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HIGGS' GOLD MINE - NARRAWA CREEKLocation and Access:

This mine is situated on Narrawa Creek about two miles east of Moina within mineral sections 11335/M and 11832/M, each of 20 acres in extent.

Access is gained by means of a recently formed cart road leaving Wilmot-Middlesex motor-road $\frac{1}{4}$ mile north-east of the Moina deviation.

History:

Gold was discovered within ten chains of Higgs' mine in 1894, when the Narrawa Prospecting Association obtained Reward Sections, and the mine workings became known as "Narrawa Reward".

The last official report on the latter appears in Bulletin No.29 - The Mining Fields of Moina, Mt. Claude and Lorrina by A. McIntosh Reid (then Assistant Government Geologist).

In 1934, A.H. Higgs, while sluicing detrital material for gold on the south banks of Narrawa Creek, some ten chains upstream from Narrawa Reward workings, found that gold was contained in certain oxidised quartzite beds, and subsequently a miniature battery was erected to test the deposit.

Geology:

The rocks in the immediate vicinity of the mine consist of dark grey quartzites of the Silurian period.

Near the surface they are often weathered to light coloured sandstones and in places are stained various colours of yellow and brown by hydrated oxides of iron. These rocks have a strike varying from 299° to 303° and dip to the north-east at 70° . On north side of Narrawa Creek the quartzites exposed in the road cutting have a similar strike but dip to the southwest at an angle of 50° , thus suggesting the presence of a synclinal axis between the road and mine.

The Ore Bodies:

At least three ore bodies have been distinguished on the property but only one has been developed to any extent. The primary lodes consist of impregnations and partial replacement of quartzite beds with sulphidic minerals in a fine state of division.

Galena is the chief component but pyrite, arsenopyrite and chalcopyrite also occur in order of decreasing abundance.

Small quartz veinlets are minor occurrences in association with the lode channels and where present trend with the bedding planes of the strata.

The ore is auriferous and in the worked portion of the main lode (chiefly oxidised) ranges from 1 to 9 dwt. of gold per ton, and averages between three and four dwt. of gold per ton of ore.

An irregular zone of oxidation extends from surface to a known maximum depth of 60 feet, in which fine particles of free gold are visible in places through quartzites stained

by hydrated iron oxides. It is from this zone that the greater part of the ore has been mined for treatment.

The small tonnage of primary ore handled up to the present has rendered small amounts of free gold, but to what extent the sulphides will yield gold in economic proportions has yet to be determined.

It seems probable that the oxidised portion of the lodes have been enriched to some extent by secondary processes and that the primary sulphides will become poorer in gold as greater depth is attained. The lodes have no well defined boundaries, but the strike & dip generally coincide with that of the enclosing quartzites. The unrefined gold has a high silver content and gives a decimal fineness of approximately .7390 gold, so that the value per ounce is about £3/2/9 mint value, less premium.

Development:

The workings consist of a lower adit crosscut, bearing 182° for 126 feet, from which drives extend 22 north-westerly and 36 feet to the south-east along the course of main lode. For the first 28 feet of the latter stoping has been carried upwards 60 feet to surface.

Disseminated galena, pyrite etc. extends over a width of 10 feet of quartzites across the south-eastern face and is also present with a width of 6 feet in the floor at north-western end of drive. Over the remainder of the drive and stopes the ore body is represented by oxidised quartzites.

Two minor lodes of similar character to the main ore body, cross the adit at 12 feet and 35 feet respectively from the portal. These have widths of approximately 3 feet in either instance and carry finely disseminated galena and pyrite with small amounts of gold. They again appear to be exposed in two small cuts, half a chain apart, on the west side of a small creek 1¼ chains further to the south-east, and below the mouth of the upper adit.

A trench in bedrock bearing 308° across a sluiced area to west of lower adit follows an auriferous oxidised quartzite belt for a length of 70 feet and width 3 to 4 feet. This probably corresponds with the southern lode penetrated in lower adit cross-cut.

At two chains south-east from mouth of lower adit, and 30 feet higher, the upper adit extends along a bearing of 205° to cross-cut the main lode in a distance of 14 feet from the portal. A drive on the lode goes north-westerly for 40 feet, from which point irregular stoping connects with the surface, approximately 30 feet above, and lower adit about the same depth below. Primary sulphides occur across a width of seven feet in the floor of the drive, with oxidised quartzites above that horizon.

