

of the State, and may closely resemble those in which values were rapidly lost in depth, it would be decidedly premature to recommend the erection of a crushing plant here until at least one of the rich bodies had proved to carry its values down to at least the water level.

(5.) *Report upon the May Queen G.M.L. 852 (Yilgarn Goldfield), with regard to the loss of the reef due to faulting.*

Acting upon instructions dated November 9th, 1910, I placed myself in communication with Messrs. Liddle and Domley, the owners of the above property, which is situated about 14 miles to the southward of Southern Cross.

After crossing the lake to the southward of the above township the auriferous belt is traversed for a distance of 14 miles, the schistose amphibolites being for the most part covered by a thin deposit of soil, but occasionally patches of mica indicate the presence of granitic dykes, or tracts of dark-red clay with weathered fragments of massive greenstone basic dykes.

At the mine itself the weathered amphibolitic schists are found to extend downwards as far as the bottom workings with so little change that it is probable that at least another 40ft. will have to be sunk before the solid rock will be met with at or near the ground water level.

The reef does not outcrop, but was located by small but rich flat stones after which trenching, and costeen proved a small vein striking nearly north and south to extend for a distance of about 100ft.

To the southward of this it is lost, being apparently displaced by a series of granitic dykes which cross it at an acute angle. This reef, which averages about 6in. in width, may be said to underlie to the westward, but so slight is the dip that it is still in the shaft at a depth of 100ft.

This reef has been driven at the No. 1 or 60ft. level for a distance of 70ft. At the No. 2 or 100ft. level the stone was very rich, and was tracked for about the same distance as in the No. 1 level in a northerly direction, but at the shaft bottom it is sharply cut off by a fault which strikes north-west and south-east and dips to the eastward.

In the northern portion of the bottom level a winze has been sunk to a depth of 30ft. in which the fault was met with at a depth of 15ft., below which the reef was lost; whilst in a crosscut a little north of the winze driven west the fault line was cut at a distance of 20ft., followed a little farther on by a large barren white quartz reef which is exposed upon this side of the auriferous vein at the surface. This would appear to indicate the absence of the small rich vein upon the western side of the fault, but to my mind it is inconclusive in so far that the crosscut was driven at a point some 20ft. above the fault intersection of the vein.

I would therefore advise that a crosscut should be driven at the bottom of the winze in a westerly direction, when if the large barren reef is first cut, it may be safely concluded that the small rich one has died out upon the slide, and further exploiting may be discontinued.

Several crosscuts have been driven in an easterly direction for a considerable distance in barren country, but since this work was executed upon the same side of the fault as the reef already exists, it was not to be expected that it would be cut again.

By crosscutting at the winze bottom the vein, if it exists, should be cut in something less than 20ft.

from it, since the main barren reef located in the 100ft. level crosscut was met with at 40ft. from that level upon the western side of the fault, and since it lies about 20ft. to the westward of the outcrop of the small veins. In my opinion there is a very good prospect of the rich vein being cut upon the western side of the fault, which appears to be quite normal, making a clear cut of the reef which is a fissured plane, judging from the walls.

CHAS. G. GIBSON, Assistant Geologist.

(6.) *Some Notes on the Principal Geological Features of the Kalgoorlie Goldfield.**

The importance of Kalgoorlie, which has been responsible for more than one half of the total gold yield of the State, renders some reference to its salient geological features necessary, by way of preface to the series of articles on mining practice, for experience in most mining fields of the globe has shown that many mining failures have been due rather to a want of knowledge, or true appreciation of, structural geology than to any lack of engineering training.

General Topography.—The chief topographical feature of the Kalgoorlie goldfield is a main central ridge of hills trending roughly north-north-west and south-south-east, and reaching its maximum altitude in Mt. Gledden—better known as Maritana Hill—which rises to a height of some one hundred and fifty feet; the ridge has a length of about four miles and dies out in a southerly direction just beyond the south end of what are known as the "Boulder Belt" mines. On each side of this central ridge are wide flats draining southerly and extending laterally on the eastern side for, say, five miles, and on the western for about three. On the east side of the eastern valley is another rather more conspicuous ridge of hills also trending roughly north-west and south-east and having a maximum altitude of possibly a couple of hundred feet; along this ridge of hills are situated the mining centres of Boorara and Waterfall (Golden Ridge). The western flats are also in their turn flanked by a low ridge of hills, less conspicuous at their northern end but well defined at their southern. Both the eastern and western valleys—if they may be termed such—drain, as before stated, southerly into the extensive salt lake or marsh known as Gnumballa or Hannan's Lake, which starts but a short distance south of the Boulder Mines and trends away in a south and south-westerly direction for many miles. On the western side of this salt marsh and some three miles to the south of the Boulder mines is a small conspicuous clump of hills, having their highest point in Mt. Hunt, the most prominent landmark in the district, which rises to a height of possibly some four hundred feet. These hills are more or less connected—by a westerly extension—to the main western ridge.

The town of Kalgoorlie is situated on the western fall of the main central ridge northwards from its middle point, and the mines are along the line of the ridge, the "Golden Mile" being at its southern end, the underlying rocks of the valleys being—as will be explained later—non-auriferous, or practically so.

General Geology.—The original rocks of the Kalgoorlie district were of sedimentary origin, viz., shales, soft sandstones, grits, conglomerates, etc.—with possibly interbedded lava flows—laid down horizontally in probably pre-Cambrian time on a gneissic or granite floor; these were by earth movement afterwards tilted into their present highly inclined posi-

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