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Golden Lead – Golden Dreams

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SUMMARY: The Golden Lead Mining Company was formed in 1890 to work a quartz/sandstone lead 10km south of Reefton. Crushing commenced 25th June 1891. In 1904 the Golden Lead company wound up, the last official figures were for 1897 when 480 tons were crushed for 196 oz of gold, representing one of the best returns in the mine's history.

This paper describes why the battery was built, the perfect location, the energy expended and its failure. The battery remains a classic example of past gold recovery technology - set in an isolated location.

March 2008 saw the battery foundation rebuilt by the Department of Conservation, this work provided clues as to the company's demise. Essentially the aerial was too steep, the mortar boxes too deep and the 1890's speculative desire to set up another gold mine failed to recognize that this group of mines was in a relatively barren parcel of ground.

1. THE CLAIM

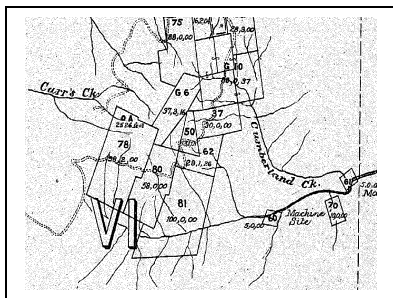


Figure 1. Shows claims as pegged out along the ridge.

The Golden Lead Claim is number G6, which includes claims 37, 3 and 16 – 50 is the top terminus site for the aerial ropeway - with 60 being the machinery site down in Deep Creek where the battery was built.

The auriferous formation that created this excitement consisted of sandstone intermixed with quartz leaders that was of unknown width (underground) but at the mine entrance was proven to be 18m wide. This seam was driven on for 24m across the seam to a depth of 21m with good gold found¹

The battery was purchased on the initial strength of the trading of shares in Reefton after a trial crushing of 100 ton of quartz which produced 67oz of gold, however later crushings only produced 5dwt's to the ton.²

There were many calls on investors, but no returns.

2. GEOLOGY

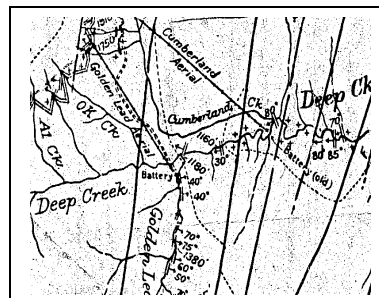


Figure 2. The geological surface features of the area around the Golden Lead aerial ropeway. The dark vertical lines are faults.

The broken nature of the Reefton quartz fields led to many disappointments as ore bodies tended to be fractured into short blocks of stone in most instances, the Golden Lead was different again though, still fractured but with the quartz in thin layers through the sandstone strata.

The Golden Lead Group is described by Gage in his geological report "Reefton Quartz Lodes" as "unclassified Lodes", "the relation of ore bodies to structure is not clear, but they appear to lie on the eastern side of an anticline and therefore constitute the only significant exception to the rule of structural guidance", Gage goes on to state that "in the region of the Golden Lead group of lodes, emplaced a broad zone of shearing. Through these are disseminated numerous quartz veinlets, but the group contains no ore body".³

This is confirmed in Henderson's report of 1918 where it is noted that "no large lode existed in the auriferous zone, which consisted of shaken greywacke traversed by numerous quartz leaders that seldom preserved their identity for more than 200ft". Henderson went on to say that "the ore was roughly sorted at the mine, but even then the yield did not cover working expenses", and that "In 1894 the plan of crushing to ore obtained from a full stoping width was abandoned, and the experiment of bagging the quartz from the leaders was tried, but proved to be no more profitable.....the company struggled along, crushing occasional parcels of picked stone, till 1903, when it merged, together with the Industry (claim) into the United Mines, a concern that went into liquidation in 1905".⁴

Other references note a "horse" of ground that covered some 33% of the width of the reef track, splitting the minable ground into two parts, large amounts of water was met in several parts of the mine, part of one footwall gave 20oz to the ton, but this was short lived.

