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THE GEOLOGY OF THE OLIFANTS RIVER AREA, TRANSVAAL

AN EXPLANATION OF SHEETS 2429B (CHUNIESPOORT) AND 2430A (WOLKBERG)

by

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Met 'n opsomming in Afrikaans onder die opskrif:

DIE GEOLOGIE VAN DIE GEBIED OLIFANTSRIVIER, TRANSVAAL

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Geological map in colour on a scale of 1: 125,000 obtainable separately at the price of 60c.

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I. INTRODUCTION

The Olifants River Area is bounded by lines of latitude 24° 00′ and 24° 30′ South, and by lines of longitude 29° 30′ and 30° 30′ East. It is 2,170 square miles in extent and comprises portions of the Districts of Pietersburg, Letaba, Lydenburg and Groblersdal.

The major portion of the area is inhabited by Bantu who live either in locations or on property of the Bantu Trust. The only white people in these areas are missionaries, storekeepers and officials of the Department of Bantu Administration and Development. The Bantu keep large herds of goats, cattle and donkeys and they grow maize, Kaffir corn and millet.

Portions of the Lowveld in the northeastern part of this area are thickly populated by a young farming community engaged in the cultivation of vegetables and subtropical fruit. The Europeans mostly settled there since 1936. A part of the plateau north of the Strydpoort Range is also inhabited by white farmers; the staple industry there is cattle farming.

Within that portion of the area lying immediately southeast of the Strydpoort Range and just to the southwest of the Drakensberg are a few white farmers and several asbestos-mines with their local accumulations of both Bantu and whites.

There are no railways within this area but four different railway lines come to within about 10 miles of it. In the southeast there is the railway between Lydenburg and Steelpoort, in the northeast the line between Komatipoort and Soekmekaar, in the northwest that at Pietersburg, and in the west the railway terminus at Zebediela.

The main roads from Pietersburg to Middelburg and Lydenburg respectively traverse the western and southwestern portions of the area. The Lowveld has several main roads and Road Motor Services of the South African Railways ply between the more important centres. A steep mountain road from Ofcolaco leads up the Selati River across the Drakensberg and thence via the Mhlapitsi River southwestwards to join the main road between Lydenburg and Pietersburg. Several secondary and numerous tracks lend access to most parts of the area, although those in the Bantu Reserves are usually in a very poor condition. Parts of the Olifants River Area such as the Leolo* Mountains and most of that along the Drakensberg are inaccessible to wheeled transport. Some of the tracks leading to isolated farms and asbestos-mines are very dangerous.

This area was first geologically surveyed by Hall (1914) between 1907 and 1911. The northeastern corner of the area was included in a survey of the Murchison Range (Van Eeden et al., 1936). Hall (1930) reinvestigated the asbestos deposits after his initial survey and Du Toit (1945) later made a material contribution to this subject. Kupferburger et al. (1937) investigated the chromite deposits in the early thirties.

The present survey was started in 1948 and completed in 1956. Aerial photographs were used but control points were fixed by plane-table and alidade in some portions of the area. Base-maps supplied by Trigonometrical Survey were mostly on the scale 1:50,000 but for some parts of the area they were on the scale 1:18,000.

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* Previously this name was spelt Lulu.

Subdivision of the work is approximately as follows: Schwellnus and Coertze mapped the Bushveld Igneous Complex and the major portion of the Pretoria Series. Engelbrecht, and to a lesser extent Schwellnus and Van ooyen, covered the Archaean Complex. The Godwan Formation, Wolkberg Formation and Black Reef Series were mapped mainly by Engelbrecht, and smaller portions by Russell, Schwellnus and Van Rooyen. The Dolomite Series was surveyed by Malherbe, Russell, Schwellnus, Coertze, Cooke and Claassen. The asbestos-mines were investigated mainly by Malherbe, with contributions from Coertze.

II. PHYSIOGRAPHY

The Olifants River Area comprises portions of four different physiographic regions, viz. Transvaal Lowveld, Central Transvaal Bushveld, Limpopo Highlands, and Bankeveld. The most outstanding feature of this area is the Great Escarpment.

A. Topography

The undulating plateau north of the Strydpoort Range, in the northwestern portion of the area, forms part of the Limpopo Highlands. It is a gently undulating terrain underlain mainly by Archaean granite which builds isolated koppies that consist of a rugged accumulation of huge boulders. The height above sea-level varies between 4,000 and 5,000 feet. Towards the Malips River there is a general decrease in altitude. From Molepo's Location 187 KS (A. 2) towards the Iron Crown (A. 3) the altitude increases and the terrain becomes fairly mountainous.

