LIGHT RAILWAYS

Number 128 April 1995

North East Dundas Construction
N.S.W. South Coast Timber Trams
Leonora to Gwalia Tram

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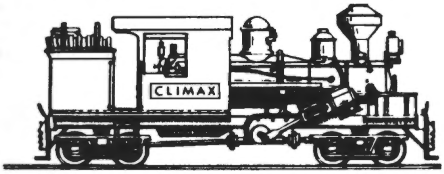

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Cover Photo:

The Leonora to Gwalia street tram conveyance 1916 to 1921. See article on page 20.

CONTENTS

EDITORIAL

The recently released membership questionnaire results have much of interest for the Society's management and editors. It is a general rule of thumb in any voluntary organisation that a mere 10% of members attend meetings and of these 1 or 2% volunteer to run the organisation. The point of this observation is that the Society is what the members are prepared to make it. Preferences have been expressed for certain topics and geographical areas but this journal cannot be expected to run articles on all states and on locomotives, routes, industries, etc. if members do not contribute such articles.

Fortunately the Society has an active base of present contributors and a varied mix of material can usually be presented in each issue of this journal. However there is always room for improvement so if you, the members, want to continue to enjoy the usual variety of articles then please consider making a contribution.

The Society's honorary executive, sales officer, editors, map makers, photographers and photocopier operators put in almost daily efforts to keep their respective portfolios operating so an article writing effort once in a while from ordinary members is not too much to ask, so go out and do it and jam the editor's post office box!

Norm Houghton

THE NORTH EAST DUNDAS TRAM

— An Engineering Account contributed by Greg Stephenson

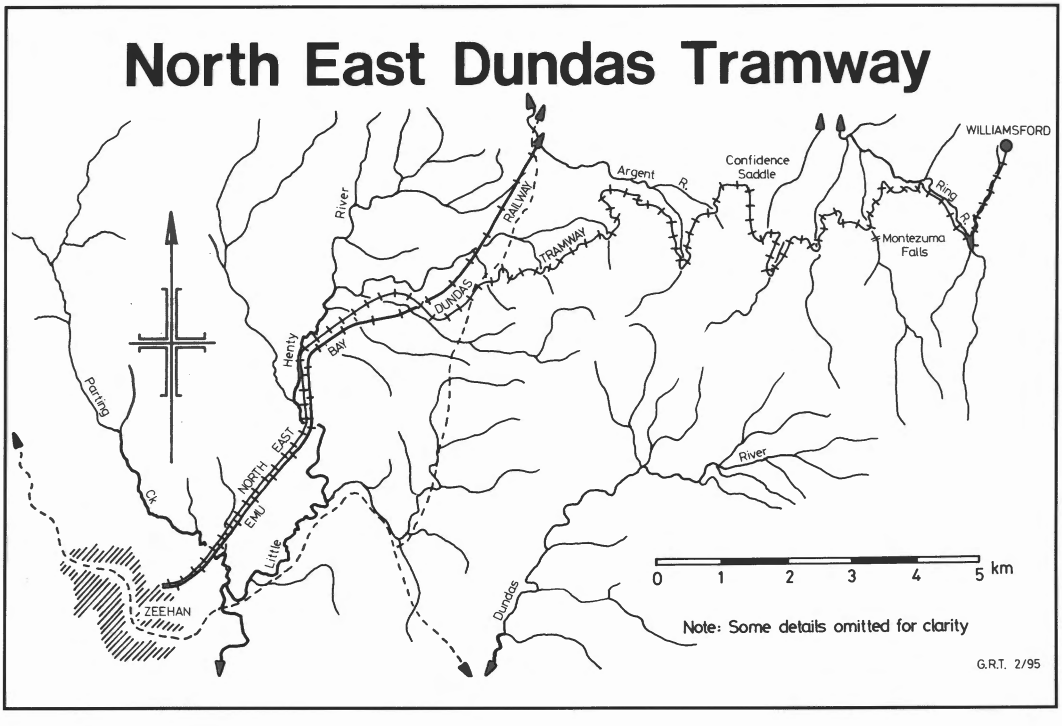
INTRODUCTION

The editorial to LR 123 commented on first hand reminiscences of those associated with light railways operations. Whilst undertaking research into timber bridge construction in Australia this contributor was lucky enough to uncover a first hand paper by William Hales included in the Institution of Civil Engineers – Minutes of Proceedings, Volume 140, 1899-1900 Session. Hales was the Resident Engineer for the North-East Dundas Tramway and was later involved with the construction of the Zeehan to Comstock Tramway in 1901 and 1902.[1]

Hales was a Member of the Institution of Civil Engineers (M.Inst. C.E.) which was the British Institution founded in 1818 with the famous canal and roads engineer, Thomas Telford, becoming the first President in 1820. One of the Institution's rules – although never enforced – was that each member should submit a paper on some practical engineering development once a year.[2] Hales wrote up his project for the journal.

Colonial Government Departments were the main employers of engineers and most of the senior engineering positions were held by Members of the Institution of Civil Engineers. The high regard for and influence of the British Institution in Australia remained until after World War 1 with the establishment of the Institution of Engineers, Australia in 1919.[3] This influence of British engineers extended to all parts of the Commonwealth, hence we find reports on engineering works from around the world presented in the Proceedings of the British Institution.

The construction of the N.E. Dundas Tramway was of interest to other colonies who were grappling with the problem of providing rail access to mountainous areas. The Parliamentary Standing Committee on Railways of the Victorian Legislative Assembly and Victorian Railways Officers visited the construction works during May 1896[4] and this visit had some influence on developing a policy of 2 ft 6 in gauge railways for mountainous areas in Victoria.



THE NORTH EAST DUNDAS TRAMWAY, TASMANIA

by William Prior Hales, Inst. C.E.

The Western District of Tasmania possesses numerous mineral deposits, principally copper pyrites, often carrying silver and gold, and galena carrying silver. To develop the district in the neighbourhood of Mounts Zeehan and Dundas the Tasmanian Government constructed a railway of 3 ft 6 in gauge, 29 miles in length, from the port of Strahan on Macquarie Harbour to the town of Zeehan. This line was opened in 1892 and cost £8,058 per mile, including rolling stock and wharf at Strahan.

In 1895 it was decided to extend railway communication from Zeehan in a north-easterly direction to the Ring River valley at the foot of Mount Read, to tap the numerous mineral deposits known to exist, and, in a few cases, partly opened out. The existing means of communication were pack tracks, 4 feet wide, and the cost of packing goods and minerals was about one penny per pound.

The country to be traversed was very rugged, and it was considered that the Tasmanian standard gauge, 3 ft 6 in, with a minimum radius of five chains on curves, would cost over £10,000 per mile. It was decided for numerous reasons to construct a tramway of 2 foot gauge with curves of not less than 99 feet radius.

Survey – The survey was begun in November 1895. Zeehan, the starting point, is 533 feet above sea-level. Between this and the Ring River valley there is a long spur, running in a north-westerly direction from Mount Dundas, with only one practicable saddle, 1,520 feet above sea-level. The preliminary survey on the Zeehan side was complicated by another long spur from Mount Dundas with several saddles, 1,000 feet to 1,300 feet above sea level. From the summit, known as the Confidence saddle, an accurate preliminary traverse and levels were run each way simultaneously, adhering as closely as possible to the gradients determined on. The maximum gradient against outward loads was fixed at 1 in 25, and against inward mineral loads at 1 in 30 (Fig 2). The traverse was plotted by latitude and departure to a scale of 1 inch to 1 chain, reduced levels being figured on, and the angles of cross slopes indicated about every 2 chains. The permanent line was then laid down on the plan, contour lines 5 feet or 10 feet above and below gradient being in many places first laid down as a guide to safe and economical location. The cross slopes being in many places 30° and even 45° would not hold a bank, and in most cases the line was located in the solid. In a few instances small retaining walls of drystone were adopted.

To 5¼ miles the line traverses easy country, attains a height of 734 feet above sea-level and has thirteen curves with a minimum radius of 5 chains. From 5¼ miles to the terminus at Deep Lead, 17 miles 70 chains, the line is almost a continuous succession of reverse and compound curves, the average number being thirty per mile. A length of at least 40 links, or 26.4 feet, was left in all cases between reverse curves. Except in difficult cases the tangent points and intersections were fixed by careful measurements on the plan, and the curves were ranged by offsets from the tangent lines. Four miles of the line are on curves of 1½ chain radius, and nearly 2 miles are on curves of 2 chains radius. The survey cost £103 per mile.

Clearing and Timber – From 3 miles to the terminus the country is densely timbered. Only three of the species were durable enough for construction, viz peppermint for all purposes, celery top pine for piles and log culverts, and leatherwood also for log culverts. The timbers used in bridges, box culverts and sleepers, were stringy bark, blue gum, and a little peppermint, almost entirely from the extensive forests of the Huon River district in Southern Tasmania. The heart timber of the Eucalypti for about 3 inches or 4 inches from the centre, warps and decays rapidly when sawn, and is therefore rejected. For this reason, and for facility of renewal, beams of any size are used in pairs, as shown in Fig 4. The sap is generally 1 inch to 2 inches thick, and the timber nearest the sap is considered the best.

The line was cleared in the first instance to a width of 30 feet, and the clearing is being gradually widened by timber-getters at no cost to the line, which makes a profit on the freight.

Earthworks – The formation width of cuttings and embankments is 10 feet, and the batters of cuttings were made as steep as possible, frequently ¼ to 1. The material was mostly slate, clay slate, trap rock and sandstone. Most of this work was done by day labour, and, to ensure economy, each ganger's work was measured, and the cost of labour and explosives was charged against it.

