



UNION OF SOUTH AFRICA
UNIE VAN SUID-AFRIKA

DEPARTMENT OF MINES

DEPARTEMENT MYNWESE

GEOLOGICAL SURVEY
GEOLOGIESE OPNAME

THE GEOLOGY

OF THE

BITTERFONTEIN AREA, CAPE PROVINCE

AN EXPLANATION OF SHEET 253 (BITTERFONTEIN)

by

H. Jansen, D.Sc. (A'Dam)

Met 'n opsomming in Afrikaans onder die opskrif :
DIE GEOLOGIE VAN DIE GEBIED BITTERFONTEIN,
KAAPPROVINSIE

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Geological map in colour on a
scale of 1 : 125,000 obtainable
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quartz. Its gypsum content may vary from 0 per cent. to 20 per cent. The quarries and pits cover a relatively large area measuring approximately 1,500 feet in diameter, and, therefore, the potentiality of the deposits should be reconsidered.

Gypsum deposits in the Vanrhynsdorp District have been described by Wasserstein ⁽²¹⁾ and Lamont ⁽³⁾. The determining factors of their origin put forward by these authors may be summarised as follows:—

- (1) Rocks capable of supplying the necessary components in the zone of weathering, such as limestone, arkose and phyllite or shale containing pyrite.
- (2) Concentration by underground and subsurface waters under arid conditions.
- (3) Locally impeded groundwater by faults or locally impeded (sub) surface water by pans.

The Moedverloren occurrences and those of the adjacent area on the east (Bergplaas, Beeswater) are largely confined to underlying belts of limestone and marble in contrast with the deposits around Komkans, Galsyfer, and Stuurman (A. 3), which are in gneiss country. There is no doubt that the formation of the latter has been dependent to a large extent on fault-zones and, in particular, on intersections of fault-zones and large valleys. Material derived from schists, which are exposed along the upper course of the Klein-Goerap River, may also have contributed to the formation of the Galsyfer deposits.

J. SALT

Salt is gained from the large pan near the mouth of the Sout River. Its annual production is estimated to amount to 3,000 tons. The salt is transported to Komkans Siding by lorries.

XIII. THE UNDERGROUND WATER-RESOURCES

Owing to the arid conditions in the area, springs and seepages having a perennial flow are not represented. The area is drained by water-courses, which are dry throughout the greater part of the year.

A few water-holes supplying brackish water are found in dry streambeds, in particular along the Jaayleegte. They are frequently located on contacts of different rock types, as for instance dolerite and gneiss or amphibolite and gneiss.

The data of an old bore-hole in Malmesbury phyllite on Moedverloren (B. 4) are as follows:—

| | |
|---|-----|
| Total depth of bore-hole in feet..... | 240 |
| Depth at which water was struck, in feet..... | 200 |
| Depth to which water rises, in feet..... | 150 |
| Yield in gallons per hour..... | 400 |

Data on bore-holes in metamorphic rocks are scarce. That of a bore-hole sunk in cordierite gneiss north of Bitterfontein (A. 3-4) according to information obtained from the owner are as follows:—

| | |
|---|-------|
| Total depth of bore-hole, in feet..... | 56 |
| Depth at which water was struck, in feet..... | 50 |
| Depth to which water rises, in feet..... | 36 |
| Yield in gallons per hour..... | 6,000 |

The averages of 21 successful bore-holes in pink gneiss are as follows:—

| | |
|--|-------|
| Average total depth of bore-holes, in feet..... | 153 |
| Average depth at which water was struck, in feet.... | 120 |
| Average depth to which water rises, in feet..... | 65 |
| Average yield in gallons per hour..... | 1,178 |

The relatively high yields are greatly influenced by bore-holes located near or on Post-Nama faults, i.e. near the faulted contacts between gneiss and Kuibis quartzite or near sheared zones in gneiss. High yields are also obtained near and in the village of Nuwerus which is situated in a valley in the vicinity of a large fault.

The maximum yield is approximately 3,600 gallons per hour, whereas the average yield of bore-holes not located in the vicinity of faults amounts to only 160 gallons per hour.

The data of a bore-hole in Kuibis quartzite along a stream-bed on Oor Kraal (A-B. 4) are as follows:—

| | |
|---|-------|
| Total depth of bore-hole, in feet..... | 325 |
| Depth at which water was struck, in feet..... | 325 |
| Depth to which water rises, in feet..... | 285 |
| Yield in gallons per hour..... | 2,000 |

The averages of successful bore-holes in Quaternary and Tertiary deposits are as follows:—

| | |
|---|-----|
| Average total depth of successful bore-holes, in feet | 267 |
| Average depth at which water was struck, in feet... | 193 |
| Average depth to which water rises, in feet..... | 99 |
| Average yield in gallons per hour..... | 556 |
| Total percentage of failures..... | 33 |

A bore-hole in the stream-bed of the Moedverloren River near the farmhouse is located near a limonite-bearing jasper vein which crosses the stream-bed and creates a natural barrier against which the underground water is dammed up. Results obtained are as follows:—

| | |
|---|-------------|
| Total depth of bore-hole, in feet..... | 12 |
| Depth at which water was struck, in feet..... | 12 |
| Depth to which water rises, in feet..... | 6 |
| Yield in gallons per hour..... | 1,500-5,000 |

An analysis of the brackish water from this bore-hole is as follows ⁽³⁾:—

| | <i>Parts per</i> 1,000,000 |
|---|-------------------------------|
| Total dissolved solids..... | 3,400·0 |
| Alkalies (as sodium)..... | 1,020·0 |
| Ca..... | 115·0 |
| Mg..... | 87·0 |
| Fe..... | 0·17 |
| Sulphate (as SO ₄)..... | 399·0 |
| Carbonate (as CO ₃)..... | 101·0 |
| Silica..... | 35·0 |
| Carbonate hardness (as CaCO ₃)..... | 169·0 |
| Non-carbonate hardness..... | 478·0 |
| Total hardness (as CaCO ₃)..... | 647·0 |

Analysts: Industrial Consulting Laboratory Ltd., Cape Town.