

and 1962/3 was 8.2% p.a. (Figure 5.4) its actual percentage of the P.W.V. fell from 8.7% to 8.4% over the same period and to 7.5% in 1968. The 2,491 workers employed in 1961/2 amounted to 5.23% of the P.W.V. total. By 1968 this decreased to 2,378 workers but amounted to 8.40% of the P.W.V. total (Figure 6.10). Only 42.1% of the establishments had utilised all the land available to them, considerably lower than the 67.79% in Johannesburg. The market area for all concerns is within the P.W.V. while 89.45% included Pretoria (Figure 6.17). Only 4.76% used telex and computers as compared with 14.73% on the East Rand (Figure 6.25). All establishments used electricity but 23.8% used coal as compared with 15.67% in Johannesburg.

Of the 21 establishments which answered, 52.38% suffered from a shortage of skilled labour. This is considerably less than the 75% of the West Rand and 61.05% of the East Rand's metal products industries. The shortage of skilled labour among metal producers has remained less chronic than among the manufacturers of machinery. There was comparatively little shortage of semi- and unskilled labour in the area. Only 47.62% of the establishments had any form of training scheme (Figures 6.13 and 6.14).

Despite the establishment of ISCOR, Pretoria has not developed any related secondary or tertiary industrial complex. Both in expansion and sophistication these industries lag behind the rest of the P.W.V., unable to compete profitably against the East Rand. Border industrial development at Rosslyn has boosted industrial growth in the area but Pretoria remains unattractive to the metal products manufacturers because of its peripheral position in the P.W.V.

3.5.3 The Machine Industry (Group 17) (Figures 5.3 and 6.5)

There was an increase from 9 in 1959/60 to 17 in 1962/3 in the number of machinery manufacturers in Pretoria, an annual growth rate of 29% (Figure 5.4). Its share of the total P.W.V. rose from 3.64% to 4.85% but fell again to 3.6% in 1968 (1968 Survey). In 1961/2 these concerns produced only R364,000 worth of goods as compared the total P.W.V. figure of R61,766,000.

Again the relative importance of Pretoria is minimal in view of production and development throughout the rest of the P.W.V. The lack of machine manufacturers is partially due to the relatively small number of metal products manufacturers (Group 16). It can be seen that Pretoria's ratio of base metal to metal products to machine manufacturers is 1 : 5.25 : 1.25 which is not in keeping with the general trend. In 1962/3 this was 1 : 7.58 : 3.15 for the whole of the P.W.V. (Figure 6.23)

This shows a weakness in Pretoria's metal products and machinery industry.

In 1961/2 the machine manufacturers employed only 266 persons in Pretoria or 0.99% of the P.W.V. (Figure 6.10). By 1968 this had fallen to 0.36% (Figure 6.10) but the average number of persons employed per establishment increased from 17.73 to 21.0 (Figure 6.6). 60% of the establishments suffered from a skilled labour shortage, which is slightly lower than similar industries on the East and West Rands (Figures 6.18 and 6.19). There was no shortage of semi-skilled or unskilled labour. Only 20% of the establishments had any training for their employees.

The current trend appears to be unaltered in Pretoria which is not developing secondary and tertiary industry to ISCOR. Despite favourable conditions during the mid-sixties and the phenomenal growth rate the area has remained an industrial back water within the P.W.V. What industry has developed serves only local needs and is orientated towards repair and maintenance rather than production.

3.6 Vereeniging and Vanderbijl Park (Economic Region 44)

3.6.1 The Base Metal Industry (Group 15) (Figures 5.3 and 6.5)

Vereeniging and Vanderbijl Park continued to dominate the country's iron and steel production. In 1959/60 the net output of Vereeniging amounted to R11,878,000 and that of Vanderbijl Park approximately R14,000,000 (I.C. Report No. 283) because the total net profits of ISCOR were R24,621,948 (Figure 6.25). This means that the region's output must have been about R25,878,000 by 1961/2 it had risen to R49,594,000; since then it continued to rise (Figure 4.12) until 1965 when controls were introduced. The expansion rate has since decreased (Figure 4.12) although demand has remained high in Southern Africa.

The number of establishments producing basemetals rose from 9 to 11 over the period 1959/60 to 1962/3 a growth rate of only 7.3% p.a. (Figure 5.4). The number of persons employed rose from 14,493 in 1961/2 to 19,456 in 1968 (Figure 6.9) when the industry employed 47.05% of all base metal workers in the P.W.V. (Figure 6.10). This meant that the average number of workers per establishment rose from 1317 to 2779.43 in 1968 (Figure 6.6). During that year the ISCOR works at Vanderbijl Park produced 1,606,748 tons of iron and steel or 169,000 tons more than Pretoria (Figures 6.7 and 6.8).

In contrast with Pretoria only 12.29% of the base metal working concerns did repair work (vs 50%). The remainder were production orientated (Figure 6.17). 85% processed raw materials and 57% used semi-processed materials.

All the establishments placed their main market within the P.W.V. but 85% included Johannesburg and 71.42% the Vereeniging - Vanderbijl Park area. These industries are not as localised as Pretoria's where 75% listed Pretoria as their major market area. Also 57.16 of the Vanderbijl Park - Vereeniging-establishments listed the East Rand as an important market area as compared to only 42.87% in Pretoria (Figure 6.17) (1968 Survey).

Again in contrast to Pretoria, 42.87% of the establishments used motor transport and 71.42% used rail and motor transport.

5 or 71.42% of the establishments used telex and 42.89% computers. These percentages are higher than those for the rest of the P.W.V. including Pretoria and the East Rand. This bears out the contention that only larger concerns find it profitable to make use of this type of equipment and so is indicative of the size and sophistication which the base metal industry of Vereeniging has reached. All the establishments used electricity, 4 or 57.16% used gas and 6 or 85.71% used coal (Figure 6.17). These percentages are all comparatively high which means that many establishments use all three forms of power and are not dependent upon one form only. Both electricity and coal are relatively cheap being produced in the area, as is gas.

Six or 85.71% of the establishments suffered from a shortage of skilled labour which is the highest of any area in the P.W.V. This is underlined by the fact as mentioned above that ISCOR ran a recruiting campaign in France during September and October of 1968. The fact that the population actually decreased between 1950 and 1961 (Figures 4.2 and 4.3) and that 77% of all the area's workers in 1960 were engaged in the metal industry would account for the difficulty in finding workers. There appears to be little or no shortage of semi- and unskilled workers in the area (Figures 6.7 and 6.8). Unfortunately population figures are not available but it is possible that the area is losing workers to the Witwatersrand and especially to Johannesburg where wages would tend to be higher. This is however very difficult to verify especially since no figures are available and industrialists are very reluctant to divulge them.

Five or 71.42% of the establishments in Vereeniging have training schemes for their employees, which is the highest figure for any group 15 industry in the P.W.V. and underlines the acute shortage of skilled labour.

3.6.2 The Metal Products Industry (Group 16) (Figures 5.3 and 6.5)

The number of firms producing metal goods in the Vereeniging - Vanderbijl Park area rose from 20 to 39 during the period 1959/60 to 1962/3 - an annual growth rate of 31.6% which is the highest for any area in the P.W.V. This amounted to only 4.6% of the total number of metal products establishments in the P.W.V. (Figure 5.4) but by 1968 rose to 5.4%. The number of persons employed rose from 3,091 in 1959/60 to 6,917 in 1961/2 (Report No. 304 and 283). The average number of workers per establishment rose from 266.1 in 1961/2 to 366.9 in 1968 (Fig. 6.6) and the area's percentage of workers within the P.W.V. rose from 14.52% to 18.24%. This means that tremendous development occurred.

The increase in workers (Figures 6.13 and 6.14) emphasises the industrial expansion which occurred between Vereeniging and the Kempton Park - Germiston - Alberton axis. The net output of these industries rose from R10,010,000 in 1959/60 to R14,016,000 in 1961/2 (Figure 6.25).

Although expansion has continued only 27.27% of the metal products establishments had used all the land available to them which is the second lowest figure in the P.W.V. Therefore there is room for further expansion. The increase in both the number of establishments and workers in the metal products industries means that the area is continuing to develop at a faster rate than the rest of the P.W.V. The fact that the average size of establishments had increased means that concerns must be expanding (Maps 5.3 and 6.5). The area appears to have a good future and development can be expected to continue, increasing the importance of the local market.

