

NEW ZEALAND TRAMWAYS IN 1897-98

A Note on an Important Source

By G. T. Bloomfield

NEW evidence on some of the traffic features of New Zealand tramways in 1897-98 has come to light in the hitherto little-known "Bingham Report".¹ This report was prepared by W. Gentry Bingham, a British engineer, who visited New Zealand in April and May 1898. Bingham was attorney representing the New Zealand Electric Light and Traction Company of London, a British syndicate interested in electric tramway investment.² During his two-month sojourn in this country Bingham examined the existing horse and steam tramway systems in the four main cities.

The report is a useful comparative study of tramways in the major cities and provides reasonably good statistical material long before the government published data.³ Auckland and Dunedin are surveyed in the greatest detail for these were the systems that offered the greatest prospects for investment in electrification. Bingham's proposals for new electric lines are interesting when related to the lines that were actually built.

Survey of Tramway Systems

TABLE 1 summarises the general details of the tramway systems visited by Bingham, but there is no mention of Invercargill in the report. This town had nearly 4½ miles of horse tramway from 1881 to 1909. The small size of Invercargill in the late 1890s would provide very limited prospects for tramway investment by a private group. Christchurch was by far the largest system by length of route. Auckland and Dunedin were similar in size and Wellington was very limited in route mileage. Horse traction was the dominant mode except in Christchurch where a number of lines were worked by steam engines. Few details about rolling stock are given in the report, this being

understandable since Bingham was mainly concerned with looking at existing traffic with a view towards future viability and profitability as electrified systems. The Auckland and Dunedin systems were then owned by the Bank of New Zealand, which had to foreclose its mortgages when the companies failed to meet their expenses in the early 1890s.

General details of traffic for the four cities are shown in Table 2. Christchurch tramcars ran the most miles of all the systems, but in terms of passengers carried per mile run the Christchurch system had very low traffic. Revenue in pence per car-mile was also the lowest of the four. Wellington had the most impressive traffic returns with the highest passenger load

TABLE 1
NEW ZEALAND TRAMWAYS 1897-98

City	Route Miles	Number of Vehicles	Motive Power	Owner (Lessee in brackets)
Auckland*	7.08	33	Horse	Bank of NZ (City of Auckland Tramways Co.)
Wellington	3.80	N.A.	Horse	Dr Grace (Mr Hall)
Christchurch	13.67	N.A.	Horse, Steam	City & Suburban Tramway Co.
"	12.74	N.A.	Steam	New Brighton Tramway Co.
Dunedin	10.10	40	Horse	Bank of NZ (Dunedin Tramways Co.)

Source: Bingham MS.

N.A. Not available.

* The Tramways Co. operated a further 4.50 route miles of buses and owned 12 horse buses and five passenger brakes.

and receipts per car mile. Bingham does not provide many details of expenditure, so the relative profitability can only be surmised from the statistics.

Christchurch

The tramway system of Christchurch was the least remunerative of the four examined by Bingham. Receipts of 6.86 pence per car per kilometre run for the City and Suburban lines and 6 pence per car per kilometre for the New Brighton line were not deemed sufficiently high for investment in electric tramways. "The population of Christchurch and its suburbs is made up of Church folk and agriculturalists and the number of trips taken per annum is very small" (p.10). The tramway network had an extensive route mileage (26.41 miles), most of it passing through low-density residential or rural areas. In summary Bingham reported:

These figures [referring to receipts] do not appear to us large enough to justify the purchase of the system, besides taking into consideration the nature of the population which does not permit expecting any noteworthy increase in the traffic. They are systems which may possibly be worked by people who do the work themselves and who derive the principal portion of their profits from the salaries they receive (p. 11).