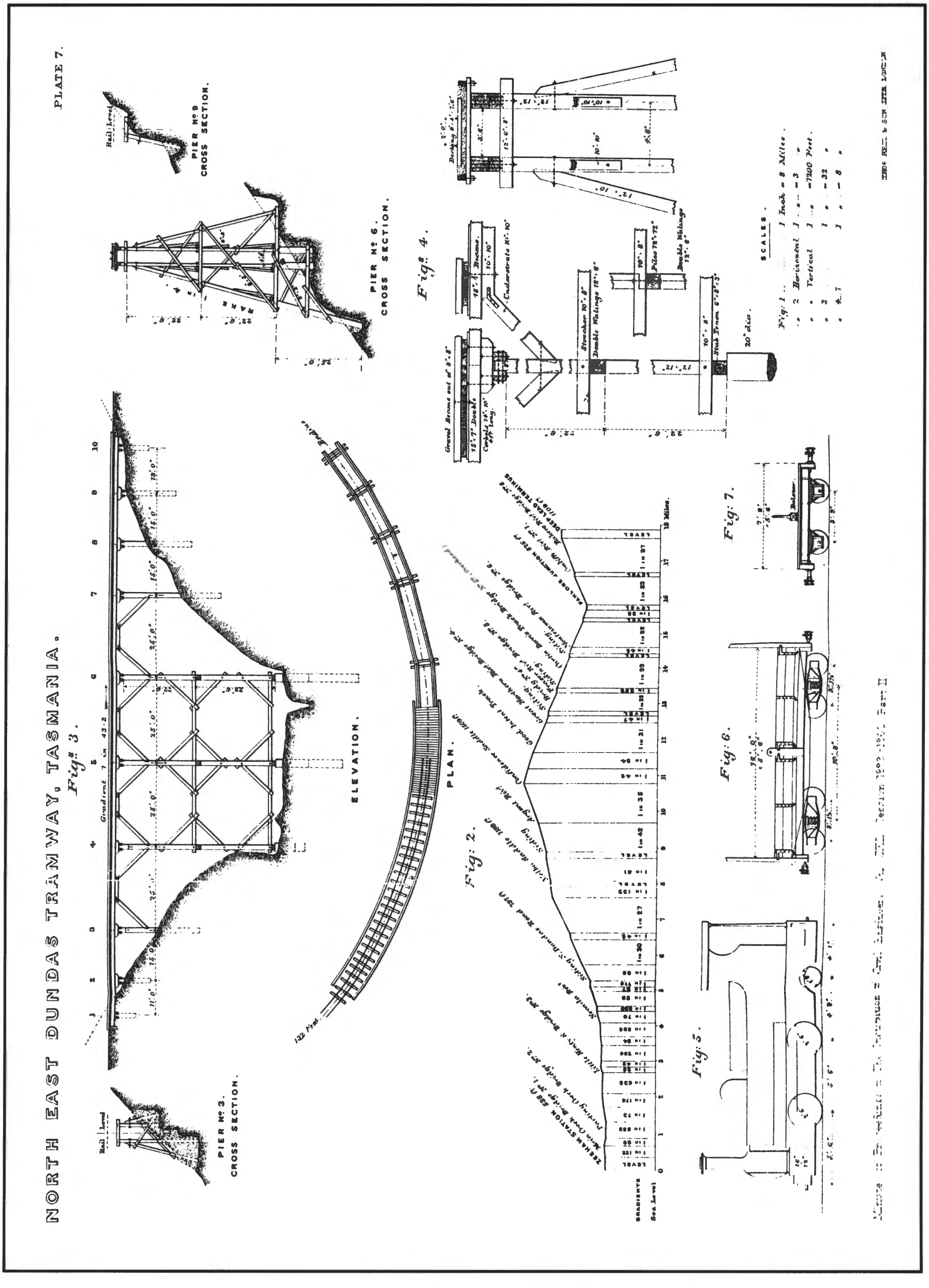


PLATE 7.
NORTH EAST DUNDAS TRAMWAY, TASMANIA.
Fig. 3.
ELEVATION.
PLAN.
PIER No 3. CROSS SECTION.
PIER No 6. CROSS SECTION.
PIER No 9. CROSS SECTION.
Fig. 4.
Fig. 2.
Fig. 5.
Fig. 6.
Fig. 7.
SCALES.
GRADIENTS
Sea Level
ZEEHAN STATION

Piecework (A) men were found in all tools, plant and material, except shovels and explosives. In spite of the numerous curves to avoid heavy works, the earthworks totalled 247,769 cubic yards, or an average of about 14,000 cubic yards per mile. The average cost was one shilling eleven pence per cubic yard. Although there is a heavy rainfall, very little side ditching was required owing to the solidity of the rock and the absorbent nature of the overlying surface soil. Light wagon roads were used on the larger cuttings; the rails were 14 lbs per yard, on sleepers of split timber, and iron tip-trucks of ¾ cubic yard capacity were employed. The rails and trucks had to be hauled along pack tracks and then carried by men to cuttings. On curves, a cant was put on the formation.

Culverts—The larger culverts are built of logs, 15 inches to 18 inches in diameter, roughly squared where bedded on one another. Their life is at least thirty years. They vary in size between 2 feet by 1 foot and 6 feet by 3 feet (double) clear opening. Smaller ones between 12 inches by 9 inches and 2 feet by 2 feet are of sawn timber. Wherever possible, in gullies having a steep fall, the culverts are built as near to formation level as possible and a contoured inlet is cut. In one case a gully 30 feet deep is thus dealt with, and a box culvert, 12 feet long with a 12 inch by 9 inch opening, takes the water. In another case a flume 60 feet in length, conducts the water from what was originally a waterfall 30 feet high to a box culvert 2 feet by 2 feet at formation level. The small spaces left on the upper side of the bank are amply provided for by drains filled with brushwood.

Bridges—Nine bridges and one overbridge were built. The spans adopted were 11 feet, 13 feet, 15 feet, 25 feet understrutted, and 30 feet understrutted. They are all of timber, the piles, except those of Montezuma bridge, being of round timber, 18 inches in diameter. In one case piles were shod and driven. In all others the piles are tenoned to sills bedded in the rock or are footed and bedded in Portland cement concrete. The superstructures are of sawn timber and have two pairs of beams for facility of renewal, 14 inches by 7 inches for 11 foot spans, and 15 inches by 7 inches for all other spans. The general character of the bridges is shown in the drawing of No. 6 bridge, Fig 3, which is 60 yards from the foot of the Montezuma falls, 340 feet high. The bridge being on a curve of 2 chains radius precluded the adoption of longer spans than 25 feet.

Permanent Way—The rails are of steel, Vignoles (B) section 24 feet in length, and, excepting about 1 mile of 40 lbs section, weigh 46 lbs per yard. The fishplates are of bar section, 14 inches in length, with four bolt holes, weighing 8½ lbs per pair; the fishbolts are ¾ inch in diameter. The dog-spikes are 4 inches by 9/16 inch square, manufactured in the colony. All rails, fishplates and bolts are secondhand and were taken from the main line from Hobart to Launceston, 3 feet 6 inches gauge, which is being relaid with a heavier rail. The rails were bent to the curves as accurately as possible by a hand press. As the press could not curve the extreme ends this was done by a jim-crow after the rails were fished. The joint sleepers are 2 feet centres, and the joints are 'suspended' and square. To 5¼ miles the curves are canted for a speed of 20 miles per hour, and beyond that point for a speed of 12 miles per hour. The switches are 7 feet long, angle 1 in 21 and are planed to fit the stock rails in the usual way; crossings angle 1 in 6 and are 46 lb steel rails, having a turnout curve of 135 feet radius. The sleepers are of stringy bark and bluegum, 5 feet by 8 inches by 4 inches, 1,980 per mile, machine adzed and bored; the inclination of rail seat is 1 in 26. They cost 9½d each delivered at Strahan. Ballast was composed of a kind of breccia also about 4 miles were ballasted with tailings from a galena dressing mill. The depth under the sleepers is 4 inches and the total depth 8 inches, the average width being 6 ft 9 inches. The estimated quantity was 800 cubic yards per mile; the actual quantity as measured in trucks was nearly 1,000 cubic yards per mile.

Rolling Stock—The first engine acquired was by Krauss of Munich, with four coupled wheels 2 feet in diameter, and cylinders 6¼ inches in diameter by 11 inches stroke, weighing in steam 6½ tons. She proved extremely useful and hauled all material, including ballast, for the first 11 miles of construction[6]. The type of engine adopted for permanent working (Fig 5) was built by Messrs Sharp, Stewart & Co of Glasgow and has the following general dimensions etc:

Cylinders	12 inches in diameter by 16 inches stroke
Four coupled wheels	2 feet 6 inches in diameter
Trailing bogie wheels	1 foot 9 inches in diameter
Fixed wheel base	5 feet 6 inches
Total wheel base	10 feet 3 inches
Weight in steam	19¾ tons
Water tanks (side)	550 gallons
Fuel capacity	60 cubic feet

Heating surface	
– firebox	42 square feet
tubes	340 square feet
	382
Grate area	9¼ square feet
Boiler pressure	140 lbs per square inch
Tractive force with 100 lbs per square inch mean cylinder pressure	7,680 lbs

The engine is fitted with vacuum brake gear, and hauls four loaded eight-wheel trucks, weighing a little over 50 tons, against the maximum resistance of a 1 in 27 gradient, combined with curves of 1½ chains radius. Two of these engines are now in use (D).