The Vereeniging establishments use semi-processed materials and so are dependent upon other sectors of the metal industry. Thirty three percent were engaged in maintenance and repair work and all of them in the production of articles. Eighty percent stated that their main market was within the P.W.V. and 66.67% included Vereeniging while 46.6% said it was Johannesburg and the East Rand (Fig. 6.17). Vereeniging establishments have a more diversified market than Pretoria where 100% of the establishments included Pretoria as their main market. Similarly the percentage of Vereeniging metal products industries which included the central and East Rand in their main market was 15% higher than Pretoria (Figure 6.17). Since the Vereeniging metal products industry is less dependent upon its local market than Pretoria, it is able to grow faster and compete better on the Witwatersrand than

Pretoria. This increased inter-dependence between Vereeniging and the Witwatersrand has helped boost areas like Meyerton and Alberton. It also means that there is likely to be pressure on industry to move southwards rather than northwards, on the Witwatersrand.

Vereeniging metal producers use motor transport, both for hauling goods in, 86.67% and out 73.34%. This is in keeping with the general trend throughout the P.W.V. Rail only accounted for 26.66% of inward bound goods and 60% of the outward bound. Four of the 15 establishments or 26.67% used telexes and computers. This is a relatively high percentage as compared to 4.76% in Pretoria and 14.73% on the East Rand. Again it can be ascribed to the size of the concerns, the largest in the P.W.V.

All the establishments used electricity, 5 or 33.34% used gas and 8 or 53.33% used coal. Again these figures are higher than Pretoria's metal products manufacturers. This is due to the fact that lighter industries tend to use more electricity than any other form of power, and because of cheap coal near Vereeniging.

Eleven of the 15 establishments or 73.34% were short of skilled labour. This figure is only slightly lower than the East Rand, but about 20% higher than Pretoria. This can be attributed to the comparatively small working population of the area, as well as the rapid expansion which has occurred. Only 5 or 33.34% of the establishments had any form of training for its workers.

In contrast to Pretoria, the Vereeniging and Vanderbijl Park Iron and Steel works are generating secondary and tertiary industry in the area, a move initiated by the government with the establishment of Vecor, Iscor, Wespeco and other heavy engineering concerns during the early fifties.

3.6.3. The Machine Industry (Group 17) (Figure 5.3 and 6.5)

From 1959/60 to 1962/3 the number of machine manufacturers in the area increased from 8 to 12, an annual growth rate of 16.67% (Figure 5.4). This category's percentage of P.W.V. concerns rose from 2% in 1961 to 5% in 1968 (Figure 6.20). The number of people employed in 1961/2 was 4,463 (Figure 6.9) or 16.6% of the total in the P.W.V.. This had risen to 21.35% by 1968, however the average number of employees per establishment fell from 743.83 to 622.86 during the same period (Fig. 6.6). The value of products in 1961/2 rose to R9,973,000 (Fig. 6.22) placing this area third in the P.W.V., while still having the highest per establishment.

28% of the establishments have fully utilised their sites (considerably lower than the utilisation figures of Johannesburg 64.91%). All the establishments which responded to the 1968 Survey were concerned with production while 57.15% repaired and maintained articles as well (Maps 6.18 and 6.19).

From these figures it may be deduced that the percentage of industries engaged in repair in Vereeniging was slightly lower than in Pretoria but slightly more than on the Far East Rand where only 48.39% were engaged in repair work. It should also be noted that like the Far East Rand all the concerns were also engaged in production (as opposed to repair and maintenance) while only 80% of Pretoria's produced articles. The Vereeniging area is therefore a production area and the machine industry here is not dependent upon the local industry as is the position with the Pretoria concerns which specialise in repair work.

All Vereeniging establishments used semi-processed materials, but 14.29% use unprocessed raw material and must therefore do some smelting or alloying work. This is Vecor which is the only concern large enough to warrant investment in such expensive equipment.

Only 5 of the seven, or 71.34% stated that their main market was in the P.W.V. This figure is lower than that of Pretoria's (80%), the Near East Rand's (79.3%) and the Far East Rand's (74.18%) but does follow the trend of machine industries which have a widespread market. This is because the production of agricultural machinery is included in this category, and it has a limited market within urban areas. Four of the establishments or 57.15% voted the Vereeniging area as their main market, while two or 28.57% included Johannesburg and the East Rand. These percentages are lower than those of the Far East Rand and Pretoria. In the case of the provinces, 3 or 42.85% of the establishments found the Orange Free State to be important, while 2 or 28.57% included the Cape and Natal. These percentages are higher than those of the Far East Rand and Pretoria (35.48% and 0% respectively). This emphasises the Vanderbijl Park - Vereeniging area's importance as a producer of agricultural implements. The fact that its markets are more widely spread throughout the country than those of the East Rand imply that it is an area tending to specialise in agricultural equipment, whilst the latter is producing for the industrial market.

One of the Vereeniging concerns has listed a foreign country (not identified) as an important market. This is possibly Rhodesia or Mocambique.

The Vereeniging machine producers use motor transport more than rail. Five establishments or 71.34% utilised motor transport for both incoming and outgoing goods and in comparison to this only 3 or 42.85% used the railways for incoming and 4 or 57.15% for outgoing goods. This conforms with the general trend in the P.W.V.

The relatively large size of the Vereeniging concerns is underlined by the fact that 3 establishments or 42.85% used both telex and computers. This is in marked contrast to the Pretoria machine industries where 20% made use of telex and computers and the East Rand where 20.46% had telexes and only 12.86% computers.

The need for telexes in the Vereeniging area can partly be understood by the need to communicate with the Witwatersrand, but the widespread use of computers is a function of firm size.

Of the establishments 3 or 42.85% used gas, and one or 14.29% coal. The comparative lack of coal users is unusual in an area where coal is a ubiquity. It cannot therefore be ascribed to the lack of a need to smelt or reheat iron which can be easily obtained in all the required shapes and sizes. Gas and electricity can be used for smelting on a small scale and for welding.

Five or 71.34% of the establishments had a skilled labour shortage. This figure is lower than the East Rand (Near 75% Far 77%) but is higher than Pretoria's (60%). Considering the shortages found in other areas of the P.W.V. and the acute shortage in the base metal industry in the Vereeniging (85.71%) this figure is not high. The fact that the machinery industry does not appear to require more skilled labour than other sectors of the metal industry, and since the Vereeniging area was suffering from a decrease in population (see above) it is surprising that this figure is not higher. There seems to be little shortage of semi- and unskilled labour in the area. The shortage of skilled labour may have resulted in 6 establishments or 85.72% of the concerns having a training scheme for their employees and this may account for the fact that the shortage of skilled labour is not as acute as in the base metal industry.

3.7

The Peripheral Area of the P.W.V.

The iron and steel producing areas of Pretoria and Vereeniging remain peripheral to the industrial core of the Witwatersrand.

The position of Pretoria has remained relatively unchanged. It still lacks the industrial development to

support any substantial form of machine producing industry and ISCOR remains the only significant iron and steel producer and industrial employer in the city. Although development has been planned, and the Rosslyn Border area has shown a rapid growth rate, the area lacks basic industries. The motorway links the city with Johannesburg and the incomplete Witwatersrand roadway.

The Chrysler factory has only recently come into production and should stimulate the area. Housing for white and non-white labour exists in the area and Chrysler Park could become the centre of an industrial area like Rosslyn. There is a possibility that the metal products and machine industries will develop in the area. Pretoria is the only area in the P.W.V. which has a deficit especially in machine manufacturers which produced only R270,000 worth of goods in 1959/60 - the lowest figure for any town in the P.W.V. (see Fig. 6.25). Since then the border area of Rosslyn has been declared. This area has had a measure of success and includes some large concerns, among which are the Datsun assembly plant.

"The Government scheme is designed to influence industrialists in favour of establishing industries in certain specified areas bordering on Bantu Homelands. The scheme offers considerable financial benefits to industrialists. The Industrial Development Corporation is already closely associated with the decentralisation concept." (Government Notice, undated).

The Rosslyn area covers 500 acres and has an African township, Garan-Khuwa, nearby, in which the workers are housed. The area's success can partially be ascribed to its relative proximity to the Witwatersrand and the fact that it is within the P.W.V.'s area.

