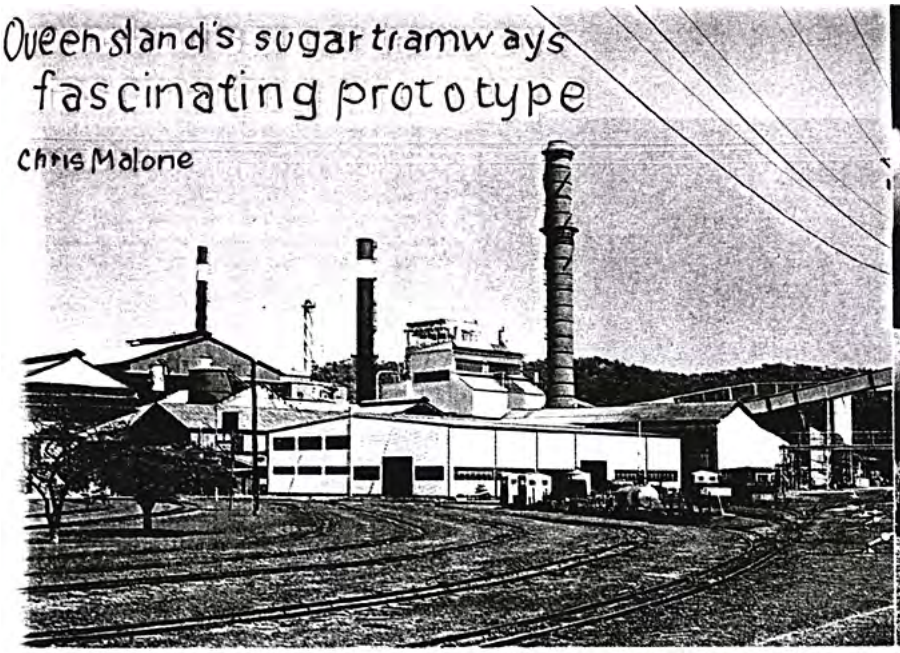
Queensland's sugar tramways fascinating prototype

Chris Malone



Introduction

The production of sugar is a major Australian industry, providing for all the country's needs with the remainder used to gain valuable export revenue. The industry produces about 3½ million tonnes annually and over $600 million is earnt in export income. Sugar is grown on a 2100km strip along the north east coast of Australia, with the industry concentrated in the State of Queensland. Small isolated regions can also be found in northern New South Wales. At present there are 32 sugar mills, 27 of these being served by narrow gauge tramways.

The industry had its beginnings in the 1880s and it was responsible for the establishment and settlement of many coastal towns and cities. Sugar mills were originally small, their large number being reduced as they formed into larger mills. Amalgamation of mills is still occuring; recent economic downturn in the industry has forced a rationalisation which is resulting in the closure of smaller mills.

The sugar year is divided into two periods, the crush and the slack. During the slack, cane is planted and grows to a height of six feet. At the same time the mill and its transport system undergo heavy maintenance. At crushing time (June-December) the industry's workforce increases to 20,000 as production enters full swing. The canefields are burnt to remove weeds and then the cane is harvested mechanically. As chopped cane deteriorates rapidly, it must be transported by an efficient transport system to the mill for crushing. Tramways have proved their worth here, although road transport is used to serve isolated pockets. Once at the mill the juice is extracted from the cane, filtered and then concentrated into syrup. The syrup then forms into crystals in vacuum pans and these are then spun in centrifugal machines and dried for storage. In the next stage the transport system is again utilised, to convey raw sugar to six bulk terminals. Both road and rail systems are used here. Following shipping, the sugar is refined. The two Queensland refineries are supplied by nearby mills but the others (located in mainland state capital cities) are supplied by ship.

