

1924.

—
LEGISLATIVE ASSEMBLY.
NEW SOUTH WALES.

REPORT

OF THE

ROYAL COMMISSION OF INQUIRY

INTO THE

RAILWAY AND TRAMWAY SERVICES,

TOGETHER WITH

COPY OF COMMISSION, EVIDENCE, AND APPENDICES.

Ordered by the Legislative Assembly to be printed, 7 and 9 October, 1924.



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1924

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COPY OF COMMISSION.

GEORGE the Fifth, by the Grace of God, of the United Kingdom of Great Britain and Ireland, and of the British Dominions beyond the Seas, King, Defender of the Faith, Emperor of India.

To our Trusty and Well-beloved,

SIR SAM FAY, Kt., J.P.,

SIR VINCENT RAVEN, K.B.E., M.Inst.C.E., M.I.M.E., M.I.E.E.—

GREETING :

KNOW YE, that We, reposing great trust and confidence in your ability, zeal, industry, discretion, and integrity, do, by these presents, with the advice of our Executive Council, authorise and appoint you to inquire into the management, equipment, and general working, including the finance, administration, control, and economy of the Railway and Tramway Services in New South Wales, and more particularly :

- (1) The organisation and running of the passenger and goods traffic, the services rendered, the scales of fares and freights operating, and the financial returns.
- (2) Matters appertaining to the organisation and conduct of the Mechanical Section of the system in relation to the respective types of locomotives and rolling-stock adopted, cost, economy of life and use, equipment, renewal, and maintenance charges.
- (3) Matters relating to the construction, renewal, and maintenance of the permanent way, including station equipment and the systems of signalling and interlocking adopted.

AND WE DO, by these presents, give and grant to you, or either of you, full power and authority, with all proper or necessary assistance at all times, to call before you all such persons as you may judge necessary, by whom you may be better informed of the truth of the premises, and to require the production of all books, papers, writings, and other documents as you may deem expedient, and to visit and inspect the same at the offices and places where the same or any of them may be deposited, and to inquire of the premises by all lawful ways and means. AND Our further will and pleasure is that you do, within the space of six months after this, Our Commission, or sooner if the same can reasonably be done, certify to Us, in the office of Our Premier, what you shall find touching the premises. AND WE HEREBY command all Government officers, and all other persons whomsoever within Our said State, that they be assistant to you in the execution of these presents. AND WE DECLARE this, Our Commission, to be a Commission for all purposes of the Act No. 29 of 1923, intituled "The Royal Commissions Act, 1923."

IN TESTIMONY WHEREOF We have caused these Our Letters to be made Patent, and the Great Seal of Our State of New South Wales to be hereunto affixed.

WITNESS Our Trusty and Well-beloved SIR DUDLEY RAWSON STRATFORD DE CHAIR, Admiral in Our Royal Navy, Knight Commander of Our Most Honorable Order of the Bath, Member of Our Royal Victorian Order, Governor of Our State of New South Wales and its Dependencies in the Commonwealth of Australia, at Sydney, in Our said State, this ninth day of May, in the year of Our Lord one thousand nine hundred and twenty-four, and in the fifteenth year of Our Reign.

(Sgd.) D. R. S. DE CHAIR,
Governor.

By His Excellency's Command,
(Sgd.) GEORGE G. FULLER.

Entered on Record by me, in REGISTER OF PATENTS, No. 40, page 13, this twenty-sixth day of May, one thousand nine hundred and twenty-four.

FOR THE COLONIAL SECRETARY AND REGISTRAR OF RECORDS,

(Sgd.) E. B. HARKNESS,
Under-Secretary.
per H.D.

ROYAL COMMISSION ON RAILWAYS AND TRAMWAYS.

REPORT.

To His Excellency Sir DUDLEY RAWSON STRATFORD DE CHAIR, Admiral in the Royal Navy, Knight Commander of the Most Honorable Order of the Bath, Member of the Victorian Order, Governor of the State of New South Wales and its Dependencies, in the Commonwealth of Australia.

