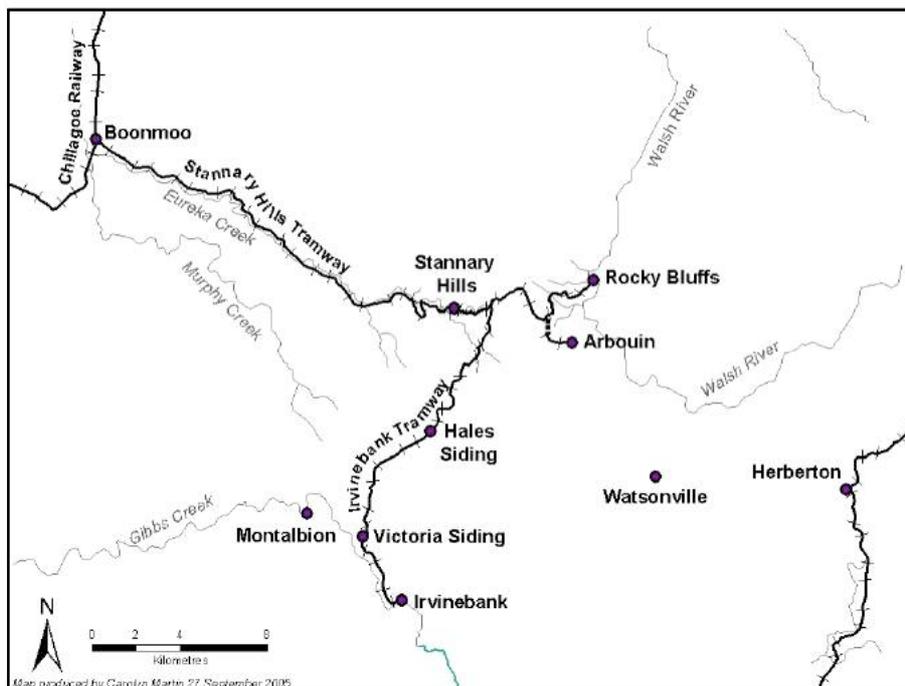


Rufashell Street and the Tin Mill at Rocky Bluffs on the Stannary Hills Tramway, north Queensland, 1903 to 1920s*

By RUTH S. KERR

The Irvinebank, Stannary Hills and Rocky Bluffs Tramways in the Cairns Hinterland stimulate excitement and curiosity from both historians and railway enthusiasts. Constructed in 1902 by a South Australian company, the Stannary Hills two feet gauge tramway extended 14 miles from Boonmoo on the Chillagoe railway and had a branch line from Stannary Hills to Rocky Bluffs on the Walsh River. A seven-mile extension constructed by John Moffat's Irvinebank Mining Company was opened in July 1907. The tin battery at Rocky Bluffs operated from 1903 to the early 1920s and a town sprang up around the battery and a school operated from 1905 to 1911. The town, tramway and battery are all typically representative of the raw frontier of north Queensland mining investment, social life and engineering developments. This paper surveys the role that the Rocky Bluffs town and mill played in the north Queensland mining industry and assesses the significance of the site today.

Figure 1: *Route of the Stannary Hills Tramway and related tram/railways in the Boonmoo - Herberton area*



Source: Carolyn Martin, Department of Natural Resources and Mines, Queensland

Rocky Bluffs township and school

In 1903 Rocky Bluffs already had a reputation. There was no wheeled traffic in the town of about 100 people. The main street was named 'Rufashell'. Rocky Bluffs was one of the mining townships established as a result of the mining operations of the Stannary Hills Mines and Tramway Company Limited. East of Stannary Hills, it was connected with it by a seven-mile extension of the Boonmoo to Stannary Hills two-foot gauge tramway, opened on 18 November 1902. At first, most people who worked at Rocky Bluffs lived at Stannary Hills and commuted to Rocky Bluffs for each shift. Later, they began to settle at Rocky Bluffs itself. Ore trains ran as required each day with usually 20 four-wheeler ore trucks per train, running whenever a load was available. A four-wheel truck for passengers and/or goods was attached to the ore train as required.