The northeastern part of the Olifants River Area, east of the Great Escarpment, falls within the Transvaal Lowveld. This area which is underlain by Archaean rocks varies in altitude from 1,500 to 2,500 feet above sea-level. It is a rather monotonous, bush-clad plain that is diversified by some narrow sharp-crested ridges of hard quartzitic rocks as much as 300 feet high; isolated hills and low ridges of ultrabasic rocks of which Pretoriakop (A. 4), with a height of 1,000 feet above the plain, is the most outstanding; hills and parallel ridges of Swaziland rocks of which some form spurs to the escarpment.

The southwestern portion of the Olifants River Area, which is underlain by rocks of the Bushveld Igneous Complex incorporating some large xenolithic masses of Pretoria sediments, forms part of the Central Transvaal Bushveld. This area is characterised by extensive soil-covered plains between dark, rugged ridges and pyramidal hills of basic or ultrabasic rocks; some isolated hills as well as ridges are built of quartzite and other highly metamorphosed sediments. The average elevation above sea-level is about 3,000 feet. Some of the isolated peaks, such as Modimolle (B. 3), Serafa (B. 3), Pramkoppies (B. 1), and Adriaanskop (B. 1) form conspicuous landmarks. The Leolo Mountains, with an average height of some 5,000 feet above sea-level, rise more than 2,000 feet above the turf-covered plains with their isolated koppies and low ridges. The range of hills northeast of the Leolo Mountains rise over 1,000 feet above the plains. The ridges of basic and ultrabasic rocks conform in strike to those of Pretoria quartzite. Owing to pseudostratification they also have steep escarpments on the northeastern or northern sides and more gradual dip-slopes on the opposite sides, as is the case with the encircling sedimentary ridges.

At least half of the Olifants River Area which is underlain by the Transvaal System, the Wolkberg Formation and the Godwan Formation, forms part of the Bankeveld. Three parallel quartzite ranges form a wide arc along the perimeter of the Bushveld Igneous Complex. These ranges are formed of the three main quartzite zones of the Pretoria Series and rise from several hundred feet to 2,000 feet above the general land-surface. Where well developed in the east the Machadodorp volcanic rocks build a similar range. The highest points on these ranges are from 4,000 to 4,500 feet above sea-level. The relief of these parallel ranges and valleys is much more accentuated east of 30° longitude than in the western portion of the area.

Between the resistant mountains and hills of banded ironstone and Wolkberg quartzite the dolomite terrain varies from an undulating plateau to dissected mountain-land; the altitudes vary from 2,000 feet along the Olifants River near Penge to 6,000 feet south of the Iron Crown. Float of banded ironstone at altitudes of 4,400 to 5,000 feet on isolated dolomite hill indicates remnants of a former erosion-surface. On Hooggenoeg 293 KS (A. 3) relicts of an old erosion-surface are found at elevations of 3,500 to 4,000 feet.

Characteristic of the Strydpoort, Wolkberg and Drakensberg Ranges is the remarkable three-fold occurrence of quartzite ledges and cliffs along the escarpments. The quartzite bands have steep dip-slopes and on the shale and lava occur smaller ledges of hard rock. The upper quartzite of the Wolkberg crowns the mountain ranges with very imposing cliffs. The Black Reef sediments lie topographically much lower on rugged hilly landscape.

The Strydpoort Range rises from 1,000 to 2,000 feet above the granite highlands north of it, and is notched by the water-gaps of three rivers. The elevation of the range which decreases gradually to the southwest, is from 5,000 to 6,000 feet above sea-level. The highest point shown on the map is at Iron Crown; the trigonometrical beacon with this name has an altitude of 6,980 feet and is situated at the northeastern extremity of the Strydpoort Range, just beyond the northern boundary of the area.

In the Wolkberg the Mhlapitsi River has incised a gorge some 3,000 feet deep. The eminence Mount Serala, on which trigonometrical beacon Wolkberg 68 stands, is 6,731 feet above sea-level and 4,600 feet above the Lowveld. This landmark commands a magnificent panoramic view in al directions.