The other rolling stock was built in the Launceston Railway workshops, and comprised twenty-five eight-wheel low-side trucks (Fig 6), tare 3 tons 1 cwt, 1 qr., load 10 tons; six eight-wheel flat trucks, tare 2 tons 18 cwt, 1 qr., load 10 tons; two four-wheel bolster trucks, for carrying long timber, tare 1 ton 19 cwt., load 5 tons (Fig 7); and four passenger cars, each with six cross-seats with reversible backs, to carry eighteen passengers, also a locker for mails and parcels. All trucks and cars have cast-steel wheels 21 inches in diameter and are fitted with automatic vacuum brakes. The trucks have side levers and the cars have hand-screw brakes. The vacuum brake can be worked from the engine or from the passenger cars, which act as brake vans. When this brake was introduced, one effect was to accelerate the journey speed by about 10 minutes, owing to more even running on down gradients.

Stations and Equipment – Besides the termini at Zeehan and Deep Lead, there are five stations, and provision is made for seven more stations when required. The buildings are of the simplest and most inexpensive kind, with no platforms, a 20 foot turntable at each terminus, and at Zeehan a 20 ton weighbridge. At Zeehan the arrangements for transfer of ore, timber, etc. to and from the 3 foot 6 inch gauge railway consist simply of a railway siding and a tramway siding laid as close together as possible, the tramway rails being 8 inches higher so that the truck floors on both gauges are at the same level. For general merchandise a 2 foot gauge siding was laid along the cart entrance side of the goods shed; its floor is therefore between the two gauges. The tramway is connected with the Zeehan street tramway which runs through the town and ramifies to seven galena mines. These mines draw large supplies of firewood and mining timber from the forest through which the North-East Dundas Tramway runs. This street tramway has similar arrangements for the transfer of traffic, which have answered satisfactorily for some years. It transfers to the Strahan Railway about 20,000 tons per annum of galena (silver lead ore), in 1 cwt bags, at a cost of about 1½d per ton.

Working – The traffic is worked by the staff and ticket system, and the staff stations are connected by telephone. The maximum journey speed is limited to 12 miles per hour on the first 5¼ miles, and to 8 miles per hour on the remainder. The North-East Dundas Tramway is at present returning a profit above working expenses of 3.3 per cent on the capital expenditure.

A summary of the cost of the line is shown in the following table:

Survey	£1,823	8	11
Clearing	1,588	2	4
Earthwork	23,983	9	7
Bridges and culverts	3,440	16	5
Permanent way	9,367	17	3
Ballasting	3,807	7	2
Buildings	568	17	9
Equipment	568	16	4
Rolling Stock	4,166	19	11
Staff	1,060	1	2
	£50,375	16	10

Cost per mile: £2,823

The work was carried out by the railway department, without the intervention of a contractor, under the direction of Mr F. Back, Assoc. M. Inst. C.E., general manager, and Mr J. M. McCormick, M. Inst. C.E., Engineer of Existing Lines, the Author being resident engineer. As soon as the plans for the first 2 miles or 3 miles were completed, construction was begun at the Zeehan end, on the 17th January, 1896. The maximum rate for ordinary labour was fixed at 7s per day, and was afterwards raised to 8s per day, about 3 months before the completion of the line in February, 1898.

As far as possible the work was let by the piece to butty gangs, but the greater part was performed by day labour.

Notes to Accompany Article:

(A) 'The piecework system, whereby a workman was paid a standard rate per unit on all his output, was a marked success from about 1880 to 1920, but floundered through the introduction of ill-conceived rates, inefficient organization, and general managerial intolerance.'[5]


BEYER PEACOCK GARRATT 'K' LOCO,
MONTEZUMA FALLS IN BACKGROUND.
N-E DUNDAS TRAMWAY (ZEEHAN-
-WILLIAMSFORD) EARLY 1900s

(B) Charles Blacker Vignoles is credited with the design of the flat bottomed rail which is now the accepted standard. Vignoles was a contemporary and rival of George and Robert Stephenson. Vignoles actively supported the 'Novelty' which competed against the Stephensons' 'Rocket' in the Rainhall trials. He went on to become a distinguished railway engineer and President of the Institution of Civil Engineers.[6]

(C) H1-2180/1889 was purchased in 1896 and would be this locomotive. Three other Krauss 0-4-OWT's were acquired – 2589/1892 in 1898 and 2459/1891 and 4080/1899 both in 1899.[6]

(D) G1-4198/1896 and G2-4432/1898. G1 exploded at Zeehan on 15 May 1899 and was replaced by 4619/1900.[6]

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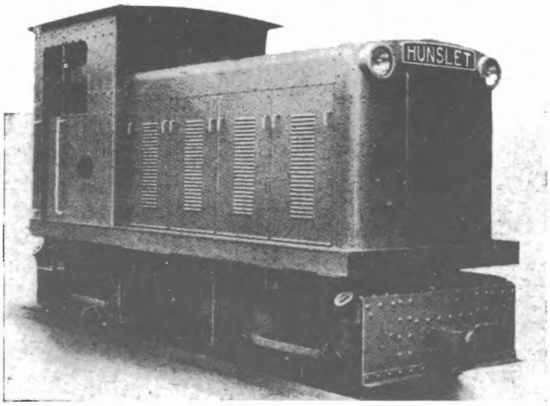


AN INTRODUCTION TO THE TIMBER TRAMWAYS OF THE NEW FAR SOUTH COAST – PART 1

by Jim Longworth

INTRODUCTION

The narrow strip of land along the NSW coast, from the Shoalhaven River southwards to the Victorian border, is characterised by rolling foothills, separating a series of east flowing rivers. Granites, slates and grit bedrock have been eroded into a gently curving topography but these poor sandy soils lack abundant plant nutrients. Each river has its own coastal port.

Many light railways have served the various industries scattered along this coastal strip. Lines of light rails have served gold mines, dairies, quarries for silica rock and granite, wharves for coastal shipping and the construction of lighthouse s and breakwaters. This three part article briefly introduces the sixteen or so light railways known to have been associated with the regions timber industry. Part 1 introduces the region, and covers the tramways between Nowra and Ulladulla.

TIMBER GETTING

Mangrove forests and salt marshes extend considerable distances inland from the regions many shallow coastal lagoons. A cool climate constrains forest growth and hence limits productivity to below that of the north coast hardwood or rainforests. Mahogany, blackbutt and she-oak are typical forest dominants. Spotted gum was the most sought after species, until after World War 2 when other species became more widely accepted. However, Red Cedar which flourished in the moist, humid, and fertile valleys along the coastal strip, was the most highly prized timber of all.

Occasionally travellers in pursuit of pheasants and other birds discovered that the Shoal Haven (sic) area also produced good quality cedar. Lieutenant Oxley had first noticed cedar there in about 1806.[1] Masters and owners of coastal vessels occasionally brought timber from Shoal Haven area to Sydney. However government indulgence of the practice led to abuse. A prohibition was placed on the cutting down and removal of timber from the Shoal Haven area after 3 December 1814,[2] causing Governor Macquarie to forbid further operations.[3] During late 1826 Thomas Florence noted large quantities of cedar growing and some as already cut, in the Kiama-Shoal Haven area.[4] However the southern limit of the distribution of Red Cedar was then thought to be around the Milton-Ulladulla district[5] and there was little incentive to exploit the forest areas further south.[6] Hardwood was then in plentiful supply to the colony anyway.

Further exploration of the south coast region was overshadowed by exploration of the plains west of the Blue Mountains, following Blaxland's discovery of a route through them in May 1813.

From the earliest days of settlement, settlers used timber freely for their own purposes, such as firewood, fencing and building construction.

Because of the isolation of the south coast forests, the region's total reliance on coastal shipping for transport and a market preference for north coast timber, only select timber was hauled from these forests. Before 1903 no royalty was charged and only a five shillings per month licence fee was levied. Timber getting was virtually uncontrolled.

Suitable access points for sailing ships determined the location for the many small settlements that gradually established along the coast. All local rivers have shallow and shoaly entrances. Shipping by sea was the only, and anyway fastest transport, prior to the development of sealed roads along the coast. The government railway line finished on the northern bank of the Shoalhaven River, being opened to 'NOWRA BOMADERRY' on the 2nd of June 1893.[7] Since then there have been many attempts to have the railway line extended further south down along the coast but all have been unsuccessful and are likely to remain so for the forseeable future.

SAWMILLS

Pit sawing predominated in the southern forests until the 1850's when sawmills began to appear. The adjacent tableland forests were not exploited until well into the 1870's.

Many south coast sawmills were located right on the coastal beaches or on the protected lee of coastal headlands. Usually the northern side. Others were built on the shores of protected embayments and along the many estuaries. Most of the mills in the region can be considered as temporary affairs.

Small villages of weatherboard houses for employees sprang up around the temporary mills. Mill managers continuously petitioned the NSW state government to provide teachers to teach the children of mill employees. Education was seen as an important factor on encouraging men to work at the then isolated mill sites. Family men were seen as being more stable, with single men regarded as temporary drifters. Provisional and/or part-time schools were provided, often operating in buildings leased from the mill. Sometimes the mill management built the school buildings at its own expense.[8] Mill-site shops were also operated by opportunistic mill managers, so keeping wages paid to the same company. Other necessities of life were purchased from travelling salesmen working out of the larger towns.

