# LIGHT RAILWAYS Number 130

**October 1995** 

Bundanoon Coal Trams Mount Bold Dam Construction Barwon Downs Tram Puzzle

ISSN 0 727 8101



The Light Railway Research Society of Australia Inc.

No. 130 **OCTOBER** 

1995

ISSN 0 727 8101 PP 342588/00002

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# EDITORIAL

There has been some interest of late in what constitutes a light railway. The letters section in recent issues raise the subject.

The subject matter for articles in Light Railways will continue to be the history of light railways in Australia, Australian territories and areas of significant Australian influence (e.g. Fiji). The term light railways may be taken to include lines of less than 3 ft 6 in gauge, industrial and mining railways (except for heavy duty mineral haulers) and timber tramways generally while a historical approach which takes into account the wider social and economic issues behind a railway's construction and operation will be encouraged.

The Society has a policy of full and open discussion, rebuttal and correction and this journal welcomes contributions from members and non members on any of the above subjects as well as corrections and amplification.

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Light Railways Editor: Norm Houghton, PO Box 1128, Geelong 3220. Phone (052) 21 7007 or Home (052) 29 4805. Articles, photographs and letters welcome.

# **Cover Photo:**

Perry 0-4-2T loco 'Klondyke' on the former 3 ft 6 in gauge Belmont Common railway at Geelong, 1979. Photo: P. Riddett.



# **'HUNG OUT FOR COAL'** TRAMWAYS OF THE RINGWOOD AND ERITH COLLIERIES NEAR BUNDANOON (NSW)

# by Jim Longworth

# INTRODUCTION

The Illawarra Coal Measures are a series of abundant coal seams laid down in the Permian Era (about 220-275 million years ago). The measures occur in a massive, basin shaped, geological formation. Underlying the Sydney region the elongated basin stretches from the Hunter Valley in the north to Ulladulla in the south. Rocks forming the basin edge outcrop in the NSW southern highlands, dipping gently north-east towards the centre line of the enormous structure.

Mines that have extracted coal from the seams near the main southern railway line between Mittagong and Tallong are located within an area known as the South-Western Coal Field. Having been produced near the edge of the original coal swamps, coal from this field is contaminated with other sediments. Thus it has a relatively high ash content. The coal seams are overlaid by horizontally bedded shales and sandstones of the Triassic Era.

Over recent eons, Bundanoon Creek and its tributaries have cut down through the overlying sandstone layers. The valleys are rimmed with massive vertical sandstone cliffs. Coal seams are exposed in the gully sides, part way up the cliff faces, or near the top of the talus slopes.

Coal mining in the area first known as Jordans Crossing, and now known as Bundanoon, is taken to have started in 1867. To outside reporters, the general area was also originally known as Sutton Forest. A Mr Martin Larkin took out mineral rights to work a deposit on his property at Bundanoon Creek.<sup>1</sup> Eventually two coal mines were worked near the township of Bundanoon, the Erith coal mine and the Ringwood Colliery. The precise location of Larkin's original coal mine has been disputed by local historians. Some authors suggest the mine later became Erith, others suggest it became Ringwood. I understand that Larkin's mine was originally called the 'Rock-roof' coal mine, and that this mine later became known as Erith when operations were renewed there by E.A. Baker et al.<sup>2</sup> Reports differ as to whether Erith used the exact same entry as the older Rock-roof mine, or was opened up in the same coal seam, but just nearby.

Ready transport for coal mined from the South-Western Coal Field had been facilitated by the opening of the Great Southern Railway from Mittagong to Goulburn. The original single-track section from Mittagong to Sutton Forest (now known as Moss Vale) was opened on 2 December 1867. The section from Sutton Forest to Marulan was opened on 6 August 1868. The section from Marulan to Goulburn was opened on 27 May 1869. The section from Exeter to Bundanoon was duplicated on 30 June 1915. The duplication was extended from Bundanoon to Kareela on 13 September of that year.<sup>3</sup>

Managers at both the Erith and Ringwood coal mines overcame access difficulties in the same rather unusual manner. At each of these two mines a wooden platform was built projecting horizontally from the cliff tops at the plateaux level, out into the valley void. Through a hole in this platform, empty skips were lowered down the face of the sandstone cliffs, to the mine entry in the valley below, and full skips raised. The same arrangement of a projecting platform was also found at the Cataract coal mine near Berrima.<sup>4</sup>

# ERITH COLLIERY

# Mine

When mining for coal in the Bundanoon area started in 1867 the newspaper reports of the time were glowing. Favourable comparisons were made with the best Newcastle coal. The coal was to be carried to the city of Goulburn and there converted to gas for use in street lighting.<sup>5</sup> Goulburn millers were reportedly interested in the source for supplying their needs. Coal was also tried in railway engines but with mixed results.

The 3 ft  $\frac{3}{4}$  in thick seam outcrops on the western bank of Coal Creek, a western tributary of Bundanoon Creek. The coal seam was composed of about five small bands. The seam outcrops about 25 metres below the cliff top. Given the form of the coal basin, the seam here rises slightly upwards from the mouth of the adit, providing free natural underground drainage. Workers gained access to the adit by negotiating a series of wooden ladders and cantilevered walkways down the face of the cliff next to the waterfall.



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Initially coal from Larkin's mine was drawn by horse teams to the Great Southern Railway just south of Bundanoon station. The night goods train stopped for fifteen minutes on the main line there for loading.<sup>6</sup> During 1871-72 the mine at Jordan's Crossing raised 200 tons of coal which was valued at £160.

