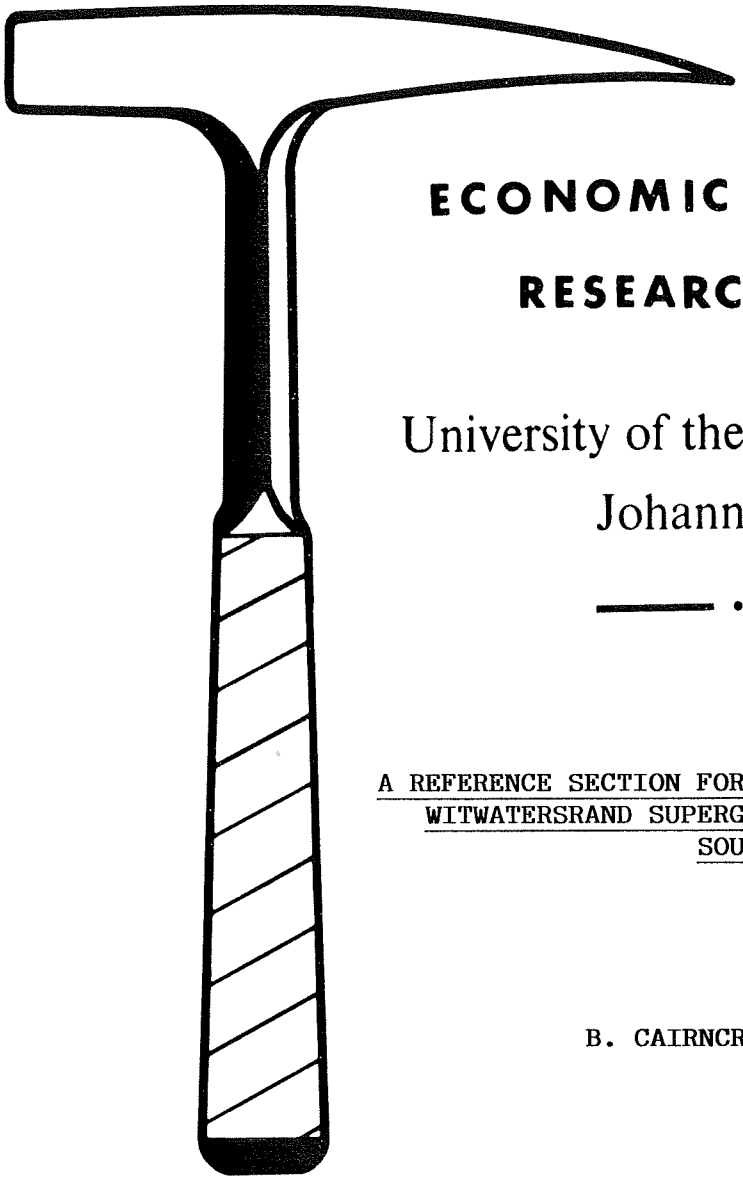

# ECONOMIC GEOLOGY RESEARCH UNIT

University of the Witwatersrand
Johannesburg

## A REFERENCE SECTION FOR PART OF THE WEST RAND GROUP, WITWATERSRAND SUPERGROUP, KLERKSDORP GOLDFIELD, SOUTH AFRICA

B. CAIRNCROSS and M.C. BRINK

INFORMATION CIRCULAR No. 209

UNIVERSITY OF THE WITWATERSRAND
JOHANNESBURG

# A REFERENCE SECTION FOR PART OF THE WEST RAND GROUP, WITWATERSRAND SUPERGROUP, KLERKSDORP GOLDFIELD, SOUTH AFRICA

by

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May, 1989

# A REFERENCE SECTION FOR PART OF THE WEST RAND GROUP, WITWATERSRAND SUPERGROUP, KLERKSDORP GOLDFIELD, SOUTH AFRICA

## ABSTRACT

A detailed lithostratigraphic profile for part of the West Rand Group in the Rietkuil Syncline west of Klerksdorp is described. This sequence was documented from core of borehole BAB 1 drilled in the early 1950's. The succession described is approximately 1500m thick and spans the stratigraphic intervals from the top of the Rietkuil Formation (lower Jeppestown Subgroup) to the central parts of the Promise Formation (Government Subgroup). This succession is relatively undisturbed by post-depositional tectonic and igneous activity and therefore provides an uninterrupted lithostratigraphic section for this portion of the Witwatersrand Supergroup stratigraphy.

The entire core sequence is composed of coarse- to very coarse-grained quartzites and quartzwackes together with interbedded conglomerates consisting of sub-rounded to well-rounded clasts, pebbly quartzites, lesser amounts of shale and two diamictite units.

Several lithostratigraphic name changes are proposed to replace those introduced by SACS (1980) for the Klerksdorp area. These include:

1). the Bonanza Formation which is renamed the Promise Formation;
2). the Welgegund Formation which is renamed the Coronation Formation;
3). the Palmietfontein Formation which is subdivided into a lower Tusschenin Formation and the overlying Palmietfontein Formation;
4). the Elandslaagte Formation which is included in the upper Government Subgroup and not within the Lower Jeppestown Subgroup; and
5). the Afrikander Formation, which is present in the Rietkuil Syncline, and separates the Government Subgroup from the overlying Jeppestown Subgroup.

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# A REFERENCE SECTION FOR PART OF THE WEST RAND GROUP, WITWATERSRAND SUPERGROUP, KLERKSDORP GOLDFIELD, SOUTH AFRICA

## CONTENTS



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Published by the Economic Geology Research Unit,
Department of Geology,
University of the Witwatersrand,
1 Jan Smuts Avenue,
Johannesburg 2001.

ISBN 1 86814 109 8

## 1. INTRODUCTION

Throughout the discovery and development of the gold-bearing reefs of the Witwatersrand Supergroup, stratigraphic and sedimentological studies have focused primarily on the Central Rand Group (Upper Witwatersrand). The conglomerates contained within these upper units have yielded more gold than the reefs associated with the strata of the underlying West Rand Group (Lower Witwatersrand), and the former are thus more extensively mined throughout the basin (Pretorius, 1986).

In the Klerksdorp region, the West Rand Group has been studied stratigraphically in the past (Molengraaff, 1905; Nel, 1934 and 1935; Beetz, 1936; Simpson, 1952; Collender, 1960) and recently some sedimentological investigations have been published (Watchorn, 1981; Antrobus *et al.*, 1986; Brink, 1986). However, even in the Klerksdorp area, more emphasis is placed on the stratigraphy, mineralogy, sedimentology and correlation of the Central Rand Group reefs (e.g. the Vaal Reef) than the West Rand Group conglomerates. The intervening, barren sedimentary packages are afforded even less attention and are frequently described in general terms only.

A fundamental criterion for detailed stratigraphic and sedimentological analysis is measured vertical sections. Borehole core is often ideally suited for vertical sequence analysis particularly where the succession is relatively undisturbed by post-depositional faulting and displacement. Unfortunately, many boreholes drilled into the Witwatersrand Supergroup strata are terminated once the Central Rand lithologies have been penetrated, and limited core of the West Rand Group is therefore available for analysis. In this context, a borehole, BAB 1, drilled by General Mining Corporation in 1950-1951 on the farm Rietkuil 397 IP southwest of Klerksdorp (Fig.1) penetrated the lower Jeppestown Subgroup strata and a large portion of the Government Subgroup, including several hundred metres of the Promise Formation. This core sequence, originally logged by either N.L. Wilson or F.D. Collender, is housed at the GENMIN core shed in Stilfontein. The stratigraphic significance of this borehole has been recognized and the core has been referred to in previous studies; Watchorn (1981, p.150) provided a generalized profile of the entire sequence, while Brink (1986) presented portions of the sequence as stratigraphic type sections for the Government Subgroup. Detailed descriptions of these formations and lithological and sedimentological features will be presented in this paper.

