southern fault has been displaced approximately 185 feet south-west, and is clearly shown on the accompanying plan. In order to indicate the faulting more clearly, and show where further ore bodies may exist, the probable position of the jaspilite in unexplored country has been inferred. The northern fault has displaced the "rich shoot" at its southern end approximately 30 feet north-east, and work was in progress on this section of the lode between the two faults at the time of inspection.

The third fault is seen best in the workings off the New Shaft at the north-west end of the dolomite lode, but is also intersected in the workings at the No. 2 level. Yellow lode, associated with replacement jasper, has been mined on the footwall of this fault, and the difficulty of locating the continuation of this ore body on the hanging wall, has arisen from the fact that the fault is parallel to the schistosity of the country for a considerable amount of its exposed length. The fault strikes north-easterly and dips 50°-60° N.W. The ore body has been located on the hanging wall of the fault at the 100ft. and 210ft. levels, and prospecting for it should be done at the 150ft. level.

In the square setting at the 200ft. level a fault striking north-westerly appears to branch off the north-east striking fault, and although it was impossible to determine the displacement on this subsidiary fault, the writer is fairly certain that as a result of faulting the block of country between the two faults has been displaced to the south-west. The difficulty of interpretation is due to the presence of folding, as well as faulting, in this vicinity.

DIAMOND DRILLING.

Two underground diamond drill bores are indicated on the plan of the No. 3 level, but unfortunately no information concerning them was available.

1. *Recommendations and Conclusions.*

From the evidence available there is good reason to believe that the southern jaspilite band has an extension, which up to the present time (April, 1938) has not been prospected. This extension is shown on the plans* of the Nos. 1 and 2 levels, and also on the 5 chain to 1 inch geological subsurface map, where its boundaries are indicated by dotting.

Prospecting for further occurrences of jaspilite lode material and for yellow lode material is strongly recommended in this area, especially above ground water level (260ft. V.D.). This area is covered by the tailing dump, and diamond drilling, either from the surface or underground, would probably be the best method of prospecting. Several bores would be necessary to prospect the area thoroughly.

2. In the vicinity of the New Shaft, owing to faulting, folding and the highly oxidised condition of the country, it has been extremely difficult to follow the ore bodies. The true nature of the faulting is not properly understood, but, as mentioned above, it is very probable that as a result of faulting, the block of country between the two faults has been displaced to the south-west.

The yellow lode material, which has been mined at the 100ft. level and 210ft. level, should be encountered at the 150ft. level by crosscutting in a westerly direction from the north-west end of the workings.

The possibility of parallel ore bodies occurring on the hanging wall of the yellow lode should not be overlooked.

3. At the No. 2 level, prospecting north from the crosscut connecting the squaresetting to the north-west end of the main dolomite lode is warranted.

If the assumption that folding has occurred here is correct, a prospecting drive commenced 60 feet from the square setting should become a crosscut as the work proceeds. A dolomite lode may be encountered in this direction.

4. Between the two faults off the south-east end of the "rich shoot" at the No. 2 level, jaspilite lode material with quartz veins is being mined. Because of its position between the two faults the length of the ore body is limited, as will be proved by driving on the ore body. Provided that ore is still in the face when the southern fault is encountered, then the west leg of the water shaft jaspilite should be investigated, because it is the continuation of the ore body, and has been displaced by faulting.

5. At the No. 1 level, in the most western synclinal trough of the Water Shaft jaspilite, typical yellow lode has been mined, and this ore body may exist in the same structural position at the No. 2 level. If the values were good at the No. 1 level, the prospecting of this structure should be carried out.

6. A crosscut north, from the vicinity of the No. 2 rise in the workings on the dolomite lode at the No. 2 level (see Plate VI.) also has possibilities of locating other ore bodies. This cross-cut should be continued until it intersects the continuation of the eastern leg of the dolomite lode.

7. The ore bodies in the sulphide zone should be thoroughly tested, to see if the erection of a plant, for the treatment of such ore, is warranted.

8. Approximately ¾ mile north-west of this property, the jaspilite is contorted into another large fold, and it is the extension of the western leg of the southern jaspilite band. The synclinal trough of this fold warrants prospecting.

* Only the plan of the No. 2 level accompanies this report.

ERLISTOUN GOLD MINE.
COX'S FIND.
MT. MARGARET GOLDFIELD.

(By R. S. Matheson, B.Sc.)

CONTENTS.

PLANS.

GENERAL INFORMATION.