The year 1871 must have been about the last year of operation in this earliest phase. Many subsequent reports refer to the mine as having been idle for about ten years prior to 1881. By 1875-76 the Rock Roof Mine was definitely reported as lying idle. Apparently the depth of the coal seam diminished as mining progressed in a westerly direction, fault lines were encountered cutting the seam and water entering the mine was causing drainage difficulties.

During the last few months of 1881 Messrs Baker (E.A. & Sons) opened up a seam of coal at or near the old Rock-roof mine, naming this new mine the Erith Colliery.<sup>7</sup> Baker's idea was to develop the seam to the north and east where it was assumed that the seam would improve. This assumption proved to be correct. However as this was along the dip of the seam, water would no longer drain away freely. The mine was leased to Mr Baker who was a Member of the Legislative Assembly, being the member for Carcoar. A limited amount of coal was extracted and placed on the market during 1880-81. Activity stirred the place somewhat. As the quality of coal seemed to be improving with further mining, hope was expressed that at last a permanent seam had been discovered.

During 1881-82, 18 men were employed raising 50 tons per day, most of which was mixed with Newcastle coal and was consumed on the railways.

Daily output ranged from 40 to 60 skips and the situation at the mine was favourable. During June 1882 Baker investigated buying a larger and stronger hauling engine to cope with increasing output but the author does not know if it was ever purchased and installed. Twenty men were employed during 1882 and 1883. During 1883-84 forty men raised 10,492 tons of coal. In December 1883 Bundanoon was quoted as having the appearance of becoming the Lithgow of the Southern Line. In January 1884<sup>8</sup> the Government announced that Mr E.A. Baker had successfully

Ringwood Colliery. Comments on the design of this overhanging pit head appreciated. Photo: W. Nicholas



tendered for supplying coal to the Goulburn, Harden and Junee railway stations for that year. Baker went on to hold three contracts for supplying 16,000 tons of coal per year to the railways.<sup>9</sup>

Consideration was given to establishing a coke works at the mainline siding. The coke works would have used slack from the mine but apparently this was not proceeded with. Large quantities of slack from the mine were however used by lime burners and brick makers.<sup>10</sup> Affairs at the mine progressed steadily through 1884 with management making provision for increasing output.

During 1884-85 the work force fell to 24 men who raised 1,811 tons of coal. During September 1884 mining met with a fault in the main heading. Fortunately, on cutting through the fault zone the seam was recovered. In December 1884 some form of industrial grievance forced work to stop and men to be idle. For the last half of 1885 work was almost suspended for want of sales. Two men were employed occasionally getting a few tons of coal.

During the 1880s men worked for five shillings a day. The Manly Ferry may have run on some Bundanoon coal.<sup>11</sup>

No work was done during 1886-87. During March 1887 the property of 250 acres, including the winding engine, tram line, tools etc was advertised for sale through Tucker and Company, 379 George Street, Sydney.<sup>12</sup>

During early 1896 Messrs Palmer and Coppard reopened the mine and targeted local domestic household consumers as their market. By July the mine was again very busy sending coal out as fast as practicable. September saw the puff of the colliery engine, reminding the locals of old times. Seventeen men raised 2,173 tons valued at £671.0.8 during 1895-96. By December 1896 the operation was on a half-time basis. Presumably the mine was later abandoned in favour of more accessible or better quality coal elsewhere.

### Tramway

In the mine tunnels, coal was loaded into skips which were hauled to the mouth of the adit, presumably by man power as the load was downhill with the underground grade. Skips were then lifted vertically from the mouth of the adit, up to the top of the cliff face. Each skip contained seven hundredweight of unscreeened coal and were lifted six skips at a time.<sup>13</sup>

At the top of the cliff, a crudely-built roundpole timber staging projected horizontally out into the valley void. Through a hole in this platform a lift raised and lowered the skips up and down the face of the cliffs to the mine adit at the level of the outcropping coal seam.<sup>14</sup> The lift was powered by an eight horsepower, stationary engine. See p.24.

The platform was connected to the Great Southern Railway by a (seemingly) one-track incline, connected to a tramway running along the ridge. The 300-yard-long incline (perhaps at a grade of 1 in 2 to 1 in 5), lead from the timber staging at the cliff up to the top of the ridge. From the top of the incline, the narrow-gauge<sup>15</sup> tramway proceeded about half a mile<sup>16</sup> to an elevated coal stage situated beside a siding off the mainline,<sup>17</sup> just south of the town of Bundanoon. The tramway was presumably horse worked. However an otherwise unsubstantiated newspaper report gives that the skips 'are taken to the railway siding by a motor'.18 The report is by 'The Stranger', not the usual 'A (or Our) Correspondent' and is wrong in other aspects of its description. At the siding, the coal was screened and emptied into government railway trucks.

#### Mainline Siding

Martin Larkin petitioned the government for a special rate for coal of one penny per ton per mile and for a siding to be provided.<sup>19</sup> By March 1868 the special cartage rate had been fixed but no siding provided. Larkin's efforts to have a siding laid in from the main line were totally unsuccessful. Some inhabitants from Goulburn organised a petition to have the siding installed<sup>20</sup> but it too proved ineffective.

Not until the middle of 1881 was a siding provided and then it was for Messrs Baker Brothers' Erith Colliery. The siding was about a mile south of Bundanoon Station towards Goulburn.<sup>21</sup> The new 516-foot-long siding was provided during 1880-81 on the Down Side at a mileage of 96 miles 24 chains from Sydney.<sup>22</sup> This siding was to become known as 'Bakers Siding'. About 1884 the siding was renamed 'Erith Siding'. Apparently Mr Baker had to guarantee coal traffic to the value of £600 per year for five years. If this condition was not observed then he was to refund the cost of the siding.<sup>23</sup> Information presented in Table 1<sup>24</sup> suggests that he would have failed to comply. Failed by a long way.

