Year	Sex.	Economic Activity.					Total Employment	
		Gold-Mining.	Secondary Industry.	Commerce and Administration.	Agriculture.	Other	No.	Index No.
1936	Male	105,015	63,149	20,876	4,283	40,995	234,318	
	Female	-	645	407	132	37,331	38,515	
	Total	105,015	63,794	21,283	4,415	78,326	272,833	100.0
1946	Male	127,833	114,482	47,441	5,242	42,140	337,138	
	Female	-	7,022	1,814	213	67,429	76,478	
	Total	127,833	121,504	49,255	5,455	109,569	413,616	151.6
1956	Male	78,234	195,000	91,800	5,700	42,700	413,434	
	Female	-	8,000	4,200	300	82,700	95,200	
	Total	78,234	203,000	96,000	6,000	125,400	508,634	186.4
1966	Male	43,000	265,000	127,000	6,000	43,100	484,100	
	Female	-	9,000	6,000	350	93,200	108,550	
	Total	43,000	274,000	133,000	6,350	136,300	592,650	217.2

Source : Work Table 15.

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106. This Table shows no absolute reduction in the Non-European labour force in the last decade of the thirty-year period. It rises from an index number of 100 in 1936, to 151.6 in 1946, 186.4 in 1956 and 217.2 in 1966. Thus, what applies to the region as a whole does not apply to its inner zone, because employment in gold-mining forms so small a proportion of total employment. The most striking developments are a four-fold increase in the number of male non-European employees in secondary industry, and a six-fold increase in commerce and administration. Here are the economic reasons for the second city that the first interim report shows to be growing so rapidly in the south-western non-European townships under the jurisdiction of the Johannesburg City Council, and for the welling up of the non-European population generally in the inner metropolitan zone. These workers are not recruited from the mines. They migrate from the rest of the Union, Basutoland and Bechuanaland; and they come in answer to the needs of secondary industry and commerce and administration, where the proportions of Europeans to non-Europeans are estimated to alter between 1936 and 1966 from 1 : 1.29 and 1 : 0.33 respectively, to 1 : 2.23 and 1 : 0.80.

107. These statistics thus confirm the conclusion reached in the first interim report in regard to the changing age structure of the non-European population, namely, that the changes taking place arise from an efflux of mine workers (every 60% of whom are returning to beyond the Union's borders) and an influx of industrial workers (who come mainly from the rest of the Union). At the same time, the Table emphasises the important influence of commerce and administration on these developments.

108. It is unfortunate that the output or service value of this latter group of activities cannot be estimated, as the combined gross value of production from the mines and secondary industry in the metropolitan zone shows a considerably more positive trend than in the case of the region as a whole - as Table XXVII undoubtedly reveals, in spite of every allowance for errors in forecasting.

TABLE XXVII.

TRENDS IN THE GROSS VALUE OF PRODUCTION AND IN WAGES AND SALARIES PAID IN GOLD-MINING AND SECONDARY INDUSTRY : THE WITWATERSRAND INNER METROPOLITAN ZONE : 1936 - 1966 AT 1956 PRICES.

Year	GROSS VALUE OF PRODUCTION.				WAGES AND SALARIES PAID.			
	Gold - Mining	Secondary Industry.	Total	Per Head of Population	Gold-Mining	Secondary Industry.	Total	Per Head of Employment.*
	£1,000	£1,000	£1,000	£	£1,000	£1,000	£1,000	£
1936	42,013	135,647	177,660	213	21,814	37,940	59,754	259
1946	41,759	224,255	266,014	226	19,380	65,622	85,002	263
1956	30,450	468,200	498,650	325	13,936	101,900	115,836	303
1966	12,500	590,000	602,500	329	8,200+	133,500+	141,700	324

:- * in ...

* in gold-mining and secondary industry.

\+ at 1956 rates.

ϕ Chamber of Mines only.

Source : Tables XIV and XVI, and Work Table 17, and Work Table 11 of the first interim report.

109. Clearly, no great recession in the economic progress of the inner zone can be deduced from this Table. The trends are all the other way. Moreover, at 1956 prices and rates, the zonal economy tends to be better off than the region as a whole in 1966, and wages and salaries paid in primary and secondary industry are more than likely to advance per head of employment. It is true that the strictures made above in para. 98 regarding the comparative "basicness" of mining and secondary industry apply with equal force to the inner metropolitan zone, but it again appears that wages and salaries lost in the mines are likely to be more than offset by gains in secondary industry. At 1956 prices, the net effect on the purchasing power of employees in these two groups of economic activities thus tends to be positive - the total is in fact estimated to more than double between 1936 and 1966 - and commerce should benefit accordingly. But, not only will the prosperity of the inner zone depend increasingly on the capacity of its leading secondary industries to take the place of gold in the regional export field; the metropolitan region itself will come to rely more and more for its economic well-being on the efforts of the inner zone in this respect, as the outer zone faces a much less favourable prospect in the years ahead.

110. <u>The Witwatersrand Outer Metropolitan Zone.</u>

The region's increasing dependence on the industrial development of the inner zone is emphasised by reference to trends in the outer metropolitan zone. While, of course, the economies of the two zones cannot be separated except artificially, it is at least instructive to compare and contrast tendencies within their respective boundaries. The outer zone's tendencies are summarised in Table XXVIII below.

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TABLE XXVIII.

EMPLOYMENT TRENDS, ALL RACES; THE WITWATERSRAND OUTER METROPOLITAN ZONE : 1936 - 1966.

Year	Race	Economic Activity.					Total Employment	
		Gold-Mining.	Secondary Industry.	Commerce and Administration.	Agriculture.	Other	No.	Index No.
1936	E	21,973	8,057	6,376	298	2,991	39,695	
	N-E	190,727	9,111	3,051	1,413	13,315	217,617	
	Total	212,700	17,168	9,427	1,711	16,306	257,312	100.0
1946	E	21,982	9,818	10,188	525	3,052	45,565	
	N-E.	145,477	13,929	3,388	2,062	22,112	186,968	
	Total	167,459	23,747	13,576	2,587	25,164	232,533	90.4
1956	E	21,623	14,000	16,000	600	3,200	55,423	
	N-E	150,245	16,000	4,600	2,400	26,600	199,845	
	Total	171,868	30,000	20,600	3,000	29,800	255,268	99.2
1966	E	15,000	17,000	22,000	775	3,300	58,075	
	N-E	58,000	19,000	5,000	2,650	29,700	114,350	
	Total	73,000	36,000	27,000	3,425	33,000	172,425	67.0

Source : Work Table 16.

111. This Table focuses attention on the economic dominance of gold-mining in the outer metropolitan zone, and on the serious consequences that must follow from any decline in mining operations. Because of the mines, total employment dropped by 10 points between 1936 and 1946, and although it is estimated to have risen to almost the 1936 level by 1956, the predicted decrease in mining activity by 1966 so reduces total employment that it is estimated to be only one-half that of 1936 at the end of the thirty-year period. No reasonable allowance for error can reverse the tendencies described and forecast in this Table, and the contrast between the economies of the outer and inner metropolitan zones is striking.

112. The gross value of primary and secondary production in the outer zone likewise tends to fluctuate with that of the mines, although the influence of secondary industry increases as the years pass.

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TABLE XXIX

TRENDS IN THE GROSS VALUE OF PRODUCTION AND IN WAGES AND SALARIES PAID IN GOLD-MINING AND SECONDARY INDUSTRY : THE WITWATERSRAND OUTER METROPOLITAN ZONE : 1936 - 1966. AT 1956 PRICES.