The Erlistoun Gold Mine is situated on a low rise approximately 41 miles north of Laverton, but the distance by road is slightly greater. The Erlistoun

PLATE Nº VII

UNDERGROUND GEOLOGICAL MAP

OF

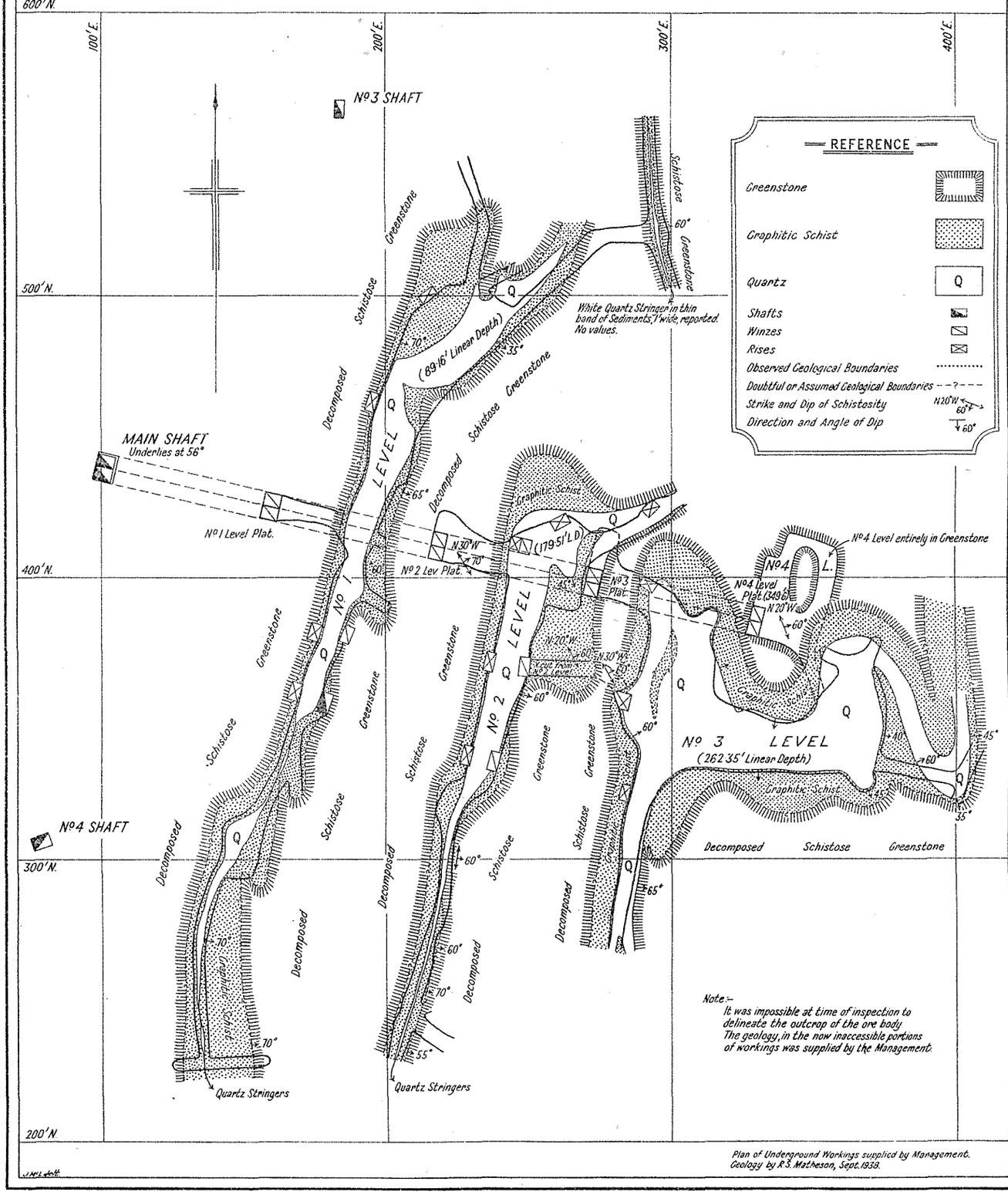
ERLISTOUN GOLD MINE

COX'S FIND

MT MARGARET GOLDFIELD

Scale 50ft. to an inch

50 40 30 20 10 0 50 100



Plan of Underground Workings supplied by Management.
Geology by R.S. Matheson, Sept. 1938.

J.H.L. del.

townsite is approximately 4½ miles N.N.W. of the mine, and Mt. Clarke is 1 mile to the west.

The ground was first pegged by E. A. Cox, J. Escreet and G. W. Cox on the 20th May, 1935, and it has since proved to be one of the most important discoveries in recent years. The Western Mining Corporation acquired an option over the find almost immediately after its discovery, and finally exercised the option in December, 1935.

At the time of inspection (September, 1938), the company held G.M.Ls. 2345T, 2353T, 2348T, 2349T, 2346T, 2406T and 2407T embracing an area of approximately 163 acres, and G.M.Ls. 2368T, 2357T, 2351T and 2356T were under option.

