Report on the Lone Star Gold Mine, Tonnant Creek Goldfield, N.T.

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SUMMARY

1. The Lone Star lode has been proved to continue to a depth of 200 feet.

2. Good gold values have been discovered in a new shaft.

3. Widespread copper is present at depth.

4. It is suggested that the outcropping lode pitches to the north west and is the same as that indicated by the magnetic survey.

5. Diamond drilling is recommended to test the lode at the magnetic anomaly and the zone of possible copper enrichment.
The core from 1920-1921 lay at the site. The formation consists of two types of minerals, well-preserved rock, and a layer of unconsolidated material. The Iron City mine is situated 3 miles north east of Iron City township. Previous surveys of the mine were the "Iron City" and "Iron City" by J. J. Jones (1937-1939) and the geological survey by the U.S. in 1950 (Avenac, 1954).

The mine was examined by N. Jones and G. E. Ryan on the 15th April, 1956. Completion of the report was delayed as soon as possible. The examination was made in order to give an application for diamond drilling as an advancement.

Production figures prior to June 1956 are given in the table. No information was collected from the workings, since that date. A parcel of 174,174 tons of ore from the new workings was crushed this year and yielded 514 ounces of copper by amalgamation. The sands were reported to contain 14 ounces per ton of gold but this has not been confirmed.

Geology and Old Workings

A plane-table survey of the area was included in Avenac's report. The map accompanies this report (Plate 1) is based on a map. The positions of the new shaft and the drill holes obtained by tape and compass survey.

The surface geology of the mine area has been re-examined and following points are significant in discussing the potential deposits:

(a) The hematite of the Western Lode appears to be only an unconsolidated deposit of limonite and manganiferous hematite. The "unconsolidated" nature of the hematite is regarded as the weathered zone of a laterite profile and from the evidence in the No. 2 Adit underneath the hematite. This lode is not considered to have either structural or economic significance.

(b) The "Inconceivable fault" (as used by Ivanac) is unlikely to be a single structure although several minor shear fractures have been noted. The interpretation given of the Western Lode is that much of the evidence for a major fault.

(c) The "Inconceivable fault" (as used by the Mine Manager) is a southwest-trending group of high-angle shear at the western end of the open cut. These are very marked on the ground and appear to have a similar trend to the probable direction of pitch of the lode.

The workings from the No. 1 Adit were not checked. The area of the Adit is approximately 60 degrees.

Three diamond drill holes have been put down at this time. The locations of the holes are on Plate 1, a copy of the logs and assays for these are enclosed. The source of the lode is not known.

The location of this hole was shown by the Manager, now obscured by material from the new shaft.

Note: The information about the location of the Adit is not clear.
The core from this hole lay at the site. The sediments were unheared but there were some minor quartz veins. The sediments range from 85 to 650 feet from the vertical (in the absence of rocks the vertical dip might be suggested, most probably to the north). There were no indications that this hole had passed near any ore. The weathering is not extensive, and small surface exposures, which average 300 feet, were noted. The dip of the vein is not known.

The location of the shaft is shown on Plate 2, fig. 1. The coordinates of the shaft are 39° 19' S., 106° 38' E., and the elevation is 420 feet. The core was a 6-foot log of nearly 3 cubic feet. The sediments in the core vary from sandstone to greenstone, with moderate northerly dip.

- 0.67 feet: Sandstone
- 0.85 feet: Sandstone and slate, with moderate northerly dip
- 0.61 feet: Greenstone (tuffaceous)
- 0.11 feet: Slate
- 0.20 feet: Greenstone
- 0.50 feet: Greenstone
- 0.15 feet: Sandstone

The hematite contact at 91 feet was irregular but gently dipping, although a dip of 77° was reported. At 100 feet the hematite contact was given by the man as dipping 20° to the north, but the core sample showed the contact at the 91-foot level.

From the 107-level a crosscut was driven 23 feet on a bearing of 335 degrees and a depth of 12 feet on a bearing of 945 degrees. Both were in hematite. A strong gold-bearing fracture paralleled the north wall of the drive.

On the 200 level a 65-foot crosscut has been driven to the north-west. It entered hematite at 10 feet. A 60-foot drill hole from the face of the crosscut was also in hematite.

Structural interpretation

The information from the surface geology indicates that the stope 1 drift hole points to a general stratigraphic succession of sandstone, shale, and greenstone. The stratigraphic development is shown in the figure.