Two new distance signals were erected at Bakers Siding during 1881-82.<sup>25</sup> During 1882-83 the siding was extended and a safety siding (comprising slip points 36 feet long) provided. The work used 8 sleepers and cost £80.12.0.<sup>26</sup> During 1883-84 a considerable amount of earth was removed for a



Ringwood Siding. Note skip being tipped over loading chute and line of skips on embankment to right of loco. Photo: Reuben Hillier, Bundanoon Historical Society.

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YEAR	TONS OF COAL OUTWARDS	VALUE OF FREIGHT TO NSW R&T (£)
1871	221	56 (from "Rock-roof")
1874	196	42 "
1875	105	25 "
1875-76	459	172 "
1880-81	54	11 (from Bakers)
1881-82	825	117 "
1882-83	1,336	197 "
1883-84	1,461	214 (from Erith)
1884-85	2,463	456 "
1885-86	946	132 "
1896-97	3,239	482 "
1897-98	442	74 "

Table 1

further extension<sup>27</sup> (891 ft long) to the siding. The siding was interlocked on 28 April 1886. The Up Home, Up Distant, Down Home and Down Distant signals were removed at noon on Tuesday 22 August 1893. A new lock was attached to the lever working the lock bolt. The lock was released by the key attached to the Train Tablet for the section 'Bundanoon-Wingello'.<sup>28</sup>

The main line at Erith siding was on a grade of 1 in 77 rising towards Bundanoon. The siding could be shunted by Up or Down trains. Guards had to take great care to see that their train was firmly braked and spragged before detaching the engine from the train.<sup>29</sup>

In early October 1890 sparks from passing steam locomotives set fire to the dry grass alongside the railway track. Several panels of the railway (boundary) fence, with the Erith coal staging, caught alight and burned over an entire weekend.

On Monday 13 September 1915, Erith Siding was removed and dispensed with, simultaneously with the opening of the double-tracked mainline between Bundanoon and Kareela.<sup>30</sup>

# **Extant Remains**

Located beside an attractive waterfall, the Erith mine has always attracted tourists. A 1869 report on some visitors from Goulburn describes the scenery as '... most delightful, and the locality admirable for picnics.<sup>31</sup> Ever since, visitors and tourist guide books have continually praised the romantic scenery of mine, wooded heights, bluegrey rocks, waterfall and pebbled creek.

Current-day guide books still recommend a bushwalk to inspect the remains of the mine and the surrounding scenery. Outside one of the mine adits a wooden roller is suspended in the horizontal position underneath a rock ledge. Apparently the rope pulling the skips up out from the mine passed over the roller. Large sectioned timbers form a ramp at the mouth of one of the entrances.

Uphill of the lift platform, the incline passed through a couple of cuttings excavated through solid rock. One is seven feet wide, vertical walled and twenty feet deep at the deepest part. The width of seven feet suggests that the incline had only a single line of track up it. Lumps of spilt coal mark the line of the tramway up onto the brow of the ridge. Once on the ridge line, houses and roadworks mask the line of the original tramway.

# **RINGWOOD COLLIERY**

# Mine

During April 1884 the prospectus of the Great Bundanoon Coal Mining Company was issued, reportedly with good prospects. The initial proposal was to sink the shaft within a few yards of the Great Southern Railway.<sup>32</sup> This would have had the advantage of enabling trucks to be shunted from the siding as rapidly as they were loaded. Expense of, and the loss of time from, a lengthy tramway system would have been avoided. Diamond drilling intersected the uppermost coal seam at a depth of 300 feet in close proximity to the main line. Below this seam were two more seams. The local newspaper suggested at the time that a second Newcastle might develop around the

nucleus of the two mines then working at Bundanoon. Estimates were, that by extracting the upper seam only at 2,000 tons per week, reserves held by the company would last 25 years. A share issue of 20,000 ten-shilling shares was organised.<sup>33</sup>

In October of 1884<sup>34</sup> Messrs T.S. Huntley, Atchison and Thomas Saywell and Sons of Sydney brought into operation an adit to extract coal from the 12 ft 1 in thick seam. Mr Huntley was the business manager. The mine was to become known as the Ringwood Colliery. Ringwood Colliery Company worked the same coal seam as that mined by the Erith Colliery a few miles further south. Despite initial plans for a shaft near the main southern railway line, the colliery entrance was eventually developed at the base of the cliff-line in Stonequarry Creek, a tributary of Bundanoon Creek. At Ringwood the seam underlies cliffs about 280 ft high.

As at Erith, the mine head gear extended several yards out from the face of the cliff, on a horizontal platform, level with the cliff top. However the platform at Ringwood was of a far more substantial and sophisticated construction than the one at nearby Erith. All lowering and hoisting of coal was done vertically up and down the face of the perpendicular cliff through a hole in the platform. Unlike Erith where men used ladders to descend to the mine, at Ringwood, men were also hoisted up and down the face of the cliff in the lift cages. These rather novel and unusual workings were designed and completed by the mining engineer Mr Thomas Bertram who had arrived in Australia about 1883.35 Mr Bertram later went on to lay out the Mount Kembla Colliery works near Wollongong.