The Pretoria area therefore lacks the potential to develop a large metal and machinery industry, however it is not likely to develop in the face of competition from the Witwatersrand. Improved communications will enable the already well established concerns of the East Rand to compete within the Pretoria area's market, where industry may come under pressure from the Witwatersrand in the future.

The Vereeniging - Vanderbijl Park area has been an area of iron and steel production since 1911. The heavy engineering and base metal industry is thus well developed. As has been shown previously the working population is small but 77% of it is engaged in the metal and engineering industry. The area has maintained this emphasis on

heavy industry and has begun to develop other smaller industries especially along the main lines of communication towards the P.W.V., Meyerton and the Klip River industrial areas which expanded during the boom of the mid 1960's.

The area has a relatively small number of establishments, but they are bigger in size than those of either Pretoria or the East Rand (Maps 6.7 and 6.13). The metal industry's expansion has occurred to the north of Vereeniging and may link up with the southward movement of the Near East Rand. Like Pretoria the area has been dominated by the base metal industry, but unlike the capital, Vereeniging has a widespread market for its secondary and tertiary industries. Although Vereeniging's metal and machine manufacturers number less than Pretoria's, they are larger concerns producing much more in net output than Pretoria and also stimulate more development.

Notwithstanding this the Vereeniging - Vanderbijl Park area remains semi-peripheral to the Witwatersrand. It has remained an area specialising in the heavy and base metal industry, from which it must derive much of its revenue. Population figures for this area are not available. Consequently it is impossible to ascertain whether the drop in population which occurred towards the end of the 1950's has continued. It is probable that the mid sixties boom and rapid growth, reversed this trend.

SUMMARY

The section covered by the late sixties period may be summarised briefly as follows:-

1. The late sixties saw a levelling off and consolidation of the metal industry;
2. Labour problems continued to affect the industry, 62.63% of all establishments questioned stated that they suffered from a shortage of skilled labour;
3. Johannesburg has continued to attract large numbers of smaller establishments, but production has remained below that of the East Rand;
4. the percentage of workers employed in Johannesburg as compared to the rest of the P.W.V. has declined;
5. the Kempton Park - Germiston - Alberton axis has continued to exhibit tendencies towards rapid expansion and is likely to continue to do so in the future;
6. the Far East Rand has continued to consolidate its position in terms of the base metal industry, and is likely to expand in this direction;
7. the metal industry in the Springs' area consists mainly of works where the volume of the completed article is smaller than that of the raw material so enabling the industry to use road transport to its advantage in marketing its produce in the P.W.V.;
8. there is an apparent shortage of industrial land in Benoni, so that future expansion can be expected in the Brakpan - Springs area where cheaper land is readily available;
9. the Far East Rand is expanding at a slower rate than the Near East Rand;
10. improved road communications could speed up future development on the Far East Rand.
11. the West Rand has remained an area of relative inactivity in so far as the metal industry is concerned;
12. Pretoria has not shown a tendency to develop a secondary metal industry but industrial activity at Rosslyn and Silverton has the effect of increasing the number of small engineering establishments engaged in the repair, service and maintenance of machinery;
13. the Vereeniging - Vanderbijl Park area has remained highly dependent upon the metal and engineering industry;
14. the expansion of industry in the Vereeniging - Vanderbijl Park area has reversed the declining numbers of Europeans which was apparent during the 1950's.

15. there has been an increased interdependency between the Vereeniging and the East Rand's industries, as a result of the development of the Kempton Park - Germiston - Alberton axis.

CONCLUSION

This study of the iron and steel and engineering industry illustrates four of Rostow's five stages of economic development:-

Firstly South Africa's traditional society i.e. pre-Newtonian, which ended by about 1820.

Secondly A long transitional in which South Africa prepared for take-off (1820 to 1933).

Thirdly The South African take-off into self sustained growth (1933 to 1945) and

Fourthly The drive to maturity (1945 onwards)

An examination of the figures (Chapters 1 to 4) show the marked change which occurred after 1933. This supports Houghton's (1964) chronological sequence of Rostow's stages, and the contention that the South African economy has "taken off". Further examination has revealed fluctuations within this general upward trend of periods of advance and retardation. This periodicity accounts for a four or five yearly cycle, but these are too erratic to form an accurate base of future predictions. It is indicative of a policy of economic stimulus and regression. In the short term expansion can be expected after 1970. In the long term the general upward trend will continue until the turn of the century when the South African economy will reach maturity and enter an era of mass consumption.

These general conclusions can be drawn from this study of the base metal and engineering industry, because of its importance to industry and all industrial development. Every major manufacturing region in the world is supported by a base metal and engineering complex either contiguous with or closely linked to it. No large scale industrial development can occur without it and general growth rates are often determined by the ability of this sector to supply the industrial demands. It is basic and essential to industrialization, normally preceeding industrial and commercial development. The base metal and engineering industry's economic integration with industrial development results in it being an indicator of the stage and rate of industrialization as well as being a stimulator of further expansion. This economic integration can be expressed in terms of forward and backward linkages.

Official planning authorities in South Africa recognise the high forward and backward linkages of the metal and engineering industry.⁺ (A.O. Hirschman 1958)*. It stimulates the use of raw materials as well as the production of numerous articles which are essential to other industries.

"According to Hirschman, the iron and steel industry has the highest combined linkage, followed in order, by non-ferrous metals, paper and products, petroleum products, coal products, textiles, coal mining, agriculture and forestry lumber and wood products, electric power, apparel and non-metallic minerals". (Optima Dec. 1963).

Work done in South Africa by D.C. Krogh has resulted in a slightly different pattern of linkages.

Table 7.1

Title: Input-output linkages of South African Industries.

Source: D.C. Krogh : 1961 "An Input-Output analysis of the South African Economy." (S.A. Journal of Economics, December, page 266.)

INDUSTRY	Backward linkage	Forward linkage	Total linkage
Non-ferrous metals	78	73	151
Petroleum and coal products	77	63	140
Paper and paper products	59	75	134
Chemicals	64	69	133
Textiles	65	53	118
Rubber Products	57	59	116
Iron and Steel	54	51	105
Coal Mining	22	83	105
Electricity and water	45	55	100
Apparel	62	5	67
Gold Mining	26	0	26

- + backward linkage : defined as the value of inter-industry purchases as a percentage of the total demand.
- * forward linkage : defined as the value of inter-industry sales as percentage of total demand.

In any event the iron and steel, metal products and machine industry taken together generate a high number of forward and backward linkages. The metal and engineering industry in fact forms a base upon which other industrial developments can be supported, therefore trends in this industry will be indicative of general trends in industry as a whole.

The continued expansion of the metal industry in the Pretoria - Witwatersrand - Vereeniging area has had and will continue to have many beneficial effects on the region's and the country's economy. This does however, bring the question of decentralisation into focus. Originally the gold mines attracted industry by virtue of the fact that they supplied a ready market. These concerns located themselves close to their principle market and so established a concentration of industries and urban settlements. As has been shown, today the gold mines are closing down and industry is replacing them as the driving force behind the country's economy. The development of nodes or growth poles can have both good and bad results. (Tobier, 1967).

"In sum, there are good reasons for urban growth. The larger the urban grouping the more abundant opportunities it potentially can offer: for individuals opportunities in choosing life styles, means of earning a living, opportunities in education, the arts and amusements; for organisations - opportunities in access to other organisations and individuals, which ultimately spells access to information, licence to influence and power." (E. Tobier, 1967).

In as far as the metal and engineering industry is concerned the P.W.V., which already has 60% of the establishments and nearly 80% of the industries and employees can be expected to continue expanding.

Over R250 million per month of goods are produced in the region. The establishment of iron and steel works at other centres in the Republic may lower the relative position of the P.W.V. but its real growth will continue. It is fortunate in one respect that the region has developed this industry, because it will supply alternative employment to the mines and will generate capital and wealth for the region long after the gold mines have closed. This is especially significant on the East Rand where gold production is expected to tail off rapidly within the next ten years. Developments on the East Rand should be encouraged and watched carefully because this region has both the potential and the room to develop. Should this not occur there will be a danger that without the gold mines insufficient capital will be generated to sustain the country's growth until reaching the period of high mass consumption.

