THE AUSTRALIAN RAILWAY HISTORICAL SOCIETY

HISTORIA NOSTRA VIA PEREGRINARI FERREA

FOR ALL WHO ARE INTERESTED IN RAILWAYS

1933

Registered at the G.P.O. Sydney for transmission by post as a periodical.

Price 3/6

BULLETIN

Vol. XVI (New Series) Bulletin No. 338 December 1965

The Queensland Railways' B.13-class 4-6-0's (original F-class of 1883) were the second "standard" design for use on the system and worked on all the originally isolated railways. The photograph shows two of these locomotives on a mixed train in the early days.
(Photo: Queensland Railways)

ONE HUNDRED YEARS OF RAILWAYS IN QUEENSLAND (Q)

(by J.W. Knowles)

The construction and opening of the first railway in Queensland in 1865, from Ipswich to Grandchester, was dealt with in Bulletin No. 333 (July 1965). We now turn to the subsequent development of railways in Queensland in the following 100 years.

Northern political opposition to railway construction only in the South continued and, to placate this feeling, the Government agreed to the construction of a 30-mile line from Rockhampton to Westwood. This short section was opened on the 17th September

1867 and thus set the pattern for future railway construction in Queensland - isolated lines from various ports for the development of agriculture and mining or to just serve political purposes. Until its extension in 1874, this Northern railway was virtually useless.

Meanwhile, extension of the Southern and Western railway continued and it reached Toowoomba in 1867. Building the line on the ascent of the Toowoomba Range brought the contractor into difficulties and, on two occasions, construction workers seized the trains at Helidon to make their way to Brisbane to protest about working conditions but, nevertheless, the 16-mile Range line, two-thirds in cutting, with $4\frac{1}{4}$ miles of embankments, nine tunnels, 47 bridges and many sharp curves, was completed on time. The intended termini at Dalby and Warwick were reached in 1868 and 1871, respectively.

With the development of agriculture, change in political groupings and obvious advantages of rail transport, agitation for an extension to Brisbane was eventually successful and the line to the capital was completed in 1875. Extensions beyond Dalby were made to Roma in 1880, Charleville (483 miles from Brisbane) by 1888 and to Cunnamulla (604 miles) by 1898.

The Southern line was extended to the New South Wales border at Wallangarra in 1887, although the New South Wales standard-gauge line was not extended beyond Tenterfield, until it became obvious that the Queensland Government would not build its line to that place, as desired by New South Wales. The South-Western line from Warwick, built mainly to prevent Queensland trade flowing into New South Wales, was commenced in 1903, reached Goondiwindi in 1908 and Dirranbandi in 1913.

The Northern line, known as the Central line after 1879,was extended gradually after 1874, with the object of opening up grazing areas (thus satisfying Northern voters) and serving Peak Downs copper field, North of present Emerald. It reached Emerald in 1879 and was then built North and West to reach Clermont (North) and Alpha (West) in 1884. Extensions beyond Alpha reached Longreach in 1892. The Mount Morgan gold and copper mine was connected by a branch line in 1898.

The Charters Towers goldfield prompted the first section of the Great Northern Railway from Townsville. The first section was opened in 1880 and the field was linked to the coast in 1882. Further extensions were made to Hughenden (1887) and Winton (1899) to serve grazing areas.

It had first been intended to link the Cloncurry mineral field to Normanton but, on the diversion of the Normanton Railway to Croydon, it was decided to extend the Great Northern Railway Westward to the field and Cloncurry was reached in 1908. Extensions were made to various parts of the field and a branch to Mount Isa was opened in 1929.

In the early 1880's, efforts were made to build even lighter railways, with 30 lbs. rails. The first was the Maryborough Railway (on which centre-buffer stock was used initially),opened from the port of that name to the goldfield at Gympie in 1881. The second was the Bundaberg Railway, destined for the Mount Perry copper mine, and opened between 1881 and 1884. The light rails proved unsatisfactory on both lines and were soon replaced by $41\frac{1}{4}$ lbs. material.

To assist the establishment of the sugar industry in the Mackay district and to aid the policy of the Central Mills, which was established with Government assistance to promote the growing of sugar cane by white farmers in an effort to eliminate the plantation system of using Kanaka (Polynesian) labour, a line was opened from Mackay to Eton and Mirani in 1885-1886. It was eventually extended to Netherdale, at the top of the Pioneer Valley, in 1910, incorporating two Shire-owned lines.

The Palmer River goldfield on Cape York Peninsula was of sufficient richness to prompt the building of a railway from Cooktown. It was opened for the 67 miles to Laura between 1885 and 1888 but changes in fortune and Governments led to the dropping of proposals for further extensions and the line languished until its closure in 1961.

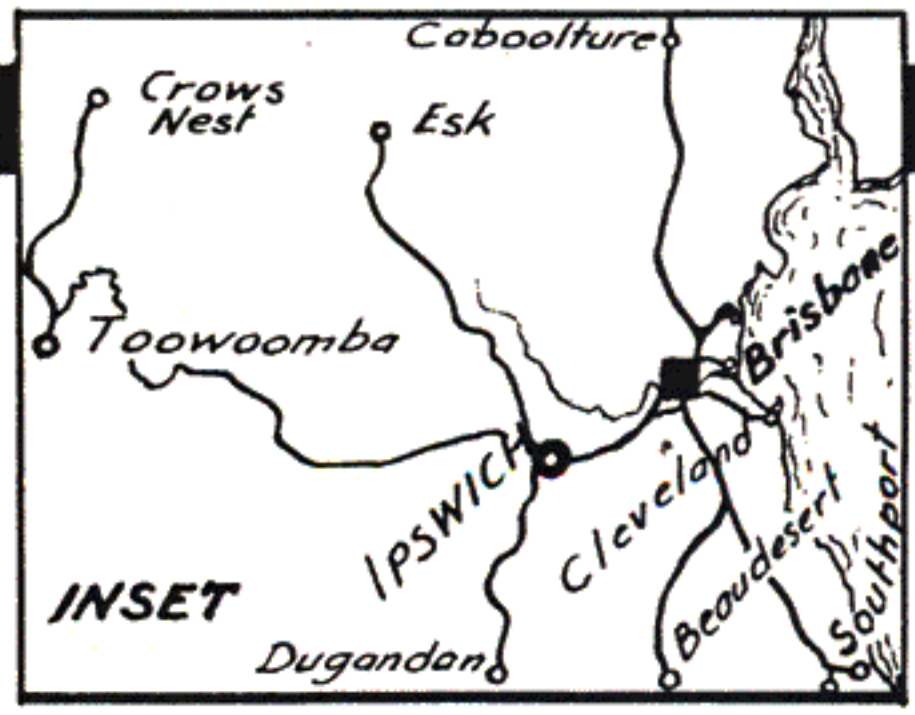
The Herberton tinfield on the Evelyn Tableland also required connection to a port. Although access to Port Douglas was easier, political considerations had the line start from Cairns,thereby necessitating the difficult construction up the Barron River gorge. The line reached Mareeba in 1893 and Herberton in 1910. The present terminus, Ravenshoe, was reached in 1916.

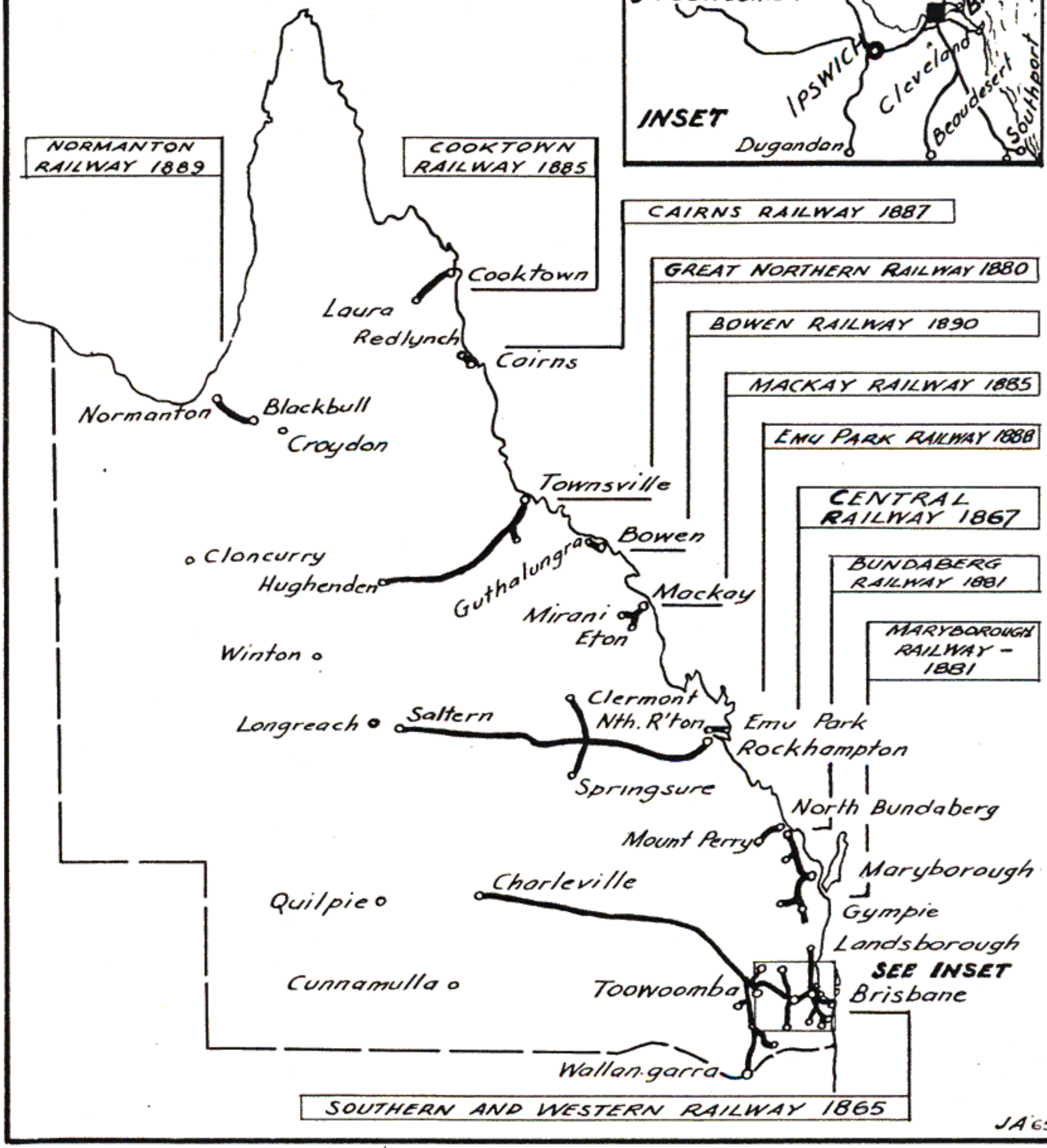
The Chillagoe Company built its own private railway from Mareeba to its copper field, 103 miles, in 1900 and subsequently built the 142-mile Etheridge Railway to a goldfield of that name, opened in 1911. The Cairns area had two other private lines - to Mount Garnet and Mount Molloy - both built for mining purposes, while a Government line from the Chillagoe line to the Mount Mulligan coal mine was worked by the Chillagoe company. Failure of the mining companies concerned caused all these private lines to pass into the hands of the Government from 1914 and 1919.