The Mines Inspector of 1894 summed up the geology saying that "indeed, it may be said that the ground is too good to be given up, and at the same time not sufficiently rich to pay for working"⁵

Figure 3 below shows the structure of the sandstone rock that contained the quartz leaders. There was no quartz or gold remaining when we visited.



Figure 3. *Just inside the mine entrance, showing the sandstone formation*

3. THE STAMPER BATTERY

Built in 1886 by A & G Price of Thames for the Enterprise Gold Mining Company, Owen River⁶ where crushing started in January 1887, results were disappointing and in August 1889 the battery was advertised for sale. (Appendix A.)

The Golden Lead Mining Company purchased the battery; prior to the battery arriving on the Big River Road high above Deep Creek the company had felled a strip down the 1km distance towards the battery site, reportedly using a flying fox to get all the components down to the site⁷.

Crushing commenced Thursday 25th June 1891. When the inaugural crushing of 500 tons was completed, the result, 127oz of gold was a huge disappointment⁸.

In 1904 the Golden Lead Company was wound up, the battery had been idle for some years, the last official crushing figures were for 1897 when 480 tons were crushed for 196 oz of gold, representing one of the best returns in the mine's history. The Golden Lead joined forces with adjoining claims but all were wound up the following year.

Several people worked the mine at various times on tribute without success, the last parcel of 18 tons mined by Messer's Sweeny and Leggoe early in 1908 returned 24 ounces by amalgamation. This was crushed at the Big River battery for a value of £96.⁹

The adjoining New Big River Company bought the claim and equipment in 1908, it was not utilized. An offer of £600 for the battery was accepted in 1919 from one Arthur Mitchell, a boot maker from Christchurch, the battery never ran again.

During the late 1930's/early 1940's the battery was saved from scrapping due to its isolation assisted by a wiry little gorge on the downstream side, and the long 60 degree slope back to the Big River Road above.

In March 2008 the battery foundation was restored by Department of Conservation staff, this involved stabilizing 13 ton of metal in mid air while placing eight ton of timber under the battery. Isolation, heavy timbers and suspended metal provided safety, logistical (and authenticity) issues to overcome, much the same as when the battery was built in 1890.

During the restoration the first clue as to why the stamper battery never lived up to expectations came to light – the sequence of drops as per the settings of the cam lifters is out of sequence. A casual glance at the battery shows nothing out of the ordinary until one realises that four cams are set at the same place, then another four, then two, so the drop is 1,5,6 & 10 together, then 2,4,7 & 9 together followed by 3 & 8 together - an unusual sequence indeed.

The usual sequence of drop is 1,8,4,10,2,7,5,9,3,6 or similar at between 85 to 95 beats per minute¹⁰

All is made clearer upon finding that the mortar boxes were too deep for the material being processed.

Researching in the Papers Past web site the Inangahua Times newspaper came up with the truth of the matter: "Considering that the stamper boxes are deeper than usual in this field, and also that the soft nature of the stuff operated upon does not cause the same amount of splash against the gratings as under ordinary circumstances, with the natural consequence that less quantity of gold is forced through and onto the plates,

the show of amalgam on the plates is such as to justify the reasonable expectations of a fair yield".¹¹

The Grey River Argus newspaper also commented that: "It seems that as soon as the stuff was put into the stamper boxes it was quickly reduced to the conduction of mud, and instead of being splashed through the gratings, as in the case of quartz sand, it merely oozed through the apertures, and so thickened the water that fine gold must have been held in suspension and so passed over the tables without coming into contact with the silvered tables".¹²

The fair yield was only achieved by careful selection of what travelled down to the battery in the aerial buckets, and looking at the annual returns this was not achieved too often, as it turned out much of the material was crushed at the Sir Francis Drake and other nearby batteries that were close to the Big River Road.

