PROPOSED DRILLING AT NEW GOLDEN GATE MINE, MATHINNA.

Between the years 1888 and 1929, over 250,000 oz. of gold were won from the New Golden Gate Mine at Mathinna. In 1929 the Main Shaft was condemned and production ceased from the mine. Since then, a small but steady output of gold has been maintained by the treatment of the tailings.

None of the mine workings are now accessible but a comprehensive account of the mine, culled from earlier reports by Montgomery and Twelvetrees, is contained in Bulletin 43 on the Mathinna Goldfield by K.J. Finucane.

The ore occurs in a series of north-south veins, the most important being Loane's and Main Reefs which were worked from the 116 foot level to a depth of 900 and 800 feet respectively, and the East and Lower West Reefs, worked from the 800 and 1,300 foot levels respectively to the 1,800 foot level. These reefs are either vertical or inclined to the vertical at small angles and their change of dip has been instrumental in forming large ore shoots. To the south, these reefs all terminate in a main "slide" or fault which strikes north-west and dips to the south-west at about 70°. Some minor reefs have been discovered to the south-west of this fault but not a great deal of exploratory work has been done.

Structure -

The main structural features in the vicinity of this mine conform with those described in detail in the report by the writer on the Dan Rivulet Goldfield. That is, the same forces have been active here on the same types of rock facies so that the same types of folding, fracturing etc. have occurred. Briefly then, the Lower Palaeozoic slates and quartzites have been deformed in Devonian times by a force with the direction of greatest stress from the north-east, so that the axes of folding are in a north-westerly direction and the shearing fractures are north-south and east-west. These fractures are almost vertical so the orientation of the strain ellipsoid shows the axes of

least strain running to the north-east, that of greatest strain to the north-west and the intermediate axis vertical. This theoretical determination of the direction of stress based on the evidence available is in accord with the position of the granitic magma, below and to the north-east of this belt of country, and it may be possible that, not only did this igneous mass supply the hot mineralizing solutions which form the fillings of the rock openings, but, by the pressure formed in the rock masses during its uprising, was responsible for the openings themselves. Now it is the normal rather than the exceptional feature of these shearing openings that one set is better developed that the other and here is an extreme case in which the north-south shears are strongly developed and the east and west shears very slightly. It is in the north-south set that the principal reefs have been formed. As these reefs are in shear openings they do not persist for great distances either vertically or horizontally. Thus, where Main and Loane's Reef cut out at 800 feet, other reefs have been developed in different planes and the lower east-west reefs occur from 800 to 1,600 feet in payable shoots.

A glance at a cross section of the mine looking north will reveal the reason for the large ore shoots occurring where they do. One of the most favourable structural evidences of ore shoot formation is a change of dip (or strike) in the reef. This is because a change of dip will cause a rock fracture to remain open and thus provide plenty of space for the hot solutions. Both Loane's and Main Reef change their dip at levels where the ore production has been greatest.

The fault or slide, where the main ore-bodies have terminated in a southerly direction, is not a post mineral fault which has dislocated the ore bodies. If this were so, it would be an easier matter to locate the positions

of the quartz veins, south east of the fault. This fault has itself been mineralised and has, therefore, occurred before or at least contemporaneously with the shear fractures. As the direction of the fault opening is approximately north-west (there is no information available as to the extent of throw) it is probably a tensional opening formed during the folding. The fault zone may have been reopened by the earth movements which occurred during the Miocene. As revealed by the underground workings of the mine, shear fractures have formed to the north-east of the fault and others must have occurred to the south-west but insufficient underground work has been done here to determine the position of these.

From the old South Gate Shaft cross cuts have been driven east and west at the 400 foot level. This corresponds to 318 feet below the collar of the Main Golden Gate Shaft. In the East cross cut formations have been passed through at 130 to 190 feet and again at 274 to 350 feet. The cross cut was driven 492 feet east and if the main slide maintained its direction that far south the cross cut stopped within a few feet of it. The directions of the two formations passed through in this cross cut have not been given but they may well be approximately north and south and hence in shearing openings. If this be so then the formations passed through may correspond to the formation neglected in the original adit of the mine, and which later developed in depth into Loane's Reef and produced so much gold.

The pitch of the rich ore shoot formed by Loane's and Main Reefs from the 116 to 700 foot levels was to the south and east so that at each successive level it was found farther to the south-east. It is, therefore, reasonable to assume that in the vicinity of the South Gate Shaft, an ore shoot may be found at a deeper level than near the Main Shaft.

Location of Bore Holes.

It is proposed to suggest only one bore-site and, from information that may be gained from that, plan a further campaign. The position of the proposed bore site is, as shown on the plan, 120 feet from the S.W. corner of 11272/M on a bearing of 255° or 82 feet due east from a peg on the side of the road marked T104. The angle of inclination of the bore hole should be at about 60° from the horizontal and the direction of the hole should be 270°, so that, if the formation cut in the South Gate cross cut maintains a northerly strike, it should be intersected between four and five hundred feet.

A hole put down in this position should not only indicate the possibility of a reef on the south side of the slide but should also determine if the formations cut in the South Gate workings improve at depth.

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