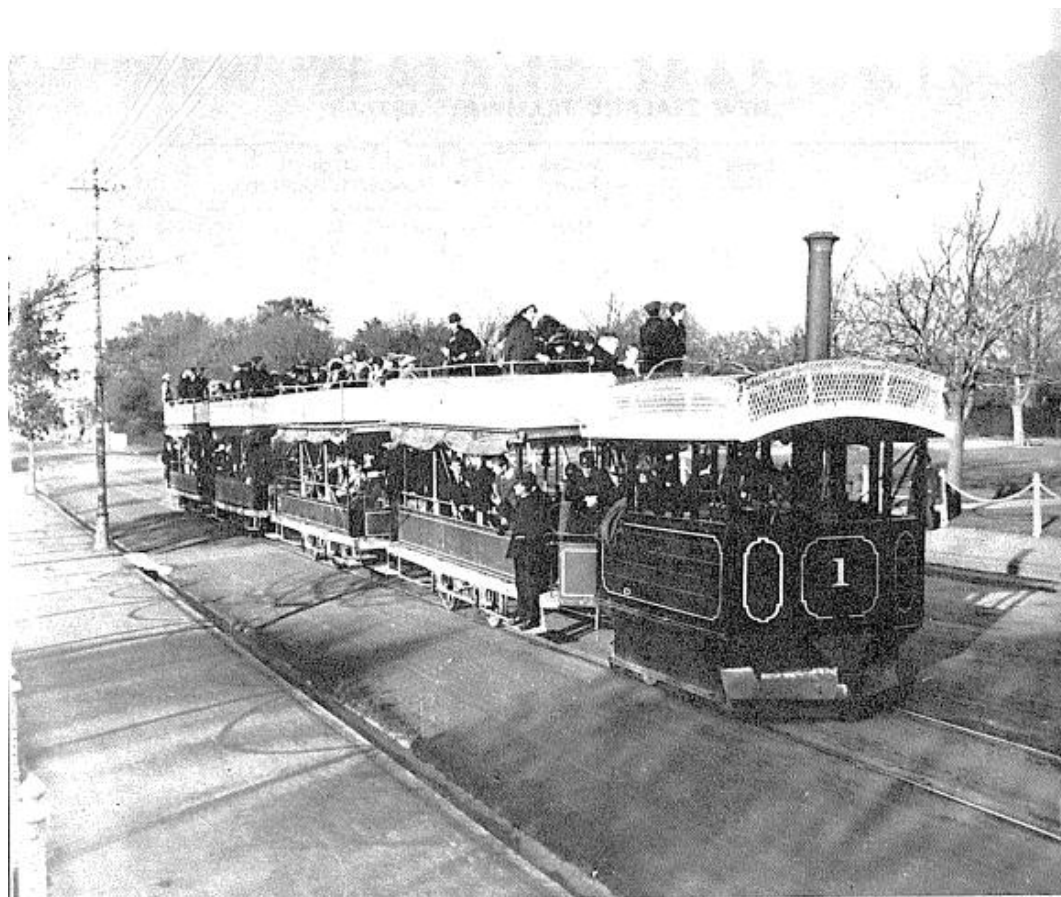
Wellington

Bingham was impressed by the profitability of the Wellington tramways. The

receipts per car-kilometre were assessed by him at 11.52 pence and other expenses at only 5.28 pence, "a very low figure where animal traction is used" (p.7). The owner, Dr Grace, received an annual rental of £1,500 from the lessee Mr Hall, and a royalty was also paid to the City Council. Bingham estimated annual profits at between £10,400 and £11,200. Since the system, like Christchurch, was privately owned, it was difficult for Bingham to secure detailed financial returns as supplied by the Bank of New Zealand and its lessees in Auckland and Dunedin.

One factor in the profitability of the Wellington tramways was the limited route mileage. The horse tramway network was only 3.8 miles long and served the two railway stations at the northern end and "the much frequented recreation park" of the Basin Reserve at the southern limit. The cars in use had large capacity, seating 58 passengers, and were drawn by three horses.

"The purchase of the Wellington Tramway System would be an excellent undertaking could it be properly effected; but unfortunately there is but slight probability of success" (p.6). Bingham mentioned the interest of the City Council in operating the system, and in 1900 the Corporation did in fact acquire the tramways.



From the "Press Collection", Alexander Turnbull Library.

A steam tram in Christchurch about 1907. The locomotive or "steam motor" No. 1 was built by Kitson and Co. at Leeds in 1879.

Dunedin

At the time of the survey the Dunedin Tramways were the largest measured by numbers of passengers carried. The route length was 10.1 miles, and 40 horse-drawn cars handled the traffic. Bingham found the tramways well managed and fairly prosperous, and found the city:

... one of the richest towns in New Zealand and is certainly the best built. Its commercial importance is considerable. The whole of the neighbouring district is highly cultivated, breeding is prosperous; gold mines are numerous

and are worked with the capital of the inhabitants which brings much wealth into the town. Manufactures are of high quality: woollen goods, iron foundries, building works, pottery manufactures, tanneries etc. exist in great numbers in the town and its suburbs (p.45).

