II. GENERAL DESCRIPTION OF THE AREA

1. Field-relationships (Folder I)

Apart from dykes and a few small sedimentary inclusions, the whole area is occupied by rocks of the Bushveld Igneous Complex. Good exposures of the Main and Upper Zones made a study of most of the constituting rock types possible. The roof-rocks outcrop on the slopes and on top of the prominent Sekhukhune Plateau which is incised along its edges by tributaries of the Steelpoort and Blood Rivers and thus lends itself perfectly to the investigation of the complex roof-relationships.

The roof-rocks extend from the higher slopes of the escarpment surrounding the Sekhukhune Plateau, and occupy the whole of the tableland in the western part of the area. At the base, they consist of highly metamorphosed felsite, generally referred to as leptite, which is about 350m thick but remarkably consistent along the strike at the edge of the plateau from Tauteshoogte in the south to Signal Hill in the north (Molyneux, 1970, Plate I). They are traversed by numerous veins of fine-grained granite and granodiorite, which, as will be seen, are considered to have originated by the melting of the leptite. The leptite is separated from less altered felsite by a thick sheet of granophyre, very homogeneous in appearance over the larger part of the area with microgranophyre and a granitic variety only locally developed at Paardekop and on Groothoek 139 JS. A conspicuous, thin layer of granodiorite or melanogranophyre is associated with the granophyre and could be followed at its base over the whole area. The overlying Rooiberg Felsite consists of a relatively homogeneous succession of black and red, mostly porphyritic felsite, more than 2500m thick of which only a small portion consists of agglomerate and amygdaloidal or flow-banded varieties.

The remaining area, i. e., south and east of the Sekhukhune Plateau, consists of rocks of the Layered Sequence which is subdivided according to the scheme proposed by Molyneux (1970, Plate II). Rocks of the Main Zone are present in the area east of longitude 29° 56' E on which the village of Roossenekal is situated, whereas the Upper Zone extends up to the Sekhukhune Plateau but is also encountered in the low-lying country of the Blood River valley except on the southern portion of the farm Buffelsvallei 170 JS where there are some outcrops of the Main Zone. Subzone A of the Main Zone consists of a

variety of anorthositic and gabbroic rocks of which only the top 600m are developed along the eastern and north-eastern boundary of the area. Subzone B is separated from the underlying rocks by the Upper Mottled Anorthosite (Folder I) and, apart from a fine-grained norite at the top, consists of a thick succession of homogeneous gabbroic rocks. These are overlain by the Pyroxenite Marker at the base of Subzone C, but with the exception of some spotted gabbroic rocks and mottled anorthosites in the lower half of this subzone, the rocks are very similar in appearance to those of Subzone B.

The base of the Upper Zone is a mottled anorthosite which is characterized by the presence of intercumulus magnetite. It is overlain by a differentiated succession of magnetite gabbro, mottled anorthosite and magnetitite seams of Subzones A, B and C of this Zone. Olivine makes its appearance at the base of Subzone C about 1 km west of the main road from Middelburg to Burgersfort. Subzone D, at the top of the Upper Zone consists mainly of olivine-bearing diorites, but olivine tends to be absent in the rocks associated with magnetitite seams. Hornblende, K-feldspar and quartz become more abundant only in the topmost differentiates of the intrusion and are considered, as published previously (Von Gruenewaldt, 1968, p. 169) to be partially due to assimilation of some of the roof-rocks by the Bushveld magma.

Over the greater part of the area, the layering of the mafic rocks is remarkably persistent and most of the horizons can be correlated accurately with those described by Molyneux (1964 and 1970) from the Leolo Mountains and Magnet Heights to the north. In the valley of the Blood River to the south, a remarkable change in this generally persistent layering takes place. This is especially noticeable in rocks of Subzone D of the Upper Zone and although the constituting rock types remain the same, the number of magnetitite seams differs considerably.

Inclusions of sedimentary material in the Layered Sequence are relatively scarce. Two very small occurrences of cordierite hornfels (G414 and G258)*, the presence in which of orthopyroxene places them in the pyroxene hornfels facies, were encountered in the Upper Zone north of the Mapochs Mine and on Duikerskrans 173 JS, respectively. Larger occurrences of original calcareous sediments are present on Luipershoek 149 JS and Mapochsgronde 500 JS.