Year	GROSS VALUE OF PRODUCTION				WAGES AND SALARIES PAID			
	Gold-Mining	Secondary Industry	Total	Per Head of Population.	Gold-Mining ∅	Secondary Industry.	Total	Per ** Head of Employment.
	£1,000	£1,000	£1,000	£	£1,000	£1,000	£1,000	£
1936	90,693	20,556	111,249	440	38,952	8,749	47,701	208
1946	93,194	29,723	122,917	358	36,085	8,698	44,783	234
1956	100,441*	47,800	148,241	274	30,226	10,400	40,626	201
1966	66,000*	54,000	120,000	173	12,900+	12,500+	25,400	233

* including the value of uranium production.

** in gold-mining and secondary industry.

\+ at 1956 rates.

∅ Chamber of Mines only.

Source : Table XXIII and XXVII and Work Table 17, and Work Table 11 of the first interim report.

113. Should such trends in gross value of production and purchasing power actually be realised by 1966 to any substantial degree - and there is good reason to believe that they will be - certain parts of the outer metropolitan zone will face serious economic embarrassment. The gross value of primary and secondary production per head of population has in fact been falling over the last twenty years, and it appears that even uranium production cannot prevent the continuation of this trend in the next decade. It can, however, prevent an even more dangerous decline in income, particularly in the western portions of the zone which are responsible for over 80% of the total uranium output. Moreover, apart from losing so much of its major basic activity and being faced with the problem of absorbing the European mine-workers stood off by the mines, the zone tends to experience a decrease in purchasing power owing to the general fall in employment. This decrease takes place in spite of the fact that the increasing importance of secondary industry tends to raise the total of wages and salaries paid per head of employment in gold-mining and secondary industry combined. While it may be offset in part or in whole by commercial ties with the new mining areas developing to the far west and far east of the metropolitan region, such a decrease in purchasing power not only raises yet another serious problem for the zone itself, but must have repercussions on the region as a whole, of which the outer metropolitan zone is an integral part.* It is true, however, that, while the eastern portion of the outer zone benefits by less than 20% of the uranium output, it enjoys some 64% of the zone's industrial production, and is experiencing an increase in European

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* See TABLE XXIII.

population which is greater than the average for the region as a whole. The picture is thus not so simple as Table XXIX implies, and needs careful analysis.

114. The Location of Industry.

It follows from paras. 110 to 114 that the final important conclusion to be drawn from this report is the danger of economically-distressed areas arising in the foreseeable future in the outer metropolitan zone,* if remedial action is not taken in good time by the various levels of government concerned. Prolongation of the lives of the mines by means of uranium production, deep-level developments and assistance to marginal producers, can certainly cushion the effects of the decline in the mining industry; but positive action to encourage the establishment and development of secondary industry appears to be at least as important. In this connection, an excerpt from a memorandum submitted by the City Council of Johannesburg to the Transvaal Local Government Commission of Inquiry is annexed as Appendix A. It sets out the controlling factors in the location of industry and suggests means by which local authorities can themselves assist to influence such location. But the memorandum urges that any encouragement of this nature should be undertaken within the framework of regional development plans, and provincial and national policy.

115. Such matters of local, provincial and even national policy must await further investigation, however, after the third interim report on the administrative structure of the Witwatersrand metropolitan region has been completed. At this stage, it would be premature to suggest, for instance, what might be done to establish and control development areas wherever they may be needed, or to contend with any other of the problems that have been raised in this section. The most that the present report can do is to analyse and describe what is happening to the regional economy, to pinpoint its weaknesses and its strengths, and to give as accurate a picture as possible of its foreseeable future. On the whole, that picture is not pessimistic; but there is no room for complacency, as the major basic economic activity has begun to decline and others must now take its place in the regional export field, if damage to the economy is to be minimised.

116. The extent of the replacement needed has still to be investigated in detail. Only a partial indication has been given in section II of this report. Even so, it is apparent that at least three main industrial divisions must be very much involved in the regional export drive, and that it should be a general policy to avoid any impediment to their development on the Witwatersrand. For example, while it is possible that some decentralisation of these industries within the region's boundaries could be linked with a scheme of development areas in the interests of the metropolitan economy as a whole, this survey strongly suggests that any movement beyond those boundaries could seriously damage the regional economic base. In relative as well as absolute terms, the region cannot afford to lose its secondary industries to other regions and areas as gold-mining declines, especially its basic industries of metal and engineering, clothing and textiles, and chemicals and paints. Moreover, damage to its economy from this cause could have direct and widespread repercussions on the prosperity of the Union's ports - except, perhaps,

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* This does not preclude the development of such areas within the inner metropolitan zone, but present indications are to the contrary.

Cape Town - because of their dependence on the Witwatersrand. And, as stated in the first interim report, the Southern Transvaal, at whose heart lies the Witwatersrand, is of pivotal importance to the national economy. In a very real sense, therefore, the prosperity of the entire Union is tied to that of the Witwatersrand metropolitan region, and the future development of Johannesburg itself is of far more than local or regional significance.

L.P. GREEN.

11th October, 1957.

APPENDIX A.

EXTRACT FROM A MEMORANDUM ENTITLED "ACQUISITION AND ALIENATION OF LAND BY LOCAL AUTHORITIES" (submitted by the City Council of Johannesburg to the Transvaal Local Government Commission of Inquiry, July, 1955.)

33. Upon analysis, perhaps the most important trend discoverable in Part I is to be found in the changing practice of local authorities themselves. Undoubtedly, this has been affected by Provincial directives and encouragement or discouragement. Nevertheless, a general conclusion may be validly drawn that as municipalities have grown in extent, population and wealth they have ceased to offer special inducements to industrialists and have discontinued the practice of alienating land to them at nominal or relatively low rates. The only major exception to this rule is Johannesburg, but it has always been the centre of the gold-mining industry and has thus never experienced a really urgent need to encourage industrial development within its municipal boundaries.

34. This general trend has resulted from the fact that once a town or city assumes from whatever cause an economic and social leadership over its surrounding district, it tends to grow faster than its neighbours situated in that district. It has then no need to encourage industry and commerce to its doorsteps. As a district headquarters it is already the main centre of employment, the collecting and marketing point for district products, the distributing centre for goods imported from outside the district boundaries, and the transport and traffic hub of a widening locality. In addition, since it is the meeting-place of local populations and the district's social centre, it will ultimately become the leader in local opinions and ideas.

35. All these developments must be a continual attraction to industry and commerce. It is true that it is difficult to establish any definite relationship of particular cause and particular effect in the matter but, on the whole, manufacturers tend to consider the following factors when deciding on the location of their businesses:

(i) the supply of skilled and unskilled labour;

(ii) transport costs for raw materials and for finished goods;

(iii) suitable land or premises with room for expansion, and public services at reasonable rates;

(iv) the proximity of similar or allied industries;

(v) the existence of a large market for their products close at hand;

(vi) the publicity value of the town, or district within the town; and

(vii) personal factors involving social life, educational facilities, and sport and cultural activities.

If, then, the location of industry is left to manufacturers themselves to decide, a continued and increasing concentration of business and population in the larger towns and cities is to be expected. (1)

:- 36. ....

(1) This is true of urban development in all countries experiencing an industrial revolution. Later, the larger towns do not tend to grow at an appreciably greater rate than smaller towns: see Prof. G.R. Allen, "The Sizes of Towns", in Town and Country Planning, pp. 566-569, London, November, 1954.