Over £20,000 was expended on machinery, ancillaries and an associated tramway. During 1883-34, 22 men only raised 70 tons of coal; probably because of the extensive alterations to the surface arrangements that were then already being made. The Ringwood Coal Company successfully tendered for the supply of engine coal required for the Goulburn, Harden and Cooma railway lines during 1885.<sup>36</sup> Apparently the coal did not give satisfaction.

After working for about six months the mine was abandoned and the plant sold<sup>37</sup> c 1885. The freehold title for Ringwood then belonged to Mr Larkin who was paid not less than £15 per week royalty. An offer of £1,000 was made for the property, but Larkin refused to sell. The company went into liquidation. Could Larkin's exorbitant royalty have been instrumental in the financial collapse of

the enterprise? Saywell bought the plant and subsequently erected it at the Bellambi Colliery near Bulli.<sup>38</sup>

After lying idle for about ten years the Ringwood property was purchased by Mr James Collins of Glebe, Sydney, who proceeded to refit it. During the later months of 1896, Ringwood was reopened. As a trial, a couple of truck loads were put out to Goulburn during July 1896. During late 1896 operations at this mine as well as at Erith were on a half-time basis, resulting in a scarcity of work for local residents. The following year (1896-97) 11 men raised 3,282 tons valued at £1,066.12.0. Reported output<sup>39</sup> remained constant at the 3,000 to 3,800 tons per annum mark, until 1904 (when records ceased to be published). Operations were temporarily suspended during 1904-5 due to disastrous bushfires.

Mr Henry Hancock was Collins' manager until July 1907 when he was replaced by Mr John Taylor. Mr Arthur Allan replaced Mr Taylor during July 1910 to be replaced in turn by Mr Edward Flood during August 1911. Collins' mine seems to have closed between 1912 and 1914, though Mr J. Collins retained mining leases well into the late 1910s.

### Tramway

Located about 1½ miles from the Great Southern Railway, Ringwood Colliery was connected to a siding off the main line by a private tramway. Constructing the tramway was soon underway, taking place during early 1884.<sup>40</sup>

The tramway from mine to main line was a wretched piece of work – arguably the worst of its type in New South Wales. A viaduct about half a mile long, built with piles, caps and braces, was very insubstantially constructed. About 300 feet of this viaduct fell while the men were still constructing it.<sup>41</sup> This may well have been an impressive domino effect. Further, the batter slopes in the cuttings were too steep. In mid May 1884, Mr Matthew Manderson was killed while excavating one of the cuttings. A body of earth containing a large rock and a tree stump gave way and fell on Manderson, nearly covering him. The rock or stump was what probably struck him on the back, causing the fatal injury.<sup>42</sup>

By the time of purchase by Collins the place was a wreck. The main cutting on the tramway had filled to a depth of 12 feet in places due to insufficient slope on the batters. One of the bridges 300 yards long had been blown down.

At the shaft, Collins installed a 20 horsepower engine and boiler with the drum attached. These



Ringwood Colliery site. Possibly the winder. Photo: Bruce MacDonald.



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semi-portable winding engines were developed for use at low cost, temporary sites, particularly in the Colonies. Coal was lifted in cages up the cliff face from the mine mouth. From here the skips were coupled up and hauled by means of a steel wire rope, a mile and a half to the screens. The tramway passed over three bridges with a total length of half a mile, some of the trestle sets were 50 feet high. Communication was maintained between screens and shaft by telephone. At the screens, Collins installed two 25 hp Cornish boilers, a 40 hp engine and winding drum 7 ft 6 in in diameter as top hauling plant.<sup>43</sup>

During the life of the mine, the poppet head was burnt out several times and rebuilt. This explains why various designs appear in various photographs. The colliery also later became known as the Federal Colliery. The final poppet head was burnt out in the 1939 bushfires. The boiler was bulldozed over the cliff edge and can still be found lying on the valley slopes below.

### **Phantom Locomotive**

G.H. Eardley<sup>44</sup> claims that the 0-6-0 side tank locomotive (Hudswell Clarke B/N 297 of 1888 was imported by Thomas Saywell in 1888, for service at the Ringwood Colliery. On abandonment of the Ringwood Colliery enterprise, the locomotive was supposedly sent overland to Saywell's South Bulli Colliery c. 1891.<sup>45</sup> The author is unable to explain why a locomotive not made until 1888 was delivered to a mine that had reportedly closed about 1885. Nor why it was sent by the gut-busting overland route, rather than the more conventional method of by rail. The author has not discovered any corroborating evidence of the locomotive ever having been there.

### **Mainline Siding**

Ringwood Colliery's siding was on the Great Southern Railway at a mileage of 92 miles 45 chains from Sydney. The siding was known initially as 'Ringwood Siding', and later renamed as 'Collins Siding'.

The 404-foot-long siding was laid during 1882-83 for the Ringwood Coal Company, 131 sleepers were used.<sup>46</sup> During 1883-84 new signals were erected, a new patent stop-block fixed, and a new gate etc. fixed to the siding.<sup>47</sup> Presumably the siding went out of use about 1885 on closure of the colliery.