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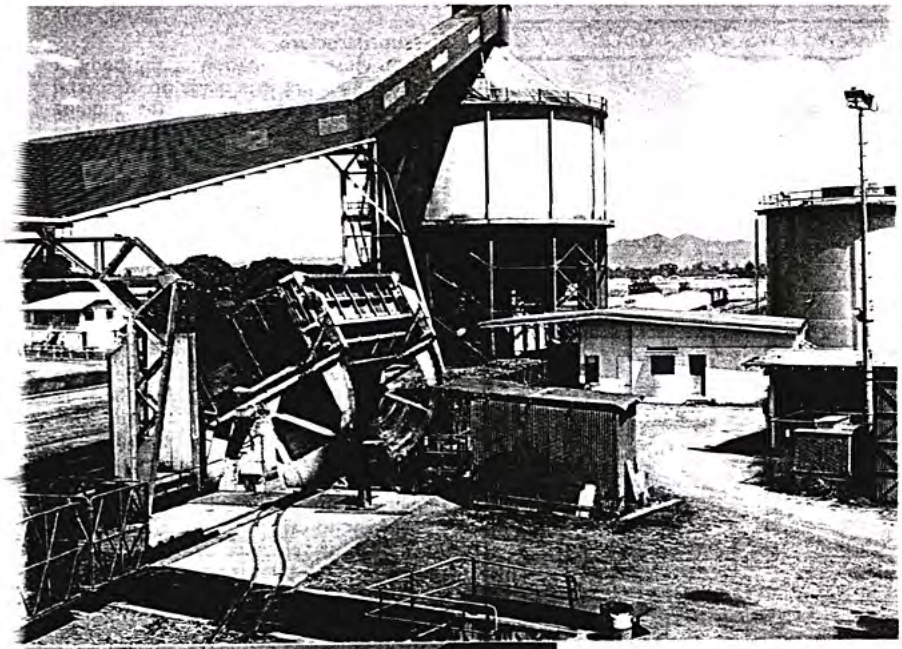
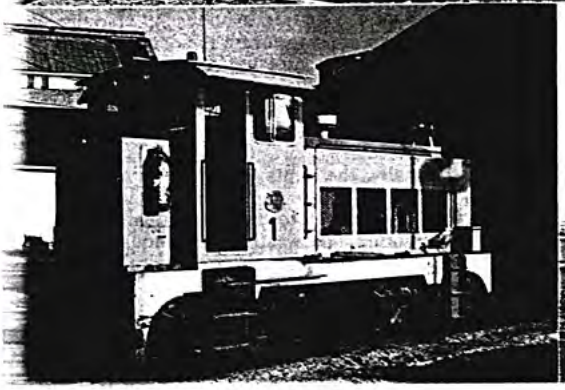
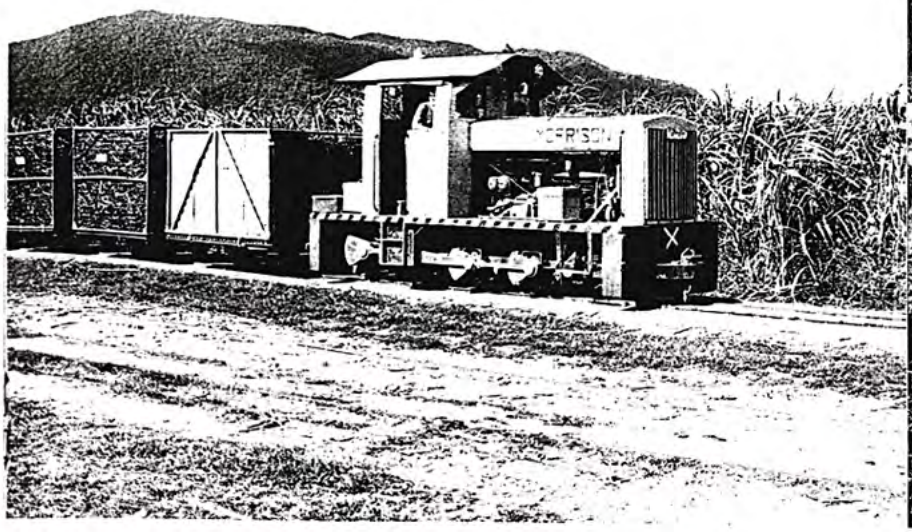
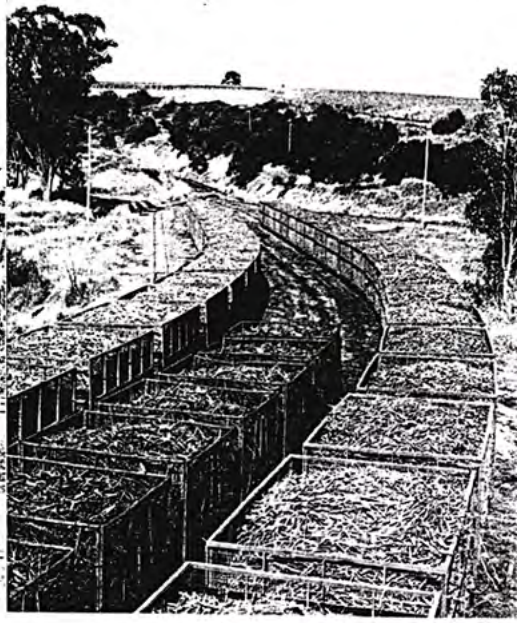
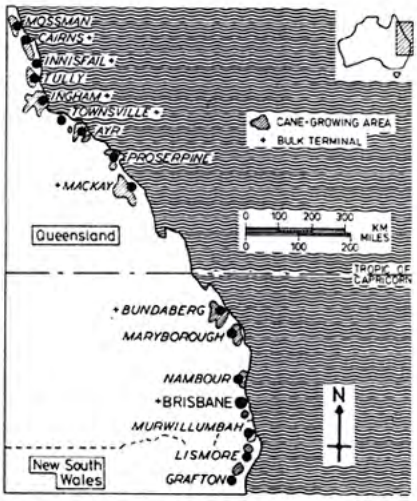