The population of Dunedin was growing only very slowly, having increased by only 2,699 between the census of 1881 and 1896 (from 45,256 to 47,955 in the city and suburbs). "The town seems however to have made a fresh start, for numerous new dwelling houses have been built in the course of the last 18 months

TABLE 2
New Zealand Tramways Working Results 1896-97

City	Car-miles Run	Passengers Carried	Passengers per Car-mile	Receipts	
				Total	Pence per car-mile
				£	
Auckland ¹	378,257	1,585,410	4.19	19,265	12.22
Wellington	267,193	3,000,000	11.22	20,000	17.96
Christchurch	683,518	2,500,000	3.66	30,000	10.53
Dunedin ²	424,500	3,905,805	9.20	20,826	11.77
New Zealand ³	1,753,468	10,991,215	6.27	90,091	12.33

Source: Bingham MS.

1. Includes the two horse-bus lines operated by the Tramways Company.
2. Excludes the Maori Hill horse tramway operated by Reid and Duncan, and the two cable-car lines.
3. Excludes the Invercargill system.

and others were being built when we were there" (p.46).

Dunedin tramways worked a number of long routes. The Princes Street line to the Botanical Gardens and thence to Hawthorne in North East Valley was the most profitable. Cars ran on average every five minutes, and even every two and a half minutes when concerts were being given in the Gardens. The Castle Street line, parallel to Princes Street, gave poor financial results, being close to the previous line and also having infrequent services. Both lines to the southern suburbs were very remunerative. The Ocean Beach line also had a branch to the race course, which was often attended by crowds as large as 12,000 people.

Competition from "pleasure vans or brakes acting as omnibuses" (p.46) was serious in Dunedin. Bingham counted 20 vehicles with 16 seats and 45 with eight seats. These vehicles carried about one million passengers per year, about a quarter of the total carried by the tramways. The two lines of "funicular tramways serving the boroughs of Roslyn and Mornington . . . each carried about 750,000 passengers" (p.53). Omnibus competition affected the tramway receipts largely on account of faster and more frequent services. Horse bus fares were threepence for any distance. Bingham discounted the competitive significance of

cabs and suburban railways, which had high fares and infrequent trains. Dunedin had only seven landaus and eight hansom cabs in 1898 (p.53).

The response of the tramways company to competition in the early period had been to "diminish the number of daily departures in order to diminish the expenses" (p.50). By 1898 the management was retaliating with improved and more frequent services and adopting more systematic organisation in order to reduce expenses. The tramway also increased its traffic, although it also reduced its receipts, by dividing the lines into two or three sections and charging one penny per section. Season tickets for one, three or twelve months were also introduced. Bingham also provided a very interesting table (p.49) showing the annual number of passengers carried, car-miles run, receipts, and expenditure from 1882 to 1897.

Auckland

Nearly two-thirds of the report was devoted to Auckland, both as a survey of existing services and detailed proposals for electrification. It provided considerable detail on the tramway company's operations in 1897-98 and on the nine omnibus operators working in the urban area.

Auckland's tramway network consisted of two main arteries — a line westwards to Ponsonby and one eastwards to Newmarket and Epsom. Both began in Queen Street and diverged at Wellesley Street. A link on Karangahape Road was only used for special traffic to the Epsom terminus. The Auckland system, which also included two horse bus lines, carried the smallest number of passengers (Table 2). Traffic details for the various routes were given in tabular form for the years from 1894 to 1897 (p.16). Passengers carried and car-miles run were fairly evenly distributed between the east section to Epsom and Onehunga and the west section to Ponsonby.