During early 1896 Messrs Collins and Company made an application for the siding to be connected with the main line. The connection was approved on 18 May 1896 with the work being completed on 28 September 1896.<sup>48</sup> Apparently this was a new siding, not just a reopening of the previous one. The previous siding must have been too steep as the opportunity was then taken to lessen the grade. Also the siding was made sufficiently long (reportedly about a quarter of a mile long) so that the longest train could stand in it.<sup>49</sup>

Collins Siding was opened for traffic from 24 October 1896. As the mainline was on a grade of 1 in 66 falling towards Bundanoon and the siding was on a grade of 1 in 19 near the points, great care had to be taken when shunting the siding. All wagons were to be properly braked and spragged. The siding could only be shunted by Down trains and then only in daylight. All Up traffic had to be worked forward (Down) to Bundanoon and attached to Up trains there. There was to be no kicking off or gravity shunting of wagons.<sup>50</sup>

The points for Collins Siding were worked from a Two-lever Frame, located near the facing points on the Up side of the line. No 1 lever worked the Facing Point Lock and could only be unlocked by the key attached to the Train Tablet for the section. No. 2 lever worked the Main Line Facing Points and Catch Point which was 126 yards in from the main line. No. 2 lever was released by No. 1 lever. Operating the siding remained substantially the same throughout its life.<sup>51</sup>

Some tonnages of coal removed from this siding, together with the financial returns to the NSW Department of Railways and Tramways, are presented in Table 2.<sup>52</sup>

Apparently introduction of new longer-boilered locomotives by the government railways after 1910 hastened closure of the operation. Water in the longer boilers was claimed to shift to the down hill end when working the steeply graded siding. Thus the siding had to be either regraded (yet again) to a lesser grade or abandoned. This led to a dispute between the railways and mine manager concerning maintenance. Having disposed of stockpiled coal slack during a coal strike about this time, Mr Collins decided not to spend further money on the operation. Extensive repairs to the mine machinery were also required. So Mr Collins abandoned the mine.

The siding was closed on and from Monday 6 January 1913 after which date traffic for the siding could not be accepted.<sup>53</sup>

### **Extant Remains**

Immediately south of the road bridge over the main southern railway line, mid way between

YEAR	TONS OF COAL OUTWARDS	VALUE OF FREIGHT TO NSW R&T (£)		
1883-84	960	340		
1884-85	196	99		
1896-97	1,330	202		
1897-98	4,326	683		
1898-99	2,847	417		
1899-00	2,645	363		
1900-01	2,545	384		
1901-02	2,177	303		
1902-03	1,609	209		
903-04	1,976	278		
1904-05	1,650	268		
1905-06	1,501	238		
1906-07	1,838	274		
1907-08	1,853	279		
1908-09	1,449	183		
1909-10	2,553	556		
1910-11	1,350	160		
1911-12	1,139	151		
1912-13	716	78		

Bundanoon and Exeter, is a narrow, elongated mound of bare soil between the road and the railway line. This mount is the remains of the embankment that brought the tramway to the elevated screens at the siding. A cutting for the tramway through the hill can be seen on the eastern side of the road, opposite the mound of soil.

# ACKNOWLEDGEMENTS

Thanks are extended to Messrs Bruce Macdonald and Grant Fleming for assistance with compiling this albeit brief research report. The plan of Collins Siding is based on a sketch in the G.H. Eardley files in the Mitchell Library.

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Mount Bold Dam during construction. See page 14.



# **MOUNT BOLD DAM TRAMWAY, SA**

# by Vic Harbour

In the period from 1935 to 1937 a dam was constructed across the Onkaparinga River, South Australia, about 35 kilometres from Adelaide. The water was ultimately conveyed from this dam to the Happy Valley Reservoir. Construction work required the excavation of large quantities of soil and the placement of a considerable amount of concrete. A network of 3 ft 6 ins (1067 mm) and 2 ft (610 mm) gauge tramways employing gravity, horses and one Fordson locomotive was used.

The soil was excavated using mechanical grabs and manual shovelling into skips on a cableway that deposited the spoil into tramway skips. These skips were of the flat-bottom, side tipping types and were gravitated downstream along a 3 ft 6 ins gauge slightly graded route for about 800 metres to the spoil dump. Horses hauled back the empty trucks. One line of 2 ft gauge was sited higher up the south slope. A crushing plant for the concrete aggregates was set up 800 metres downstream and on the opposite bank to the spoil dump. A tram track was laid on a slight downgrade to the dam site where the mixing plant was built. A quarry was opened near the crushing plant, but the stone proved unsuitable so supplies were trucked in from further afield. The quarry stone was dumped into a receiving hopper at the top and lowered to the crushing hoppers at the bottom on a two-way balanced tramway incline. From the hoppers the crushed aggregates were dropped into side-tipping steel trucks made into rakes of eight and hauled by the locomotive to the cement mixer bins.

The mixed cement for the main dam was placed by means of a cableway bucket. Cement for the downstream stilling weir was delivered via the cableway to two tramways on the bed of the river and thence by horse traction for 120 metres to derrick cranes for placing.

# Tipping spoil from cableway to tramway truck.



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Internal combustion loco on aggregate tram.

Photo: S.A. Engineering & Water Supply Dept. from A. Lockyer Collection.

Crushing plant for aggregate, 800 metres from dam.



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The entire project was carried out under the management of Messrs Essery & Cartledge for the Engineering and Water Supply Department of South Australia. It appears that as a cost-saving measure the contractors agreed to take over certain Departmental construction equipment and reduce their tender accordingly. Included in the equipment inventory were the tramway materials rails, trucks and a steam locomotive.

The locomotive was a 0-4-0 Baldwin saddle tank Builders Number 8130 of 1886 formerly used on Murray River lock construction projects in the 1920s. The locomotive was completely overhauled in the Department's workshop and sold to Essery & Cartledge for use at Mount Bold. It seems the locomotive was transported to Mount Bold, but the Contractors declined to use it probably because of the usual problems with steam power and the short length of line.