## 2. LITHOSTRATIGRAPHY

The South African Committee for Stratigraphy (SACS) has formulated a formal lithostratigraphy for the West Rand Group in the Klerksdorp Goldfield (SACS 1980, Fig. 3.2.3). This, together with several other workers' schemes, is presented in Table 1. The portion of the stratigraphy from the Bonanza Formation (Lower Government Subgroup) to the Babrosco Formation (Lower Jeppestown Subgroup, Table 1) are the lithologies present in borehole BAB 1.

It has been noted (Antrobus *et al.*, 1986) that a close similarity exists between the West Rand Group sequences in the Klerksdorp area and corresponding strata elsewhere in the basin. Some of the Klerksdorp area formational names proposed in this paper therefore bring their terminology in line with those of the neighbouring regions. Some additional formations are, however, also proposed. These include:

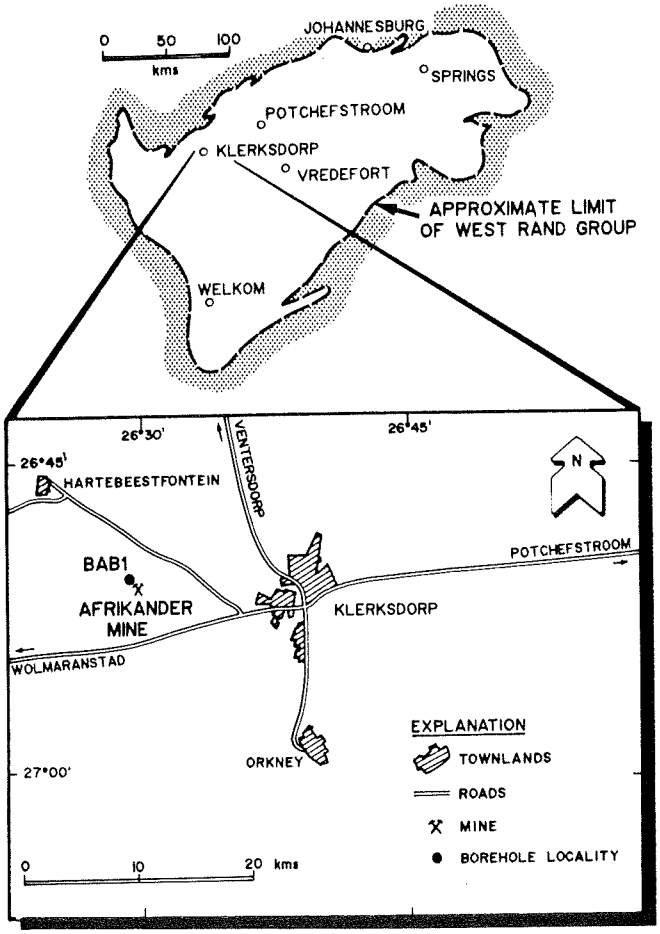



*Figure 1: Position of borehole BAB 1 in the Rietkuil Syncline northwest of Klerksdorp.*

(1). the Bonanza Formation (basal Government Subgroup) which is changed to the Promise Formation to bring the nomenclature into line with the correlative central Rand stratigraphy. The Bonanza Reef, from which the proposed name of the Formation was derived (SACS 1980), actually belongs to the sedimentary unit above, viz. the Coronation Formation;

(2). the Coronation Formation which is retained, the base of which is delineated by the Bonanza (Red) Reef:

(3). the Palmietfontein Formation (SACS 1980), which is subdivided into the lower Tusschenin Formation and overlying Palmietfontein Formation;

(4). the Elandslaagte Formation which is included in the Government Subgroup and is not incorporated as part of the overlying Jeppestown Subgroup (SACS, 1980). Antrobus *et al.*. (1986, Fig. 2) have proposed a similar stratigraphy incorporating the Elandslaagte Formation as the top of the Government Subgroup;

(5). a stratigraphic unit, termed the Afrikander Formation, which is present in the Rietkuil Syncline where BAB 1 was drilled. This Formation immediately overlies the Government Subgroup and has a similar relationship to the underlying and

overlying lithologies as does the Venterspos Formation (VCR) higher up in the stratigraphy, i.e. it occurs as an erosive, incised sequence and, as such, is afforded a separate formational status to the underlying Government strata and the overlying Jeppestown Subgroup; and

(6). the Buffelsdoorn Reef which constitutes the base of the Rietkuil Formation (Jeppestown Subgroup).

A total average thickness for the West Rand Group in the Klerksdorp area is 5150m (Table 1). This is slightly more than the 4665m of SACS (1980) and Antrobus *et al.*, (1986). The subdivision of the West Rand Group in Klerksdorp by SACS (1980) has been based primarily on previous interpretations (by Nel, 1935; Collender, 1960). As a result, discrepancies exist as some of the earlier workers failed, for various reasons, to describe certain aspects of the stratigraphy. Nel (1935) did not recognize the Promise Reef (Mellor, 1911) in the Klerksdorp area. Furthermore, Nel concluded that the Coronation Shale of the West Rand region has no correlative in the western Transvaal. Therefore, Collender (1960), using Nel's interpretation, placed his "Promise Reef" higher up in the Government Subgroup and not within the conglomerates that comprise part of the base of the Government Subgroup (Brink, 1986). Collender (1960) also placed the "Promise Reef" between the two diamictite units which, in this study, are assigned to the Coronation Formation. This latter interpretation is borne out by other observations of the diamictite in the Heidelberg and Vredefort regions (Camden-Smith, 1980; Rogers, 1922; Nel, 1927). Most of the subsequent stratigraphic studies (e.g. Hutchison, 1975; Watchorn, 1981) have, to a degree, been based on Nel's (1935) and Collender's (1960) interpretations.