Unlike the other cities where the tramways dominated urban public transport, Auckland's traffic movement was largely in the hands of nine bus proprietors owning a total of 68 vehicles. Paterson and Co. with 22 buses and Pullan Armistage and Co. with 14 vehicles were the largest concerns. The hilly terrain of central Auckland gave "... omnibuses a great advantage over existing tramways because they can employ lighter cars, and so ascend the slopes in quicker time than tramway cars, although the latter are drawn by four horses up the inclines" (p.15). Fourteen horse-bus routes were operated in addition to the two run by the tramways company. In 1897-98 the private horse buses carried 2,332,000 passengers whilst the tramways carried 1,585,410 passengers. Receipts on the city and suburban routes were very high, reaching 18 pence per car-mile on one suburban route. The highest tramway receipts per car-mile were on the Ponsonby route with 14.28 pence. Long-distance bus routes gave poor returns — Avondale 5.00 pence per car-mile, Panmure and Howick 5.60 pence, and Otahuhu 7.28 pence. The tramway company's Epsom-Onehunga bus line gave receipts of 7.59 pence per car-mile. Although not mentioned as a factor by Bingham, the existence of suburban railway services must have affected passenger loadings and receipts to many places. Another source of competition in Auckland was the enterprise of 11 carriage owners working 260 brakes, cabs, and buggies at a profit.

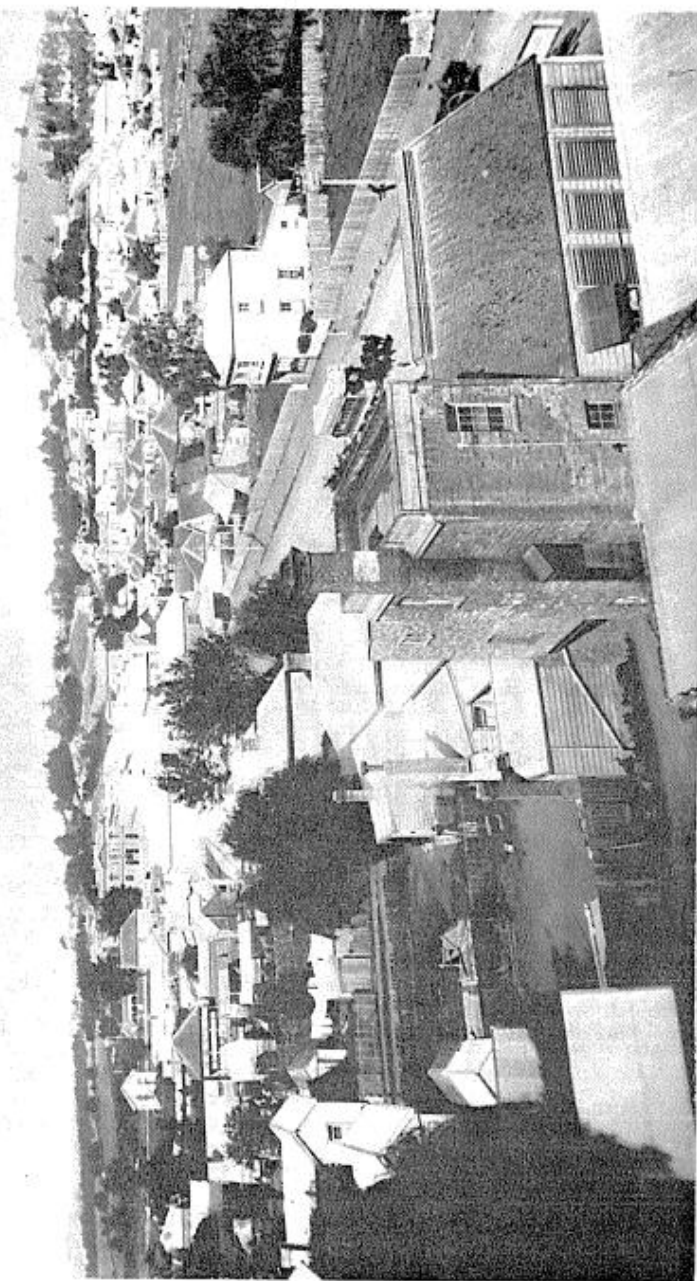
Bingham also examined the daily and monthly variations in traffic (pp. 21-22). The main times of heavy passenger traffic for employees and workmen were between 8 and 10 a.m. and between 4.30 and 6 p.m. "During these hours all the cars are filled and considerable overcrowding even takes place. The number of passengers carried each trip during these hours is four times as great as during the middle of the day." There was little evening traffic and Sunday tram operation was forbidden, although "the omnibus companies run a reduced service on Sundays and all the cars running are full up." "Traffic is greater during the latter part of spring and during summer than in other seasons, owing to the hot and damp climate of Auckland which makes walking a fatigue." On the Epsom line traffic was greatest between April and September on account of "the numerous football matches which take place at Potter's Paddock during the period."