Top left: Plane Creek mill at Sarina near Mackay is typical of these installations. *Above:* cane is first burned, then cut by mechanical harvesters and loaded directly into cane bins carried into the fields on road trailers. These are transferred to the rails at a nearby siding, and hauled to the mill *(upper right),* here by a Commonwealth Engineering 0-6-0DH of 1960. *Top right:* rakes of loaded cane bins are stored to ensure a steady flow over the weighbridge and through the tippler *(centre left),* here at Marian Mill, Mackay. *Above right:* A Clyde 0-6-0DH shunting molasses tank wagons at Marian Mill. *Right:* outside the loco shed at Proserpine Mill is a radio-controlled brake wagon built by E. M. Baldwin, whilst inside a Clyde 0-6-0DH receives attention. *Bottom row, from the left:* Bundaberg Mill No. 1, a 24 ton loco built in 1973 by E. M. Baldwin; 'Te Kowai' at Pleystowe Mill, Mackay is a Clyde DHI.71 of 1956; Mossman Mill No. 1 'Mowbray', a 1954 vintage Baguley. Mossman also operate a tourist train with a 1952 Bundaberg Foundry 0-6-2T Fowler copy. *Bottom right:* Victoria Mill at Ingham have preserved 'Homebush', a Hudswell Clarke 0-6-0 of 1914.





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CAIRNS
INNISFAIL
TULLY
INGHAM
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MACKAY
CANE-GROWING AREA
BULK TERMINAL
0 100 200 300 KM
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Queensland
TROPIC OF CAPRICORN
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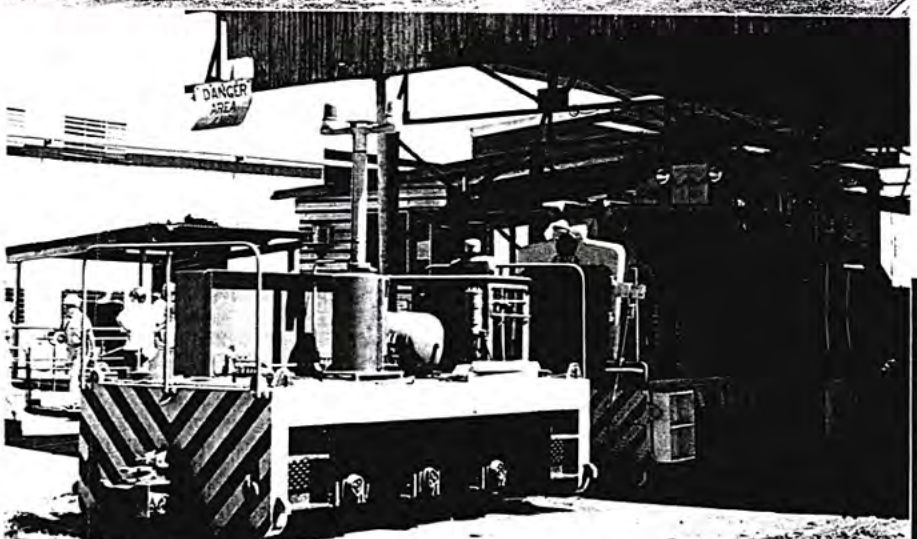
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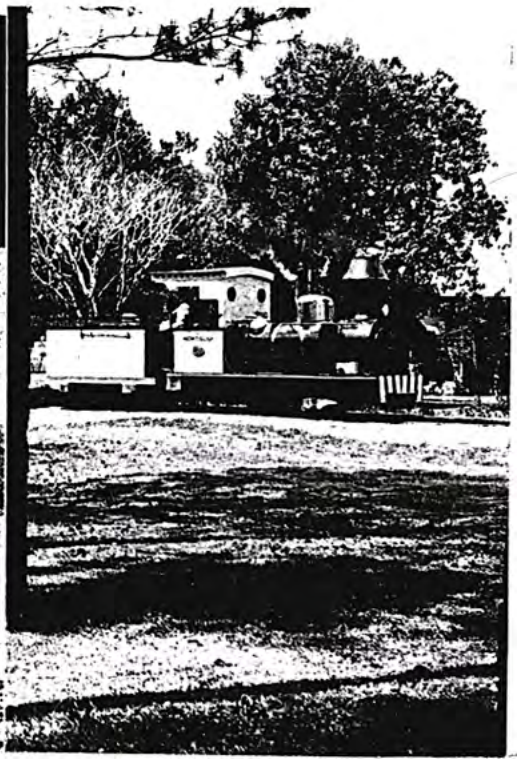
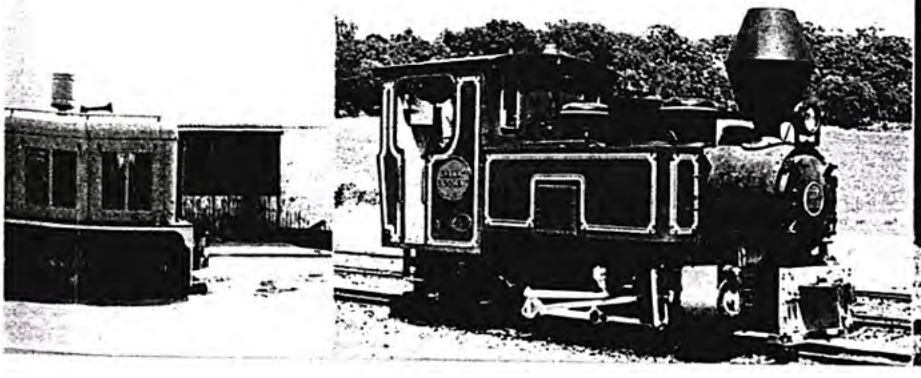
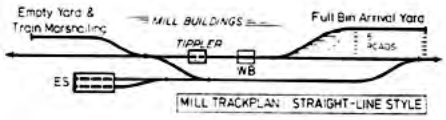