While construction timber has always been an important product from the southern forests others have included railway sleepers, pit props and roof supports for the many coal mines in the Illawarra area. Recent exploitation has been for woodchips. Even as late as 1883 the timber trade was almost the sole significant industry in the Batemans Bay – Clyde River district. Thirteen sawmills plus two or three being then erected there, cut on 700 cubic metres per week of spotted gum and blackbutt. These mills generated employment for between 250 and 300 families.[9]

During 1922, mill managers blamed the high basic wage and introduction of the 44 hour week, for reducing employment in the timber industry around Batemans Bay.[10] Managers asserted that the reduced working hours made the difference between profit and loss, elsewhere on the south coast[11] as well.

The Red Hill sawmill, 1879, when owned by Goodlet & Smith. This mill produced sleepers for the tramways of Sydney. Photo: Courtesy A. McAndrew.

MILL ACCIDENTS

An unknown number of workers have died in the NSW timber industry. On the far south coast, timber getters were killed by branch "spears" falling from trees without notice,[12] and being crushed by trees as they fell after cutting. Apart from the innumerable loss of fingers and limbs, mill workers have also died in double digit numbers. Accidents were due to being crushed by flitches coming too fast off the mill bench, boiler explosions[13] and being crushed by rolling logs while unloading the logs at the mill.[14]

TRAMWAYS

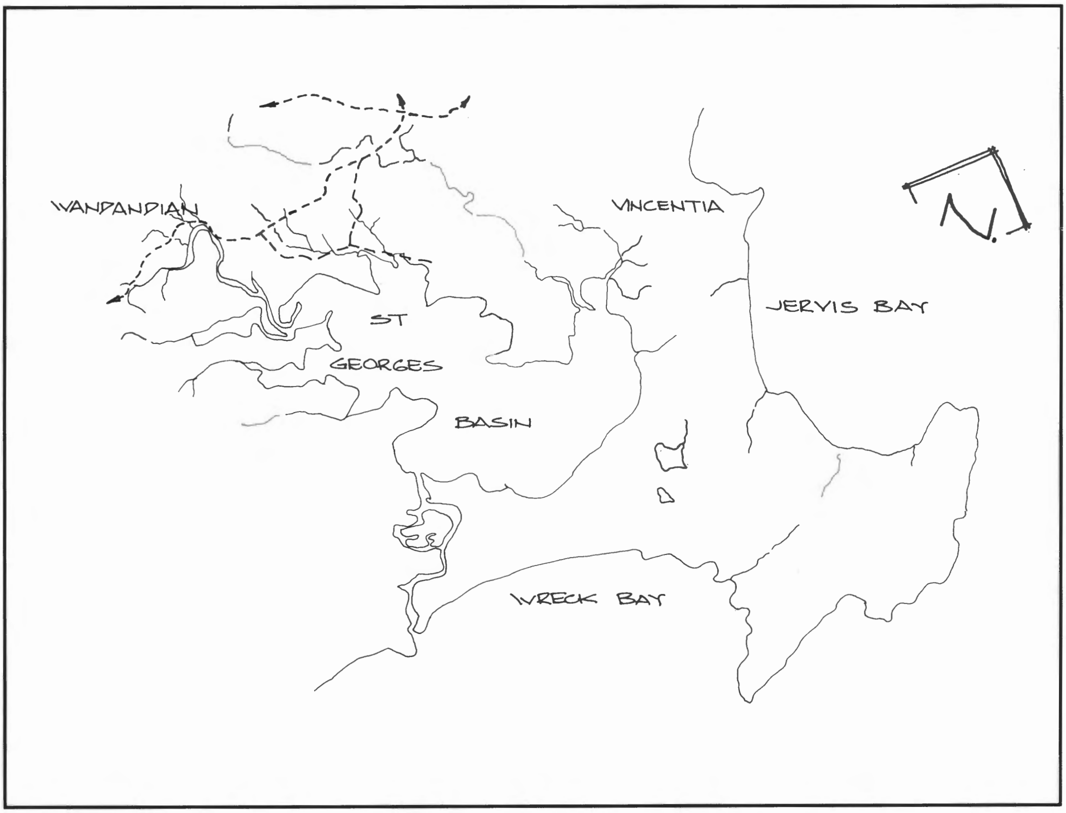
Most south coast mills were small temporary operations. There have been well over 100 of them. However only a few used tramway technology for more than their saw benches. Tramways were used to either bring logs in from log dumps in the forest to the mill to carry the sawn timber from the mill to its outgoing transhipment point.

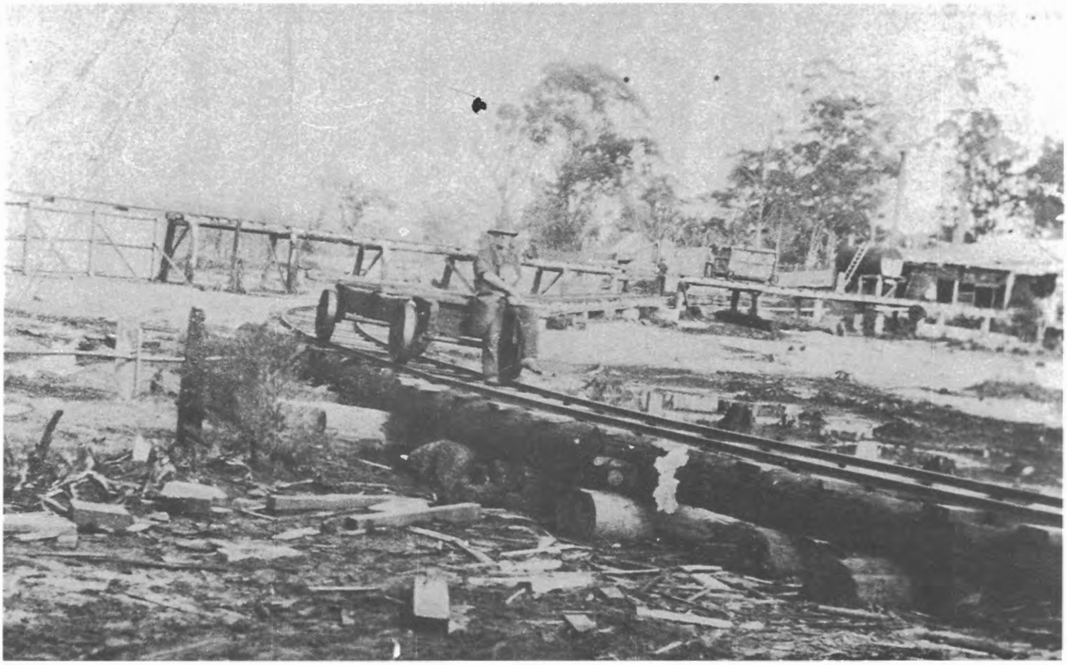
Low values of the south coast forests meant that financial rates of return on invested capital were lower than on the NSW north coast. Therefore there was little incentive to invest in capital intensive works such as laying a line of even light rail.

The Parish of Kioloa is the only south coast parish, frequently mentioned in the NEW Government Gazette as the location of Special Lease applications for tramways.[15] The presence of a forest of trees better suited for milling, in the Bawley Point - Kioloa area, resulted in a concentration of the more significant tramways there.

On the accompanying maps, tramways shown by a thick solid line (______) have been confidently plotted from contemporaneous maps and/or interpretation of old air photos and/or field survey. Those shown by a line of thick dots (......) are known to have existed but have not been accurately plotted. Roads shown by a line of dashes (- - - - - -) are modern roads shown to aid current field location. The roads are not likely to have been contemporaneous with the tramlines.

The maps are not to scale.





Wandandian sawmill. Paddy Hayward riding a wagon down to the punt loading wharf. Note the elevated saw-dust line in background. Photo: J. Wallace Collection.

1. WANDANDIAN MILL

SAWMILL

During the 1890's Alan Taylor's sawmill at Tomakin (near Moruya) was shifted north to Wandandian and rebuilt there by Abraham Jennings. The mill operated under Alan Taylor's management until about 1911 when it was purchased by Messrs William Watt and Alexander Mathie.[16] Between c. 1915 and 1925 timber was cut for the mill from the gorges west of Wandandian and around Jerrawangala and hauled to the mill by bullock team. At one time 13 teams were in operation. Milled timber was shipped out from the mill in shallow draft vessels downstream to the deeper water in Sussex Inlet. Timber was there re-loaded on the water into ocean going ships for the trip to Sydney. Initial coastal shipping was powered by sail, later replaced by coastal steamers.

W. Watt and Son's steam punt or barge (known as a 'Drougher' was the ex-New Zealand drougher 'The Advance'.[17]

TRAMWAY

Sawn timber and sawdust were removed from the Wandandian mill via two narrow gauge tramways. One was a short curving line that ran downhill to take sawn timber from the mill to the punt loading wharf on the shore of 'The Lagoon'. The other was the sawdust disposal line. The sawdust line rose up from ground level at the mill on an inclined elevated timber trestle. The sawdust line crossed over the sawn timber line apparently by some form of opening bridge arrangement.