MAY IT PLEASE YOUR EXCELLENCY,—

1. We, your Commissioners, appointed to make a full inquiry into the finance, management, equipment, and general working, including the administration, control, and economy of the railway and tramway services in New South Wales, and more particularly—

- (a) The organisation and running of the passenger and goods traffic, the services rendered, the scales of fares and freights operating, finance and financial returns,
- (b) Matters appertaining to the organisation and conduct of the Mechanical Section of the system in relation to the respective types of locomotives and rolling-stock adopted, cost, economy of life and use, equipment, renewal and maintenance charges,
- (c) Matters relating to the construction, renewal, and maintenance of the permanent way, including station equipment and the systems of signalling adopted,

have the honour to submit the following report :—

I.—INTRODUCTORY.

Appointment of Royal Commission.

2. The appointment of a Royal Commission was announced by the Premier on the 22nd December, 1923, the members being Sir Sam Fay and Sir Vincent L. Raven, to whom your Commission was issued on the 9th May, 1924, authorising and appointing those Commissioners to inquire into the above-quoted subjects.

3. The appointment of this Royal Commission was the result of discussions in the Legislative Assembly upon railway administration generally, including the reappointment or otherwise of the present Railway Commissioners. As a temporary arrangement, and pending the report of your Commission, the services of the Railway Commissioners were extended until 31st December, 1924.

Conduct of the Inquiry.

4. Your Commissioners arrived in Sydney on 9th May, and immediately proceeded to issue a questionnaire of sixty items (subsequently amplified) through the Minister for Railways to the Railway Commissioners. Statements were also obtained from the same source as to the duties of the various chief officers, and the general organisation and administration of their branches. We have also called for, and perused, the Minutes of the Board Meetings of the Commissioners, the Committee Meetings, and the various Officers' Conferences, and have also analysed the complaints, numbering some hundreds, addressed to the Railway Commissioners by the public over a period of six months. In conjunction with our personal observations, these have probably given us as much information on the subject of the New South Wales Railways as the evidence placed before us.

5. Commencing on 13th May, we travelled over the whole of the main lines, and, with few exceptions, the branch lines, of the New South Wales State railway system. We devoted thirty-six days to the tours of inspection, travelling 9,580 miles in that period, and inspecting the plant and facilities. In the course of these tours, which

were

were undertaken primarily to enable us to become acquainted at first hand with the location, general layout and equipment of the track, stations, and buildings, we ascertained the traffic conditions of the lines, the facilities provided for the handling of various classes of traffic, the nature of the country served by the railway network, and the methods of local supervision and working. To this end an inspection was made of passenger and goods stations, refreshment-rooms, locomotive and electrical workshops, sheds, and manufacturing establishments, stores, yards, signalling equipments, and the permanent way, together with other essentials of railway service, while conversations with the local supervisory officials helped us to appreciate the nature of the railway problem in this State. These tours of inspection also enabled us to study the detailed organisation of the various districts on the spot.

6. With the exception of a tour to Broken Hill and an inspection of the lines in the Riverina area, we were accompanied—at our own request—by Mr. J. Fraser C.M.G., Chief Railway Commissioner, in order that we might have the advantage of ascertaining at first hand such information upon the layout of the lines and various phases of railway working as we required. The Chief Traffic Manager, the Chief Mechanical Engineer, and the Information Officer also accompanied us, while traffic and locomotive officers were present in their respective districts for the purpose of explaining the various features of the railway system in their areas.

7. The tours of inspection were completed on 11th July, and at intervals between journeys evidence was taken on oath from the Commissioners, the principal officers of the Railway Department, and also from Mr. F. A. Coghlan (Auditor-General), Mr. E. J. Sievers (Valuer-General), Mr. J. Spencer Watts, of Messrs. Smith and Johnson, Public Accountants, Sydney, who made a report to the Railway Commissioners in 1921 upon finance and financial methods, and Mr. J. Spence, Director of Finance at the Treasury.