---

* Numbers in brackets refer to specimens collected in the field, and are indicated on Folder I.

Mineral assemblages developed in these correspond to those described by Willemse and Bensch (1964, p. 33 and 71) from the Upper Zone in the vicinity of Magnet Heights. These occurrences are presently being investigated in detail by Mr J. Joubert (research in progress).

A number of small quartzite xenoliths are present in the diorite of the Upper Zone close to or on the contact with the roof-rocks (Folder I). The largest one of these is on Duikerskrans 173 JS where rheomorphic breccia which consists of fragments of quartzite in a quartzitic matrix, is also developed. All these xenoliths are pure quartzite and there is no evidence that any granitization has taken place. They probably represent disrupted fragments from the floor which drifted to the top of the intrusion.

The Bushveld Granite has intruded the leptite and the granophyre in the extreme northern part of the area. Smaller intrusions of granite porphyry and some aplitic and pegmatitic veins are considered to be related to the Steelpoort Park Granite.

Post-Bushveld intrusive rocks consist of a few fine-grained porphyritic dykes and sills, probably related to the Spitskop Alkaline Intrusion, and of numerous dolerite dykes of Karroo age. These rocks were not investigated in this study.

2. Topography and drainage

Broadly, the area can be subdivided into three distinct topographic regions, namely, the Sekhukhune Plateau in the west, the valleys of the Steelpoort and Blood Rivers, and a rugged mountainous terrain east of Roossenekal.

The Sekhukhune Plateau has an average elevation of more than 1600m above sea-level. It forms a gently undulating tableland which is deeply incised along its edges by tributaries of the Blood and the Steelpoort Rivers. In a northerly direction the elevation gradually increases and reaches its maximum of 1900m at the prominent Paardekop, the highest point for many kilometres.

The edge of the plateau is well defined and the transition to the low-lying surrounding country is in the form of steep slopes along which the contact of the hard, resistant, acid rocks and the underlying gabbroic rocks of the Upper Zone is situated. This sudden drop in elevation is about 330m in the south, but increases northwards along the eastern edge to about 600m where prominent cliffs of leptite enhance the beauty of the landscape.

Short, but deeply incised rivers drain the plateau region. The rivers often

follow zones of weakness, as for instance along the Steelpoort Fault and where dolerite dykes intruded the acid rocks.

Rocks of the Upper Zone occupy the low-lying country which surrounds the plateau. The elevation is about 1300m in the south and drops to 1100m above sea-level in the north. These low-lying areas are drained by the Steelpoort and Blood Rivers, east and south of the plateau respectively. The Blood River, a small and insignificant rivulet, can hardly be held responsible for the wide valley in which it flows, whereas the much more significant Steelpoort River is characterized by deeply incised meanders. Willemse and Frick (1970, p. 161-171) who investigated the drainage pattern of the Steelpoort River concluded (p. 162) that the headwaters of the Blood River were captured by a tributary of the Swartspruit (south of the area mapped), which is considered by them to represent the southern continuation of the Sekwati River (north of the area mapped). These headwaters of the Sekwati River, characterized by a mature stage of development, were captured by the Steelpoort River owing to headward erosion along the Steelpoort Fault (p. 169). This caused rejuvenation of the captured upper course of the Sekwati River and would thus explain the deeply incised meanders of the Steelpoort River (ex Sekwati) in this area.

East of Roossenekal, the relatively homogeneous rocks of the Main Zone offer more resistance to weathering than the differentiated rock types of the Upper Zone, and consequently the elevation of the country rises to above 1800m. This high mountainous region, the southern continuation of the Leolo Mountains, is drained by the Klip and the Dwars Rivers, which have cut deep valleys into the gabbroic rocks. The presence of high-lying marshes (1750m above sea-level) on Draaikraal surrounded by mountain peaks of up to 2300m, is ascribed by Willemse and Frick (1970, p. 166) to a complex history of the drainage system. They are of the opinion that the headwaters of the Klip River were captured by the Klein Dwars River and that the recapturing by the Klip River of its head-waters caused the elbow in this river on Draaikraal 48 JT and the windgap on the border of this farm and Uysedoorns 47 JT.