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B. C. R. Record 1952/22.

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NOTE ON THE RECENT DISCOVERY OF MARMATITE ON THE WAU-EDIE CREEK ROAD, WAU.

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Rec'd 01952/22.

INTRODUCTION:

An outcrop of marmatite (zinc sulphide) has been located within the boundaries of E.P.L.26 held by New Guinea Goldfields Limited.

The following notes describe the outcrop as discovered and certain recommendations are made to assist in the evaluation of the outcrop as a base-metal orebody. Other recommendations are made embracing other known occurrences of base-metal sulphides in the Territory of Papua and New Guinea.

The occurrence of boulders of base metal sulphides in alluvial workings in the Bulolo River, Edie Creek and the Koranga piedmont indicates that sulphide mineralization has accompanied the intrusion of the quartz-biotite porphyry, locally known as the Lower Edie porphyry, which outcrops on the north and north-eastern slopes of Mt. Kaindi. One sulphide lode located near the headwaters of Maori Creek was explored for gold by the Mt. Kaindi Prospecting and Treatment Syndicate before the war. This project has since been abandoned.

The gossanous outcrops in the vicinity of Kunai Creek have received considerable attention from Mr. and Mrs. J. Rade, former New Guinea Goldfield's geologists and they have noted the presence of zinc minerals in the gossans and their parent mineralized zones. None of the Kunai Creek exposures suggest the presence of base metal sulphides in commercial quantities. One of the gossans which outcrop on the Wau-Edie Creek Road about 200 feet on the Wau side of the creek crossing carries extremely good gold values and this alone should provide sufficient incentive for underground exploration.

In an appraisal of the work done by New Guinea Goldfields geologists in the Kunai Creek area, the writer recently recommended further prospecting for gold in the vicinity of the Kunai Creek gossans and discounted the possibility of the existance of base - metal sulphide ore bodies of economic dimensions.

The gossanous outcrops along the Wau-Edie Creek road between the Road-master's camp and Namie Creek have been noted by many, but until recently they have not been examined closely. They have previously been regarded as secondary gossans superficially deposited from limonitic seepages from higher up the slopes of Mt. Kaindi.

GENERAL GEOLOGY:

The gossans which outcrop between the Road-master's camp and Namie Creek have recently been examined in some detail by the writer. They are only in part secondary. Some primary gossans are encrusting a mineralized zone of stopable dimensions. The mineralization appears to be by both total and partial replacement of typical medium grained, Lower Edie biotite porphyry adjacent to a fault plane which has provided the channel for the move-

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ment of mineralizing solutions. The fault plane strikes approximately N 30° W. and dips to the North-east at 60°-70°. The faulting appears to have taken place near and parallel to an intrusive contact of the Lower Edie porphyry and Kaindi phyllites, although in the mineralized exposure on the road the characteristic fine grained siliceous and pyritic marginal phase of the porphyry is absent. Metasomatic replacement has definitely favoured the porphyry side of the fault. The adjacent phyllites are strongly pyritic but replacement by marmatite is not apparent.

The lack of brecciation along the fault and the mineral suite suggest that the deposit has been emplaced at medium depth, within the mesothermal zone, and subsequently exposed by vigorous erosion. Other auriferous lodes in the area associated with the Lower Edie porphyry are typically epithermal, that is emplaced at shallow depth. Thus it appears that the marmatite fissure filling and associated metasomatic replacement are representative of the upper part of the mesothermal zone. Such mesothermal deposits usually persist to considerable depths and are subject to mineralogical zoning with depth. Thus it would be possible for the zinc-iron sulphides to gradually give way to lead-iron sulphides and ultimately to copper-iron sulphides.

MINERALOGY:

The road exposure presents a mineralized and metasomatically altered face over about 35 feet, the true thickness of this zone is probably 15-20 feet. The fissure filling is naturally the most mineralized zone, it is irregular and varies in width from 6" to 18". It is occupied by coarsely crystalline marmatite (ferruginous zinc sulphide) associated with its oxidation product smithsonite (zinc carbonate) and some large blebs of massive pyrrhotite (magnetic iron pyrites). Normal crystalline iron pyrites is usually intergrown with the marmatite but it is not a major constituent in this zone. Some of the pyrites exhibits the characteristic iridescent tarnish of chalcopyrites but this mineral has not been positively identified.