8. Regular sittings were commenced in Sydney on 15th July, and one day's hearing took place at Newcastle on 20th August. Evidence was taken on twenty-eight days. In all, twenty-eight departmental officers and twenty-five representatives of public bodies and associations were heard in addition to the gentlemen named above. The list of witnesses is given in Appendix 3.

9. It became evident at an early stage of the inquiry that the system of financial control under which the railways and tramways are dependent upon the yearly budget of the State, coupled with the fact that no reserves exist to meet wasting assets, dominated the organisation, and through it the efficient and economical operation of the transport services. We have, therefore, placed Finance and Financial Control in the forefront of our report.

10. Summarised, the Terms of Reference fall into five main heads, as shown below, and we deal with them in that order:—

FINANCE AND FINANCIAL CONTROL.

ORGANISATION.

MANAGEMENT.

- (a) Permanent Way and Works,
- (b) Signalling,
- (c) Mechanical.
- (d) Electrical.
- (e) Stores.
- (f) Operation.
- (g) Rates and Fares.

TRAMWAYS.

MISCELLANEOUS QUESTIONS.

A final section contains a Summary of our principal Recommendations.

Railway Development in New South Wales.

11. The first attempt to introduce railway communication in New South Wales was in 1846, but it was not until 1848 that a company entitled The Sydney Tramroad and Railway Company was formed for the purpose of constructing a railway from Sydney to Parramatta and Liverpool, with possible future extensions to Goulburn and Bathurst. This company, however, made very slow progress with the work, which was ultimately taken over by the Government. Meanwhile, another company had been started in 1853 with the object of constructing a railway from Newcastle to Majtlan. This was no more successful than the Sydney company, and shared the same fate.

12. The Government, on taking possession of the property of the defunct companies, carried on the works with energy and on 26th September, 1855, opened the line from Sydney to Parramatta, while communication was established between Newcastle and East Maitland on 11th April, 1857. Thus, practically from the inception of railways, the Government has managed and operated the railway transport services and now, except for a few short private lines, the whole of the system in New South Wales is State-owned. In the first decade after the opening of the Parramatta railway, 129 miles were built, in the second decade, 294 miles, and in the third, 1,295 miles of construction took place. From 1885 to 1895, 799 miles were added. Railway development rapidly proceeded, and during the eleven years from 1914 to 1924, the route mileage actually increased by over 39 per cent.—from 3,967 route miles to 5,523 route miles.

13. The Statutory relations between the Government and the railways, as contained in various Government Railway Acts, provide for the appointment by the Government (*i.e.*, by the Governor with the advice of the Executive Council) of Commissioners as a corporate body under the name of "Railway Commissioners for New South Wales." For the purposes of the Acts the railways and tramways (including equipment and lands are "vested absolutely" in the Commissioners. They are authorised to work and manage the railways, but their powers are circumscribed in several important respects. Expenditure is limited to moneys appropriated by Parliament, and all receipts are to be paid into the Consolidated Revenue of the State day by day. Moneys for additional stores, plant, rolling-stock, stations or other accommodations considered necessary to meet traffic requirements have to be sought by application through the Minister for Railways. Approval of by-laws must be obtained and as rates and fares are imposed by by-law this entails a submission to the Government of any proposed increase or decrease in charges. Examiners of candidates for permanent employment in the Railway Service have been appointed by the Chief Commissioner. An Appeal Board to deal with appeals by the staff against punishments must have a Chairman appointed by the Government. All regulations as in the case of by-laws must receive Executive authority before becoming operative.

Important Facts and Figures.

