

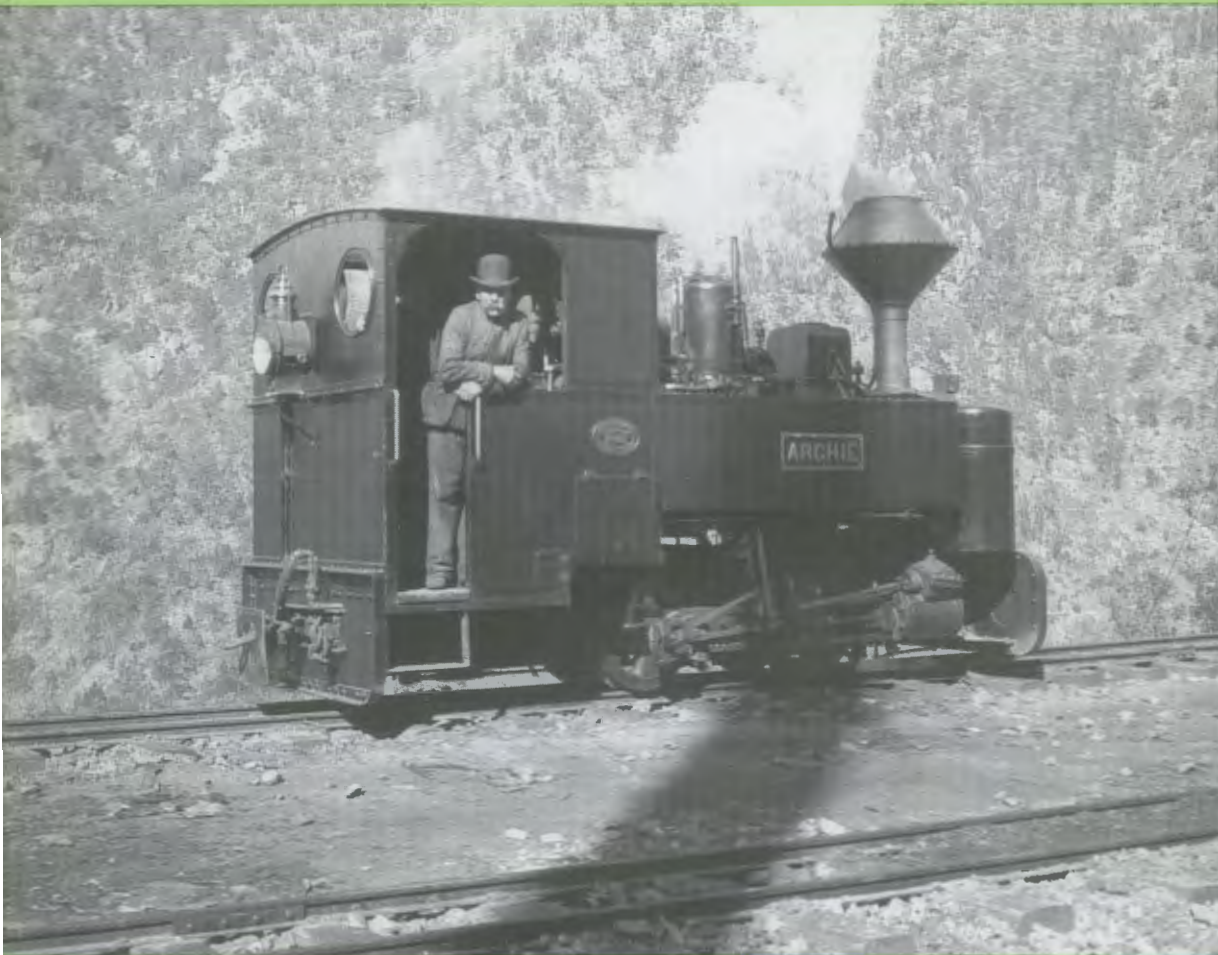
# **LIGHT RAILWAYS**

**Number 110**

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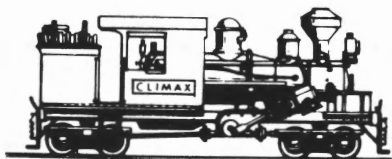
**Queensland Guano Tramways  
Marienberg Timber Tramway, PNG  
Low-impact Elevated Inclines**

**ISSN 0 727 8101**



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# 1990

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## IDENTIFICATION WANTED

Paul Simpson is hoping readers can assist with identification and further details of the scene depicted in the photograph reproduced below. The caption "Balwyn Wylde [sic] Life Sanctuary" are pencilled on the back of the photograph.



**Cover:** Bowler hats symbolise a former era as *ARCHIE* (Krauss 6063/1908) rests on the Burrinjuck Tramway in New South Wales.

SRA Archives

# QUEENSLAND GUANO TRAMWAYS

by John Browning

## The Guano Trade

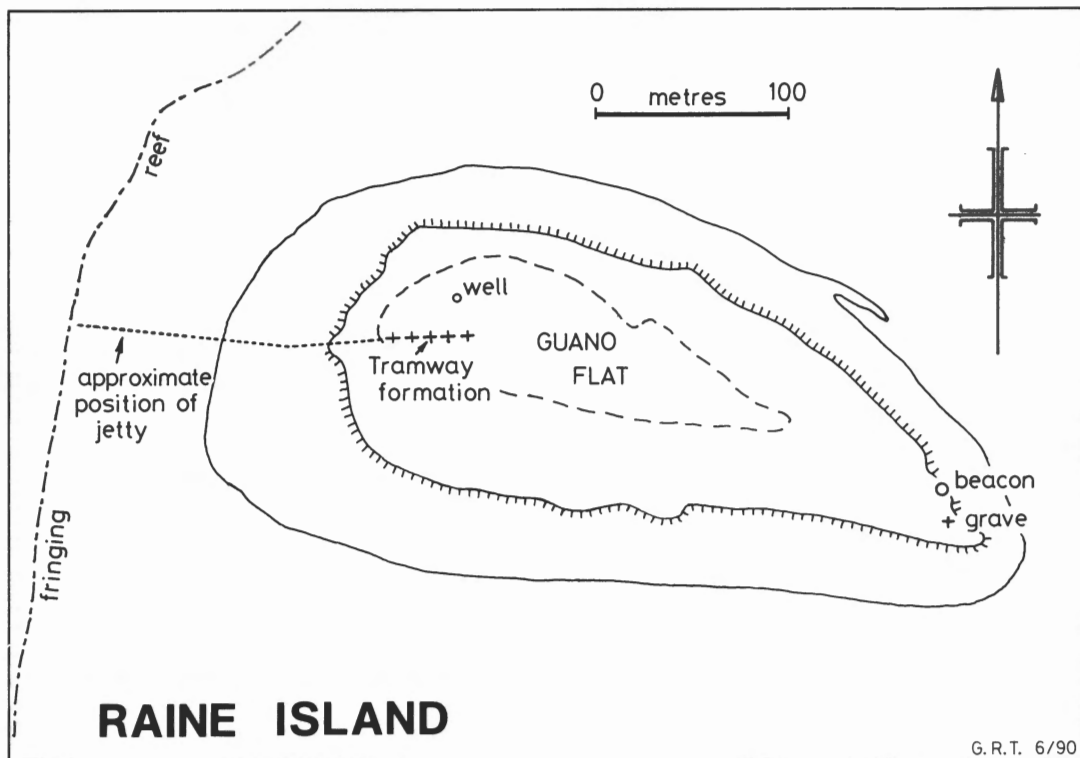
The latter part of the nineteenth century saw the development of mining of phosphate rock, which can be treated with sulphuric acid to produce soluble phosphate for use as fertilizer. However, before 1900, when Ocean Island was first opened up for mineral exploitation, the main source of phosphate for fertilizers for Australia and New Zealand was guano, the accumulated excrement of thousands of generations of seabirds, transformed over time into an alluvial phosphate of varying composition.

An estimated 200 million tons of guano, formed mostly through a million or more years of the Pleistocene period, is estimated to have been available world-wide at the start of guano mining in the mid-nineteenth century.

The guano deposits of the western Pacific area were exploited during the second half of the century, using broom-and-shovel and wheelbarrow technology in partnership with cheap labour, both Asian and Pacific Islander. One of the main entrepreneurs of this trade was John T Arundel, an Englishman whose first contact with the guano trade was at the age of nineteen in 1860 off the coast of Peru. His operations were to extend right across the Pacific Ocean, using tramway systems and even a 2 ft gauge steam locomotive.

## Raine Island

Raine Island, off the coast of far-north Queensland, was exploited for its guano in 1890-92. It must have been one of the remotest locations of a steam tramway in Australia.



