LIGHT RAILWAYS

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The Australian Central Sugar Milling System

Penang Sugar Mill, Fiji

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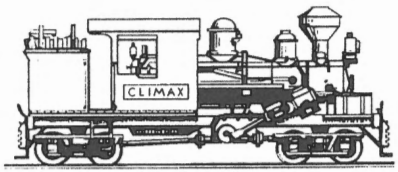

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Cover Photo:

Moreton Central Mill's A class Shay loco Dulong *(Lima 2091/1908) passes a loaded cane train hauled by Krauss 0-6-0T* Moreton *(4687/1901).* Dulong's *condition, and the presence of* Moreton, *would suggest a pre-1914 date.*
Photo: Belbin Collection

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Light Railways Editor: Norm Houghton. Letters or other items for LR No. 139 should be sent to: Bruce Belbin, 44 Union Street, North Sydney 2060.

EDITORIAL

This issue of "Light Railways" is the last to be put together by Norm Houghton, who has served the Society in the role of Editor for the last six and a half years. I am sure that all readers will agree that Norm has done a great job and deserves our thanks for his stewardship of the publication.

Norm's great efforts are underlined by the fact that it will take three people to replace him! I am delighted to be joining Bruce Belbin and Bob McKillop as the third member of the editorial team for "Light Railways".

A special conference was recently held in Sydney to set future directions for the Society, and for its publications in particular. 1998 should see some exciting developments in this area. Don't forget to watch this space!

– John Browning

CONVERSIONS:

1 inch (in)	25.40 millimetres
1 foot (ft)	0.30 metre
1 yard (yd)	0.91 metre
1 chain	20.11 metres
1 mile	1.60 kilometres
1 super foot	0.00236 cubic metre
1 ton	1.01 tonnes
1 pound (£)	$2.00 (in 1966)
1 pound (lb)	0.454 kilogram
1 acre	0.4 hectare
1 horsepower (hp)	746 Watts
1 gallon	4.536 litres
1 cubic yard	0.765 cubic metres

ORIGINS OF THE AUSTRALIAN CENTRAL SUGAR MILLING SYSTEM: THE CSR LEGACY

Robert F McKillop

INTRODUCTION

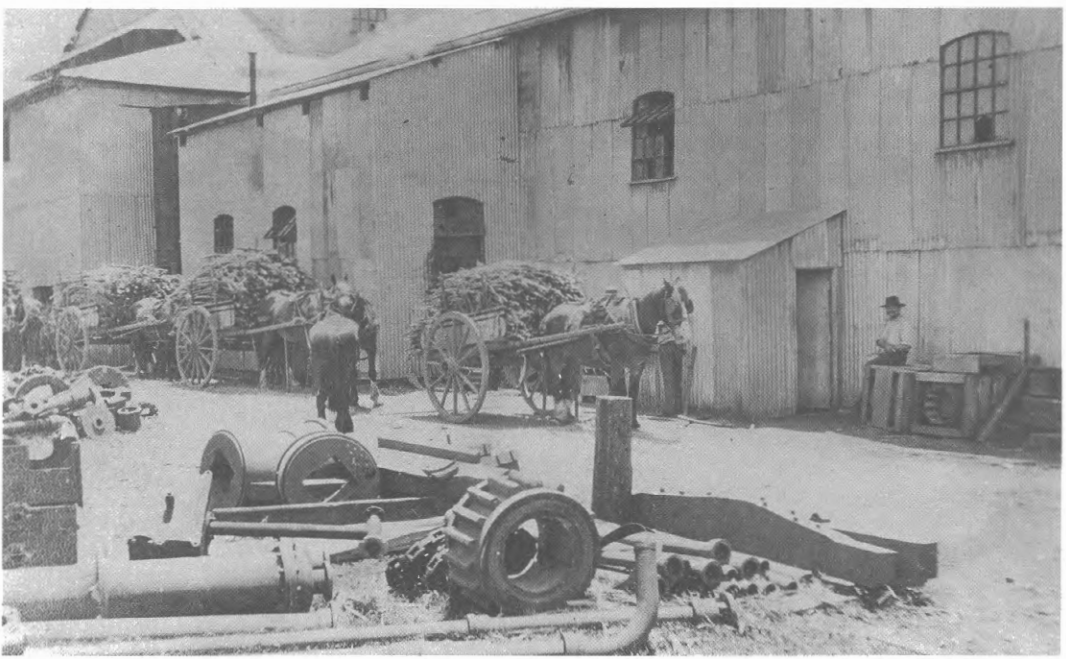
The central role of narrow-gauge industrial railways in providing the super-efficient transport which underlies the international competitive advantage of Australia's sugar industry is self-evident to most. Sugar cane is one of the bulkiest of crops, requiring the transport of large quantities of cane to processing facilities within hours of harvesting. Efficient transport is essential to avoid losses of sugar content after harvesting and to maintain a uniform flow of cane through the mills.

This article sets out to explore the origins of the central milling system on which the efficiency of the modern industry has been built. The focus is on the evolution of rail transport to meet the needs of expanding processing capacity, but the story begins with earlier transport modes. It is based on detailed research into the files and documents of the Colonial Sugar Refining Company (CSR) held by the Noel Butlin Archives Centre at the Australian National University in Canberra.

Thanks are extended to the friendly staff of the Archives for their assistance over an extended period, to CSR for their permission to research the records and to John Browning for his comments on the draft.

THE PIONEERS

Sugar cane was brought to Australia from South Africa with the First Fleet in 1788. In the same year Captain King took cane to Norfolk Island. Australia's first centre of growing was at Port Macquarie, where Captain Allman, commandment of the penal settlement, supervised planting



The CSR sugar mill at Harwood Island on the Clarence was established as a central mill in 1872 using equipment from the original Darkwater Mill. In this c.1899 scene, cane arrives at the mill by horse and dray. Photo: Noel Butlin Archives Centre, CSR 2303, Neg. 4408

of cane from Norfolk Island in 1821. This was done by a West Indian convict, James Williams.

In 1823 T A Scott arrived to expand the enterprise and commenced the experimental manufacture of sugar, molasses and rum. Scott was dismissed in 1828 after 20 tons of sugar had been produced and the venture was abandoned in 1831.[1] Scott retired to Point Claire, in the Hastings Valley where, for the rest of his long life, he continued to grow cane and promote the industry. By 1868, there were nine mills in NSW which produced a total of 60 tons of sugar. The focus of the NSW industry shifted to the Clarence, Richmond and Tweed River valleys after 1870.

The first sugar cane in Queensland was planted in 1858 by curator Walter Hill at the Brisbane Botanic Gardens and crushed at the Machine Biscuit Factory in Brisbane's Queen Street.[2] The 'father' of Australia's sugar industry is regarded as Captain Louis Hope who established a plantation near Brisbane using cane supplied by T A Scott. Hope opened the first commercial sugar mill, Ormiston, near Cleveland, in 1864, just five years after Queensland had become a separate colony.[3] However, management problems led to its closure in 1874. Early in 1865 J F Kelsey, a Mauritian sugar planter, floated the Bowen Sugar Company to establish a large sugar estate at Kelsey Creek near Proserpine. Some 30 tons of sugar and 3729 gallons of rum were produced in 1868, but the climate was unsuitable and the venture failed. However, other sugar centres progressed and by 1867 there were 2000 acres under cane in the Brisbane district and six mills in Queensland. The industry expanded rapidly northwards with mills opening at Maryborough in 1866 and Mackay in 1868.

The early sugar ventures were based on individual farms with their own small-scale milling ventures or central mills taking supplies from surrounding farms. As early as 1867 the Clarence River Sugar Growers' Association was formed with the intention of forming a joint-stock company to construct a mill. On the Brisbane River, Angus Gibson had, before 1869, 'endeavoured to induce the farmers in the district and around to co-operate with the object of securing a central mill'.[4] At Mackay, local farmers sought to establish a co-operative company, in 1869, to set up a central mill.[5] The venture folded, although there were several subsequent attempts.

The lack of efficient transport was a constraint to the early ventures. The bulky, low-value crop initially restricted manufacture to small mills to which the cane was transported over often muddy roads in *German wagons* and drays hauled by bullocks or horses. Even a small amount of rain was sufficient to make the roads impassable for a time and prevented farmers carting their cane to the mill.

ENTER CSR

Company Background

The Colonial Sugar Refining Company was formed on 1 January 1855 to take over the assets of the Australasia Sugar Company which operated a pioneering sugar refinery in Sydney.[6] Edward Knox, the former manager of the Australasia Company, applied himself with vigour to organising the new company into a commercial success.

Knox departed for England in 1857. This coincided with a fall in the world price of sugar, a depression in Australia and an internal dispute in the company. With estimated losses of over £120,000 the Sydney directors were ready to throw in their hand, when Knox returned. Faced with personal ruin, Knox threw his energy into restoring the company. To establish greater stability in the supply and price of sugar, Knox decided to grow his own cane, sending, in October 1868, the company's sugar expert Melmoth Hall, 'an Indian planter of 16 years' experience', to report on the potential for sugar growing on the north coast of NSW.[7] Hall's report was favourable and it was decided to establish central sugar mills on the Macleay and Clarence Rivers. The Company placed an advertisement for contracts in the *Clarence & Richmond Examiner* on 14 July 1868.

Sugar Milling: the first decade

Edward Knox chose a system whereby independent small farmers entered into forward contracts with the central miller to supply cane. The Company arranged for the harvesting and transport of the crop. The approach involved terms of agreement with individual farmers to grow cane for 10 shillings per ton (with an extra 1 shilling for cartage to the mill).[8] The river systems provided the transport artery. Cut cane was brought to the river bank by dray and loaded on to company punts, which were hauled to the mill by company steamer.

Knox placed his son, Edward William, in charge of the project to establish the mills.[9] The mills (initially at Darkwater on the Macleay and Southgate and Chatsworth on the Clarence), opened in 1870. The Clarence mills were success-

ful, becoming the main source of the company's profits in their second season.

CSR's entry to sugar milling was a bold new venture into uncertain fields. Edward William Knox was only 23 years of age when appointed to manage the Southgate mill.[10] The following year he took over responsibility for both Clarence mills. This was extended to the mill on Harwood Island when the Darkwater Mill was moved here after the 1872 season. Young Knox soon mastered the problems of an infant industry, working on the NSW coast for 10 years. During this period he established the foundations for the Company's future success as a sugar miller. Knox kept a firm hand on all aspects of operations, recording progress in detailed reports which he thoroughly analysed for lessons which could be applied to achieve greater efficiency.

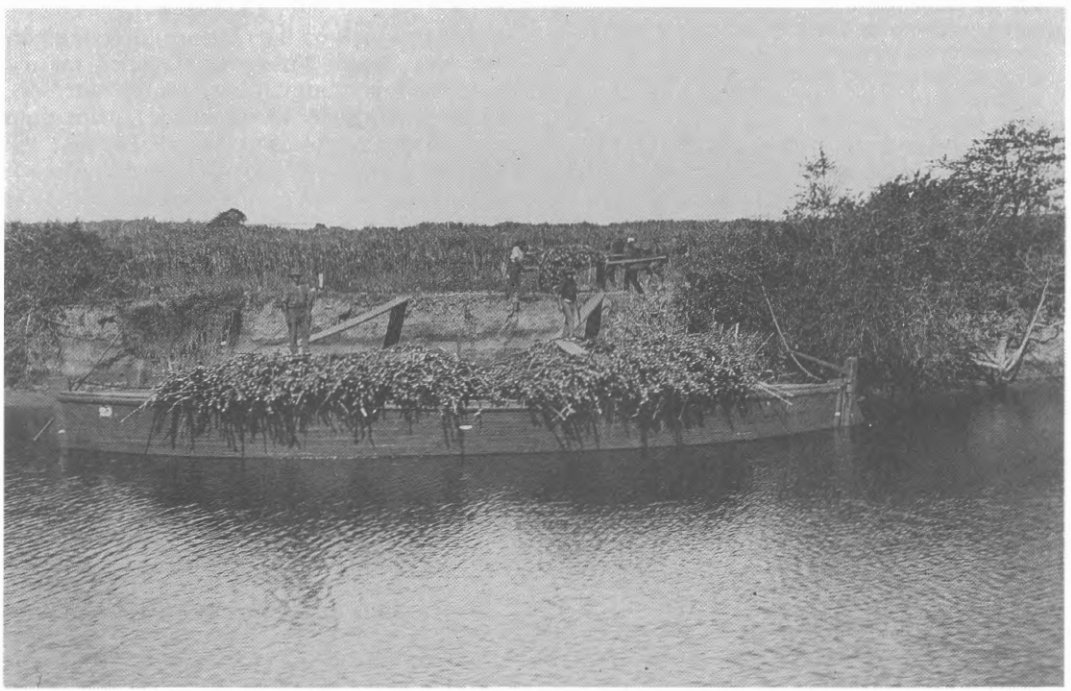
Arrangements for the cutting and transport of cane and the prices to be paid were important issues to be settled from the outset. Knox observed:

> For some time after we commenced work, the cutting was done by hands on day labour, but we soon found this a most costly plan and I offered the cutters two shillings and six pence per ton for cutting, bundling and loading the cane into the carts. This offer was accepted, but bundling was shortly after discontinued – we paid for some time two shillings for cutting and loading, while we put the cane onto the punts. When the gangs were removed from Southgate, we dismissed the punt men and paid the cutters six-pence per ton extra for loading the punts. I doubt that the work could be done for much less.[11]

Cane prices and purchasing arrangements were also difficult issues. Knox reported:

> The mode of purchase of cane is a matter requiring great consideration, many objections can be urged against the present system of buying by the ton, the principal of which are that no distinction is made in the prices paid for good and bad cane, and the dissatisfaction among the farmers arising from their inability to understand the gauging of the punts.[12]

E W Knox visited the West Indies in 1876 and, on his return, introduced double crushing and other efficiencies to improve sugar recovery and fuel use in the company mills. Knox was constantly seeking to keep abreast of international developments in the industry and, on the basis of his West Indian experience, proposed:



Loading cane onto a punt on the Clarence River from a horse and dray, c.1901.
Photo: Noel Butlin Archives Centre, CSR 2303, Neg. 4410

> Now that we have seen in both branches of our business how necessary it is that we should be kept fully informed of what is being done elsewhere in the refining and manufacture of sugar, it will be well to arrange to send some of our staff every two or three years in the quest for knowledge that will be of service to us.[13]

Chemical laboratories were also established to improve quality control. With these improvements, CSR was able to improve the efficiency of their mills over those operated by competitors. By 1879, the three Clarence mills crushed 65,000 tons of cane, although with increased boiler power, the mills had the capacity to crush 100,000 tons.[14]

At the conclusion of the 1879 crushing season E W Knox looked back over his ten year's experience in establishing the NSW mills with satisfaction, offering the following retrospective.

> Although we may to some extent congratulate ourselves on the improvements which we have effected in our work of late years . . . the results . . . show how much money we have thrown away by our ignorance of the business when we commenced and in the alterations which we have now been compelled to make in our plant . . . Had we used the double crushing system throughout, the yield of sugar for '70 to '76 would have been increased by about 3500 tons, and our present market is at least 2 pounds per ton better than the average of those years. A considerable improvement has been in the consumption of coal which has come down from a mean of 6.5 tons cane per ton of coal in '71 and 8.7 tons in '72 to 12.7 tons in '79, and the quantity of cane crushed per hour has increased at Chatsworth from 7 tons in '71 to 13.27 tons in '79.
>
> The profits on the business have been as large as we have had any reason to expect. In the ten years including '79 the . . . profits give a return of 23 per cent on capital after charging interest at the rate of 6% on the ventures of the sugar.[15]

But Knox continued to be troubled by the relationship of the company with his suppliers and the threat he saw from the emergence of small mills. In terms of future prospects, he concluded:

> Our outlook is also not altogether a cheery one: although we have gradually improved our work . . . we have to face the questions:
>
> 1. How are we to maintain the supplies of the Clarence mills; and
> 2. check the defection of so many of our largest planters who are erecting mills for themselves.
>
> I must confess that I see no way of ensuring the retention of the business in our hands except we raise the price of cane sufficiently to leave a smaller amount of profit to induce the erection of small mills, while at the same time the owners of the river frontage above Rocky Mouth, which hitherto has mainly been devoted to maize, would plant it with cane were a price for the latter offered giving a better return than maize at three shillings per bushell . . . I question if we are acting wisely in seeking to retain so much of the profit: in the longer run we shall have to give way or loose the business, and if by a little liberality we can secure our footing, my opinion is that it would be better for us to pay the higher price and be content with slightly lower but more secure profits.
>
> We have reached a point now where we cannot stand still and, on the Clarence at any rate, must either advance or lose ground: surely, it is not wise that a company such as ours should permit itself to be driven from that district by a number of men possessing but small means and paying high rates of interest for the money they borrow to purchase their manufacturing plant. The large balances which we shall have this year to divide will enable us to make our position secure against all opposition and we can then without
>
> any misgivings pursue a liberal policy which will, I firmly believe, eventually prove to be of direct benefit to ourselves as well as to the farmers with whom we have dealings.[16]

Early Cane Transport

CSR's first mills on the Clarence River in northern New South Wales were founded on the opportunity to transport cane on the waterways. Steam tugs hauled 40-ton wooden punts from river-side loading areas to the mill. Two tugs, the *Chatsworth* and *May Queen,* were available to service Southgate mill from 1870.[17] The *Darkwater* was brought to the Clarence when that mill closed in 1872. An ocean-going steamer, the *Keera* (158 tons) was introduced in 1873 to carry coal to the northern mills and a steam launch was introduced in 1874.[18] Thirty punts were in service by 1875, but were insufficient for the three Clarence mills.

The double-handling of cane, onto and off the punts, was a significant disadvantage, while navigation difficulties in shallow waters added to the problem. From the outset, E W Knox observed:

> The creeks on which a large quantity of cane is planted are extremely troublesome for working the punts in. The steamer is only able to go up during a flush or at the top of the high-water spring tides. A small amount of rain is sufficient to make the roads impassable for a time and prevent farmers carting their cane to the mill. However, grumbling will not improve the cane or alter the situation of the mill, so we must only try to make the best out of a bad bargain.[19]

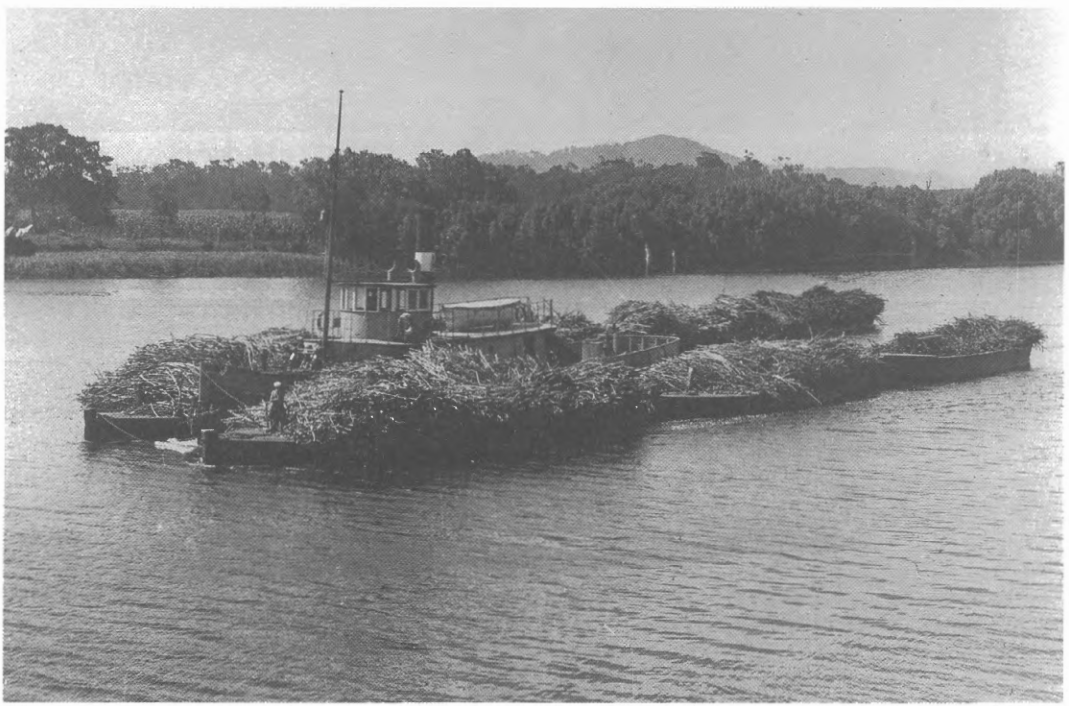
To improve transport, a steam launch entered service in 1873 to tow punts into and out of creeks, and to move cutting gangs.[20] It was successful and others were soon added to the fleet.

Construction of two iron punts capable of carrying between 120 and 150 tons of cane commenced in 1875, while a new steamer, the Fiona, and a steam launch for Harwood entered service that year.[21] With the opening of Condong mill on the Tweed, the steam tug Wollumbee was obtained for that operation. The Iluka, a side-paddle tug built in England, entered service on the Clarence in 1879. A floating dock was brought into service in 1880 to assist with maintenance of the fleet of tugs, steam launches and barges.

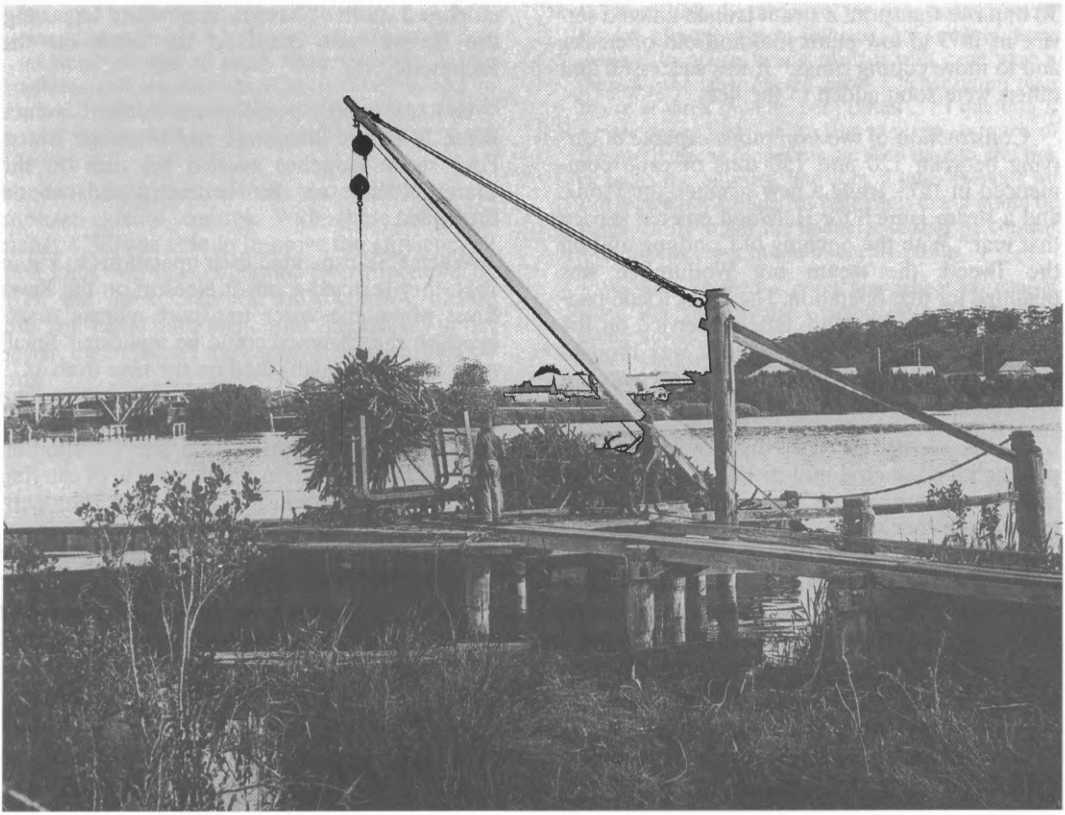
On the Richmond River, an assessment of its potential for a central mill in 1878 noted that the bends in the river gave a frontage of over 20 miles to the main river on each side before it reached a point six miles distant from the sea.[22] Although cane needed to be towed long distances, the river offered the potential for tugs with a draft of seven feet of water compared with the shallow boats employed on the Clarence. A new and larger tug, the *Kyogle,* was obtained for work on the Richmond.

By 1881, there were 55 punts on the Clarence River, 24 on the Richmond and 18 on the Tweed. Four steam launches assisted the tugs on the Clarence, three on the Richmond and two on the Tweed.