14. Prior to the detailed consideration of particular questions, it will probably be of advantage briefly to outline the salient points of the railway system and the financial results of the New South Wales Government Railways Undertaking over the past few years. Comparisons over the period of eleven years are included in this review, but it must be observed that such comparisons should be regarded with caution, owing to the disturbing effect of the war period vitiating the accuracy of conclusions drawn wholly upon the figures here presented. The unification of accounts on the railways of Australia in 1921 also led to certain changes in the methods of calculating figures, and this is a further complicating factor. We give the figures, which are extracted from the annual reports, in order to show to some extent the nature of the problem with which we were confronted on our arrival.

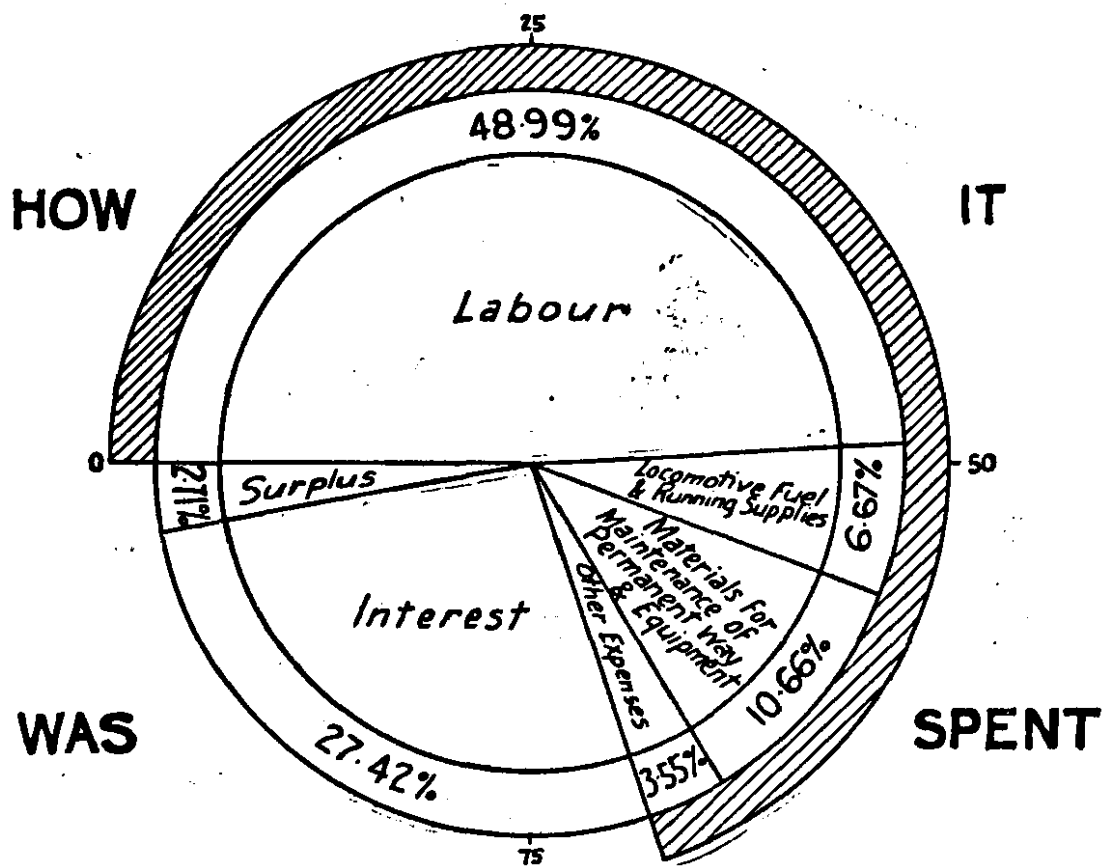
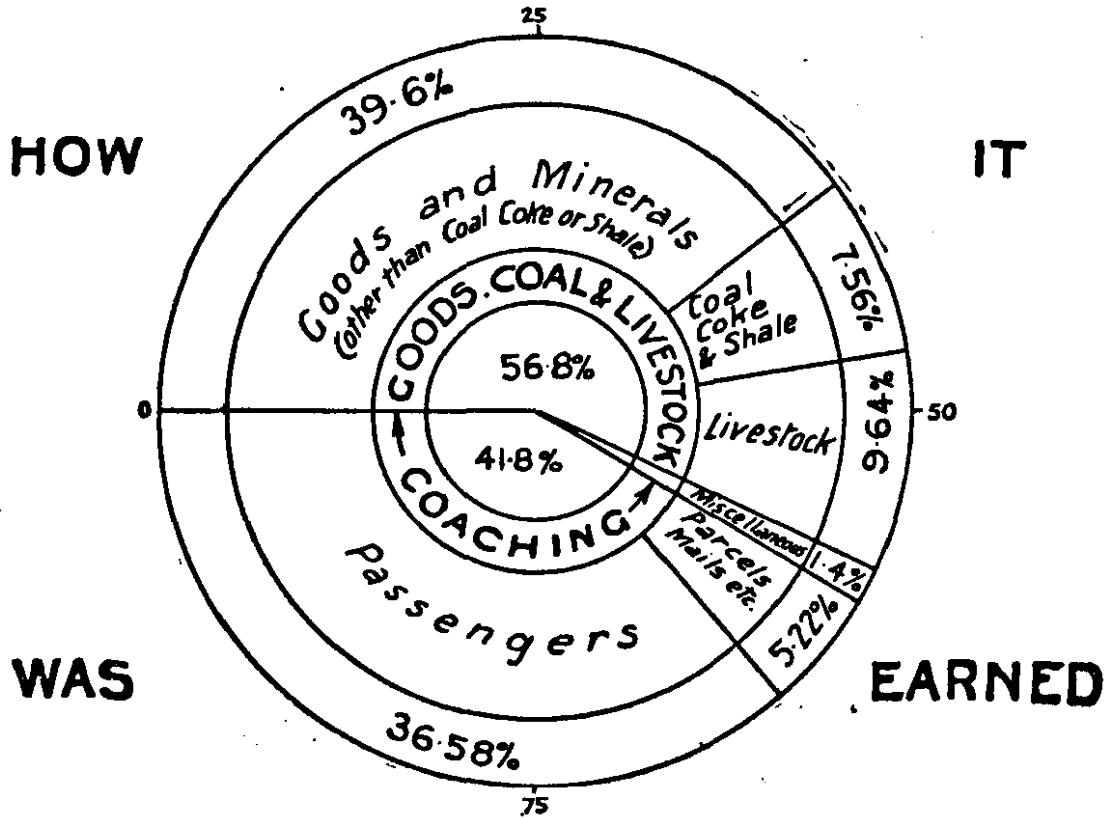
15. At 30th June, 1924, the New South Wales Government Railways open for traffic represented a capital of £93,355,167, this being divided as follows:—