The official figures show that between 1890 and 1907 11,344 tons of ore were processed realizing 2,653ozs (75kg) of gold. The mine operated for 12 of those years and three years, 1892 to 1895 produced 10,293 of that tonnage.¹³

4. THE IDEAL SITE - FOR A STAMPER

The juxtaposition of creeks, topography, large red beech trees and aspect appeared to be in the companies favor.

Sited near the confluence of Golden Lead and Deep Creeks the battery sits on a gentle slope down to the flat camp site area. This area also had an abundance of large virgin forest Red Beech trees eminently suitable for stamper battery foundation bed logs.

Upon surveying the site it became clear that the direction of felling the trees chosen for the bed logs was the same angle as the second part of the pelton wheel water drainage ditch. The stumps and remains of the heads of the trees are still visible, therefore it is concluded that the pitsaw site for the sawing of the battery foundation bed logs were prepared in that part of the ditch. Other factors included that they would not have wanted to fell the trees into Golden Lead Creek, or the stamper building or camp parts of the site.

The small ridge that runs up behind the battery is just at the right slope to position the ore bins without a great deal of preparation, and gives enough elevation not too distant from the back of the bins from the aerial ropeway terminus. This ridge also gave enough height for the aerial ropeway to span a greater distance across the valley, reducing the number of towers required.

The slope of the hill above the battery building site and up to the water race that runs just below and parallel to

the Big River Road is perfect for the iron pipe supplying water to the pelton wheels.

All in all the ideal site, with road access already established to just below the mine, no need for aerial working assistance due to the angle of the drop-off, and plenty of available water supplies.

5. THE AERIAL TRAMWAY

The aerial tramway rope was purchased from the Lone Star gold mine which ran from their mine to the Just-in-Time battery, (Boatmans Valley, 16km north of Reefton).¹⁴ It appears that the Owen River rope was too short for the job, and as it turned out the Lone Star aerial rope was also too short and the Golden Lead company had to purchase new rope from Wellington.

The Golden Lead aerial tramway was constructed by one Mr. Kruzenga. A newspaper article of the time noted "The erection of the aerial tramway is progressing well, and Mr Kruzenga expects to have his contract completed well within the specified time."¹⁵

"The Golden lead line has a total fall of 1000ft, (304m) in 66 chains (1328m) horizontal; this would give 4,469ft (1362m) nearly as the hypotenuse (sic), doubled equals 8,938ft (2724m); the actual length of rope when in good working order is 9,012ft (2747m), or equal to an allowance of 74ft (22.5m) for sag both sides."¹⁶

By 1890 it was noted in the same newspaper that "Surveys go to show that the fall from the mine to the Deep Creek battery site is rather much for the safe working of an aerial tramway line, and it is probable therefore that the line will have to be lengthened to some extent beyond what is actually necessary to connect the two points, in order to get rid of some of the fall. The matter is now under consideration".¹⁷

The building of the aerial tramway was not without difficulty, another article in the Inangahua Times noted "The inclement weather has retarded operations in connection with the completion of the aerial tramway, which is the only unfinished portion of the crushing plant and appendages. Since the snow and rain ceased the frost has hindered the work, which would only require a few fine days to complete. After the wire rope had been spliced the contraction caused by the cold placed such a strain on the shaft of the terminal sheave that it bent, but fortunately a stronger one had been provided as a reserve, so that no great delay occurred on that account".¹⁸ The aerial tramway tested mid-June 1891 with the battery commencing crushing late June.

Following the aerial rope down the hill to the stamper battery one comes across several shallow cuttings on the up hill (the full bucket) side of the ropeway. It is

obvious that the mine still had issues with buckets hitting the ground with loose quartz visible in a couple of locations.

The grade of the aerial tramway was reported as 1 in 4.36 and was capable of transmitting 35cu yards in eight hours – but the best grade was 1 in 7¹⁹. Due to the location of the battery this was impossible to achieve, there was talk of extending the aerial and though not confirmed section 70 appears to be the next logical place to build the battery, this never eventuated.