When CSR expanded their operations to Fiji in 1881, they selected a site at Nausori on the Rewa River where the water transport systems developed on the Clarence could be replicated. Small mills had been established on the river from 1875 which received cane punted on the river. The Rewa Plantation Company commenced purchasing cane from farmers in 1875 and transporting it to the Pioneer mill in punts capable of carrying between 2 and 30 tons of cane.[23] With the opening of Nausori mill in August 1882, CSR introduced five steam tugs, eight 180-ton lighters and 30 iron cane punts of 60 tons capacity to meet its transport needs. However, the basic inefficiencies and uncertainties inherent in the water transport



Steam tugs and punts provided the bulk of sugar cane transport on the Northern Rivers of NSW for a century. This timeless scene epitomises the task. Photo: NBAC, CSR 171/285, Neg. 2711



Short tramways from the farm to riverside jetty fed cane to the "river highways" of the northern NSW sugar mills. In this typical scene, a derrick loads cane from railway trucks into a punt on the river.
Photo: Noel Butlin Archives Centre, CSR 171/294, Neg. 5432

system remained a significant constraint to the further development of the industry. In order to achieve the potential economies of scale from their improved and larger central mills, CSR needed to establish a more efficient means of transporting large volumes of cane from dispersed farms for processing.

Building on the Foundation

EW Knox became general manager of CSR in 1880, the year crushing commenced at the new Condong mill on the Tweed. Success in northern NSW had placed the company in a good position to take on opposition and expand.

In contrast to New South Wales, Queensland's sugar industry was initially dominated by plantations. The first estates of the 1860s required only small capital investments, coupled with a resilient pioneering spirit on the part of the local plantation owners.[24] By the 1880s, large amounts of capital were invested and the owners needed business acumen, not pioneering zeal. The plantation regime was characterised by large farming units, vertical integration of the farming and milling process, and extensive human capital investment using indentured Melanesian labour. It required efficient transport of the bulky cane to the mills.

CSR were concerned at increased competition from Queensland mills and anticipated a drop in Australian sugar prices to those prevailing overseas. Their response was to expand investment in

***Right:** A busy scene at Harwood Mill, c.1899 with cane punts awaiting unloading.*
Photo: Noel Butlin Archives Centre, CSR 2303, Neg. 4409.

plantations and raw sugar mills, placing the company in control of the production process from planting to the marketing of white sugar.[25] To this end, CSR purchased large tracts of land at Mackay and on the Herbert and Johnstone Rivers.

Initial expansion into Queensland was through a subsidiary, the Victoria Sugar Company which opened Homebush and Victoria mills in 1883. Goondi mill near Innisfail followed in 1885.

SUGAR CANE RAILWAYS

Origins

The solution to the problem of transporting sugar cane over land to central mills emerged with the development of light rail technology by the French farmer and engineer, Paul Decauville, and the English firm John Fowler & Company. Decauville had a large estate at Petit Bourg, near Paris, where he grew sugar beet. He purchased Fowler steam ploughs and manufactured Fowler implements under licence after 1867.[26] To harvest his crop, Decauville devised a rail system in late 1875, patented as *Decauville's Iron Carrier,* consisting of light, 400 mm gauge portable track in short lengths which could be carried by two men. The original system was designed to be worked by men or animals, but in 1878 a small four-coupled steam locomotive was constructed by M M Corpet of Bourdon of Paris to operate on 500 mm gauge track.

The firm *Societe Anonyme Decauville* was founded to manufacture Paul Decauville's light railways. Decauville began designing its own locomotives in 1882, although manufacture was contracted out to other builders, notably *Societe Anonyme des Usines Metallurgiques du Hainault, Couillet Marcinelle* (Couillet) in Belgium.

In 1877, John Fowler & Co. took out a licence to manufacture *Decauville's Iron Carrier* at its Steam Plough Works in Leeds. They made improvements to the system and developed a range of wagons to carry sugar cane. In 1879 John Fowler demonstrated two steam locomotives on its 20-inch-gauge light rail track at the Royal Agricultural Society's annual show at Kilburn.[27] By 1881, Robert Fowler made marketing tours to the Kingdom of Hawaii to promote the firm's equipment to sugar plantations.

Fowler recommended 16-inch and 18-inch gauge tramways for hand operation, 20-inch gauge for animal power, and 24, 26 and 30- inch gauge for general use, bulky loads and locomotive power.[28] Fowler supplied railway lines in sections of 15 feet long with four sleepers at 3 ft 9 in centres for animal power and at 3 ft centres for locomotives. The claim was made that six men could take up and relay 250 yards of line, 50 yards further on in 20 minutes.

The first locomotives built by John Fowler for its light railway systems were considered unsatisfactory in some quarters because their working parts were too near to the ground 'and the wear and tear on them would be excessive, because of the dirt and dust which they could not escape.'[29] In July 1880, Alfred Greig and William Beadon of the Steam Plough Works filed a patent for an improved steam locomotive with jackshaft drive which placed the working parts, particularly the cylinder and crank, considerably above the driving wheel axle. A number of these jackshaft-drive locomotives were delivered to sugar plantations in Queensland, Fiji and the Hawaii.

Early Australian Operations

John Spiller was a pioneer in developing railway technology for cane haulage in Australia when he commenced construction of a sugar cane tramway on the aptly named Pioneer plantation near Mackay in 1879. Spiller constructed his tramway to the Queensland Railways, 3 ft 6 in gauge and introduced a locally built locomotive in August, 1880.[30] He imported a locomotive from John Fowler the following year.

By the early 1880s a number of the larger estates had built tramways to bring cane to their mills, including Cedars in 1880, Airdmillan, Hambledon and Fairymead in 1882, Bloomfield, Ripple Creek, Palms, Meadowlands and Mourilyan in 1883, and Pyramid, Pioneer and Seaforth in 1884. Apart from Spiller's operation and Drysdale's Pioneer mill at Ayr, these tramways were built to 610 mm or 2 ft gauge, using track supplied by either Decauville and John Fowler. Most were worked by horses, but Airdmillan and Mourilyan introduced steam locomotives from the outset.

Tweed Valley Cane Railways

In northern New South Wales, CSR reports indicate the use of short tramways to transport cane from farms to the riverside by 1875.[31] These were probably wooden-railed. In May 1878, Decauville wrote to the CSR Company with an offer to sell portable railway via its agent, Audley Coote of Hobart, for use on its proposed operations on the Tweed River.[32]

Soon overtures were made by farmers not conveniently served by rivers for the construction of tramways. In December 1879, E W Knox reported that his assessment of portable railway 'now used largely in France' indicted that two miles of line with wagons would cost between £1200 and £1500. He calculated that some 5000 to 7000 tons of cane would be required each season for a horse-operated line and a much larger supply for a locomotive-hauled line.[33]

Condong was the only NSW CSR mill to establish an extensive railway network, as opposed to feeder line from farm to river wharves. A lightly built horse-operated tramway, 2.5 miles (4 km) in length and of 2 ft (610 mm) gauge was planned for the German Creek area in 1883, but construction was not undertaken until early in 1885. It was most successful and a network of 2 feet gauge tramlines was constructed by the mid-1890s. By 1897 horses hauled cane over seven miles of track. A petrol locomotive was introduced in 1925-6, possibly following an unsuccessful trial of a steam locomotive.

The Cudgen mill, originally erected by W W Julius about 1878, came into the ownership of John Robb & Company by 1883. The company built a 2 ft gauge tramline to a wharf at Chinderah, on the Tweed, by 1892 (two miles) and a John Fowler locomotive (No. 6554/1892) was imported to operate the line.[34] By 1897 the mill's tramline, totalled about 11 miles, with an additional two miles of portable track.

In 1912 the CSR Company bought the mill and the machinery was dismantled and incorporated in the Company's nearby Condong mill. The line to Chinderah Wharf became the main outlet for the products of the fields. Cane was hauled to the wharf and transferred to barges for the journey upstream. The Cudgen tramways operated as a separate system until connected to the Condong network in 1959.

By 1969 the Condong system totalled about 36 route miles (57.6 km), including the isolated Crabbes Creek line. In 1971 mechanical harvesting was commenced and the cane was brought to the mill by road transport. By 1973 tramway operations were on a reduced basis and at the conclusion of the 1974 crushing season the tramway system was closed.

Foundations of The CSR Railways

When the CSR Company established its Homebush and Victoria mills in Queensland, it looked to locomotive-worked 2 ft gauge tramways to make sure sufficient cane was brought in each day to ensure a regular mill supply. In order to compare the respective products, the Company purchased railway plant and rolling stock from the French firm Decauville and the English manufacturer, John Fowler. Edward Knox specified that the 50 miles of track, locomotives and rolling stock ordered from Decauville were built to 2 ft (610 mm) gauge instead of their standard 600 mm gauge.[35] For the new Homebush mill, construction of which commenced in July 1881, 10 miles of 24 lb. per yard rail was ordered from England, to be laid on wooden sleepers, and 10 miles from Decauville on iron sleepers.[36] There was also seven miles of portable track to connect the main tramway to the fields. The portable line system enabled trucks to be located in the fields near the cutting gangs by manual labour or draught animals, usually horses. For the Homebush system, Decauville supplied two wood-burning locomotives in the first order, with 800 wagons suitable for tipping, 12 bogie wagons for raw sugar, two heavy machinery wagons and a passenger carriage.

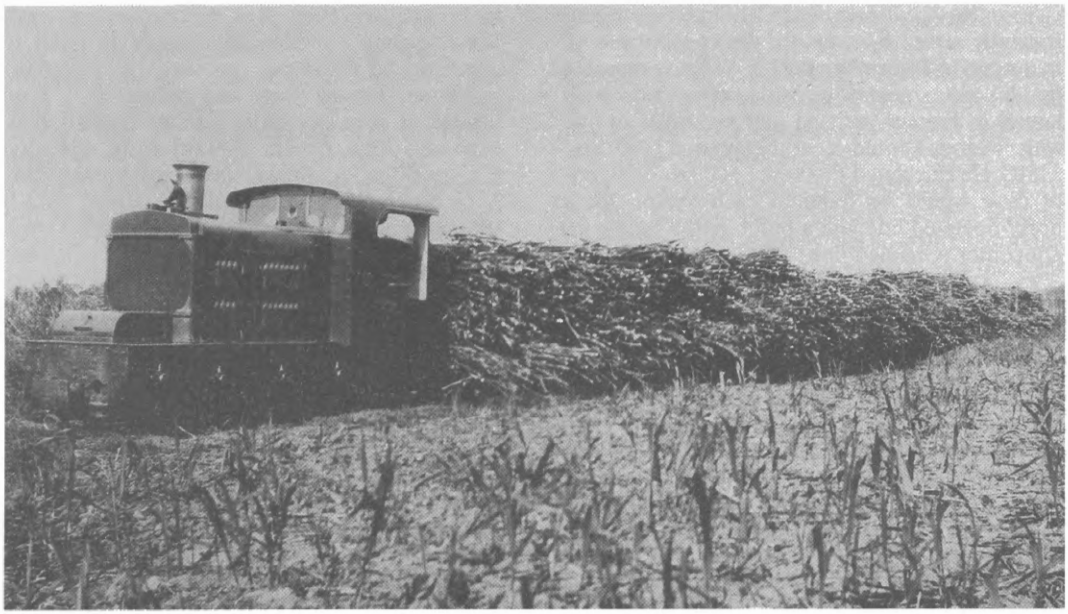
The locomotives were modified Decauville No. 5 class – distinctive, compact 0-4-0 side tank locomotives weighing 7.5 tons, with wheel diameter decreased from 700 mm to 600 mm.[37] In all, CSR imported six of these locomotives for their Queensland and Fijian mills.

John Fowler products were employed at Victoria mill. A permanent line, 8 miles (12 km) in length, was laid down from the Herbert River to the mill site in 1882 to carry machinery from the head of the river navigation.[38] The identity of the first locomotives at Victoria is a matter of some debate. The likely candidates are explored by John Browning in Light Railways No. 78.[39]

Goondi mill followed in 1885 and Childers in 1895. John Fowler products were selected for both these systems. When CSR began to crush cane on behalf of surrounding farmers (see below) its tramway systems made it possible to haul cane long distances to the mills. The construction of 2 ft gauge tramways on a large scale by CSR set the pattern for other mills.

The tramway systems were laid out according to practicable grades, the distribution of potential cane lands and the geographical and historical facts which originally determined the location of the mill.[40]

Although cane tramways were initially constructed by estate companies, it was the central



CSR introduced 0-6-0PM locomotives to their mill railway systems from 1925. Built by John Fowler, the first unit to arrive in Australia was 16830 of 1925, which was fitted with a 50 hp Waukesha petrol engine. Records indicate it went to Childers Mill, but this CSR publicity photo is believed to show the loco at Condong Mill. Photo: NBAC, CSR 171/380, Neg. 5433

mill which was to utilise the technology to the greatest extent, and thereby gain the efficiency of cane transport necessary to achieve the economies of scale possible from larger mill capacity.