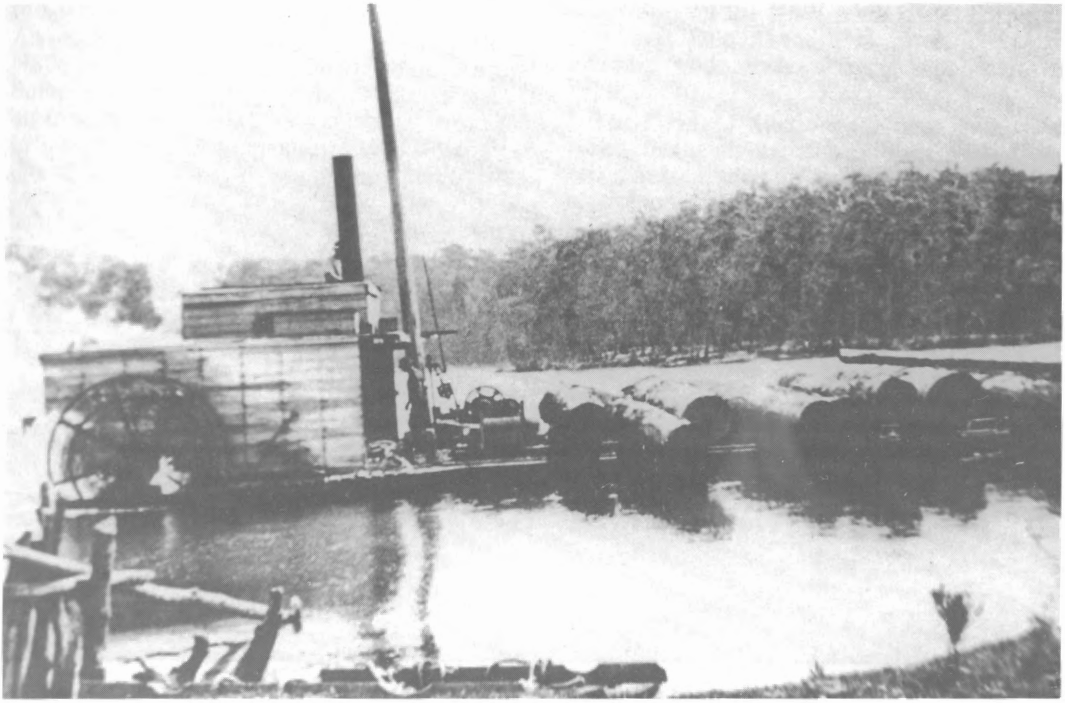
CLOSURE

The Wandandian sawmill closed for an indefinite period during early May 1922.[18] Re-opened at a later unknown date the mill operated in the Watt name until c. 1961. Sea transport continued until after World War 2 when it was replaced by road haulage.

2. RED HEAD MILLS

GOODLET & SMITH'S SAWMILL

The first sawmill at Wreck Bay on the northern shores of the Red Head headland was started during the latter half of 1878 by Messrs Goodlet and Smith under the managership of a Mr William Pearson.[19] Wreck Bay is now called Boat Harbour and Red Head is now called Bendalong. Mill



Drougher of the type typically used proceeding towards Chinaman Island. *Photo: Courtesy A. McAndrew.*

worker families moved into the locality and a petition was soon organised for a school to be established. During December 1878 Mr Pearson expected the timber trade to last about three years. A provisional school was opened for mill worker's children in July 1879.

The mill was an impressive looking, two storey wooden structure on the side of the hill. Logs were rolled from the ground level log dump, out onto the top level to the saw benches. The top level was supported high above the steeply sloping hillside on long round timber poles.

Sawn timber was removed from the saws and shot down one of several steeply sloping wooden chutes. At the bottom of the chutes men removed the timber and stacked it on the ground along the base of the hillside. The boiler house with its tall, square brick chimney was located behind the mill on the lower level.[20]

By 1883 the mill was cutting an average of 40,000 feet of timber per week principally blackbutt. Timber was procured locally from the district. About thirty men were employed. Plant consisted of a 25 hp engine, breaking-down frame, three circular saw benches and a shingling machine. Two schooners regularly plied north to Sydney.[21]

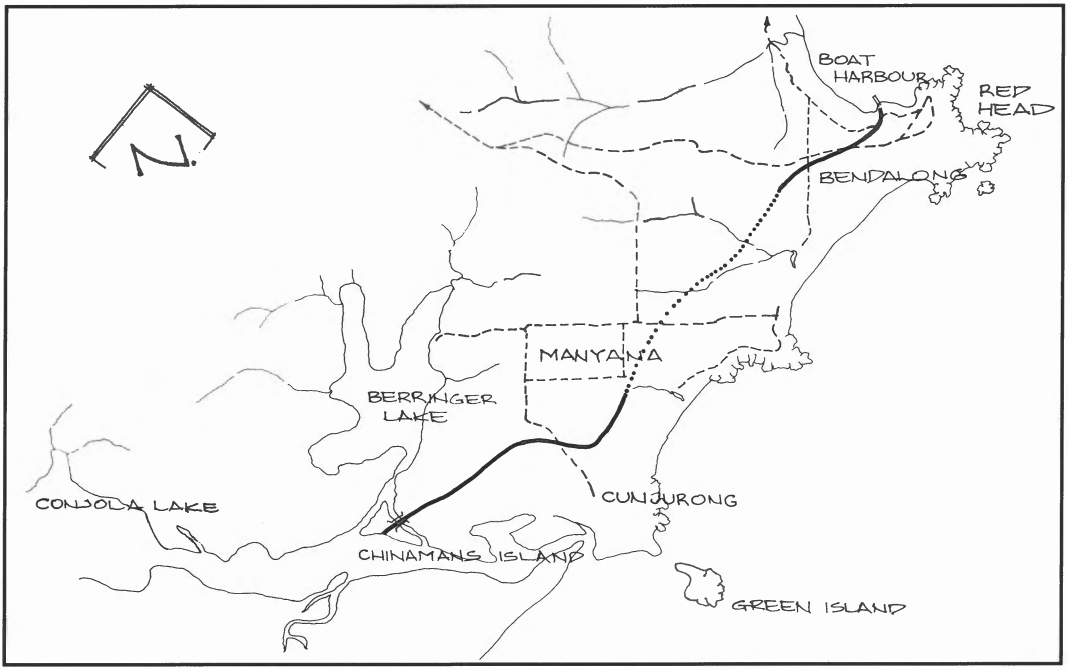
By 31 October 1884 mill management was planning to move the mill a few miles further south shortly. The move was estimated to be going to happen in about six weeks from 12 January 1885.[22] The Red Head mill operated until some time early in 1885 when it was moved southwards to Kiola.[23] Most of the timber close by had been cut out.

KIRTON AND EARNSHAW'S SAWMILL

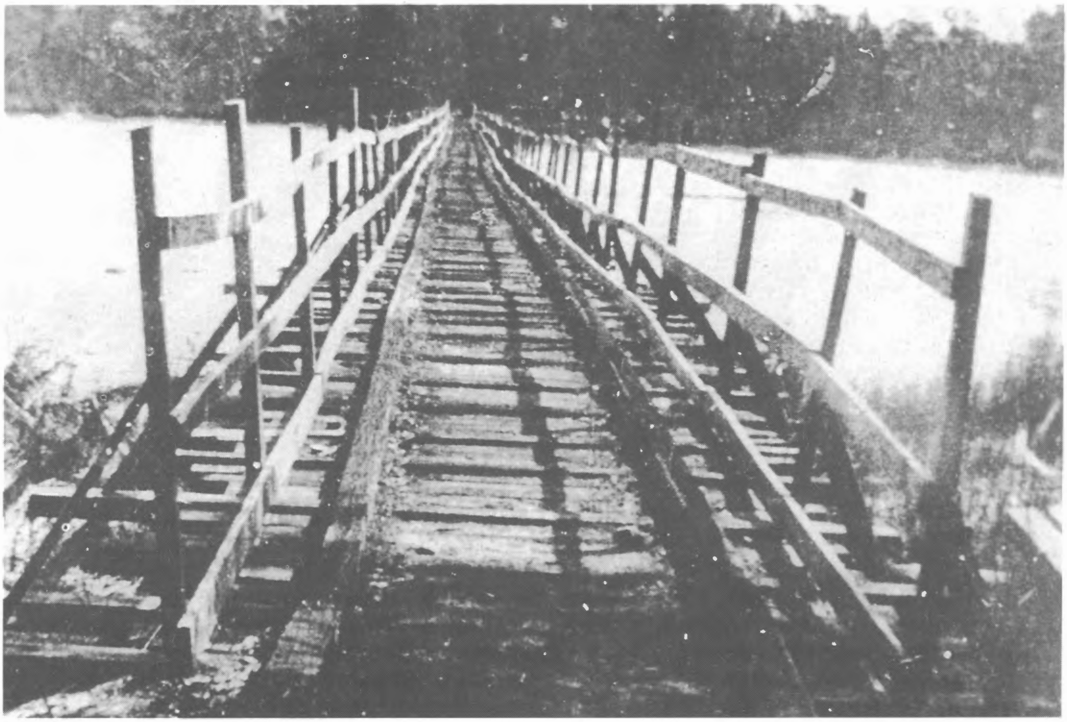
During the early months of 1920, Kirton and Earnshaw Ltd set up a new timber mill at Red Head to which they gave the amalgamated name of 'Red Mill'. Kirton and Earnshaw were colliery agents and coal contractors of Sydney and Newcastle. A Mr W. Hockey was the sawmill manager during the 1921 era, with a Mr Davis taking over managership prior to early September 1923.

SILICA MINING

In about 1921 a new venture into the mining of silica rock was welcomed into the area's industrial base. Silica rock is practically worthless except for its use in making fire bricks. Mining started but by February 1922 '. . . further retrenchment' in the



Tramway bridge. Looking towards the mainland from Chinaman Island. Photo: Courtesy A. McAndrew.



silica and timber industry around Milton was then expected shortly.[24] Working in conjunction with the then existing sawmill, mining was hoped to provide a more reliable future for the small settlement on the headland.[25]

TRAMWAY

Timber (mostly blackbutt) was drawn from around Lake Conjola and floated across to the south side of Chinaman Island with the aid of a paddle wheel steamer. Most Australian hardwoods do not float, so cannot be rafted across the lake as can be done with softwoods. Instead, logs were hauled up onto the punt-like vessel known as a 'Drougher' and ferried across the lake as deck cargo. Bill McIntyre and later Fred Tetley drove the drougher.