In 1934 the Contractors sold the locomotive to Forward Down and Company, Engineers, who held it in storage at Kilkenny in Adelaide. The locomotive remained here for many years in a

knocked-down condition (no cab and saddle tank). LRRSA member Arnold Lockyer inspected the locomotive in about 1952 and noted that the reconditioned wheel sets still showed the lathe marks, thus indicating the locomotive had not been used since 1934.

The locomotive was sold in 1953 to R.G. Howard of Mitcham who intended to run it on his property, but used it as a stationary boiler to power a steam engine. The owner later intended to secure a current boiler certificate in order to sell the locomotive as a going concern, but did not proceed and it is believed the locomotive was subsequently sold for scrap.

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Baldwin 8130 at Forwood Down & Co works, Kilkenny, early 1950s. Photo: A. Lockyer.

The actual motive power used at Mount Bold was an internal combustion locomotive made from a Fordson tractor by Linwood Quarries Limited, a subsidiary of Quarries Limited. The Linwood Company ran the quarry at Mt Bold. At the conclusion of the contract the locomotive was stored at the Clapham Depot of Quarries Limited and was eventually scrapped.

# **REFERENCES:**

Transactions of the Institute of Engineers, Australia, January 1937, p.17-23.

Mining Review No. 59, December 1933, South Australian Mines Department. Information supplied by Arnold Lockyer.

# **NOT ON RECORD** SOME TRAMWAY PUZZLES AT BARWON DOWNS, VICTORIA

# by Norm Houghton

Sawmilling at Barwon Downs in Victoria's Otway Ranges was the preserve of two companies from 1897 to 1944 – Hayden Brothers and Anderson, Mackie & Company. These firms operated south of the settlement beginning two kilometres out and ultimately extending 20 km. Both used 3 ft 6 ins (1067 mm) gauge tramways running from the Barwon Downs railway station to serve several logging and milling sites in the Otway State Forest. In preparing a detailed history of these firms for a revision of 'Sawdust & Steam', the author referred to the usual sources such as the Forestry files, parish plans, District Surveyors plot books, local newspapers, municipal ratebooks, aerial photographs and local knowledge. It soon became evident that entries in the files were ambiguous and portions of the survey lines and mill site traverses on the parish plans were just that - lines that bore no relation to what was on the ground. In addition, as field checks subsequently revealed, there were tram routes not referred to anywhere on paper, but clearly in evidence on the ground.

What was required was a thorough survey on site using one's imagination to determine the likely positioning of the tram routes and a lot of tramping through the bush with eyes glued to the ground.

# **DUMMY MILLS**

One issue that took a lot of effort to solve was the problem of what turned out to be imaginary mill sites. The author initially took the plans at face value and, for example, went looking for Hayden's three mill sites shown along Callahan Creek. The results were to find two sites as very narrow mud flats jammed between a cliff, the creek and a steep slope and another site perched out of the creek valley on a severely sloping narrow spur. At the bottom of the spur was a log landing with a snig line running up the spur through the imaginary mill site. The actual mill site itself was shown on the plan but in such a way as to look like a stable or depot. The parish plans indicated the tramway connecting the Barwon Downs railway station to these mill sites was mortgaged to the Victorian Railways Commissioners. At that time the Victorian Railways, as a traffic generation device, leased old iron rails to sawmillers to use on access lines between the mill and the railway station. The offer of rails did not apply to log lines out of the mill. It is the author's surmise that the sawmiller and surveyor would agree to run a survey as far into the forest as possible and place what proved to be a dummy mill at the end of the tram in order to qualify for iron rails over both the access and log lines. It is possible that the Victorian Railways connived at the tactic.

The surveys for the tramways of Alex Sanderson in adjoining sites at Forrest show similar features except that Sanderson's dummy mills were placed in even more ridiculous sites to Haydens. The survey for Mackie's tram along Mackie Creek shows no mill at all and a plot line that turns too far to the south along a side creek that does not exist. Perhaps the difficult terrain bamboozled the surveyor as the author found Mackie Creek to be in the wildest and most ferocious landscape imaginable. Even modern maps have difficulty coming to grips with the complexity of the terrain hereabouts.

# ANDERSON, MACKIE

Anderson, Mackie & Company began operations in Barwon Downs in 1897 when a tram line (A) was laid south for 11 kilometres to the mill. The mill worked at this location until 1904. The tram was a crude affair with a very narrow road bed, tight curves and steep grades. In parts it was simply laid straight onto the ground.

In 1904 the mill was shifted closer to Barwon Downs on a branch of King Creek. A branch line (B) almost one kilometre in length was built from the original route. The mill is shown as Mackie No. 2 on the plan. This tram was evenly graded and mostly ran downslope to the mill. Its short length probably permitted Mackie to construct it to a reasonable standard. An impressively built log tram was laid out of the mill along a very deep side cut for 600 metres. The logging site was cut out in 1908.

The mill was moved again, 1.2 km due west to a site on Mackie Creek, the Mackie No. 3 mill. The access tram from this mill ran north-west along the flood flats of the creek for one km and could have continued this way for another 2.5 km, but did not. Instead a deep side-cut took the tram out of the creek valley on a steep grade (C) for 1.5 km right to

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the top of the dividing spur between Mackie and King Creek, where the earlier tram route was joined (D), and from here the route ran downslope.

This roller-coaster route (C) would have been difficult to work as it was graded against the load, so a deviation (E) was eventually installed, but even this deviation had a bump in it (F) as it come off the rising grade of the earlier line (near Goat Track) and dropped back into the creek valley. This deviation was used until Mackie's operation was flooded out in 1923.