A 10-head battery, ball mill and cyanidation plant is in operation on the mine, and is reported to treat an average of 1,500 tons of ore per month.

Mulga is the predominant type of vegetation and is unsuitable for mining purposes except as fuel, but the company has resorted to the use of fuel oil as a means of creating electrical power to work the plant.

Owing to the nature of the country rock, and the shape and attitude of the ore body, square set stoping is resorted to, which necessitates the use of large quantities of timber. Salmon gum and oregon are being used for square setting, and costs are consequently high.

Water for mining purposes is obtained from the underground workings, ground water level being 95 feet V.D. from the surface.

Water for domestic purposes is obtained from some old workings approximately 3 miles south of the main lease, G.M.L. 2345T, and is at present (September, 1938) being carted. A pipeline is in the course of construction, however, and in the near future domestic water will be pumped to the mine.

According to the official production returns, from the time of discovery to 21st August, 1938, the mine produced 33,197 fine ozs. of gold from the treatment of 35,821 long tons of ore.

It is reported that the tailings contain 1.1 dwts. gold per ton, which is not recoverable by cyanidation.

The writer is indebted to the management for information concerning the now inaccessible portions of the mine, and for copies of the mine plans.

GENERAL GEOLOGY.

There was not sufficient time at the writer's disposal during this visit to allow for the compilation of a geological map of the country surrounding the mine, but this is contemplated later.

A brief reconnaissance of the area was carried out however, and it is composed of contorted, interbedded greenstones, meta-sediments and jaspilites, which are presumably of Pre-Cambrian Age. Quartz porphyry dykes are reported in the area but were not seen. The rocks have a general strike N. 10°-15° W. and dip of 60° E. Except for the jaspilites, the rocks are highly decomposed at the surface, and appear as yellow, brown or purplish schists. A hard, brown capping often overlies the outcrops.

The mine is situated between two jaspilite bands approximately 10 chains apart, which persist for some distance north and south. Although these two bands of jaspilite have not actually been traversed, they are believed to be the bands which occur in the same relative positions at the "Westralia Tasmania" Group and the "Midas" Group, which are respectively 2½ and 4½ miles north of the Erlistoun mine. From the top of the brace at the Erlistoun mine these groups appear to be in a straight line, and are probably situated in the same favourable horizon throughout. Dragfolds are frequent in the jaspilites, especially the eastern band, and reversals in pitch occur indicating the presence of crossfolding. In the vicinity of Cox's Find the dragfolds pitch 45° southeasterly, while north-westerly pitches prevail at the "Westralia Tasmania" Group. The axial planes of the dragfolds are everywhere overturned to the west. It is believed that crossfolding has played an important role in gold deposition, and that various finds are located where the axes of crossfolds intersect the favourable horizon.

There is a noticeable convergence and brecciation of the two jaspilite bands approximately ½ mile north of the late "Westralia Tasmania" which is probably near a crossfold axis, and this convergence suggests that the two bands of jaspilite are in reality one band repeated by folding on a north north-west-south south-east axis.

It is hoped that these ideas may prove of some value for future prospecting in this area, but it must be borne in mind, that only one type of crossfold may bring about gold deposition. For instance, an anticlinal crossfold may be more favourable than a synclinal crossfold or vice versa.

THE COUNTRY ROCKS.

The rocks described hereunder are only those exposed in the underground workings.

Greenstones.—The greenstones are decomposed throughout the workings and are believed to be metamorphosed basic tuffaceous rocks. They occur interbedded with the erosion sediments but are distinct from them. Between the surface and the No. 3 level the greenstone is in a highly decomposed state and consists of a mixture of white, yellow, brick red and brownish puggy material. On the No. 3 and 4 levels the greenstone is in a slightly fresher state, and appears as a cream coloured schist, with black streaks which may be due to the presence of biotite.

Metamorphosed Erosion Sediments.—These consist of grey phyllites and graphitic schists occurring as a narrow band, interbedded with the greenstones. These rocks do not suffer greatly from weathering, and their appearance is practically the same throughout the mine. This sedimentary horizon appears to have been the means of access for the gold-bearing solutions.

THE ORE BODY.

The ore body at the Erlistoun mine is a bluish-grey vughy quartz reef, which is intersected by a network of white quartz veinlets. It is confined to a contorted band of metamorphosed erosion sediments consisting mainly of graphitic schist, and is roughly parallel to the band in strike and dip. At the No. 1 level (74.75 feet V.D.) the ore body has a general strike N. 20° E. and a general dip of 60° E.S.E., while the pitch is 45° in a direction S. 40° E. At lower levels, however, owing to the folding becoming more complicated, there is no general strike or dip.