RISE OF THE CENTRAL MILL

During the 1880s opinion leaders in the north saw plantations worked by coloured labour as an essential element of their economic future and the growing shortage of kanaka labour was viewed with increasing concern. Despite its successful experience of central mills serving independent farmers in NSW, CSR personnel in Queensland were initially hostile to independent smallholder suppliers and the company initially adopted plantation production in Queensland and Fiji. The experience was generally unsatisfactory, with constant labour problems and difficulties in controlling labour costs.

The establishment of efficient rail systems enabled cane to be transported over considerable distances at low cost. At the same time, public opinion was turning against the kanaka trade on which the sugar plantation system relied. Following a Royal Commission into the traffic in Pacific Islanders in 1885, legislation was introduced for cessation of the recruitment of Pacific Islanders after 1890.

The issue of coloured labour was resolved by economic forces. Following an industry boom in the early 1880s, competition from European beet sugar producers resulted in the world sugar price falling by a third in 1884.[41] The inefficiency, low productivity and rising labour costs of the plantation system were exposed. Moreover, technological advances meant that erection of sugar mills now required large-scale capital. As in Mauritius and the French West Indies, this situation was met by the emergence of a central mill system based on farmer co-operatives.

In the Queensland context, central mills were also seen as an experiment to help solve the deep-rooted question of abolition of coloured labour. Social questions were at the forefront of the policies of the Liberal Party headed by Sir Samuel Griffith. As early as 1875, the Liberal Party was urging the construction of central mills and studies were undertaken of the system in the US and the West Indies. In 1883 a Sydney engineer, Angus Mackay, had reported to the Queensland

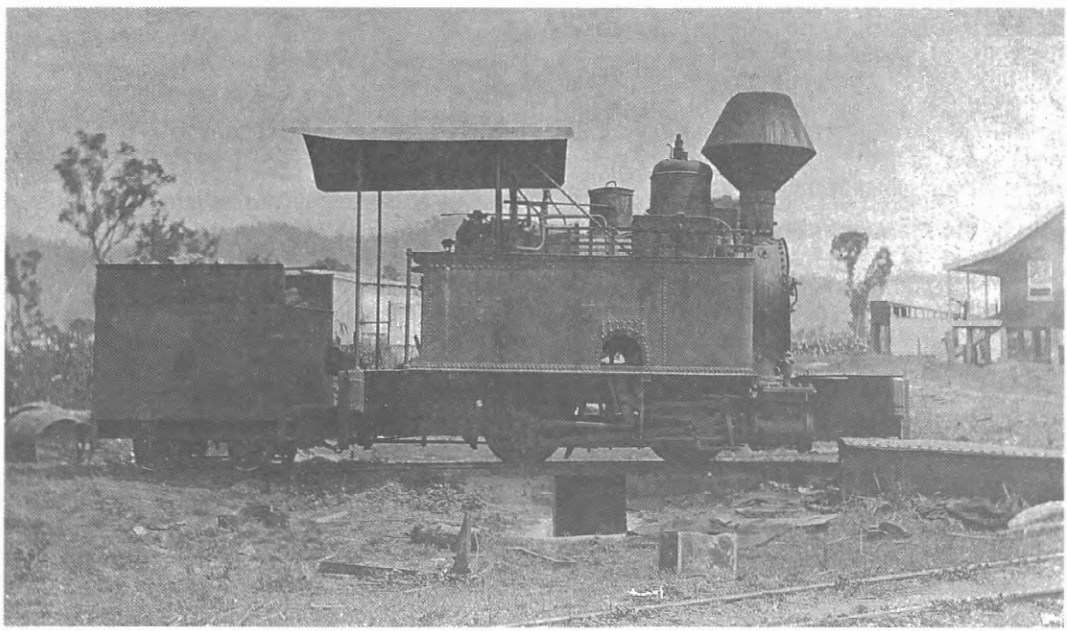
Government on the working of central mills overseas.[42] Mackay highlighted the efficient central mill system in the West Indies and noted that in times of difficulty, large plantations would be cut up into farms of 50 acres rented by white or black farmers.

The idea lay dormant for several years, but was taken up by the Griffith Government in the late 1880s.[43] In 1885 a small group of farmers from around Eton in the Mackay district petitioned Premier Griffith for the establishment of farmer-controlled central mills as the only solution to the labour problem and "a remedy by which farmers and selectors may be rescued from impending ruin".[44] This move was an obvious corollary to Griffith's desire for smaller scale agricultural settlement in the colony and an end to dependence on coloured labour. His vision was a population "not of tenants, nor a servile race, but of man living on his own lands, growing there his own sugar and making not large incomes, but fair incomes and selling their produce to the mills".[45]

Good transport was an essential element of the vision, as a public railway could release farmers from bondage to the nearest mill-owner by providing competition for cane. Public support began to seek such a railway in the Mackay district. The Government agreed to a public railway and a 22.5 mile (36 km) line from Mackay to Eton, via Newbury with a 7.5 mile (12 km) branch to Hamilton (renamed Mirani), was surveyed in May 1883.

The 3 ft 6 in (1067 mm) gauge railway was opened on 10 August 1885.[46] However, the railway did not have sidings to the mills, with only Victoria being located beside the line, and little cane was carried in the early years. Sidings were constructed to Marian, to Kowai, Palms, Alexandra and Pleystowe mills after a visit to Mackay by Railway Commissioner Curnow in April 1887. The railway was extended to Pinnacle in 1902, with subsequent branches to McGregor Creek and Hatton (62 km from Mackay).

In 1886 W O Hodgkinson was sent to identify areas where government, supported central co-operative mills could be established. In most districts small-growers were firm in their belief that sugar growing required coloured labour and rejected Government proposals, but at Mackay groups of farmers supported the central mills and agreed to lease their lands to the government for an advance of between £20,000 and £21,000.[47]



One of the first two Decauville 0-4-0T locomotives delivered to Homebush Mill in the Mackay District, showing a home-built tender. Old postcard, RF McKillop collection

Hodgkinson duly recommended the establishment of central mills at Racecourse and North Eton in the Pioneer Valley.

The North Eton Central Sugar Company mill was officially opened on 1 January 1888 by the Queensland Premier, Samuel Griffith, but it did not begin crushing until August 1888. Cane supply from farmers was a problem from the outset, and the new mill contracted to crush cane from adjoining plantations. A tramway was laid to Victoria in 1890-91, but there were insufficient funds to build more lines. The Double Peak Central Sugar Company was formed in 1895 to provide tramways for the North Eton mill and tenders were called for the construction of 10 miles of 2 ft gauge track. Three lines were in use by the 1896 crushing.

Racecourse Mill began crushing on 20 October 1888 as the show mill of the district. However, there was insufficient cane available. Closure of the estate-based Pleystowe Mill and the transport of its cane over the Mackay Railway to Racecourse for six years provided the means for survival. In this manner, Racecourse avoided disaster by exploiting a combination of Kanaka labour cane and its efficient transport by rail.[48]

Thus, both the farmer-controlled central mills concerns ran into early difficulties, due to insufficient cane supplies. These difficulties furnished the coloured labour party with a stick to beat Griffith's policy.[49] This opposition, together with the lack of co-operation by old-fashioned planters, finally broke Griffith's stand against the recruitment of Islanders, and coloured labour recruitment resumed in 1892.[50]

End of the Plantation Era

By the nineties the old system of heavily capitalised estates worked by gangs of Island labourers was doomed. Technological advances had made milling a specialised occupation. By concentrating on processing and subdividing their land for sale to small farmers, mill-owners were able to spread the risks of sugar production. EM Long at Habana Estate, was one of the first planters to see alternatives to the plantation system and, by 1883, he had already let four farms to tenants.[51]

Many of the plantations established in the McIlwraith boom of the eighties were bankrupt by the nineties.[52] The underlying issues were readily apparent by 1897, when the book *Work and Wealth of Queensland* summed up the dilemma of the plantation:

> Large estates require more labourers per unit area than independent farms [1x1000 acre plantation requires 1 labourer:5 acres cane compared with 1:10 on 100 acre farms], so that farmers can afford to sell cane to the mill more cheaply than the mill owner can grow it himself. On the other hand, the introduction of modern machinery and the benefits of scientific methods of manufacturing have created a position in which the small [mill] owner has no place. A mill which contains the expensive machinery and employs the expensive labour essential for the new methods does not pay unless it turns out more sugar than can be grown on even a very large estate. Both causes are working toward the same effect. The planter and mill owner who grows all his own sugar is becoming a figure of the past.[53]

At CSR, Knox initially thought Long's scheme impractical since he did not consider Europeans could cut enough cane in warmer months to keep the mill going.[54] CSR initially proposed to cut its losses and rationalise its Queensland operations. Homebush was to be sub-divided while Goondi would be retained with coloured labour, but Victoria was to be closed and the mill moved to Fiji.[55]

Once continuation of *Kanaka* labour was assured, Knox's attitude softened. In 1891, CSR, after thorough investigation into the viability of the plantation system, took the decision to cut up the Homebush estate into farm-sized blocks and lease them to farmers, with an option to purchase. Knox agreed to conditions much the same as those enforced by the co-operative mills with the exception of giving the entire freedom in the matter of the labour to be employed.[56]

The experiment proved promising, and other estates at Herbert and Johnstone Rivers followed shortly after. By the turn of the century, the majority of cane in the Herbert district was being produced by independent farmers on 160-acre selections.[57]

The view that the collapse of the plantation system was linked to pressure to cease indenture of Melanesian labour has been challenged by Moore.[58] He notes that small-scale farmers were as dependent as the largest planter upon Melanesian labour in the 19th century. Moreover, the crucial transition from plantations to small-scale farms occurred in the 1880s, when the labour trade was still flourishing.

What is not in dispute is that the most powerful organisation in the industry had been forced by labour difficulties into radically reforming its production system in Queensland. By eliminating the plantation, CSR placed the labour question in

the hands of the farmers. In so doing, the company reflected the industry trend. For, although the Government, sponsored central mills were designed to avoid the use of coloured labour altogether, in practice, their operations were indistinguishable from those of CSR.[59]

Sugar Works Guarantee Act, 1893

With the return of McIlwraith to government, he declared himself a convert to the encouragement of smallholders. In 1893 he brought forward legislation to authorise the financing of central mills by debentures backed by a government first mortgage on the mill itself and the lands of farmers supplying it with cane.[60] Authority for construction was to be granted in any district where there was sufficient cane available for profitable working. Eleven new central mills were established, expanding sugar production in existing areas and allowing new areas, such as Mossman, Proserpine, Sarina and Mulgrave to be planted to cane. The new mills constructed extensive tramway networks to service their suppliers.

As the old plantations subdivided their lands new settlers arrived to take up the challenge. Italian and Maltese migrants proved to be hard-working and successful settlers and they brought out relatives to the new industry. Between 1892 and 1902 the area of cane in North Queensland increased from 23,623 acres to 46,291 acres and sugar production from 31,052 tons to 69,486 tons.[61] By 1894 it was estimated that all but 110 of Queensland's 1,387 cane-growers were smallholders with less than 90 acres each. A few plantations continued under the old system but all were operating under financial strain.

With Federation, the Commonwealth Parliament became dominated by spokesmen espousing a White Australia. In October 1901 legislation was passed prohibiting the introduction of Pacific Islanders from 31 March 1904.[62] Attitudes against coloured labourers hardened after this in the white community and in the summer of 1906-07 most Pacific Islanders were repatriated. However, those who remained brought a strong Melanesian heritage to many Queensland coastal communities, such as Mackay, where 10 per cent of the coloured community are descendants of Melanesian indentured labourers.[63]

Triumph of the Yeoman Farmer

The decline of mining in the early 20th century resulted in men turning to the canefields for employment. Old estates were subdivided for sugar lands and new mills were erected at Babinda, South Johnstone and Inkerman in 1914-15, followed by Giru in 1920 and Tully in 1924. North Queensland was well on its way to becoming the yeomanry of small-farmers visualised by Griffith.[64] The new settlers were pioneers, but it was pioneering in which the whole family took part. Until the mills were working the family kept themselves in whatever jobs were offering. The area of cane in North Queensland increased from 57,954 to 78,013 acres between 1906 and 1917.

A dramatic restructuring of the sugar industry ensued. In the Mackay district, the 30 mills of 1885 gave way to large central mills. By 1900 there were five farmer-controlled mills which out-produced the seven remaining plantation mills. In 1925 seven central mills produced three times as much sugar as the 30 mills of 1885.[65]

Foundations of the Modern Industry

The central milling system initiated by Edward Knox, on the Clarence in 1869, and shaped by his son, Edward William, over the following decade, set the crucial foundations for the modern Australian sugar industry. The water transport which supported the pioneer mills could not be widely replicated, so the development of appropriate rail transport technology for the efficient transport of cane to central mills emerged as a pillar of the industry.