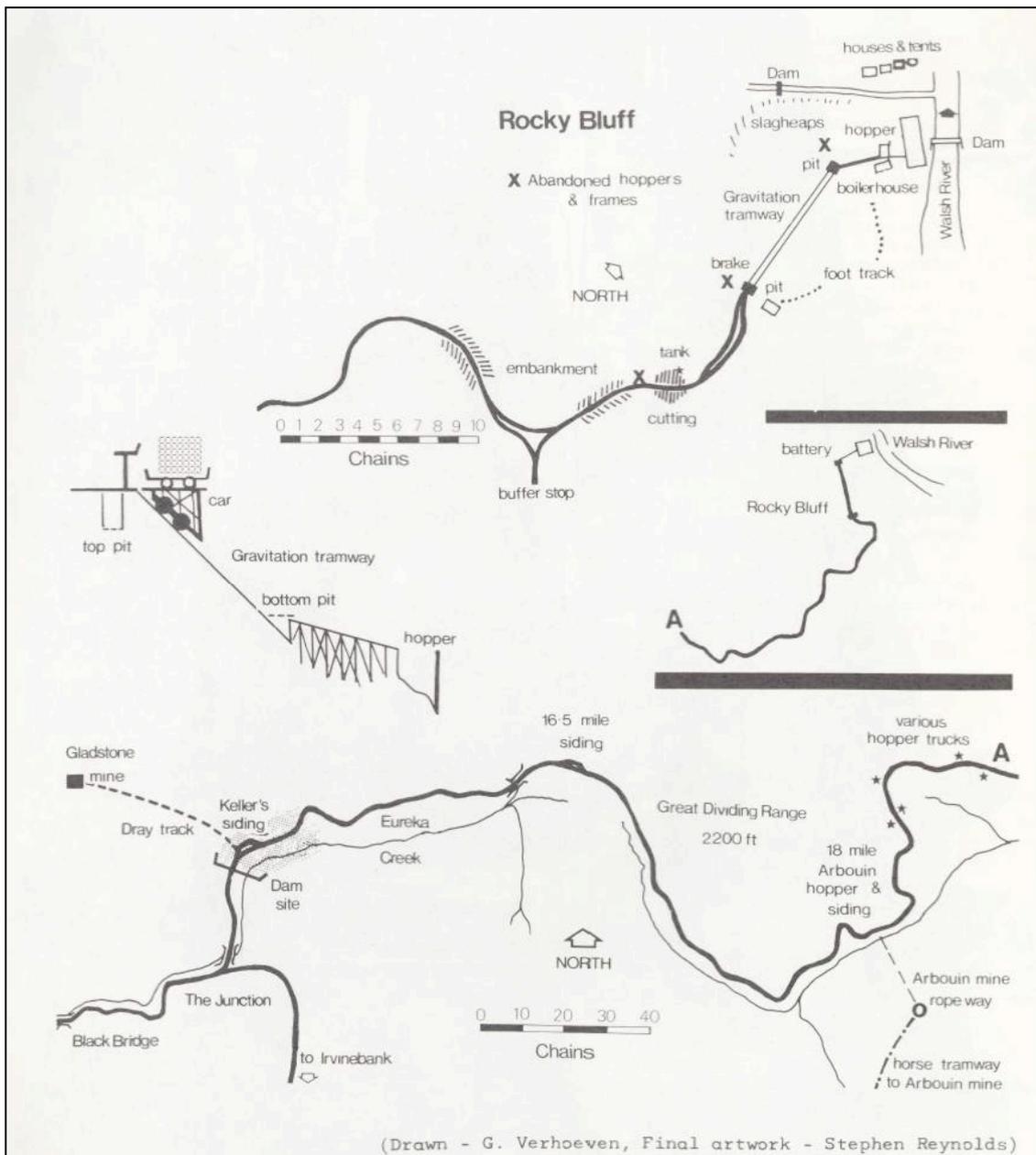
From Stannary Hills the tramway followed Eureka Creek to its source, crossed the Divide at about halfway (18 miles from the junction with the Chillagoe Railway at Boonmoo) and descended into the valleys of the tributary creeks of the Walsh River. The tramway down the 500 feet incline to the mill beside the river was a gravitation tramway. A large wheel at the top of the incline from where the handbrake was operated manually balanced one car on each track. Trucks of ore, firewood or supplies for the mill were pushed on to a type of turntable at the top, the truck then being directed onto whichever car was at the top of the incline. Meanwhile, at the bottom, an empty truck was being moved onto the car. The trucks that were then emptied into a hopper were returned. The mill was worked by steam although it was originally intended that it be operated by waterpower from the Walsh River.¹

Rocky Bluffs' main town buildings and the school had electricity supplied by the mill and from 1905 water was reticulated from the Walsh River by the company along a water race.² Bridget Crimmins took over the Walsh River Hotel from Samuel Megaw in 1905.³ Bridget had held licenses of the Chillagoe Railway Hotel, Boonmoo, and a hotel at Dimbulah.⁴ Owen Mitchell, who had been on the Chillagoe field, had the store for several years to 1907, when J.P. Tully took over.⁵ S. Probert, the company clerk and storekeeper, took over the Post Office in 1910.⁶

For their education, the children initially attended Stannary Hills School, travelling on the tramway in 1903 free of charge. Because of the risk of accidents to the children on the tramway, the parents established a private school at Rocky Bluffs and

paid a local teacher to teach the children in a room belonging to the company. The General Manager paid ten shillings per week out of his own pocket to finance the school. When the teacher left the mining town, the parents decided in early 1904 to apply for a government school at Rocky Bluffs. They formed a Committee with Charles Bennett as Secretary, and William Eddie, Samuel Megaw, James Rough and Stephen Johns as members.

Figure 2: Diagram of Rocky Bluffs Tramway and Unloading Facility.



Source: *Light Railways*, no. 32, Winter 1970, published by The Light Railways Research Society of Australia. Reproduced with kind permission of Gerry Verhoeven.

There were too many children to be adequately accommodated in the company's schoolroom, so the Committee erected a 30 x 18 feet timber and galvanised school building with white beech flooring and without a ceiling lining for £74. This was more than the local contribution required by the government for a Provisional School. The Committee stated they could not supply closets for the school as Rocky Bluffs was in such a tiny area; so two closets at the mill were made available for the school children. Also, the Committee said it was unhealthy to supply a galvanised iron tank for drinking water because the sulphur and arsenic fumes from the roasting furnace and mill would contaminate the water. The Department of Education (then known as Public Instruction) approved a new school on 29 July 1904 and arranged to send school requisites and a replacement male teacher as soon as possible, because the local teacher was leaving the district at the end of September. The new building was in use for three months before the government teacher arrived.

Rocky Bluffs single teacher Provisional School had four teachers during the period it was open. Largely because of accommodation difficulties all were male - George Junner, Henry Finter, James Best and James O'Brien. Henry Finter, resigned in 1907 to take a local job as the town Telegraph and Mail Receiving Officer because the teacher's salary was lower than the wages of local labourers, while James O'Brien, applied for a transfer to South Queensland at the end of the 1909 school year as he had served in isolated districts for many years. He was guaranteed a transfer when there was a vacancy but still had to return to Rocky Bluffs in January 1910 for the beginning of the school year. When he arrived at Stannary Hills he found that all work at Rocky Bluffs had ceased and all trains between Stannary Hills and Rocky Bluffs had stopped running. So December 1909 marked the end of the operation of the Rocky Bluffs branch of the Stannary Hills tramway - at the time of the decline of the Stannary Hills Mines and Tramway Company Limited. O'Brien had to walk out to Rocky Bluffs, leaving his bags behind at Stannary Hills only to find there were only four families left and that there would be no more accommodation for him after the hotel closed in a few weeks time. So James O'Brien was immediately transferred to Tableland School (situated on the Calliope Range west of Gladstone) and the school closed at the beginning of February 1910.