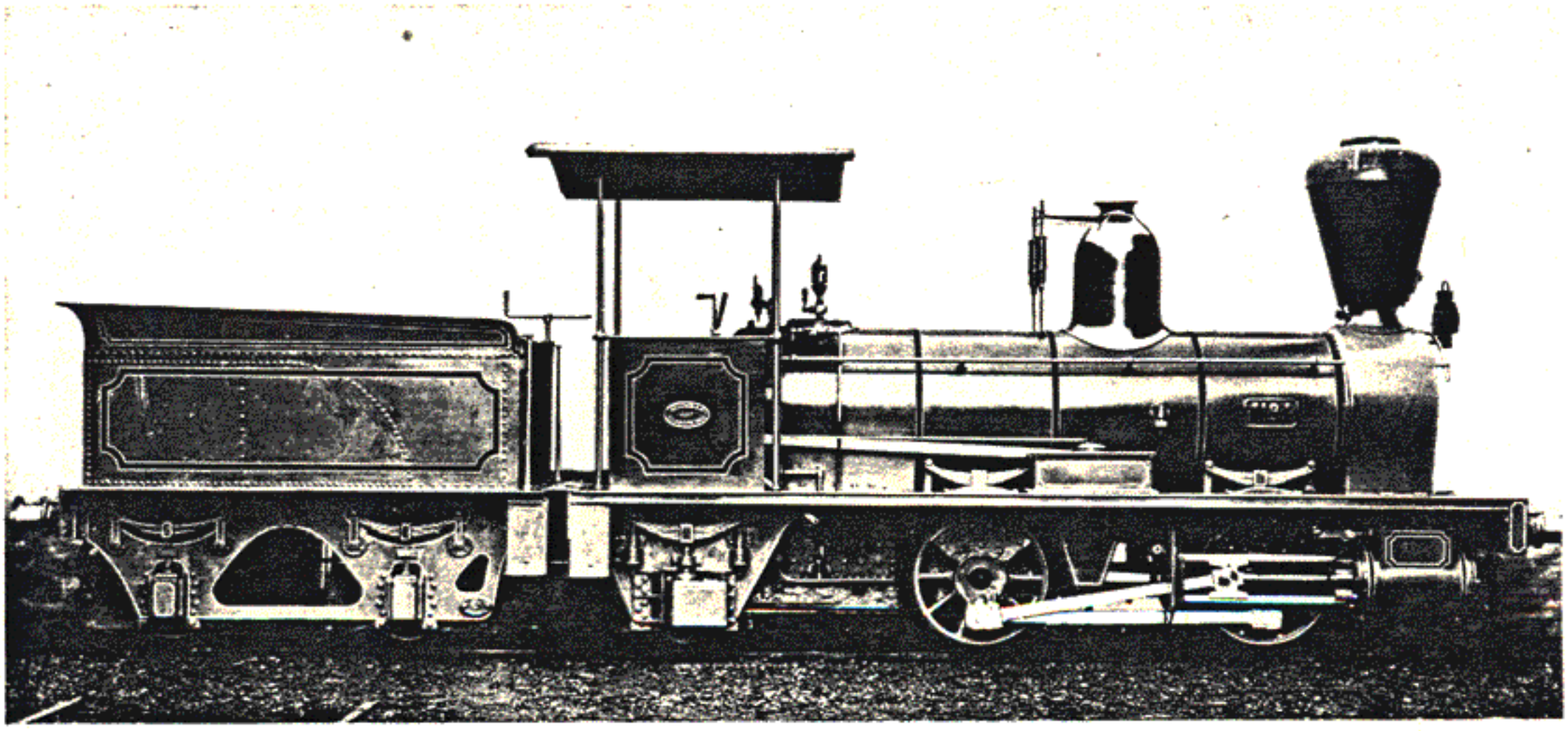
A second isolated railway was opened out of Rockhampton but from the North side of the Fitzroy River to Emu Park, a seaside resort, in 1888. In 1898, a branch was opened to Broadmount, an early attempt at a

THE RAILWAYS OF QUEENSLAND 1890

showing year that first section of each line was opened.







The second type of locomotive to be introduced was the Neilson-built B-class 0-4-2 of 1865-66 (A.10-class from 1889). Two of the class still exist – one preserved by the Queensland Railways and the other, still in service, is owned by Messrs. Gibson & Howes Ltd. of Bingera sugar mill and ran with special trains during the recent Queensland Railways' centenary celebrations. (Photo: Queensland Railways)

deepwater port for Rockhampton, between which place and Gladstone plied the Queensland Railways' own steamer, the "Premier", between 1898 and 1903.

The Normanton Railway was originally planned to go to Cloncurry but the boom conditions of the Croydon goldfield caused a deviation to be made so that it could go to either Cloncurry or Croydon. The latter place was preferred and was reached in 1891. The line was built with George Phillips' patent steel sleeper with no ballast, a scheme which later led to the building of low-level lines under the "packed earth" scheme without ballast. The Normanton Railway is now the only isolated line and has been operated since 1929 by rail-motors hauling goods wagons.

The last separate system built was the Bowen Railway, opened from Bowen to Wangaratta (now Bobawaba) in 1890. It was built to compensate Bowen for the building of the line to Charters Towers from Townsville and was relatively useless until it became part of the North Coast line.

Connections were gradually provided between all but two of these isolated lines. A line was built from Brisbane to Gympie between 1888 and 1891, a line from Maryborough having reached Bundaberg in 1888. This North Coast line was extended to Gladstone in 1897 and Rockhampton in 1903, thus providing a "Southern and Central" system.

The North Coast Railway Act of 1910 provided for the completion of a coastal route to Cairns. This absorbed Shire-built lines from Proserpine to Don (near Bowen), 39 miles and opened in 1909, Ayr to Stuart (near Townsville), 44 miles and opened in 1901 and Babinda to Cairns, 36 miles and opened from 1897 to 1910. Work on this through, coastal route, 1043 miles, was completed in 1924.

The Central and Great Northern lines were also connected by an inland link from Longreach to Winton, completed in 1928. The Great Western Railway Act of 1910 provided for a North-South trunk line across Western Queensland, joining the Western extremities of the three main inland lines but only a few sections (to Quilpie, Yaraka and Dajarra) were completed.

Another scheme allowed to lapse was the "Via Recta", the direct railway from Brisbane to Warwick, advocated to shorten the mileage to the Southern Darling Downs and to Sydney and abandoned about 1914, some 18 years before the 4' $8\frac{1}{2}$"-gauge connection from South Brisbane to Kyogle (N.S.W.) was built by agreement between the Commonwealth, New South Wales and Queensland.

The first true branch line was the line to Fassifern, the first section of which was opened from Ipswich to Harrisville in 1882. Between 1885 and 1894, 491 miles of branch lines were built but it was the period from 1905 to 1924 that branch lines were extensively built and of 2983 miles built in that 20-year period, 1728 miles were branch lines. Most of the branch lines were built in the South-Eastern part of the State to aid the

MILEAGES OF GOVERNMENT RAILWAY CONSTRUCTION IN QUEENSLAND

Decade	Total Capital Expenditure at end of decade (b) (£ millions)	Main Line (miles)	Branch Line (miles)	District Southern (percentages)	Central	Northern
1865-74	2.65	249.5	1.0	82	18	-
1875-84	8.03	736.0	220.4	52	31	17
1885-94	16.42	691.2	491.3	48	23	29
1895-04	20.89	521.6	176.7	42	26	32
1905-14(a)	33.85	779.8	874.9	47	20	33
1915-24(a)	49.71	477.0	864.1	25	25	50
1925-34	64.07	232.4(e)	280.1	40	46	14
1935- (d)	138.51(c)	-	15.4	-	100	-
		3687.5	2923.9	43	26	31
		Total - 6611.4(d)				

Notes - (a) includes purchases of private and Shire lines.
(b) includes £28 million written off in 1931.
(c) 1964 value. Excludes approx. £27½ million for Mt. Isa project.
(d) excludes extensions from deviations on Mt. Isa line (1961-65)
(e) includes Interstate 4' 8½"-gauge line of 68.8 miles.

agricultural development. Quite a number of these, especially the shorter ones, were not wisely built and several have since been closed, along with others which did serve a useful purpose before the development of road motor transport, the cutting out of the timber or the cessation of mining.

Government railway mileage reached a peak of 6560 in 1953, the year the only two lines built since 1932 were opened. This was the greatest mileage of Government railway in any Australian State but closures have since reduced the mileage to 5788.

The early lines were quite substantially built, in the traditional manner, with high-level bridges and fairly even changes in the gradients, although with sharper curvature than on broader gauge lines (five-chain radius was very common on the first line to Toowoomba on the ranges and four-chains has since been used).

Efforts to build greater mileages with limited funds led to the adoption of road-side locations, low-level bridges, absence or near absence of ballast and abrupt change in gradients, especially on branch lines. The use of 30 lbs. rails proved unsatisfactory, so the original weight of around 40 lbs. became the minimum weight used. The need for heavier rails on the sharply-curved ranges was soon seen and 60 lbs. material became the standard for these from 1879. The lightness of early rails and bridges, the sharpness of curves and the steepness of grades have meant that considerable improvements had to be made over the years and most main-line sections have had deviations made at various stages.

Axle loadings, however, have always been very restricted and the eight-ton standard was only gradually raised to nine tons (to permit the operation of the C.16-class of 1903) and, later, 12 tons (for the B.17-class of 1911). In 1913, the 12-ton standard only covered from Brisbane to Nambour, Chinchilla and Wallangarra, a total of 392 miles, while the C.16-class locomotives could run only to Dirranbandi, from Rockhampton to Gladstone and Blair Athol and Townsville to Hughenden, in addition.

There is still a large mileage laid in 41¼ lbs. or 42 lbs. rails and much which will only carry a nine-ton axleload with steam engines, while 12 tons (steam) is still the standard on main lines.

In the suburban area, strengthening to the 12-ton standard commenced in 1901 to allow the use of heavy tank locomotives and 75 lbs. rails were laid from 1907 but, outside this area, weight of rail on main lines was generally 60 lbs. until the 1950's. The rail weights are now becoming 94 lbs. for suburban areas and 82 lbs. for the country lines.

The most spectacular range railway in Queensland is the Cairns Range line. This view shows a B.15-class 4-6-0 negotiating sharp curves on the Barron Gorge section with a descending log train. (Photo: Queensland Division Collection)

There is little double track in Queensland. The Brisbane-Ipswich section required duplication only 10 years after it was first opened in 1875 and other parts of the suburban area have been duplicated as required. Only six miles of the system was constructed in this form. Duplication of country lines from Brisbane to Helidon and Caboolture, 72 and 31 miles respectively, was carried out in the 1910-20 decade to carry burgeoning traffic, a short section near Rockhampton, linking the Emu Park and Central systems was built as double track in 1899 and six miles near Townsville were duplicated as a 1930's depression relief measure. Quadruplication of the suburban line to Corinda was completed in 1963 and a further six miles of duplication near Townsville was opened in 1964. Total mileage of duplicated track is now 154.