Between Mount Serala (A. 3) and Mamatzeeri 15 KT (A. 3) the above-mentioned trio of quartzite cliffs is less prominent in the escarpment due to folding, and the upper quartzite of the Wolkberg Formation gives rise to the highest peaks rising above the dissected mountain-land. This portion of the area, with spectacular landscape views, is exceedingly difficult of access.

The Drakensberg rises from 3,000 to 4,000 feet above the Transvaal Lowveld and attains altitudes of 6,000 to 6,500 feet. It is a very impressive topographical feature with rugged cliffs and thickly wooded kloofs.

In the northern extremity of the Drakensberg and in the Wolkberg the decrease in altitude towards the Lowveld is very sudden in some places, e.g. 4,000 feet in 2 miles on Mamathola Location 635 LT (A. 3). Elsewhere as on Tours 17 KT (A. 3–4) and Thabina Valley 13 KT (A. 3) the Archaean rocks form rugged foothills or spurs below the escarpment and thus a more gradual descent to the Lowveld. Cliffs of the basal quartzite of the Godwan Formation are usually very prominent in the foot-hills.

In the southeastern part of the area, which is near to the point where the Olifants River has notched the Drakensberg, there is a rise of 4,000 feet from the river to the top of the mountain within 3 miles. These steep dip-slopes are intersected by thickly wooded, almost impassable gorges of the tributary streams.

B. Drainage

Some 25 square miles in the northwestern corner of the area is drained by the Diep River which flows northwards towards the Sand River and ultimately to the Limpopo. The rest of the area falls within the drainage basin of the Olifants River.

The Olifants River does not flow permanently in the southwestern portion of the area but as more and more permanently flowing tributaries join it towards the east, the main river becomes a perennial stream. In the southeastern part of the area the Olifants River is deeply incised with steep walls of several hundred feet in places. In comparison with the Steelpoort River little alluvium has been deposited along it.

Numerous ephemeral streams join the Olifants River on its southern side; the only perennial rivers on that side are the Steelpoort, Moopetsi, nd Motshe.

On the northern side the main tributaries are the Chunies, Mphahlele, Malips, Molapatsi, and Mhlapitsi Rivers. The first-mentioned three rise on the granite plateau north of the Strydpoort Range and cross the latter through steep-sided water gaps.

On the granite plateau with its soft sandy soil a large proportion of the rain water soaks into the ground. The stream-beds are broad and choked with sand and debris. The rivers are in spate only after heavy rains and during the winter the water is forced to the surface only where dykes or other impervious rocks obstruct the underground flow through the loose material.

According to information obtained locally the Malips River used to be a perennial stream from the Strydpoort Range downstream. Nowadays the river-bed is clogged with sand below the water-gap and the water disappears under the loose material.

The Malips, Mphahlele and Chunies Rivers have superimposed drainage-lines as they cut through the Strydpoort Range. The Molapatsi also shows superimposed characters relative to the southern mountain ranges. Numerous picturesque waterfalls occur along it in the mountains. On Hooggenoeg 293 KS (A. 3) calcareous sinter occurring 300 feet above the present river-bed indicates a pause in the morphological development of this river.

The Mhlapitsi River which rises a few miles outside the present area northeast of the Iron Crown, is a small ephemeral stream in a broad alluvial flat. Less than 2 miles from its origin the river flows through a gorge some 2,500 to 3,000 feet deep and is fed by numerous tributaries. In its upper reaches, the Great Letaba River, known as the Broederstroom, flows southwards to within a short distance of the Mhlapitsi water-gap and then turns eastwards towards the Lowveld. This is evidently a case of river piracy; it has been described (Hall, 1914).

In the Wolkberg where the Mhlapitsi River follows a winding course more or less on the contact of the Wolkberg Formation and the Black Reef Series, it has cut magnificent gorges with vertical cliffs on either side in the quartzite ridges but on the softer rocks the stream meanders for short distances on alluvium and gravel deposits (plate I). On the dolomite it makes broad alluvial flats. The Mhlapitsi is also a superimposed river; as has been mentioned, it has been beheaded.

The Drakensberg and the Lowveld are drained by several permanent streams that flow in a general northeasterly direction. The Selati and Makhujwi Rivers rise at the back of the escarpment and cut through the different quartzite bands. Where the rivers cross the quartzite ledges or cliffs on the Great Escarpment there are several beautiful waterfalls, e.g. on Forest Reserve 8 KT (A. 3) and the western boundary of Mamatzeeri 15 KT (A. 3). All these rivers ultimately join the Olifants River far to the east of the present area.