Three small cuts at intervals along a west trending line, over a length of 1½ chains to the north-west of the open surface stopes, expose oxidised quartzites showing traces of gold.

In the absence of further evidence this occurrence cannot be correlated with the lodes already described but may have some connection with the main ore-body.

Two further cuts, $1\frac{1}{2}$ chains south-west of the above disclose traces of gold in quartzite strata disseminated with pyrite, over a length of $\frac{1}{2}$ a chain in a north-westerly direction.

Above the water race, $2\frac{1}{2}$ chains west of lower adit portal, a small cut in the hillside again exposes iron stained quartzites, from which assayed samples are reported to have given a result of $2\frac{1}{2}$ dwt. of gold per ton.

Crossing the western boundary line of section 11335/M on the west side of Narrawa Creek, a north westerly line comprising six cuts extending over $1\frac{1}{2}$ chains, have recently been excavated in quartzite. In the first two cuts, from the east, gold was found to be absent, but the next three showed traces of fine gold. In the sixth hole, in which pyrite was visible in iron stained quartzites, good prospects were obtained by crushing and panning methods.

Detrital Deposits:

On the lower southern hill slopes falling to Narrawa Creek, between the lodes and the stream, detrital material has accumulated to depths ranging from two to eight feet. The deposit consists of soil, sand and clay, with an admixture of quartzite boulders of varying sizes. Fine particles of gold set free by the disintegration of the ore bodies, are present in the detrital deposit.

During the latter part of 1934 and early 1935 two areas adjacent to the lower adit were sluiced for the gold content and approximately 55 oz. (decimal fineness .826) obtained before work was concentrated on the lodes. Later some of the quartzite boulders found to contain gold were crushed in the battery. Further areas in this vicinity will, no doubt, be similarly treated in the future.

Detrital material on the slopes falling to the small south-east flowing branch of Narrawa Creek, below the six cuts recently excavated about west boundary of section 11335/M also carries gold, and should be tested for economic possibilities as a sluicing proposition.

Milling:

The mill in operation at present contains a five-head stamp battery with 200 lb. heads falling at the rate of 100 drops per minute. The plant is driven by hydro-electric power generated on the property - 4 to 5 horse power being produced from a 60 feet head pressure of water. In dry periods when insufficient water is available the plant is operated by means of a 6 to 7 horse power Deisel engine. The battery crushes about half a ton of ore per hour and has handled approximately 1118 tons to date for a recovery of $188\frac{1}{2}$ oz. of gold.

After crushing in the battery the ore passes over a shaking amalgamating plate where the free gold is collected as amalgam and afterwards retorted and smelted to ingot. The residue is treated by hydraulic classifier and the resulting sulphidic sands syphoned to head of a Wilfley shaking table. From the table the firsts and seconds, consisting of galena - pyrite concentrates, pass into storage bins, but the latter are first syphoned back to the table for further treatment.

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The firsts, not being in a marketable condition, are stored for final cleaning in the future. The method to be used for this purpose has yet to be devised but it is considered that flotation will have to be adopted if the available quantity and quality of primary ore warrant the necessary plant expenditure.

Production and Ore Reserves:

Gold production commenced about November 1934 and up till June 1935 approximately 43 oz. of fine gold was obtained by sluicing detrital material.

Milling was started on a miniature scale with a small hand constructed battery on 28th August, 1935, and continued until 16th September, 1936, when the present battery was put into operation.

The total recorded production from all sources up to the end of June, 1937, is illustrated in the following table:-

Quarter Ending	Gold Oz. fine	Value £ Sterling
March, 1935	21.45	154
June "	16.40	117
Sept. "	10.92	77
Dec. "	17.85	128
March 1936	47.58	335
June "	61.43	429
Sept. "	47.90	331
December	56.52	401
March 1937	48.69	346
June "	42.99	303
Total 371.73 oz.		£2619

At the present stage ore reserves are negligible. The oxidised ores of main lode, excluding possible extensions have been almost depleted. A small tonnage of primary ore is in sight in the workings but this has not yet been proved to be payable with the existing plant.

Much exploratory work in seeking new ore bodies and the testing and development of known lodes will be necessary before reserves can be established.

F. BLAKE
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