Construction work required some quite considerable engineering work in places, although the topography of the State has generally been very favourable to railway construction. The use of sharp curves on range sections, with the lines clinging to mountainsides, rounding promontories and avoiding valleys, was established on the first line to Toowoomba.

There have been 18 such range lines (three are now closed), of which the most notable are the Toowoomba, Cairns and Dawes Ranges ascents (the latter on the Gladstone-Monto line). This method of construction reached extremes on the Haughton (Great Northern) and Drummond (Central) Ranges where sharp curves were used to avoid even quite reasonable cuts and fills. The ascent of the Razorback Range to Mount Morgan, [illegible] in 1898, used an even cheaper method of construction - a rack railway, with grades down to 1 in 16 - but this was replaced by a conventional range line in 1953.

Tunnels have been necessary in surprisingly large numbers, however, and 53 have been bored, of which six [illegible] and one has since been [illegible] 46 remaining, 15 [illegible]

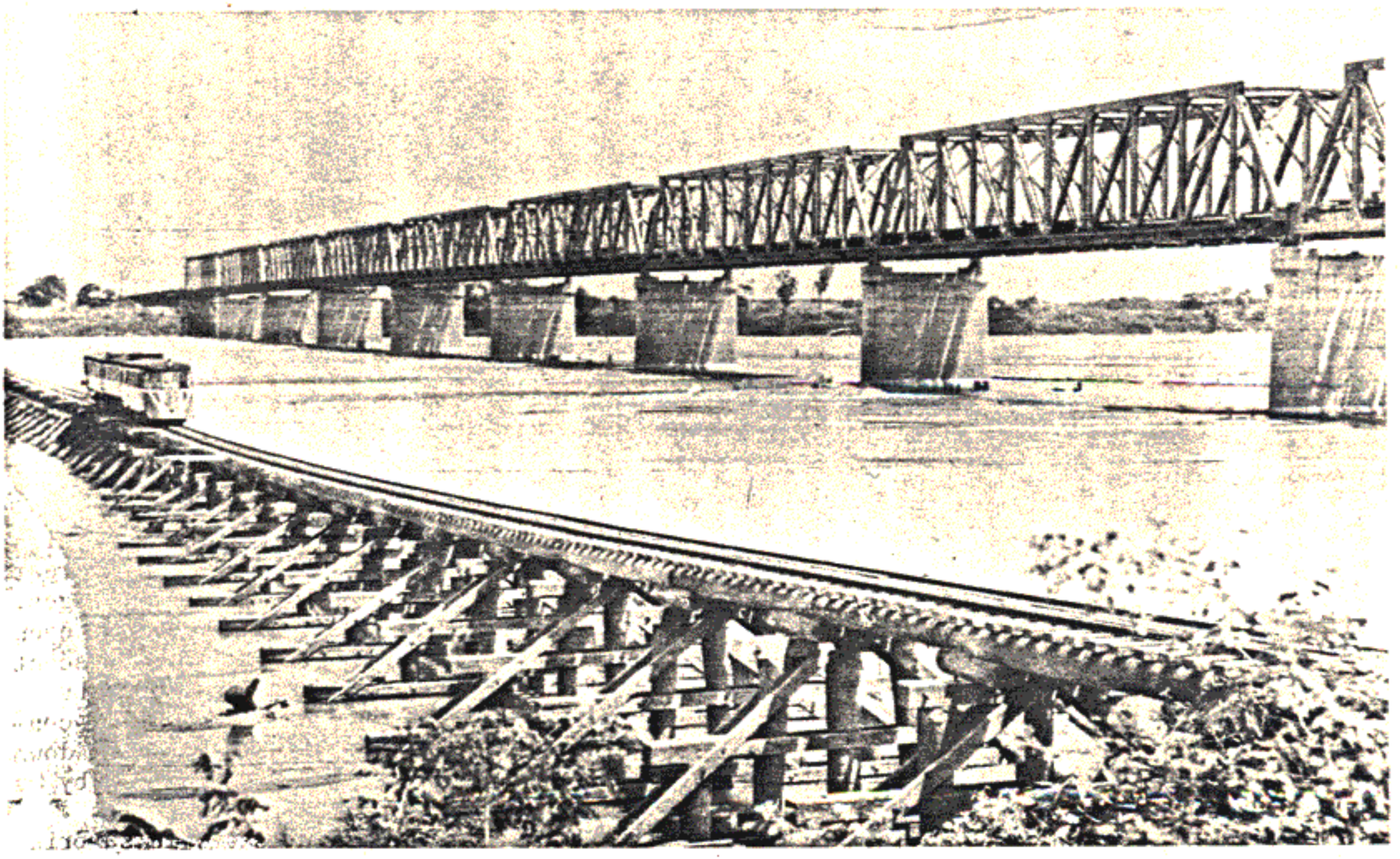
nine on the Toowoomba Range and five on the Dawes Range. The longest is the busiest - the 37-chain-long "hole" between Brisbane Central and Brunswick Street stations, bored in 1889-90. One, on the Mount Perry line (now closed), was unlined.

With ample supplies of Queensland hardwoods available in the construction days, it is not surprising that most railway bridges in the State were built in timber. The well-known trestle design was so inexpensive that, in places, it could be provided more cheaply than an embankment. The heavy rainfall of the tropics required ample flood openings and, with the uncertainty caused by lack of adequate knowledge of local conditions in construction days, these were provided in large numbers.

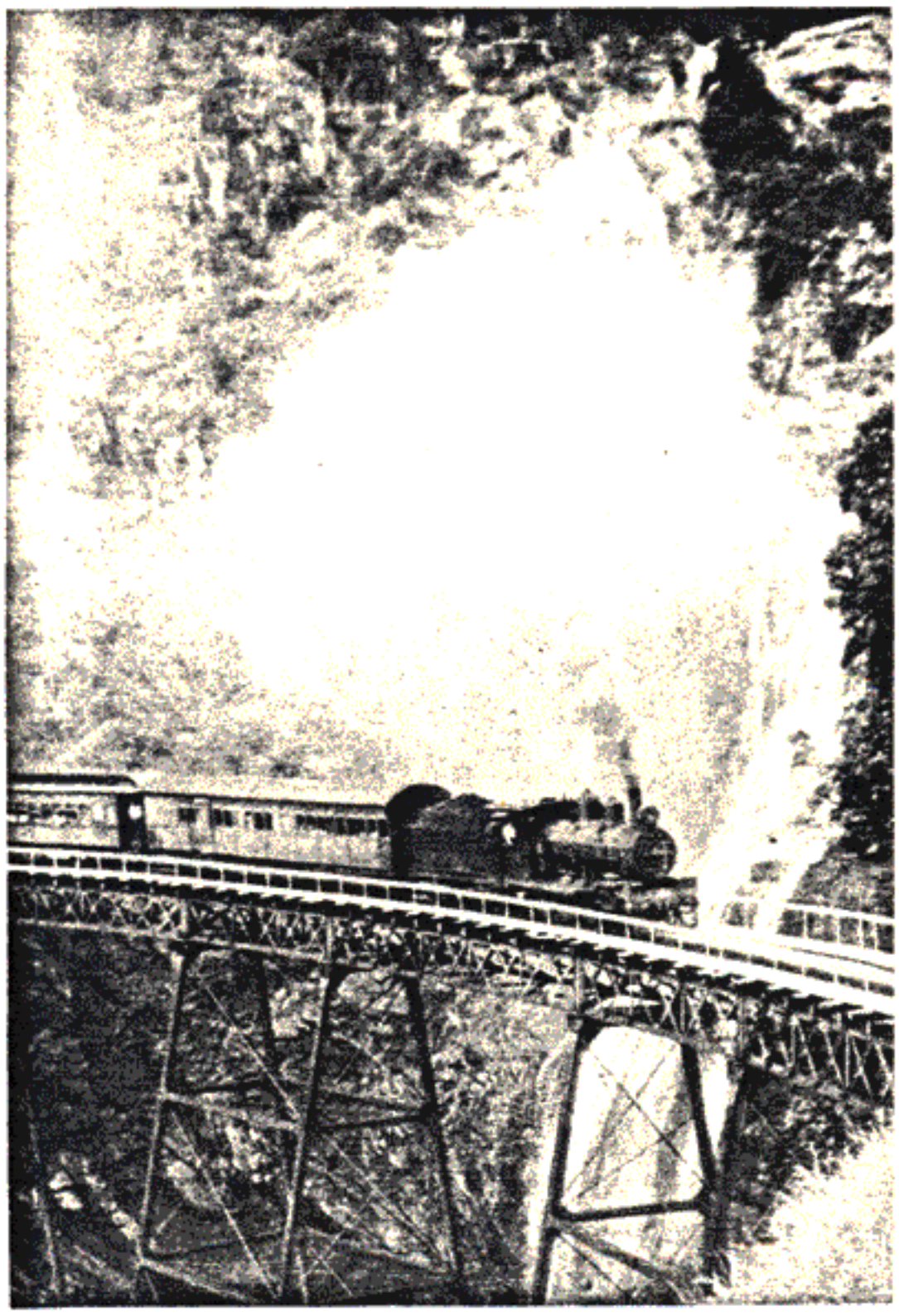
Suitable timber is now scarce and expensive so, for the last 15 years, many timber bridges have been filled in or replaced by steel and concrete bridges or by culverts. Many creek crossings have been made at low level,with short, sharp momentum grades down the banks and the most famous of these was the original 37-chain Burdekin River bridge at Carstairs, built in 1913, with 1 in 33 sections at each end and many times covered and damaged by the mighty Burdekin, when in flood. It was replaced in 1957. Other trestles on the system, however, have been higher.

The earlier iron and steel bridges were also very light and they have proved the most difficult to strengthen for heavier axleloads. None is particularly large and this form of construction was originally used only for crossings of major streams, with most of them having numerous timber approach spans. Perhaps the most famous of the steel bridges is that spindly structure below Stoney Creek falls on the Cairns Range line - on a four-chain curve! A large number of spans changed location over the years as lines in the original area required some strengthening and others have been used for road overbridges or sold for use on sugar mill tramways. There have been no stone or brick viaducts on the system.

The generally light standard of track and bridgework was part of a deliberate policy of building as great a mileage of railway as possible - there was even some consideration of adopting a narrower gauge in the late 1870's. By 1888, Queensland, with 1931 miles of line, had 479 miles per 100,000 of population, compared with 176 miles for both New South Wales and Victoria, on the same ratio of population. In 1882, the Clermont line was built for £1070 per mile and the Normanton line, largely in steel sleepers, was completed in 1891 for £2700 per mile, including rolling stock. One line with very little earthworks, no ballast



A 102 h.p. [illegible]-motor crossing the original low-level Burdekin River trestle while, in the background, work proceeds on its replacement structure, the high-level rail and road bridge, which was (Photo: Queensland Railways)



B.15 Converted 4–6–0 No. 306 with a Queensland Division special train on the most famous steel bridge on the Queensland Railways, the four-chain curved structure at Stoney Creek Falls on the Cairns Railway, in January 1965.
(Photo: J.W. Knowles)

and four short bridges - the 24-mile Dalby to Bell line, opened in 1906 - cost only £956 per mile.