RAILWAY CAPITAL EXPENDITURE AT 30TH JUNE, 1924.

1. Acquisition of land, property, &c., used in connection with railway working (approximate)	£	4,243,659
2. Construction of lines and works open for traffic		67,945,357
3. Rolling-stock—	£	
(a) Locomotives	7,332,764	
(b) Coaching stock	3,594,290	
(c) Freight stock	5,317,145	
		<hr/> 16,244,199
4. Manufacturing and repairing works and plant—		
(a) Land and buildings	1,340,660	
(b) Machinery and plant	1,685,731	
		<hr/> 3,026,391
5. Miscellaneous expenditure		332,561
6. Vote for purchase of stores and materials		1,563,000
		<hr/>
Total		93,355,167

N. S. W.

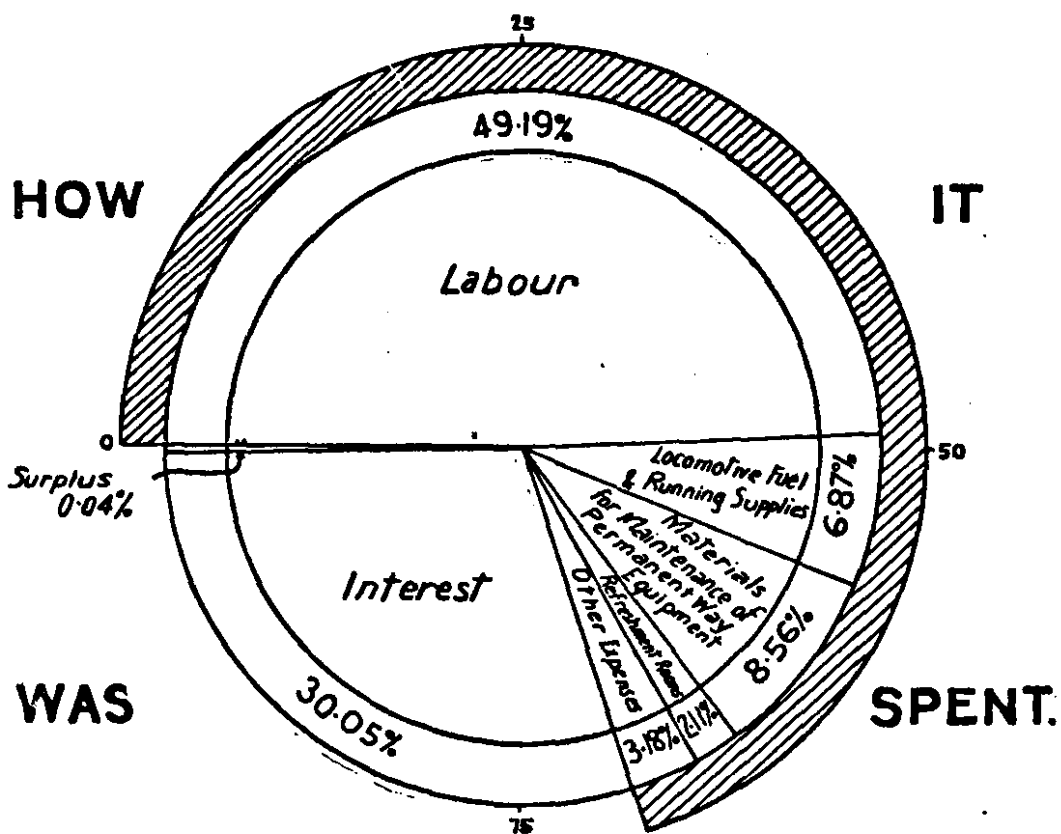
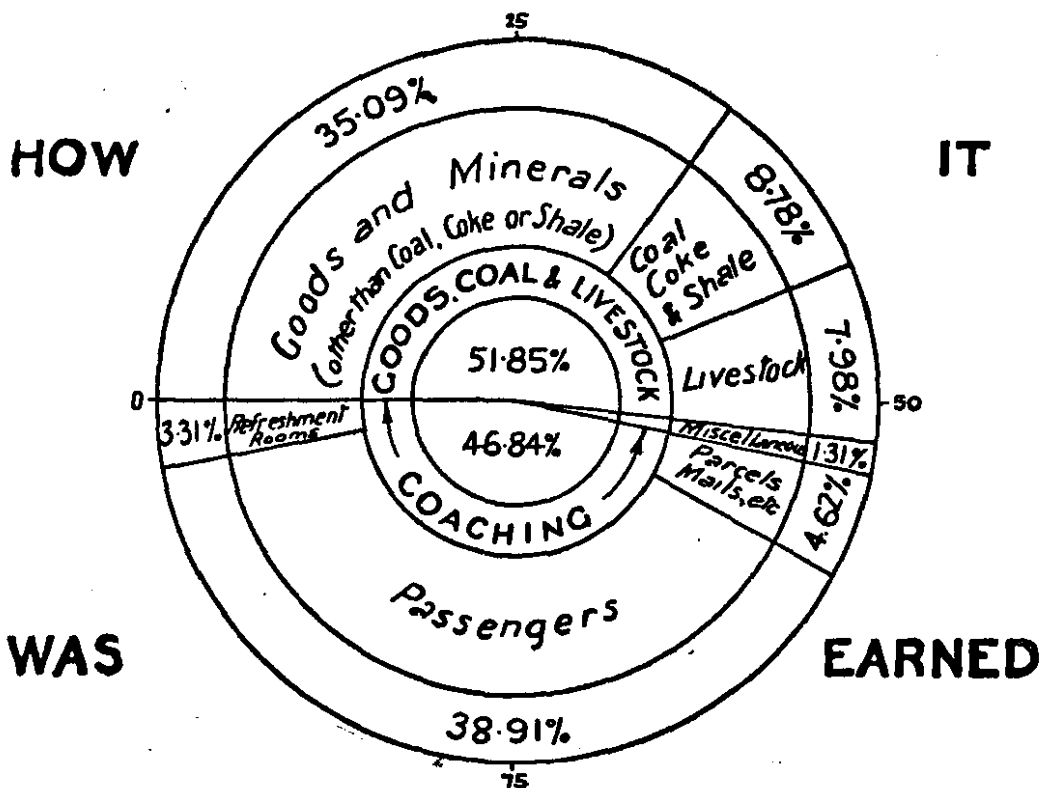
RAILWAY REVENUE, 1913-14.