Suitable rail technology emerged during the 1870s, so that when CSR established its Homebush and Victoria mills in 1882 it could apply narrow-gauge rail transport. CSR ordered equipment from two suppliers and compared their performance. From this beginning, canefield railways have evolved into the highly sophisticated and efficient systems of today. In practice, the CSR central milling system, pioneered in NSW by Knox and enhanced by rail transport after 1882, provided the model for Government-backed central mills which emerged after 1888.

Technological innovation has brought a dramatic improvement in the efficiency of Queensland's narrow-gauge sugar rail systems since the 1950s. By the 1960s the mills considered QR freight rates were too high and they began to construct new 2 feet gauge lines to serve the areas formerly serviced by the QR. In the Mackay region, QR branch lines to Kungurri and Owens Creek were converted to 2 feet gauge by the Marian Mill, while extensive new tramways were built, by Farleigh and Plane Creek Mills, which parallel the QR North Coast Railway.

However, production and marketing controls, many of which date from the First World War, have inhibited the efficiency of the Australian sugar industry.[66] Cost savings have been demonstrated by reallocation of cane assignments among mills, weekend milling with fewer mills, new tramway linkages and alternative season lengths.

During the 1980s, a process of industry rationalisation resulted in the closure of several mills and further expansion of tramway systems to transport cane to even larger, more efficient central mills. By 1995, the Queensland crop was 35.27 million tonnes of cane hauled over some 3500 km of track to mills which processed it into 4.61 million tonnes of sugar.

Today's large-scale operations are a far cry from the 7 tons/hour mill at Chatsworth of 1871, but the management systems and technological evolution which underlie the industry's prosperity owe a great deal to the vision and systematic observations of E W Knox on the Clarence River in the 1870s.

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On 10th October 1968, Fowler 0-6-0DM 20827 of 1935 hauls a load of whole-stick cane towards Condong Mill. Unlike the majority of its Queensland colleagues, Condong did not upgrade its tramway network to cope with the transition to machine-cut cane, opting instead for a switch to road transport using the 'Canetainer' system. The last cane trams ran in 1974. Photo: R F McKillop

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THE EARLY HISTORY OF PENANG SUGAR MILL, FIJI: A CASE STUDY IN THE SOCIAL IMPLICATIONS OF RAIL TRANSPORT

by John Peterson

INTRODUCTION

There seem to be two basic questions in many writings about railway topics. Did the coming of the railway 'lift the burden from the back of the labouring poor?' As railway enthusiasts, it is easy for us to be caught up in the ideology of railways as a 'progressive' force. Was this the case for everyone? The second question has to do with the notion of efficiency. The components of this have varied according to the historical period, levels of available technology and the social relations and ideology of the time. Particularly puzzling to me has been the use of modern technology like railways in an environment of cheap labour. The second question therefore becomes 'in what ways did railways make industries efficient?'

As is well known, the sugar producing process has two seasons: the labour intensive harvesting season and the 'slack'. A key problem for the owners was how to balance the labour requirements of the two without paying more for the labour than required. This became a crucial problem in the time we are examining due to the continuing decline in the price of sugar.

Because planters had little control over the market price of sugar, the only way planters could make profits was by reducing the costs of production. The high costs of the capital equipment in the sugar industry meant that once investment had started, it was difficult to change to other industries that might give a better return.

As the price of sugar declined, the variable over which the planter had the most direct control, was labour. During the time we are examining, the dominant characteristic of the system was the various methods used to reduce labour cost of which the use of railways was one.

I wish to use the early history of Penang Sugar Mill in Fiji as a means of exploring these questions. Inevitably this will need a detailed analysis of the use of labour since it was the reduction of this that provided the context for the use of railways.

FOUNDATIONS

The Chalmers brothers, Dr. Charles Bonar and Nathaniel, established the first sugar mill in Fiji on the dry side. Nathaniel had been a sheep farmer in New Zealand and came to Fiji with £70,000 and purchased land in Ra in 1872. He managed the mill until the early 1890's. He was joined later by his brother Charles who had retired from the British Indian Army where he had worked as a surgeon and also injected considerable funds into the mill [Chalmers (1949)].

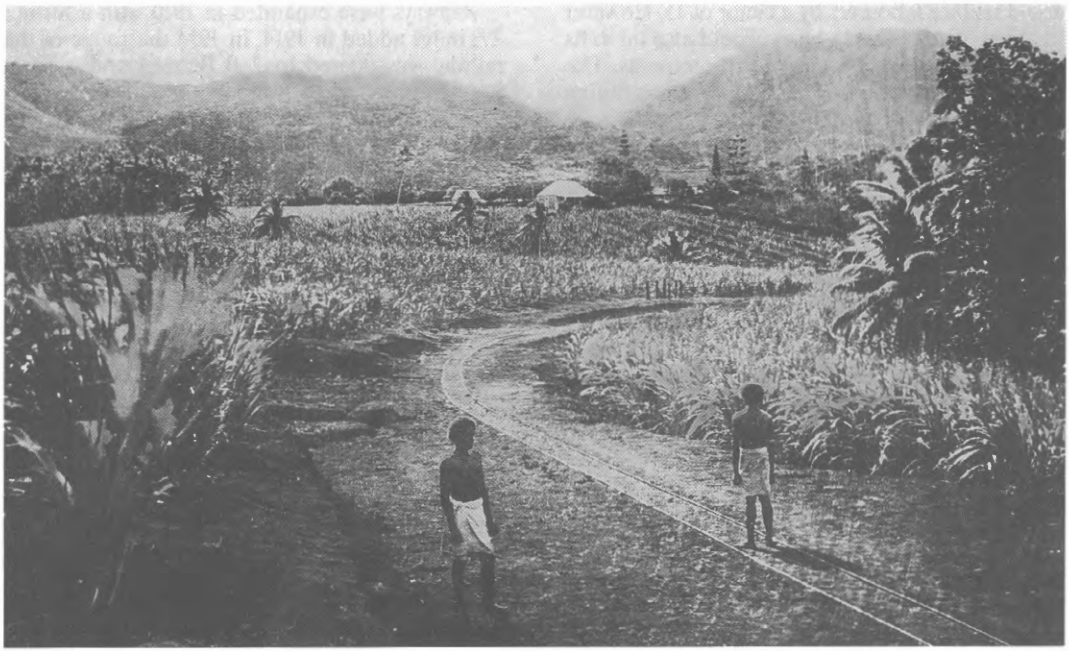
Penang mill is the only survivor of the seven mills established at that time but it seems that this site was their second choice since Nathaniel had previously written to the Government asking for land on the Rewa River. Luckily for them, the site in Raki Raki proved much more suitable for growing sugar.[1]

Not so lucky was the timing of their investment which coincided with a peak in the price of sugar which steadily declined thereafter, reaching less than one quarter of the 1880 value.[2] Both men were elderly, so dreams of an easy retirement as wealthy planters must have turned sour for them.

The brothers had great confidence in their venture since they invested in the latest three-roller mill from Mirrlees, Tait & Watson of Glasgow. It was considered to be the most modern in Fiji at that time.[3]

In addition, the plantation land was purchased direct without any of the government inducements needed to attract bigger companies. Stanlake & Lee and the CSR, both much larger concerns and hence having easier access to finance, needed government concessions on land prices in order to induce them to invest in Fiji.[4]

To maximise profits on their investments, every stage of the sugar producing process was owned and controlled by the Chalmers. Although initially cane was bought from other planters and from Fijian gardens as part of an early tax scheme, they soon bought out most of the early planters and the Fijian scheme lapsed.



Early sugar plantation development in Fiji was accomplished using Fijian labour. This scene, believed to be on Mago Island in the early 1880s and depicting the 20 in. gauge tramway with attendant Fijian labourers, characterises the early plantation development era. Photo: Fiji Museum

PHASES OF DEVELOPMENT

I have defined four phases in the development of the Penang mill prior to the CSR takeover in 1926: establishment, consolidation, expansion and stagnation. These phases represent different strategies to cope with conflicting demands for labour of which railway represented an important tool.

Establishment Phase (1881-1883)

In this phase the initial clearing of the land, planting and initial harvesting took place. There was no slack season as such because labour could be shifted from harvesting directly to clearing and planting of new land. The plantation at this time was described as 'nearly all laid out with the exception of hills in 10-acre blocks, divided and sub-divided by fine broad roads'.[5] The mill was centrally located to minimise distance travelled and to optimise the use of the carts used to haul the cane. Fijian labour was utilised during this period.

Consolidation Phase (1883-1897)

During this phase the annual cane area harvested centred around the 250ha level. This was also a period of a steadily decreasing price for raw sugar (£34/ton in 1892 to £9 in 1903). At the same time, competition from Queensland for Melanesian labour increased their costs. Recruitment from Melanesia finally collapsed from 1886 and Indians, despite higher initial transportation costs, became the main labour source.[6] The effect of this was to intensify ways of reducing costs.

It was during this phase that railways were introduced, two miles in 1883 and a further mile in 1887 [Dyer & Hodge (1988) p.79]. The gauge seemed to be 2 ft 6 in. Chalmers was asked by developers of the street tramway in Levuka to quote costs based on this line. The gauge quoted was 2 ft 6 in, rails as 12 lb/yd, sleepers as 4 ft long and 4 ft spacings [*Fiji Times*, 15 March 1884 quoted by P F Dyer].

In advocating narrow gauge railways (and perhaps being biased in their favour), Robinson calculated that a horse can haul 16 tons on the level using a tramway compared to one ton on a country road.[7] Assuming a person is needed to control each horse, then this suggests that a tramway

could replace labourers by a factor of 15. However its value in the sugar industry would also lie in its ability to balance the labour requirements. The use of a tramway could reduce the labour during the peak labour-intensive time to roughly balance the needs during the 'slack'.

Similar reasons could be also given to the number of horses used. Once the initial clearing and planting was completed, the need for horses was not so intense so their costs could also be reduced by the introduction of the railways.

Dr Chalmers died in 1889 and the remainder of this period was characterised by various attempts to sell the mill as a going concern, without success. The mill initially transferred to the trustees, Messrs Fraser & Co. of Melbourne, and ultimately passed into the hands of this firm's liquidators.[8] Mill production remained constant during the period at five tons of raw sugar per day so investment in increasing milling efficiency was not a strategy pursued during this period.

Expansion Phase (1893-1920)

Finding no buyers, the liquidators decided instead to expand the mill to reduce unit costs. The Melbourne Trust Company Ltd was formed and Thomas Coster appointed as the new manager. Coster remained manager throughout this phase, a record for any manager at Penang. His daughter, Winifred Harper, recorded European life at the mill in a book called *Remembering Fiji: Penang.*

Messrs Fraser & Co. were also the owners of the Deuba Sugar Estate Company and the Mago Island Estates at this time, both of which were complete sugar milling plantations. Milling equipment, principally the steam boilers, from these sources formed the basis for the early expansion of milling capacity at Penang from 5 to 10 tons/day by 1896. Winifred Harper recorded the event:

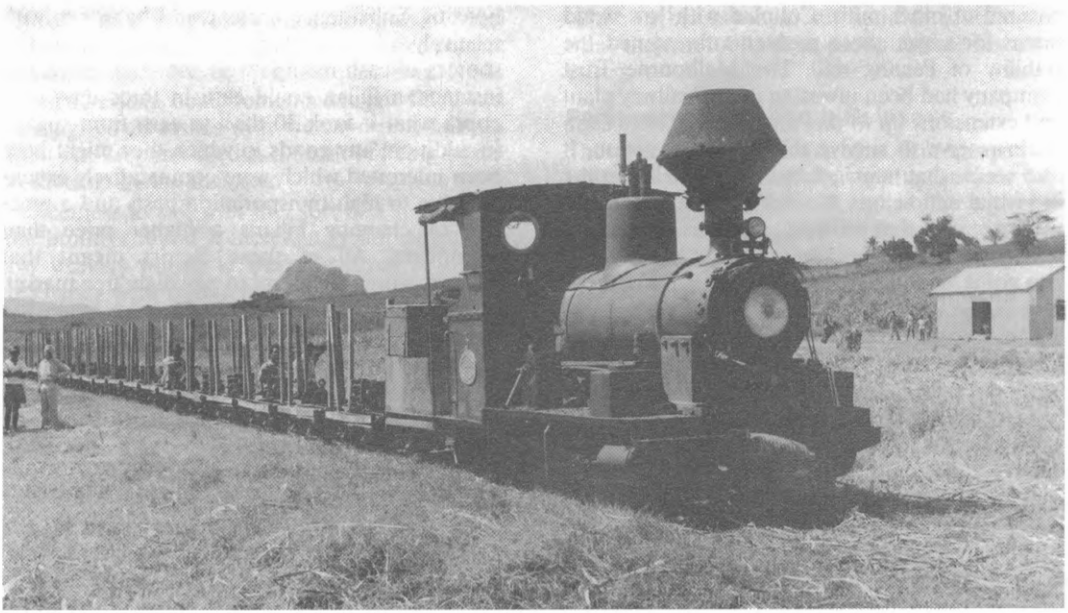
> When my father extended the mill and a new boiler was needed he knew of one that had been in use at a mill on Mango, an island about two hundred miles away to the east. Mr. Butschkow [the chief engineer] had worked there before the mill closed down and he knew the boiler was in good order. So he set off for Mango, most likely by cutter, and towed the boiler to Penang across two hundred miles of sea and negotiating the many bends of the river, to land safety at the mill.[9]

It is interesting to note that a railway system, including locomotives, was among the plant available from Deuba but was sold to a neighbouring mill rather than transferred to Penang.[10]

Railways were expanded in 1910 with a further 2½ miles added in 1914. In 1914 the gauge of the railway was altered to 2 ft [Frazer] and a locomotive ordered to suit. Why the gauge was changed at all remains a bit of a mystery to me. 2 ft 6 in gauge would seem to be a more appropriate gauge since the greater width of wagons would make the wagons more stable given the staking crossways of the cane. Indeed problems were found with the wagons derailing after conversion. The locomotives were purchased new for the mill and could just have easily been built to 2 ft 6 in gauge and, indeed, 3 ft 6 in gauge versions of the first Barclay locomotive were used successfully in New Zealand and Australia.