As a contrast, however, construction of the Cairns Range line, opened in 1891, cost £58,779 per mile. By 1913, when Queensland had 4523 miles of railway, the greatest mileage of any Australian State (a position reached in 1910), cost per mile, including rolling stock, was £7036, compared with £14,670 for New South Wales. In 1964, the capital value, exclusive of rolling stock, was £11,300 per mile opened or £18,792, including rolling stock (£23,494 per mile, if amounts written off the capital account are included).

The wisdom of building light, sharply-curved lines has often been questioned. There is no doubt that more trains have often been necessary, because lines were (and are) unable to carry locomotives of reasonable weight and power and that much of the saving in capital cost has been offset by higher operating expenses. There is, however, a good case for requiring expenditure of later eras to rehabilitate and strengthen lines, as the traffic to be carried necessitates such work.

The Queenslanders of the construction days wanted railways - any railway was an improvement on existing transport - and if these were to be provided in a large area of small population, they had to be cheaply built. Even low-level lines were likely to be trafficable for all but about 15 days of each year - a vast improvement on the roads of the day. The problem has been that the Governments of recent decades have had so many demands on the public purse that proper railway rebuilding has had to be deferred. The public image of railways has consequently suffered and it is only with the complete reconstruction of the Mount Isa line (in parts, from 42 lbs. to 82 lbs. rails and from nine-ton to 28-ton axleload) that the State is seeing a modern, heavy duty railway line.

The lightness of the track has severely limited speeds. A main-line limit of 40 m.p.h. on 60 lbs. or heavier rails was imposed from before 1900 until the 1940's. It has since been raised to 50 m.p.h. on most sections but in few places do the conservative timetables take advantage of even that limit. The long lengths of secondary main line, laid with $41\frac{1}{4}$–42 lbs. rails, have had passenger-train speed limits of 30 or 35 m.p.h., although two lines are permitted a maximum of 40 m.p.h. Limits on branch lines are generally 20-25, with up to 35 m.p.h. for railcars. Speeds allowed around curves in the sharper range have generally been higher than on broader gauges.

Encouragement to the building of non-Government railways was given in various ways. Local Authorities were permitted to build and operate tramways under an Act of 1882 and Treasury loans were provided to assist. At least 13 such lines were built, of which six were taken over by the Government, including a 2'-gauge system around Innesfail and purchased in 1914-15. Only one Shire line - the Aramac Tramway - now remains.

Sir Thomas McIlwraith, as Premier, tried to encourage land-grant railways again from 1880. Several earlier schemes to build such lines to the Gulf of Carpentaria, to make it the shipping entry into Australia, were rejected but McIlwraith thought land alienation in this way a reasonable alternative to a large public debt. An 1883 election was fought largely on this issue and resulted in the return of the Liberals under S.W. Griffith, who lavishly raised a £10 million loan for intensive construction.

When Griffith and McIlwraith eventually became allies (in the "Grifflewraith"), the land subsidy scheme had to be again encour-

Two passenger trains cross at Spring Bluff, on the Toowoomba Range, in the 1890's (above). The locomotive on the ascending train is an A.12-class 4-4-0 and (below) a PB.15-class 4-6-0 climbs to the Queensland-New South Wales border from Coolangatta in 1903, with the first train to Tweed Heads. (Photos: J.W. Knowles Collection and Queensland Division Collection)

aged, as loan funds were scarce during the depression of the early 1890's. Several lines were permitted under this scheme (all to mining companies in return for mining leases) but only the Chillagoe and Mount Garnet lines were actually built.

Although railways on the whole paid handsomely until World War II, the question of profitability became more and more of importance as more lines were advocated so that, after about 1905, profitability at some time in the future was usually demanded in any extensions.

In a measure to ensure that losses on new railways were borne by those who benefitted from their construction, local bodies were required to guarantee any deficits by striking a special rate in a designated "Railway District". This scheme was introduced in 1906 and, although many areas were willing to pay before a line was built and for some time after, much criticism was directed at the railway administration for its methods of operating and account,and the scheme was abandoned in 1915.

Under an earlier scheme, the mining company at Mount Morgan was required to give a guarantee on the operation of the branch line to that place and the Government only agreed to build a line to Mount Isa if the company made up losses,which it was required to do for many years.

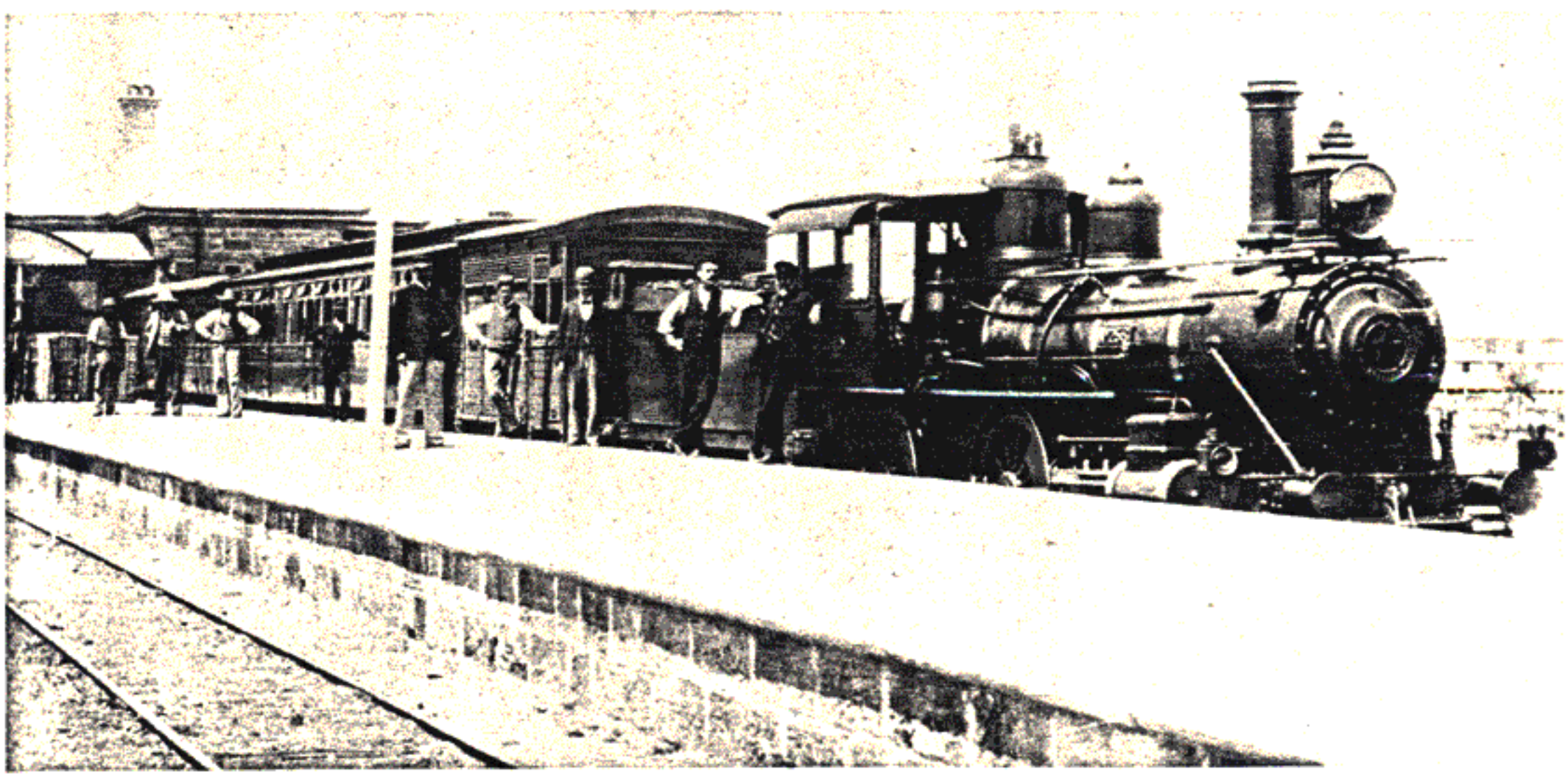
Railways in Queensland have continued to be a part of politics and it is difficult to see the pursuit of any consistent policy. They still remained part of the immigration-settlement-transport trio but responsible for the greater part of the public debt. In 1900, of a public debt of £35.9 million, £23.1 million had been voted for railway construction. Squatter interests opposed the building of branch lines for agriculture and, especially, resumption of grazing lands for that purpose in railway areas. They wanted trunk lines to the interior.

Although railway history in Queensland probably can be said to have followed a theme of "necessity", the North Coast and Great Western schemes of 1910 were one definite attempt to provide an integrated system of trunk lines. Possibility of losses, lack of voting strength in the West, World War I and subsequent inflation led to the abandonment of the Great Western scheme. Although many lines were built for developmental reasons, only a few were pushed into almost unsettled areas. Most linked pre-existing towns around or between which some development had occurred.

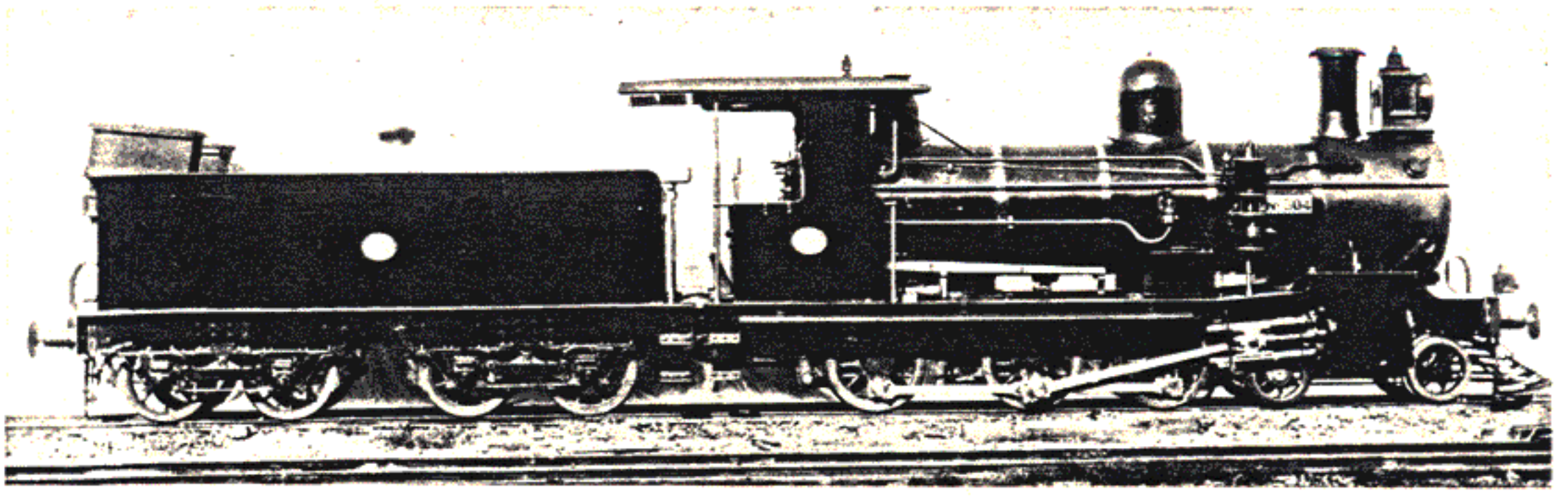
It was, however, fortunate for Queensland that so many local lines were built from the various ports, although it is unlikely that the system would have been vastly different had it been planned as an entity. The separate lines allowed for local development, where resources were suitable,at a minimum of capital expenditure and thereby set a pattern which has permitted Queensland to remain more decentralised than other mainland States.