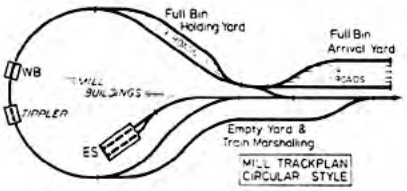


As mentioned above, tramways are an integral part of the sugar industry. They have proved to be the most efficient bulk haulage method and will continue in that capacity for many years to come. At least 48 mills have operated locomotive powered tramways, the majority running to the gauge of 2' or 610mm. Of the 27 mills currently operating over 2000 miles of tramline in Queensland one runs on 3'6" gauge and the remainder on 2'. There are no sugar tramways currently in New South Wales.

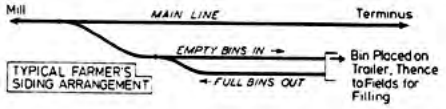
The 3'6" gauge Queensland Government Railways were historically a large carrier of cane. This has dwindled since the end of the steam era (1969) but they still haul bulk sugar from a few mills.



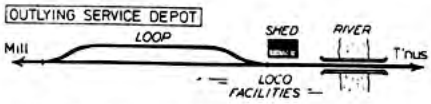
The size of a mill's transport network depends largely on the area under cultivation. Networks vary from a 19 mile system with four locos to a 150 mile system with 32 locos. The two main types of system found are: either radiating from the mill, or a single line from the mill which then has several branches, depending on the position of the mill in relation to the cane growing areas. Many mill systems are joined allowing, for example, one mill to help another that is behind schedule and to allow more than one mill to serve an area. The focal point of a sugar tramway is the mill.



There are two main track arrangements used at Queensland sugar mills: the straight line design, which on a relatively straight axis has full and empty yards separated by the unloading point; and the circular design in which the tracks run around the mill, again with the unloading point between the full and empty yards. This design is used where there is a shortage of space. Each mill includes the following features: an engine shed, with an adjoining workshop; a bin repair shed, usually located just after the unloading point; a weighbridge on which the bins are weighed before unloading; and the tippler or tipplers which empty the cane bins by rotary dumping.



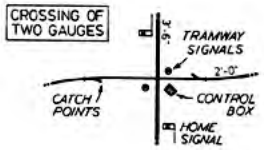
Most sidings on the main lines face the mill. They are of a lower standard than the main line as locomotives do not usually run on them. At the end of the siding the empty bins are winched onto a trailer, which is then hauled by a tractor around the fields beside the harvester. When the bin is full it is placed back in the siding awaiting collection and an empty one is picked up for filling. The transport network must be efficient to reduce delays due to bin shortage and to deliver harvested cane promptly.