Lake Conjola north of Chinaman Island was, and still is, all shoaly shallow water. Therefore boats could not bring the timber direct into the mainland. So, on the lake (southern) side of the island, logs were rolled off the drougher, into the shallow shoreline water, rolled up planks laid down on the beach, and loaded onto the trolleys of a horse drawn tramway.[26]

The tramway carried the logs northwards over the island, along an extensive low bridge across the shallow water and then across the mainland to the mill at Wreck Bay on the northern shore of the Red Head headland. Chinaman Island timber depot bridge and sections of the tramway at both ends of its run, were covered by a Permissive occupancy for a tramway applied for in 1921 by K&E.[27]

Tramway rails were of about 3 by 4 inches (75 x 100 mm) timber with a gauge of about three feet (914 mm). Horses were housed in a long timber and corrugated iron building on the grassy edge of Boat Harbour Beach. The building was later used as a holiday residence and during 1946 was known as the 'Stables'.

CLOSURE

The Red Head sawmill ceased working in about mid May 1926. K & E blamed the Workers' Compensation Act for closing the sawmill in claiming that the Act so adversely affected the profitability of their timber operation that they were unable to continue the operation without showing a substantial loss. However the mill probably closed

Riding to Red Head on the tram near Lake Conjola. Photo: Courtesy A. McAndrew.

because of the very poor timber market.[28] During the early days of July of 1926, the mining operation also closed down.

Horizontal beams of the bridge north of Chinaman's Island were still in evidence as late as 1940. Remnants of the tramway remained in good condition until the early 1980's.[29]

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Horse team hauling a log load towards the mainland from Chinaman Island, c. 1924. Photo: Courtesy Maggie Brown.

FROM ALEXANDRA TO THE RUBICON

by A. Kersten

In 1947 I undertook a walk from Alexandra to Rubicon. Coming from lovely Marysville, I was not impressed with the denuded low hills of Alexandra, with their garb of yellow grass and just a few trees here and there. But the district improved on further acquaintance. There are shady, restful spots under the trees on the banks of the wide Goulburn. The Municipal swimming pool with its charming surroundings is as attractive as any I have seen. Such eminences as Brook's Cutting, Mr Pleasant and Mt Prospect afford very fine views of the Goulburn Valley, the Thornton flats, with Mt Buller, the Black Range and the Cathedral as an imposing background.

The landscape becomes greener and brighter as one walks on to Thornton (8 miles). Though it is mostly sheep country there is a good deal of dairying and mixed farming. On the road to Thornton grow many magnificent old eucalyptus, such as any artist would love to paint. On the Goulburn, near the main road bridge, is a beautiful picnic ground. Here, the course of the river is broken by several picturesque flower and tree covered islands.

A further four miles through agricultural country brought a friend and myself to the State Electricity Commission's Rubicon A Control and Transformer Station. Rubicon A receives the current from the Sugarloaf power station and the four mountain stream stations in the Rubicon and Royston catchment areas. The voltage is raised here to 66,000 volts and the current is transmitted to Benalla, the North East, or the Metropolitan area. By a perfect system, supervision and control is exercised from this point over the whole Sugarloaf-Rubicon power-generating scheme.

A few miles further travel took us through Lower Rubicon to the Rubicon power station, whose immaculate machinery and marvellous electrical equipment were explained to us by Mr A.W. Boyne, the assistant engineer in charge of Rubicon-Sugarloaf scheme. The Rubicon power station is situated at the confluence of the Royston and Rubicon Rivers in a little Paradise with the very prosaic name of Lower Rubicon or 17 miles to Tin Hut. By the way, you need not walk the 14 miles to Lower Rubicon or 19 miles to Tin Hut. A very efficient little railway runs from the timber seasoning works in the railway yards at Alexandra to the saw mills at Tin Hut. When you are riding on chaff bags on the tiny trucks attached to the 70 hp diesel locomotive, you travel at 10 mph as comfortably through the countryside as if you were seated in the observation car of the Spirit of Progress.

At Tin Hut, further technical marvels awaited us. The station lies at the foot of one of the steepest hills I have seen in Victoria (1450 ft rise). Down this hill comes the 36 inch pipe line feeding the turbo-generators, and up the hill runs a roomy cart on rails. It is attached to a heavy wire rope, manipulated by a powerful winch on the top and said to be accident-proof. The grade in sections is 1 in 1½. Going up and down this steep incline provides a real thrill.

As you go up, a glorious panorama unfolds, stretching as far as Wangaratta and the Strathbogie ranges. It is one of the most enchanting views I have seen. Arriving on top, about 2700 feet, we were at the end of the main Rubicon race, at the forebay, where the waters rush from the main channel into the pipeline, which is protected by a big grill. Here not only the floatsam is caught, but on warm afternoons sometimes up to 20 snakes. The snakes get into the race to drink and cannot get out again. The swift flowing race winds around the western mountain side. It not only carries water from the Rubicon River, but also from innumerable creeks and rivulets, cleverly caught in auxiliary channels. A narrow-gauge tramline runs along the full length of the main race, around sharp bends and over long bridges. It is used for patrol and inspection purposes, also for the transport of timber, provisions and building materials. We rode to the Royston Power House in a neat little battery-driven tram car and marvelled at the completely automatic working of this station, under the distant control of Rubicon A.

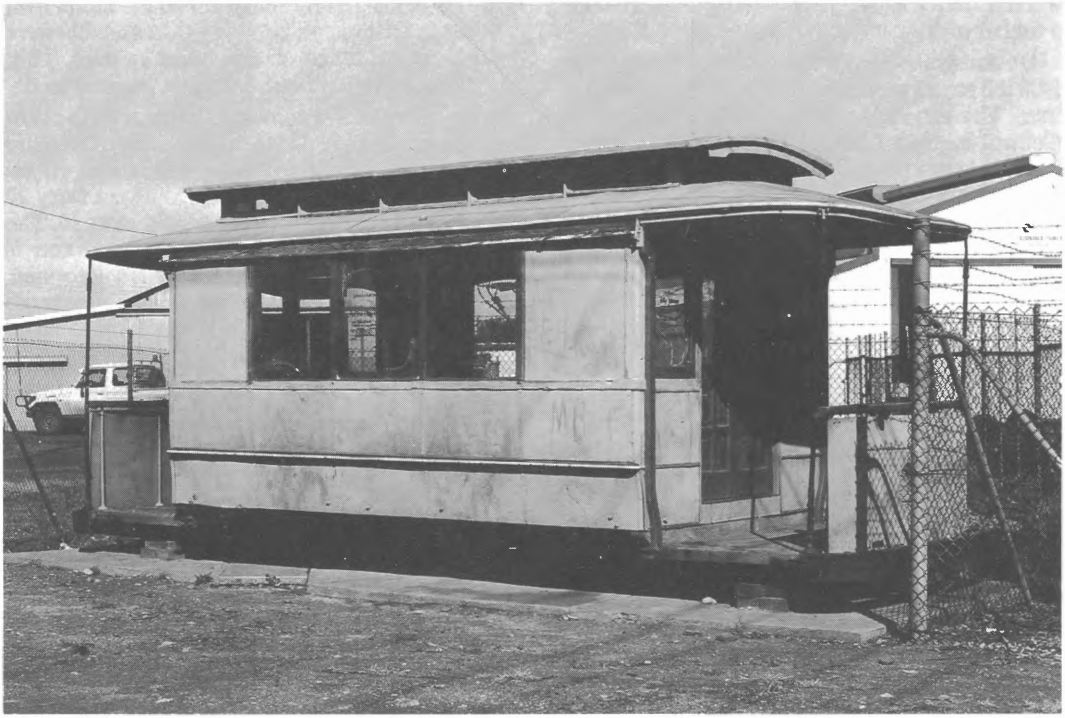
From Royston, we walked the short distance to the Rubicon dam, a lovely spot high up in the hills, where the main race begins. In spite of the enormous damage done to the forests by the 1939 bush fires, and the long stretches of grey ghost trees, the scenery in general is again magnificent, and the distant views as far as Lake Mountain are captivating. When we were there, the S.E.C. were still repairing the great damage done by a breakaway in the main race six months ago. The main channel had been repaired and was now supported by a strong temporary timber structure, to be replaced by proper earth and cement foundations — a tremendous job.

My companion and I had a most enjoyable lunch in a fly-proof marquee at the construction camp. Better food could not be obtained in the city.

For one of the most informative and beautiful outings I have had in 30 years my thanks are due to Mr F. Aplin, Engineer in charge of Rubicon and Kiewa hydro-electrical undertakings, Mr A. W. Boyne, Mr E. Rees, in charge of haulage and trolleys and Mr L. Reed, leading hand at the construction camp. My friend and I left with a profound respect and admiration for the enterprise and efficiency of the S.E.C. It was a trip I can warmly recommend to members. There is an excellent camping site at Tin Hut and Mr Boyne has all the information concerning the condition of tracks in his territory and camping facilities high up in the hills. A long weekend, Christmas or Easter at Rubicon will enable you also to visit the very beautiful waterfalls within easy reach — the Snobs Creek falls, a magnificent hurtling cataract of great volume and height, the Royston falls — 310 ft of tumbling silver in the enchanting setting of ferns, rocks and big gums, and the Rubicon falls in the Rubicon state forest, also an impressive spectacle.

(Article originally appeared in "The Melbourne Walker")

Leonora to Gwalia Tram Car No. 1 on display at Leonora, September 1993. Photo: David Whiteford.