The school had apparently been the only building left besides the mill when Rocky Bluffs was deserted in 1910. It was subsequently broken into and the school requisites stolen. However, in 1912, the Department of Education approved a Saturday School

conducted by the Stannary Hills Head Teacher for a few children of the miners and mill workers for the duration of the company's operations. The teacher was paid £3 per year per child, plus travelling expenses.⁷

Rocky Bluffs never recovered as a smelter centre again after the Stannary Hills Company became defunct. The John Darling Company purchased its assets in 1911. Thereafter, the Irvinebank Mining Company's smelter at Irvinebank treated most of the tin from the Irvinebank - Stannary Hills areas. The collapse of metal prices at the end of World War I started a recession in mining and all operations at Stannary Hills were closed down in 1922. Finally, the rails of the Stannary Hills to Rocky Bluffs line were taken up in 1926 and the owners, John Darling Company, sold them for the cane lines, and the mining tramways of the Mount Isa area.

Large investments

What of the background surrounding this Ruffashell Street and the school? The Rocky Bluffs development originated as part of John Moffat of Irvinebank's Stannary Hills project that he successfully sold to a public company. After he acquired long-term leases under the *Mining Act 1898*, Moffat had intended to sell the Ivanhoe and other Eureka Creek mines located at the newly named 'Stannary Hills', to Adelaide investors.⁸ Subsequently, in 1899, Samuel Dixon, the agent of the Queensland Venture Syndicate, secured options over a number of mines including the Ivanhoe⁹ and the North Queensland Tin Mining Corporation Limited was formed on 20 September 1899. The Chairman was W. Herbert Phillips of G. Wills and Company, and Samuel Dixon was appointed local director in North Queensland.¹⁰

The Ivanhoe was a shrewd sale for Moffat but an irritating venture for the new company which faced problems associated with dewatering and re-timbering that was supposed to have been attended to by Moffat. Due to a misunderstanding Moffat's company did not commence the task until March 1900 and Dixon was forced to obtain an extension of the option. This allowed Moffat to tempt the company to spend another £5,000 on purchasing more of his Stannary group¹¹ - all without any geologist's report.

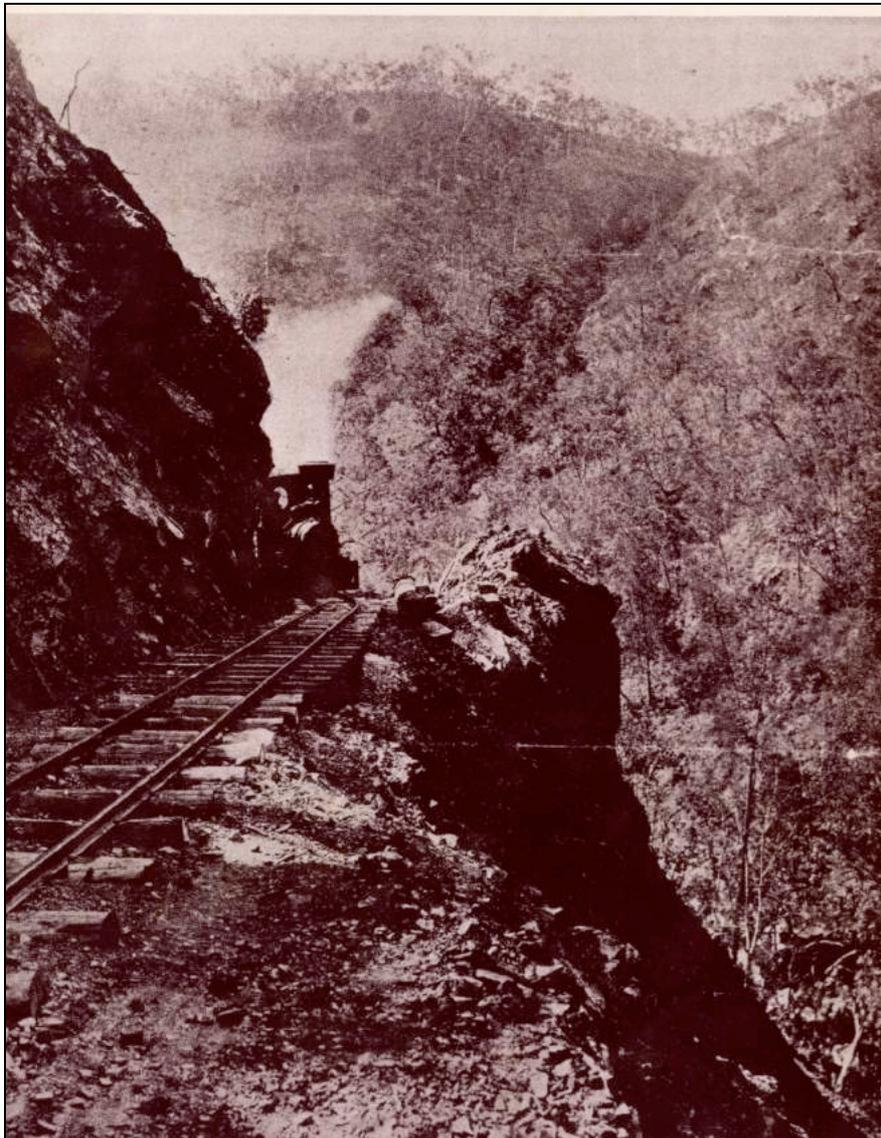
With tin at £150 per ton, Chairman, W.H. Phillips, and director, Frederick Cudmore, inspected the properties in August 1900, prophesying handsome mine production, a tramway servicing the mines, town and a mill to be electrically driven by the Walsh River waterfalls.¹²