In the Lowveld there is evidence that the main streams have shifted their channels at different times, probably from north to south. However, no definite conclusions on the morphological development can be drawn from this small area alone.

C. Climate

The Lowveld has a subtropical climate with very hot summers but very mild winters. The average annual rainfall is 26 inches or 660 mm. The streams are infected with bilharzia but malaria has been largely conquered.

The Limpopo Highlands south of Pietersburg have an average rainfall of 500 mm. per year and experience periodic droughts. It is hot during the summer and moderately cold with a fair amount of frost during the winter.

The portion of the area falling within the Central Transvaal Bushveld also has an average rainfall of 500 mm. The rainfall is slightly higher on the mountains which are covered by mist at times. The winters are mild with occasional frost but the summers are hot.

The area along the Great Escarpment has a pleasant and bracing climate without extreme temperature differences in winter and summer. The rainfall varies from 685 to 890 mm. per annum and mist is very prevalent along the escarpment. Farther towards the west and southwest in the Bankeveld the rainfall decreases and is more irregular in the lower-lying portions of this physiographic region. It is very hot during the summer between the mountains but mild in the winter with occasional frost.

D. Vegetation

The Lowveld is characterised by a luxuriant growth of grass and a great variety of trees such as *Acacia* species, tambotie, marula (*Sclerocarya caffra*), and wild fig (*Ficus* species). The vegetation is very thick along the watercourses.

In the escarpment area there are numerous patches of native forest that contain valuable timber such as yellow-wood, stink-wood and white elder. Small areas have been afforested.

Proteas and sour grasses flourish on the mountains. *Acacia* varieties and tambotie are found in the kloofs while ferns and various creepers abound along the streams. The natural vegetation of dolomite terrain is grass and thorny scrub or thorn trees. Large private plantations of conifers have been established on the plateau south of the Iron Crown.

The granite highlands north of the Strydpoort Range are sparsely overgrown by a variety of indigenous trees such as *Acacia* species and marula. On the granite koppies and more rocky places aloes and euphorbia abound.

In the southwestern part of the area thorny scrub, marula and witgatboom are common on the plains. Euphorbia and rooibos favour the mountains.

III. GEOLOGICAL FORMATIONS

Tertiary to Recent			Alluvium, soil, sand, talus, ferricrete, surface-limestone, river-terrace gravel
Transvaal System	Pretoria Series	Smelterskop Stage	Felspathised quartzite and leptite (unclassified)
			Quartzite with minor hornfels and dolomitic marble
			Hornfels with quartzite and limestone layers
		Magaliesberg Stage	Quartzite
			Hornfels
			Tuff and agglomerate (Machadodorp volcanic rocks)
			Carbonaceous and calcareous shale and hornfels with limestone bands
			Hornfels with interbedded quartzite
		Daspoort Stage	Quartzite, partly felspathised, leptite and minor hornfels
			Ongeluk lava with interbedded shale and tuff
			Ongeluk quartzite and conglomerate
			Hornfels and shale with minor tillite, conglomerate and quartzite
		Timeball Hill Stage	Quartzite
			Shale, hornfels and minor schist
			Bevet's conglomerate
	Dolomite Series	Upper Dolomite Stage	Dolomite and chert with quartzite and shale lenses
			Shale and hornfels with dolomite layers, conglomerate and tillite
			Dolomite
		Banded Ironstone Stage	Banded ironstone with shale bands and asbestos
		Main Dolomite Stage	Dolomite, chert and limestone with shale and quartzite layers, breccia and asbestos
	Black Reef Series		Quartzite, conglomerate, shale and dolomite
			Quartzite with conglomerate and shale layers

Wolkberg Formation		Basic lava, pyroclasts and shale
		Quartzite with conglomerate layers
		Shale with minor quartzite
		Quartzite with minor shale
		Shale, partly tuffaceous, with a quartzitic zone
		Quartzite and felspathic quartzite with conglomerate beds
Godwan Formation		Basic lava with interbedded quartzite, arkose, shale and tuffaceous shale
		Quartzite, felspathic quartzite and conglomerate
		Tuffaceous shale
Swaziland System		Quartzitic rocks, hornfels, schist (unclassified)
	Fig-tree Series	Different schist varieties, grit and phyllitic shale with bands of quartzite and quartz schist, sheared conglomerate, banded ironstone and schistose carbonate rocks
		Shale and phyllitic shale with banded ironstone, graywacke, grit, and interbedded sheared felspar porphyry, amygdaloidal lava, quartz phyllite, and possibly basic lava
	Onverwacht Series	Quartz and felspar porphyry, mainly sheared, with quartz phyllite and some shale
		Amygdaloidal and massive basic lava