At the time of inspection stoping was in progress at the No. 3 level (217.10 feet V.D.), the No. 1 level and the No 2 level (148.60 feet V.D.) having practically been stoped out, and crosscutting to intersect the ore body was being carried out at the No. 4 level (289.30 feet V.D.). The quartz is reported to contain good values throughout, and has only been left where its width has become too narrow to be worked profitably.

It is reported that both the bluish-grey and the white quartz are auriferous, but the gold occurs mainly in the bluish-grey variety. The values are said to be fairly uniform, but enrichments occur at the footwall of the main synclinal portion of the ore body. This portion of the ore body was extremely rich at the No. 3 level.

That secondary enrichment has played some part in the formation of the ore body is suggested by the occurrence of gold in cross fractures above ground water level (95 feet V.D.). The graphitic schist is much more pervious to water than the greenstone country, and during crosscutting to the ore body at the Nos. 3 and 4 levels, there was a considerable make of water when the graphitic schist was encountered.

Mineral Associations.—Sulphides occur abundantly in the quartz at the No. 3 level, and are reported to have first been noticed in the ore body at 130 feet V.D. from the surface. As a result of determinations carried out by the Government Chemical Laboratory on specimens of the sulphide-bearing quartz, the sulphides were found to be entirely pyrite with only traces of chalcopyrite.

It is reported, however, that galena occurs in the ore body near the local enrichments, but does not have a wide distribution.

The sulphides are said to cause no treatment difficulties, the assay values agreeing closely with the plant returns. This suggests that little, if any of the gold, is in solid solution in sulphides.

The graphitic schist in proximity to the ore body is highly mineralised with sulphides, and the absence of payable values in it, is further evidence for the belief that there is practically no association between the gold and sulphides, in this manner.

Structure.—As is pointed out in the section of the general geology, the broad geological structure in the vicinity of Cox's Find, will only be determined after further geological mapping, but the find is expected to be in some way related to crossfolding.

With regard to the geological structure in the underground workings (see Plate VII.), the ore body conforms approximately to the shape of a folded band of graphitic schist. The folding becomes more evident with depth and is very pronounced at the No. 3 level. This is suggestive of a change in pitch, but investigations show that no change in pitch has occurred. An interpretation of the folding of the ore body at the No. 3 level, shows that it is a minor fold on the eastern limb of an anticline, pitching 45° south-easterly, and having an axial plane overturned 50°-60° to the west.

Apart from the folding of the ore body, fracturing has taken place and three main sets of fractures are developed. Two of the sets are approximately parallel to the schistosity and cleavage respectively, and the third is roughly horizontal.

Mode of Origin.—The area originally consisted of horizontal, interbedded, greenstones and erosion sediments, which were later subjected to folding. Simultaneously with or subsequently to the folding there was a period of granitic intrusion associated with mineralisation. Due partly to the composition and partly to the inherent structure, the graphitic schist band was the more favourable host rock, and ore deposition occurred therein by means of metasomatic replacement. The replacement was only partial and variations in the amount of replacement occur both vertically and horizontally. This accounts for the occurrence of "horses" of graphitic schist within the quartz, and the greenstone as walls to the ore body in some places. The bluish-grey colour of the majority of the quartz, is also due to the fact that the replacement of the graphitic schist has been incomplete.

The network of white quartz stringers through the ore body, are thought to have been formed by the refusion of portion of the original quartz, and its intrusion into fractures which occurred in the quartz when the area was subjected to another set of forces.

RECOMMENDATIONS AND CONCLUSIONS.

1. Prospecting for parallel ore bodies is recommended and they should be looked for north-westerly and south-easterly from the main ore body. Underground diamond drilling would probably be the best method of attack, and the east-west section of the ore body at the No. 3 level would be the best point to commence operations.

2. Prospecting along the strike of the graphitic schist band is also warranted, as other folds containing ore shoots may exist. Owing to the mode of origin of the ore body, other reefs may or may not outcrop.

The main ore body offers scope for prospecting north along the strike, at the Nos. 1, 2 and 3 levels. In the extreme eastern workings at the No. 3 level a quartz reef with unpayable values strikes in a northerly direction into the wall, and this should be followed as other folds, containing ore shoots, may occur along the strike. The syncline immediately to the west of these eastern workings at the No. 3 level, contains good values, and by projecting this structure back along the pitch, it will be seen that it has been unexplored at the Nos. 1 and 2 levels. This position is obvious at the No. 2 level, and at the No. 1 level, this structure will probably be found where the main reef joins the thin quartz stringer at the north end.

3. The prospects of the ore body persisting for a considerable depth were very promising at the time of inspection (September, 1938). The replacement of the graphitic schist by auriferous quartz was becoming more complete with depth, and the values showed an improvement. This is a particularly pleasing feature, as ground water level is now passed, and the increase in values cannot be attributed to secondary enrichment.

4. What influence the major structure will have on the life of the ore body, is at present problematical.