The possibilities for obtaining the tramway concession and building electric lines must have seemed very strong at the time of Bingham's visit, for he undertook an inventory of the tramway company's land, buildings and plant (Table 3). In the comment on the assets of the company most attention was given to the details of the track, which would have to be replaced before electric trams could run, and to the land and buildings. As for the vehicles, "the tramway cars could be towed on the line where the gradients are not too steep. Part of the omnibuses will be used on the Onehunga line: the remainder could be easily sold in the neighbouring towns and villages. They are all in very good condition" (p.26).

The property at Potter's Paddock, comprising 33 acres set out for trotting races with a proper course, stands and stables, was used for sports and shows. In one corner of the property were the stables and tram depot. The Ponsonby property was almost entirely built over with the depot and workshops.

Proposals for Electrification

From the evidence of the report it would appear that Bingham had partially secured the tramway concession for Auckland from the City Council and therefore



Photograph courtesy Auckland Institute and Museum. Khyber Pass Road, Newmarket, in 1898 about the time of Bingham's visit. A horse tram of the Auckland Tramways Company is beginning the climb towards Symonds Street.

TABLE 3

Auckland Tramways Company Inventory and Approximate Value of the Land, Buildings and Plant as on 31st March 1898.

Land:		£	£
Potter's Paddock		7,000	
Ponsonby Stables		2,000	
			9,000
Buildings:			
Stables and various buildings including two houses at Potter's Paddock		850	
Stables, workshop, forge and one house at Ponsonby		2,150	
			3,000
Horses, Harness and Forage:			
322 horses at £8.8.0d		2,700	
Harness and collars		345	
Forage		255	
			3,300
Rolling Stock:			
16 tramway cars (closed) to carry 36 passengers, at £100		1,600	
11 tramway cars (closed) to carry 24 passengers, at £60		660	
6 tramway cars (open) to carry 36 passengers, at £60		360	
6 "Jubilee" omnibuses at £70		420	
1 "Diamond Jubilee" omnibus		100	
5 other omnibuses		300	
13 other vehicles (4 brakes, 4 gigs, 3 buggies, 1 wagonette, 1 trap)		428	
Sundries		32	
			3,900
Line and Plant:			
Rails, 1415 tons at £1		1,415	
Chairs, 1,620 tons at £2.10.0d		4,050	
			5,415
TOTAL			24,665
Less wear and tear			2,665
NET TOTAL			22,000

Source: Bingham MS, pp. 29-30.

his proposals for that area were very detailed. Christchurch was not considered in the report as being suitable for electrification.

Wellington

Although it was unlikely that the Wellington tramway concession would be made available to private developers, Bingham was obviously impressed with its potential and made a number of sugges-

tions. Wellington city and suburbs had an impressive record of population growth from 20,563 in 1881 to 41,758 in 1896 (p.54) and the configuration of the land "was favourable for working tramways, the town consisting of a long narrow band of ground surrounded by hills; these latter on which the population lives are easily reached by streets on a gentle incline" (p.6).

Bingham recommended the electrification of all the existing system and the construction of two new lines along Tinakori Road in the north and southwards along

Willis Street to Oliver Street (fig. 1). A total track length of 9.94 miles would be required with 28 electric cars to provide capacity. The system was planned to carry about six million passengers annually, bringing receipts of £36,000 and expenses of £18,400. Net profit would be £17,600.

Capital costs were estimated as follows: Lines, £30,400; overhead system, £14,560; generating engine of 600 h.p., £14,000; rolling stock, £16,800; and sundries, £14,240; amounting to a grand total of £90,000. The annual profit would be about 19.5 percent on the capital employed on construction (p.10).

Bingham's estimates of traffic potential and profitability were borne out by the first stage of the Corporation's own electrification scheme completed in 1904, although the municipality was more adventurous in its new construction.

Dunedin

"The Dunedin Tramways, although a good concern, do not appear to be as favourable as those of Auckland. In fact, not only is the purchase price higher but the value of the properties and plant [is] less" (p.4). Bingham also set out the other disadvantages of slow population growth (only 6 percent in 15 years), lower receipts per car-mile than in Auckland, and the need for a greater length of line. Against these disadvantages were the facts that "the Dunedin population is in better circumstances than that of Auckland and travels much more by the Tramway [estimated to reach 145 trips per head in 1898], the company is well managed and actually makes considerable profits, and the Company has obtained on principle an extension of its concessions from the Municipal Council [for 21 years from 1 September 1896], which extensions could be turned to profit" (p.4).