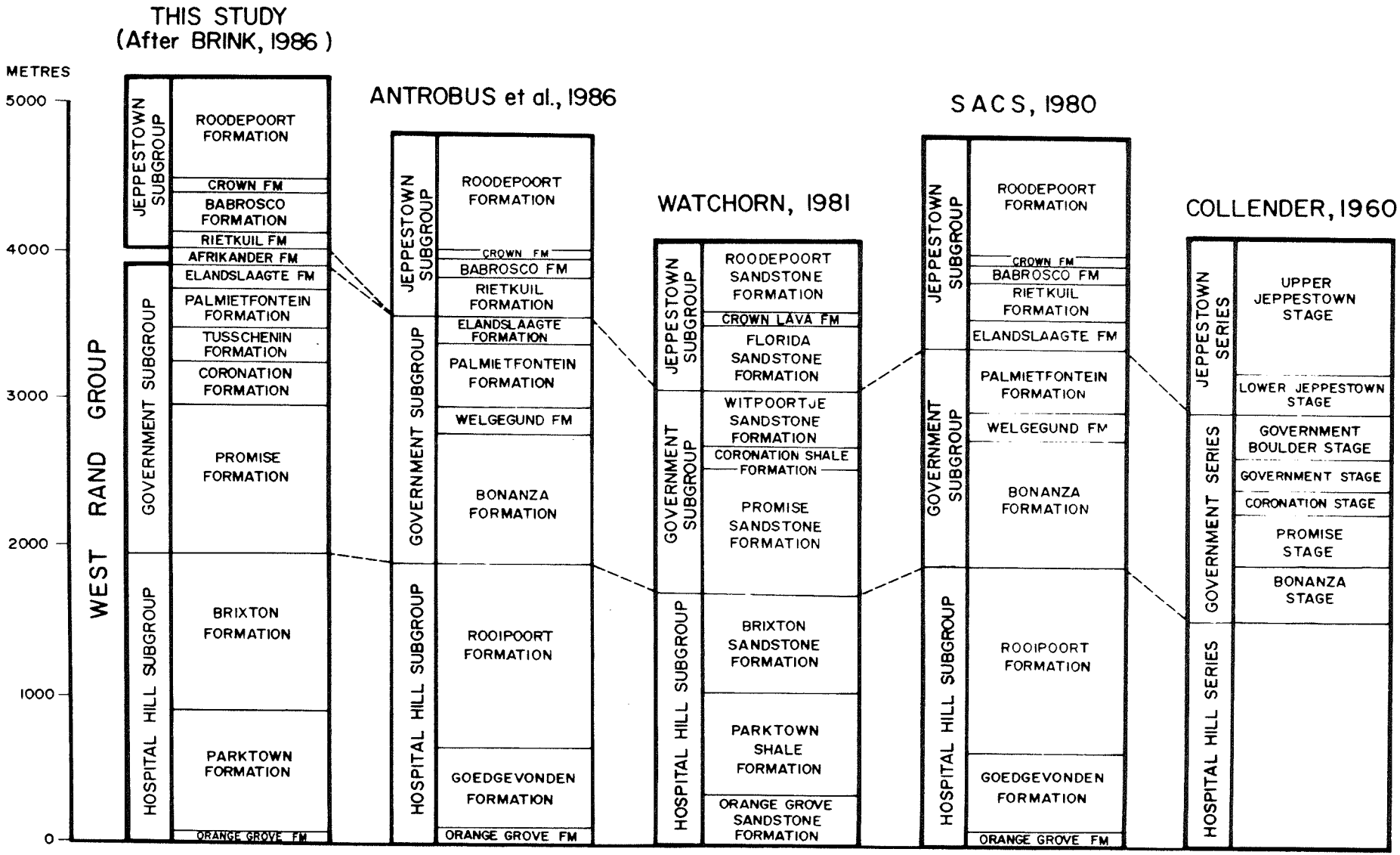
The stratigraphic classification of SACS (1980) is based on lithostratigraphy and not on genetic or sedimentological principles. Therefore, units which have the same composition, deposited from similar depositional environments or related to the same tectonic package, do not have to be grouped and classified accordingly. For example, the boundary between the Government and Jeppestown Subgroups is placed by SACS (1980) on a possible, ambiguous contact and below rock units which sedimentologically do not belong to the Jeppestown. The uppermost contact of the Government Subgroup in this study and in Antrobus *et al.* (1986), is therefore taken as the top of the Elandslaagte Formation (Table 1).

## 3. BOREHOLE BAB 1

A summary sketch of the vertical sequence of BAB 1 is presented in Figure 2. Due to the thickness of the core sequence ( $\pm$ 1500m), this composite profile has been somewhat simplified for drafting purposes. However, each constituent stratigraphic section has been logged in detail and is described separately, and these together form the section shown in Figure 2. The legend for the symbols and sedimentary structures shown on Figure 2 and the subsequent figures is contained in Figure 3. The sequence consists essentially of coarse- to very coarse-grained quartzites and quartzwackes interbedded with conglomerate, pebbly quartzites, minor shale (except in the Rietkuil Formation, Fig. 2) and two diamictite units in the Coronation Formation. Post-depositional igneous intrusives have been removed from the profile so as to restore continuity between the sedimentary units. These were present mainly in the Promise Formation at depths of 1420m (33m thick intrusive),1470m (32m thick) and 1519m (204m thick).

TABLE 1

COMPARATIVE STRATIGRAPHY FOR THE WEST RAND GROUP IN THE KLERKSDORP GOLDFIELD



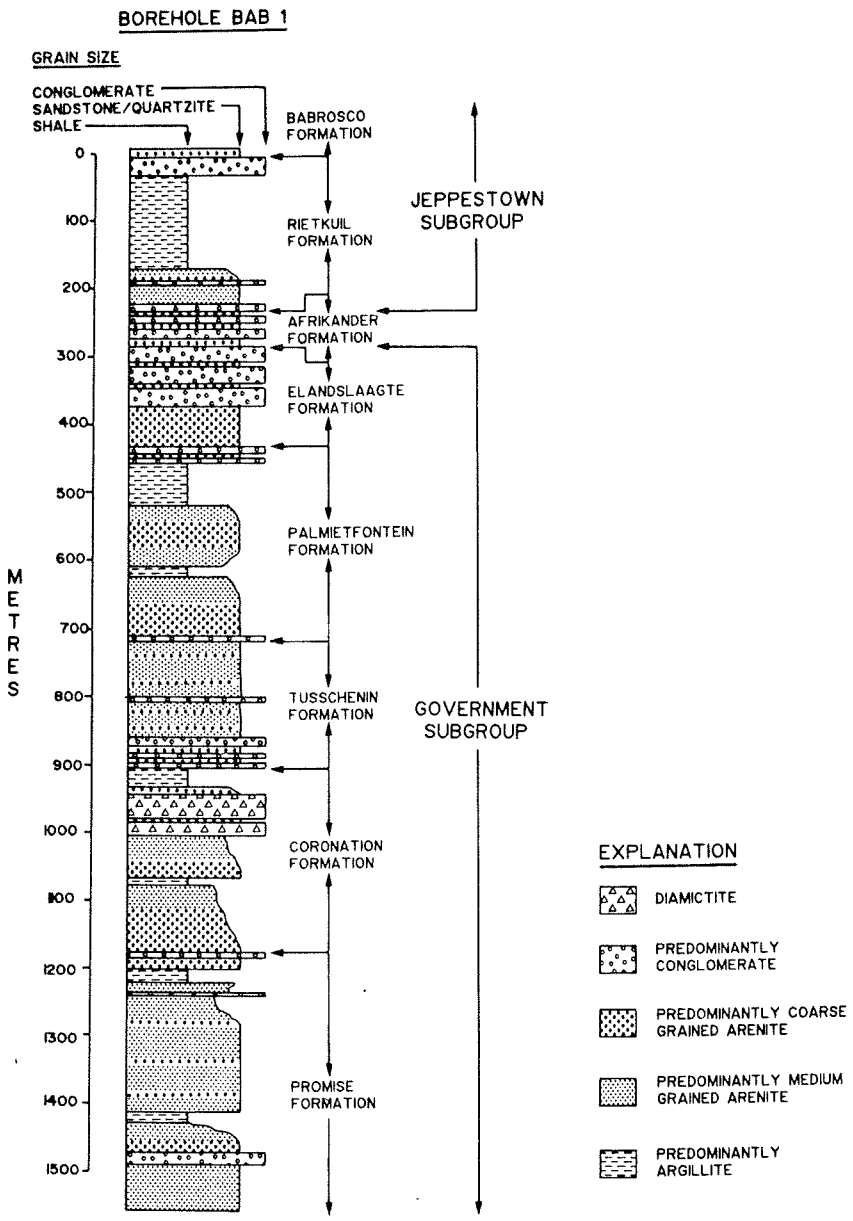



*Figure 2: Summary profile of the lithologies and stratigraphy of the core sequence contained in borehole BAB 1.*