36. This conclusion was recognised and illustrated in South Africa by the Social and Economic Planning Council in 1944. In its report on Regional and Town Planning (1), the Council stated that a large shift of the Union's population to urban occupations was an historical and inevitable tendency whose continuation at an increasing rate would prove irresistible and whose long-term result must be the raising of living standards. Nevertheless, it considered that this movement would produce its best results and avoid adverse consequences only if the siting, growth and functional arrangements of urban concentrations were planned in accordance with "the essential requirements of a healthy national life". The Council added that it was imperative that this urbanisation should be guided to conform to the "real economic prospects of different regions", and that in allocating land for development "a sound distribution of population, so important in a mixed community, (should) be ensured." "This" stated the Council in para. 12, "will not be achieved without guidance as there is every reason to suppose that in its absence past trends will continue. That is -

(a) the urban population increase will continue to accrue mainly to the six main centres of concentration which accounted for a fifth of the total population in 1936 and for one-half of the Europeans in 1941. This happened during the period 1921 to 1936, when the following increases occurred:-

Metropolitan centres	: 74% increase;
Other urban areas	: 52% increase;
Rural areas	: 28% increase;

(b) the influx to urban occupations will, in the absence of development elsewhere, necessarily again mean a large influx of Natives to European centres. Between 1921 and 1936, the urban European population increased from 850,000 to 1,300,000 while the urban Native population increased from 590,000 to 1,140,000;

(c) alternatively, if permanent urban settlement is prevented, e.g. by lack of housing, the already large number of migratory Native workers will have to increase further."

37. The Council then stated there was no physical reason why urbanisation should in the main continue to be concentrated in three or four large centres. It hastened to add that it did not question or deplore the cultural advantages and economic pulls of our large cities, but insisted that some of their cultural and economic advantages are man-made and can be duplicated elsewhere by laying out factory towns of fair size in other suitable places. The Council continued, in para. 16, "It is not implied in the least that manufacturing industries should be located at will. They often have to obey as definite locational rules as farming and mining. But there are many mobile industries which have a wide range of choice of location, and important services in every-day demand that must follow them .... The Council holds that when an industry can be established equally economically at alternative places - including centres which are to be developed to the extent needed to furnish the economies that flow from the concentration at one place of different activities - its location should be consciously influenced so as to accord best with wider social factors."

:- 38. ....

(1) Social and Economic Planning Council, Report No. 5, Regional and Town Planning, U.G. No. 34 - 1944.

38. Clearly, much of that influence can be exerted by municipal authorities themselves, if the factors mentioned in para. 35 above are at all important. In particular, they can arrange for suitable land (or premises) and public services to be made available at concession rates, and can control and ameliorate traffic conditions; they can effectively encourage cultural activities, sport and social life generally; and they have much to do with the general publicity value of the towns they govern. In addition, they can indirectly influence the supply of skilled and unskilled labour by their housing policies, their transport facilities and other public services and amenities.

39. It follows that the question of acquiring and disposing of land by local authorities for industrial purposes cannot be considered in vacuo without reference to wider implications involving town, regional and even national planning. Moreover, unless such planning considerations are to be entirely ignored, there is good reason for adopting a differential policy in regard to the alienation of municipal land for industrial purposes, provided this policy is calculated to assist in guiding the location of industry on a planned regional basis. It is no co-incidence that South African local authorities of different sizes have already tended to adopt differing pricing policies since, for example, the City Council of Johannesburg has based its resolution not to encourage further extraordinary development upon considerations in regard to housing, transport, traffic and municipal services that are themselves basic to proper planning. In fact, the tendency for industrial and commercial development to take place in a few metropolitan centres has undoubtedly led the larger local authorities to cease from actively attracting manufacturers, while the smaller authorities have quite naturally tried to induce manufacturers to settle in the smaller centres as their progressive expansion depends upon the building up of an industrial and commercial core. Such differential policy is no more than that advocated by the Social and Economic Planning Council, and the means already employed by the local authorities in a rather haphazard manner may well be adapted for use by any Provincial or regional authority concerned with co-ordinating future land use over an extensive area, with a view to off-setting the tendencies deprecated by the Council and to diversifying the industrial make-up of urban centres. As municipal experience shows, one of the most potent of these means is control over the price of land and charges for essential services.

40. Similar considerations apply to the acquisition and alienation of land for housing purposes. In fact, as the history of Johannesburg shows, there is a very close link between the development of industry and demands for housing, especially Native housing. As a large part of this housing must be specially assisted or sub-economic, because so many Native employees cannot pay economic rents, industrial development necessarily involves local authorities in some form of subsidy; and any policy of alienating industrial land at reduced rates in order to accelerate such development must substantially increase the incidence of that subsidy. Where special assistance is given to Europeans, the subsidy may take the form of selling land at reduced rates. Where non-European housing is concerned, since land is not sold local authorities must attempt some other means of assistance, e.g. by entering upon extensive non-European housing schemes in which many rents are sub-economic and in which at least part of the loss must be borne by local ratepayers. It is true that the City Council of Johannesburg tried to avoid this burden by adopting a no-loss policy in regard to all housing schemes in 1951, but it has not been established that the Council can really provide Native housing without some kind of subsidy as economic rents are still beyond the capacity of many Natives to pay. Moreover, the Council is now beginning site and services schemes with the assistance of moneys from the Native Services Levy Fund.

/- 41. ....

41. Ultimately, therefore, policy in regard to industrial development cannot be isolated from policy in regard to housing, and especially non-European housing, which must bring the question of subsidies into the picture and eventually involve the Central Government - as indicated in paras. 30 to 32 above. It follows that the policy of the Provincial Executive Committee in regard to the alienation of land for industrial and housing purposes cannot be formulated without reference to the wishes of the Central Government, which is more than likely to view the matter in the wider setting envisaged by the Social and Economic Planning Council, i.e. the national and regional planning of land use. In fact, the directive from the Minister of Native Affairs quoted in para. 31 above, instructs the Townships Board to consider these very aspects and to deal with applications for both residential and industrial townships within the framework of central policy and regional planning.

42. It is beyond the scope of this Memorandum to comment upon the nature of that policy, but the acceptance of the principle of planning control over land use for industrial and housing purposes is most relevant to the submissions made here. If that principle is to be applied generally in the Transvaal, or on only the Witwatersrand, incentives or inducements must be developed to assist in the implementation of planning and, as already submitted, the use by the local authorities concerned of a differential pricing policy keyed to planning requirements will be one of the most important inducements or incentives available. This will remain true even if Central Government policy should continue to prohibit the declaration of any new industrial townships on the Witwatersrand until all existing declared townships have been fully developed.

43. If differential land prices (and differential charges for public services) should thus be used to implement Central Government or Provincial policy, it is only fair and reasonable that the local authorities encouraged to reduce land prices (and service charges) to influence the location and development of industry should be assisted by the Central Government to provide the necessary housing for the consequent influx of European and non-European workers. This assistance can be given either by subsidy or by the erection of houses by means of a special board provided with Central funds. In any case, the burden of implementing Central or Provincial policy should not fall entirely upon local shoulders, although industrial development will naturally be in the long-term interests of the local authorities concerned.

APPENDIX B.

WORK TABLES 1 - 17

Unless otherwise indicated, in these Work Tables the Witwatersrand Metropolitan Region = the magisterial districts of Benoni, Boksburg, Brakpan, Germiston (including Kempton Park), Johannesburg, Roodepoort and Springs, and the municipal areas of Krugersdorp and Randfontein. The Witwatersrand Inner Metropolitan Zone = the magisterial districts of Benoni, Boksburg, Germiston (including Kempton Park), Johannesburg and Roodepoort. The Witwatersrand Outer Metropolitan Zone = the magisterial districts of Brakpan and Springs and the municipal areas of Krugersdorp and Randfontein.