Intrusive Rocks

Post-Karoo		Dykes and sills of dolerite
Post-Transvaal	Bushveld Igneous Complex	Granite
		Pegmatite veins
		Magnetite and magnetite-bearing hortonolite dunite pipes
		Gabbro with bands and pipes of magnetite
		Pegmatitic felspathic pyroxenite (Merensky Reef)
		Porphyritic pyroxenite
		Pipes and sheets of peridotite
		Norite and anorthosite
		Pyroxenite with chromitite seams
		Norite
Post-Transvaal	Forerunners of Bushveld Complex	Diabase sills
		Porphyritic microgranodiorite sill
Post-Transvaal and Pre-Godwan		Dykes of diabase and altered diabase

Post-Swaziland........	Archaean Granite...............	Coarse-grained granite Granite and gneiss with pegmatite
	Jamestown or Rooiwater Igneous Complex	Gabbro and diabase, partly serpentinised, and talc schist, with magnetite band Serpentinite and talc schist Amphibolite

IV. ARCHAEAN COMPLEX

Archaean rocks underlie a triangular area of some 200 square miles on the plateau north of the Strydpoort Range and another 300 square miles in the Lowveld.

A. Swaziland System

Numerous small xenolithic masses of Swaziland rocks are found in the Archaean granite north of the Strydpoort Range. The majority are too small to be mapped separately and with a few exceptions these rocks could not be classified as belonging to any particular series. What correlations are made are based on the work done in the Barberton area (Visser, comp., 1956).

In the Lowveld there are, besides small xenolithic masses of Swaziland rocks in the Archaean granite, also fairly large occurrences of this system. In the latter the rocks are highly metamorphosed as a rule and have a general northeasterly strike. These Swaziland rocks form prominent koppies, narrow sharp-crested ridges and some of the foot-hills of the Drakensberg; the weather-resistant siliceous types have determined the topography to a large extent.

1. Onverwacht Series

(*a*) *Basic Lava*

Several lenticular masses of highly altered basic lava occur north of the Strydpoort Range, e.g. on Aasvogelkrans 265 KS (A. 1) and Diepsloot 250 KS (A. 1).

The lava is fine- to medium-grained, dark grey to greyish-green and amygdaloidal in some instances as on Kliphoek 238 KS (A. 1) and Driehoek 236 KS (A. 1). In some occurrences as on M'Phatlelespoort 266 KS (A. 1) the lava is partly sheared and altered to schistose rocks.

A sample of lava from Diepsloot 250 KS (A. 1) is seen in thin section to consist of plagioclase insets and green pleochroic amphibole in a crypto-crystalline ground-mass of amphibole, felspar, a little quartz and a fair amount of magnetite. The felspar is partly altered to green chloritic material and the amphibole is partly changed into brown biotite. Amygdales in this type of lava consist of quartz, chlorite and hornblende.

Some varieties of fine-grained lava are slightly glassy but the mineral composition approximates to that described above.

In the Lowveld basic lava is found on Toul 72 KT (A. 4) and Bokhalva 77 KT (A–B. 4). The Archaean granite is intrusive into the lava which is only slightly thermally metamorphosed.

Records of the results of this prospecting are not available, but it is said that with a reef width of about 5 feet, the values averaged from 2·5 to 3 dwt. per ton.

XIV. UNDERGROUND WATER

Detailed information concerning the majority of the bore-holes in this area is lacking and only some general conclusions will be given. In the Drakensberg area with its high rainfall there are so many springs and streams that bore-holes are not needed.

In the Lowveld bore-holes in the schistose Fig-tree rocks yield very good supplies: e.g. in the northwestern corner of Dusseldorp 22 KT (A. 4) and at the Inyoni Mine on Burgersdorp 19 KT (A. 4). The latter bore-hole is 150 feet deep and yields 2,000 gallons per hour. The serpentinite and schist of the Rooiwater Complex are equally good aquifers. Bore-holes on Luxemburg 24 KT (A. 4) in these rocks vary in depth from 90 to 200 feet and yield from 1,200 to 3,000 gallons per hour. Favourable positions for bore-holes in the granite and granitic gneiss are the shear-zones, dykes transverse to watercourses, and basins of decomposition. The gneiss is usually more deeply weathered than the granite.