The island is now one of the world's outstanding nature reserves. The Raine Island Corporation, set up under the Meaker Trust (Raine Island Research) Act, 1981, is custodian of the island, which is a haven for hundreds of thousands of seabirds and is a major turtle rookery. A number of remains of the guano exploitation industry have been identified on the island, and are likely to be the subject of archaeological research in the future. Access to the island is strictly limited by law, but the Corporation is active in encouraging the bringing together of historical evidence about the island, and in encouraging further research.

The uninhabited tear-shaped island of some 30 hectares is some 170 km from the Australian mainland. Surrounded by a coral reef, the island has sandy beaches with low grassland behind. A line of low sandstone cliffs surrounds the interior of the island, which contains a flat central depression. At the south-eastern tip stands a tall stone convict-built navigation beacon constructed by a naval party in 1844. The beacon was restored as a bicentennial project in 1988 after extensive archaeological and engineering investigation.

### **Guano Operations**

JT Arundel had been active in scouring the Pacific Islands in search of guano, but by the late 1880s, most substantial deposits had been worked out. As a result, he decided to try the islands off the coast of Queensland. He had taken samples at Raine Island in 1883, and returned to exploit the guano deposit in 1890. The island was worked from 1890 to 1892, guano being taken from an area about 400 by 200 metres in the centre of the island.

In fact, it appears that Raine Island had been worked for its guano previously. In 1865, Dr WL Crowther of Hobart applied for and was granted a licence to remove guano. Rent of £ 50 per year was remitted for the years 1870-72, when an estimated 500 tons were removed.

In 1890, the Arundel operation moved 4000 km from Baker Island in the Pacific to Raine Island. Five Europeans accompanied the equipment on a three-masted schooner, including the man to take charge on Raine, 21-year old Albert Ellis, and his mother. Arundel himself, with five more Europeans, met up with Ellis' party at Raine late in August, having come from Cooktown with the first batch of labour, mostly Chinese and Malays.

It was not possible to bring the experienced Kanaka labour force from Baker Island, as the law by then prohibited their importation to Queensland. In spite of some fears, the Asian workers performed well enough, although they did not have the same

strength and skill in handling the surf boats which took the guano from the jetty to the outer moorings. Thus it was fortunate that, as Raine was not in mid-ocean, it was not subject to the same ferocious breakers as were usually experienced out in the Pacific.

Arundel stayed for over two weeks to supervise the initial operations. A jetty was built on the western end of the island, where the fringing reef is closest to the shore, and accommodation was erected.

The remains of a well in the interior of the island appear to date from the guano era, but a lack of fresh water seems to have been a real problem, especially as a steam locomotive was in use. Accordingly, a condenser was made by the locomotive driver to produce fresh water. This consisted of a 400 gallon (1820 litre) tank to be used as a boiler and some 100 metres of galvanised pipe to condense the steam. Driftwood was used as the initial fuel. Other items brought in included a stock of Chinese bibles, purchased by Albert Ellis as a source of edification for the labour force.

### **Tramway**

The 2 ft (610 mm) gauge railway equipment brought in was used to build a line linking the jetty with the interior where the guano mining was carried out. About 100 metres of formation is still visible in the form of a causeway or embankment running east-west in the western end of the island's central depression. It seems likely that the line continued for another 200 metres across the central depression, and that there were branches serving the mining areas.

Various heaps of roughly cut limestone scattered across the mining area are believed to be the remains of loading ramps. In the early operations at Ocean Island a few years later, timber loading bins were constructed over the railway line. They were charged with wheelbarrows pushed up a stone ramp on each side of the track. Empty barrows were taken down timber ramps. On Raine Island, there are 16 rock piles and three earth mounds which await archaeological investigation.

The guano was housed in a storage shed adjacent to the tramline while awaiting shipment. At Raine Island, the first attempts were made to dry the guano to reduce its moisture content, a practice later developed further at Ocean Island and Nauru. This was possibly done in an area close to the storage shed. The guano was probably also blended before packing, and it was Arundel's practice to establish a laboratory as part of each operation so that this could be done to the greatest advantage.



Raine Island jetty at low tide. The government steamer, *Albatross*, is at the inner buoy and the *Concordia* at the outer buoy. A flat wagon stands on the jetty, while another wagon is at the jetty head. Batty Library

After blending, the guano was loaded into 60 lb (27 kg) sacks for ease of handling. The guano was transported in sailing ships of around 1000-1500 tonnes, which would moor at the outer buoy, clear of the reef. The guano was taken over the tramway to the jetty, where it was loaded into 2.5 tonne lighters by means of a chute. On arrival at the vessel, the bagged guano was transferred making use of a timber staging, and was emptied into the hold, the bags being returned to the storage shed for reuse. All the guano shipped from Raine is reported to have gone directly to Europe, with the exception of two cargoes for Melbourne, believed to have been used for manufacturing superphosphate on an experimental basis.

#### **Bagnall Locomotive**

According to his diary, Arundel purchased his locomotive at WG Bagnall's works at Stafford in England in June 1882. This machine is thought to be Bagnall 377, a 2 ft gauge 0-4-0T built in 1881 for Henry Hughes & Company. It was dispatched to Sydney Island in the Phoenix Group (now part

of Kiribati), where it arrived in March 1883. It was later used on Howland and Baker Islands in the same general area of the Pacific. Following its time on Raine Island, the locomotive was sent to Auckland in New Zealand for storage. It had been disposed of by 1900, but nothing more is known of its fate.

#### **Closure**

It is not known how much guano was taken from Raine Island by JT Arundel. Government records indicate that 9539 tons worth £ 23,240 were removed in 1891-92. By mid-1892, the guano extracting operations had exhausted most of the black soil-like material. The jetty, houses and other buildings were taken down, equipment removed, and the railway line dismantled.

Albert Ellis, the son of Arundel's Assistant Travelling Manager, was to become famous as New Zealand's long-serving Commissioner on The British Phosphate Commission. He held this position from 1920 to 1951, and was knighted for his services in 1938. His mother, Mrs Annie Eliza



Ellis, had died on Raine Island in 1891. Her gravestone, situated near the beacon, has recently been restored.

### Other Operations

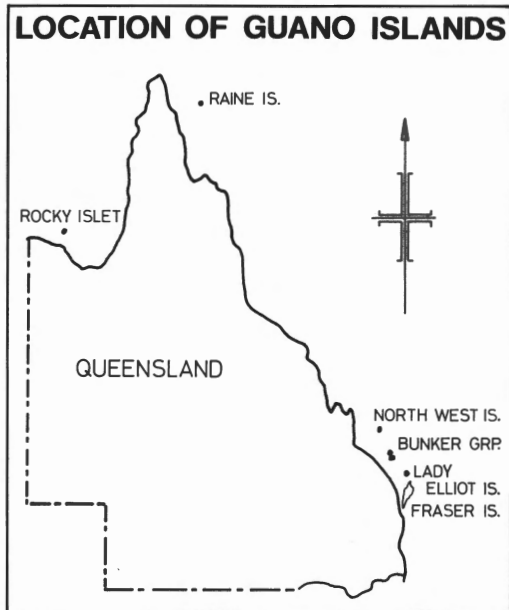
Other islands off the Queensland coast worked by Arundel had tramways, although those further south probably used horses and mules for motive power.

**Rocky Islet** in the Gulf of Carpentaria had been the subject of a Special Lease issued in March 1888 to Beaver & Company of Melbourne, who built a 3 ft 6 in (1067 mm) gauge tramway as part of their guano operations. After removing the alluvial guano, this company seems to have abandoned the island. However, in September 1891, the lease was transferred to Arundel. He inherited a jetty, railway track, three trolleys and two sets of points from the previous lessees. What Arundel had discovered was that the top 50 mm of sandstone beneath the layer of guano had gained a significant content of phosphate and was worth mining and crushing. Because of the violent gales experienced here, a strong hut was built in an old railway cutting where the men could take refuge. The island appears to have been worked until 1894. The lease seems to have been extended to Rocky Islet No.2 (Little Rocky), but it appears this island was not worked.

**Lady Elliott Island**, about 80 km off Bundaberg, was worked from 1894, and was followed from 1896 by **Bunker Islands Nos 1 and 2** (Lady Musgrave and Fairfax Islands), 100 km off Gladstone. During 1895, 7000 tons of guano were exported to New Zealand, Tasmania, Honolulu and Melbourne, bringing a return to the Queensland Government in royalties of £ 1750 (5s per ton), and employing 80 men, mostly Asians. In 1896, leases were also held for **Bramble Cay** (Torres Strait) and **Cape Grafton** (mainland south of Cairns), but it is not known if these were worked.

The final island to be worked was **North West Island**, 90km from the coast near Rockhampton. Guano shipped from Bunker Island averaged 63.5% phosphate, a better grade than that shipped from North West Island at 54%. None of these central and southern Queensland operations was considered to be commercially successful. It appears that Arundel had exhausted the major guano deposits, but wished to continue the trade as long as possible.