The regional distribution of the industry within the P.W.V. shows some tendency towards specialisation. The development of Johannesburg as the centre of small establishments is the result of increased development. As the Near East Rand expands its industry it is also showing a tendency towards developing smaller concerns. Together with this trend is an increased interdependency between Johannesburg and Germiston. The rapid growth of Kempton Park and Alberton has resulted in the development of an industrial axis running north - south across the older east - west belt. This new development has occurred along the main lines of communication and could also be a factor in the increased importance of Germiston as an administrative and commercial centre. The expansion of the East Rand's iron and steel and engineering industry has only really come about since the Second World War, although the basis of it is much older. Its significance is the development of a medium-heavy metal industry which has allowed:

1. The country to become more self sufficient;
2. given alternative employment to the gold mines;
3. resulted in the investment of capital derived from the mines;
4. moved the centre of the heavier metal industry eastwards and so relieved the pressure on industrial land in Johannesburg;
5. resulted in a degree of decentralisation and consequently avoided the congestion which has plagued the world's larger urban complexes.

As Green has pointed out the inner-metropolitan area can be expected to expand and as it does more and more of the Near East Rand will be included in it. The growth of Germiston as a commercial centre is an important indicator of this. It can be expected that as the Near East Rand moves more and more into the sphere of the central Rand, the Far East Rand will develop different tendencies. The expansion of industry along the Witwatersrand will be as rapid as it was during the early 1960's.

There is little likelihood of the P.W.V. area being surpassed as the most important industrial area in the Republic. The present policy of decentralisation will have only a limited effect upon the growth of the area, especially as old mining land becomes available for development both for industry and for residential use.

Notwithstanding this potential industrial land, development can still occur within the P.W.V. Both Pretoria and the West Rand are comparatively under-developed areas, and on the East Rand development can move southwards. This has already occurred in the case of Alberton and Springs. The northward extension of the Vereeniging metal industry into the Meyerton area could result in any extended north-south industrial belt developing. This would swing the centre of the metal and engineering industry to the Alberton area, and could result in the re-orientation of growth poles on the Far East Rand and Johannesburg. As long as this potential development exists on the East Rand, other areas of the P.W.V. will not develop substantial metal industries. This will adversely affect Pretoria's metal products and machine producers.

In sum it can be said that it is the East Rand which holds the key to the future of the metal industry. Trends in that area will greatly influence the future of the rest of the Pretoria - Witwatersrand - Vereeniging complex.

APPENDIX I

QUESTIONNAIRES

1. N.R.D.C. Survey 1961.
2. 1968 Survey.

G.P.-S.1400062-1961-62-8,000.

OFFICIAL-AMPTELIK

N.R.D.C./R.O.N.H.,

Private Bag/Privaatsak 84,

PRETORIA.

Fold here.

Van hier.

NATURAL RESOURCES DEVELOPMENT COUNCIL
RAAD VIR DIE ONTWIKKELING VAN NATUURLIKE HULPBRONNE.

No. _____

REGIONAL INDUSTRIAL SURVEY, 1961.
STREEK NYWERHEIDSOPNAME, 1961.

In case of queries please phone:—
Ingeval van probleme, bel asseblief:—

Mr./Mnr. K. J. Dewar..... 33-0571 (Johannesburg).
Mr./Mnr. C. E. Marshall..... 34-1111 Ext. 228 (Johannesburg).
Mr./Mnr. J. Sharp..... 23-5791/2/3/4 (Johannesburg).
Mr./Mnr. C. J. Viljoen..... 3-1651 (Pretoria).
Mr./Mnr. R. A. Fone..... 642-2251 (Vereeniging).

For Office Use Only.
Slegs vir kantoorgebruik.

Region	
Complex	
Area	
Economic Activity Group Code No.	
Major Group Minor Group	

Name of Firm
Naam van firma

Address
Adres

Telephone/Telefoon No. _____

Stand No. or Farm Portion No.
Erf No. of plaasgedeelte No. _____

Township or Farm
Dorp of plaas

Type of Industry
Tipe nywerheid

N.B.—Kindly ring, preferably in RED, the printed numbers as answers to questions which apply, thus: 1-1 and state number of employees, etc., in number columns.

L.W.—Trek asseblief 'n kring, by voorkeur in ROOI kleur, om die gedrukte nommers as antwoorde op vrae wat van toepassing is, aldus: 1-1 en gee die aantal werknemers, ens., in die getalle kolomme.

LABOUR/ARBEID 1-5.

1. Are there fewer than 10 persons (administrative and productive workers) working in your establishment?
Is daar minder as 10 persone (administratiewe en produksiewerkers) werksaam in u inrigting?

Yes/Ja. No/Nee.

1-1 1-2

If yes, questions 2 to 5 need not be completed.
Indien ja, hoef u nie vrae 2 tot 5 te voltooi nie.

2. Working proprietors, Administrative, Commercial and Technical Staff.
Werkende eienaars, administratiewe, kommersiële en tegniese personeel.

	Whites, Blankes.		Other Races, Ander rasse.	
	2-1 Male, Manlik.	2-2 Female, Vroulik.	2-3 Male, Manlik.	2-4 Female, Vroulik.
Number/Getal.....				

3. Production Workers.
Produkstewerkers.

	Whites. Blankes.		Coloureds. Kleurlinge.		Asiatics. Asiate.		Bantu. Bantoe.	
	3-1 Male. Manlik.	3-2 Female. Vroulik.	3-3 Male. Manlik.	3-4 Female. Vroulik.	3-5 Male. Manlik.	3-6 Female. Vroulik.	3-7 Male. Manlik.	3-8 Female. Vroulik.
Number/Getal.....								

4. Transport Staff.
Vervoerpersonnel.

	4-1 Whites. Blankes.	4-2 Coloureds. Kleurlinge.	4-3 Asiatics. Asiate.	4-4 Bantu. Bantoe.
Number/Getal.....				

5. Total Number of Working Proprietors and Employees.
Totale aantal werkende eienaars en werknemers.

	Whites. Blankes.		Coloureds. Kleurlinge.		Asiatics. Asiate.		Bantu. Bantos.	
	5-1 Male. Manlik.	5-2 Female. Vroulik.	5-3 Male. Manlik.	5-4 Female. Vroulik.	5-5 Male. Manlik.	5-6 Female. Vroulik.	5-7 Male. Manlik.	5-8 Female. Vroulik.
Number/Getal.....								

LOCATION/VESTIGING 6-12.

6. Does your company operate similar factories in other areas in the Republic?
Beheer u maatskappy soortgelyke fabriek in ander dele van die Republiek?

Yes/Ja. No/Nee.
6-1 6-2

If yes, please state where:—
Indien ja, meld asseblief waar:—

Does your company operate similar factories in other countries?
Beheer u maatskappy soortgelyke fabriek in ander lande?

Yes/Ja. No/Nee.
6-3 6-4

7. How do you find the following factors in relation to your undertaking?
Wat is u bevinding in verband met die volgende faktore ten opsigte van u fabriek?

8.

9.

	Satisfactory. Bevredigend.	Unsatisfactory. Onbevredigend.	Of no Consequence. Onbelangrik.
Road transport services Padvoervoordienste.....	7-1	8-1	9-1
Rail transport services Spoorwagdiens.....	7-2	8-2	9-2
Availability of skilled labour Beskikbaarheid van geskoolde arbeid.....	7-3	8-3	9-3
Availability of unskilled labour Beskikbaarheid van ongeskoolde arbeid.....	7-4	8-4	9-4
Nearness to raw materials Nabyheid van grondstowwe.....	7-5	8-5	9-5
Nearness to your market Nabyheid aan u mark.....	7-6	8-6	9-6
Services (water, power, etc.) Dienste (water, krag, ens.).....	7-7	8-7	9-7
Size of building Grootte van gebou.....	7-8	8-8	9-8
Size of site Grootte van terrein.....	7-9	8-9	9-9

Please state any other factors which you regard as advantageous or disadvantageous to the efficient operation of your firm.
Noem asseblief enige ander faktore, hetsy voordelig of nadelig, wat die doeltreffendheid van u fabriek beïnvloed.

10. If you were to resite your plant, which of the following areas would you select?
Indien u u fabriek sou verskuif, watter van die volgende gebiede sou u verkies?

West Rand/Wesrand.....10-1
East Rand/Oosrand.....10-2
Johannesburg.....10-3
Pretoria.....10-4
Vereeniging.....10-5

Remain in same locale/In selfde omgewing bly...10-6

State if other areas in Republic/Noem, indien ander dele van die Republiek.

11. Do you intend to resite your plant in the next ten years?
Beoog u die verskuiwing van u fabriek binne die volgende tien jaar?