Outlying depots are seen on many systems. They serve many purposes including loco refuelling, track maintenance camps, and holding points for bins. Often they are found at junctions or at rivers, a convenient point in the steam era for watering locos.

Operation

In the early years, cane wagons were horse drawn and track was primitive. As power progressed from horse to steam and later to diesel so too have the track standards. Investment on trackwork has reached unprecedented levels lately. In an attempt to increase efficiency and reduce delays, many mills now use concrete sleepers and at least 60lb/yard track for mainline, while some use 80lb/yard rail. A considerable number of rivers and creeks are crossed by tramline, bridges ranging from timber trestle to pre-stressed concrete. Many bridges over large rivers are well under the flood level, being covered by water in the wet season during the slack. Tunnels are non-existent due to the terrain and the cheaper approach adopted originally, but there are many deep cuttings and road overbridges.



A typical feature of a system is a crossing of the Queensland Railways 3'6" gauge system. These crossings are protected by catchpoints and disc signals, with the QR having right of way. Some of these time consuming crossings have been replaced by under bridges. Dual trackage (2'0" and 3'6") can be found. Road level crossings are very common, with flashing lights on major roads and warning signs on minor ones.

Safe working on systems is generally by two-way radio. Only a few mills use signals and these are only used for directing traffic at the mill itself. Train operations at large mills are effected by Centralised Traffic Control, but points are changed manually with ground throws. Operations managers are often used to plan traffic movements and do the directing. Much of the planning is done by computer. Trains do not operate to any set timetable, but are arranged to suit the areas in which the cane is being harvested.

Locomotives

Steam power took over from horses very early as mills became larger. Most early locomotives were of Continental or English origin, e.g. John Fowler, Hudswell Clarke, Krauss. A small number of American locos also found their way to the canefields. Australian built locos, in the form of Perrys and Bundaberg Fowlers served from the 1930s onward as replacements for the ageing overseas equipment. Dieselisation really began in the 1950s although there were some examples of petrol and diesel locos before this. The first mill was fully dieselised in 1955 but a few mills operated steam into the 1970s and one mill to 1980. Most mainline diesels have been of the 0-6-0 wheel arrangement with either hydraulic or mechanical transmissions. Since 1973, bogie (B-B) diesels have been used with great success. However, older 0-6-0s have remained in service due to the high cost of these locos. Early diesels included Hudswell Clarkes, Fowlers, Baguleys and Drewrys but these firms were quickly overtaken by local builders Clyde and Commonwealth Engineering (Com-Eng), and later the bogie diesel builder E.M. Baldwin & Sons. However, Clyde built its last cane loco in 1975 and Com-Eng in 1977, with E.M. Baldwin closing down altogether recently. Tough economic times in the industry have dictated that the mills must do with the locomotives they have now.

Rolling stock

Cane bins are the main type of wagon found on any system. They vary in capacity from four to six tonnes for four wheel bins and ten tonnes for the bogie type used by one mill (Mossman). Basically they are a platform on wheels with a four sided steel framework covered with steel mesh. Each bin has number-plates which link the contents of the bin to the farmer. Several mills use automatic couplers, but most still use the traditional chain and hook coupling of the steam era. There are no braking systems on any bins. As a result of this, and the fact that some loaded trains are around 200 bins long, brakewagons have been introduced by some mills. These are a six wheel or bogie unmanned flat wagon which is braked by remote control from the locomotive. A small engine powers an air compressor for the brakes. They also have a flashing light to indicate to the loco crew (driver and points boy) that their train is complete. Other methods used to indicate the rear of the train include flags and reflector triangles.

Most mills also have maintenance wagons. These vary greatly, many being leftovers from when tramways also carried passengers and goods.

Two other innovations successfully applied to sugar tramways are Locotrol and the use of slave units. Locotrol has been used with great success at many mills, allowing longer trains to operate efficiently with the use of mid-train radio-controlled helpers. One mill also uses slave locos. These are old 0-6-0 diesels with cabs removed. These are coupled to a similar 0-6-0 command loco, thus creating a double powered loco. All diesels have flashing warning lights, powerful horns and many of the colour schemes incorporate safety stripes.

Conclusion

As you can see from the above basic overview, the sugar tramways of Queensland combine many facets of the past with modern innovations to operate a highly efficient system of seasonal transport. The haulage feats accomplished are a scaled down version of those of the world's major railways. Yet despite this quest for efficiency and haste in operation, these tramways still convey the charm of narrow gauge.

Editor's note: the author has modelled a typical Queensland sugar tramway in 0-16.5, and we shall be featuring his layout in a future issue.