Although Arundel's main interests were reorganised as The Pacific Islands Company Ltd in 1897, the lease for North West Island was held in 1900 by the Colonial Guano Company, with George Ellis, Arundel's manager, in charge. Here



there were 107 Japanese, Malays and Indians employed, together with seven 'white men'. A tramline had been laid right across the island and along a jetty, 1050 yards (950m) long extending to the edge of the reef. However, the jetty was partially destroyed in a gale on 26 December 1899. Soon afterwards, the discoveries at Ocean Island, exploited by Arundel, overshadowed any future prospects off the Queensland coast, bringing the short-lived Queensland guano industry to an end.

There is ample scope for further research into this fascinating area of light railway history. Peter Dyer is currently researching both guano and phosphate tramways in the Pacific, and would be pleased to hear (via the Editor) from any others who share his interest.

### Acknowledgements

I wish to thank Ruth Kerr, Peter Dyer (who has studied JT Arundel's diary), and Dr Hugh Lavery (Chairman of the Raine Island Corporation), for their assistance with the preparation of this article.

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## MOSQUITO COAST II: MARIENBERG SAWMILL AND TRAMWAY, PAPUA NEW GUINEA

by Bob McKillop

### Introduction

In his novel *The Mosquito Coast*, Paul Theroux<sup>1</sup> explores the interaction of an unholy trinity - Western technology, missionary zeal and the tropical jungle - in a mythical Central American country. Briefly, determination and innovation appear to offer prospects that the intrusion will bring an improved life-style for the local Indians, but it is only a brief illusion. Soon nature reasserts its dominance and man's artifacts revert to the jungle.

This is the story of a real-life *Mosquito Coast*: the mission station at Marienberg, on the lower Sepik River in Papua New Guinea, and the rise and fall of its sawmill operations. The time frame extends over 75 years, with changes which were less dramatic than those depicted by Theroux. Nevertheless, the model is a useful one for analysing the Marienberg experience.

Research into the history of New Guinea relies heavily on oral sources. Documentary records are dominated by a European view of events and even these documents have been depleted by the ravages of war. This analysis builds from interviews with some surviving participants in and observers of events, supported by available documentary evidence. Significant gaps remain in the story, particularly for the pre-war years.

### COLONIAL INTRUSION

#### Traditional Society

Before the colonial era, the people of the Marienberg area were evolving their subsistence systems in response to environmental, demographic, social and economic pressures<sup>2</sup>. Agriculture had converted areas of land north of the Sepik River from lowland rainforest to open grassland of low fertility<sup>3</sup>. Within the forest, the primary rainforest was gradually converted to secondary forest by the disturbance of man. The rate of change was greatly accelerated after colonial contact<sup>4</sup>.

#### First Contact

The rural societies of the lower Sepik first came into contact with the power of Imperial Germany around the turn of the century. The mighty Sepik River had been explored by Otto Finsch in 1885 and the New Guinea Company established a station on the coast at Berlinhafen (Aitape) in 1897<sup>5</sup>. However, the region was generally inhospitable to the Company's efforts to promote agriculture and, apart from scientific and guttapercha collecting expeditions, the people of the lower Sepik River had little contact with Germans over the next 25 years<sup>6</sup>.

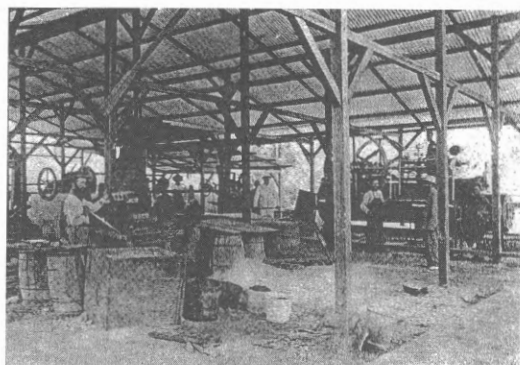
#### In Search of Souls

In 1913 missionaries of the Society of the Divine Word (*Societas Verbi Divini*, SVD), led by Father Franz Kirschbaum, established a mission

station on a prominent hill overlooking the Sepik River about 60 km from the mouth, which they named Marienberg. It was the first European settlement on the River. From this new base, the German missionaries hoped to extend their influence into the vast interior of the Sepik basin.

The SVD had established themselves in German New Guinea in 1896, when Eberhard Limbrok arrived at Freidrich Wilhelmshafen (Madang) as Apostolic Prefect.<sup>7</sup> Under colonial policy to separate the different denominations, Limbrok was encouraged to move further west, and he purchased land from the New Guinea Company on Tumleo Island, near Berlinhafen, where he established a station. The new group rapidly expanded their influence, opening a large station at Prinz Albrechthafen (Bogia) in 1900 and a new headquarters at Alexishafen in 1905.

From the outset, Limbrok combined commerce with missionary work in order to make his operations as independent as possible from overseas financial sources<sup>8</sup>. Extensive plantations were established - by 1914 the SVD had more land under coconuts than the New Guinea Company - and industrial enterprises were established to achieve



The steam-powered sawmill at Alexishafen c1906. It was one of the largest industrial enterprises in the German colony.  
Photo: SVD

self-sufficiency. At Alexishafen, a steam-powered sawmill, one of the largest industrial ventures in the colony, was in operation by late 1905 cutting timber to build mission houses, schools and a huge church<sup>9</sup>. But, the task of converting the local people to Christian beliefs remained at the forefront of SVD endeavour. The Society sought to influence people through their children and schools were established for the teaching of "adopted" children. The Divine Word missionaries emphasised the teaching of German in their schools in an attempt to overcome linguistic fragmentation. Later, under Australian administration, they developed *Pidgin English* as a lingua franca.

#### Early Years at Marienberg

Records of the early period at Marienberg are sketchy, but it appears probable that the first missionaries built temporary dwellings of bush materials and established a sawmill to cut timber for more permanent buildings. However, these pioneering efforts were disrupted by the outbreak of the Great War in far away Europe.

On 9 December 1914, an Australian military force under the command of Colonel Pethebridge entered the Sepik River and sailed to Marienberg, where they obtained intelligence from "a German Missionary"<sup>10</sup>. They sailed onto the Government station at Angoram, where they found the doctor ill with fever, while the police officer and about 30 local policemen had fled. On 15 December, a flotilla of three Australian destroyers - the *Yarra*, *Warrego* and *Parramatta* - and the *Nusa* and *Siar* arrived at Marienberg under Commander Cumberlege. The expedition was to sail 450 miles (720 km) up the Sepik and arrest the German police officer from



Father Franz Kirschbaum (1882-1939), SVD missionary who established Marienberg station in 1913. *Societas Verbi Divini*



Angoram (after a minor skirmish) and a German scientist, Richard Thurnwald, working up river. Of Marienberg, they recorded:

The River is flanked on either side by magnificent virgin forest. Marienberg ... stands on a little hill, and the forest for half-a-mile in every direction has been, and is in the course of being cleared for planting<sup>1</sup>.

At this time, the government station was closed. The Australian administration later opened a police post at Marienberg adjacent to the mission station. GWL Townsend visited Marienberg in 1922 and found:

a sawmill and store established where firm ground extended to the water. A hundred yards away, sawn timber dwellings had been established for the Sisters and Fathers near a big church. For miles behind, there were grassland plains broken by clumps of forest, with three to four native villages... After several days at Marienberg, I acquired a taste for cheese made by Dutch brother Joachim from cows milk, with a dash of goat and mares milk!<sup>2</sup>

It seems then that the initial sawmill at Marienberg was on the river bank at the mission station. Whether or not a tramway had been constructed at this time has not been established. However, Jess Lyng reports that the SVD Mission owned 37 narrow-gauge railway trucks and sawmilling plant in 1919<sup>3</sup>. This appears to be in

excess of the number of trucks required for the Alexishafen operation alone, so possibly a tramway operated at Marienberg from an early date.

The *Annual Reports on Administration of the Territory of New Guinea* record two sawmills operating on the mainland in the period 1921-23, with that at Sek Harbour (Alexishafen) turning out bulk hardwood and softwood for local building<sup>4</sup>. Presumably the other was the Marienberg operation. However, the Marienberg mill is not listed in reports over the period 1926-32. Possibly the initial sawmilling operations had produced sufficient timber to meet the building needs of the station and had then closed.

### Malaise

The efforts of the missionaries at Marienberg aroused scepticism in Brian Stirling, who visited the station in the mid-1930s<sup>5</sup>. He reported:

Marienberg consists these days of a few scattered huts and a Roman Catholic mission station, where live a tiny group of German missionaries: men devoted to their work, who have forgotten the world and are content that this should be so. They labour unceasingly to tear down ancient



Aerial view of Marienberg station, c.1935. The mission was situated on a hill overlooking the Sepik River.

Hallstrom Pacific Library

and savage beliefs, attempting to replace them with the teachings of Christ.