Locomotives

Track and bridge considerations have always dominated locomotive size and weight in Queensland and the locomotives have usually been small, even by 3' 6"-gauge standards. Nevertheless, with the policy of strengthening main lines to a 12-ton axle load standard after 1900, quite substantial



Warwick Station in the early 1890's,with a short train in the dock platform and headed by a Baldwin A.12-class 4-4-0. (Photo: Queensland Division Collection)



The B.15 4-6-0's, with 36"driving wheels, were introduced from 1889 and 93 of the 98 engines in the class were subsequently rebuilt as the B.15 Converted class, with 45" driving wheels (above) and (below) the eight Queensland-built A.14 4-4-0's, introduced in 1894-95, were an enlargement of the A.12-class. (Photos: Queensland Railways)

progress was made between 1900 and 1925.

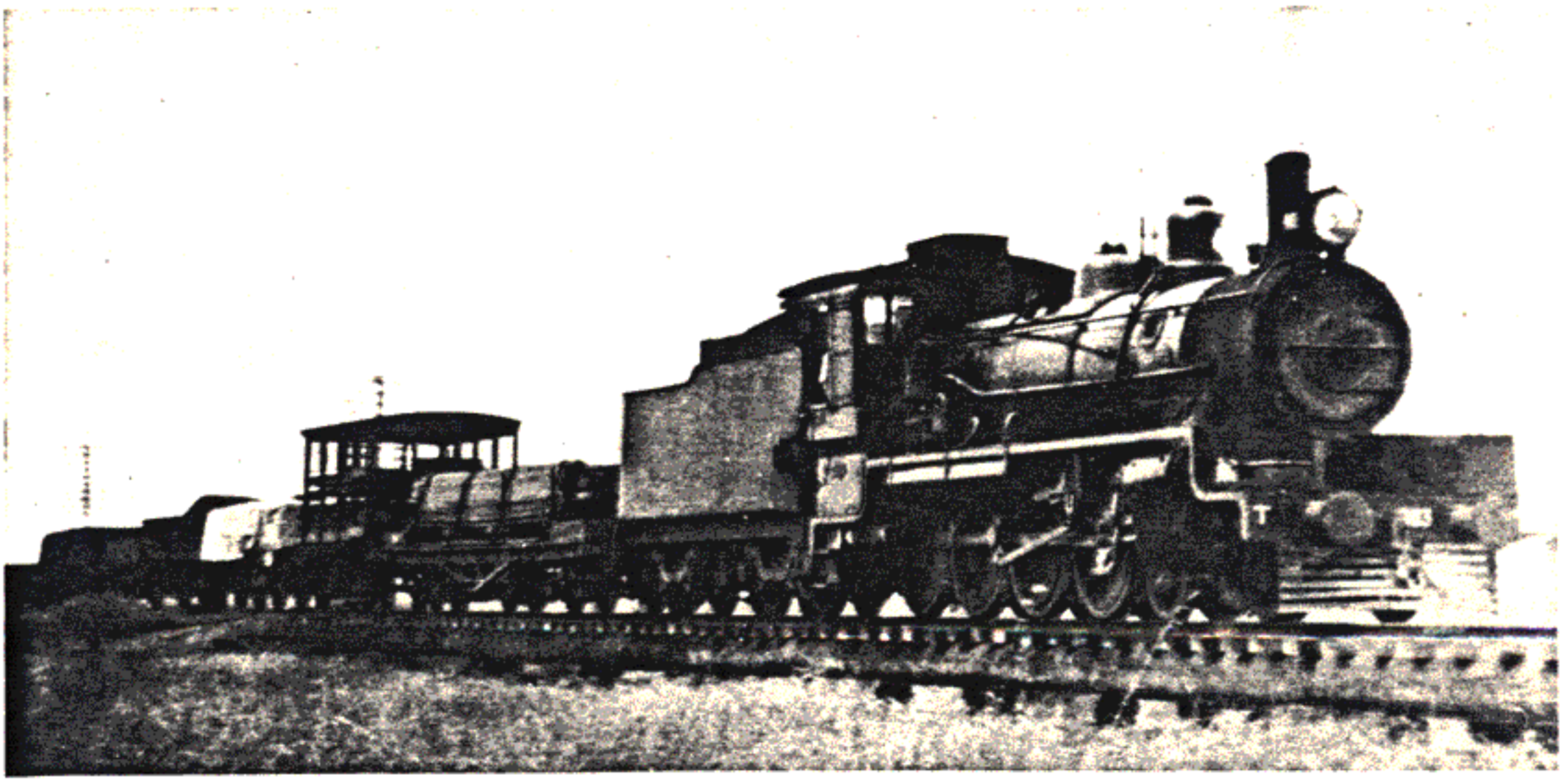
It was not long after 1865 before six-coupled locomotives were tried. The first of these were the C-class (B.11-class from 1889) of 1869, with 11-inch cylinders, to be followed by the D-class of 1870 and E-class of 1875, both with 12-inch cylinders and both later designated the B.12-class. These all had a 2-6-0 wheel arrangement.

The importing of three 4-4-0's from the Baldwin Locomotive Works in 1878 (later the A.12-class) showed that a leading bogie was more suited to the light, rough tracks and the next development of the six-coupled mixed-traffic design was the F-class (later B.13-class) 4-6-0 of 1883.

Apart from this progress in the basic design, various other types were built in small numbers. For the light Bundaberg Railway, there were two 2-4-2T's, with nine-inch cylinders, arriving in 1881 (later the 4D.9-class). In 1883, the C.13 light 2-8-0 class was introduced to the Bundaberg and Maryborough lines. For the coal trains from Ipswich to Brisbane, heavier power on the Central line and, perhaps, banking on the Ranges, five large 2-8-2T's (later the 8D.15-class) were placed in service from 1884.

To provide extra power on the Toowoomba Range, one double Fairlie (No. 42), sent to the Colony as a speculation, was placed in service in 1876, to run until 1902. For the Brisbane suburban trains, three 2-4-2T's were built in 1884 and four Neilson B-class 0-4-2's were rebuilt as 2-4-4T's between 1888 and 1890.

Some Baldwin locomotives were imported for the Bowen and Great Northern lines - two 4-4-0's, with 10-inch cylinders, in 1881; two 2-6-0's, with 11-inch cylinders, in 1879 and two 2-8-0's, with 15-inch cylinders, in 1879 and, for extra power on the Drummond Range of the Central line, three large Baldwin 2-8-0's, with 16-inch cylinders, arrived in 1882. Forty-three enlarged A.12-class 4-4-0's, from Baldwin and a local builder, were placed in service between 1882 and 1891.



The C.17-class 4-8-0 was the standard design for nine-ton axleload lines and the photograph shows No. 983, one of the final 40 fitted with roller bearings. (Photo: J.W. Knowles)

Larger locomotives, however, followed the standard line of development and the B.15-class 4-6-0, with its 14,000 lbs. tractive effort, was the next stage. From 1889, 93 were built and five more were taken over with the Chillagoe Railway in 1919. Eight of an enlarged 4-4-0 (A.14-class) were built from 1894 but subsequent development in the passenger field followed the B.15-class with the PB.15-class of 1899, an outstandingly successful 4-6-0, which could run all over the system and perform any task and of which 202 were built to the original design.

The PB-15-class was the last of a line, in some ways. Mr. H. Horniblow, Locomotive Engineer from 1883, was demoted from head of the Mechanical Branch with the appointment of Mr. W. H. Nisbet as Chief Mechanical Engineer in 1899. Mr. Nisbet introduced the first 12-ton axleload engine - the 6D.16 class 4-6-2T (later 4-6-4T) - for the increasing suburban traffic but it could not run in many places until tracks had been strengthened.

His successor, Mr. G. Nutt, of 1901, introduced the C.16-class 4-8-0, with 16-inch cylinders, a tractive effort of 17,500 lbs. and an axleload of nine tons. This represented a 25% increase in power over the B.15 with little track strengthening required and 152 were built up to 1917, both by Mr. Horniblow (again Locomotive Engineer from 1904 to 1910) and his successor, Mr. C. Pemberton, whose appointment was once again to that of Chief Mechanical Engineer.

Although the C.16 was really a goods locomotive, members of the class hauled the passenger trains, including the Sydney Mail, as they were 46% more powerful than the PB.15-class. The success of the PB.15's prompted the rebuilding of most of the B.15-class, to be generally similar, between 1903 and 1929.

The first 12-ton axleload main-line locomotive was introduced in 1911. This was the ponderous B.17-class 4-6-0, of which 21 were built up to 1914, mainly for passenger duty. The largest conventional Queensland locomotive design followed in 1914. This was the C.18 4-8-0, with a tractive effort of 21,700 lbs. and this was developed into the C.19-class 4-8-0 of 1922, similar in most respects but superheated and with larger cylinders.

During the 1920's, three new designs of importance were introduced. Firstly, the C.17-class 4-8-0's, really a superheated version of the C.16's, and built until 1953, with various modifications, until there were 227 in the class. The D.17 4-6-4T's were introduced to provide extra power for the suburban system and 30 were built from 1924 to 1942.

In an attempt to provide a powerful locomotive for passenger trains on the North Coast line, which was then being completed, the first B.18$\frac{1}{4}$-class "Pacific" appeared in 1926. The design proved most satisfactory and 83 were built up to 1947. During this decade, a modified version of the PB.15-class was introduced for light Western lines and 30 were built in 1925-26.

Construction since the 1920's relied mostly on proved designs. For the large mileage of nine-ton-axleload track, the C.17 was about as powerful an engine as could be provided. On the 12-ton-axleload lines, the C.19 and B.18$\frac{1}{4}$ were of adequate power until

World War II, which brought into operation two designs foreign to local development – the AC.16 2-8-2, a standard U.S. Army medium gauge design, and the Australian Standard Garratt.

The Australian Standard Garratts did useful work but faulty workmanship and prejudice caused their withdrawal after only two years' work. The AC.16, however, has proved most useful and led to some new ideas in the design of the postwar DD.17 4-6-4T's and to some changes in the B.18¼, which led to the BB.18¼-class 4-6-2's, 55 of which were placed in service between 1951 and 1958. The only other postwar design was the imported Beyer Garratt 4-8-2+2-8-4's, 30 of which entered service from 1950. These have done useful work but were soon eclipsed by diesel power.