However, it is assumed that the company either changed the surveyed route up the gully to make the route longer and more gradual (this could account for the 30 degree difference in compass bearings between the plan and what’s on the ground), as the distance from the terminus to the back of the stamper battery is some 25m further away than the recommended distance in the 1896 AJHR report.

Les Wright found no buckets remaining on the downhill (empties) side of the aerial, during a second inspection of the line we found five buckets on the uphill, or full side. The conclusion was that the New Big River Gold Mining Company had purchased the Golden Lead machinery and claim essentially to have access to spare aerial tramway parts – as their aerial tramway was exactly the same in every detail.

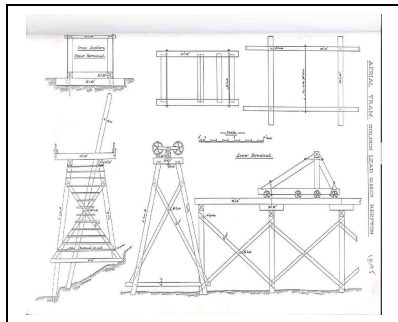


Figure 4. Drawing of a tower and the battery terminus²⁰

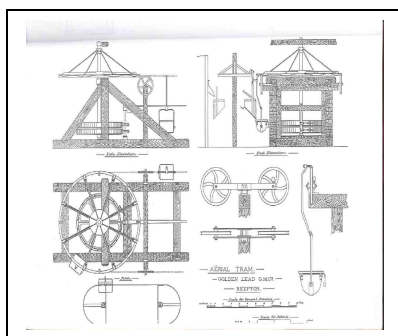


Figure 5. Drawing of the top terminus and loading facilities²¹

The Mines Report of 1896 in the Appendices to the Journals of the House of Representatives has a full description of the aerial tramway.

6. CONCLUSIONS

1. The speculative effect on prospective shareholders was huge at the time of prospecting the claim, with shares rising from 10 pence in November 1889 up to a high of 11 shillings prior to the first crushing of ore in June 1891 – with the poor results shares soon dropped back to around 2 shillings. My contention is that it was this initial euphoria that led to the purchase of the 10 head stamper battery.
2. The availability of the cheap Owen River stamper battery coincided with the desire of the company to have their own stamper battery, however, it appears that the Owen River battery was not inspected prior to its purchase, it was purchased sight unseen.
3. The ground was not prospected sufficiently to prove the resource, there was plenty of speculation, but reading the reports suggests the “horse” rock intrusion presented problems not foreseen by the prospectors, or the Golden Lead Gold Mining Company.
4. The depth of the stamper battery mortar boxes combined with the quartz/sandstone material being crushed was to become a major issue as the material crushed turned to a mud consistency resulting in no splash, “pugging up” and not travelling through the screens, much fine gold was lost being suspended in the muddy water that flowed over the top of the mercury table into the sludge channels.
5. The aerial tramway was deemed at the time of construction to be too steep and an alternative site further down Deep Creek was looked at for the terminus but not pursued. Several small cuttings had to be cut into the uphill side of the aerial to stop the buckets hitting the ground. These factors would have lowered the optimum bucket speed, reducing the volume of ore transported to the battery.
6. This gold mine was up against it from the very start, what looked to be a promising gold mine with a stable long term future turned out to be a dismal short lived failure, however it has left a legacy of a stamper battery, aerial ropeway, the mine adits and associated tracks which are in very good condition, these will provide interpretive insights into this and other gold mining activities in the Reefton area.

The Golden Lead stamper battery is to become part of the proposed "Reefton Goldfields Journey" being promoted by the Reefton Community Board with assistance from the Department of Conservation.

This initiative is a walking/mountain biking experience over some 45km that will run between Waita in the south to Caplestone in the north utilizing mine pack tracks, water races, heritage sites and good hut accommodation along with proposed transport by local companies.