Three of their number, Father Kirschbaum, Father Meyer and Brother James received praise as "the best types of missionaries", but others at the station were criticised by Stirling for exhibiting German arrogance and inflexibility. At this time, there was a small settlement of recruiters and prospectors on the opposite side of the river. Their living conditions were described vividly:

Marienberg, their home, offers them no comforts: it rises squalidly from the mud; sodden undergrowth oppresses the place; billions of mosquitoes make life almost unbearable; no woman's hand softens its discomfort; a few discouraged natives wander idly about; pigs root noisily in the slush beneath the huts... A mournful looking schooner, the *Win On*, the property of a couple of Chinese traders, completes the picture as it presses its cockroach-infested length hard against the muddy bank!<sup>16</sup>

### Nazareth Sawmill and Tramway

By 1939, Marienberg was the service centre for a string of eight mission stations along the Sepik River. Each station required timber for houses, schools and the obligatory church and, accordingly, there was a need to expand the sawmilling operations at Marienberg. Forest within easy reach of the station was soon cut out and supplies had to be brought from further afield, across the grass plains to the north.

The mission established a steam-powered sawmill in the bush at a location called Nazareth, behind Bonam village, before the Pacific War<sup>17</sup>. A 700 mm gauge tramline, about 6 km in length, was constructed to haul timber from the mill to the river for shipment. Sawn timber, and possibly logs, was hauled over the tramline by buffalo<sup>18</sup>.

Grades on the tramline were largely in favour of the load. Villagers remember the buffalo hauling trucks of timber and empty trucks up the grades. Trains were allowed to free-wheel downgrade and the buffalo would be hitched up again at the bottom. Oral sources indicate that two trips were made from the mill to Marienberg each day. The remains of the boiler and steam engine and mill are still in the bush at Nazareth!<sup>19</sup>

### Social Impact

As the Divine Word missionaries expanded their operations they came to be a dominant force in the Sepik region. The SVD had purchased land at Dallmanhafen (Wewak) in 1905 and a separate vicariate for the Sepik, with its headquarters at Wewak, was opened in 1928. The 56 expatriate personnel employed by the SVD in New Guinea in 1931 grew to 107 by 1940, while the number of adherents grew from 11,500 to 42,872 over the same period. However, the impact of their efforts often differed from their intention.

The SVD established a station on Manam Island off the Sepik coast in 1910. An anthropologist working in the area records the influence of this initial contact on the local villagers:

The missionaries came to explore, to see what was there, not to convert. The recruiters came to get men. Both brought with them objects, ideas and ways of behaving that were, for the Tangu, literally from a different world. Tangu admit today that they were greedy for the trade goods the recruiters had. And they were impressed with the apparel and equipment of the missionaries<sup>21</sup>.

At Marienberg, the missionaries sought to civilise the people through conversion to Christianity, but the recipients had very different perceptions of religion. Melanesian villagers viewed Christian religion as a technology rather than a cosmology<sup>22</sup>. They wanted the ritual of the new order to help them gain control over their environment, but they were disappointed in the manipulative power of the new teaching. Many believed that the missionaries had failed to reveal the true knowledge which gave the white man his wealth and influence.

A specific impact was the activities of missionaries who set out to destroy traditional ritual and beliefs in order to impose their own. While Father Kirschbaum is credited with having done much to preserve the art and culture of the Sepik people<sup>23</sup>, the SVD took valuable artifacts away to their museum at Alexishafen which were later shipped to Europe, while other German expeditions also took many artifacts. This is a cause of resentment among the River people<sup>24</sup>.

In establishing their station and sawmill at Marienberg, the Divine Word missionaries created a land problem which was eventually to threaten their continued survival. The initial transactions between SVD missionaries and local missionaries for use of land at Marienberg and at Nazareth were eventually recorded by the colonial administration as a land sale involving the *alienation* of three parcels of land (Portions 2 and 4 at Marienberg and Portion 9 at Bonam). The SVD, backed by "government authority", maintained a Western perception of land ownership. To the villagers, however, these transactions were regarded as a temporary lease for the use of land and timber. This fundamental difference of values over land was to eventually lead to hostility between the groups.

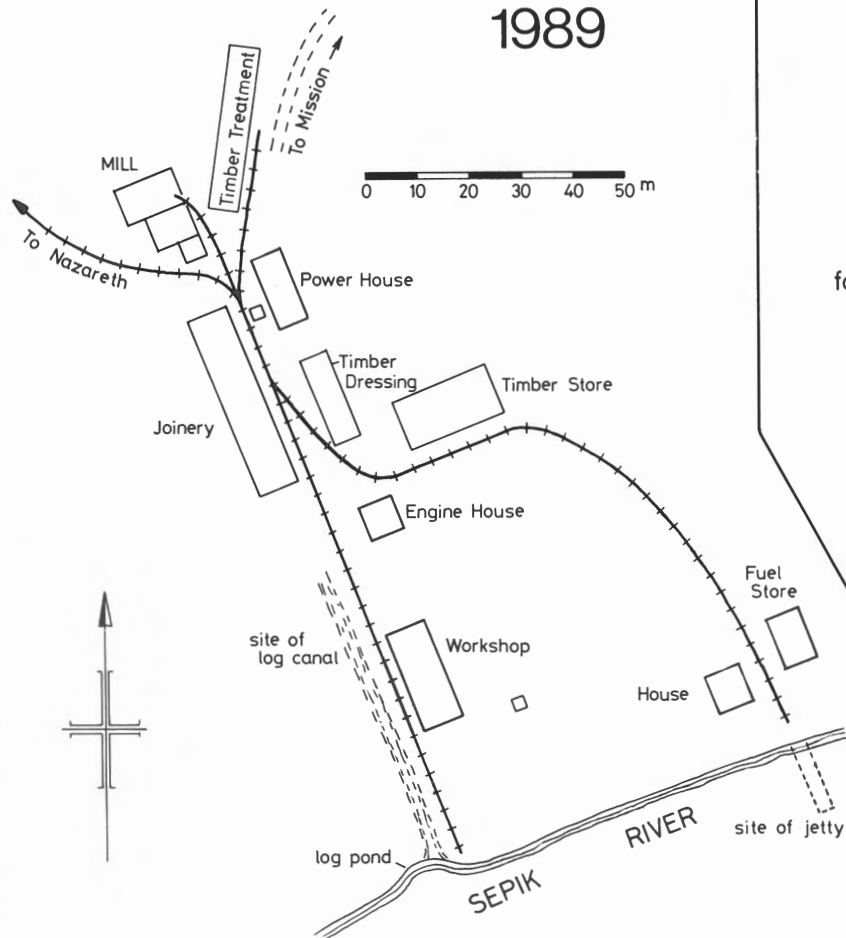
### FORCES OF CHANGE

#### The Pacific War

On 23 January 1942, Japanese military forces occupied Rabaul and Kavieng and by May they had overrun the Sepik area. Marienberg station was occupied by the new conquerors for the next two years.

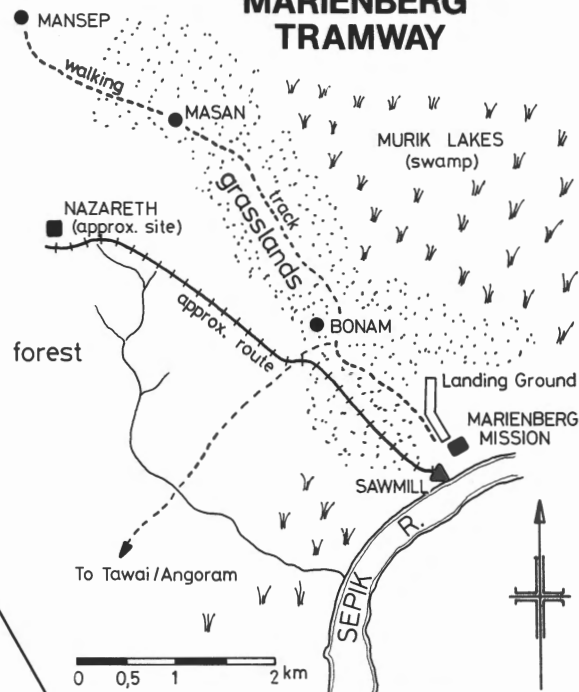
# MARIENBERG SAWMILL

1989



G.R.T. 8/90

## MARIENBERG TRAMWAY



## LOCATION MAP



At first there was only limited disruption to local villagers. Schools were opened by the Japanese and a number of sawmills were established to supply timber for the Japanese forces. However, the sawmill at Nazareth was not made operational, even though Japanese troops were based there<sup>25</sup>.

With the return of Allied forces in April-May 1944, the Sepik area was the site of fierce battles. Marienberg station was completely destroyed by Allied bombing, the only remaining structure being a water tank riddled with bullet holes. Nearby Bonam village was abandoned after aerial strafing killed inhabitants and destroyed houses<sup>26</sup>.