In contrast to the larger steam classes, diesel power has come in many different varieties, ten classes by 1965. This form of motive power has wrought considerable change in Queensland, largely because much more powerful designs have been possible on existing tracks than with steam.

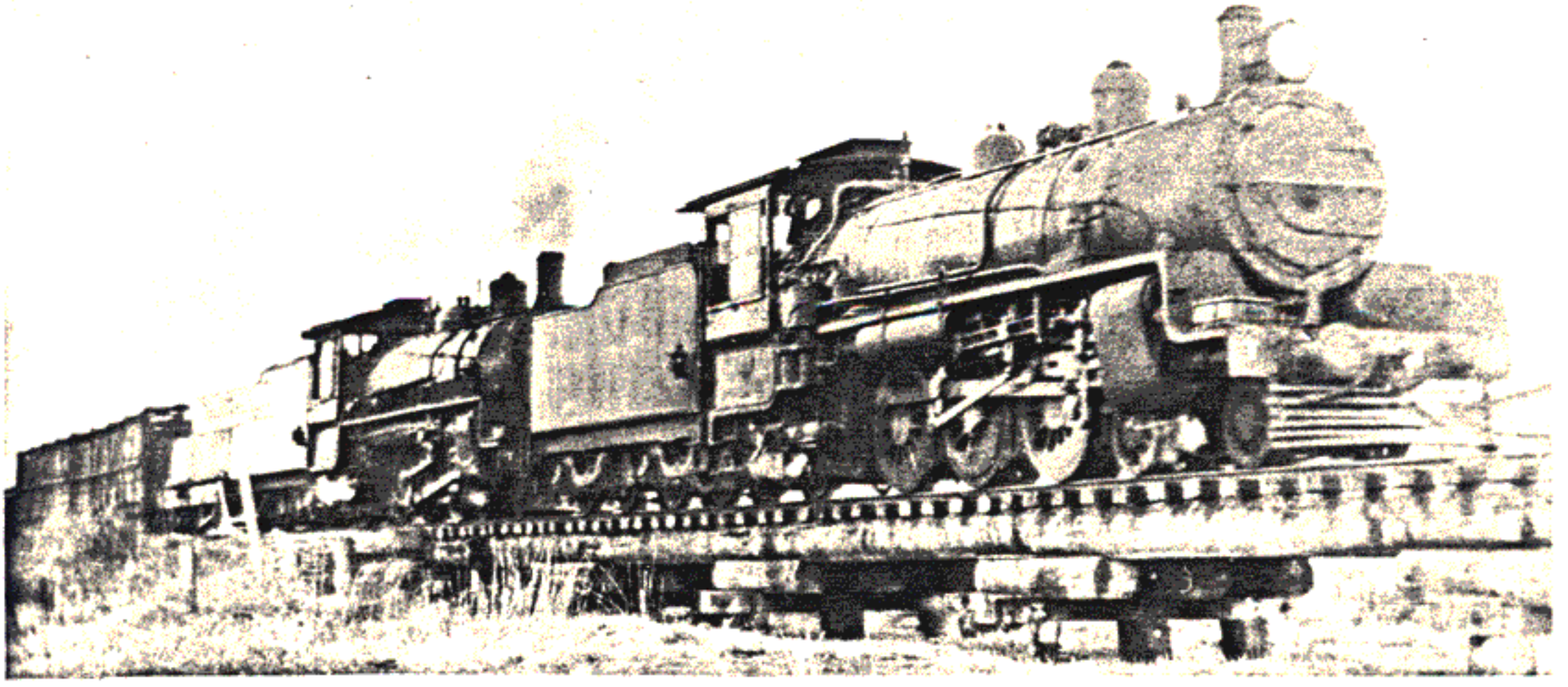
Local builders were responsible for most of the locomotives to run on the Queensland Railways. Of the 1311 steam locomotives operated during the century, no fewer than 908 were built in the State. The Department's own Ipswich Workshops commenced its locomotive construction in 1877 and has supplied a total of 216.

Messrs. Evans, Anderson, Phelan & Company of Brisbane were the first private builders, the first of 185 engines supplied dating from 1890. The Phoenix Engine Company of Ipswich supplied 23 locomotives between 1890 and 1895. Walkers Limited of Maryborough made their first delivery in 1897 and, up to 1958, built 449. The Toowoomba Foundry built 35 after 1912. There are now four builders of diesel-electric locomotives in the State and these are now supplying all requirements of this form of motive power.

Queensland locomotives gradually adopted mixtures of English and American practice, with additional local items. Boiler-top sandboxes, cowcatchers and bogie tenders are typically American but the "organ-reed" type of whistle, standard until 1948, followed English design. The stovepipe chimney, with leading capuchion, is a local development, as is the smokebox blowout chute.

Although such ideas as feedwater heaters exhaust steam injectors, regulators in the smokebox header, low temperature superheat for originally saturated slide-valve engines and screw reverse gear were tried, most of the features have been standard between the designs - right-hand drive, pull-out regulators (since the 1890's) and Johnson bar reverser. The cab design of the B.15's, from the early 1890's, lasted until 1935, when it was replaced by the "sedan" cab of the newer C.17, B.18¼ and BB.18¼. Tenders have even been standard - the C.16, B.17, older C.17 and B.18¼ have one type, the newer C.17's and the BB.18¼ have another.

Driving wheel diameters have been remarkably standard. The B.11, B.12 and B.13 early standard designs had 39" driving wheels and the first two actual passenger designs - the A.12 (large) and PB.15 - had 48". This was increased to 51" in the A.14



B.18¼-class 4-6-2 No. 901 and BB.18¼-class 4-6-2 No. 1039 double-heading a goods train out of Dalby in June 1957. *(Photo: J.W. Knowles)*

and continued in later passenger designs - B.18¼, BB.18¼, Beyer Garratt and suburban tanks of the D.16, D.17 and DD.17-classes. The large mixed traffic classes for lighter lines, the C.16's and C.17's, have 45" and the B.15, built with 36", was altered to conform. The heavier mixed traffic engines of the B.17, C.18 and C.19-classes had 48".

Queensland locomotive practice, therefore, followed a small engine policy, with the construction of large classes with many standard features. Seldom were specific designs introduced for a particular special duty and, with the exception of the suburban tanks, the Mount Morgan rack-line engines and a few shunting locomotives, most classes ran everywhere they were permitted. One further exception was the first use of diesel power - the light DL-class diesel-mechanicals, introduced in 1939 for the Etheridge line, which was unable to carry even the lightest of steam locomotives.

A source of considerable confusion to students of the system has been the method of classification and numbering. Until 1889, classification was by letter for some, description for other classes and engines were numbered separately on each railway. In 1889, the whole were numbered together, following on Southern and Western numbers which had by then reached 103, and the present system of classification was adopted - a prefix denoting the number of coupled wheels (A for four, B for six, C for eight, D for tank engines, originally with a preceding numeral, which denoted the number of driving wheels) and a number denoting the cylinder diameter in inches. Additional prefixes - "A" (AC.16) and "P" (PB.15) - denote "American" and "passenger", while the doubling of the prefix denotes some difference from earlier engines (e.g., DD.17).

From 1915 to 1936, some new locomotives were given numbers of earlier engines, by then written off. Thus, while many classes are numbered in blocks, some confusion can arise from the spread of the numbers - the PB.15's are numbered between Nos. 5 and 751; the C.17's between Nos. 2 and 1000; the B.18¼'s between Nos. 16 and 916 - and a further confusion can arise from the low numbers being very mixed in their classes, e.g., No. 2 (C.17-class), No. 3 (B.15 Converted), No. 4 (C.16), No. 5 (PB.15), Nos. 6 to 14 (C.16), No. 15 (C.17), No. 16 (B.18¼), etc. Steam numbers reached 1109 after this system was adopted. Diesel-electrics were originally numbered in blocks and classified by type but are now classified by the class leader and numbered in hundreds, viz., 1200, 1250 and 1270-class by English Electric.

The following table shows the progress made over a century in the increase of the tractive effort of steam locomotives.

Class and Wheel Arrangement		Year	Tractive Effort lbs.	Toowoomba Rge. Load tons
A	2-4-0	1865	4,500	55
C	2-6-0	1869	5,000	65
8D.11 (Fairlie)	0-4-4-0	1876	10,000	120
C.15	2-8-0	1879	12,600	100
C.16 (Baldwin)	2-8-0	1882	15,900	-
F	4-6-0	1883	9,700	85
B.15	4-6-0	1889	14,000	145
C.16	4-8-0	1903	17,500	195
B.17	4-6-0	1911	19,400	230
C.18	4-8-0	1914	21,750	285
C.19	4-8-0	1922	23,500	285
B.18¼	4-6-2	1926	22,600	230
Beyer Garratt	(4-8-2+ (2-8-4	1950	30,800	375

Braking was always a problem in Queensland, on account of the many sharply-curved range sections. In 1884, test trains were fitted with both Westinghouse and vacuum brakes. By 1887, all passenger trains on the Southern and Western system were fitted with the vacuum brake but, in 1891, the Westinghouse system was decided upon. The fitting of rolling stock was rapidly carried out, a great proportion of the Southern and Cairns stock being fitted by 1900 and almost all stock by 1914.