The next project is another stamper battery on this journey, the Lord Brassey.

7. ACKNOWLEDGEMENTS

Les Wright, NZAA file keeper, Historian and writer of several local history books surveyed the Golden Lead mine, aerial tramway, pipeline and battery sites, Les was the on-site archaeologist while we replaced the stamper battery foundation timbers and has contributed with comment and advice to this paper.

8. APPENDIX

Appendix A²²

For Sale.

THE TEN STAMP QUARTZ CRUSHING BATTERY PLANT as it is now erected at the Enterprise Mine, Owen District, Nelson, consisting of

Ten head 8cwt stamps, with all belting, shafting, gearing, pelton wheels, electro-plated copper, and blanket tables, &c., &c. (makers A. and J. Price, Thames), together with 10 berdans fitted with Adams and Forth's patent drags driven by separate pelton wheel with all accessories, the whole in good going order; also, the whole of the mining tools and stores, together with the tools and contents of the blacksmith's shop and battery store. One case of large-sized (4) electro copper plates (new), iron safe 28 x 25 x 28, set of gold scales and weights ($\frac{1}{2}$ dwt to 128oz), enamelled buckets, dishes, &c., six bottles of quicksilver, blocks, ropes, chains, &c. Iron delivery pipes in 16ft lengths, 2ft x 2ft, connecting head race with the battery, &c., &c.

The battery has only crushed about 1200 tons in all, and is as good as new, offering a rare opportunity to any Company to acquire a Crushing Plant at Low Cost. The expense of cartage from the present site to Nelson would be about £7 per ton. A very Low Price would be accepted for the lot, and terms could be arranged. Detailed specification will be forwarded on application.

Apply to

CUFF AND GRAHAM,
Christchurch.

9. REFERENCES

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- ¹ Mines report, 1889, (C2:113-114). *Appendices to the Journals of the House of Representatives, (AJHR)*.
- ² Mines report, 1892, (C3:56; C3A:24), *AJHR*.
- ³ Gage, Maxwell, M.Sc. 1948, *The Geology of the Reefton Quartz Lodes*, Wanganui Herald Newspaper Co Ltd, Wanganui.
- ⁴ Henderson, J. 1917, *The Geology and Mineral Resources of the Reefton Subdivision, Westport and North Westland Divisions, Bulletin 18, New Zealand Geological Survey, Department of Mines*.
- ⁵ Mines Report, AJHR, 1894, (C3:77)
- ⁶ Sited in the upper Buller River, some 110km away from the Golden Lead site by road. DOC GIS Mapping.
- ⁷ *Pers comms*, Staton/Lockington, 1975, (nephew of the wagon driver who transported the equipment), oral history session, Reefton.
- ⁸ Inangahua Times Newspaper Various editions through July 1891, *Papers Past, National Library of New Zealand*
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- ¹⁰ Wright, Les 1993, *Big River Quartz Mine*. Friends of Waiuta, Craig Printing Co., Ltd., Invercargill
- ¹¹ Inangahua Times Newspaper, 02nd July 1891, *Papers Past, National Library of New Zealand*
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- ¹⁴ Inangahua Times Newspaper, 24th June 1889, *Papers Past, National Library of New Zealand*
- ¹⁵ Inangahua Times Newspaper, 1st April 1889, *Papers Past, National Library of New Zealand*
- ¹⁶ Mines Report, AJHR, 1895, (C3:252)
- ¹⁷ Inangahua Times Newspaper, 6th October 1890, *Papers Past, National Library of New Zealand*.
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- ¹⁹ Golden Lead Mine - Specification for Aerial Tramway, 1895, (C-3:252), *AJHR*.
- ²⁰ *ibid*
- ²¹ *ibid*
- ²² Inangahua Times Newspaper, 1st July 1889, *Papers Past, National Library of New Zealand*.