The change of gauge makes some sense when you learn of the involvement of CSR officials at Penang. P F Dyer, quoting newspaper reports of the time, gives an indication of mutual visits by Penang and CSR officials. The proposed Rewa Valley-Suva government railway line of 1914 had a recommended gauge by the engineer of 2 ft 6 in. Included in the file on this held in the Fiji Archives is a letter from CSR critical of the projuect and suggesting the gauge be changed to 2 ft gauge. This clearly annoyed the engineer who responded along the lines that the government was not there just to serve CSR's interests. If CSR went to such lengths to influence the choice of gauge for a proposed government line, how much stronger would it be within professional peers within the small expatriate community of the sugar industry. Having worked for two years on a Pacific island (Niue) I can certainly understand the intense social relations between expatriates living in a 'foreign' environment. Certainly the gauge change worked out well for CSR in the long term.

On February 8, 1915, a steam locomotive arrived being a seven ton 0-4-0T Barclay built locomotive [No. 1393]. In size it was comparable to other locomotives at the smaller mills and should have been suitable for the short distances and level terrain of the mill at this stage. Frazer suggests its purchase was in anticipation of the expansion of the rail link by seven miles to Ellington wharf. However, P F Dyer points out that it was ordered before the purchase of Voli Voli estate. Frank Lamont the engineer of the time who expressed disappointment with the locomotive saying that it would do for the season but would eventually be relegated to shunting duties on the wharf [Frazer (1981) p.33]. The short wheelbase and/or inside frames which may have



Number 3, the last of the Melbourne Trust Company's locomotives (Andrew Barclay 1671 of 1920) at the head of an empties train on the western line in 1954. It had been converted to a tender locomotive in 1941. Photo: Derek Cross (Peter Dyer collection)

caused it to derail are possible reasons for his dissatisfaction. This fits into the problems that were associated with the existing unsprung trucks which were prone to derailment in locomotive haulage. These were rebuilt with springs. If this were the case then fixing up the track may have been a cheaper alternative to buying a replacement locomotive. The facts remain that this locomotive had an extremely short working life at Penang.

Another larger locomotive arrived in 1916 [Barclay No.1456 (1916)] in time to work the new seven mile link to Ellington wharf. This was agreed to in 1915 and completed the following year.

Winifred Harper describes the expansion to Ellington:

> My father improved the method of shipping by building a wharf at Ellington and running a railway from Penang on the wharf. Here the water was deep enough for ships to come alongside and load the sugar from the wharf.
>
> An engine had to be used on this long run as Ellington was over seven miles from the mill and it would have been too far for the horses to draw the trucks. They did not like this fussy, puffing, noisy addition to their peaceful life and made a great show of their disapproval by shorting and shying if they encountered it along the line but they were too intelligent to be upset for very long and soon accepted it as part of the working of the estate. In time they were able to stay quite still as the engine clattered by.[11]

1916 was the peak year for tonnage of cane crushed and sugar produced and output steadily declined thereafter. This was also the year that the Indian Government suspended all recruiting of indentured labour.

Despite this, the Company still seemed optimistic, perhaps based on the widespread expectation that sugar prices would rise after the war. The railway was then expanded westward some five miles from the mill and a third 11 ton 0-4-0T Andrew Barclay locomotive was acquired No. 1671 (1919).

The following year all current indentures were cancelled. Fiji had to rely more and more on a 'free' labour source, drawing from the labour pool already existing in Fiji. Would 'free' Indians willingly continue to labour in the cane fields?

Stagnation Phase (1920-26)

With cancellation of indenture contracts in 1920, Indian workers used their new bargaining position to demand better conditions and strikes

ensured at other mills. Coupled with low world prices for sugar, these problems threatened the viability of Penang mill. The Melbourne Trust Company had been investing in new railway plant and extensions up to this time, leaving little capital in reserve to survive this industrial action. It also seems that management initially felt that the industrial action was the work of a few 'troublemakers' and that normal relations would be resumed. When it became obvious that this was not going to happen, they attempted to sell the mill as a going concern.

The Company suspended planting of cane in 1921 and, in May 1922, the directors decided to close the mill after the current crushing and dispose of the plant and machinery.[12] However, the Company decided to reopen the estate in June 1923 to have cane ready for the 1925 crushing season. Following this crushing, the Melbourne Trust Company entered into negotiations with CSR who bought the estate and mill as a going concern.

LABOUR RELATIONS

Having the capital items like the land and manufacturing plant is of little benefit unless labour is available to create a product of value. Producing sugar last century was a labour intensive industry. Since Fiji was off the main shipping routes as well as being some distance from its major markets, its cost of production had to be reduced to allow for this. The solution to this in Fiji was to be the use of 'coloured' labour which had a lifestyle that needed less cash income to maintain their material standard of living compared to Europeans.

The Fijian Era

The obvious source of labour was the Fijians. Certainly the early planters assumed this and the attitude is typified by an elected member's description of one of the powerful chiefs of the time:

> What are they but niggers and hillmen? Is it not an insult to this house and to every white man in this country to have an old nigger like the king set up, as he is being set up? King indeed. He would be more in his place digging or weeding a white man's garden.[13]

However, there were problems with this. Fijians were subsistence farmers on their own land. Planters expected Fijians to give up their traditional self-sufficient lifestyle to work long hours on monotonous heavy manual tasks under constant supervision by very physical overseers as well as being fed poor food and live in inferior housing. Subsistence crops could be grown with relatively small amounts of labour. Alternative sources of cash income were more attractive. For instance, a Fijian could earn in three days with copra what it took 30 days to earn from sugar.[14] In addition, any goods in which they might have been interested which were comparatively expensive due to high transportation costs and a practice of charging Fijians a higher price than Europeans. All of these factors meant that planters would have had to pay high 'free market' prices for labour which would have made the industry uneconomic.

Planters rationalised the reluctance of Fijians to work for below free market wages that they were prepared to offer as proof that Fijians were lazy and uncivilised so early thoughts turned to compulsion, which was perceived to benefit 'natives' by teaching them the habits of hard work and industry. A common colonial method of the time was a form of personal or head tax paid to the Government in cash which, for 'natives', could only be raised by working for Europeans. Although an attempt was made to introduce head tax, the Government realised that this could not be done without undermining the power base of the chiefs.

Europeans were still very much in a minority and relied on the goodwill of key chiefs for their safety. The chiefs in turn needed European support to supply key goods such as imported status items, weapons, etc. for their internal support and support against rivals. If the chiefs rebelled, then the government could be faced with a war similar to the then recent Mauri wars in New Zealand. If this were the case then the Europeans faced likely defeat. From the colonial point of view there could be little value and justification for the expense of bringing outside soldiers to fight a war in Fiji.

Limited contract work was eventually allowed with Fijians which was important in the initial stages of the development of Penang mill. Their role became that of short term contract labour during the harvest season, particularly in the mill. Diseases and the subsequent reduction of numbers in the 1890s means that, from this time, Fijian labour ceased to have an important role in the sugar.

Problems between the Chalmers brothers and the Fijians started before the mill was built. Local Fijians were accused of planting on land belonging to the mill and of continual thefts and damage. Livestock, like, goats, turkeys, ducks and fowls

(introduced to control a cane-eating grasshopper) disappeared. Horse-stampeding and fence cutting as well as theft of stores became problems. Thefts led to 42 Fijians being sentenced to jail, fined and being given 20 lashes with the cat-o-nine-tails. In 1880 one labourer died as a result of being boxed in the ears by the manager.

Needless to say, with this sort of a reputation, the brothers found it increasingly difficult to get any workers willing to work for them at all. By 1887 they were paying high rates of pay for men described by the inspector as 'a poor lot'. At one stage they had most of the Fijian labour force jailed for labour offences leaving them with virtually no labour! This led to the sabotage of the mill itself by iron being placed in the rollers.[15]

Indentured Labour

When Fijian labour could not meet the demands placed on them, the planters turned to the use of imported indentured labour, initially from Melanesia, but eventually from India.

Although the planters faced the high cost of transportation of the labourers from their home country, once in Fiji costs were reduced because the labourers were fully dependent on the planters for all necessities. They could not return home and faced certain capture if they ran away. Basic food was imported and obtained from the planter from the meagre wages earned. Employers had the power to set and enforce daily tasks. There were fines and punishments for 'laziness'. Government inspectors were few and in practice favoured the planter. For most labourers, there was little choice but to put up with poor pay and working conditions on the plantations.

Strategies used at Penang during this time included giving poor quality food, poorly maintained housing, giving every possible discouragement to keep patients out of the hospital they were obliged to provide. An example of the latter is provided by Chalmers personally treating, those who reported sick in the mill office.

Physical force on labourers was also used which sometimes led to the death of the victim. To give just one example of the lengths gone to, a labourer was reported to have been chained, for three weeks, to his workplace until he promised to reform.

Not surprisingly the death rate was high. Ten per cent in 1886. A Government inspector described Chalmers' relationship with his workers as 'not of wilful rancour but of warped principles'. Another reported that 'none of his employees (white or black) would stir hand or foot beyond what they are obliged to do, to further his interests'.[20]

Perspectives of Labour Relations

The colonialist view was that Europeans and Indians worked peacefully together at their own work places. Europeans occupied the top positions at the mill and formed a social circle among themselves. The manager was respectfully called by the Indians as 'Mother and Father'. A key person at this time was Dost Mahomed, head *sirdar,* who was described as being 'a firm leader who did not hesitate to beat anyone who did not do as he was told'. He was regarded as a friend by Coster who paid his fine when convicted of assault on labourers. Winifred Harper paints a contented view of life at Penang during this time:

> Stacks of railway lines piled on bogies were drawn past the cottage by a heavy cart horse. An Indian walked beside it holding a short rein. These were taken to gangs of men to lay temporary lines along side roads and cut tracks through the centre of the fields to lay lines there too. When these had been connected to the permanent line long trains of cane trucks would be drawn past, rattling and clanking; they were iron trucks with up-standing ends. A chain was attached to one end of each truck and this hung loosely over the top bar adding to the clatter.
>
> Other men would collect the cane and load it onto the trucks piling it high then securing the load . . . As each truck was loaded other men would push it carefully over the field to the main line hooking the trucks together until they had as many as the horse could draw. The horse would have been waiting in the shade of trees beside the road and would now be brought to the trucks dragging its long chain which rattled along the ground and clanked over the rails. It would stand between the rails while the driver hooked the chain to the trucks and when he came forward to take the short leading rein, the horse would brace his whole body as he pushed with his hind legs and pulled on the collar and when he had started the trucks rolling he would pull with a steady pace keeping the chain taut. If the ground sloped the chain became slack and the driver would uncouple the hook, fling the chain from the line and the horse would step out from between the rails and hurry to the roadside out of reach of the cane which overlapped the edges of the trucks. No order was given, the horse knew as well as the man what had to be done. The trucks would roll on until the line leveled when the chain was hooked on again and the load drawn to the mill yard. This was of course level ground but both man and horse knew the trick of lining up the trucks. When they were about fifty yards off the horse would increase his pace and as the chain slackened it was unhooked, the horse stepped quickly

> out of the way and the trucks would roll gently on until they bumped into the line of trucks already waiting there.
>
> Our method of travelling when dressed for tennis or an evening party was by specially made truck pushed by one or two boys; a wooden platform on four wheels curved up to a bar at each end and a box shaped seat with a centre back rest was fixed in the middle. Four could sit comfortably on the seat, two facing ahead and two looking backwards, but the whole family could fit in by double banking. We would skim along the permanent line at two boy power at a tremendous pace. The trucks moved easily and the boys ran on the rails pushing on the bar. Each family had its own truck and it was quite amusing to see all the trucks skittering along the line to a meeting place where a picnic had been planned, the women in shady hats and gossamer veils, the men in helmet or panama hats and the children in wide brimmed home made linen hats.