The war experience had a number of major influences:

It caused serious questioning of the myth of European dominance created before 1941; European colonials ran away in the face of Japanese aggression, European soldiers were seen to be capable of hard physical labour, and were prepared to share food and shelter with Papua New Guineans. It mixed Papua New Guinean ethnic groups together as never before... It exposed people to unbelievable quantities of material wealth; aircraft, ships, vehicles, tents, weapons, foodstuffs and clothing in huge amounts, piled up in the new posts and airstrips of the largest military bases in the Pacific... It brought terror and hardship to thousands of village men and women, forced to hide on their own land and exist on famine foods while the holocaust passed over<sup>27</sup>.

### Third Marienberg Sawmill

The SVD missionaries returned after the war and set about rebuilding their station. A new sawmill was established on the river bank adjacent to the station, using salvaged equipment from Alexishafen and old equipment used by the Japanese for sawmilling<sup>28</sup>. Some of the equipment is colourfully described as having been salvaged from "bomb craters", while the Japanese machinery included some old-fashioned heavy diesel engines.

The tramway survived the war, but all the buffalo had been killed. Joachim Onol, of Bonam village, was employed to push the trucks up the hills and they were then allowed to free-wheel down the grades<sup>29</sup>. He remembers it was hard work. The tramway was still seeing some use when Joachim entered the police force in 1959. In 1951 when the mill was visited by Forestry Officers, rosewood and kwila logs were being cut in the bush<sup>30</sup>. Most logs were brought in by truck, but the heavy kwila logs posed problems and the tramway was used to bring them into the mill. The location of the mill on the river bank caused a number of technical problems. The heavy clay became a sea of mud during the wet season and only part of the mill had been roofed, so that heavy rain caused havoc with operations.

### Sawmill Operations

Brother Roland left his war-torn Germany to work at Marienberg mission in 1956<sup>31</sup>. He was initially assigned to the bush logging operations and managed the farm, including a large cattle herd.



**Marienberg sawmill complex from the air, March 1989. The approximate route of the tramway is indicated. RF McKillop**

Later he took over management of the mill until it closed around 1974, when he moved to Angoram.

Most logs came down the river as rafts, although hardwood (*kwila*) was still logged in the local bush. A former bren-gun carrier was used for local logging operations. Logs would be cut up river by villagers and stockpiled for the wet season, when they were lashed together into rafts for the journey to Marienberg. As they came near to their destination, the villagers would send a canoe ahead to advise the missionaries. A launch would then collect the rafts and tow them to the log receiving area.

There was an extensive tramway system at the mill. Logs were winched onto trucks from the river and pushed to the saw benches. Other lines carried sawn timber to storage sheds and a jetty on the river for loading.

At one stage a steam boiler and engine from a ship were converted to power the mill. However, the

boiler was designed for coal firing, and its appetite for fuel wood was beyond the local supply. There were also difficulties in encouraging boiler attendants to make a sufficiently early start to get up steam prior to the mill operations commencing at 8 am. One morning the safety valve blew, which caused a great commotion as everyone ran for cover. Steam operations only continued for a few years, then the mill went back to the old diesel engines.

Later, the German Government provided a new joinery shop, including diesel engines and electric generators and gradually new machinery was obtained for the mill. A team of Austrian volunteers came out to provide technical assistance in furniture-making and other vocational skills.

Lay brothers provided the management of the mill, joinery shop, mechanical workshop and bush logging operations. A great deal of innovation was required to get salvaged machinery operational and to keep it going. By the 1970s, there were 60-70 people employed in the sawmill, joinery shop and associated activities.

Timber was produced for all the mission houses on the Sepik, the Wewak Hospital, many private houses in Wewak, and was exported to the Wewak Islands and a plantation on Wuvulu Island. It was shipped by mission vessel or on the many other ships which served the Sepik at that time.

### **Tramway Closure**

Expansion of the Marienberg facilities brought about final closure of the bush tramway. The aid-funded joinery shop included power generating plant and the opportunity to reticulate the station, but power poles presented a problem. Brother Roland took up the bush tramway rails for this purpose. His power poles are constructed of three rails, each about 6.5 m in length. Rails were also sent to a mission plantation near Bogia.

However, the tramway system at the sawmill remained in use for moving logs and sawn timber around the complex. Four wagons were noted at the mill in 1989, while another two from Marienberg were sited at a nearby small-scale milling operation.

### **Conflict**

The large and thriving industrial operation at Marienberg came to a sudden end shortly before Independence (1975). The Sepik area had been at the forefront of political developments in Papua New Guinea and Michael Somare was receiving an enthusiastic response in his attempts to organise the Pangu Pati among local villages.

The first signs of unrest came from employees over alleged low wages. A strike resulted and management called in Administration Labour

Officers to check that the "books were in order", but this did not resolve the underlying resentment. Landowners were also concerned over their lack of involvement in management and decisions affecting their livelihood.<sup>32</sup>

The mission offered to hand over the business to local landowners. Initially it was suggested that they should take over the logging operations, with the mission maintaining the more complex mill operations, but this was rejected. Landowners were then offered a 12 month trial period to carry out logging and to run the sawmill in order to build up funds for eventual purchase. However, local people had not been given any experience or training in managing such a complex business and no operations took place during this period. Later, an approach was made to the Development Bank for loan finance, but they were unwilling to assist because the group had not demonstrated an ability to operate the enterprise. The sawmill operation and related industries collapsed. This brought about a deterioration in relations between the mission and surrounding villagers. Claims were made for the return of the mission land, stealing of mission property became common and sabotage of mill equipment is alleged.<sup>33</sup>



The author with the remaining tramway truck at Marienberg, March 1989. The joinery shop is to the right.



End of the line! 70 cm gauge track at Marienberg leading to the site of the former jetty. RF McKillop

### The Area Today

A highway has now been built to Angoram, and a large settlement scheme based on rubber has been established along its route. Marienberg, however, has become more isolated being only accessible by boat or by foot from Tawai. The airstrip which once provided a regular link with the outside world lies abandoned and overgrown. The sawmill and associated machinery stands rusting and overgrown with weeds and vines. An old Japanese single-cylinder horizontal slow-speed diesel engine stands in the engine house and a small bulldozer remains where it was parked 17 years ago. Three power generating units remain in place, and one of them still generates a feeble light for mission buildings when sufficient fuel is available.

Relations between the mission and local communities have deteriorated over the experience. Local landowners feel cheated in their efforts to participate in their own business. Two Polish priests tend the spiritual needs of a declining flock and guard the remaining mission property against an increasingly hostile community. On the manse walls, faded, fungus-ridden photographs and pith helmets

bear testimony to the hopes and values of a former era. The mission community, despondent and reduced to bare subsistence living, dream of an industry revival which would once again generate employment. In the villages, leaders hold meetings with politicians and shady 'businessmen' who propose new ventures to exploit the forest.

For Bartholomew Mandara, a clan leader in Bonam village, the tramway has at last brought some tangible benefit. He and family members recently brought nine lengths of rail in from remaining sections of tramway near Nazareth. They have provided a sturdy framework for the floor of his new house in the village.

### Future Prospects

Villagers at Marienberg are mystified and concerned over the changes which have gone on around them. The old order of *tambuna* gave way to the missionaries, but now their images and order have crumbled, leaving in their wake insecurity and decay. Dashed hopes among youth lead to crime and violence within village communities, as well as against *outsiders*. New evangelists, in the form of national politicians and Asian businessmen, now



preach a gospel of *bisnis* and urge landowners to exploit their forest for the promises of cash.

The forest continues to be logged on a small scale for local needs, and the desire for *bisnis* may yet see its exploitation on and more intensive basis, but there is little prospect of resurrection for the Marienberg sawmill. Its purpose was to provide timber for a mission expansion, its volunteer managers produced with technology and a cost-structure divorced from the realities of commercial markets, and colonial structures maintained the compliance of local communities to this order. Now all that is gone, and the jungle is now reasserting its dominance: entwining the old sawmill buildings and returning them to the earth.

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18. Estimate based on mapped location of Nazareth according to oral sources. Brother Roland (interview 20 April 1989) states that the tramline was 7-8 miles long and that it was operated by bullocks, but all other sources say buffalo were used.
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24. Based on responses to the author during field work in the area during February-June 1989.
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26. *Ibid*. Bonam village returned to its pre-War site in 1980.
27. Allen, B, *op cit*, p.113.
28. Brother Roland, interview at Angoram Divine Word Mission, 20 April, 1989.
29. Joachim Onol, interview at Bonam village 16 May 1989.
30. Jim Kavanaugh, former PNG Forestry Officer, phone interview 7 July 1989.
31. It is reported that Br Roland was a German fighter pilot during the war. The following sections are based on the interview conducted at Angoram on 20 April 1989.
32. The description of the conflict is based on extensive interviews with mission personnel (including Br Roland) and villagers conducted between February and June 1989. The wider issues of business development in the area are discussed in the author's paper *Rot bilong bisnis: the East Sepik tradition* presented to ANU Pacific History Seminar series on 24 October 1989.
33. Mission personnel claim that sawmill equipment was deliberately sabotaged by disgruntled landowners. An inspection by an engineer on 16 May 1989 concluded that equipment had probably been rendered unserviceable by children removing bearings for use as marbles.