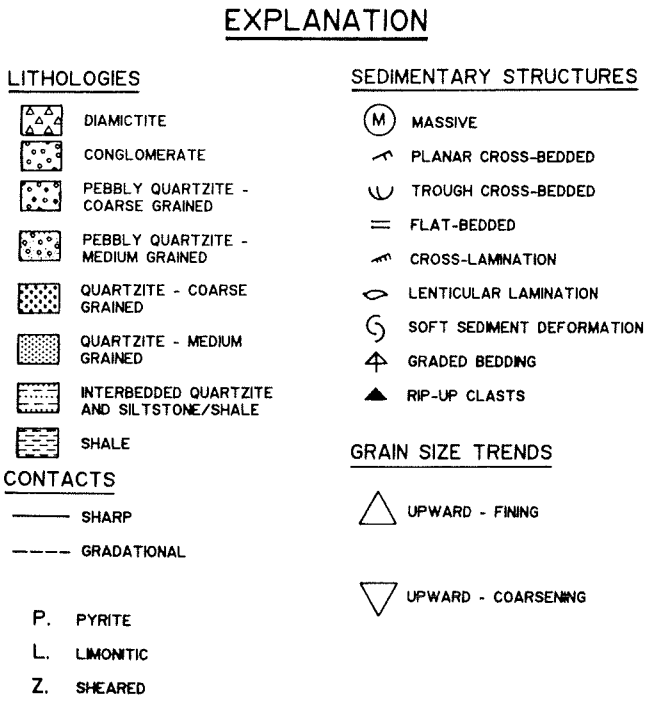



*Figure 3: Key to symbols and sedimentary structures shown on Figure 2 and those of all the subsequent figures.*

## 4. WEST RAND GROUP

### A. Promise Formation

The Promise Formation attains a maximum thickness of 1025m in the Klerksdorp area (Brink, 1986), although SACS (1980) described a thickness of 830m. Over one third of the Promise Formation (approximately 360m) is present in borehole BAB 1 (Fig. 4). This succession consists predominantly of a series of stacked upward-fining units with minor upward-coarsening grain size profiles (Fig. 4). The main lithologies are:

(1). polymict, erosively based conglomerates and conglomeratic coarse-grained quartzites. These form the basal units of upward-fining cycles;
(2). medium- to very coarse-grained poorly sorted quartzites, quartz arenites and quartzwackes. These often contain dispersed, granule-grade, black and white chert and quartz grains; and
(3). minor amounts of mud rock comprising interbedded shale and siltstone.

A distinctive feature of this largely arenaceous sequence is a pervasive light-green coloration from 50m to 180m (Fig. 4). In places, this coloration imparts a pale green translucency to the arenites and these appear super mature and orthoquartzitic. In thin section, however, these "ortho-quartzites" contain a considerable proportion of clay and mica as matrix between the quartz grains. A distinct and abrupt colour change to a dirty, khaki green occurs at approximately 180m (Fig. 4). Matrix percentage increases considerably in these units and becomes more clay rich.

The upper and lower contacts of the interbedded conglomerates are characteristically sharply defined, although scattered clasts, similar to those within the conglomerates, occur in the overlying quartzites. These coarse-grained lithologies appear massive, with only a few faint, ill-defined bedding surfaces present.

The finer-grained facies towards the top of the Promise Formation consist of interbedded fine-grained quartzite and shale or siltstone and shale (Fig. 4). These display lenticular and cross lamination and soft-sediment deformation of the coarser laminae are also present.

### B. Coronation Formation

The Coronation Formation attains a maximum thickness of approximately 270m (Brink, 1986). Watchorn (1981) gave a range of thickness from 80m to 200m.

The term Coronation Formation is applied in this study instead of the Welgegund Formation (Table 1, SACS, 1980) so as to align the terminology with the neighbouring goldfields.

The base of the Coronation Formation is defined by the Bonanza Reef (Red Reef). This polymictic conglomerate is highly pyritic and is composed of rounded to sub-rounded pebbles of quartz and black and white chert in a quartzitic matrix. The clasts attain a maximum diameter of 2cm.