WORK TABLE 1 : GOLD PRODUCTION OF THE WITWATERSRAND. 1887 - 1955.

Central Rand : Magisterial districts of Roodepoort, Johannesburg and Germiston.

East Rand : Magisterial districts of Benoni, Boksburg, Brakpan, Springs and Nigel.

West Rand : Magisterial districts of Krugersdorp and Randfontein.

Far West Rand: West of Randfontein.

Source : Planning Survey of the Southern Transvaal, 1957.

Period	Central Rand	East Rand	West Rand	Far West Rand
	%	%	%	%
1887 - 1897	91.29	5.28	3.43	-
1898 - 1911	85.14	6.44	8.42	-
1912 - 1923	62.22	28.95	8.83	-
1924 - 1938	38.77	51.22	10.01	-
1939 - 1949	34.11	51.97	10.57	3.35
1950 - 1951	27.77	46.33	14.91	10.99
1952 - 1953	26.85	44.72	14.73	13.70
1954 - 1955	26.44	42.52	12.80	18.24

WORK TABLE 2 : GOLD PRODUCTION AND EMPLOYMENT, THE WITWATERSRAND METROPOLITAN REGION AND INNER AND OUTER METROPOLITAN ZONES: 1936 - 1966.

Basis: 1966 estimated on rate of change 1941 - 1951, projected forward to 1961, and on official estimates contained in Natural Resources Development Council's Planning Survey, 1957, originally made by the Government Mining Engineer.

(1) The Witwatersrand Metropolitan Region.

Year	Output	Employment in Service (Average for the Year)		
	Ozs. fine	European	Non-European	Total
1936	10,627,627	34,953	295,742	330,695
1941	13,631,091	44,795	359,869	404,664
1946	10,807,706	38,267	273,310	311,577
1951	9,576,667	36,508	256,088	295,596
1956	8,720,461	32,013	228,479	260,492
1966	3,500,000	24,000	101,000	125,000

(2) The ....

(2) The Inner Metropolitan Zone.

Year	Output	Employment in Service (Average for the Year)		
	Ozs. fine	European	Non-European	Total
1936	3,364,601	12,980	105,015	117,995
1941	4,179,313	16,285	127,833	144,118
1946	3,344,233	14,014	88,366	102,380
1951	2,891,701	13,248	93,836	107,084
1956	2,598,717	10,390	78,234	88,624
1966	1,000,000	9,000	43,000	52,000

(3) The Outer Metropolitan Zone.

Year	Output	Employment in Service (Average for the Year)		
	Ozs. fine	European	Non-European	Total
1936	7,263,026	21,973	190,727	212,700
1941	9,451,778	28,512	232,036	260,546
1946	7,463,563	24,253	184,944	209,197
1951	6,684,966	23,260	162,252	188,512
1956	6,122,744	21,623	150,245	171,868
1966	2,500,000	15,000	58,000	73,000

Work Table 3 ....

WORK TABLE 3 : THE MEASUREMENT OF THE ECONOMIC BASE, THE WITWATERSRAND METROPOLITAN REGION AND INNER AND OUTER METROPOLITAN ZONES. C. 1951.

Basis : Official census returns for 1946 in the case of agriculture, for 1951 in the case of European employment in commerce and administration, and for 1950 in the case of secondary industry. The gold-mining statistics were obtained from the Government Mining Engineer. The figures for commerce and administration (as defined in paragraph 15 of this report) have been adjusted to allow for a deduction of 18,000 Europeans estimated to be employed in Government service in 1951, and for an increase of 11,000 non-Europeans over the 1946 returns, which are the last available. The statistics of secondary industry were broken down by magisterial districts by the Bureau of Census and Statistics for the Natural Resources Development Council, and include both private and Government-owned establishments. "Other" activities includes government, educational, domestic and other service activities.

Total Employment Index of Net "Surplus" Workers

$$= S = \frac{ei}{et} - \frac{Ei}{Et}$$

where S = "surplus" workers;

ei = the regional or zonal employment in the economic activity concerned;

et = the total regional or zonal employment in all economic activities;

Ei = the national employment in the economic activity concerned;

Et = the total national employment in all economic activities.

(1) The Witwatersrand Metropolitan Region.

Economic Activity	ei	et
	All Races	All Races
Agriculture	10,314	
Gold-mining	290,772	
Secondary industry	241,383	
Commerce and administration	192,241	
Other	147,551	
		882,261

(2) The ....

(2) The Witwatersrand Inner Metropolitan Zone.

Economic Activity	ei	et
	All Races	All Races
Agriculture	7,727	
Gold-mining	123,532	
Secondary industry	215,658	
Commerce and administration	172,604	
Other	121,444	
		640,965

(3) The Witwatersrand Outer Metropolitan Zone.

Economic Activity	ei	et
	All Races	All Races
Agriculture	2,587	
Gold-mining	167,240	
Secondary industry	25,725	
Commerce and administration	19,637	
Other	26,107	
		241,296

(4) The Union.

Economic Activity	Ei	Et
	All Races	All Races
Agriculture	2,418,185	
Gold-mining	373,888	
Secondary industry	712,103	
Commerce and administration	707,919*	
Other	923,876	
		5,135,971

* Assuming that the increase in non-European employment between 1946 and 1951 was the same as the deduction to be made from the 1951 European returns for government employees.

WORK TABLE ....

WORK TABLE 4 : THE MEASUREMENT OF THE ECONOMIC BASE, SECONDARY INDUSTRY; THE WITWATERSRAND METROPOLITAN REGION AND INNER AND OUTER METROPOLITAN ZONES. 1950.

WMR = Witwatersrand metropolitan region.
IMZ = Inner metropolitan zone.
OMZ = Outer metropolitan zone, and including the magisterial districts of Krugersdorp and Randfontein.

	Industrial Division	Employment (All Races)			
No.		WMR	IMZ	OMZ	Union
1	Treatment of agricultural products	705	154	551	4,532
2	Processing of stone and clay	12,282	10,467	1,815	46,551
3	Working in wood	6,954	5,457	1,497	30,416
4	Metal and engineering	80,592	66,140	14,452	182,822
5	Food, drink and tobacco	16,752	14,930	1,822	86,885
6	Clothing and textiles	31,791	31,311	480	76,193
7	Books, paper and printing	8,799	7,473	1,326	25,947
8	Vehicles	10,327	9,118	1,209	41,501
10	Furniture	6,790	6,790	-	14,246
11	Chemicals and paints	11,637	11,637	-	29,652
12	Surgical, dental, etc.	301	301	-	467
13	Jewellery	1,641	1,641	-	2,296
14	Heat, light and power	8,709	8,709	-	24,497
15	Leather and leatherware	3,796	3,713	83	22,358
16	Building and contracting	35,430	33,298	2,132	110,524
17	Miscellaneous	4,877	3,968	909	10,581
	Secondary Industry	241,383	215,658	25,725	712,103

WORK TABLE 5 ....

WORK TABLE 5 : OCCUPATIONAL STRUCTURE OF THE GAINFULLY EMPLOYED EUROPEAN POPULATION, 1951 : THE UNION.

Source : Union Census, 1951.

Occupation*.	No.	Percentage
1. Professional and managerial	174,878	17.8
2. Office workers and salesmen	261,641	26.6
3. Miners and quarrymen	31,914	3.2
4. Industrial workers	268,000	27.3
5. Transport and services	77,075	7.8
6. Miscellaneous	170,388	17.3
Total	983,896	100.0

* 1. Professional, technical and related workers: managers administrators and officials (excluding farming and mining)

2. Clerical, office and related workers: salesmen and related workers.

3. Workers in mines and quarries, and related workers.

4. Craftsmen, factory operators, manual workers, labourers, etc.

5. Workers in operating transport occupations and services, and related workers.

6. Other workers, including farming and unidentifiable.

WORK TABLE 6 : OCCUPATIONAL STRUCTURE OF THE GAINFULLY EMPLOYED EUROPEAN POPULATION BY CHIEF MUNICIPAL AREAS, 1951: THE WITWATERSRAND METROPOLITAN REGION.