### Acknowledgements

The documentation of Marienberg history relies heavily on oral sources interviewed during field work in the area between February and June 1989. A number of public meetings were held at Marienberg which were attended by up to 100 villagers. In addition I am grateful to the following for assisting with information:

Father Adam, Marienberg station, Divine Word Mission; John Amauro, Minister for Local Government, ESPG; Petris Digi, chairman, Petris Digi Business Group, Gaven; Father George, Marienberg station, Divine Word Mission; Jim Kavanaugh, former PNG Forestry Officer, Surfers Paradise, Qld; Robert Kemis, manager, Itiako Development Corporation, Koronas; Joe Kenny, publican and businessman, Angoram; Bartholomew Mandara, clan leader, Bonam village; Joachim Onol, Bonam village (former employee, Marienberg tramway); AP (Tony) Power, Kakra Development Corporation, Wewak; Brother Roland, Catholic Church, Angoram (former manager Marienberg sawmill, 1956-1974); Mr Alan Ross, Department of Forestry, Port Moresby; Fr Fons Ruijter, Bagi Agricultural Centre.

I am also indebted to Dr Bill Gammage and Dr Bryant Allen of the Australian National University for their support and assistance in preparing this paper.



# ROPE WORKED, ELEVATED INCLINES: AN ENVIRONMENTAL FUTURE.

by Jim Longworth<sup>1</sup>

Ed. Heightened awareness of the environment has brought new opportunities for railways as a non-polluting, fuel efficient and environmentally friendly form of transport. While the focus has been on main-line railways and *people movers* (light rail or modern tramways), the new era also brings opportunities for the innovative application of light railway technology. The following article describes one such application to minimise the environmental impact of a construction project.

## Introduction

Rope worked inclines had their heyday in servicing off grade mining, quarrying and timber harvesting operations. Several characteristics also make them ideal for providing temporary access during construction works. Specific values include that they:

- \* are cheap to construct
- \* require small scale equipment that is easily transportable to site
- \* require minimal earthworks
- \* can penetrate through narrow access points
- \* can negotiate very steep gradients
- \* can negotiate sharp changes in grade along their length
- \* can be installed by general construction personnel
- \* can be easily dismantled on completion of work
- \* may utilise reusable equipment.

## ENVIRONMENTAL IMPACT

Parnell noted the minimal environmental impact associated with using a tramway system to gain access for pipe laying along a sewer laying job in Launceston<sup>2</sup>. When elevated above the ground, installation of a rope worked incline requires almost no earth works. This is of particular note when considering the environmental impact of a proposed transportation system. Both the degree of change from the existing, (base line) environmental conditions and the extent of impacted area are minimised.

The alternative of road haulage, relies on provision of a suitably aligned, graded and surfaced access road. Borrow pits, cut and fills, earthen batters, drainage crossings, etc are all required. Earth works usually result in clearing of vegetation, loss of productive top soil, soil erosion, sedimentation, corridor openings and visual scarring. These impacts are usually long term and expensive to restore.

Eliminating formed access roads facilitates site restoration, which may involve as little as removing the support framework and winch. The need for revegetation is largely reduced to areas around the loading point and winch site. No permanent topographic features are left to provide ongoing unauthorised access nor intrude into the landscape.

## Case Study

The Sydney Water Board used a small-scale, 600mm gauge, elevated rope-worked incline to give access to a sewer laying job in Sydney's Frenchs Forest during August 1986. The incline was an environmental success, primarily because it provided access to the site without necessitating construction of an access road.

A feature of the incline was the use of scaffolding to elevate the line up and over the surface of the ground. As a result, the outcropping rocks which



600mm gauge elevated rope – worked incline installation in Frenchs Forest, 1986.



**Tub used on the Water Board elevated incline. Note use of wheelbarrow wheel rims.**

so set the landscape character of this part of Sydney's urban bushland were preserved. The significant arboreal vegetation present on both sides of the system was not disturbed by the construction, and most ground-level vegetation was preserved, even under the incline. Such vegetation, plus a much wider strip under fills and from over cut batters, would have been killed had an equivalent access road been built.

A further attraction was that soil did not need to be brought onto site. Creation of exposed unstable soil surfaces subject to erosion was eliminated and the threat of importation of weed propagules in either imported spoil or topsoil was overcome. Truck movements through the surrounding residential neighbourhood were reduced significantly. The need for structural erosion control works and plantings was minimised.

#### **Operation**

The cable was hauled by a 1.5 ton air operated drum winch, giving a rope speed of about 5 metres/minute. Gravity returned the tubs to the down slope loading point. Down slope control of the tubs was by the winch's drum brake or stopping the winch. The winch was bolted to solid sandstone

bedrock. In other cases where the winch could not be secured to solid rock they have been bolted to concrete anchor blocks of nominally 1.5 cubic metre size. The size of the anchor being calculated to counter-balance the weight of material being hauled.

Off-the-shelf 50mm diameter scaffolding tube and clips were used to construct the track and supports. Verticals are installed on about 2m centres, 150mm outside the rail tubes. Lower level ties are added to tall trestles to counter down hill creep where required by normal scaffolding procedure. Supports are footed on solid rock or where in soil, buried 600mm deep.

On curves, the inside verticals are extended above the track to prevent tubs being pulled off the rails by the haul rope. Verticals are capped with "T" clips to stop the rope flipping up and over off the top end of the tubes. Wooden rubbing blocks are sometimes used to protect the wire rope and vertical tubes. Experience shows that the rope is harder than the scaffolding tube, which tends to wear first. Three workers can install and erect 100 metres of incline in about three days.

Noise generation was minimised by use of an

air-operated winch to haul the rope. Atmospheric pollution from the compressor's exhaust fumes, was confined to the single unit necessary for other excavation work. Back injuries were avoided by saving on manually hauling materials up the slope.

Tubs are fabricated in the local depot workshop. They average 600mm wide at the top by 1200mm to 1800mm long. Sides taper in to pass inside the wheels. Strapping and reinforcement are added as required. Tubs average slightly less than 1 cubic metre in capacity. 200mm diameter pneumatic wheel-barrow wheel rims are used, providing double flanged stability on the tubular track. Special wrap around cradles on wheels are provided for long lengths of pipe. Spacer blocks are installed inside the cradle to accommodate varying pipe diameters. Where the incline is steep, the lower 1/3 of the tub's normally open top is covered to enclose the load, so stopping spillage of loose loads (eg concrete).

Communication between winch operator and the

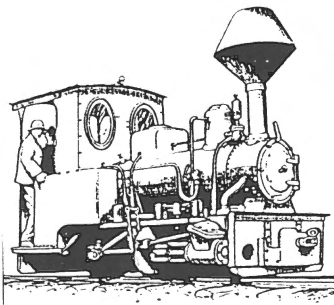
other end of the incline is maintained by two-way radio. The rope is marked for the length of incline (once the distance to the loading point is established) so the operator knows when the tub has reached the desired lower terminus.

### Conclusion

With a growing environmental awareness, there is a potential demand for transportation systems that can provide access with minimal environmental impact. Elevated rope worked inclines are such a technology. In addition, they are attractive in that they can be considered under the typology of Appropriate Technology, so finding potential markets in marginal economic ventures and underdeveloped regions.

### Notes:

1. Jim Longworth is Regional Environmental Scientist, Development Division, Sydney Water Board.
2. Parnell, AJ & RR "West Launceston Sewer Tramway Launceston, Tasmania". *Light Railways*, No. 83, January 1984.



### Cheetham Salt Company

Recently the Cheetham Salt Company deposited a huge consignment of old administrative files dated 1923-1966 with the Geelong Historical Records Centre. Norm Houghton, Archivist at the Centre, has now finished culling and cataloguing the records, and intends to compile a series of articles on the Company's tramways using the files as a basis. He would be interested to hear from readers who have additional records or material on these tramways. The address is PO Box 104, Geelong VIC 3220.

Cheetham operated, or were responsible for, tramways at salt works at Moolap, Laverton, Avalon, Linga and Kanagulk in Victoria; Port Augusta, Lochiel, Price, Kangaroo Island, Lake Heart and Edithburg in South Australia; and at Bowen in Queensland.