By late 1900, Dixon's company had in place all its arrangements for mining leases, water rights and tramway. Dixon had already reported glowingly how £1,690,000 worth of tin had been exported from the Herberton Tinfields between 1880 and 1896 under mining regulations framed for miners' rights, not company capital, and with transport costs at a high £20 per ton. Basing their assumptions on the success of the famous Tasmanian Bischoff mine production, the Stannary Hills Company directors believed that dressed ore assaying 0.6 per cent would be sufficient to pay working expenses and interest.¹³ By agreement, and for a consideration of 360,000 £1 shares, the company passed the properties and fixed assets to Dixon's and Cudmore's new the Stannary Hills Mines and Tramway Company Limited that was incorporated on 18 January 1901.¹⁴ Under their agreement with Dixon dated 8 September 1899, Moffat and Walter Vandeleur were to receive 26,500 shares as vendors. Fifteen months later Moffat sold 1,400 of his 2,000 shares and the remainder the following year.¹⁵

Stannary Directors boldly claimed their mines to be the largest group worked by one Proprietary Company in Australia. They spent £120,000 in three years on tramways, plant and mine development.¹⁶ In September 1899, surveyor Stephens started surveying 14 miles of permanent way for a narrow gauge (two feet) tramway from Boonmoo to the Ivanhoe mine in the Eureka Creek Gorge. The line rose 350 feet in four miles from the 10-mile point. The ruling grade through the gorge was 1 in 40, and the notorious horseshoe bend of 1.5 chains radius was the sharpest curve. Thirty-pound rail was used with 2,000 local cypress pine, spotted gum and bloodwood sleepers per mile. The tramway was officially opened to Stannary Hills in May 1902. The cost of construction of the line to Stannary Hills was £32,278.6s.7d (£2,000 per mile) and £5,055.18s.7d was spent on rollingstock. The first locomotive purchased was Pompeii in 1900, a Krauss 0-4-0 tank locomotive from South Australia, which was used in construction. The next locomotives were 0-6-0 tender engines (Nos.292 and 293 of 1902) from Brush Electric Company, bought in April 1902. The trams had commenced running through from Stannary Hills to Boonmoo in February 1902, carrying passengers and supplies every Monday, Wednesday and Friday. By departing Stannary Hills at 9.30am the tram could meet the Chillagoe train at Boonmoo and return to Stannary Hills in the afternoon. The fares were three shillings and six pence each way. The Stannary Hills railway was not a common carrier providing service to all who required it but passengers could hail the tram anywhere along the line there being no stations.¹⁷

The tramway was extended to the mill site at Rocky Bluffs in December 1902. The largest bridge on the whole line was in this section. The Black Bridge, 40 feet above the Eureka creek and 200 feet long, was a timber trestle bridge with one set of piles on head sills - in several places being on top of a bottom set. The speed limit was three miles per hour.¹⁸ The time-table was changed from 1 January 1903 to depart Stannary Hills at 8am on Monday, Wednesday and Friday, and 9.30am Tuesday, Thursday and Saturday, returning after the departure from Boonmoo of the Chillagoe train. The Rocky Bluffs tram ran as required each day. The proposed extension across the Walsh River to Watsonville was abandoned.¹⁹

Figure 3: *No. 1 (Pompeii) is shown rounding a sharp curve on the Stannary Hills Tramway, typical of the country traversed by the line.*



Source: George Bond Collection, held by R.S. Kerr, Queensland.

Construction

One hundred and fifty men constructed the Rocky Bluffs mill on a Machine Area of 10 acres beside the Walsh River.²⁰ Sand and gravel had to be carted on horses and taken up a steep slope 200 feet up from the Walsh River. The foundations were finished in November 1902.²¹ Bricks were brought 21 miles on the Stannary Hills Tramway and then lowered 500 feet down the hill to the battery site.²² The 20-head battery, Huntingdon mill, Merton furnace and Worthington pumps were perched high on the riverbank.²³

The battery was formally opened on 6 May 1903 and christened 'Jumping Moses' and the main engine 'Converted Jane'.²⁴ The official party comprised: Mr & Mrs Hugh R. Dixon; General Manager, Charles Paisley and Mrs Paisley; Miss Martindale; William Robert Dearnley and Mrs Dearnley; Surveyors Beech, Donoghue, Stephens, and Treweek; Messrs Samuel Dixon, Brownlee, and Raleigh; Chief Engineer, John Whitehall; and Assistant Manager, Ernest Henry Osborne. They travelled down the incline tramway in trucks. Lunch was taken at the Chief Engineer's house. Inspector of the Tramway at the time was John Dillon.²⁵

The company had an optimistic financial strategy of paying dividends based on their glowing ore estimates, and believed they needed to double their battery capacity.²⁶ A sum of £600 was to be spent on two Frue Vanners (although unskilled workers found them difficult to operate efficiently), two Wheeler Pans and a small four compartment Jigger.²⁷ 'Jumping Moses' had to be closed almost immediately in June 1903 because the mortar box shifted, there was insufficient boiler power and the new equipment had to be installed quickly.