Yes/Ja. No/Nee.
11-1 11-2

If yes, where?
Indien ja, waar?

12. What would be the *principal* factors influencing the siting of your factory in any area? Indicate order of importance in second column.
Watter sou die *belangrikste* faktore wees vir die vestiging van u fabriek in enige gebied? Gee die volgorde van belangrikheid in die tweede kolom.

	Order of Importance, Volgorde van belangrikheid.
Close to main road Naby 'n hoofpad.....	12-1
Close to rail transport Nabyheid aan spoor.....	12-2
Availability of skilled labour Besikbaarheid van geskoolde arbeid.....	12-3
Availability of unskilled labour Besikbaarheid van ongeskoolde arbeid.....	12-4
Nearness to required raw materials Nabyheid van benodigde grondstowwe.....	12-5
Nearness to your market Nabyheid aan u mark.....	12-6
Near similar or linked industry Nabyheid van soortgelyke nywerheid of een waarby u inskakel.....	12-7
Suitable site available Gesikte terrein beskikbaar.....	12-8
Suitable building available Gesikte gebou beskikbaar.....	12-9
Other factors Ander faktore.....	12-0

Please state other factors
Meld asseblief ander faktore

RELATIONSHIPS/VERBAND 13-16.

13. What percentage of your output by value is supplied to the gold mines?
Watter persentasie van u produksie in waarde word aan goudmyne verskaf?
- | | | | |
|------------------------------|------|-----------------------|------|
| Less than/Minder as 10%..... | 13-1 | 25% to/tot 50%..... | 13-3 |
| 10% to/tot 25%..... | 13-2 | Over/Meer as 50%..... | 13-4 |
14. If you do supply to the gold mines, to which of the following areas do the bulk of your supplies go?
Indien u aan goudmyne lewer, na watter van die volgende gebiede gaan meeste van u produkte?
- | | |
|---|------|
| Kinross Area/Gebied..... | 14-1 |
| Far East Rand/Verre Oosrand (Nigel and/en Springs-Brakpan)..... | 14-2 |
| Near East Rand/Naby Oosrand (Benoni-Boksburg-Germiston-Kempton Park)..... | 14-3 |
| Central Rand/Sentraalrand (Johannesburg-Maraisburg-Florida)..... | 14-4 |
| West Rand/Wesrand (Roodepoort-Krugsdorp-Randfontein)..... | 14-5 |
| Far West Rand/Ver Wesrand (Westonaria-Carltonville)..... | 14-6 |
| Free State/O.V.S..... | 14-7 |
15. Is the bulk of your basic material—
Is meeste van u basiese materiaal—
- | | |
|--|------|
| Completely unprocessed?
Heeltemal onverwerk?..... | 15-1 |
| The by-product of another industry?
Die neweproduk van 'n ander nywerheid?..... | 15-2 |
| The product of another industry?
Die produk van 'n ander nywerheid?..... | 15-3 |

Is it essential to locate near the industry or industries referred to in 15-2 or 15-3 above?
Is dit noodsaaklik om naby die nywerheid of nywerhede waarna in 15-2 of 15-3 hierbo verwys word, te vestig?

Yes/Ja.	No/Nee.
15-4	15-5

If yes, kindly state the type of industry or industries.
Indien ja, meld asseblief die tipe nywerheid of nywerhede

16. Do you mainly produce—
 Produseer u hoofsaaklik—

- Finished articles for sale to the public?
 Finale produkte om aan die publiek te verkoop?..... 16-1
- Products for use by other industries?
 Produkte wat deur ander nywerhede gebruik word?..... 16-2
- Do you have by-products that are used by other industries?
 Het u neweprodukte wat deur ander nywerhede gebruik word?..... 16-3
- Is it essential to locate near the industry or industries referred to in 16-2 or 16-3 above?
 Is dit noodsaaklik om naby die nywerheid of nywerhede waarna in 16-2 of 16-3 hierbo verwys word, te vestig?

Yes/Ja.	No/Nee.
16-4	16-5

If yes, kindly state the type of industry or industries.
 Indien ja, meld asseblief die tipe nywerheid of nywerhede.

17. SOURCE OF RAW MATERIALS/BRON VAN GRONDSTOWWE. (See map of areas/Sien kaart van gebiede.)

Where do your raw materials come from?
 Waarvandaan verkry u grondstowwe?

- Pretoria, Witwatersrand, Vereeniging area/gebied..... 17-1
- Eastern/Oostelike Transvaal..... 17-2
- Western/Westelike Transvaal..... 17-3
- Northern/Noordelike Transvaal..... 17-4
- Natal..... 17-5
- Cape Province/Kaapprovinsie..... 17-6
- Orange Free State/Oranje-Vrystaat..... 17-7
- South West Africa/Suidwes-Afrika..... 17-8
- Imported from outside the Republic
 Van buite die Republiek ingevoer..... 17-9

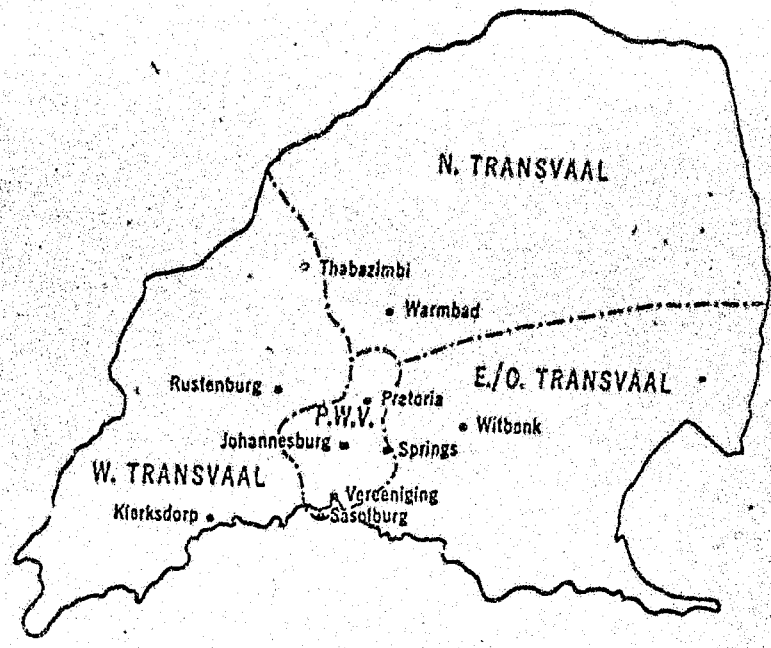
If outside the Republic, state where
 Indien buite die Republiek, meld vanwaar

18. MARKETING FINISHED PRODUCTS/BEMARKING VAN EINDPRODUKTE. (See map of areas/Sien kaart van gebiede.)

Where are your products marketed?
 Waar word u produkte bemark?

- Pretoria, Witwatersrand, Vereeniging area/gebied..... 18-1
- Eastern/Oostelike Transvaal..... 18-2
- Western/Westelike Transvaal..... 18-3
- Northern/Noordelike Transvaal..... 18-4
- Natal..... 18-5
- Cape Province/Kaapprovinsie..... 18-6
- Orange Free State/Oranje-Vrystaat..... 18-7
- South West Africa/Suidwes-Afrika..... 18-8
- Outside Republic/Buite die Republiek..... 18-9

If outside Republic, state where
 Indien buite Republiek, meld waar



19. SIZE OF INDUSTRY AND EXPANSION/GROOTTE EN UITBREIDING VAN FABRIEK 19-21.

Please state the areas of your establishment.
Gee asseblief die groottes van u inrigting.

Roofed Areas/Onder dak.

- 19-1 Offices for administrative and other commercial uses
Kantore vir administratiewe en ander kommersiële gebruike..... sq. ft./vk. vt.
- 19-2 Factory or other productive space, including assembly, storage, packing, etc.
Fabrieksoppervlakte of enige ander oppervlakte vir produksie insluitende
montering, berging, verpakking, ens..... sq. ft./vk. vt.
- 19-3 Canteen, residential and other buildings, including roofed parking space
Restaurant, woonhuise en ander geboue insluitende onderdakke parkering... sq. ft./vk. vt.

Unroofed Area/Nie onder dak.

- 19-4 Used for production utilising gantries, etc., or storage areas or for other
productive uses
Oppervlakte vir produksie met bokkrane, ens., berging en vir ander vorms
van produksie..... sq. ft./vk. vt.