## RESEARCH COLUMN

### Archives of Business & Labour

A most valuable resource for research into light railways is the Archives of Business and Labour at the Australian National University in Canberra. The Archives collection includes records of Australian companies, trade unions, associations and employer organisations. Of most interest to LRRSA members are the business records of Australian companies which were involved with industrial railways, notably:

- \* Aberdare Railway Company
- \* Allen Taylor & Company Ltd, Sydney
- \* Australian Agricultural Company Ltd
- \* Australian Estates Company Ltd
- \* British New Guinea Development Co Ltd
- \* CSR Limited
- \* Dalgety Australia Ltd
- \* Elder Smith Goldsbrough Mort Ltd

- \* Evans Deakin Industries Ltd
- \* Goldsbrough Mort & Co Ltd
- \* Humes Limited
- \* John McIlwraith Industries Ltd
- \* Mort & Company
- \* Morts Dock Engineering Co Ltd
- \* Mt Kiera & Mt Kembla Collieries
- \* Newcastle Coal Mining Co Ltd

Gerry Verhoeven has been undertaking detailed research into CSR files and he has found valuable information on sugar tramways. Access to some of the archival material, including CSR, is restricted,

so intending researchers should contact the Archives Officer to request access and provide details of their areas of interest prior to visiting the Archives. The address is Archives of Business & Labour, Australian National University, GPO Box 4, Canberra ACT 2601; Phone (06) 249 2219; Facsimile (06) 257 1893 or (06) 249 0140.

The Archives are open 0900-1700 Monday to Friday. They are located at Acton Underhill, 12 Balmain Crescent, Acton ACT. Access is via Balmain Crescent on the ANU campus.

## KRAUSS LOCOMOTIVE *THE NANCY*

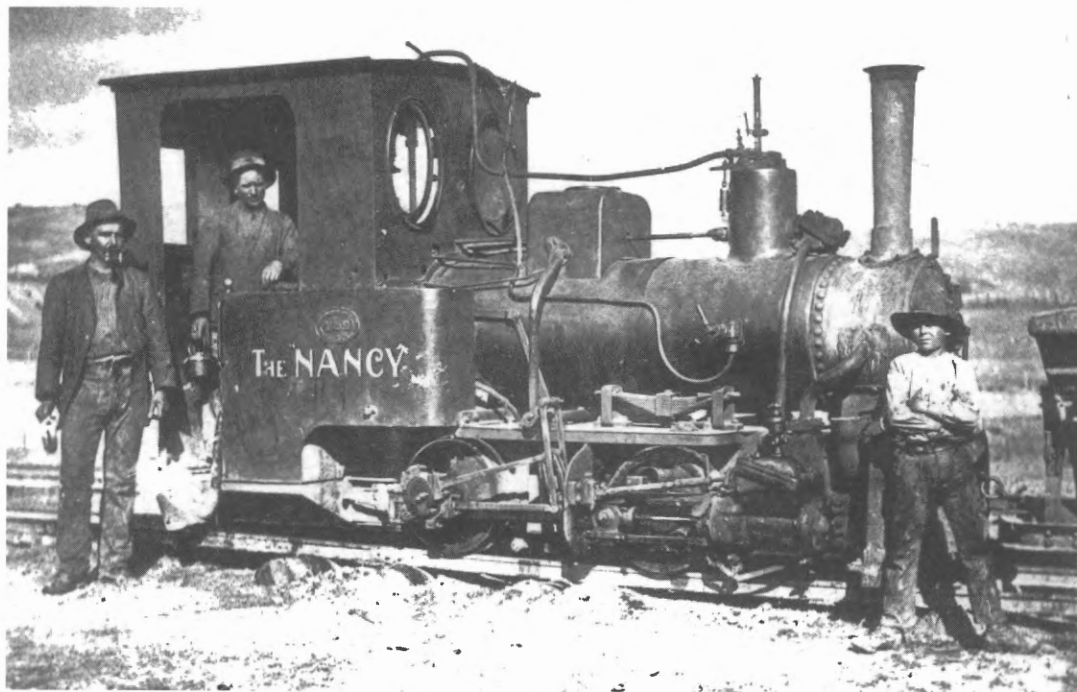
by Arnold Lockyer

At the request of the management of the Port Dock Railway Station Museum, David Parsons and myself have been trying to identify photographs which, over several years, have been donated to the museum without any details of the subject, location etc. Amongst these, we came across a photograph of a small locomotive, *The NANCY*. The original

had sufficient clarity to read the number on the builder's plate, namely 2591. This confirmed that this was the locomotive I have always found referred to as just *NANCY*.

The known history of this locomotive is as follows:

**Builder:** Krauss



**Builder's Number:** 2591 of 1891

**Original Owner:** Unknown

**1895:** Purchased second hand by Mt Lyell Mining & Railway Company Ltd, Tasmania. Given Road No.1. Arrived March 1895, sold to Victoria 1908.

**1908:** Sold to Miller Machinery Company, Melbourne, who resold her to Wade & Company, contractors for the Heatherton Benevolent Asylum. Used on a line from the VR Cheltenham station to the construction site. Job completed 1910.

**1911:** Believed to have been transferred to South Australia, where Wade & Coy had a contract to build Metropolitan & Export Abattoirs at Gepps Cross.

**March 1912:** Registered by FA McCarty, after being in his possession for two months. At this time McCarty was engaged in excavating an underpass for the railway to go under the Bay Road (now Anzac Highway) at Keswick. McCarty gave the loco's name as *NANCY* on application to register.

**June 1913:** Loco sold to Joseph Timms, a well known South Australian railway contractor. Timms was engaged in building the railway line from Goodwood to Willunga at this time and advised that the loco was working near Reynella.

**February 1915:** Loco inspected by a Government Boiler Inspector at S Perry's Works, Mile End, at Joseph Timms request, probably because he wished to sell it.

**October 1915:** Registered by H Teesdale Smith, railway contractor. Loco still at S Perry's Works, shown as Perry & Son and named *NANCY*.

Teesdale Smith did not complete the question 'Purpose for which used' on the Registration Form.

**April 1917:** Australian Salt Company of Port Wakefield advised that they had purchased the loco from Mr Teesdale Smith and that it was employed at the Lake, Lochiel, hauling trucks of salt. Inspections by the Government Boiler Inspector in 1917 and 1918 found her to be 'in good condition'.

**May 1919:** The Salt Company advised that they had disposed of the locomotive to the Rubicon Lumber & Tramway Company of Melbourne and dispatched per rail on 28 May, 1919. At Alexandra, it became the second locomotive of the RL&T Company's tramway and remained in service until 1935. No further records.

The photograph of *The NANCY* shows part of a skip to the right with the letters "F A". This could be the beginning of FA McCarty, but the low hills of the surrounding country suggest that the location is Reynella, not Keswick. It would therefore appear reasonable to assume that, when Joseph Timms acquired *The NANCY* from FA McCarty, he also took over other light railway equipment bearing McCarty's name.

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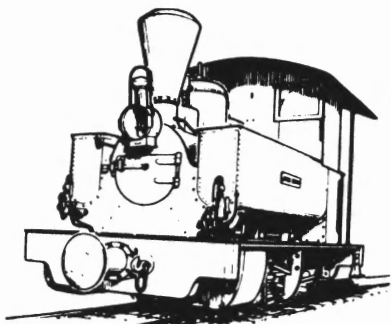
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Records of the Factories and Steam Boilers Department, Adelaide (now the State Department of Labour).



**Gemco 20-ton 4wBE locomotive (3513.14.248.87) for Awaba Colliery at Sydney Showground July 1986.**  
Peter Jzilezck Photo





## LETTERS

### IDENTIFICATION WANTED, LR95, 99, 102 AND 104

Further to the comments in the letters section of the above listed Light Railways, I can now confirm the identity of the locomotive in question as being built by CALDWELL ENGINEERING (AUSTRALIA) MARRICKVILLE, and not as previously suggested by the "Caldwell-Vale Motor and Traction Construction Company Limited" of Auburn.

Caldwell Vale was established in 1910 at Auburn NSW by Felix Caldwell (late of South Australia), who had also acquired the remnant locomotive works of Henry Vale and Sons, hence the name Caldwell-Vale. For some unknown reason, Felix Caldwell sold the company to T Purcell in 1916 and, in 1925 the company became Purcell Engineering. The production of four-wheel drive motor lorries and the patented friction grip locomotives continued, while other products appeared and expanded the range of goods manufactured by the firm.

It is not known what happened to Felix Caldwell in the intervening years, but according to Shand's Directory for 1932/3, he lived at 34 Burwood Road, Burwood and under "Engineers-Mechanical", he established the company Caldwell Engineering (Australia) at the premises of 11 Brompton Street, Marrickville, NSW. The company operated here until 1945. The telephone directories of 1946, 1947 and 1948 list the company at 63 Pitt Street, Sydney, but no entries appeared for 1949 or beyond.