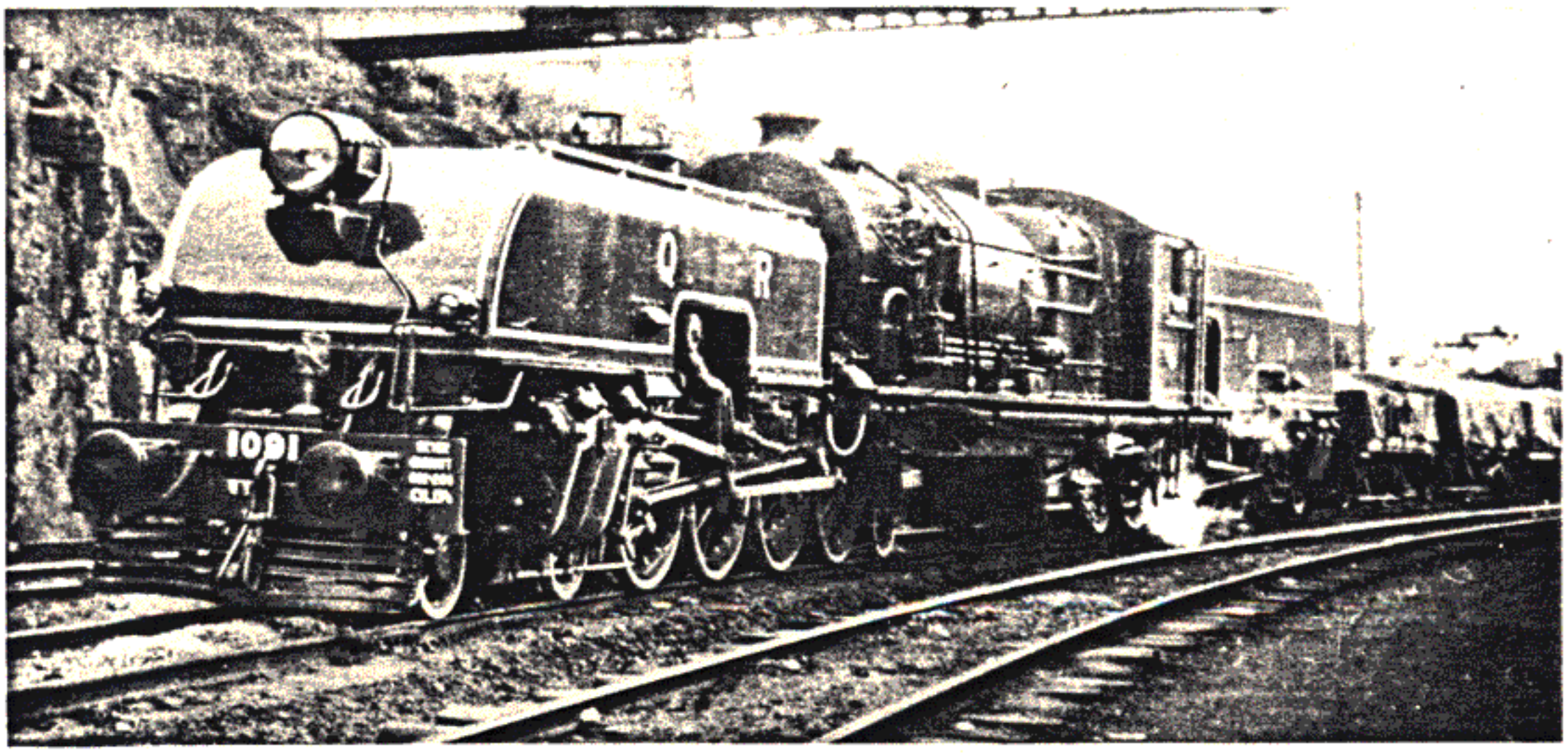
Goods Stock

Goods stock has been built in varying sizes and types to suit the traffic offering and, until 1880, all wagons ran on four or six wheels, with the greatest loaded weight of any being 16 tons. Development to 1940 was not spectacular, although an increasing proportion of stock was bogie and, in that year, the greatest loaded weight was 32 tons (i.e., to suit an eight-ton axleload).

Construction of both bodies and frames was, with a few exceptions, entirely in Queensland hardwoods until the late 1940's. Since then, steel construction has been favoured and gross weights and lengths have been progressively increased, so that there are now open wagons with a gross weight of 64 tons and a heavy duty well - wagon of 96 tons.

One peculiarity of Queensland wagon stock has been the widespread use of the Grover's bogie - a single axle but pivoted in the true sense of a bogie and with the two bogies of a wagon connected by cross-rodding. Some 3,500 of these wagons were built, most of them still being in service.

Another development has been the wagon-brakevan, designed to reduce deadweight in trains hauled by small locomotives. From early this century, box, hopper, sheep,



The Queensland Railways' largest locomotive is the 4-8-2-2-8-4 Beyer Garratt, 30 of which were imported from 1950. No. 1091 is shown on a goods train at Mayne in 1957. (Photo: J.W. Knowles)

cattle and open wagons, with a guard's compartment, were built, many of these vehicles being still in service.

A high proportion of Q.G.R. wagon stock has been bogie since the 1880's. Of 6036 wagons in 1900, 39% were bogie and the percentage of bogie in the 26,021 wagons now in service is about 42. The bogie form has permitted the carrying of reasonable loads on light tracks and has been of advantage on the many sharp curves.

Drawgear strength restricted train loads to 650 tons until the late 1950's - this was another reason why low-powered locomotives were adequate. Stronger drawgear since introduced permits loads of over 2,000 tons. The standard screw coupling has given way slightly to automatic couplers for the Mount Isa and Moura line wagons since 1962.

Passenger Stock

The original length of 35 feet for the carriages had increased to 53 feet by 1905 and tare weights had increased to about 23 tons. About this time, steel underframes came into use but wood was used for bodies until the 1950's (and, up to the present, for goods brakevans). Wooden carriages were built up to $55\frac{1}{2}$ feet in length, for a maximum tare weight of 32 tons. Maximum width used appears to have been 9' over body, with a width of 9' 4" over guards' lookouts.

The last development of main-line wooden stock was the Sunshine Express stock, built from the mid-1930's, with roller bearings to increase loads hauled by comparatively small locomotives. The first complete set of these carriages, dating from 1935, was the first completely-fitted roller-bearing train in Australia, apart from the rail-motor trains in the RM.46-49 series of 1929-30. Roller bearings have since been extensively used on both passenger and goods stock.

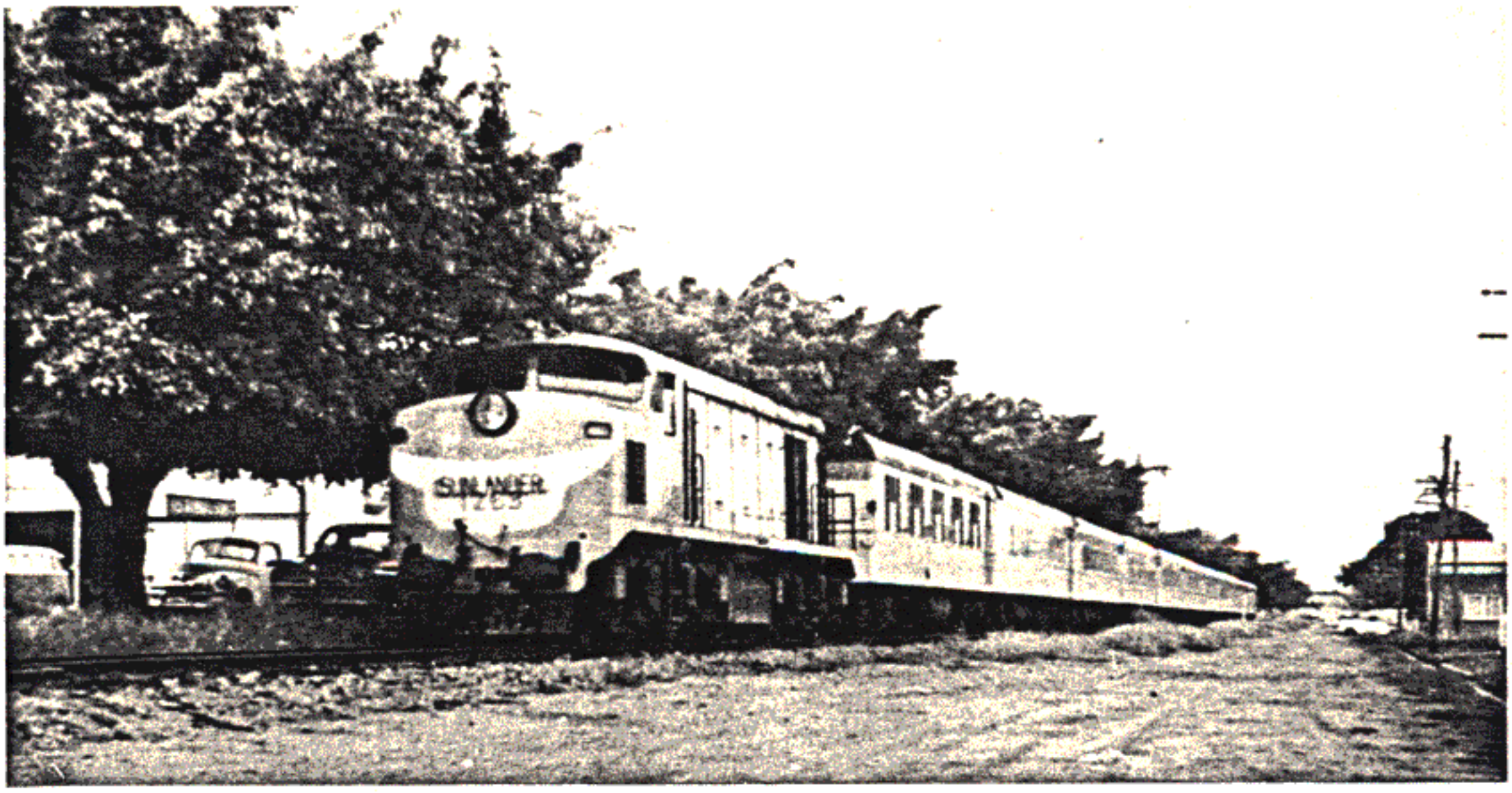
The first steel carriages were also the first air-conditioned stock on the system and built for the "'lander" trains. The first of the nine sets in this series were introduced in 1953. Dimensions are similar to the last wooden stock but tare weights reach up to 35 tons.

Queensland passenger stock has seldom been as opulent as that on other railways but quite comfortable and reasonably roomy. First and second-class sleeping accommodation, dining cars and, at one stage, even a bath car, have been provided on the main-line mail trains since the trunk lines were completed and, in the 1920's and 1930's, two trains had observation cars. Travelling post offices were conveyed on trunk-line mail trains from before 1877 to 1932.

Many Queensland carriages have gated end platforms, although construction of such ceased in the mid-1920's. An unusual but common carriage is the composite-lavatory-brakevan, with first-class, second-class and guard's compartments, for use on mixed trains and to save deadweight.

The earliest carriages used specifically for suburban traffic were end-platform Pullmans, some imported from the U.S.A. and dating from about 1900. From 1913, however, the cross-seat, side-door type, seating up to 90 in a length of $53\frac{1}{2}$ feet, came into use. This has, in turn, been displaced by the stainless steel type, in service since 1961.

The most important trains on the trunk lines have always been referred to as "Mail" trains and the only exceptions, even now,



The "Sunlander", hauled by 1250-class D/E No. 1263, passing along Flinders Street, Townsville in February 1962. *(Photo: J.W. Knowles)*

are the four air - conditioned "'lander" trainsets - the "Sunlander", the "Midlander", the "Inlander" and the "Westlander". The "Sydney Mail" to Wallangarra was the most important train on the system from 1888 to 1932. During the 1930's and 1940's, it was the "Sunshine Express" on the coastal route to Cairns. Prior to the opening of the through coastal route, the "Gladstone Boat Mail", which ran right on to the wharf at Gladstone to tranship its passengers and mails for the North, was the most important train on the North Coast line.

There is little long-distance express running in Queensland. Even where a train is designed not to serve certain towns, it usually has to stop for crossings or to pick up the staff at the many unattended crossing stations. Thus, although the "Sunlander" does not serve places until beyond Rockhampton, 396 miles from Brisbane, it makes many stops to the South of that place. With a low population in a large area, the mail trains are required to perform roadside duties to make their running worthwhile.

Prior to the advent of diesel power, passenger train loads for the small steam locomotives used were decidedly heavy - up to 400 tons for the "Pacifics" and, in some places, with roller-bearing stock, in excess of goods loads. All these factors severely reduce overall speeds and the averages of long distance mail trains are about 25 m.p.h., terminus to terminus. The only instance of express running for specific places have been trains from Townsville to Charters Towers, in the heyday of the Charters Towers goldfield, the Helidon railcars (since 1961) and the Southport Expresses (1935-64). The steam suburban service of Brisbane has been, on the whole, efficient and relatively fast, although services are not as frequent as in comparable cities.