Balance of site/Res van die terrein.

- 19-5 Available for future expansion
Beskikbaar vir toekomstige uitbreiding..... sq. ft./vk. vt./
Acres.

- 19-6 TOTAL AREA OF SITE
TOTALE OPPERVLAKE VAN TERREIN..... sq. ft./vk. vt./
Acres.

EXPANSION/UITBREIDING.

20. Do you plan any extensions on your present site within the next ten years?
Beoog u enige uitbreidings op u bestaande terrein binne die volgende tien jaar?

Yes/Ja.	No/Nee.	Uncertain/ Onseker.
20-1	20-2	20-3

21. Do you contemplate expanding onto a new site within the next ten years?
Beoog u enige uitbreidings op 'n nuwe terrein binne die volgende tien jaar?

Yes/Ja.	No/Nee.	Uncertain/ Onseker.
21-1	21-2	21-3

If yes, please state where
Indien ja, meld asseblief waar

TRANSPORT/VERVOER.

22. Is your site served by a private railway siding?
Word u terrein deur 'n private sylyn bedien?

Yes/Ja.	No/Nee.
22-1	22-2

If yes, state how many truckloads this siding takes.
Indien ja, meld hoeveel trokvrage op hierdie sylyn hanteer word.

Per Day/dag	or/of	Per Week	or/of	Per Month/ maand.
-------------	-------	----------	-------	----------------------

Incoming truckloads
Inkomende trokvrage.....

Outgoing truckloads
Uitgaande trokvrage.....

Do you use road transport?
Gebruik u vragmotors?

Yes/Ja.	No/Nee.
22-3	22-4

If yes, state how many lorry loads.
Indien ja, meld hoeveel vrage.

Per Day/dag	or/of	Per Week	or/of	Per Month/ maand.
-------------	-------	----------	-------	----------------------

Incoming lorry loads
Inkomende vrage.....

Outgoing lorry loads
Uitgaande vrage.....

MOVEMENT OF INDUSTRY/BEWEGING VAN NYWERHEID.

23. When was this factory originally established in this region?
Wanneer is die fabriek oorspronklik in hierdie streek gevestig?

Before/Voor 1935.....	23-1	1946-1950.....	23-4
1936-1940.....	23-2	1951-55.....	23-5
1941-1945.....	23-3	1956-60.....	23-6

24. If you were located elsewhere in this region during this period please state where.
Indien hierdie fabriek voorheen op ander plekke in hierdie streek gevestig was, meld asseblief waar.

Before/Voor 1935.....	24-1	1946-50.....	24-4
1936-1940.....	24-2	1951-55.....	24-5
1941-45.....	24-3	1956-60.....	24-6

25. Essential Services/Noodsaaklike Dienste.

What is your average monthly consumption of—
Wat is u gemiddelde maandelikse verbruik van—

(a) Water?_____

(b) Electricity/Elektrisiteit?_____

(c) Gas?_____

PARKING/PARKERING.

26. Is there on-site parking space available for all the cars of your employees?
Is daar parkeerruimte op u terrein vir al die motors van u werknemers?

Yes/Ja. No/Nee.

26-1 26-2

If no, how many on-site parking spaces are there?
Indien nee, hoeveel parkeerplekke is daar op u terrein?_____

Approximately how many cars are parked elsewhere?
Ongeveer hoeveel motors word elders geparkeer?_____

27. Name of firm

Naam van firma_____

Address

Adres_____

Do you operate your own transport for any business whatsoever?

Gebruik u u eie padvervoermiddels vir enige besigheidsdoeleindes hoegenaamd?_____

Yes/Ja. No/Nee.

27-1 27-2

Do you employ hauliers?
Huur u padvervoermiddels?

Yes/Ja. No/Nee.

27-3 27-4

If yes, please state name and address of firm
Indien ja, gee asseblief naam en adres van firma_____

EXPLANATIONS/VERDUIDELIKING.

Area.

The area covered by this survey includes Pretoria in the north, the Vereeniging-Vanderbijl Park-Sasolburg complex in the south, Carletonville in the west and Springs, Nigel and Heidelberg in the east. It is referred to as "this region" in several of the questions.

Gebied.

Die gebied wat deur hierdie opname gedek word strek vanaf Pretoria in die noorde tot by die Vereeniging-Vanderbijl Park-Sasolburg kompleks in die suide en vanaf Carletonville in die weste tot by Springs, Nigel en Heidelberg in die ooste. In sommige van die vrae word dit „hierdie streek" genoem.

An "establishment" is a factory or undertaking under the same ownership or management at a particular location.
'n „inrigting" is 'n fabriek of onderneming onder dieselfde eienaarskap of bestuur by 'n bepaalde plek.

INDUSTRIAL SURVEY OF PRETORIA—WITWATERSRAND—VEREENIGING AREA.

The Natural Resources Development Council in collaboration with other state departments, the provincial administration, local authorities and private organisations is preparing a physical development plan which should guide development within this region for the next twenty years. Due to the rapid growth of towns and cities land for residential, industrial, recreational and other purposes must be reserved many years in advance.

With the closing of the gold mines industries are of vital importance in the present and future development of the region. The structure of the existing industrial complex must be studied in detail in order to make preparations for the future and your co-operation in completing this form will be invaluable.

All the information will be regarded as secret and details of individual firms will not be published. The final report should be of value not only to government departments and local authorities but also to industrialists.

Thank you very much for your kind co-operation.

C. J. VILJOEN,
Assistant Director, N.R.D.C.

NYWERHEIDSOPNAME VAN DIE PRETORIA—WITWATERSRAND—VEREENIGING GEBIED.

Die Raad vir die Ontwikkeling van Natuurlike Hulpbronne in samewerking met ander staatsdepartemente, die provinsiale administrasie, plaaslike besture en private instansies is besig om 'n fisiese ontwikkelingsplan op te stel wat as gids sal dien vir die ontwikkeling van hierdie streek vir die volgende twintig jaar. As gevolg van die snelle groei van dorpe en stede is dit noodsaaklik dat grond vir woon-, nywerheids-, ontspannings- en ander doeleindes jare vooruit gereserveer word.

As gevolg van die sluiting van die goudmyne is nywerhede van die allergrootste belang in die huidige en toekomstige ontwikkeling van die streek. Die samestelling van die bestaande nywerheidskompleks moet in detail bestudeer alvorens projeksies vir die toekoms gemaak kan word. Die hulp wat u verleen deur die vorm te voltooi is van die allergrootste belang.

Al die inligting wat u verstrekk sal geheim gehou word en gegewens van 'n enkele inrigting sal nie gepubliseer word nie. Die finale verslag behoort nie alleen vir staatsdepartemente en plaaslike besture van groot waarde te wees nie, maar ook vir die nywerars self.

Baie dankie vir u welwillende samewerking.

C. J. VILJOEN,
Assistent-direkteur, R.O.N.H.

QUESTIONNAIRE

Questions/Vraeys

1. When was this industry established on this site?
Op watter datum was hierdie bedryf op hierdie plek gevestig?

2. Are you concerned with:-
Het u te doen met:-

A. The service, maintenance and repair of articles?
Die diens, onderhoud en herstel van goedere?

Yes/Ja No/Nee

☐	☐
--------------------------	--------------------------

B. The production of articles?
Die vervaardiging van goedere?

☐	☐
--------------------------	--------------------------

3. What do you service, maintain or repair?
Vermeld asb. die geaardheid van die diens, onderhoud of herstelwerk

4. For what reason was the firm established here?
Gee asb. die redes waarom hierdie bedryf op hierdie plek gevestig is

5. Raw Materials/Grondstowwe

Do you use:-
Gebruik u:-

A. Semi-Processed Materials
Gedeeltelik verwerke grondstowwe

Yes/Ja No/Nee

☐	☐
--------------------------	--------------------------

What are they?/Vermeld asb. watter grondstowwe

Do you use :-
Gebruik u :-

B. Raw Materials
Grondstowwe

Yes/Ja No/Nee

☐	☐
--------------------------	--------------------------

What are they?/Vermeld asb. watter grondstowwe

6. Size of Establishment/Grootte van bedryf

- A. What is the total area of your site? / Hoe groot is die totale gebied?
- B. What percentage is unused? / Watter persentasie is ongebruik?
- C. What is your total employment? / Hoeveel persone is in u diens?