The Archaean granite north of the Strydpoort Range is mostly covered by sandy soil into which the rainwater soaks very readily. The replenishment of the underground water should therefore be fairly good. Bore-holes situated in basins of decomposition in the granite yield from 80 to 300 gallons per hour; an exceptional one on Noodshulp 193 KS (A. 3) gives 1,300 gallons per hour. The bore-holes in the valleys and near watercourses have much better yields than those on the rising ground. Shear-zones and deeply weathered basic dykes are good aquifers and yield permanent supplies, e.g. on Doorndraai 245 KS (A. 1). In deeply weathered granite the basic dykes act as aquifuges in watercourses or on the slopes of gently rising ridges, e.g. in the southwestern portion of Klipspruit 178 KS (A. 1) a bore-hole of 96 feet in badly weathered dolerite yields 200 gallons per hour. The dykes also give rise to barrier-springs and in the sand-filled streams they force the underground flow of the water to the surface. Bore-holes in the patches of alluvium on the granite yield good permanent supplies, e.g. on Doornveld 182 KS (A. 1). Shallow wells in the sandy watercourses do not yield permanent supplies.

Master-joints in the quartzite of the Strydpoort Range are good aquifers. Several permanent springs rise in them on the dip-slopes and feed the streams, as on Mooiplaats 358 KS (A. 1) and Kransrand 267 KS (A. 1).

Numerous springs rise in the formations that build the Wolkberg and Drakensberg. They feed the mountain-streams that flow towards the Lowveld.

In the dolomite terrain adjoining the latter mountains numerous springs rise in the gullies and valleys; some are on the contact of diabase sheets or dolerite dykes, e.g. on Ashmole Dales 211 KS (A. 2–3). A spring in the dolomite on Lot 123 (A. 2) yields 5,000 gallons per hour. A 30-foot bore-hole in the Main Dolomite Stage on Gramdoel 269 KS (A. 1) has a yield of 1,000 gallons per hour. A 55-foot hole in the same formation on Tubex 295 KS (A. 2) becomes very weak in the dry season.

The Banded Ironstone and Upper Dolomite Stages of the Dolomite Series are poor aquifers. Several bore-holes in the banded ironstone on Lot 245 and Lot 251 (A. 2) were unsuccessful. Some bore-holes on the latter farm started in superficial deposits but may have reached the underlying hornfels, Upper Dolomite Stage or banded ironstone. They yielded water at depths of 160 to 170 feet for a time and dried up later. A bore-hole in the Upper Dolomite Stage on Toornkop 398 KS (A. 2) is 140 feet deep and yields on 250 gallons per hour.

Very strong supplies of water are pumped by the asbestos-mines and a school from bore-holes of 20 to 70 feet deep in the superficial deposits along the Malips River; these holes probably tap the underground flow of the river. Bore-holes in the superficial deposits on Wonderkop 397 KS (A. 1–2), Goudmyn 379 KS (A–B. 1), and Yzermyn 380 KS (A–B. 1) also yield good supplies.

There are a large number of bore-holes in the rocks of the Bushveld Complex and the hornfels around its periphery but data about them are very scanty or wanting. The successful bore-holes are apparently all in basins of decomposition. In a 200-foot hole on Forest Hill 117 KT (B. 3) yielding 700 gallons per hour, the water was probably struck at the contact of pyroxenite and a chromitite seam. There are many wells in the superficial deposits where watercourses pass through gaps in the ridges or ranges of hills. The solid formations occur at shallow depths in these gaps and force the water, that is flowing underground, towards the surface. There are some contact-springs and barrier-springs in the rocks of the Bushveld Complex. On Croydon 120 KT (B. 3) one is located in a crush-zone in pyroxenite. Several old prospecting pits also contain water.

On Badfontein 531 KS (B. 1) there are luke-warm springs aligned more or less in the direction northwest—southeast. There are no exposures but the underlying solid formation is most probably Bushveld granite. The large tear-fault is some 2,600 yards farther east but the springs are probably connected with it.