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Geophysical Surveys at Mount Morgan Queensland

1st progress report

by

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GEOPHYSICAL SURVEYS AT MOUNT MORGAN, QUEENSLAND

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INTRODUCTION

Geophysical surveys have been carried out at Mt. Morgan during October-December, 1948 by W.J. Langron and H.A. Doyle and during May-September, 1949 by H.A. Doyle and R.P. Loh. The surveys have been made at the request of Mt. Morgan Mines Ltd., the purpose being to aid the search for copper-gold ore bodies in the Mt. Morgan district.

The geophysical operations have been planned with the aid of geological advice from H. Connolly, Consultant Geologist to the Company. Mr. Connolly has planned and commenced a diamond drilling campaign in the search for new ore bodies and is looking to geophysics for assistance in the selection of additional drilling targets.

NATURE OF THE PROBLEM

The Mt. Morgan ore-body had a horizontal length of about 1300 feet, an average width of about 400 feet and extends to a depth of 950 feet from the original surface. The present mining operations are being conducted in the keel portion of the body at a depth of about 650 feet from the surface. The outcrop was small compared to the maximum horizontal section and was due to the exposure of a corner only of the deposit. The enclosing rocks are beds of the Morgan Series which consists largely of various types of volcanic rocks in horizontal beds of a few hundred feet thickness. The ore-body is within a down-faulted block of these beds, one of which has been partly replaced by the ore body mineralisation. The bed at the base of the ore-body is considered to be the same as the surface bed found out-cropping over most of the area surrounding the faulted block. The ore-body consists predominantly of silica and pyrite.

The Sugarloaf ore-body is believed to be a smaller replacement of a different bed to that concerned in the main ore-body mineralisation and located in a corresponding struct-ural position within the faulted block. It has little or no outcrop and appears to be smaller than the main ore-body. Drilling is in progress to prove the extent and nature of this ore-body.

A ferruginous material occurs over an area surrounding the two ore-bodies. It is referred to as gossan but there is some doubt as to whether that term is correct for the whole of the material. It may be largely a superficial occurrence of lateritic nature. The Company's exploration campaign called for an examination of this area and during 1948 operations were designed to cover this area in the search for concentrations of mineralisation.

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OUTLINE OF OPERATIONS

During 1948 gravity, magnetic and natural earth current surveys were carried out over the mine area. The latter were of limited extent because measurements could be made only on Sundays when the direct current equipment used in the open-cut operations was not functioning.

The gravity results show irregular anomalies of somewhat complex distribution due partly to terrain effects. Corrections for the latter have yet to be applied to the major part of the results and until this is done a final interpretation cannot be made. However, it seems unlikely that the corrected results will show any direct evidence of ore-bodies.

The magnetic results also show irregular anomalies which are probably related to the volcanic rocks and dykes some of which are known to have strong magnetic properties. Parts of the main ore-body has been found to be magnetic, indicating the presence of pyrrhotite or magnetite in the ore. However, it is considered that the magnetic results contain no obvious anomalies which can be confidently attributed to ore.

The earth current surveys of limited extent show no negative centres of the type produced by oxidising sulphide bodies.

During 1949, operations commenced with magnetic and earth current surveys over the Morgan Series adjacent to the mine area on the north side. The magnetic results show an abundance of anomalies which are no doubt largely, if not entirely, due to beds of the Morgan Series. No pronounced earth-current anomalies of significant type have been noticed. The complete results over the Mine Area and the adjacent area to the north are to be examined further when all results are returned to Melbourne.

Upon the completion of the above-mentioned operations it was decided that the surveys on the Mine Area and adjacent area should be terminated for the time being mainly because it was considered that the results were apparently contributing little towards the solution of the ore finding problem.

Discussion were held with Mr. Connolly on 6th June and it was agreed that attention should be transferred to the Woonmera area which lies about 4 miles to the north of Mt. Morgan. On this area light copper-gold mineralisation was known to exist in the foothills and slopes adjacent to a section of Mesozoic capped country. It was believed that more favourable mineralisation might occur beneath the Mesozoic sandstone or at depth on the slopes.

Detailed magnetic and earth current surveys were conducted on the slopes and extending on to the sandstone, a formidable field operation for the geophysicists and surveyors on account of the rugged relief involved.

The earth current surveys show no features of obvious interest.

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The magnetic results show features which are believed to be related to the distribution of certain rock types. Firstly it appears that the central part of the area consists of acid granitic rock of non-magnetic character which is flanked on the east by a biotite granite exhibiting appreciable magnetisation probably due to its magnetite content. It is believed that the magnetic survey results reveal the position of the contact between these rocks. Secondly, the rocks of the Morgan Series, where encountered on this area, produce a strong magnetic anomalies as they do also on the Mine Area. Where these rocks abut the acid granitic rocks this contact can also be determined by the magnetic results and it can be traced through the areas covered by the sandstone. It is therefore believed that geophysical surveys can make useful contributions towards the elucidation of the geological picture at Moonmera and probably elsewhere.

It has been found that the occurrences of mineralisation at Moonmera occur predominantly in the acid granitic rock. Some samples of this rock taken from outcrops and showing disseminated malachite, were assayed. The best result was 1.18% Cu and 1.2 dwts of gold. Samples of these rocks and others have been forwarded to Dr. Stillwell for mineragraphic examination.

CONCLUSIONS

It is considered that the geophysical work so far carried out on the Mine Area has not yielded results of economic significance and that no further work should be carried out there until all the results have been reviewed and consideration given to alternative possibilities in the approach to the problem.

The results at Moonmera are believed to be of interest primarily for delineating geological boundaries beneath cover and it is possible that the findings might aid initial exploration of this area in the search for disseminated copper-gold ore bodies. As knowledge of the area accumulates it might also be possible to attach some significance to magnetic anomalies of low intensity which are present within the acid granitic area. It is considered that field work at Moonmera has proceeded far enough for the time being.

It is recommended that the geophysical surveys in the Mt. Morgan district should be terminated at an early date and the results subjected to detailed analysis in the office.

L.A. Richardson

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Superintending Geophysicist.

Melbourne
26th September, 1949.