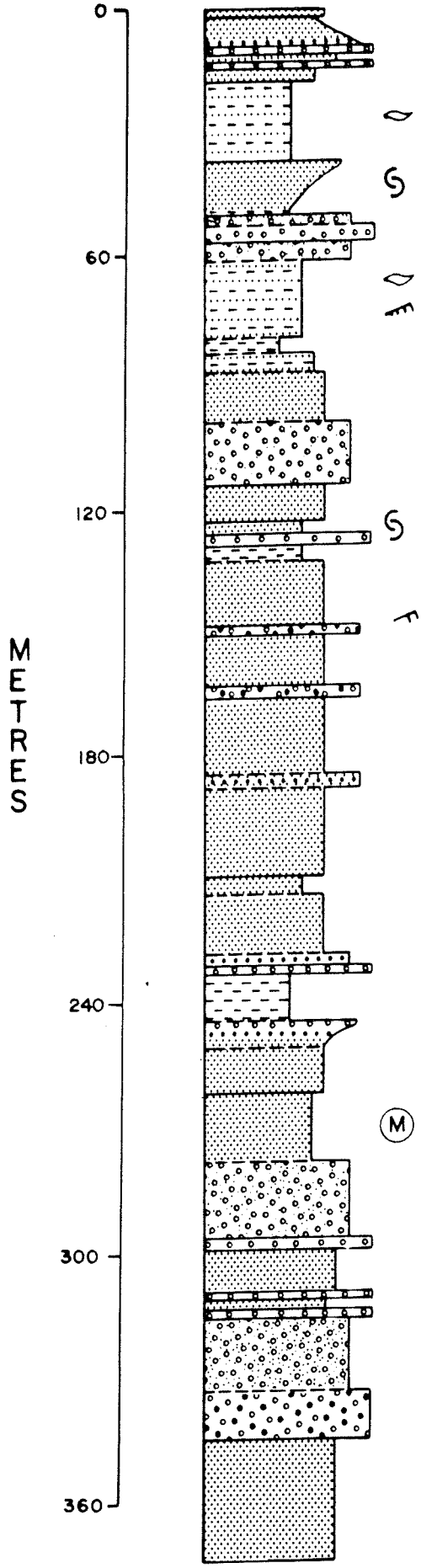



*Figure 4. The Promise Formation*

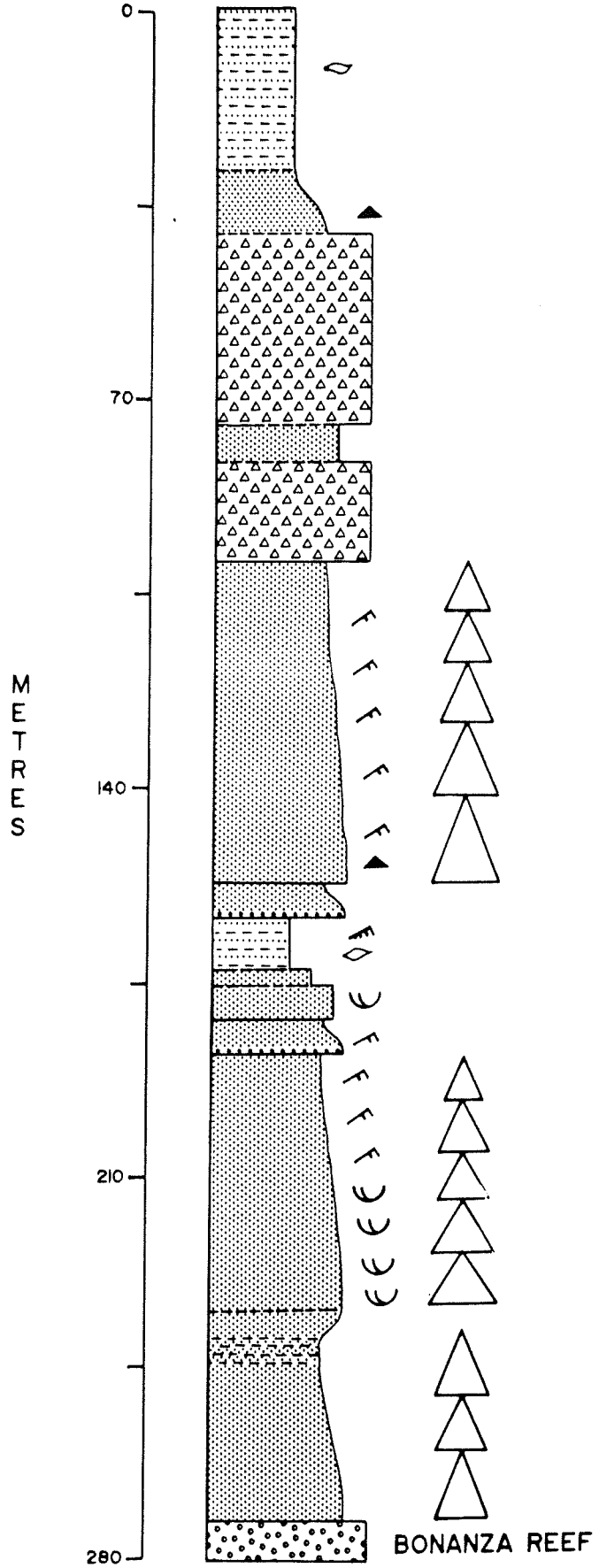



*Figure 5. The Coronation Formation*

Overlying the Bonanza Reef is a sequence of interbedded quartzite and mudrock units which define stacked upward-fining sequences. These are typically trough and planar cross-bedded with relatively sharp basal contacts. The overall grain size decreases vertically (Fig. 5, 210m). This coarse clastic sequence is overlain by very coarse-grained quartzite, planar cross-bedded which grades vertically and fines upwards into trough cross-bedded coarse-grained quartzite (Fig. 5). This is gradationally overlain by interbedded mudrock and fine-grained quartzite containing lenticular and cross-lamination and wave formed ripples.

Sharply overlaying the argillaceous sequence is a 6m upward-fining unit, overlain by a 60m sequence composed of stacked upward-fining cycles (Fig. 5). This quartzitic unit is planar cross-bedded throughout and angular rip-up clasts of the underlying argillite are present in the basal coarse-grained lithologies (Fig. 5). Many of the foresets are defined by thin laminae of limonitized sulphides.

Above this arenaceous sequence is the first of two structureless diamictite units (Fig. 5). These diamictites are correlatable over large portions of the basin. Constituent clasts are sub-rounded to well-rounded, up to 5cm diameter, and consist of vein quartz, grey and cream coloured chert 1cm to 2cm diameter, and yellow, altered argillite. The surrounding matrix consists of arenaceous and medium-to-coarse-grained angular grains. Scattered granule-grade grains (2-4mm) grains of chert and quartz are also present in the matrix. Rare interbeds, less than 30cm thick, of coarse-grained greywacke are interspersed within the lower diamictite. These show faint cross-bedding and have gradational top and bottom contacts with the enclosing diamictite.

Gradationally overlying the upper diamictite is an upward-fining sequence of medium- to fine-grained quartzwacke containing interbedded mudrock and quartzite in the upper 2 m. This passes vertically and gradationally into black shale containing isolated siltstone laminae which occasionally define lenticular lamination. This argillaceous succession forms the uppermost lithology of the Coronation Formation and is weakly magnetic.

C. Tusschenin Formation

The Tusschenin Formation and overlying Palmietfontein Formation together form the Palmietfontein Formation described by SACS (1980). This subdivision is based on genetic criteria as the Tusschenin Formation represents a fluvial sequence while the Palmietfontein above is composed of deeper water turbidites and pelagic shales (Brink, 1986).

The Tusschenin Formation attains a maximum thickness of 210m in the Klerksdorp area (Brink, 1986) and 160m is contained within borehole BAB 1 (Fig. 6). The base of the Formation is defined by a polymictic conglomerate which erosively overlies the strata of the Coronation Formation. This conglomerate is pyritic and contains clasts of quartz and chert up to 18mm diameter. Overlying the basal conglomerate are several upward-fining cycles composed of a basal conglomerate less than 50cm thick which is gradationally overlain by granule-grade to very coarse-grained planar cross-bedded quartzwacke. Scattered small pebbles of vein quartz and chert 5-10mm diameter are common in the quartzwackes. The uppermost unit of the Tusschenin Formation consists of ±70m of trough cross-bedded medium- to coarse-grained quartzwacke (Fig. 6), which displays little or no vertical variation in grain size.