7. Markets/Bemarking

- A. Is your main market within the Pretoria-Witwatersrand-Vereeniging complex? ☐ Yes/Ja
Is die Pretoria-Witwatersrand-Vereeniging-gebied u vernaamste bemarking-gebied? ☐ No/Nee
- B. If it is, is it
Indien dit is, is dit
- | | Yes/Ja | No/Nee |
|---|--------------------------|--------------------------|
| in Pretoria area/ in Pretoria gebied? | ☐ | ☐ |
| in Vereeniging area? / in Vereeniging gebied? | ☐ | ☐ |
| in the East Rand (Germiston to Springs)? / in die Oos Rand (Germiston tot Springs)? | ☐ | ☐ |
| in the West Rand (Krugersdorp to Oberholzer)? / in die Wes Rand. | ☐ | ☐ |
| in the Johannesburg area (incl. Florida)? / in die Johannesburg gebied (ingesl. Florida)? | ☐ | ☐ |
- C. Is your main market elsewhere in the country? If so, is it ...
Is u vernaamste bemarkingsgebied in ander dele van die land?
Indien dit is, is dit ...
- | | Yes/Ja | No/Nee |
|---|--------------------------|--------------------------|
| in the Cape/ in die Kaap Provinsie? | ☐ | ☐ |
| in Natal/ in Natal? | ☐ | ☐ |
| in the O.F.S./ in die O.V.S.? | ☐ | ☐ |
| in the Transvaal / in die Transvaal? | ☐ | ☐ |
| in South West Africa / in Suidwes-Afrika? | ☐ | ☐ |
- D. Is your main market overseas? If so, in what country is it?
Is u vernaamste mark oorsee? Indien dit is, na watter land(e)?
.....
.....

8. Communications / Middele van Verbindings

- A. What is your main method of transport? / Wat is u vernaamste vervoer-middel?

	Road/Pad	Rail/Spoorweg	Air/Lug	Other/Andere
Incoming/Inkomend				
Outgoing/Uitgaande				

B. Which has the greatest transport volume? / Wat het die grootste vervoer-omvang?

Your incoming goods / U inkomende goedere?

Your outgoing goods / U uitgaande goedere?

Yes/Ja No/Nee

C. Do you make use of ... / Maak u gebruik van ...

Telex machines / Telex masjiene

Computers / Rekenoutomate

9. Power / Krag

A. Do you use ... / Gebruik u ...

Electrical power / Elektriese krag?

Gas / Gas?

Coal or Coke / Steenkool

Yes/Ja No/Nee

10. Labour / Arbeid

A. Approximately what percentage of the employees are
Omtrent watter persentasie van u werknemers is

Skilled/Geskool

Semi-skilled/Halfgeskool

Unskilled/Ongeskool

B. Do you have any trouble finding ...
Ondervind u enige moeilikheid om te verkry ...

Skilled Labour / Geskoolde Arbeid?

Semi-skilled Labour / Half-geskoolde Arbeid?

Unskilled Labour / Ongeskoolde Arbeid?

Yes/Ja No/Nee

C. Do you have any training period for workers employed in your firm? / Het u enige skoling -tydperk vir werknemers in u bedryf?

Yes/Ja No/Nee

--	--

BIBLIOGRAPHY

- Act No. 28 (1956) Industrial Conciliation Act (as amended by Act 41 of 1959). Government Printer, Pretoria.
- Act No. 88 (1967) "The Physical Planning and Utilisation of Resources Act". Government Printer, Pretoria.
- Alexander. J.W. (1963) "Economic Geography" Pub. Prentice-Hall Inc. New Jersey.
- Anderson. P.(undated) Notes on Vanderbijlpark Town Engineers Dept. ([±] 1969).
- Benoni (1962) "Benoni- Transvaal, Suid Afrika. The Town Council and Publicity Department of the S.A.R. & H. Printed Artone Press, Johannesburg.
- Benoni (undated) "Benoni - Industrial Hub of the Transvaal). The Town Council.
- Benoni (undated) "Benoni Street Map and Addresses". The Town Council.
- B.O.T. & I. "An Investigation into the Iron and Steel, Metallurgical and Engineering Industries". Parts I
Rep. No.6 (1968) and II. Board of Trade and Industries No. 6 of 1968.
- Boksburg (undated) Location Map with Streets and Stand Numbers. Town Council.
- Boksburg (undated) Industrial Index. Town Engineers Department.
- Braby's (1968) "Business Directory of Johannesburg, Witwatersrand and the Vaal Triangle 1968.
Braby's, Melle Street, Johannesburg.
- Brakpan (undated) "Industrial Potential of Brakpan". ([±] 1967). Director of Industrial Affairs, Town Hall, Brakpan.
- Brakpan ([±] 1964) "Brakpan - The Centre of the Industrial East Rand". Director of Industrial Affairs, Town Hall, Brakpan.
- Brakpan (undated) "Brakpan - A short History". Director of Industrial Affairs, Town Hall, Brakpan.
- Bury, J. (1921) An Address to the Chairman and Directors of the South African Iron and Steel Corp. Pretoria.
J. Bury, Consulting Engineer.
- Cartwright, A.P.(1962) "The Gold Miners". Pub. Burnell, Cape Town.
- Cartwright, A.P.(1965) "The Corner House". The early history of Johannesburg 1965.
Pub. Purnell, Cape Town.
- Cole, M.M. (1961) "South Africa" Pub. Methner. Printed Butler and Tanner Ltd., Frome, London.
- Davidson, B. (1959) "Old Africa Rediscovered". Pub. Victor Gollancz Ltd., London.
- Delfos (1921) Letters, statements and Reports referred to by Richards (1940), dated 3/5/1921 and
18/5/1921.
- Department of "Economic Development Programme for the Republic of South Africa 1966/67"
Planning (1965) Government Printer, Pretoria.
- Department of Customs Annual Reports. Vols. I and II. Government Printer, Pretoria.
& Excise (1965/69)

- Drummond, E.P. (1966) "Significant Trends in the Development of the Iron and Steel and Engineering Sector". Paper to the 5th Annual Business and Management Conference, 1966.
- Dunswart (1961) "Dunswart Iron and Steel Works 1911 - 1961". An Anniversary Brochure, Dunswart, Benoni.
- Estell R.C. and Buchanan R.A. (1961) "Industrial Activity and Economic Geography". 6th Edition 1966. Pub. Hutchinson University Library, London.
- Evidence (1928) Evidence given by Delfas and others to Parliament. (Richards 1940).
- Fair, T.J.D. (1965) "The Core - Periphery Concept and Population Growth in South Africa 1911 - 1960". S.A. Geog. Journal. Vol. XLVII, 1965.
- Germiston C.E.D. (1963) "Planning for Traffic". City Engineers Department Report 1963.
- Germiston (1965) "Industrial Index". Public Relation's Officer, Germiston City Council.
- Government Department of Information: (undated) "South Africa - Quiz". Some Facts and Figures on South Africa.
(- 1963) "Pillars of the South African Economy". General Information and Figures on South African Industry.
(± 1966) "This is South Africa". Background and General Information on South African Industry.
(± 1968) "Decentralised Industrial Development in South Africa".
- Government Industrial Census, Reports (1915 - 1939). Numbers 14/1918, 51/1918, 17/1920, 28/1920, 48/1921, 40/1922, 14/1924, 41/1924, 35/1926, 41/1927, 32/1928, 51/1928, 18/1930, 44/1930, 33/1931, 34/1936, 30/1937, 24/1938, 39/1939, 21/1941. Government Printer, Pretoria.
- Government Industrial Census (1945 - 1962)
Special Reports:-
No. 219 - 1947/8 and 1949/50, Industrial Census.
No. 201 - 1949/50 and 1950/51, Industrial Census.
No. 212 - 1952/3, Industrial Census.
No. 218 - 1953/4, Industrial Census.
No. 308 - 1957/8, Industrial Census.
No. 283 - 1959/60, Industrial Census.
No. 304 - 1961/2, Industrial Census.
No. I.C. 45 - 1950/1 to 1960/1, Summary Census, Groups 73 (Iron and Steel) and 74 (Smelting and Refining).
- Government Mining Engineer (1940, 1955, 1959, 1959/60 and 1965).
Government Mining Engineer Reports Nos. U.G. 30 - 56, U.G. 58 - 60, R.P. 18 - 62, R.P. 53 - 66. Pub. Government Printer, Pretoria.
- Government Reports
Report No. 6 (1908) Transvaal Report of the Customs and Industries Commission, Transvaal. Government Printers.
Report No. 21 (1910) Report on the Manufacture of Iron and Steel in the Transvaal, Transvaal Government Printers.