The author's father-in-law D. Ram Singh remembers a different picture of life in the fields based on early memories as a child and talking to older members of the Indian community in Raki Raki. This picture is of poverty, hunger and hard labour in the fields, a view backed by figures provided by Narsey. Half the women and a fair proportion of the men would not have earned enough money to satisfy the *minimum* daily requirements for food.

Under the indenture agreement, workers were set tasks defined as what an ordinary able-bodied adult male worker could do in six hours. In practice there was a 'tendency to establish a scale of tasks based on the capabilities of picked workmen . . .' and a common practice to increase the tasks of those who finished early.[22] Failing to do the tasks as defined by the employer was a criminal offence with the penalty of imprisonment, a fine or more usually an extension of time on their contract. Between one-third and one quarter of the immigrants had time extended ranging from an average of 37.7 days in 1896 to 110.9 days in 1904.

DID THE COMING OF RAILWAYS IMPROVE WORKING CONDITIONS?

The above suggests a focus of the Fijian sugar mill owners was to extract as much labour as possible from the captive immigrant population. My argument here is that one reason why the railways and, in particular, locomotives were selected by the mill owners was because they allowed the indentured work force to be regrouped to allow more intensive supervision and thus enable more labour to be extracted from the labourers.

Stephen Marglin, in his investigation of the origins of the industrial revolution in England, concludes that increasing technical efficiency was a by-product of this revolution, not the cause.[19] He argues that the creation of the factory system (upon which the plantation system was modelled) was created when various entrepreneurs took advantage of extensive unemployment to centralise weavers under one roof where intensive supervision could be used rather than the workers doing the job in their own home as was the previous practice.

Initially, the simple machines were the same in both settings. The increased output and ability to depress wages in an era of high unemployment enabled owners to become wealthy and encouraged more entrepreneurs to enter the field. One response to this by some owners was to invest in innovative technology. Machines that increased production AND reinforced existing patterns of authority were chosen: ones that relied on the labour component being unskilled (and thus easily replaceable) and therefore dependent on employers to set working conditions. The key argument here is that technology is not 'neutral' as often assumed, but rather reflects the values of the people in a position to buy it.

In this context, the introduction of locomotive on sugar plantations represents an attempt to increase efficiency not just in the number of workers' jobs it replaced, but also to allow greater control over the existing workers. The locomotives eliminated the need for drivers of the horses taking the cane to the mill. Only trusted workers would be given this sort of position since they could not be directly supervised. This suggests that there was some sort of career structure for workers within the indenture system. If they worked hard under the direct supervision of a *sirdar* in cane cutting and other gang tasks then they may be promoted to the relative ease of delivering cane to the mill. The coming of locomotives effectively eliminated these opportunities.

At this time in Fiji there was a racially segregated work force. Locomotive drivers were European as were all of the top jobs at the mill. The mill workers were generally 'half-castes' or seasonal Fijians. The advent of locomotives meant that indentured labourers could be redeployed into the physically demanding tasks associated with plantation field work under intense direct supervision with little prospect of

Bullocks became the preferred mode of haulage of cane on portable track and can still be seen hauling cane from field to main line today. This timeless scene was captured near Lautoka in 1954.
Photo: Peter Carpenter (Peter Dyer collection).

change in the future. The outcome was both a physical and psychological worsening of working conditions for the workers.

The overall data from the period and the chain of events of the time support this theme, although it is difficult to isolate specific data dealing with Penang. Under the indenture system, after the contract for five years, the workers were to be paid to return to India after 10 years, the expectation being that they would re-indenture for the extra five years Only 10% re-indentured in 1892 for instance and 40% returned to India. The indenture system directly kept the potential wages of 'free' Indians low to the point where they preferred to grow subsistence crops rather than work in the sugar industry. This meant that the system became dependent on the continuing supply of new indentured labourers from India.

The death rate was another indicator of the poor working conditions. The suicide rate in the period 1902 to 1912 for indentured workers reached 926 per million compared with 147 among 'free' Indians and 63 in the province in India from which most came. The death rate of adult workers who died within five years of arrival in Fiji for the period, 1909 to 1914, averaged 8%, a high figure considering that they had to pass a health test before being accepted and the vast majority of them being between 20 and 30 when their mortality rate should be at the lowest.

Between 1889 and 1910 around 22% of adults on estates were convicted of 'laziness' crimes with the result that between 1896 and 1904 around one-third of the workers had their time compulsorily extended an average of 64 days each.[20] The indenture system effectively criminalised a large proportion of the workers.

END OF THE PLANTATION SYSTEM

It is little wonder that India ceased the indenture system in 1916, and that Indian workers used their new bargaining position to demand better conditions from 1920. However. it is important to clarify the reasons for this.

Indentureship in itself did not create this crisis situation. Indeed indentureship agreements are still part of modern industrial practices in Australia in the form of apprenticeships. What caused the crisis was the unequal and the exploitive nature of the contract which overwhelmingly favoured the employers. In addition, the Government failed in its duty as an independent 'umpire' to enforce fairly the conditions of contracts that did exist. The resulting loss of

confidence in the system made the collapse inevitable.

The transfer to CSR ownership brought the rapid break-up of Penang Estate. CSR was able to buy the Penang operations at a bargain price of £40,600 compared with the £93,000 valued just after its closure.[21] CSR used its Australian experience to break the plantations into small farms. In the Fiji situation, however, the size of 10-15 acres was chosen because it was difficult to support a family on this area, forcing the adults to sell their labour during harvesting time. An important aspect of the land contracts was that the small farmer MUST grow only sugar and not any other cash crops. The break-up of the estates has been described as 'the boldest experiment in Colonial agriculture during the present century',[22] but in fact drew on existing practices started 40 years earlier in Australia and still allowed CSR a great deal of control over the cane growing process. Penang remained a high quality sugar producer paying growers a special rate for their cane until the 1950s.[23]

Another reason mentioned for the purchase of Penang was to maintain the dominance of sugar in Fiji and hence ensuring that potentially more attractive alternative crops were not available as an income source since rumours were current at the time that Penang was going to be purchased by a pineapple canning company.[24]

CONCLUSION

In the Fijian context, the use of railways within a sugar plantation economy allowed greater efficiency by firstly reducing the overall labour needed. It also allowed a more efficient use of labour by spreading the requirements between the slack and the harvesting seasons. The coming of locomotives allowed the intensive use of plantation labour by allowing greater direct supervision on the remaining labour intensive tasks. This involved a significant worsening of conditions for the workers. The direct result of these poor working conditions was the collapse of the plantation system in Fiji once a 'free' labour market situation came into being.

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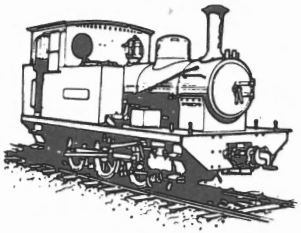


BOOK REVIEWS

RACK RAILWAYS OF AUSTRALIA

by David Jehan

112 pages, 297mm x 210mm, 83 photographs, 36 maps and diagrams, card cover. Published 1997 by the author and distributed by the Illawarra Light Railway Museum Society Ltd., PO Box 244, Albion Park 2527.

Rack railways are a specialised answer to the problem of gradients which are too steep for conventional adhesion motive power to surmount (or descend) safely and economically. As a solution to this problem they are expensive and cumbersome, but they have their place among the world's railways and some have stood the test of time. A book covering the just five Australian rack railways to have existed covers government, private and industrial ownership, narrow and standard gauges, steam, diesel and electric power, and 102 years of history (although there was no operational rack railway in Australia between the last steaming of a Mt. Lyell loco in 1970 and the opening of the Ellalong Colliery system in 1984). Something for everyone you might say, and David Jehan has managed to produce a book which delivers, in readable and attractive form, the kind of treatment which will appeal to all who have more than a passing interest in any aspect of its subject matter.

The two nineteenth century rack railways were built to serve what turned out to be great mines, one by private enterprise and the other by government. They were built when it was not totally clear how rich the mines were, or how long they would last, and as a result incorporated rack sections as a cheaper alternative to more heavily engineered grades capable of adhesion working. These rack sections were relatively short parts of what otherwise were conventional railways. Even after coming under common ownership with the expensively-built and adhesion-worked rival North Lyell line, the Mt. Lyell line survived. It was finally vanquished by road transport. The Mt. Morgan line was eliminated when the rack section was replaced by an adhesion-worked deviation, itself now closed. The author makes some interesting comparisons between the equipment and methods of working on these two lines, and as he points out, it is interesting to speculate on the degree to which those responsible for the running of the two lines were familiar with each other's operations.

Skitube is a high-density tourist line which provides a ready means of rapid transport into an ecologically sensitive area, and has most likely carried more passengers in its brief life than its two steam-worked predecessors put together. It is the only one of the five to be a pure rack railway, for all the others existed as parts of systems that were both rack and adhesion worked.

By contrast, the two remaining lines have been seen by very few people, as they were both industrial and predominantly underground, and one was in operation for just a few weeks. While the two nineteenth century steam rack railways were totally European in design, the three modern lines have incorporated exciting technical and design innovations originating in Australia.

David Jehan's background enables him to deal well with technical aspects of the lines and their equipment, but he does so in a way which is readable and easily accessible to the lay person. This ability is enhanced by the creative use of graphics which, for example, provide a clear idea of the gradients of the lines and the train consists commonly used over them. His material is also enhanced by the obvious way in which he has obtained information from those with first-hand knowledge of the operation of each of the lines. The use of well-selected and generally well-reproduced photographs, many with extended captions, are a further feature of the book which is worth applauding.

The author is to be congratulated on a first book which will can be highly recommended as a worthy addition on many a bookshelf.

Hopefully, it will not be his last. My copy came from the ARHS Bookshop, Renwick Street, Redfern, for $20. JB

ONLY ROOM FOR ONE: A HISTORY OF SUGAR IN THE ISIS DISTRICT

by John Kerr

160 pages, 297mm x 210mm, 84 photographs, 2 maps and diagrams, hard cover. Published 1996 by Isis Central Mill Co Ltd, PMB 1, Childers 4660.

The history of the sugar industry in the Isis district of Queensland can be divided into two halves, the first confused and competitive, and the second testimony to the author's proposition that there was indeed only room for one. The Isis Central Mill seemed a very unlikely candidate for this distinction for most of the first third of its century, a century whose achievement was marked by the publication of this book. Apart from the neighbouring Bundaberg sugar interests, the fledgling co-operative had also to contend with the might of the Colonial Sugar Refining Company, whose Childers Mill dominated the district for a time. But the district suffered from inadequate water supplies, a lack only very recently remedied, and indifferent results eventually encouraged CSR to shift its assets to the more profitable northern mills.

The Isis district is hilly, and the provision of tramlines was never easy. Nevertheless, tramlines were a particularly strategic factor as one mill closed and its lands were tapped by a tramline connection to its neighbour. Eventually, in recent times, it was ex-government railway formation which gave way to the 2 ft gauge, replacing the older winding trackbeds which were perhaps adequately suited to the rattling cane trucks and small steam locomotives of yesteryear, but a limiting factor in transporting the immense tonnages of today. The district has always featured innovation in cane railways, with CSR's mill being the pioneer in the extensive use of internal-combustion locomotives. Isis Mill's innovations include the use of ex Tasmanian-government steam locomotives which were eventually rebuilt to be the most powerful steam locomotives used on the 2ft gauge in Queensland, the complete rebuilding and replacement of whole new sections of cane railway in recent times, the introduction of the bogie brake wagon and remotely-controlled points, and the wholesale elimination of a fleet of first generation Australian diesels in favour of a fleet of rebuilt government railway diesel-hydraulics.