WMR - Witwatersrand metropolitan region.
"Metropolitan" area = including suburbs beyond municipal boundaries.
Source = Union Census, 1951 M = Male. F = Female. T = Total.

Occupation.*	SEX	Johannesburg "metropolitan area".	Germiston "metropolitan area."	Benoni "metropolitan area".	Boksburg municipal area.	Brakpan municipal area.	Krugersdorp municipal area.	Randfontein municipal area	Roodepoort-Maraisburg "metropolitan area".	Springs municipal area.	W. M. R.
1. Professional and Managerial.	M	27,428	3,008	1,507	867	1,079	1,098	445	1,364	1,619	38,415
	F	7,658	869	386	361	313	447	123	418	468	11,043
	T	35,086	3,877	1,893	1,228	1,392	1,545	568	1,782	2,087	49,458
2. Office Workers and Salesmen.	M	27,474	3,345	1,489	1,050	1,114	1,098	470	2,089	1,224	39,353
	F	26,552	3,391	1,887	1,159	1,285	1,211	480	1,724	1,450	39,139
	T	54,026	6,736	3,376	2,209	2,399	2,309	950	3,813	2,674	78,492
3. Miners and Quarrymen.	M	4,717	1,515	1,615	1,321	2,536	1,781	1,177	1,593	2,636	18,891
	F	46	7	-	4	6	2	2	6	1	74
	T	4,763	1,522	1,615	1,325	2,542	1,783	1,179	1,599	2,637	18,965
4. Industrial Workers.	M	37,636	10,592	5,147	3,084	3,264	2,768	1,204	2,995	3,527	70,217
	F	7,183	1,479	385	394	325	248	85	379	275	10,753
	T	44,819	12,071	5,532	3,478	3,589	3,016	1,289	3,374	3,802	80,970

:- 5. ....

WORK TABLE 6 (Contd.)

Occupation.*	SEX	Johannesburg "metropolitan area".	Germiston "metropolitan area."	Benoni "metropolitan area".	Boksburg municipal area.	Brakpan municipal area.	Krugersdorp municipal area.	Rand-fontein municipal area.	Roode-poort-Marais-burg "metro-politan area."	Springs munici-pal area.	W. M. R.
5. Transport and Services.	M	9,238	2,096	671	652	509	523	239	624	636	15,188
	F	2,625	222	137	100	88	136	25	100	170	3,603
	T	11,863	2,318	808	752	597	659	264	724	806	18,791
6. Miscellaneous.	M	3,213	835	479	247	312	436	146	221	251	6,140
	F	575	113	37	14	44	42	9	17	24	875
	T	3,788	948	516	261	356	478	155	238	275	7,015
TOTALS.	M	109,706	21,391	10,908	7,221	8,814	7,704	3,681	8,886	9,893	188,204
	F	44,639	6,081	2,832	2,032	2,061	2,086	724	2,644	2,388	65,487
	T	154,345	27,472	13,740	9,253	10,875	9,790	4,405	11,530	12,281	253,691
Not gainfully employed.	M	14,621	2,192	1,200	842	837	1,050	412	881	772	22,807
	F	87,755	16,669	9,146	5,975	7,314	6,676	3,130	7,090	7,851	151,606
	T	102,376	18,861	10,346	6,817	8,151	7,726	3,542	7,971	8,623	174,413
GRAND TOTALS.	M	124,327	23,583	12,108	8,063	9,651	8,754	4,093	9,767	10,665	211,011
	F	132,394	22,750	11,978	8,007	9,375	8,762	3,854	9,734	10,239	217,093
	T	256,721	46,333	24,086	16,070	19,026	17,516	7,947	19,501	20,904	428,104

* See Work Table 5 for explanation.

WORK TABLE 7 : OCCUPATIONAL STRUCTURE OF THE GAINFULLY EMPLOYED EUROPEAN POPULATION BY CHIEF MUNICIPAL AREAS (GROUPED). 1951: WITWATERSRAND METROPOLITAN REGION.

Basis : Work Table 6.

W.M.R.: Witwatersrand metropolitan region.

Inner Metropolitan Zone = Municipal and "metropolitan" areas of Johannesburg, Germiston, Benoni, Boksburg and Roodepoort-Maraisburg, as in Work Table 6.

Outer Metropolitan Zone = Municipal and "metropolitan" areas of Brakpan, Krugersdorp, Randfontein and Springs, as in Work Table 6.

* As in Work Table 5.

M = Male. F = Female. T = Total.

Occupation. *	SEX	Johannesburg (including suburbs).		Inner Metropolitan Zone.		Outer Metropolitan Zone.		W. M. R.	
		No.	%	No.	%	No.	%	No.	%
1. Professional and Managerial.	M	27,428	-	34,174	-	4,241	-	38,415	-
	F	7,658	-	9,692	-	1,351	-	11,043	-
	T	35,086	22.73	43,866	20.28	5,592	14.97	49,458	19.50
2. Office Workers and Salesmen.	M	27,474	-	35,447	-	3,906	-	39,353	-
	F	26,552	-	34,713	-	4,426	-	39,139	-
	T	54,026	35.00	70,160	32.43	8,332	22.31	78,492	30.94
3. Miners and Quarrymen.	M	4,717	-	10,761	-	8,130	-	18,891	-
	F	46	-	63	-	11	-	74	-
	T	4,763	3.09	10,824	5.00	8,141	21.80	18,965	7.47
4. Industrial Workers.	M	37,636	-	59,454	-	10,763	-	70,217	-
	F	7,183	-	9,820	-	933	-	10,753	-
	T	44,819	29.04	69,274	32.02	11,696	31.31	80,970	31.92

WORK TABLE 7. (Contd.)

Occupation.*	SEX	Johannesburg (including suburbs).		Inner Metropolitan Zone.		Outer Metropolitan Zone.		W. M. R.	
		No.	%	No.	%	No.	%	No.	%
5. Transport and Services	M	9,238	-	13,281	-	1,907	-	15,188	-
	F	2,625	-	3,184	-	419	-	3,603	-
	T	11,863	7.69	16,465	7.61	2,326	6.23	18,791	7.41
6. Miscellaneous	M	3,213	-	4,995	-	1,145	-	6,140	-
	F	575	-	756	-	119	-	875	-
	T	3,788	2.45	5,751	2.66	1,264	3.38	7,015	2.76
TOTALS.	M	109,706	-	158,112	-	30,092	-	188,204	-
	F	44,639	-	58,228	-	7,259	-	65,487	-
	T	154,345	100.00	216,340	100.0	37,351	100.00	253,691	100.00
Not Gainfully Employed.	M	14,621	-	19,736	-	3,071	-	22,807	-
	F	87,755	-	126,635	-	24,971	-	151,606	-
	T	102,376	-	146,371	-	28,042	-	174,413	-
GRAND TOTALS	M	124,327	-	177,848	-	33,163	-	211,011	-
	F	132,394	-	184,863	-	32,230	-	217,093	-
	T	256,721	-	362,711	-	65,393	-	428,104	-

WORK TABLE 8. **EMPLOYMENT TRENDS, ACTUAL AND ESTIMATED, IN SECONDARY INDUSTRY, 1933 - 1966: THE WITWATERSRAND METROPOLITAN REGION.**

Basis : The statistics for all industry have been taken from the official occupational censuses for 1936 and 1946, where figures are given for the major municipalities and their suburbs, and for the Witwatersrand. The statistics for private industry in 1933, 1943 and 1953 have been collated by magisterial districts by Dr. H. Brookes from census returns, but for Europeans and Natives only. The latter statistics have been used to guage the rate of increase in employment in all industry between 1946 and 1956, however, as the probable error is negligible.