Report No. 9 (1912). Select Committee Report qq G. 59 - 1045.
 Report No. 10 (1912). Union Government Report. Government Printer, Pretoria.
 Report No. 5B (1920). Evidence of J. Blacklock Select Committee Report,
 Government Printer, Pretoria.
 Report No. 14 (1925). Evidence before Select Committee q. 137.
 Government Printer, Pretoria.
 Report No. 1 (1928). Evidence before Select Committee q. 327 - 328,
 Government Printer, Pretoria.

Green, L.P. and
 Fair T.J.D. (1962)

"Development in Africa". A Study in Regional Analysis with Special Reference
 to Southern Africa. Pub. Witwatersrand University Press, Johannesburg 1962.

Green L.P. (1957)

"First Interim Report : The Social Structure of the Witwatersrand Metropolitan
 Region". City Engineers Department, Johannesburg.

Green L.P. (1957)

"Second Interim Report: The Economic Structure of the Witwatersrand Metropolitan
 Region". City Engineers Department, Johannesburg.

Gutehoffnungshutte Commission Report (1924). ~~Never Published.~~ (Richards, C. 1940).

Hansard (1926, 1927, 1928). Debate van die Volksraad - House of Assembly Debates.
 (7:4519, 1/6/1926; 9:2888, 28/4/1927 i 122, 13/4/1928)
 Pub. Government Printer, Pretoria.

Houghton, D.H. (1964)

"The South African Economy". Pub. Oxford University Press.
 Cape Town, London, New York.

Hirschman, A.O. (1958)

"The Strategy of Economic Development". Yale, New Haven 1958.

ISCOR (1948)

"ISCOR/YSCOR". A Brochure on Wartime Production.

ISCOR (1965)

"Steel". Company Brochure 1965.

ISCOR (1955-1970)

Annual Company Reports.

ISCOR (undated)

"Facts and Figures about ISCOR" Pamphlet issued by ISCOR [±] 1966.

Jacobsz E.P. (1966)

"The Situation and Prospects in the Iron and Steel and Engineering Sector".
 A paper to the 5th Annual Business and Management Conference.

Jacobsz E.P. (1967)

"The Situation and Prospects in the Iron and Steel and Engineering Sector".
 A paper to the 6th Annual Business and Management Conference.

Johannesburg C.E.D.
 (1965)

"White Population Existing and Projected Johannesburg Study Area 1965 - 1985".
 City Engineers Department, Forward Planning Branch, Johannesburg.

Johannesburg C.E.D.
 (1966)

"Metropolitan Johannesburg". A Report by Forward Planning.

Joint Sitting (1928)

Joint Sitting of Both Houses of Parliament. Joint Sitting Debates (i 122, 13/4/1928)
 Government Printer, Pretoria.

- Krogh, D.C. (1961) "An Input - Output Analysis of the South African Economy". South African Journal of Economics 1961.
- Kruger, C.M. (1964) "A general review of the Iron and Steel Industry in South Africa". Pub. ISCOR 1965.
- Lydolph, P.E. (1964) "Geography of the U.S.S.R." Pub. John Wiley and Sons, Inc, New York, London. Sydney.
- Monthly Bulletin of Statistics (1939/1941) Monthly Bulletin of Statistics. Government Printer, Pretoria.
- Marks, S. & Lewis (1926) "USCO"- The Iron and Steel Industry of South Africa". A report published by USCO, Vereeniging.
- Mining Survey (1967 & 1968). Nos. 60, 61 and 63. Pub. Chamber of Mines of South Africa. Printed: Swan Press.
- N.R.D.C. Report No. 1686094 (1958) "A Planning Survey of the Southern Transvaal". (The Pretoria -Witwatersrand - Vereeniging Area). Pub. The Natural Resources Development Council.
- N.R.D.C. Survey (1961) "Regional Industrial Survey 1961". Never published.
- N.T.V.L. Chamber of Industries (1968) "Production and Service Register 1967/8." Pretoria.
- Oppenheimer (1927) A Speech by Sir Ernest Oppenheimer. Union Assembly Debates 8924. 2nd May, 1927.
- Optima (Dec. 1963) "The Tugela Basin as a Future South African Metropolis". O.P.F. Horwood and E. Thorrington-Smith. Pub. Anglo American Corp. (S.A.) Ltd., Johannesburg.
- Optima (June 1966) "Iron Ore Reserves and the World's changing Needs". G.A. Schnellmann. Pub. Anglo American Corp. (S.A.) Ltd., Johannesburg.
- Optima (March 1967) "Mineral Resources of the Transvaal". T. Anderson. Pub. Anglo American Corp. (S.A.) Ltd.
- Optima (March 1968) "The Witwatersrand: a time and tailings" N. Gordimer and D. Goldblatt. Pub. Anglo American Corp. (S.A.) Ltd., Johannesburg.
- Pretoria C.E.D. (1969) Town Planning Scheme. Pub. C.E.D. Pretoria Municipality.
- Population Census (1960) The Population Census Report Vol 2. Sections 1 to 12. Pub. Bureau of Statistics, Pretoria.
- Richards, C.S. (1940) "The Iron and Steel Industry in South Africa". University of the Witwatersrand, Johannesburg.
- Raikes, H.R. (1949) "Liquid Fuel from Oil". South African Journal of Economics 1949.
- Rostow W.W. (1960) "The Stages of Economic Growth". Pub. Cambridge 1960.

- S.A. Financial Times (1971) The South African Financial Time (5/1/71)
- SEIFSA (1966) "Organisation and Structure of the Metal and Engineering Industries in the Republic of South Africa". Pub. Steel and Engineering Industries Federation of South Africa (SEIFSA), Johannesburg.
- SEIFSA (1957) Engineer and Foundryman "21 years of service to the Metal Industries 1936 - 1957". Pub. SEIFSA 1957.
- Sunday Times (1968) "The Steel and Engineering Industries Federation Survey". Sunday Times Business Time Section. October 20th, 1968.
- Skinner, C. (1968) "A Review of the Iron and Steel Industry". Sunday Times October 27th, 1968.
- The 1968 Survey (1968) Postal and Field Survey of the Base Metal, Metal Products and Machine Industry in the Pretoria, Witwatersrand, Vereeniging Region.
- Thornycroft (1921) Report to the Central Mining and Investment Corp. Ltd., Johannesburg.
- U.G. Report 61 (1955) "Summary of the Report of the Commission for the Socio-Economic Development of the Bantu Areas within the Union of South Africa". Government Printer, Pretoria.
- U.S. Annual Survey of Manufacturers (1958). Bulletin No. M.C. 58(1). The United States Census of Manufacturers Washington 1958.
- U.S.C.O. (1964/68) Annual Reports, USCO, Vereeniging.
- VECOR (1958) "VECOR" Brochure by the Company 1958.
- White Paper (1927) Preamble of Bill of 1927. "The Iron and Steel Industry Bill, 1928". Government Printer, Pretoria.
- W.P.F. (1956) White Paper, Memorandum on Government Decisions on the Recommendations of the Commission for the Socio-Economic Development of the Bantu Areas within the Union of South Africa. Government Printer, Pretoria.
- Year Book (1966, 1968) "State of South Africa, Year Book". Pub. The Standard Bank of South Africa Ltd., Johannesburg.

Author Drake M F

Name of thesis The iron and steel, metal and engineering industry in the Pretoria-Witwatersrand-Vereeniging region 1971

PUBLISHER:

University of the Witwatersrand, Johannesburg

©2013

LEGAL NOTICES:

Copyright Notice: All materials on the University of the Witwatersrand, Johannesburg Library website are protected by South African copyright law and may not be distributed, transmitted, displayed, or otherwise published in any format, without the prior written permission of the copyright owner.

Disclaimer and Terms of Use: Provided that you maintain all copyright and other notices contained therein, you may download material (one machine readable copy and one print copy per page) for your personal and/or educational non-commercial use only.

The University of the Witwatersrand, Johannesburg, is not responsible for any errors or omissions and excludes any and all liability for any errors in or omissions from the information on the Library website.