LEONORA TO GWALIA TRAMWAY

by David Whiteford and Don Reid

The photograph in LR126, p. 23, and reproduced again in this issue, was obtained from the Mitchell Library. It depicts the final service stock used on the Leonora to Gwalia Municipal Tramway, Western Australian goldfields. This interesting tramway system deserves a fuller mention as it was the most isolated public transport service in the state. The service began early in 1903. A steam loco, the 'Leonora', pulling two double-decker carriages between the towns, carried miners to work at the Sons of Gwalia mine and shoppers to Leonora. The Municipal Council had installed the service for both reasons, as the Leonora businessmen were intent on keeping as much Gwalia trade as possible to themselves.

The loco was former WAGR D Class No. 6 and worked here for five years when it was sold to a timber mill.

Obviously the service was well patronised, for in 1908 the steam service was replaced by an electric tram. The generating plant installed enabled the Council to light Leonora with electricity rather than by kerosene, and also supply private customers. The system was supplied by Noyes Bros. of Fremantle, and included a 43 BHP gas engine driving a 35 KV generator. Producer gas was generated using local 'mulga' charcoal. 250 Tudor cells helped maintain the service during engine shutdowns and during periods of heavy use. The tram No. 1 was built by Westralia Ironworks, North Fremantle. The supply of electricity was a profitable venture and a second generator was installed in 1909.

The electric service began on 5 October 1908 when Mrs Avard, wife of the Town Clerk, broke a bottle of wine over No. 1. The Members of Council, their friends and the town band were then driven along the line initiating the service. The steam service carriages were still used, but their upper decks were dismantled. At night, the town lights dimmed dramatically when No. 1 started or pushed its way round the very tight Gwalia bend.

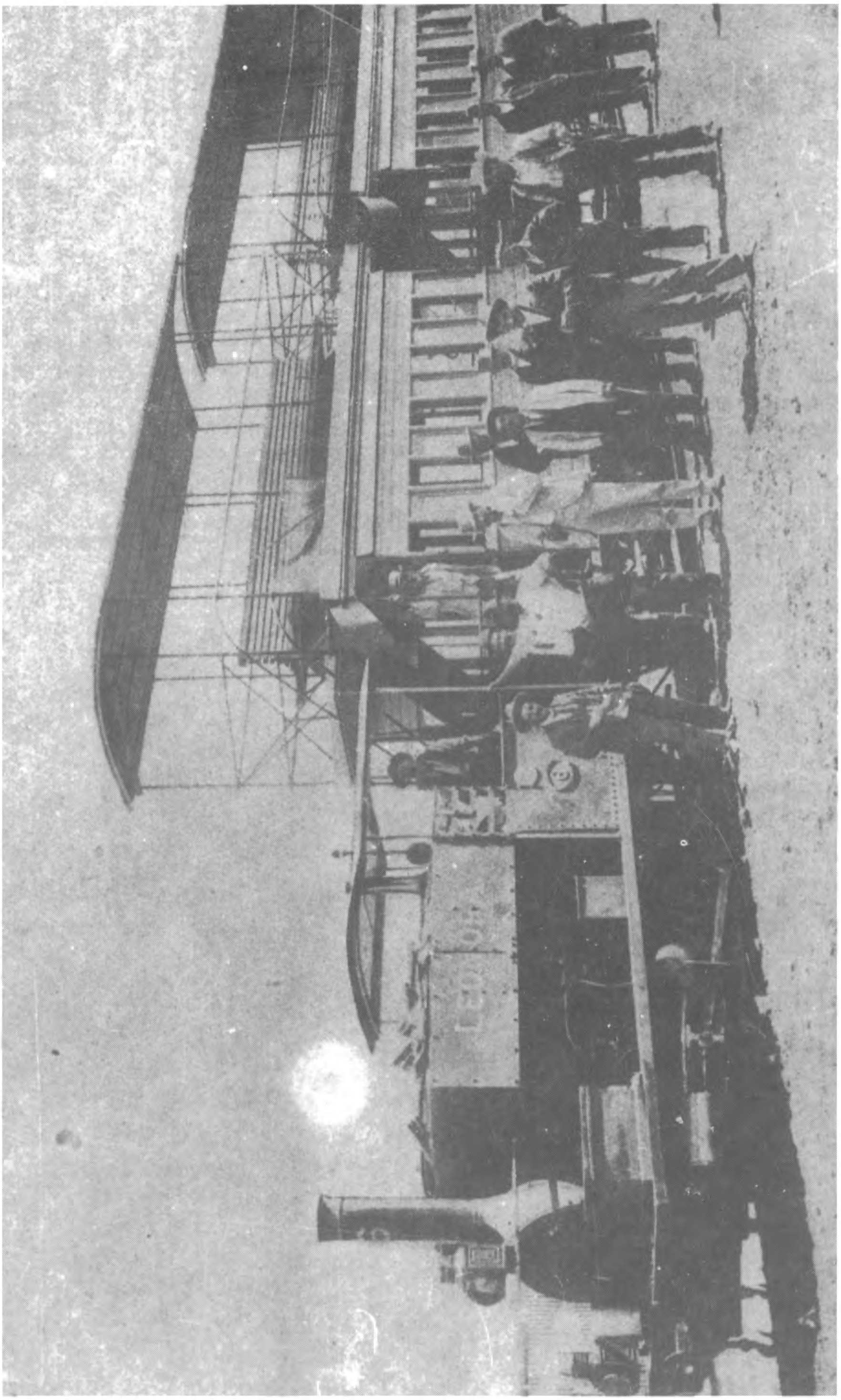
The tram barely paid its way, patronage gradually declined, and in 1916 it was decided that No. 1 should be retired and replaced with a motor-driven rail car. Fate helped this decision when a fire started in the powerhouse battery room on 16 July, 1916 and razed it. No. 1 was pushed into its shed and never ran again and the Leonora Municipal Council immediately wrote to the WAGR offering the tramway cable and fittings for sale with the tram itself also available. Next month, the WAGR replied with a short refusal.

Replacement service was provided by a Leonora Council owned converted motor truck, a 1½ ton Overland, and the following quote from a June 1919 report by the Acting Chief Mechanical Engineer (WAGR) to the Deputy Commissioner of Railways takes up the story. (After the fire, a petrol motor was placed on rails) "by the Municipality which has recently handed the motor over to a syndication of Leonora citizens who were going to pay rental of a nominal amount. This, however, they have not been in a position to do.

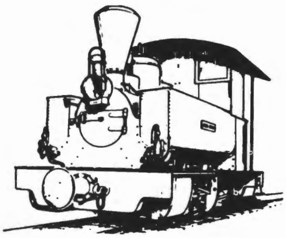
Track consists of some two miles of 35 lb rail in bad condition. A 35 hp utility truck (Overland motor) altered and fitted with small flanged wheels is driven by sprockets and chains; it can carry 20 passengers but on our rating would carry 10. The motor is obviously in very bad order, and is frequently under repair, and is, I am informed, worked at a loss by the syndicate. This is one more illustration of the futility of attempting to adapt a motor car for rail service."

The powerhouse was rebuilt and started running again on 23 December, 1916, the mine having supplied electricity in the interim. The rail car, nicknamed 'The Tank', ran until 1921 when the service was discontinued. The rails were pulled up in 1923 and sold to the Sons of Gwalia mine, marking the end of a unique service.

The photograph of the tank reproduced here dates from 1921. It shows the rail car with a substantial cover over the passenger seats whereas earlier photographs of the vehicle show no cover or even any framework for a cover. Surprisingly, Electric Car No. 1 survived to be restored and preserved outside the present Leonora powerhouse, although it is minus the power frame and bogies.



Leonora to Gwalia steam tram. *Photo: C.B. Thomas Collection, courtesy Jim Longworth.*



LETTERS

Dear Sir,

W.A. Locomotive conversions from Traction Engines, LR 78, 95, 99

Recently I came across several letters written by each of the Buckingham brothers in August 1943, to a W.R.B. Johnson, concerning Buckingham's conversions.[1]

According to the letters, Mr Alexander Buckingham went to England about 1879 and purchased the traction engine there. The engine was used to haul logs from the bush to a water driven sawmill, about 1½ miles from Kelmscott Railway Station, and for carting sawn timber from the mill to Perth. About 1912 the traction engine was converted into a locomotive. The loco was then used to haul logs over Buckingham's private line near Buckingham's Siding near Collie.

Having its own winch the loco could do its own loading at the log landings. Use of the machine as a winch and as a locomotive continued to at least after late 1943.