E = European. N-E. = Non-European. N = Native.
T = Total. A/A = Annual average.

Year	Race	EMPLOYMENT: All Industry. No.	In-crease	A/A In-crease	A/A Change	Private Industry No.	Increase	A/A Increase	A/A Change
1933	E					26,802			
	N					34,583			
	T					61,385			
1936	E	57,542							
	N-E	72,905							
	T	130,447							
1943	E					59,405	32,603	3,260	
	N					91,838	57,255	5,726	
	T					151,243	89,858	8,986	
1946	E	67,492	9,950	995					
	N-E	135,433	62,528	6,253					
	T	202,925	72,478	7,248					
1953	E					94,405	35,000	3,500	+ 240
	N					195,915	104,077	10,408	+4,682
	T					290,320	139,077	13,908	+4,922
1956	E	125,000*	37,000	3,700	*				
	N-E	219,000*	84,000	8,400	*				
	T	324,000	121,700	12,170	+4,922				
1966 Min.	E	115,000				Minimum = 1936/46 increase.			
Max.	E	142,000				Maximum = 1946/1956 increase.			
Min.	N-E	282,000							
Max.	N-E	303,000							
Min.	T	397,000							
Max.	T	445,000							
1966 Mean	E	128,000	23,000	2,300	-1,400				
Mean	N-E	293,000	74,000	7,400	-1,000				
Mean	T	421,000	97,000	9,700	-2,500				

* on the basis of the 1953 proportions between E and N.

WORK TABLE 9: **Employment Trends, Actual and Estimated, in Secondary Industry, by Race, Sex and Index Numbers, 1933-1966: The Witwatersrand Metropolitan Region.**

Basis: As for Work Table 8, with estimated employment according to sexes in 1956 and 1966 based on rates of change between 1946 and 1950. The statistics for 1950 were obtained from the Bureau of Census and Statistics by Dr. F. W. Quass of the N.R.D.C. and relate to employment by magisterial districts (as do those for private industry).

E= European, N-E = Non-European, N = Native. M= Male, F= Female, T = Total.

Year.	Race.	Sex.	Employment: All Industry. Number	All Industry. Index No.	Private Industry. Number	Private Industry. Index No.
1933	E	-			26,802	100.00
	N	-			34,583	100.00
	ALL	-			61,385	100.00
1936	E	M	49,105	-		
		F	8,437	-		
		T	57,542	100.00		
	N-E	M	72,226	-		
		F	679	-		
		T	72,905	100.00		
	ALL	M	121,331			
		F	9,116			
		T	130,447	100.00		
1943	E	-			59,405	221.64
	N	-			91,838	265.56
	ALL	-			151,243	246.38
1946	E	M	58,349	-		
		F	9,143	-		
		T	67,492	117.29		
	N-E	M	128,077	-		
		F	7,356	-		
		T	135,433	185.77		
	ALL	M	186,426	-		
		F	16,499			
		T	202,925	155.56		
1950	E	M	65,110	-		
		F	18,516	-		
		T	83,626	145.33		
	N-E	M	150,000	-		
		F	7,757	-		
		T	157,757	216.39		
	ALL	M	215,110	-		
		F	26,273	-		
		T	241,383	185.04		

:- 1953 ....

WORK TABLE 9 (continued)

Year.	Race.	Sex.	Employment. All Industry Number	All Industry Index No.	Private Industry Number	Private Industry Index No.
1953	E	-		-	94,405	352.23
	N	-		-	195,915	566.51
	ALL	-		-	290.320	472.92
1956	E	M	74,000	-		
		F	31,000	-		
		T	105,000	170.31		
	N-E	M	210,000	-		
		F	9,000	-		
		T	219.000	309.99		
	ALL	M	284,000	-		
		F	40,000	-		
		T	324,000	248.38		
1966						
min.	E	-	115,000	-)		
max.		-	142,000	-)		
min.	N-E	-	282,000	-)	) minimum = 1936/46 increase.	
max.		-	303,000	-)	) maximum = 1946/56 increase.	
min.	ALL	-	397,000	-)		
max.		-	445,000	-)		
1966						
	E	M	84,000	-		
		F	44,000	-		
mean.		T	128.000	205.07		
	N-E	M	283,000	-		
		F	10,000	-		
mean		T	293.000	415.61		
	ALL	M	367,000	-		
		F	54,000	-		
mean.		T	421.000	322.74		

WORK TABLE 10 : Employment Trends, Actual and Estimated, in Commerce and Administration* by Race, Sex and Index Numbers, 1936 - 1966 : The Witwatersrand Metropolitan Region.
* As defined in paragraph 15 of this report.

Basis: Comparative trends in secondary industry and commerce and administration between 1936 and 1946, with employment by race and sex estimated for 1956 and 1966 on change between rates of increase between 1936 and 1946. Statistics of commerce and administration are for the main municipal areas and their suburbs; see Work Table 6.

E= European, N = Native, M = Male, F = Female, T = Total.

(1) Actual and Estimated Trends, Commerce and Administration and Secondary Industry:

Year	Employment in Commerce and Administration.			Employment in Secondary Industry (Work Table 9)	
	No.	Index No.	Increase.	Index No.	Increase.
1936	95,992	100.00	-	100.00	-
1946	153,883	160.31	60.31	155.56	55.56
1956	250,000	261.06	100.75	248.38	92.82
1966	328,000	341.55	80.49	322.74	74.36

(2) Actual and Estimated Trends in Commerce and Administration by Race and Sex:

Year.	Race.	Sex.	Employment.		
			Number.	Index No.	Increase.
1936	E	M	49,918	-	-
		F	21,740	-	-
		T	71,658	100.00	-
	N-E	M	23,893	-	-
		F	441	-	-
		T	24,334	100.00	-
	ALL	M	73,811	-	-
		F	22,181	-	-
		T	95,992	100.00	-
1946	E	M	66,053	-	-
		F	35,187	-	-
		T	101,240	141.28	41.28
	N-E	M	50,645	-	-
		F	1,998	-	-
		T	52,643	216.34	116.34
	ALL	M	116,698	-	-
		F	37,185	-	-
		T	153,883	160.31	60.31

:- 1956 ....

WORK TABLE 10 (continued)

Year.	Race.	Sex.	Employment.		
			Number.	Index No.	Increase.
1956	E	M	93,000	-	-
		F	57,000	-	-
		T	150,000	209.33	68.05
	N-E	M	95,000		
		F	5,000		
		T	100,000	410.95	194.61
	ALL	M	188,000	-	-
		F	62,000	-	-
		T	250,000	261.06	100.75
1966	E	M	114,000	-	-
		F	76,000	-	-
		T	190,000	265.15	55.82
	N-E	M	131,000	-	-
		F	7,000	-	-
		T	138,000	567.11	156.16
	ALL	M	245,000	-	-
		F	83,000	-	-
		T	328,000	341.55	80.49

WORK TABLE 11: Employment Trends, Actual and Estimated, in Agriculture and Other Activities, by Race and Sex, 1936 - 1966 : The Witwatersrand Metropolitan Region.