"Converting the system would entail laying down 21.9 miles of track. The cost of construction would amount to £140,000" (p.6). Bingham did not make any detailed recommendations about precise routes but judging from the actual municipal tramways system in 1905 the absence of details implies the electrification of existing routes.

The subsequent municipal takeover, in 1901, of the tramways has been recounted elsewhere.⁴

Auckland

"The fitting up of Electric Tramways in Auckland would be very profitable. As a matter of fact this town is very prosperous and its population is rapidly increasing" (p.1). Bingham was clearly interested in the potential of Auckland in terms of population growth and projected a population of 115,000 for Auckland City and Suburbs in 1904 (a figure not reached until 1911) when the tramway concession was due to expire. Existing services were obviously insufficient. "During the hours of crowded traffic, the cars are overlaid and at times carry more than double the number of passengers they are normally capable of carrying, and even then a number of people, after waiting for the cars, proceed on foot. Continual complaints are made in the papers" (p.2).

Bingham's proposals for electrification were modest. He recommended the conversion of all existing lines, together with new lines from the city centre to Ponsonby via College Hill (to replace the company bus service), a new line from Queen Street to Newmarket to capture the Parnell traffic, and two short lines along Mt. Eden Road and Mt. Roskill Road (later Dominion Road) to serve fast-growing districts. By such a scheme "the whole of the actual traffic would be drained and an increase of at least 50 percent in the number of passengers could be counted on from the first year" (p.2).

The proposed system would require a total track length of nearly 23 miles, and to allow 90 departures from each terminus each working day of 17-18 hours, 42 cars would be required. The number of cars, each to seat 40 passengers, would allow a reserve of 20 percent or seven cars (pp. 33-35). The system was planned to carry six million passengers in its first year of operation, bringing receipts of about £50,000.

The report contained very detailed estimates of the cost of electrifying the system, including items such as customs duties on imports, and shipping costs from North America. Capital costs were estimated as follows: Lines, £68,000; overhead system, £30,600; generating engines of 700 h.p. and works, £23,220; rolling stock, £26,160; and sundries, £22,020; a grand