69.87% Operating Expenses
 Surplus = £209,367.

N. S. W.

RAILWAY REVENUE 1923-24.



69.91% Operating Expenses
Surplus £5,669.

16. The New South Wales railways extend from Albury, Tocumwal, and Bombala in the south to Wallangarra and Murwillumbah in the north, a distance of 900 miles. The most distant western terminals are Hay, Trida, Bourke and Brewarrina, these ranging between 470 and 522 miles from Sydney. There are two isolated sections, one at Broken Hill and the other along the North Coast, the latter being cut off from the rest of the system by the Clarence River at Grafton.

17. The system comprises 5,523 route miles of lines, of which 4,875 are single track, and represented 6,261 track miles on 30th June, 1924, this comparing with 3,967½ route miles and 4,403½ track miles at 30th June, 1914, increases of 39 per cent. and 42 per cent. respectively. During the year ending 30th June, 1924, the Railway Department carried 117,356,316 passengers on the suburban services and 10,744,868 on the country services, these figures comparing with 77,431,809 and 8,896,612 respectively in the year 1913-14. The corresponding figures for freight traffic (goods, coal, coke and live stock) were 15,693,127 for the year ending 30th June, 1924, and 13,245,842 tons for the year ending 30th June, 1914.

18. The total revenue for the year 1923-24 was £15,616,577, and the working expenditure £10,917,491, thus leaving £4,699,086 net revenue to cover the amount required to meet interest obligations. Ten years ago, the corresponding figures were £7,742,241 earnings, £5,409,820 working expenses, and balance after paying working expenses, £2,332,421. The percentage of working expenses to receipts for the two years in question was 69·91 and 69·87 respectively.

19. The brief summary in the preceding paragraphs clearly indicates that considerable development has taken place in the last decade, and while in the course of the ten years, largely owing to the incidence of the war, there have been variations in development, it is to be noted that since 1913-14 capital expenditure has increased 52 per cent., revenue 102 per cent., working expenses 102 per cent., and interest payments 121 per cent.