Rail-motors

This form of traction has found great favour in Queensland to provide faster and more frequent local services, especially on branch lines and between towns and cities on main lines. The large 200 h.p. McKeen cars of 1913 were not successful and development then followed conversion of road vehicles to railway usage until 1927, when the 45 h.p. A.E.C. car, built on a road chassis, was introduced. Forty of these "Tin Hares" were built up to 1931. Further development had 100 h.p. and 150 h.p. petrol cars by 1930 and diesel power, the first application in Australia, by 1935. Postwar development has been directed to heavier, faster and more comfortable types.

With the rail-motor form of traction in Queensland, light trailers, for both passengers and goods, have been employed, thus adding to the versatility of the cars. On the Cooktown, Normanton and Etheridge railways, rail-motors have been the only form of motive power at various times and six and 10-ton rail-motors hauled goods wagons.

Administration

With a widely spread system, centralised administration has not been possible. The Commissioner for Railways was a corporation sole from 1863 to 1889, when a three-man Board of Commissioners was appointed. This was not a success and, since 1896, there has again been a single Commissioner.

Until 1914, each line had its separate officer-in-charge, under the direction of a central Traffic Manager, with the engineering and mechanical sections responsible to a central Department Head. Following a trial period from 1910, the present system was instituted in 1914. The system is divided into four Divisions, each under the control of a General Manager, with a Locomotive Engineer and a Maintenance Engineer responsible both to the General Manager (for local matters) and to the heads of the respective branches. Each Division has outlying Districts, under the control of Superintendents.

Safe Working

Although Queensland has generally followed British practice, the staff and ticket system did not become completely binding until after the Darra accident in 1884. On double lines, the British system of block working is followed, except where signalling is automatic. Most of this is colour-light but there are a few upper-quadrant semaphores automatically worked; otherwise, all signals are lower-quadrant semaphores.

Interlocking is not as common as in some Australian States but its provision and the installation of the electric staff have been made on the busier single lines while, except for one station, all stations and junctions on double track are interlocked. The first interlocking frame was installed in 1880 and 56 stations had frames by 1905 but this number had increased to 155 by 1915.

The first installation of an electro-pneumatic interlocking system in Australasia was made at Brisbane Central in 1904. There are now six installations, either of this type or purely electric.

Two features of safe working in Queensland deserve mention. With long lines passing through sparsely settled areas, very many crossing stations on single lines are unattended and, at the older loops, much depends on the human element but more recent loops, fitted with the innovation of trailable facing points, leave less to chance.

Following the Murphy's Creek accident in 1913, drivers are given additional tuition on Range sections and are required to sign a statement of competency before being allowed to work trains over the sections. On most range sections, all trains must stop at certain places to recharge air reservoirs.

The Effects of World War II

The greatest period of strain suffered by the Queensland Railways occurred during World War II, when troops and equipment were shifted in large volume to strategic areas in North Queensland. Repairs to rolling stock were deferred and, with heavy postwar traffic, it was not until some 10 years after the war that the backlog was overcome.

In 1943, the average number of miles per working locomotive was 39,019 and average wagon mileage, 16,213 - greater, it is claimed than any other Australian system. In the period 1941 to 1945, despite diversion of workshop facilities to munition production, 43 locomotives, 54 carriages and more than 2,000 wagons were built. All other Australian State railways built a total of 55 locomotives in the five years to June 1944.

Traffic

A large proportion of the traffic of the Queensland Railways has always been associated with primary industry. Livestock is hauled from the inland to coastal meatworks, wool, wheat and other grains for shipment The sugar industry has been responsible for

The utilitarian carriage for use on mixed trains, the composite-lavatory-brake, with accommodation for 1st and 2nd-class passengers, and a guard's compartment (left) and (right) one of the 45 h.p. AEC rail-motors, with trailer, at Townsville in 1957. (Photos: J.W. Knowles)

Yarraman, a typical Queensland Railways' branch-line terminus, in 1913, with a B.15 Converted 4-6-0 on a construction train. (Photo: Queensland Railways)

shorter hauls of cane to mills and manufactured sugar to ports.

Coal traffic has been mostly short hauled, except for the railway itself, and for Mount Isa mines (a 754-mile haul from Collinsville). Export coal for Japan is now creating additional traffic. The mineral traffic for the last 30 years has been dominated by the haulage of production of Mount Isa over the 604 miles to Townsville, although production of the nearby Cloncurry field provided considerable traffic prior to 1920.

General merchandise and perishable traffic to the inland has always imposed a heavy burden of returning empty wagons unsuited for any other traffic. On the coastal line, return fruit traffic balances Northbound perishable traffic to some extent. The decline in coastal shipping since World War II has resulted in increased general traffic on the coastal line.

Some idea of the growth of the system and traffic on it can be obtained from the following table -

Year	Mileage	Locomotives	Wagons	Carriages	Staff	Train Miles	Goods Hauled (tons)
1866	49½	15	183	37	-	-	11,394
1900	2,801	335	6,036	388	-	6,426,054	1,922,311
1935	6,498	734	18,735	1,030	16,249	12,869,974	4,840,870
1964	5,885	781(a)	26,021	1,452	26,193	18,847,744	9,205,716

(a) - includes 120 diesel locomotives

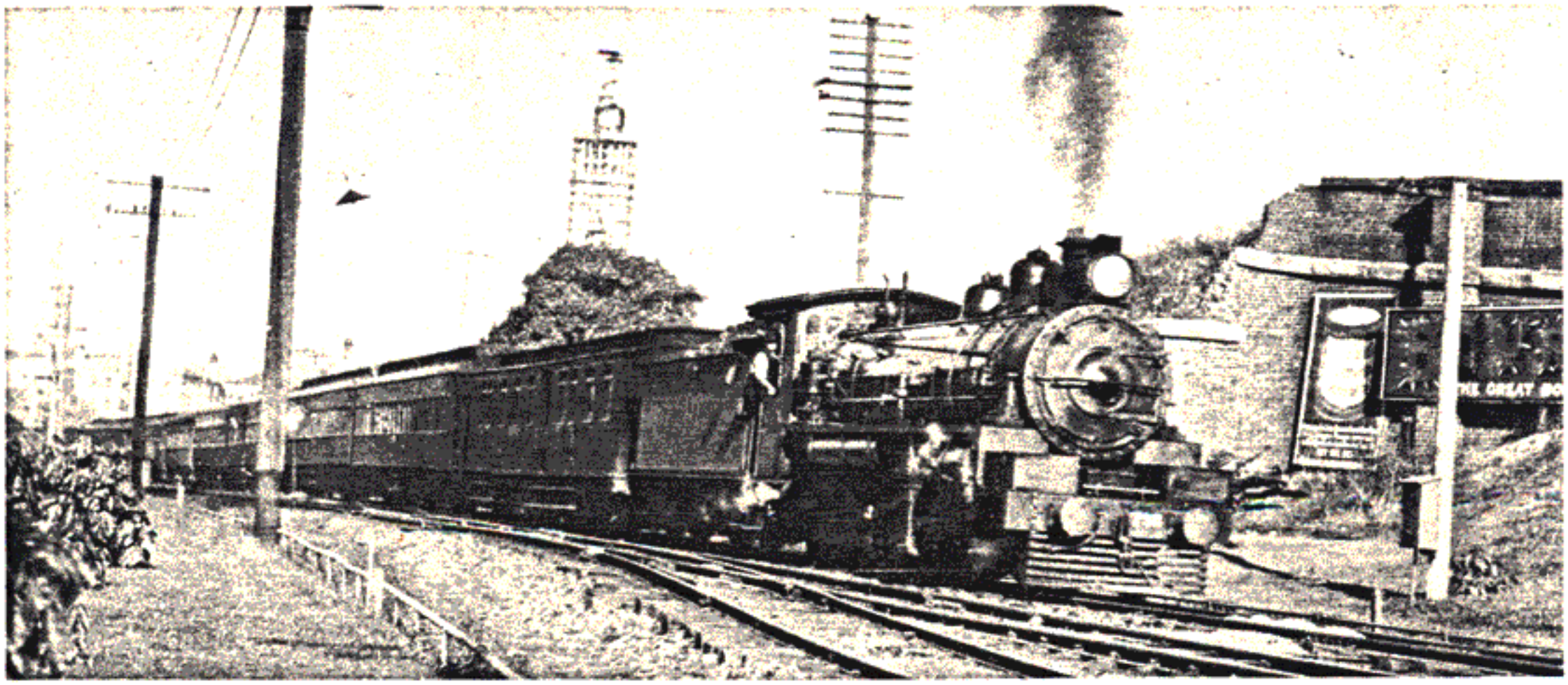
In Lighter Vein

With any organisation 100 years old, there are various isolated facts which, while not entering into the serious evaluation of its history, do tend to show how human beings were connected with it.

In 1870, only five years after the opening, there was a political storm-in-a-teacup over the fact that 30 special trains were run during the year for Ministers of the Crown, eight being for the Speaker's funeral. In the stern Victorian days of 1876, a man was fined for smoking on Rockhampton station and, in the following year, a passenger was fined for carrying 15 lbs. of dynamite as passenger's luggage.

A man went to sleep on Bone Creek bridge (Central line) in 1880 and was killed by a train. In 1881, it is noted that railway surveyors, on completion of their route surveys, were required to survey towns on route.

An interesting contract - for cleaning earth closets on the 101 miles of line from Brisbane to Toowoomba - was let in 1882. In 1883, political demands on the administration



The Western Mail approaching Brisbane's Roma Street station in the early 1930's and headed by C.19-class 4-8-0 No. 798. (Photo: Queensland Railways)

were heavy and of 23,659 free passes issued during the year, only 11,000 were for the Department's own purposes. Included among "imported items" for the years 1884 to 1886 were 68 cases of tickets from England.

The Salvation Army was awarded the contract for washing linen in 1890. In 1895 and, in fact, until 1907, wages were paid monthly. An experiment was introduced in 1902, whereby traffic staff were required to paint stations in their spare time. A time-table of 1910 informed passengers that hatbags were available from conductors for ladies' hats and that rugs and pillows could be hired. A further note informed all and sundry that an electric bell was installed at the ladies' end of first-class sleeping carriages.

General

The railways of Queensland have always been forced to follow Abram Fitzgibbon's original dictum of "cheapness and adequacy". They have been lightly built, provided an adequate service and rehabilitated as necessary to preserve the adequacy. The opening of their second century is a period of great rehabilitation, which seems, at last, to be providing well for the future.

Perhaps, no more can be asked of a public transport system than adequacy of service, for Queensland's developmental transport needs have been of a special character. Few would challenge the statement that the significant pioneering of Queensland was that done by means of the railway.

Development has been very largely due to the large, well-spread railway mileage and the many freight concessions given. The pattern of routes has enabled provincial ports to flourish, has been responsible for the development of lines of communication and the establishment of areas of common interest.

In very many ways, the development of the State of Queensland has followed the development of the Queensland Railways and it may be said that the progress of the State is, in a large measure, due to the efforts of its "iron horse", despite the fact that one early critic disparagingly described the 3' 6"-gauge system as a mere "pony" railway.