The blocks of land at 11 and 13 Brompton Street were both owned by a Percy R King who was listed as a contractor. He was also listed as a consulting engineer at 144 Victoria Road, Marrickville, which happened to be not far around the corner from Brompton Street. In 1946, Percy King sold both properties to finance a new building and property for the consulting firm at 155 Victoria Road,

Marrickville. The business is still carried on to day by one of Percy's two sons under the name PR King and Sons. It manufactures and installs a range of inclinator (inclined lifts, chair stairs etc).

One of the sons, Alex, told me that Felix Caldwell and his father were good friends and came to some arrangement to rent the workshop at 11 Brompton Street. King's workshop actually occupied both blocks at Nos.11 and 13. Felix had use of all the workshop machinery, which was under a common roof, and paid a low or non-existent rent. The original building still stands to day, albeit separated



Felix Caldwell, c.1914.

from each allotment by a wall. It is occupied by two engineering companies who manufacture special bolts.

Felix is said to have a fiery temper, which he expressed in a physical manner on whatever angered him. On the other hand, he had an ingenious flair for gearboxes and a passion for epicyclic gearboxes. He also manufactured winches which were supplied to the Metropolitan Water Board. He constructed and patented a front-end loader/excavator, on which the bucket was driven by wire ropes and winch to fit a tractor, long before such machines were introduced as a complete unit.

Alex King remembers seeing as a lad one of the locomotives - similar to that in the *LR.102* photograph - under construction at No.11 before he went off to university at 16 years of age (this would have been 1939). It is not known how many locomotives were constructed by Felix Caldwell and his apprentice, Bob Ables, but Alex King and his brother Lindsay estimate that two or three locomotives would have been the total output from this remarkable engineer during the years 1932 to 1946. So far, Caldwell locos have been sighted at Erica, Kingscliffe, Garden Island and Cudgen, being of 2ft or 2ft 6in gauge, but what is the true number of locomotives built?

In reference to the number 646 as being a builder's number, this would not seem applicable to the quantity of Caldwell locos involved. It may have stood for June 1946, or was it the engine number on the motor unit?

Back to the photograph in *LR.102*. When this was shown to the chief engineer for Kelly and Lewis, James D Beeching, in August 1988, he confirmed my thoughts that what can be seen under construction are motor/air-compressor units and NOT locomotives. However, why the Caldwell locomotive was there is not known. Possibly it was at Kelly & Lewis for either overhaul or regauging and the photo is of the end result, looking like new.

It is interesting to note that the radiator on the compressor unit at the right hand side of the photo is almost identical to the radiator on the Kelly & Lewis diesel-mechanical locomotives Nos 4271/1935 and 5957/1936. In fact, the drawing of the radiator for the locos stated that the pattern for the air-compressor radiator had been altered to suit the locomotive requirement.

This statement could lead us to believe the scene in the photo is c1935. However, James Beeching remarked on this point that it was not unusual for the pattern to be changed back to the former dimensions and purpose, thus leaving the reason

and date of the photo open for further comment.

**Paul Simpson**  
**Panania, NSW**

### **ORENSTEIN & KOPPEL LOCOMOTIVE, LR.107**

The number 22665 identifying the locomotive mentioned by David Mack was the New Zealand (Auckland North) boiler registry number for Orenstein & Koppel No. 2033 of July 1906. This was a 20 hp 0-4-0WT locomotive ordered by HP Taylor & Co for the Northern Colliery Company, Kiripaka, Northland. The gauge was 635 mm - approximately 2ft lin. Cylinders were 5.75 x 8in; wheels 1ft 6in diameter; boiler pressure 176 lbs/in<sup>2</sup> and weight 3.19 tons.

2033 was at Kiripaka from 1908 until 1921, when she was offered for sale as David notes. She reappeared on the Auckland City Council's 2ft 6in gauge lines from Muddy Creek wharf to the Nihotupu Dam site in October 1921, where she stayed until 1930. She was later sold to the Mokau Collieries at Awakino and is now at the Museum of Transport & Technology, Auckland, having been rescued from a Tauvanga children's playground.

I am at a loss as to why 2033 was advertised at 2ft 9in gauge. This gauge is not unknown in New Zealand, the erstwhile Waihi Gold Mining Company system being the best known, while there were other lines of this gauge in the Te Aroha-Waihi district. Perhaps 2033 was so altered for a prospective customer and the deal fell through.

**Ron Grant**  
**Christchurch, NZ**

### **BENDIGO STEAM TRAM MOTORS IN TASMANIA, LR.57**

In *Light Railway News* Nos 4 and 5, John Buckland and Bruce Macdonald outlined some of the history of the steam motors from the Bendigo Tramways following electrification of the system in 1903. David Beck noted in *Light Railways* No.57 that boiler records in the Tasmanian DLI files showed that three ex-Bendigo motors came to Tasmania.

It is well established that originally five Baldwin motors were purchased for the Bendigo Tramways and that, subsequently, three further motors were purchased. These came from the Phoenix Foundry in Ballarat. Unfortunately, the exact identity of the three engines which came to Tasmania has not been established, but a close study of boiler records and reference to the notes in *LRN.4/5* goes part of the

way to answering some of the questions surrounding the movements of these little engines.

DLI records show that:

- \* JS Lee & Sons owned two Phoenix engines. The first was purchased early in 1908, but was sold and shipped back to Melbourne in 1910. The second was not purchased until late 1910 and remained in service until 1920. It appears that the latter engine was a replacement for the former and that both Phoenix locos were never operated at the same time.
- \* The Marrawah Tramway Company purchased a Baldwin motor which had formerly worked on the Bendigo Tramways.
- \* All three ex-Bendigo motors arrived in Smithtown in worn condition.
- \* The Phoenix motors were slightly larger than the Baldwin. This supports the statement made by Sue Mackinnon in *Bendigo and its Talking Trams* (p.22).

Bruce Macdonald has shown that two Phoenix engines were sold to Victorian operators: one to the Cave Hill tramway and one to Gunn's mill at Crossover. Clearly one of these must have also worked in Tasmania. This is almost certainly the unit which returned to Melbourne in 1910.

Surprisingly, there is little documentary evidence relating to any Phoenix locomotives working on Lee's tramway in north-western Tasmania. Only on rather poor photograph has been discovered. However, there is a widely held view that one of the tank engines which worked in the Circular Head area was known as *STEAM MOTOR*. This could well have been a Phoenix.

The history of the Baldwin after its purchase by the Marrawah Tramway has been well established. In 1915, it passed into the ownership of the Tasmanian Public Works Department when that department took over the tramway and its assets. It was extensively overhauled in 1917 and received a new boiler in 1923. The Tasmanian Government Railways took over the tramway in 1929 and retained this engine, which had acquired the name *SPIDER* on tramway duties. In 1949, it was sold to Britton Brothers for use on their tramway at Britton's Swamp.

I would be most interested to learn of the builder's numbers of the locos which went to Lilydale and Crossover and the dates on which these transfers occurred.

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## LAKE MARGARET TRAMWAY, TASMANIA

Book 3 "the West Coast", the latest in the series *Along the line is Tasmania* has some interesting photos on the Lake Margaret Tramway, but I am puzzled as to the caption for the photo on page 12.

It reads "The 10.00 am Wednesday shopper service from Lake Margaret is ready to depart with the 1929 *Dorman Ricardo* hauling the 24 seat passenger car. Behind the car, but not coupled to it, is a flat wagon for general goods and the *self-propelled* ambulance".

The 1929 *Dorman Ricardo* is not a locomotive at all, but refers to a diesel motor built by Dormans in England using the Ricardo patent indirect injection with a pre-combustion chamber for each cylinder in the head of the motor.

The loco which appears in the photo was designed and built in 1959 by Tullochs of Rhodes, NSW for the Mt Lyell Mining and Railway Company. This 4wDM locomotive, model DMM-40-4 of 2ft gauge, weighed 4 tons and used a 40 hp Fordson diesel motor. It was 9ft 5in long, 3ft 7.5in wide and 6ft 6in high, had a tractive effort of 2750 lbs at 4mph with two speeds (4 or 8 mph) in each direction.

As for a *self-propelled* ambulance car, I wonder if any reader can verify this statement as the car doesn't appear to exhibit any characteristic of such a vehicle. The only self-propelled car in the photo is the Vauxhall railcar which can be seen just outside the shed. I enclose another photo showing the Tulloch locomotive coupled to the ambulance car (when the loco was new in 1959) at the Lake Margaret depot.

Finally, does any reader know the subsequent history or current location of the Tulloch loco since the demise of the Lake Margaret system? This loco was not mentioned in Lou Rae's book, *A history of railways and tramways on Tasmania's West Coast*.

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**Rear Cover. Top:** Builder's photo of Tulloch Model DDM-40-4 industrial diesel mechanical locomotive built for Mt Lyell Mining & Railway Coy in 1959.

**Bottom:** The Tulloch locomotive coupled to the ambulance car at Lake Margaret depot, 1959.  
Paul Simpson colln.