WELLINGTON TRAMWAYS

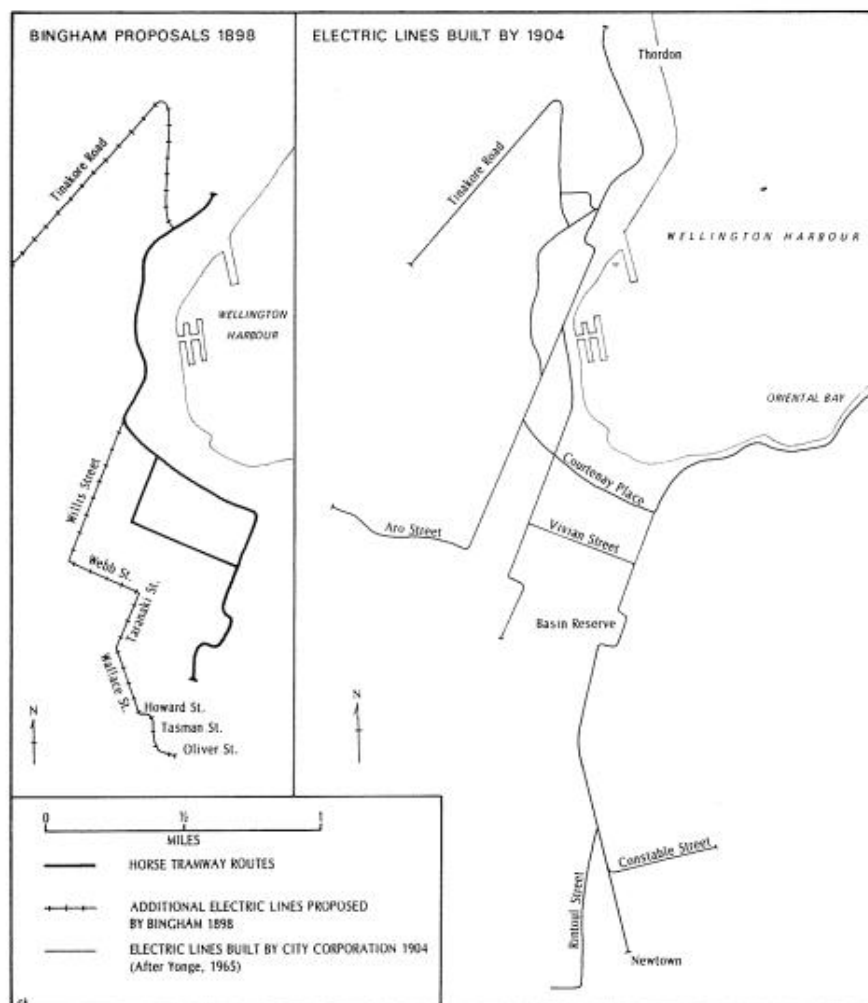


Fig. 1

A NOTE ON THE MAPS

Figures 1 and 2 are based on the street map series NZMS 17 published by the Department of Lands and Survey.

Actual lines constructed are derived from J. R. Yonge, *New Zealand Railway and Tramway Atlas*, Auckland, Quail Map Co., 1965.

The suburb "Thordon" should read "Thorndon" and "Tinakore Road" is the present "Tinakori Road".



From the "Zak Collection", Alexander Turnbull Library.

An early Wellington electric tram approaching the Cleveland Street terminus on the Brooklyn route opened in 1906.

total of £170,000 (pp. 42-43). This figure excluded the estimated purchase price of £22,000 for the existing assets (Table 3). Some expenditure was recommended to convert Potter's Paddock into a "recreation ground" which could return another £3,000 annually in revenue (p.43).

Bingham also made some interesting estimates of working expenses, setting out labour costs; "engine" (tram) drivers were to receive 7s per day and conductors 4s 3d (p.44). Total annual expenses, including costs of coal and water for the power house, were set at £30,500 or about 7.43 pence per car-mile (estimated 984,000 car-miles in the first year). Receipts from the tramways were calculated at £50,000 or about 12.19 pence per car-mile. A surplus of at least £22,100 would be made in the first year (p.2). In practice

Bingham expected even better results, for the estimates were based on "... the supposition that each inhabitant would travel 84 times per annum whereas in such an important town each inhabitant could be relied on travelling from 100 to 120 times per annum" (p.3). Increased usage of this magnitude would bring the annual total of passengers carried closer to eight million rather than six million.

Whilst undertaking the surveys, Bingham applied for and secured the concession from the city council to electrify the Auckland tramways (pp. 23-24).⁵ In the following year the concession was transferred to the British Electric Traction Co. Ltd. Bingham appears to have stayed in Auckland for some time afterwards organising the project of electrification. The first phase of electric tramways,