The Directors did not encourage custom ore as they were confident of sufficient supplies from their own mines. However, they quickly found that their initial glowing assays merely illustrated their exploitative mining methods of ripping out the rich ore at the expense of long-term development. They also discovered that the necessary transshipping of ore at the top of the 500 feet funicular tramway snarled the crushing program.²⁸

In the first year of activity only 210 tons of tin valued at £15,848 were produced from 5,660 tons of ore crushed, a disappointing outcome for the most ambitious tin mining company in Queensland.²⁹ Consequently the share price fell.³⁰ After the poor crushings chairman of directors, Phillips, called in John H. Reid of Ottery Mine, Tenthill, NSW to make a report. Reid had been Moffat's mining partner since 1876 and was a director in the

Irvinebank Mining Company. Charles S. Paisley, first general manager, resigned. Reid was appointed manager and made changes in crushing and ore dressing methods.³¹

Figure 4: *Rocky Bluffs Chimney and Battery remains.*



Source: Photograph by John D. Kerr, 21 June 1977.

The company expanded in 1903 by purchasing the Arbouin mine across Eureka Creek Valley and building an aerial ropeway in 1905 connecting on to the horse-drawn

tramline around the ridge.³² They drilled deeper mines, and by adding another 10-head produced £3,000 per month profit, that was first used to repay the mortgages.³³ Thus, Moffat's competitor was comparatively successful for the several years that tin prices were high.

In 1905 a new 10-head was added and the old 20-head (all Walkers Ltd, Maryborough) was taken out and new concrete foundations and storage bins put in, along with new crusher rolls (Jacques Bros, Melbourne) between the rockbreaker (Hawke & Co of Kapunda) and the battery, as well as a travelling 'grizzly' to take the crushed ore and then the roughs out on a moving elevator. The gravitation water service into the mill, including several trestle bridges, was also completed along with the replacement of all pumps by new return pumps throughout the mill. All this machinery was driven by 350 HP Babcock & Wilcox boilers, a 30HP Robey compound engine and a Pelton wheel run by water brought through 15 X 12 inch wooden fluming a mile to the mill. A Krupp ball mill reground the coarser parts of the battery pulp. The bases of the vanners were built in and the brickwork of the Merton furnace was repaired and relined. A slime buddle was also put in to deal more efficiently with the overflow slimes, and a new iron stack was raised. The mill provided electricity and reticulated water to the small town.³⁴

Operations

The new battery commenced on 24 July 1905 but continued to be plagued by stoppages and further repairs. Replacement dies were obtained from Bundaberg.³⁵ Nevertheless they treated 3,526 tons of tin ore in three months for a yield of 98 tons of dressed tin.³⁶

With metallic tin at £134 a ton, oxide of tin produced by Stannary Hills Company was worth £84 per ton. Large bodies of ore were opened up in Ivanhoe, Kitchener & Eclipse mines, sufficient John Reid thought to keep a 40-stamp battery going for three years. The total working costs for the tin dressing works now managed by F.G. de V. Gipps was £3,000 per month.³⁷

The Rocky Bluffs mill operations were described in full technical detail in 1907 in the Australasian Institute of Mining Engineers *Transactions*.³⁸ Ore was delivered to the top of the gravitation tramway, each truck containing about 2.5 tons of ore. The truck was disconnected from the locomotive at the top and lowered 500 feet to the 8-hours capacity bin at the mill. Full trucks pulled the empties up; no other power being required. The speed of lowering was regulated by drum and brake operated by a man at the top. The jaw

crusher operated at 20.4 strokes per minute, crushing 200 to 300 tons crude ore from mines through a 2.5 inch ring in 24 hours. A conveyor belt distributed ore to secondary bins of 120 tons capacity or 20 hours supply. Material was fed automatically by shaking feeders to the stamps. Battery capacity was increased by 20 to 30 per cent by erecting two Cornish rolls to reduce the feed from the Blake crusher from 2.5 inches to half an inch before feeding to the stamps. The 30-head of 1,320 pound stamps operated at 104 drops of 6 inches per minute. Ample water supply from the Walsh River enabled nine to ten tons of water to be used in crushing each ton of complex ore in the battery, and the dressing floor used an equal amount.

The battery originally crushed through 25 mesh screens but the company converted to 12 mesh screens of 22 SWG wire. Coarser crushing increased capacity of the mill by up to 10 per cent and lessened the slimes. Hydraulic classifiers and Hartz jigs were used and fines flowed through a series of spitzkasten that fed to the Wilfleys, then to large settlers, then to three revolving buddles. The product of the jigs went to calciner pits as 30 to 40 per cent tin oxide concentrate. Five Wilfleys treated finer ore from the battery, then to two other Wilfleys where these tables operated at 220.75 inch strokes per minute - treating 20 to 30 tons each per 24 hours. The revolving buddles made one revolution per minute, efficient for slime tin. A sample of pulp and tails was taken from the mill every two to five minutes. The heads of the Wilfleys contained 90 per cent tin oxide, collected in cement settling pits near the Merton furnace. It was dried on sloping platforms over the flue of the furnace. Fifty to 80 tons of concentrates were collected per six-day week. The Merton furnace had a capacity of 80 tons per week. It was extended by a factor of a third. It was a very slow smelting process where material could not be rushed through and only partially cooked; otherwise it would form black magnetic oxide and could not readily be separated from tin without long and costly labour.

The product from the Merton furnace was fed to three grinding pans and to six Krupp vanners (the cast iron shoes for the grinding pans only lasted six to eight weeks, grinding about 140 tons. Krupp steel shoes lasted six months grinding 560 tons of roasted concentrates). Material from the pans went to three classifiers and then to Luhrig vanners, yielding 70 to 72 per cent of tin, the middle 50-60 per cent, and the tail 7 per cent, which later went back to the Krupp vanners. The Luhrig vanners did 83 strokes per minute. The middles passed over the same tables again. The heads from the Luhrig vanners were collected in settling boxes, dried and bagged. The middles ('seconds') were tubbed in Cornish kieves, the iron skimmed off, and then bagged. Kieves were wooden tubs four feet

in diameter and four feet deep, while a shaft with radial arms stirred the dirty concentrates with water. The arms were removed, the side knocked by a cam and heavy particles settled out. The top was skimmed until tin was met, sufficiently clean for bagging. The skimmings were treated on a small Cornish dressing table of 12 feet diameter, the heads re-tubbed, and tails returned to the calciner for re-roasting. The drier was a vertical shaft around which wet concentrates were placed, with a firebox at bottom. The dry tin was collected in hoppers, bagged in sail canvas with a calico 'inset' inside, holding approximately one hundredweight. The overflow water from the calciner pits, containing fine tin in suspension passed through settling boxes and was discharged to Cornish buddles. The excess water from the dressing floor tin settling boxes also passed through a series of boxes and pits to the Cornish buddles.