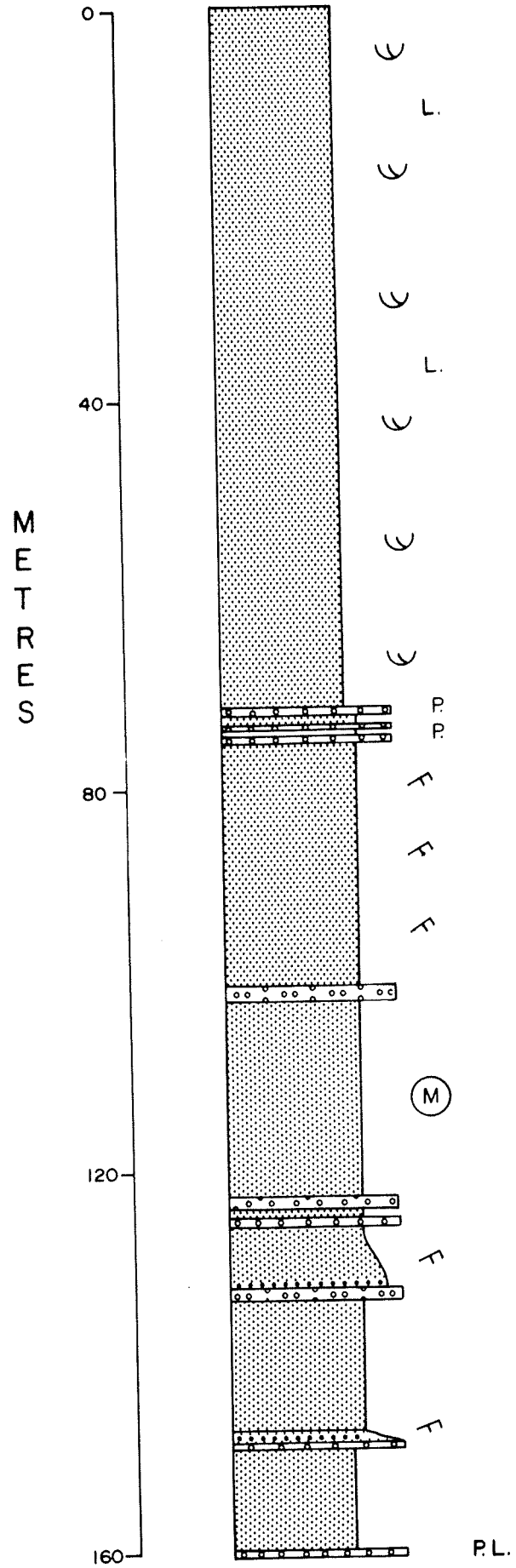



*Figure 6. The Tusschenin Formation*

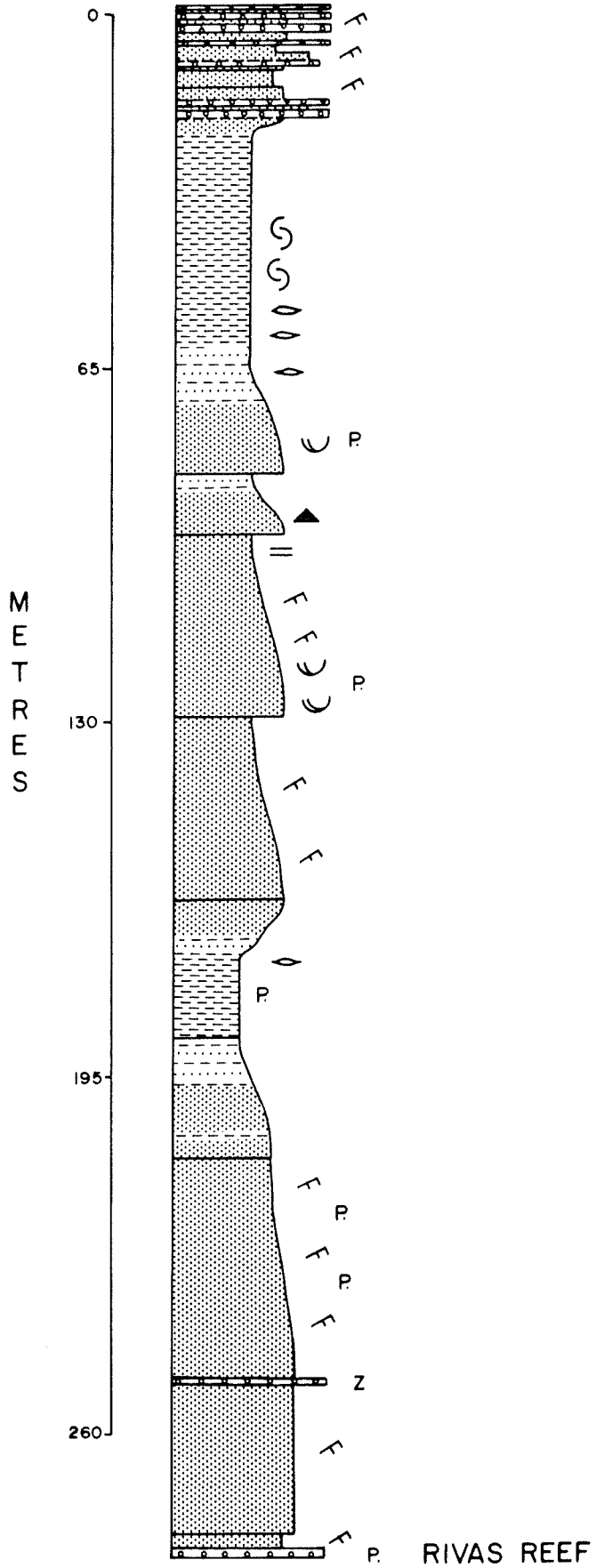



*Figure 7. The Palmietfontein Formation*

D. Palmietfontein Formation

The Palmietfontein Formation is approximately 290m thick (Fig. 7). The base of the Formation is defined by the Rivas Reef (Government Reef equivalent), an oligomictic conglomerate comprising rounded quartz pebbles up to 45mm diameter contained in an orthoquartzitic matrix. This conglomerate is laterally extensive in the Klerksdorp region. Overlying the basal conglomerate is a sequence of upward-fining coarse- to medium-grained quartzites (Fig. 7). Planar cross-bedding is prevalent throughout as are interlaminated layers 5-10m thick of chert and quartz pebbles 10mm in diameter. Pebble laminae less than 10mm thick often define the foreset bedding surfaces. This succession grades into interbedded fine-grained quartzite and shale and finally into green, magnetic shale. This contains rare very fine-grained sandstone laminae and is pyritic (Fig. 7).

Immediately above the shale is an upward-coarsening unit composed of basal shale gradationally overlain by fine- to medium-grained quartzite. This is followed by a series of upward-fining cycles (Fig. 7). These grade from coarse-grained at the base to fine-grained at the top. Trough and planar cross-bedding is common, with some flat-bedded sets at the top of cycles. Pyrite is present as micro laminae (1-2mm) on some of the trough cross-bedding surfaces, and basal rip-up clasts are also present in some basal coarse-grained quartzites. The uppermost upward-fining unit (Fig. 7) grades vertically into shale which forms a 40m unit above the underlying, predominantly arenaceous lithologies. Interbeds of greywacke up to 10cm thick occur within the shale - these have sharp, distinct upper and lower contacts with the enclosing shale. Well-developed lenticular lamination is evident together with soft sediment deformation, slumping and sandstone dykelets associated with the arenaceous interbeds.

The top succession of the Palmietfontein Formation consists mainly of polymictic conglomerate interbedded with medium- and coarse-grained quartzite (Fig. 7). The basal contact is gradational with the underlying shale. The Large Pebble Reef of Nel (1935) is present as the basal conglomerate in this 15m thick succession. This contains large (greater than 10cm diameter) quartz clasts in a quartzitic, sulphide-rich matrix. The overlying conglomerates contain a variety of sub-rounded to rounded clasts including white, grey and black chert, quartz, volcanic porphyry, quartzite and beige-coloured shale. The latter are flattened and oblate in shape. The interbedded quartzites are medium- to coarse-grained, planar cross-bedded or structureless, and commonly contained scattered granule-grade chert grains.

E. Elandslaagte Formation

The Elandslaagte Formation is approximately 200m thick and can be broadly subdivided into a lower quartzitic unit, devoid of distinctive conglomerate reefs, overlain by an upper unit consisting of complexly interbedded conglomerate and quartzite ( Fig. 8).

The lowermost unit of the succession is a dark-grey planar and trough cross-bedded fine-grained quartzite containing disseminated 1-3mm diameter white chert grains. This coarsens upwards into medium-grained quartzite (Fig. 8). An upward-fining unit sharply overlies this sequence. Basal granule-grade laminate 1-4cm thick, comprising quartz and chert grains, form the lower 6m which fines upwards into medium- and fine-

grained quartzite. A 25m-thick planar cross-bedded quartzite overlies the upward-fining cycle. This quartzite contains scattered 10mm diameter rounded chert pebbles and finely dispersed black chert grains which impart a speckled appearance to the rock. Minor pebbly layers up to 10cm thick are also interbedded in the quartzite.

The remaining 115m of the Elandslaagte Formation is composed of interbedded conglomerate, pebbly quartzite and quartzite, associations of which define multiple, stacked upward-fining cycles (Fig. 8). Some of the thicker conglomerate beds appear diamictic, but faint trough cross- bedding can be seen with 10mm diameter quartz pebbles defining some of the cross bed set surfaces. From 56m to 90m (Fig. 8), pebbles are scattered throughout the coarse-grained quartzites. These clasts consist of yellow and black shale, subrounded grey, black and banded chert, porphyry and vein quartz ranging from 1cm to 5cm diameter. The quartzites, which have sharp upper and lower bounding surfaces are planar cross-bedded in places. The conglomerates are polymictic containing a similar assemblage of pebbles found in the quartzites. These are predominantly clast supported in a very coarse-grained quartzite matrix which also contains disseminated sulphide grains.

The uppermost contact of the Elandslaagte Formation represents the top of the Government Subgroup.

## 5. AFRIKANDER FORMATION

In the Rietkuil Syncline, a coarse-grained clastic sequence is present between the Government and Jeppestown Subgroups. In this study, a separate formational status, the Afrikander Formation, is assigned to these strata. These rocks are not sedimentologically or genetically related to the Elandslaagte Formation as the sequence erodes into the underlying strata. The grain size of the sediments is also significantly coarser-grained than those of the Rietkuil Formation above.