AUCKLAND TRAMWAYS

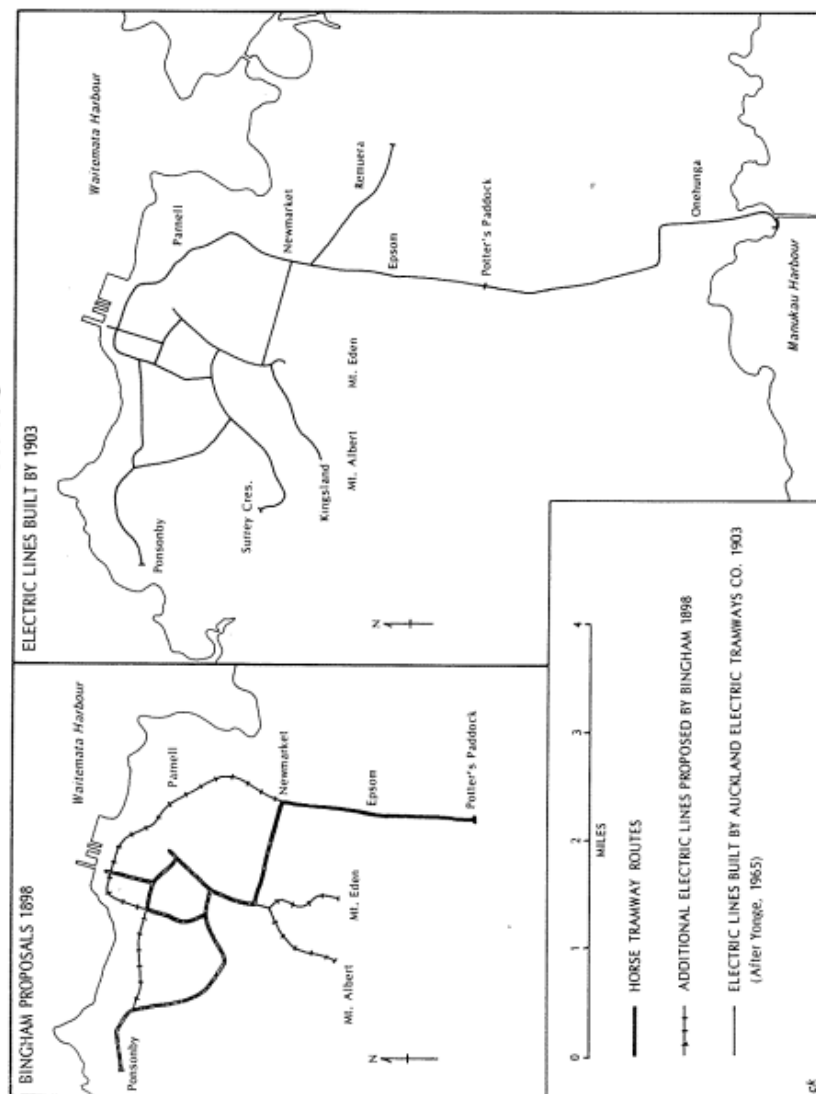


Fig. 2

opened in 1902-03, was considerably longer in extent than the proposals of Bingham five years earlier (fig. 2).

The Bingham Report is an example of a useful *genre* of business document: appraising the viability of a system, forecasting new traffic developments, and making estimates of the cost of new capital investment. Such documents are comparatively rare in archives and collections, but their value to research workers is considerable. The detailed statements and recommendations of such reports often provide a useful check to the "inevitability of development", an approach commonly found in many historical works. More understanding is required of the decision-making process of transport investment, and more knowledge must be sought on the perception, preferences, and biases of transport promoters and managers. Some of this will emerge from further search of records and more appraisal of their value when related to other sources of information.

NOTES

1. W. G. Bingham and Associates, *Report on New Zealand Tramways*, London c. 1898. Typescript, 57 pp. A copy of the report was deposited in the Alexander Turnbull Library Wellington (call number: q 625.6 P BIN) in 1958 by Mr C. T. Cooch, then Assistant General Manager of Wellington City Transport. It would appear from the typescript that the extant copy is not an original but was made from an original by Cooch. Maps and plans referred to in the text are not attached to the copy. Since Mr Cooch died in October 1966 it would be difficult to trace the detailed history of the report. One curious feature of the manuscript is the use of kilometres for many route measurements together with francs and centimes for some financial returns. The only allusion made to overseas tramways is to lines in Paris (p.7). These details suggest that French investors have been concerned with the New Zealand Electric Light and Traction Co. Ltd. All the comparative statistics have been calculated by the present author.
2. Knowledge of W. G. Bingham and the New Zealand Electric Light and Traction Co. Ltd. is very sketchy. Some details are given in G. W. A. Bush, *Decently and In Order. The Centennial History of the Auckland City Council*, Auckland, Collins Bros. & Co. Ltd., 1971, pp. 155-156, 182-183.
3. Statistical material for individual municipal systems is not available until the late 1920s in the *New Zealand Official Yearbook* and the *Local Authorities Handbook*. Generalised data on electric tramways were published in the Census reports for 1911 and 1916 and in the report on *Industrial Production Statistics* from 1921.
4. K. C. McDonald, Dunedin, *A Century of Civic Enterprise*, Dunedin, Dunedin City Corporation, 1965, pp. 225-228.
5. The complex and confusing negotiations about the Auckland tramway concessions are described in: E. W. Alison, *A New Zealander Looks Back*, Auckland, 1946, pp. 156-173, and G. W. A. Bush, *Decently and In Order*, 1971, pp. 155-156.

To mark a Centenary . . .

DUNEDIN AND PORT CHALMERS RAILWAY

By T. A. McGavin

Published to mark the centenary of the opening of New Zealand's first 5ft. 6in. gauge railway, this 24-page illustrated booklet outlines its origins and early years. It was the first in New Zealand to use Robert Fairlie's patent double-boiler locomotives.

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