- Sandstones (with one slate)
- Greenstone (in new shaft and 1 and 2)
- Mudstone (partly replaced by hematite)

In conclusion, the development of the mine is as follows:

The overall dip appears to be approximately 50° to the north, although many small, but marked, irregularities are present. The hematite lode appears to lie within the mudstone horizon but to be restricted laterally. The hematite and ore are probably localized by faulting and crumbling of the mudstone. A pitch to the north-west at a dip of 30 to 40 degrees is indicated. The section (Plate 2) is probably slightly more northerly in trend than the pitch of the lode itself.

If the lode continues at this pitch it would lie at a depth below surface of approximately 400 feet at the magnetic anomaly. It is suggested that the outcropping lode may be continuous with that found by the magnetic survey.

Sampling and Ore

Details of the sampling during the examination and assay...
results are attached. The assay figures for the samples 501-510 suggest that the gold is irregularly distributed and probably concentrated in soft or brecciated zones. No useful indication is given on the dimensions of the ore-shoot.

Further information available on the grade of the ore in given the grade of the crushing previously mentioned, and assay figures supplied by the manager. The crushing, which averaged 29.76% by amalgamation and may have had a total gold content in excess of 30 dwt, came from the shaft between 130 and 160 feet, and the 12 feet drive and first 13 feet of the crosscut on the 157 level. The manager's grab sample assays gave a gold content of nearly 3 oz. per ton for this ore, probably because such sampling favoured the finest and the massive haematite has a much lower gold content.

Apart from these doubtful generalisations about hardness and softness of haematite, ore and barren lode cannot be distinguished by visual examination. Nevertheless it seems reasonable to assume that ore is likely to continue to depth with a probable even-fall-off in grade just above the water-table. The richer ore is probably confined to “pockets” but the lower grade (3-10 oz) ore could be continuous.

Copper was not reported from the surface or the shallow “old workings” but is widespread at depths of 100-200 feet. Apart from small pods (one with reported 16% Cu) the grade of copper would be less than 2%. However, an improvement, possibly to economical grades, may be anticipated just above the water-table (5-200 feet). The primary zone should also be tested.

Recommendations

It is recommended that drilling should be carried out at the lower level, for either or both of the following targets:

(a) The magnetic anomaly found by the AGEMA survey. A site is recommended in the report of this survey (Richardson and Hayner 1937). Approximately 400 feet of drilling would be required.

(b) The possible zone of copper enrichment at a depth below ground level of 250-300 feet. Selection of the exact drilling site should be made on the basis of information provided by underground development now in progress. The site would probably be 150-200 feet north-east of the shaft, with a steeply inclined hole approximately 200 feet deep.

In addition to helping in the development of this mine, both these holes would provide information of general value to the haulage system.

[Signature]
N. O. Jones
Resident Geologist.
31-7-56
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<thead>
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<th>Sample No.</th>
<th>Location</th>
<th>Assay</th>
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<td>Shaft, south face 160-164 feet</td>
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<td>2</td>
<td>Shaft, east face 160-164 feet</td>
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<tr>
<td>3</td>
<td>Shaft, north face 161-164 feet</td>
<td>2.8</td>
</tr>
<tr>
<td>4</td>
<td>Shaft, east face 160-164 feet</td>
<td>2.8</td>
</tr>
<tr>
<td>5</td>
<td>Crosscut 157 level, north west face</td>
<td>0.3</td>
</tr>
<tr>
<td>6</td>
<td>Crosscut 157 level, west wall 13-21 feet</td>
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<tr>
<td>7</td>
<td>Crosscut 157 level, west wall 4-12 feet</td>
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<td>Drive, 157 level, west face 4-12 feet</td>
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<td>Drive, 157 level, north wall 4-12 feet</td>
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**Lone Butte Gold Mine**

**Dip Hole 31**

- **Location:** Evans Creek, Comstock-Comstock, Nevada
- **Depth:** 1400 feet

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<th>Depth (ft)</th>
<th>Rock Type</th>
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<tr>
<td>275-300</td>
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<td>300-325</td>
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- **Gold:**
  - 0.01 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz

- **Other Minerals:**
  - None detected

**Notes:**

- **Location:** Evans Creek, Comstock-Comstock, Nevada
- **Depth:** 1400 feet
- **Gold:** 0.01 oz
- **Other Minerals:** None detected

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**Dip Hole 32**

- **Location:** Evans Creek, Comstock-Comstock, Nevada
- **Depth:** 1400 feet

<table>
<thead>
<tr>
<th>Depth (ft)</th>
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</tr>
<tr>
<td>275-300</td>
<td>Sandstone</td>
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</table>

- **Gold:**
  - 0.01 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz
  - 0.02 oz

- **Other Minerals:**
  - None detected

**Notes:**

- **Location:** Evans Creek, Comstock-Comstock, Nevada
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