In the three following years the Rocky Bluffs mill treated 77,174 tons of ore for a yield of 1,273 tons of tin valued at £129,737.³⁹ Crushings and yields declined progressively. Nevertheless improvements were made in 1908 with new poppet legs and winding plant, 100HP air compressor and 275 HP engine.⁴⁰ However, there were also serious strikes in the mines by the newly formed unions in both 1908 and 1909.⁴¹ At the time there were 60 men working on the tramway and in the mill under the management of F.G. Wilesmith. Foreman of the Workshop was Ben Smith; the Fitters were J. McBride and B. Atahal; Foreman Carpenter, A.B. Jennings; Assayer, Neil Campbell; and Clerk and Storekeeper S. Probert.⁴²

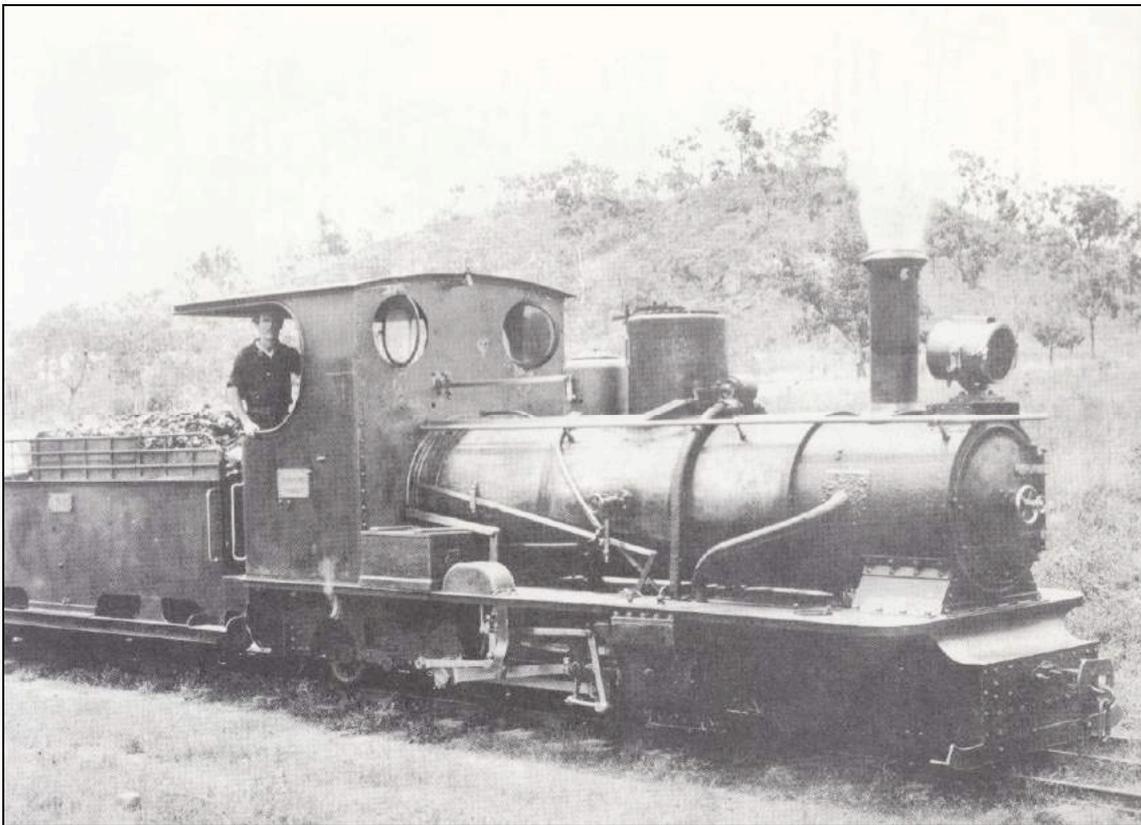
Reconstruction

Another South Australian firm, John Darling and Company, bought the assets of the liquidated Stannary Hills Tramway and Tin Mines Limited in 1911 and did extensive repairs to the mill.⁴³ The mill then ran part-time crushing public stone and a parcel from the Dead Finish mine.⁴⁴ The company also obtained a new manager, Martin, from 9 September 1912.⁴⁵ Success was not sustainable. Millwork was suspended for lack of water in December 1912 and ore was railed to Irvinebank.⁴⁶ By February 1913 the fluming had been washed away when the Walsh River rose to the highest level ever known.⁴⁷ The mill re-opened with only 10 stamps operating one shift per day.⁴⁸ The mill was renovated in 1917,⁴⁹ and reopened with one shift per day in the latter half of 1918 and operated into the mid 1920s.⁵⁰ The machinery was offered for sale and progressively scavenged for other mines and mills in the region.

Remains and preservation

The Stannary Hills, Irvinebank and Rocky Bluffs Tramways are among the most scenic tramway formations in Queensland today. Victoria has many timber tramways and Tasmania its mining tramways. The extent of this tramway is rare in Queensland. It is one of the most substantial private narrow gauge tramways ever built in Queensland. The formation snaking around the Eureka Gorge is spectacular and intact and easily traceable.