Basis: Trends between 1936 and 1946, with the aggregate increase from 1946 to 1966 geared to that of the 15 - 64 age group.

Other activities include state, provincial and local government personnel and police, defence, educational and domestic services, and miscellaneous activities not included in gold-mining, secondary industry, commerce and administration or agriculture. Statistics are for main municipal areas and their suburbs, see Work Table 6.

* Adjusted on basis of change in female European labour, 1936/46, as 1936 and 1946 censuses are not compatible.

** on basis of 1946/51 rate of change.

E = European, N-E = Non-European, M = Male, F= Female, T = Total.

Year. Race.	Sex.	Agriculture	Other Activities.
		Number Employed.	Number Employed.
1936. E	M	1,764	15,393
	F	103	6,419
	T	1,867	21,812
N-E	M	5,665	47,564
	F	163 *	44,077
	T	5,828	91,641
ALL	M	7,429	62,957
	F	266	50,496
	T	7,695	113,453
1946. E	M	2,585	14,825
	F	212	6,967
	T	2,797	21,792
N-E	M	7,182	51,011
	F	335	80,670
	T	7,517	131,681
ALL	M	9,767	65,836
	F	547	87,637
	T	10,314	153,473
1956. E	M	2,900	15,000
	F	250	7,300
	T	3,150	22,300 **
N-E	M	8,000	53,000
	F	400	99,000
	T	8,400	152,000
ALL	M	10,900	68,000
	F	650	106,300
	T	11,550	174,300

WORK TABLE 11 (continued)

Year.	Race.	Sex.	Agriculture.	Other Industries.
			Number Employed.	Number Employed.
1966	E	M	3,300	15,100
		F	300	7,700
		T	3,600	23,000
	N-E	M	8,500	54,000
		F	500	112,000
		T	9,000	166,000
	ALL	M	11,800	69,100
		F	800	119,700
		T	12,600	188,800

WORK TABLE 12 : EMPLOYMENT TRENDS, ACTUAL AND ESTIMATED, ALL ACTIVITIES BY RACE AND SEX, 1936 - 1966 : THE WITWATERSRAND METROPOLITAN REGION.

Basis: Work Tables 2, 8, 9, 10 and 11.

E = European, N-E = Non-European, M = Male, F = Female, T = Total.

Year	Race	Sex	Gold-Mining	Secondary Industry	Commerce and Administration.	Agriculture.	Other *	Total Employment
1936	E	M	34,953	49,105	49,918	1,764	15,393	151,133
		F	-	8,437	21,740	103	6,419	36,699
		T	34,953	57,542	71,658	1,867	21,812	187,832
	N-E	M	295,742	72,226	23,893	5,665	47,564	445,090
		F	-	679	441	163	44,077	45,360
		T	295,742	72,905	24,334	5,828	91,641	490,450
	ALL	M	330,695	121,331	73,811	7,429	62,957	596,223
		F	-	9,116	22,181	266	50,496	82,059
		T	330,695	130,447	95,992	7,695	113,453	678,282
1946	E	M	38,267	58,349	66,053	2,585	14,825	180,079
		F	-	9,143	35,187	212	6,967	51,509
		T	38,267	67,492	101,240	2,797	21,792	231,588
	N-E	M	273,310	128,077	50,645	7,182	51,011	510,225
		F	-	7,356	1,998	335	80,670	90,359
		T	273,310	135,433	52,643	7,517	131,681	600,584
	ALL	M	311,577	186,426	116,698	9,767	65,836	690,304
		F	-	16,499	37,185	547	87,637	141,868
		T	311,577	202,925	153,883	10,314	153,473	832,172
1956	E	M	32,013	74,000	93,000	2,900	15,000	216,913
		F	-	31,000	57,000	250	7,300	95,550
		T	32,013	105,000	150,000	3,150	22,300	312,463
	N-E	M	228,479	210,000	95,000	8,000	53,000	594,479
		F	-	9,000	5,000	400	99,000	113,400
		T	228,479	219,000	100,000	8,400	152,000	707,879
	ALL	M	260,492	284,000	188,000	10,900	68,000	811,392
		F	-	40,000	62,000	650	106,300	208,950
		T	260,492	324,000	250,000	11,550	174,300	1,020,342
1966	E	M	24,000	84,000	114,000	3,300	15,100	240,400
		F	-	44,000	76,000	300	7,700	128,000
		T	24,000	128,000	190,000	3,600	22,800	368,400
	N-E	M	101,000	283,000	131,000	8,500	54,000	577,500
		F	-	10,000	7,000	500	112,000	129,500
		T	101,000	293,000	138,000	9,000	166,000	707,000
	ALL	M	125,000	367,000	245,000	11,800	69,100	817,900
		F	-	54,000	83,000	800	119,700	257,500
		T	125,000	421,000	328,000	12,600	188,800	1,075,400

* Including government, educational, domestic and other service activities : see Work Table 11.

WORK TABLE 13 : EMPLOYMENT TRENDS, ACTUAL AND ESTIMATED, SECONDARY INDUSTRY AND COMMERCE AND ADMINISTRATION*, 1936 - 1966: THE WITWATERSRAND INNER METROPOLITAN ZONE.

* As defined in para. 15 of this report.

Basis: Proportionate changes between the region as a whole and the inner metropolitan zone, 1936/46 and 1943/53. In the case of male and female employees in Secondary industry in 1956 and 1966, the estimates are made on the basis of the rates of change between 1946 and 1950. Except for secondary industry in 1950, the statistics are for the main municipal areas and their suburbs : see Work Table 6.

E = European, N-E = Non-European, M = Male, F = Female, T = Total.

Year	Race	Sex	Secondary Industry	Commerce and Administration
			No. Employed	No. Employed
1936	E	M	41,311	45,438
		F	8,174	19,844
		T	49,485	65,282
	N-E	M	63,149	20,876
		F	645	407
		T	63,794	21,283
	ALL	M	104,460	66,314
		F	8,819	20,251
		T	113,279	86,565
1946	E	M	49,099	59,676
		F	8,575	31,376
		T	57,674	91,052
	N-E	M	114,482	47,441
		F	7,022	1,814
		T	121,504	49,255
	ALL	M	163,581	107,117
		F	15,597	33,190
		T	179,178	140,307
1950	E	M	57,631	-
		F	17,808	-
		T	75,439	-
	N-E	M	132,483	-
		F	7,736	-
		T	140,219	-
	ALL	M	190,114	-
		F	25,544	-
		T	215,658	-

Year ....

WORK TABLE 13 CONTD.

Year	Race	Sex	Secondary Industry	Commerce and Administration
			No. Employed	No. Employed
1956	E	M	63,000	83,000
		F	28,000	51,000
		T	91,000*	134,000
	N-E	M	195,000	91,800
		F	8,000	4,200
		T	203,000*	96,000
	ALL	M	258,000	174,800
		F	36,000	55,200
		T	294,000	230,000
1966	E	M	71,000	102,000
		F	40,000	66,000
		T	111,000	168,000
	N-E	M	265,000	127,000
		F	9,000	6,000
		T	274,000	133,000
	ALL	M	336,000	229,000
		F	49,000	72,000
		T	385,000	301,000

* On the basis of 1953 proportions between E and N (See Work Table 8).

WORK TABLE 14 : EMPLOYMENT TRENDS, ACTUAL AND ESTIMATED, AGRICULTURE AND OTHER ACTIVITIES, 1936 - 1966: THE WITWATERSRAND INNER METROPOLITAN ZONE.

Basis: As in Work Table 11. Statistics are for the main municipal areas and their suburbs : See Work Table 6.

E = European, N-E = Non-European, M = Male, F = Female, T = Total.