There is a reference dated 1922 in Hayden's file to Mackie wishing to join Hayden's line at the top of the Seymour-King roller coaster (D) along Hayden Road so as to abandon the balance of the tram to Barwon Downs. It appears Mackie's tram was fairly decrepit by then. The notion occurred to the author that the roller-coaster earthworks of 1908 may have been just that and no rails were ever laid. A complicating factor is that the top of the roller coaster is a sandy ridge dissected by bulldozer cuts and prone to earth slips. Hayden's line is quite evident on the western slope, but no junction point could be discerned coming over from the eastern slope, so the 1922 proposal was not acted on. A careful check along the creek and at Goat Track revealed that the bump at (F) is the only route past this point. It is highly unlikely Mackie would have taken the tram from the mud flats to the heights and back to the mud flats in the first route along the creek. It does not make sense. The author's conclusion is that the original 1908 route did take the roller coaster and all trace of this line disappeared when the bulldozers constructed Hayden Road.

# **HAYDEN BROTHERS**

Hayden Brothers worked their first two Otway mills using a tramway along Den Creek (G) from 1897 to 1901. In 1901 a second tram was built along Callahan Creek using the Delaney Road route (H). The tram dropped into Callahan Creek by a very steep alignment (I), now mostly built over as Goat Track, and was used until 1904. In that year a deviation was installed (J) taking the tram out to the west in a large circle before rejoining the original route. The grade was extremely even and would have made operations over this section much easier. Hayden's Baldwin locomotive used this route from 1908 to 1917.

In 1919 Haydens secured a new mill site near the former Mackie No. 1, 11 km from Barwon Downs.

Cutting on Hayden's tram at point where tram route leaves Maher Road. Photo: N. Houghton.



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A section along Mackie's tram on lower level Callahan Creek route near 'E' on map. Photo: N. Houghton.

A tram was built from the railway station for 4.5 km (K) following Mackie's route, but on the other side of the road reserve for Maher Road, before rising steeply from the flats and taking to the slopes to the west of Mackie's 1908 to 1923 line.

Haydens rejoined Mackie's 1897 line at (L) and followed it to the mill. Mackie's tram route was regraded and widened. In those spots where Haydens went away from Mackie's route, the contrast is stark – Hayden's wide and smooth, Mackie's tight, twisting and narrow.

# ARCHAEOLOGICAL EVIDENCE

It took 11 trips and 35 hours of walking to unravel these puzzles in what, by the author's Otway experience, is not (apart from Mackie Creek) too severe terrain and vegetation. The uninitiated might think otherwise. Most of these tramways are accessible to bushwalkers, although with rare exceptions, the routes are overgrown and only fit for the well-kitted and heavy-booted pioneer. Haydens tram from the big bend in Maher Road (K) to near the top of the spur at (A) is relatively easy to walk. South of (A) the going gets rough and, towards the bottom of the map, the route is murderous to energy and clothing, and is not recommended under any circumstances. The Goat Track deviation at (C) can be picked out here and there where the road has not obliterated it. The line along the creek (E) is very difficult to track as the earthworks are minimal or non-existent.

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The route to Mackie No. 2 (B) is hard to trace near the top of the spur, but closer to the mill it is quite evident. The log line south of the mill is a gem with a deep bench along a picturesque creek valley, but it is completely overgrown and blocked at frequent intervals by huge fallen trees. The terminus is a hard place to get out of (straight up the slope to the road to the east through clutching swards of wire grass) and a visit is only for the very fit.

Hayden's deviation (J) is obvious over its southern half and is not too difficult to walk. The northern end is hard to pick out because of the flat nature of the terrain and thick scrub. The original route (I) is very difficult to discern because of minimal earth works or road works built on top.

Mackie's route from (F) to the No. 3 mill is an easy walk along a part-bulldozed track and then along the creek flats. Near the mill, evidence of the route disappears and at the mill there is nothing to see but bracken-covered mud flats. It is not advisable to walk further along Seymour or Mackie Creeks as the terrain and vegetation are too wild.



# **BOOK REVIEW**

# GHOSTS & GOLD IN THE VICTORIAN HIGH COUNTRY

The Story of Mining and Settlement in Victoria's Alpine Areas by R.W. Christie, 1993, High Country Publishing, Dargo – rrp \$24.95, 92 pp. 90 photos, 18 maps, laminated hardcover.

This book is the first of two volumes, which to quote the preface ... 'provide a basic guide to mining sites in The High Country detailing their past glories in word and picture and enabling us to compare them with what remains today'. Whilst tramways do not figure prominently, this book does contain much to interest the industrial historian. Setting aside alluvial and hydraulic mining, virtually every mine had at least a set of rails and a box truck. The larger the enterprise, the more elaborate the rail system which was, after all, just a means to an end.

Areas covered in the text include Oriental Claims near Omeo, Dargo-Crooked River (Grant), Howqua Hills, Cassilis, Glen Wills and Sunnyside, and Mt. Murphy. All these sites have been declared historic areas under State legislation thereby making unauthorised removal of relics an offence. This book should provide fertile ground for keen historians looking for an interesting research project.