Figure 5: *Stannary Hills 2-ft gauge tramway locomotive No. 4 (Germany) - a Borzig 4_4_2 locomotive built about 1907. Photographed at Boonmoo in 1922.*



Source: George Bond Collection, held by R.S. Kerr, Queensland.

Being graded tramway formation the track is pleasant for walking. Some of the short sidings to mines and for firewood are also traceable. The whole of the Irvinebank, Stannary Hills Tramway and Rocky Bluffs Tramways are deserving of preservation for future generations of bushwalkers and tourists. Although the bridges have been burnt out and sections in the Eureka Creek area near Stannary Hills have been bulldozed for alluvial mining, the whole 21 miles of tramway formation are a visible and a valuable formation traversing the mining field. The Port Douglas to Georgetown Telegraph line dating from

the late 1870s crosses the tramway near its crossing of Eureka Creek and some telegraph posts still survive. The last locomotive to work on the tramway, the Borzig, survives in Queensland at the Australian Narrow Gauge Railway Museum Society museum at Woodford.

The Rocky Bluffs mill site is one of the few mill sites in Queensland with a substantial square brick chimney intact. The site was efficiently selected beside permanent water in the Walsh River. The dam wall survives below. Remains of the funicular tramway down from the top of the cliff where the Stannary Hills Tramway ended, to the mill site are visible. Foundations of the boilers and mill floors still exist. The dam, boiler and mill floor foundations survive. The site itself is very impressive and its relationship with other Stannary Hills and Irvinebank area sites confirms its status for preservation under criteria of s.23 of the *Queensland Heritage Act 1992*. The Queensland Heritage Council decided in January 2003 to enter the Rocky Bluff Battery and Township, six miles east of Stannary Hills, onto the State Heritage Register under s.24(4)(b) of the Heritage Act 1992.⁵¹

The Heritage Council has expanded its registration of cultural heritage significance in the area by entering the Stannary Hills, Rocky Bluffs and Irvinebank Tramways on the Queensland Heritage Register. This took place in February 2005, although some breaks in the route were left out because they had been obliterated by miners and fencing contractors in the 1980s and 1990s.⁵²

*Paper presented at the Australian Mining History Association Conference, Hobart, 1999.

Endnotes

¹ Gerard H. Verhoeven, 'To Rocky Bluff' (Stannary Hills - Rocky Bluff Tramway west of Herberton, North Queensland), *Light Railways*, no. 32, Winter 1970, pp. 5-11; Personal Visits; W. Lauder Cleland, 'Tin Dressing at Stannary Hills, North Queensland', *Australasian Institute of Mining Engineers, Transactions*, vol. 12, 1907, pp. 154-64.

² *Queensland Government Mining Journal* [hereinafter QGMJ] November 1905 pp. 562-63.

³ 'Old Time Mining Records: The Mines of North Queensland' by 'Tramp', *Cummins & Campbell's*, September 1934, p. 13.

⁴ *Wild River Times* 2 June 1905.

⁵ *Pugh's Almanac* 1906, p. 831; 1907, p. 745; 1908, p. 783; 1909, pp. 831-2.

⁶ *Ibid.*, 1910, p. 825.

⁷ EDU/Z2374, Queensland State Archive [hereinafter QSA]; My short article, 'The Rocky Bluffs Provisional School', was published in *Stack Talk* (Australian Narrow Gauge Railway Museum Society Inc), March 1976, pp. 28-29, 32.

⁸ Moffat obtained control of the Ivanhoe through the indebtedness of Vollenweider of Mount Garnet.

⁹ The members of the Queensland Venture Syndicate were J.F. Cudmore, William Clarke, R. McEwin, C.R. Hawkes, William Moffin, Robert Armstrong, Samuel Dixon, and Hugh R. Dixon. Their agreement

with Dixon for acquiring North Queensland options was dated 12 May 1899. Dixon took options over the Phoenix, Black King, St Patrick, St Patrick No.1, Iron Clad, Home Rule, Lyee Moon, Three Star and Ivanhoe. The new company, North Queensland Tin Mining Corporation Limited, organized a new agreement with Dixon on 15 September 1899 (Stannary Hills Correspondence collected by Mr G. Bond and in possession of Ruth S. Kerr, Brisbane).

¹⁰ General Records Group [hereinafter GRG] 1CB/3, 68/1899, State Records Office of South Australia (hereinafter SROSA).

¹¹ 3 and 23 July 1900, S. Dixon to Moffat, Stannary Hills Correspondence collected by Mr G. Bond and in possession of Ruth S. Kerr, Brisbane.

¹² *Cairns Post*, 22 August 1900.

¹³ GRG. 1CB/3, 3/1901, SROSA; Kayser and Provis, 'Mount Bischoff Tin Mine', *Proceedings of the Institute of Civil Engineers; Australian Mining Standard*, August 1896.

¹⁴ GRG 1CB/3, 3/1901, SROSA; Company File 203 Book 10, QSA. The company's assets included: Ivanhoe lease ML1 403, Black Rock ML1 404, Iona ML1 405 and Hornet's Nest ML1 407 totalling 320 acres, Ronald Valley ML1 718 (including Young Australia and Ironclad) of 13 acres, Caledonia ML1 417 (15.5 acres), Lowlands ML1 371 (20 acres), ML360 (80 acres), Machine Area at Rocky Bluffs (10 acres), 213 acres of Tramway Leases from Boonmoo to Stannary Hills (the name given to the town to be developed on Eureka Creek near the Ivanhoe mine) and Watsonville, Water Rights Nos. 227, 229, 230 and 264 each of twelve sluice heads, and No. 222 for ten sluice heads, together with plant, machinery and ore at grass.

¹⁵ GRG 1CB/3, 3/1901, SROSA.

¹⁶ *Cairns Post*, 8 May 1903.