The replacement zone on the porphyry side of the fault consists of siliceous, sericitized and pyritized quartz porphyry which retains a relict porphyritic fabric. Throughout this zone marmatite occurs as pockets up to 1 foot in diameter and as irregular veinlets. The concentration of marmatite falls off away from the fissure. In this zone, iron pyrites is more abundant and in the outer ten feetof the zone it is considerably in excess of the marmatite.

On the phyllite side of the fault, replacement has been mainly pyritic and it extends from the fault surface for about ten feet. Replacement has taken place along bedding and cleavage planes. No marmatite was observed in this zone, though microscopic examination may reveal it.

The mineralized zone has not yet been assayed for gold or silver but the panning of crushed ore does not indicate gold in any appreciable amounts. However, it is probable that the lode contains a very small gold and silver content, for other quartz and

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sulphide lodes related to the same porphyritic body are auriferous.

Galena (lead sulphide) was not observed in the face exposed by the road. The repeated occurrence of boulders of galena in the present Koranga workings in the auriferous piedmont deposits at the foot of Mt. Kaindi opposite this mineralized area indicates that galena does occur in the vicinity.

Above and below the road the outcrop of the mineralized zone is masked by vegetation. About 100 feet above the level of the road a spring carrying about two cusecs of water emerges from a cavity near a porphyry-phyllite contact. The water contains a high percentage of soluble metallic salts and deposits a considerable amount of limonite. An analysis of a sample of this water would no doubt indicate a high percentage of zinc and lead salts. No Cdd. A sample will be collected for such an analysis. On the road about 250-feet on the Edie Creek side of the mineralized zone white zinc sulphate crystals encrust permeable bedding planes and fractures in a phyllite exposure which is protected from the weather by an overhanging cliff. This indicates that zinc mineralization extends for at least 250 feet in a westerly direction.

No systematic sampling of the exposure has been done and facilities for the analysis of the component minerals are not available locally. Mineral identification has been by crude blowpipe methods only.

When the outcrop and its environs are cleared of moss, other vegetation and superficial gossanous material, systematic sampling will be possible. The results of assays for zinc, gold and silver of samples from various portions of the mineralized zone should define the width of payable zinc values and indicate whether gold and silver might be worthwhile by-products from the zinc extraction. At present the writer considers that approximately 6-8 feet of the zone as exposed in the road cutting could be economically mined. Though a final decision would, of course, be governed by the world price for zinc, costs of installing plant at such a distance from the coast, and the shipping costs to the nearest smelter or buyer.

CONCLUSIONS:

A marmatite fissure filling and an associated zone of metasomatic replacement has recently been discovered within the boundaries of EPL. 26 held by New Guinea Goldfields Limited. It outcrops on the Wau-Edie Creek Road between the Roadmaster's camp and the Namie Creek crossing.

The potential ore body appears to be related to a fault which strikes N 30° W. and dips to the north east at 60°-70°. This fault brings Kaindi schists in contact with medium grained quartz biotite porphyry (lower Edie porphyry). The mineralized zone consists of a high grade fissure filling which varies from 6" to 18" in width and a lower grade zone of metasomatic replacement in the adjacent quartz porphyry. The total width of the mineralized zone is approximately

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20 feet. About 6-8 feet of this zone appears to be of economic grade.

The mineralogy of the lode and the nature of the fault plane suggest that the ore has been emplaced at medium depth and falls into the upper portion of the mesothermal zone of ore deposition. Such deposits are likely to persist laterally and to considerable depth.

Zinc, iron and doubtful copper sulphides are visible at the outcrop. It is probable that either at depth or laterally nearer the source of mineralization, lead sulphide will be encountered.

This outcrop appears to indicate an important source of zinc and probably lead. Whether or not it can be extracted profitably under present economic conditions is a matter for detailed study.

It is doubtful whether at this early stage in the country's development, base metal ores can be won profitably. However, the time will undoubtedly come when such deposits will be of vital importance to the Islands economy. It is hoped that the deposit described above, together with other base metal deposits known to the writer, (but not examined) in the Morobe District, the Eastern Highlands and the Milne Bay District, will be considered in future economic planning.

RECOMMENDATIONS:

The amount of zinc sulphide exposed in the outcrop justifies both further surface prospecting and underground exploration away from the influences of surface weathering and leaching. Surface prospecting will be difficult and it is thought that a short drive on the present outcrop would give the most valuable information.

The results of analysis of spring waters for zinc should also provide valuable information regarding the lateral and vertical extent of the body.

If a survey of other base metal sulphide deposits known to occur in the Territory of Papua and New Guinea could be made, it would be a step towards an appreciation of the Islands' mineral wealth with a view to the installation of smelting facilities in the Territory.

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