Year	Race	Sex	Agriculture	Other Activities
			No. Employed	No. Employed
1936	E	M	1,481	13,073
		F	88	5,748
		T	1,569	18,821
	N-E	M	4,283	40,995
		F	132	37,331
		T	4,415	78,326
	ALL	M	5,764	54,068
		F	220	43,079
		T	5,984	97,147
1946	E	M	2,086	12,677
		F	186	6,063
		T	2,272	18,740
	N-E	M	5,242	42,140
		F	213	67,429
		T	5,455	109,569
	ALL	M	7,328	54,817
		F	399	73,492
		T	7,727	128,309
1956	E	M	2,300	12,800
		F	200	6,300
		T	2,500	19,100
	N-E	M	5,700	42,700
		F	300	82,700
		T	6,000	125,400
	ALL	M	8,000	55,500
		F	500	89,000
		T	8,500	144,500
1966	E	M	2,600	12,900
		F	225	6,600
		T	2,825	19,500
	N-E	M	6,000	43,100
		F	350	93,200
		T	6,350	136,300
	ALL	M	8,600	56,000
		F	575	99,800
		T	9,175	155,800

WORK TABLE 15 : EMPLOYMENT TRENDS, ACTUAL AND ESTIMATED, ALL ACTIVITIES, BY RACE AND SEX, 1936-1966 : THE WITWATERSRAND INNER METROPOLITAN ZONE.

Basis: Work Tables 2, 13 and 14.

E = Europeans, N-E = Non-Europeans, M = Male, F = Female, T = Total.

Year	Race	Sex	Gold-Mining	Secondary Industry	Commerce and Administration.	Agriculture.	Other*	Total Employment
1936	E	M	12,980	41,311	45,438	1,481	13,073	114,283
		F	-	8,174	19,844	88	5,748	33,854
		T	12,980	49,485	65,282	1,569	18,821	148,137
	N-E	M	105,015	63,149	20,876	4,283	40,995	234,318
		F	-	645	407	132	37,331	38,515
		T	105,015	63,794	21,283	4,415	78,326	272,833
	ALL	M	117,995	104,460	66,314	5,764	54,068	348,601
		F	-	8,819	20,251	220	43,079	72,369
		T	117,995	113,279	86,565	5,984	97,147	420,970
1946	E	M	16,285	49,099	59,676	2,086	12,677	139,823
		F	-	8,575	31,376	186	6,063	46,200
		T	16,285	57,674	91,052	2,272	18,740	186,023
	N-E	M	127,833	114,482	47,441	5,242	42,140	337,138
		F	-	7,022	1,814	213	67,429	76,478
		T	127,833	121,504	49,255	5,455	109,569	413,616
	ALL	M	144,118	163,581	107,117	7,328	54,817	476,961
		F	-	15,597	33,190	399	73,492	122,678
		T	144,118	179,178	140,307	7,727	128,309	599,639
1956	E	M	10,390	63,000	83,000	2,300	12,800	171,490
		F	-	28,000	51,000	200	6,300	85,500
		T	10,390	91,000	134,000	2,500	19,100	256,990
	N-E	M	78,234	195,000	91,800	5,700	42,700	413,434
		F	-	8,000	4,200	300	82,700	95,200
		T	78,234	203,000	96,000	6,000	125,400	508,634
	ALL	M	88,624	258,000	174,800	8,000	55,500	584,924
		F	-	36,000	55,200	500	89,000	180,700
		T	88,624	294,000	230,000	8,500	144,500	765,624
1966	E	M	9,000	71,000	102,000	2,600	12,900	197,500
		F	-	40,000	66,000	225	6,600	112,825
		T	9,000	111,000	168,000	2,825	19,500	310,325
	N-E	M	43,000	265,000	127,000	6,000	43,100	484.100
		F	-	9,000	6,000	350	93,200	108,550
		T	43,000	274,000	133,000	6,350	136,300	592,650
	ALL	M	52,000	336,000	229,000	8,600	56,000	681,600
		F	-	49,000	72,000	575	99,800	221,375
		T	52,000	385,000	301,000	9,175	155,800	902,975

* See Work Table 11.

WORK TABLE 16 : EMPLOYMENT TRENDS, ACTUAL AND ESTIMATED, ALL ACTIVITIES, BY RACE AND SEX, 1936 - 1966: THE WITWATERSRAND OUTER METROPOLITAN ZONE.

Basis: Residually computed from Work Tables 2, 12 and 15.

E - Europeans, N-E - Non-Europeans, M - Male, F - Female, T - Total.

Year	Race	Sex	Gold-Mining	Secondary Industry	Commerce and Administration.	Agriculture.	Other*	Total Employment
1936	E	M	21,973	7,794	4,480	283	2,320	36,850
		F	-	263	1,896	15	671	2,845
		T	21,973	8,057	6,376	398	2,991	39,695
	N-E	M	190,727	9,077	3,017	1,382	6,569	210,772
		F	-	34	34	31	6,746	6,845
		T	190,727	9,111	3,051	1,413	13,315	217,617
	ALL	M	212,700	16,871	7,497	1,665	8,889	247,622
		F	-	297	1,930	46	7,417	9,690
		T	212,700	17,168	9,427	1,711	16,306	257,312
1946	E	M	21,982	9,250	6,377	499	2,148	40,256
		F	-	568	3,811	26	904	5,309
		T	21,982	9,818	10,188	525	3,052	45,565
	N-E	M	145,477	13,595	3,204	1,940	8,871	173,087
		F	-	334	184	122	13,241	13,881
		T	145,477	13,929	3,388	2,062	22,112	186,968
	ALL	M	167,459	22,845	9,581	2,439	11,019	213,343
		F	-	902	3,995	148	14,145	19,190
		T	167,459	23,747	13,576	2,587	25,164	232,533
1956	E	M	21,623	11,000	10,000	600	2,200	45,323
		F	-	3,000	6,000	50	1,000	10,100
		T	21,623	14,000	16,000	650	3,200	55,423
	N-E	M	150,245	15,000	3,800	2,300	10,300	181,645
		F	-	1,000+	800	100	16,300	18,200
		T	150,245	16,000	4,600	2,400	26,600	199,845
	ALL	M	171,868	26,000	13,800	2,800	12,500	226,968
		F	-	4,000	6,800	200	17,300	28,300
		T	171,868	30,000	20,600	3,000	29,800	255.268
1966	E	M	15,000	13,000	12,000	700	2,200	42,900
		F	-	4,000	10,000	75	1,100	15,175
		T	15,000	17,000	22,000	775	3,300	58,075
	N-E	M	58,000	18,000	4,000	2,500	10,900	93,400
		F	-	1,000+	1,000	150	18,800	20,950
		T	58,000	19,000	5,000	2,650	29,700	114,350
	ALL	M	73,000	31,000	16,000	3,200	13,100	136.300
		F	-	5,000	11,000	225	19,900	36,125
		T	73,000	36,000	27,000	3,525	33,000	172,425

* See Work Table 11.

\+ To the nearest thousand.

WORK TABLE 17 : WHOLESALE AND RETAIL PRICE INDEXES, UNION, 1936 - 1956.

Year	Wholesale Price Index	Retail Price Index	Average Price Index*
	All Groups	All Items	
1936	94.5	94.3	94.4
1938	100.0	100.0	100.0
1941	119.1	108.2	113.6
1946	156.2	134.1	145.1
1951	225.8	171.0	198.4
1953	261.2	192.4	226.8
1956	275.3	205.9	240.6

* The average price index has been used in this report when adjusting valueson the basis of 1953 and 1956 prices.

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