Reference

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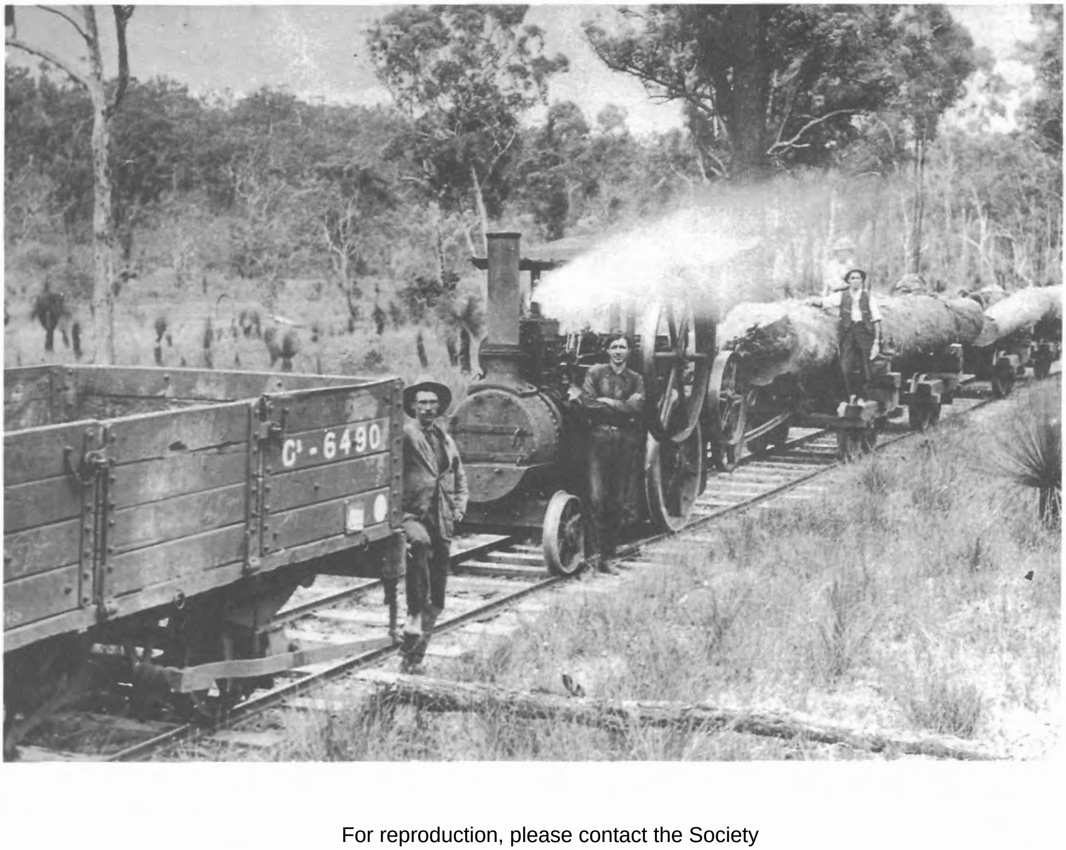
Jim Longworth
Cheltenham, NSW



Dear Sir,

Identification wanted LR 102, p. 30, lower photograph

I recently came across a print of the same scene, in a fragment of the H.H. Matthews collection, held in the ARHS Archives, Sydney. The photos are not identical but must have been taken only about a second or two apart. On the back of the print is written; 'R.72. Gold Dumps Pty. Ltd. (Llanberris Plant) Ballarat East. 'Fordson' Tractor hauling four dump trucks. 11.3.40. W. Jack. photo'.

Perhaps a Victorian researcher can chase up the details?

Jim Longworth
Cheltenham, NSW

* * *

Dear Sir,

Rail gauge 3 ft 4½ inches

I have long been intrigued by the 3 ft 4½ in gauge tramway in the Rubicon Forest and have often wondered why such a hybrid gauge was adopted in the Victorian timber trade where 3 ft or 3 ft 6 in would seem the standards. See LR 28, 36, 44 and Rails to Rubicon. In my wanderings through the bush I make it a point to measure the gauges of any tram wheels I come across. In most instances the wheels sets are damaged (bent axles, misaligned treads, etc.) and I usually find measurements that are 2 to 4 inches less than the nominal gauge or occasionally a little wider.

However I have been fortunate to find various examples of undamaged wheelsets in the Otways. At Beech Forest and Gellibrand, where the standard gauge was 3 ft the wheelsets measure from 2 ft 9 in to 2 ft 11 in i.e. from the rail to rail contact point where the vertical flange meets the horizontal tread. The West Otway wheelsets seemed to be tinkered with as there was no consistent actual versus nominal gauge difference i.e. 2 ins or 1½ ins. Some of the sets had been re-axled and apparently returned to 'gauge' by eye or perhaps when the mill blacksmith ran out of energy belting the wheel back on. Former tramway operators have told me that allowance had to be made for all the wobbles and variations in wooden rails, clearance for the wheels to go around curves and the generally rough nature of construction, especially in the short-lived log lines.

In recent months I have come across intact and undamaged wheelsets in the East Otways at sites operated by W.R. Henry and Anderson, Mackie & Co. The East Otways was a 3 ft 6 in gauge area and there is sufficient evidence on the gauges of the nine locos that worked the tram lines to dispel any doubts. In addition I located a section of intact wooden rail on Henry's Noonday Creek tram and it measures 3 ft 6 ins.

At the sites mentioned above I measured a total of seven undamaged wheelsets and each of them gives a rail to rail contact point of 3 ft 4½ in. It is my view that 3 ft 4½ in was the standard rail to rail spacing for 3 ft 6 in gauge timber tramways in Victoria. I support the proposition in Rails to Rubicon p. 6 that 'It is possible that Clark and Kidd, having little experience in such matters, simply ordered timber tramway wheelsets without specifying the gauge and, when they arrived, ignored the designed side-play between the flanges and the rails and set the rails the distance apart that looked 'right' under the wheels.'

If this were the case then the standard of construction would need to be of a high standard as there would not be very much slack in the gauge. The photos on p. 21 in Rails to Rubicon seem to indicate a very true track and certainly the standard is much better than prevailed in the Otways.

Norman Houghton
Geelong, Victoria

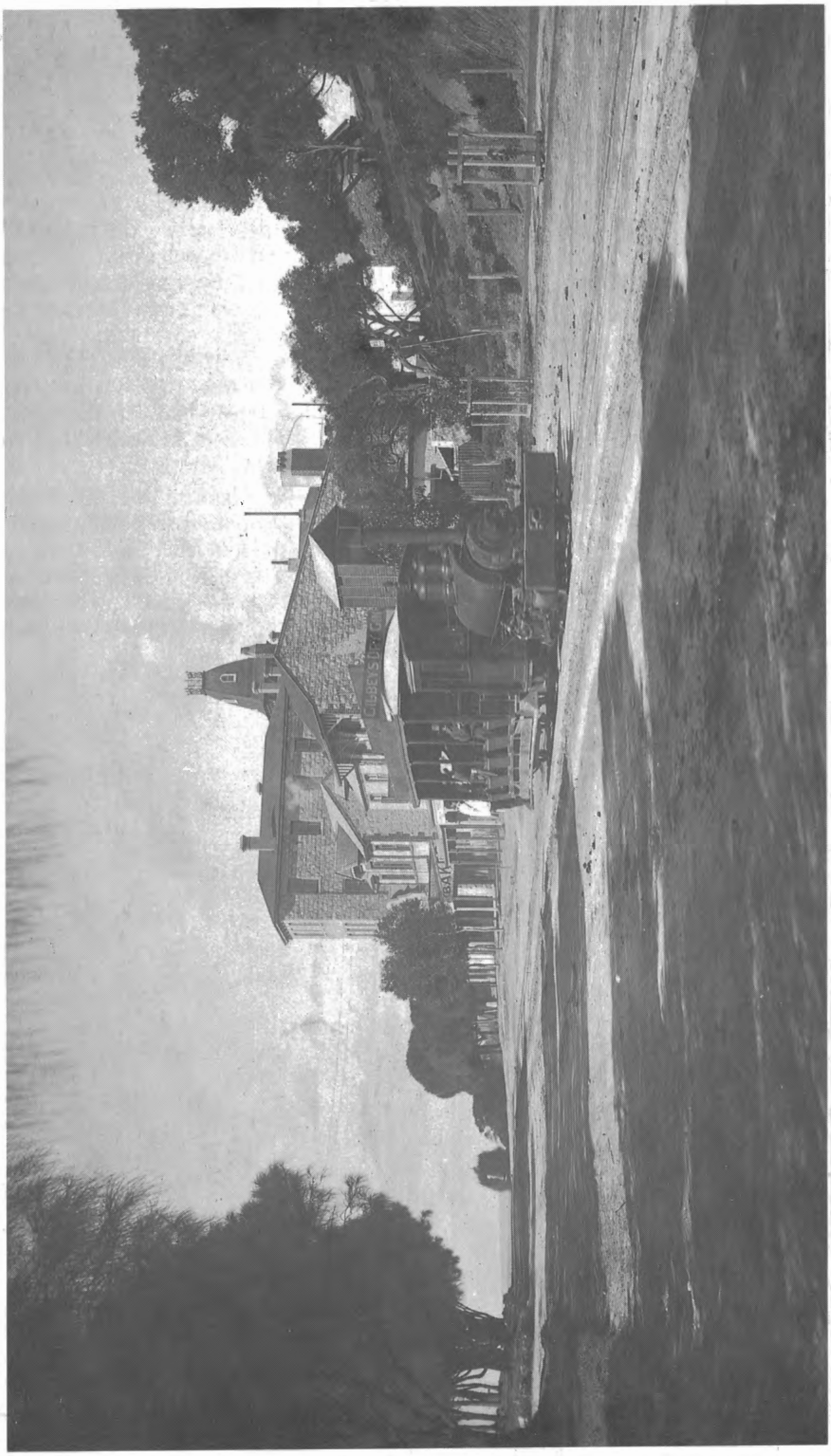
* * *

Dear Sir,

Coffs Harbour Discoveries LR74 and LR76

Although I can't find it actually recorded in "Light Railways" I'm sure discerning readers will have observed that the 0-4-0ST pictured in the top photo on page 36 of LR74 (and regarded as a mystery), appears to be identical to the loco depicted on page 25 of LR86 where it is identified as NSW PWD loco No. 31, by Parkinson & Monaghan/1895 concocted from Henry Vale-supplied parts. Readers' comments are invited.

Phil Rickard
Ringwood, Victoria



As it was at Sorrento, Vic., early this century. Catch a steam hauled tram to the beach.   Photo: Mark Plummer Collection.