It is perhaps the importance of cane railways in the Isis district which ensures that they feature so prominently in this book. Certainly it is a very attractive feature to this reader, and the photographic and statistical detail provided is more extensive than is usually found in John Kerr's mill histories. The volume does not lack the wealth of interest about settlement, mill politics, the interplay between industry and government legislation and policies, and the technological development which is so much a part of the history of the Queensland sugar industry. It is perhaps a biased view, but it seems to this author that Kerr's expertise in writing sugar industry history has reached a peak with this volume, which is readable, comprehensive, and above all, well organised. My copy cost $30 from the mill plus postage for 800g weight. Highly recommended. JB

A CRYSTAL CENTURY: THE HISTORY OF PROSERPINE'S SUGAR MILL, ITS FARMS AND ITS PEOPLE

by John Kerr

192 pages, 297mm x 210mm, 108 photographs, 4 maps and diagrams, hard cover. Published 1997 by Proserpine Co-operative Sugar Milling Association Ltd, PO Box 101, Proserpine 4800

Proserpine Mill is the latest to reach an anniversary thought worthy of a history book – its centenary – and John Kerr once again has provided an addition to his now familiar line of illustrated sugar industry works. Proserpine differs from many districts in that the single mill has stood alone throughout its history. The lack of rivalry between neighbouring mills does not mean that the Proserpine story is a featureless one. The mill was built to a too ambitious scale, and spent much of its history striving to obtain a crop large enough to repay its seemingly ever-increasing debts. The struggle to repay took 54 years through periods of grower control, government management and government control, until the mill and its liabilities were handed over to the grower co-operative in 1931. It was this co-operative which finally succeeded in paying off the government's "investment" in 1950.

The subtitle of the book emphasises the inclusion in this book of the history of the local farms and people. These matters have generally been well-marshalled into the content of John Kerr's previous books, but one gets the sense that with this commission, the author was expected to include rather more material in this vein than has normally been his preference. Biographical and other vignettes are featured on many of the book's pages. That this reader found this a little irritating at times perhaps reflects an interest focused more on the development of the mill and its cane railways than any real imbalance in the treatment offered by the author. In any case, the book's intended audience is clearly the mill's growers, workers, and local community, not a one-eyed railway enthusiast . . . However, the expected photographs and details of cane railway operations

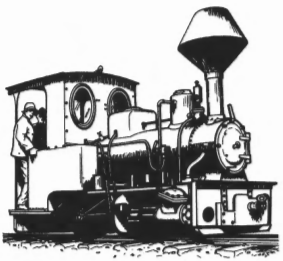
which are so important a part of the history of the industry in Queensland are not lacking.

One need do no more than add that the book demonstrates the usual Kerr mastery of content, welded into a readable account demonstrating the deftness of touch which comes with a real sympathy for human affairs, and a solid knowledge of an industry he literally grew up with.

The book can be as strongly recommended as John Kerr's previous efforts. The corpus of sugar industry history which he has been largely responsible for is now so extensive that one is filled with hope that further commissions will come, particularly from CSR and Mackay Sugar, among whose mills can be numbered most of those for which a history remains to be written.

My copy was a bargain at a cost of $33 from the mill including postage. Highly recommended.

JB



RESEARCH COLUMN

FYANSFORD CEMENT WORKS RECORDS

The Takeover of the Fyansford Cement Works by the Adelaide, Brighton Company resulted in a records clean out of mammoth proportions. The Geelong Historical Records Centre has recently taken custody of several truck loads of records comprising Board Minutes, reports by the managing director, engineer reports, works manager reports, wage books and other materials.

It will take some time to sort the accumulation, but a random delve indicates there is much of railway interest. For instance, the company bought a Purcell locomotive in January 1924 to use in the (old) quarry. The Purcell kept breaking down and by May 1924, it was suggested that the manufacturer be asked to buy it back. Another snippet was that the contractor building the tunnel used a battery-electric locomotive.

Member Norm Houghton hopes to write a comprehensive article on the Fyansford locomotives when the collection is sorted.

ARCHIVE MATERIAL, REQUESTS AND COPYRIGHT

The Society does not maintain a permanent archive, nor does it recommend to its members where to deposit collections. Member Norm Houghton is a professional archivist in charge of the Geelong Historical Records Centre and offers a safe haven for LR materials, but this may not be the solution for all cases, especially non-Victorian material.

Each state has permanent collecting archives/libraries that can look after a LR collection, but access for later generations of researchers can be a problem. Some members have instanced examples of near-impossible access and copying provisions by zealous librarians and archivists. Some institutions regard non-academic railway and tramways enthusiasts with similar contempt to genealogists and bar the door.

As well, the copyrights laws are strict and provide for a variety of exclusions (life of author plus 50 years, 50 years from the publication, etc.). Members who are considering depositing their collection in their state library/collecting institution should give consideration at the time to specifying easy access and release conditions.

Such considerations should include provisions for reasonable and unrestrictive access to bona fide researchers for non-commercial purposes and for copying of papers, maps and photographs in reasonable amounts to be free from the usual copyright restrictions.

Finally, if members undertake this exercise, then please advise the Society in writing so that all can know the location and content of the records.

EARLY LOCOMOTIVE REFERENCES

In researching the shipping of locomotives from other states to W.A. I have come across some newspaper references which may be of interest:

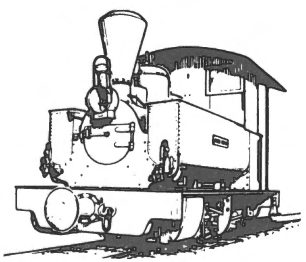
1. *The Argus,* 25 September 1886
   Ship *SF Hersey* (ex Melbourne, 24 September 1886 for Port Darwin)
   9 packages (locomotive), 498 steel rails, 311 pieces and packages of tip waggons, 19 pieces

and packages of sawmill plant, 50 wheelbarrows, etc. I would suggest that this is the locomotive *Sandfly* (Baldwin No. 7860/1886) as delivered from the builder, and contractor's plant for C. & E. Millar.

2. Barque *Armistice* (ex Adelaide, 28 May 1887 for Port Darwin)
   1 locomotive and tender.
   This is probably ex S.A.R. "W 41" (Beyer Peacock No. 2139/1882) for C. & E. Millar.
3. *The West Australian,* 3 September 1887
   SS Menmuir arrived at Port Darwin on 17 August 1887, with a locomotive for C. & E. Millar. This would be locomotive *Silverton* (Beyer Peacock No. 2689/1885).
4. *The Argus,* 21 December 1888
   Ship *Moreton* (arrived Melbourne, 20 December 1888 ex Launceston) 1 locomotive.
   This could be ex TGR "A2", as mentioned in LR65 p. 13.
5. *The Argus,* 27 September 1893
   Ship *Glenelg* (ex Melbourne, 26 September 1893 for Strahan, Tasmania) 8 pieces – a locomotive.

Any suggestions on this engine and comments on the other references.

Jeff Austin



LETTERS

Locomotive Conversions from Traction Engines, LR 72, 78, 95, 99, 107, 1282

The numerous references in *Light Railways* over the years to the fascinating locomotives created from steam traction engines by "bush engineers" highlights the potential for further research into this topic. Two examples of these remarkable machines have survived to the present time: Ransomes, Sims & Jefferies steam traction engine (18047 of 1905) converted to a 2-2-0WT locomotive known as *Snorting Liz,* now at the Manjimup Timber Museum, and Polly, a John Fowler 0-4-0WT at the Collie Steam Locomotive Museum.

The above LR issues also provide references to a conversion from a Marshall portable engine for Anderson's Tramway in Victoria (LR 72, p.18) and a 2-2-0WT conversion by Buckingham Bros in WA (LR 128, p.22). Another traction engine conversion is illustrated in *The Beaudesert Shire Tramway* (LRRSA, 1980, p.50-51) and a portable steam engine conversion known as *Lumbering Liz* is described in *Tram to Warburton* (APW, 1981, pp.8-9).

The time might now be right to consider an issue of Light Railways featuring traction engine locomotives in Australia. Invitations could be extended to LRRSA members to provide the associated illustrations and historical information to document this remarkable purpose-built machinery that operated in Australia. Technical and dimensional details of the remaining examples of these traction engine locomotives would be a welcome addition to the LRRSA heritage collection in order to quantify and qualify the heritage value and significance of these special items and ensure their preservation for future generations.

David Mottram
Herons Creek NSW

Editor: LRRSA presently has some information and photographs of traction engine conversions made by Britton Bros. of Tasmania. We would welcome input from LRRSA members concerning these and other examples of this form of 'vernacular engineering' and its historic associations. Sufficient material could support a special Light Railways *issue on this theme.*

The Cangai Railway, LR 134

It should be pointed out that the photographs of Orenstein & Koppel (O&K) 4631 on the front cover and page 16 of LR 134 have been printed back-to-front. The pipework along the boiler should be on the loco's right-hand side and the smokebox door hinges on the door's right-hand side. The buttons on the jacket of the man in the photograph on page 15 confirm that this *is* printed the correct way round!

The Narrow-Gauge Question, LR 135

In spite of the fact that the article shows why the VR chose 2 ft 6 in gauge for their narrow-gauge lines, the Alexander Penney & Co advertisement shown on page 7 illustrates a 3 ft 6 in gauge locomotive. This is, in fact, a "doctored" wood-cut taken from the builder's photograph of Dubs 1414 of 1880, No. 1 of the Bundaberg Railway, later QGR 4D9 1. The style of the steam dome has been altered and the sand dome removed altogether, the diamond-shaped Dubs builder's plate replaced by an oval one and the circular number plate on the smokebox side deleted (although its outline is just detectable).

Tasmanian Picture Parade, LR 135

The photograph at the top of page 13 shows the Western Silver Mining Company 0-4-2T.OC locomotive *Western,* Black Hawthorn 1134 of 1897. Although it is clearly stopped and posed for a photograph outside the Venezia Hotel, Zeehan, one would hesitate to say that the location was a "tram stop".

West Melbourne Gas Works, LR 136

The Peckett builder's photograph shown on page 18 does not show the West Melbourne loco, but an earlier, similar loco of 2 ft gauge, Peckett 1030 of 1904, *Gamecock* of the Mendip Granite & Asphalt Coy., Cranmore, Somerset. The name *Cranmore* was painted on for the builder's photograph to illustrate the class name. A cursory comparison of this photograph with that of Peckett 1711 of 1926 (pages 18 and 20 of LR 90) shows several differences, the main one being the replacement of the ornate dome and safety valve cover on 1030 by a more utilitarian design with pop valves on 1711.

Richard Horne
Surrey, UK

Cocos Island Tramway, LR 78

In his short article on the North Keeling Island Tramway in the Cocos Island Group, David Burke suggests the line operated from the 1920s to the 1940s.

I have recently located two photographs which throw more light on this isolated line. The first, dated c.1915, shows unloading operations from tramway trucks to lighters for transhipment to a cutter anchored offshore. The second photograph, depicting the 1954 Royal Visit to North Keeling Island, shows the tramway was still intact at this time.

Norm Houghton
Geelong, Victoria

An Australian Military Might-Have-Been, LR 133

Regarding the Orenstein & Koppel loco that came to Melbourne Exhibition Buildings after the War, I have found some details which, although not referring to the loco, may be of some help to solve the puzzle.

Extracts from *Victorian Icon – The Royal Exhibition Building* by David Dunstan. Published by The Exhibition Trustees, 1996 in association with Australian Scholar Publishing, P.O. Box 299, Kew, Victoria. 520 pages. Price $59.95.

"Sir Henry Weedon . . . during his second term as Trust Chairman in 1917-18 was instrumental in locating the Australian War Museum (AWM) at the (Melbourne) Exhibition (Buildings)". p. 317.

"The idea of an officially constituted AWM consisting of trophies and relics gathered by the AIF was provoked by the decision of British Military authorities . . ."

"The task was then given to the War Records Section which, in addition to its documentary work, began collecting relics in September 1917." p. 328.

"By February 1919 there were 25,000 trophies . . . Many were given away to add potent images of militarism to Melbourne's previously placid public places and civic buildings." p. 331.

(The AWM) ". . . finally opened on 20/8/1921 . . ."

"In January 1925, the exhibition was packed up and shifted to Sydney for display." p. 333

Peter Medlin
Fern Tree Gully, Victoria

BACK COVER

TOP: 610mm gauge copra tramway on North Keeling Island, c.1915. A flat truck is depicted on the jetty.

BOTTOM: Islanders dance before Queen Elizabeth II and the Duke of Edinburgh as they walk beside the tramway from the quay to the home of their hosts, Mr and Mrs Clunies-Ross, in 1954. Both photos: Geelong Historical Records Centre.