¹⁷ *Cairns Post*, 1 September 1900; 11 March 1902 and 6 May 1902; QGMJ May 1902, p. 265; *Wild River Times*, 27 September 1899; *Queenslander*, 5 July 1902, p.33.

¹⁸ A.F. Waddell Correspondence collected by Mr G. Bond and in possession of Ruth S. Kerr, Brisbane.

¹⁹ For further details on the construction and operation of the Stannary Hills and Rocky Bluffs Tramways and the mines and mill see: George E. Bond, 'The Stannary Hills and Irvinebank Mining Tramways of North Queensland', Australian Railway Historical Society, *Bulletin*, vol. 13, no. 302, December 1962, pp. 190-97; Ruth S., Kerr, 'John Moffat and the North Queensland Tinfields', in Kett H. Kennedy (ed.), *Readings in North Queensland Mining History*, James Cook University of North Queensland, Townsville, 1980, vol. 1, pp. 161-88; Ruth S. Kerr, 'The Stannary Hills and Irvinebank Tramways in Northern Queensland: a Window into our Mining Heritage', Fifth National Conference on Engineering Heritage 3-5 December 1990, *Preprint of Papers*, The Institution of Engineers, Australia, pp. 115-22; Gerard H. Verhoeven, 'Stannary Hills and Irvinebank Tin Mining Tramways', *Light Railways*, no. 30, Summer 1969-70, pp. 4-14; Gerard H. Verhoeven, ' "To Rocky Bluff" (Stannary Hills – Rocky Bluff Tramway west of Herberton, North Queensland)', *Light Railways*, no. 32, Winter 1970, pp. 5-11.

²⁰ QGMJ, August 1902, p. 427.

²¹ *Cairns Post*, 18 November 1902.

²² *Ibid.*, 3 March 1903.

²³ *Ibid.*, 3 March 1903, 8 and 12 May 1903.

²⁴ *Ibid.*

²⁵ *Ibid.*, 12 May 1903.

²⁶ *Ibid.*, 26 June 1903.

²⁷ *Ibid.*, 26 June 1903; Half-yearly Report of the Stannary Hills Mining and Tramway Company quoted in *Cairns Post*, 21 July 1903; QGMJ, July 1903, p. 332 quoting *Cairns Argus*; Stannary Hills Mines and Tramway Company Limited, *General Manager's Report* 13 April 1903, QGMJ, July 1903, p. 376; Queensland. Department of Mines, *Annual Report* [hereinafter MR] 1903, p. 71.

²⁸ MR 1902, p. 71; *Cairns Post*, 12 December 1902 and 12 May 1903; *Wild River Times*, 27 January 1904.

²⁹ MR 1903, p. 175.

³⁰ *Ibid.*, p. 9.

³¹ 'Tinfield Memories' by G.P., *Cummins & Campbell's*, July 1949, p. 15.

³² *Cairns Post*, 21 July 1903; *Wild River Times*, 23 June 1905; QGMJ, July 1905, p. 371.

³³ MR 1904, pp. 67-68; *Ibid.*, 1905, pp. 67-68; QGMJ, August 1905, p. 426; *Wild River Times*, 28 April 1905, quoting *Sydney Bulletin*.

³⁴ MR 1905, p. 68; QGMJ, July 1905, pp. 349-51 and November 1905, pp. 562-63.

³⁵ *Ibid.*, July 1905, p. 365 and August 1905, p. 426.

³⁶ *Ibid.*, August 1905, p. 426, September 1905, p. 477 (20 August 1905), and October 1905, p. 536 (21 September 1905).

³⁷ QGMJ, March 1905, p. 142, quoting *South Australian Advertiser*, 3 March 1905.

³⁸W. Lauder Cleland, 'Tin Dressing at Stannary Hills', pp. 154-64.

³⁹MR 1907, p. 70; 1908, p. 74, and 1909, p. 84.

⁴⁰*Ibid.*, 1908, p. 74.

⁴¹*Ibid.*; *Wild River Times*, 26 May 1909.

⁴²MR 1908, p. 148; *Pugh's Almanac* 1910, p. 825.

⁴³MR 1916, p. 203.

⁴⁴*Cairns Post*, 10 April 1912; 6 May 1912; 19 June 1912; 7 August 1912.

⁴⁵*Ibid.*, 13 September 1912.

⁴⁶*Ibid.*, 17 December 1912.

⁴⁷*Ibid.*, 8 February 1913.

⁴⁸MR 1913, p. 11.

⁴⁹*Ibid.*, 1917, p. 18.

⁵⁰*Ibid.*, 1918, p. 17 and *Ibid.*, 1919-1925.

⁵¹Lot 619 on Plan OL72, Parish of Myosotis, County of Western (*Tablelands Advertiser*, 15 January 2003, p. 27).

⁵²The tramways are on Lot 2 on HG659 Parish of Halpin County of Hodgkinson, Lot 477 Parish of Masterson County of Hodgkinson, Lot 598 on OL64, and Lot 10 on CP862894 Parish of Myosotis County of Hodgkinson. (*Tablelands Advertiser*, 9 March 2005, p. 32)

NOTES ON UNITS:

Imperial units are used throughout the text because of the detailed nature of the production figures, mine and distance measurements and the frequency with which they appear in the mining records. Also, the conversion of some commonly used terms would detract from the meaning of the text. The following conversion tables should be used where required:

1 foot	=	0.305 metres.	1 yard	=	0.914 metres
1 mile	=	1.608 kilometres	0.621 miles	=	1 kilometre
1 ton	=	1.016 tonnes	1 pound	=	0.4536 kilograms
1 gallon	=	4.536 litres	1 horsepower	=	0.746 kilowatts
1 acre	=	0.405 hectares	1 square mile	=	259 hectares or 2.59 sq km
1 pound	=	AUS \$2 (Conversion on 14 February 1966)			
1 pound (£)	=	20 shillings	1 shilling	=	12 pence