What untold stories lie behind The New Good Hope mine at Grant; The Cassilis, with its pioneering hydro-electric scheme; or the all-encompassing title of the Glen Wills Gold Mining, Battery and Tramway Company which had started as a tin miner before reforming in 1894? The only photo to include a locomotive shows an 0-4-0 BE with nine box trucks at the Maude mine of the Maude and Yellow Girl Goldmining Company, Glen Wills, where they ceased mining in 1952. One of Victoria's more remote tramways must have been that at the Mt. Murphy Wolfram mine in far north-eastern Victoria (near where the straight bit meets the wiggly bit on the map!). Here, mining occurred in two phases, the last being 1942-43, when the Commonwealth Government needed the wolfram for tungsten in the war effort. A threerail incline tramway connected two upper adits to the mill.

The author is to be congratulated on producing a very interesting and well written book which is a useful introduction to the subject. The layout is good and the historic photos are well reproduced. Colour photos, presumably taken by Mr. Christie are interspersed, depicting site remains. One small criticism is that his proof-reader has let him down in a couple of places. That aside, this book can be certainly recommended if your tastes extend past timber mills. We look forward to volume two! PFR 12/94



# LETTERS TO THE EDITOR

Dear Sir

### Mt Bischoff (LR 126)

In regard to John Browning's query, the Department of Supply and Shipping's central files concerning the wartime mining operations for strategic minerals are available in the Australian Archives ACT regional offices (Series A1146).

File N14/11 contains correspondence relating to Mt Bischoff and topics such as geologists' reports and a detailed description of the hydro-electric power station. The file reveals that only 18 mainline trucks, each with a capacity of 44 cubic feet, were available in July 1943. These were horsehauled in rakes of nine.

To boost production, an electric shovel was obtained from Butlers Gorge, additional trucks were constructed and a locomotive ordered. Although the details of the order do not appear to be on file, the correspondence indicates that Russell Allport Pty.Ltd of Hobart was paid £750 for a petrol locomotive in early 1944. File N14/33 consists of the Mt Bischoff Mine Manager's fortnightly progress reports. The delivery date of the locomotive was not reported. However, on 8 October 1943 the Manager stated that the loco-

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motive was 'expected within two weeks' and on 20 October he reported that delivery had been further delayed by the difficulty in obtaining certain items of material for its manufacture.

Also included in this file is a list of the plant and buildings on Mt Bischoff Tin Coy mine and property. This list is undated but was probably compiled at the time of the Commonwealth take-over of operations in November 1942. In addition to the 18 mainline trucks, it records 13 mine trucks, half a dozen pairs of truck wheels, one 2-ton trolley and one 1-ton trolley. No locomotives are listed.

If the steam locomotives were still stored on site as suggested in A History of Railways and Tramways on Tasmania's West Coast, why were they not listed and possibly considered for operation pending arrival of the petrol locomotive?

Colin Harvey Reservoir, Victoria

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#### Dear Sir,

Leonora to Gwalia Tramway, LR126 & 128

Following Messrs Whiteford and Reid's article in LR128, a few additional comments on this line may be of interest. The 'preserved' electric tram is described as being 'minus the power frame and bogies'. I am not sure in terms of tramway or railway parlance what the 'power frame' might be, but the tram was carried on a single (4 wheel) Brill type 21E truck powered by two General Electric type GE58 35 hp motors. It was built as a 'California Combination' car (i.e. with open end sections containing bench seating) but was shortened to help it either negotiate awkward curves necessitated by the line being relocated to avoid a mine tunnel ('Destination Subiaco' 2nd Ed, Traction Publications 1967, p.51) or to more easily negotiate the tight balloon loop at the Gwalia terminus ('Trolley Wire' 112, SPER, October 1967, p.13).

Both these publications give a short history of the line, with photographs; the latter contains a map. The original power plant included a 35 kW, not kV, generator of course. The line used twin trolley wires (like Saywell's Rockdale Tramway in Sydney, before takeover by the Government in 1914). I can only assume this was done to allow the former steam tram track to be used without the need for rail bonding. The article in 'Trolley Wire' shows that a report of April 1909 commented that the track needed attention to enable full speed operation, which would tend to support the assumption that the track was not new. The U-shaped bracket in front of the radiator on the converted Overland lorry originally carried a headlight of tramway pattern, presumably from the electric car. Note also the tramway style gong beside the driver, presumably also from the same source.

'Destination Subiaco' indicates that the tramway originated in 1901 as a privately-owned 2ft 6in gauge line probably horse-worked but possibly with a steam locomotive however, this information is not corroborated by the article in 'Trolley Wire'. The 3ft 6in gauge ex WAGR locomotive 'Leonora' (Hunslet 331 of 1884) was sold in December 1908 to Bunning Brothers and ran at the Argyle, Muja and Tullis Mills, latterly as a tender locomotive. It was sold for scrap by 1956.

Richard Horne Surrey, England

# ERRATA 1

### TULLAH LOCO NOTES (LR127)

The list of citations was omitted from this item. Fricke K., Bude R., Murray M. (1978) O&K. Steam Locomotives Works List 1892-1945.

Bristol, Arley Hall Publications.

Jux F. (1985) John Fowler & Co. Locomotive Works List, Richmond, Frank Jux.

Rae, L. (1983) A History of Railways and Tramways on Tasmania's West Coast, Hobart, Lou Rae. Schmeiser B., Wenzel H., Slezak J. O. (1977) Krauss Lokomotiven, Vienna, Verlag Joseph Otto Slezak.

Traction Publications (1972) Along the Line in Tasmania Book 2 Private Lines, Canberra, Traction Publications.

### ERRATA 2

The first half of a sentence in LR 128; p.10, col 1, para 4, was omitted. It should read '3 December 1814 ... causing Governor Macquarie ...'



Staging and lift, Erith Coal Mine. Photo: Town & Country Journal, 16 September 1882, p.552.