The Afrikander Formation is 30-60m thick and is demarcated at the top by conglomerate (Buffelsdoorn Reef) of the overlying Rietkuil Formation. The lowermost lithology is diamictitic with quartz and chert pebbles up to 35mm diameter contained in a massive matrix (Fig. 9). The remainder of the succession consists of a series of stacked upward-fining cycles (Fig. 8). Each unit contains a thin (less than 1m) basal conglomerate overlain by very coarse-grained to coarse-grained grey quartzite. The conglomerates are sulphide-rich, with pyrite either disseminated in the quartzitic conglomerate matrix or, in places, as 1mm stringers on bedding-plane surfaces. The quartzites are poorly sorted and predominantly planar cross-bedded and contain scattered rounded quartz and chert pebbles up to 10mm in diameter.

## 6. JEPPESTOWN SUBGROUP

Two of the Jeppestown Subgroup formations were intersected in borehole BAB 1 - the lowermost Rietkuil Formation and the Babrosco Formation above (Fig. 2). The core section containing the Babrosco lithologies is weathered and broken and for this reason is not included in this study. The underlying Rietkuil Formation lithologies are, however, well developed.

A. Rietkuil Formation

The stratigraphy of the Rietkuil Formation is shown in Figure 10. This succession attains a maximum thickness of 230m in the Klerksdorp area (Brink, 1986) and most of the sequence is present in borehole BAB 1.

The base of the Rietkuil Formation is defined by the 60cm thick Buffelsdoorn Reef. This is a polymictic conglomerate containing grey and white chert, quartz, and quartzite pebbles up to 20mm in diameter. Scattered pyrite grains and finely disseminated kerogen are contained in the quartzose matrix. Above the Buffelsdoorn Reef is a fine-grained sericite rich quartzite above which is developed an interbedded pebbly quartzite and a quartz-chert pebble conglomerate. These conglomerates are pyritic and the 15mm diameter pebbles occur in a coarse-grained quartzite matrix.

The remainder of the Rietkuil Formation is composed of an argillaceous sequence of interbedded shale and siltstone overlain by shale. An overall upward-fining trend is evident (Fig. 10), including a 10m trough cross-bedded quartzite unit overlying the conglomerates. The uppermost 50m shale sequence is magnetic and contains pyrite laminae. Lenticular lamination and graded bedding are common sedimentary structures in the underlying interbedded shale/siltstone lithologies (Fig. 10). A gradational vertical transition takes place from the shale sequence into a thin ( $\pm$ 6m) upward-coarsening unit of interbedded shale and quartzite laminae (Fig. 10). This is in turn overlain by a further upward-coarsening sequence of coarse-grained, pebbly quartzite which terminates the Rietkuil Formation. The latter unit is not present throughout the whole of the Klerksdorp region, but is relatively well developed in the core sequence of BAB 1. This pebbly quartzite grades from medium-grained at the base to coarse-grained at the top with sub-rounded vein quartz and chert pebbles up to 30mm diameter.

## 7. CONCLUSIONS

A continuous vertical section of portion of the West Rand Group was penetrated by borehole BAB 1, drilled in the Rietkuil Syncline west of Klerksdorp. The stratigraphic sequence extends from the lower Jeppestown Subgroup (Rietkuil Formation) to well into the Government Subgroup (Promise Formation). This 1500m core sequence is relatively undisturbed and thus reveals a relatively complete stratigraphic record not often recorded from a single section.

The Government Subgroup consists of the Promise Formation (360m), overlain by the Coronation (270m), Tusschenin (160m), Palmietfontein (290m) and Elandslaagte (200m) formations. The Afrikander Formation (60m) is classified independently of the Government Subgroup below and the Jeppestown Subgroup above. Only the lowermost Rietkuil Formation (230m) is described from the Jeppestrown Subgroup.

Differences with the SACS (1980) stratigraphic nomenclature are:

1). the Bonanza Formation is renamed the Promise Formation to correspond with correlative strata in the Central Rand region:

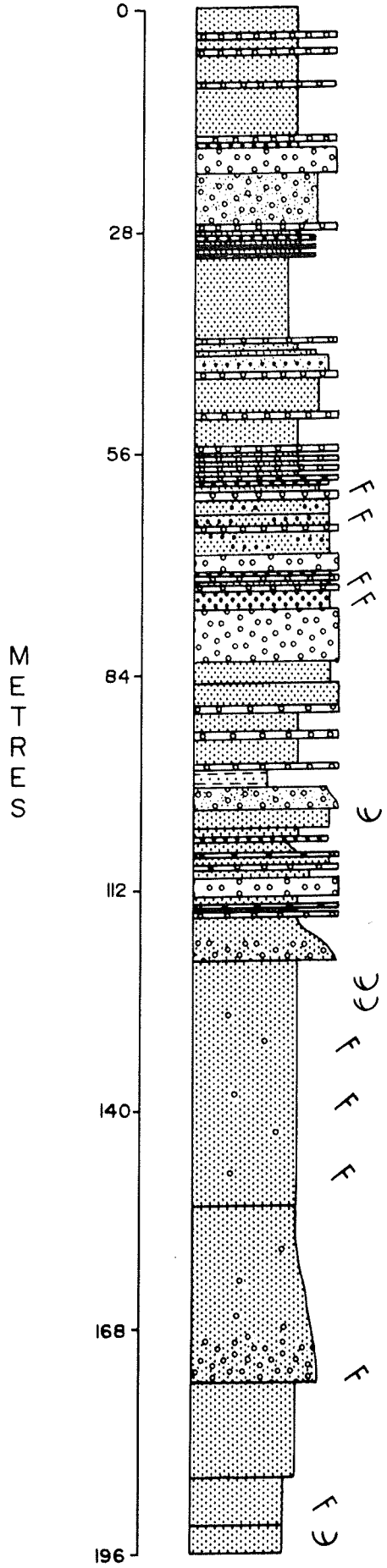



*Figure 8: The Elandslaagte Formation*

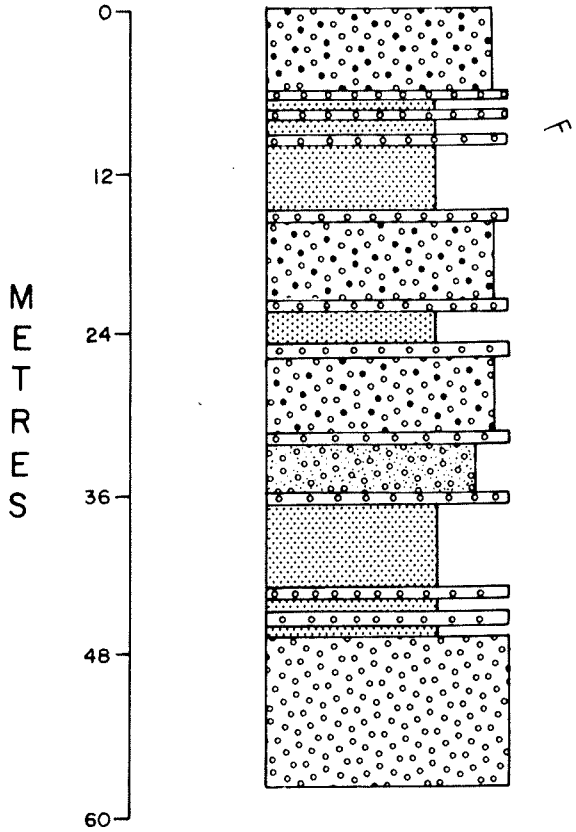



*Figure 9: The Afrikander Formation*

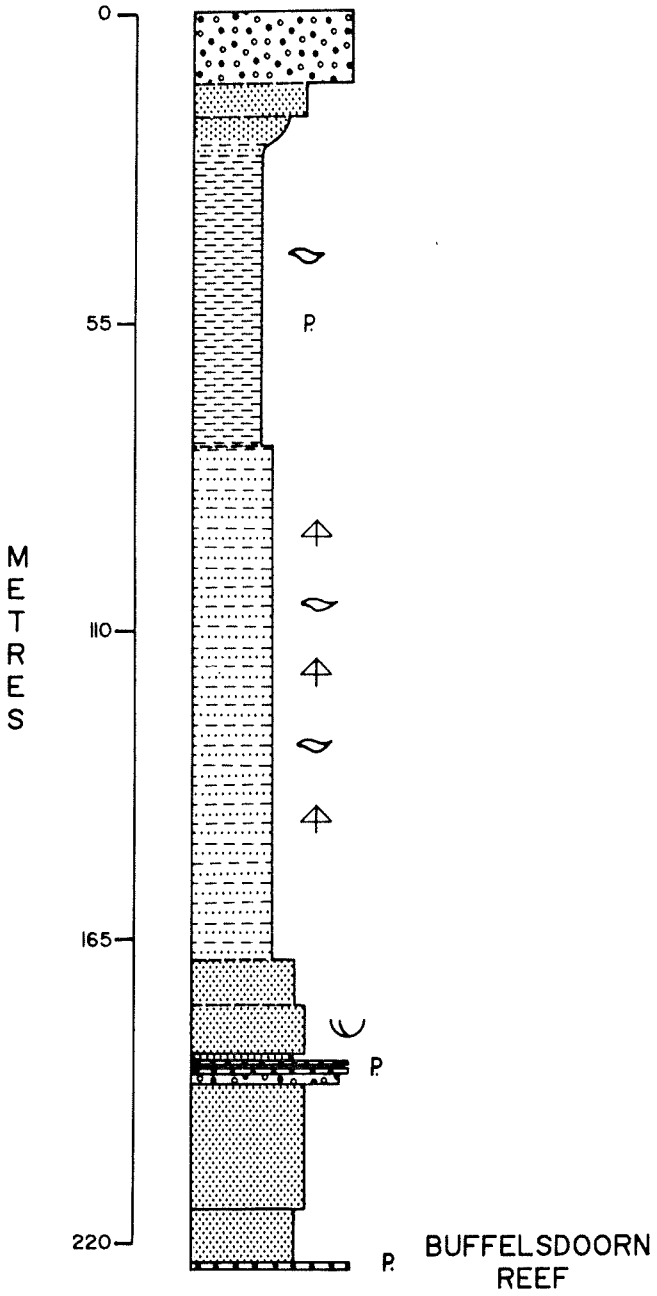



*Figure 10: The Rietkuil Formation*

2). the Coronation Formation is retained for the sequence above the Promise Formation;
3). the Palmietfontein Formation (SACS 1980) is sub-divided in a lower Tusschenin Formation and overlying Palmietfontein Formation;
4). the Elandslaagte Formation is classified within the Government Subgroup; and
5). within the Rietkuil Syncline, the Afrikander Formation underlies the Buffelsdoorn Reef of the Rietkuil Formation. The Afrikander Formation, a fluviatile sequence, erodes into the underlying Elandslaagte Formation which is classified independently.

The entire core sequence consists of coarse- to very coarse-grained quartzites and quartzwackes with interbedded conglomerates, pebbly quartzites, shale and two diamictite units (Fig. 2). The greatest concentration of conglomerate is present in the Elandslaagte and Afrikander Formations, while the Rietkuil Formation is composed predominantly of shale.

## ACKNOWLEDGEMENTS

The authors are grateful to GENMIN Ltd for permission to publish these data. The manuscript was typed by Janet Long and the figures were drafted by Una Ryan.

## REFERENCES

Antrobus, E.S.A., Brink, W.C.J.,Brink, M.C., Caulkin, J., Hutchison, R.I., Thomas, D.E., Van Graan, J.A., and Viljoen, J.J. (1986). The Klerksdorp Goldfield, 549-598. *In:* Anhaeusser, C.R. and Maske, S., Eds., *Mineral Deposits of Southern Africa*, 1. Geol. Soc. S. Afr., 1020pp.

Beetz, P.F.W. (1936). Contributions to the geology of the Klerksdorp District from the results of drilling activities by the Western Reefs Exploration and Development Company Limited. *Trans. geol. Soc. S. Afr., 39*, 223-261.

Brink, M.C. (1986). *Tektoniese en stratigrafiese ontwikkeling van die Witwatersrand-Supergroep en verwante gesteentes in die gebied noord en oos van Klerksdorp*. Ph.D. thesis (unpubl.), Rand Afrikaans University, Johannesburg, 317pp.

Camden-Smith, P.M. (1980). *The sedimentology, geochemistry and diagenesis of the West Rand Group sediments in the Heidelberg area, Transvaal*. M.Sc. thesis (unpubl.), Univ. Cape Town, 96pp.

Collender, F.D. (1960). The Witwatersrand System in the Klerksdorp area as revealed by diamond drilling. *Trans. geol. Soc. S. Afr.,63*, 189-226.

Hutchison, R.I. (1975). *The Witwatersrand System as a model of sedimentation in an intracratonic basin*. D.Sc. thesis (unpubl.), Univ. O.F.S., Bloemfontein, 253pp.

Mellor, E.T. (1911). The normal section of the Witwatersrand System in the Central Rand and its connection with West Rand sections. *Trans. geol. Soc. S. Afr., 14*, 99-131.

Molengraaff, G.A.F. (1905). Note on the geology of a portion of the Klerksdorp district, with special reference to the development of the Lower Witwatersrand Beds and the Vaal River System. *Trans. geol. Soc. S. Afr., 8*, 16-25.

Nel, L.T. (1927). The geology of the Country around Vredefort. *Spec. Publ. geol. Surv., S. Afr., 6*, 130pp.

Nel, L.T. (1934). The Witwatersrand System in the Klerksdorp-Ventersdorp area. *Bull. geol. Surv. S. Afr.*, 1, 32pp.

Nel, L.T. (1935). The geology of the Klerksdorp-Ventersdorp area. Explanation of geological map No. 37. *Special Publ. geol. Surv. S. Afr.*, 9, 130pp.

Pretorius, D.A. (1986). The goldfields of the Witwatersrand Basin, 489-493. *In:* Anhaeusser, C.R. and Maske, S., Eds., *Mineral Deposits of Southern Africa*, 1, Geol. Soc. S. Afr., 1020pp.

Rogers, A.W. (1922). The geology of the country around Heidelberg. Explanation of geological map. *Spec. Publ. geol. Surv. S. Afr.*, 4, 84pp.

South African Committee for Stratigraphy SACS (1980). Stratigraphy of South Africa, Part 1 (Comp. L.E. Kent). Lithostratigraphy of the Republic of South Africa, South West Africa/Namibia, and the Republics of Bophutatswana, Transkei and Venda. *Handbk. geol. Surv. S. Afr.*, *8*, 690pp.

Simpson, D.J. (1952). Correlation of the sediments of the Witwatersrand System in the west Witwatersrand, Klerksdorp and Orange Free Strate areas by radiometric borehole logging. *Trans. geol. Soc. S. Afr.*, *55* 133-152.

Watchorn, M.B. (1981). *The stratigraphy and sedimentology of the West Rand Basin in the western Transvaal.* Ph.D. thesis (unpubl.), Univ. Witwatersrand, Johannesburg, 154pp.

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