Twelve Months ended 30th June.	Total Railway Capital Expenditure.	Gross Earnings.	Working Expenses.	Net Earnings.			Per cent. of interest on State Loans attributable to Railways.
				Amount.	Per cent. of Profit to capital invested.	Surplus or deficit in interest on State Loans.	
	£	£	£	£	£	£	£
1914	61,264,869	7,742,241	5,409,820	2,332,421	3·87	+ 209,367	3·6685
1915	65,583,274	7,616,511	5,311,162	2,305,349	3·60	— 23,331	3·6694
1916	68,825,592	8,006,078	5,661,168	2,344,910	3·45	— 223,749	3·7774
1917	72,006,621	8,380,085	5,915,360	2,464,725	3·50	— 394,064	4·0933
1918	75,050,450	8,954,880	5,940,447	3,014,433	4·10	— 28,916	4·1738
1919	76,601,591	9,958,173	6,904,450	3,053,723	4·03	— 211,817	4·35
1920	79,318,917	13,033,847	9,570,984	3,512,863	4·48	— 129,125	4·6863
1921	82,304,194	14,267,205	11,032,677	3,234,528	4·01	— 577,032	4·7608
1922	85,552,871	15,213,019	11,116,302	4,096,717	4·88	— 121,164	5·0635
1923	89,276,871	15,221,333	10,649,974	4,571,359	5·22	+ 84,056	5·1606
1924	93,355,167	15,616,577	10,917,491	4,699,086	5·13	+ 5,669	5·1606

II.—FINANCE AND FINANCIAL CONTROL.

Commissioners' and Treasury Capital Figures.

20. In reviewing the financial position of New South Wales railways, a difference presents itself as between Railway and Government figures by reason of the fact that the capital assumed by the Railway Commissioners refers to lines open for traffic only, whereas Treasury accounts include moneys spent on lines under construction, interest upon which is not charged against railway administration until completion and the opening of lines for traffic. At 30th June, 1924, the capital commitment in railways and works open for traffic was £93,355,167. At the same time the State indebtedness upon those lines and works, plus lines under construction, totalled £98,851,357. There is roughly £104,000,000 sterling (including tramways) represented in the loan account of the State out of a total of £210,493,974 resting upon the Consolidated Revenue Fund.

21. In sixteen years, viz., since 1908, the railway capital account has been doubled, and since July, 1913, there has been an addition of £35,701,389, or 62 per cent., whilst mileage of line increased by 41 per cent. during the same period. The railway capital, revenue, expenditure, and interest figures from July, 1913, to 30th June, 1924, are given in the preceding table, while the diagrams on pages x and xi show how the revenue was earned and how it was spent in 1913-14 and 1923-24.

Interest Charged to Railway Account.

22. Over these years the deficiency in net revenue necessary to meet interest charges upon that portion of the Consolidated Loan Account of the State attributable to railways totalled £1,410,106, and it will be observed that only in the years 1914, 1923, and 1924 was there a surplus over and above the interest charges.

23. In this connection it is well to note here that the Railway Commissioners are not altogether satisfied that the interest charged by the Treasury to their account has been strictly correct. Mr. Hartigan, the Chief Accountant, in answer to the query (Q. 1): "Does the interest on capital represent the actual rate at which moneys for railway purposes was raised?" said "No. The interest is calculated on the capital invested at the average rate of interest paid on the whole of the State loan. The Railway Commissioners are advised of this rate by the Treasury, but have no means of checking the correctness thereof." He said further (Q. 37) "I have never been able to ascertain how the average rate is computed. The Treasury advises us of the average rate, but I personally doubt whether that rate is correct. It is questionable whether we are not being overcharged by too high a rate." It is very desirable that this point should be cleared up.

24. The figures tabulated in the preceding table bear the impress of the war directly and indirectly. Increase in the purchase price of coal and materials was £1,095,000, municipal and water rates account for £58,000, while wages—increased to meet the enhanced cost of living and reduced hours of work—represent over £3,105,000 of the difference between the 1914 and 1924 expenditure. How serious is the burden upon the railways of the rising rate of interest on the State debt is shown by the figure of 3·6685 per cent. in 1913-14 and 5·1606 per cent. in 1923-24. The actual cash difference under this head between the two years is £1,357,000. We deal elsewhere with the war effect upon the rolling-stock, and also the disturbance of the suburban electrification programme. We might, however, add that the adverse effect of the war upon railways generally would appear from these figures to have been less in Australia than in many other countries of the world.

Capital Expenditure Charged to Working Expenses.

25. The working expenses shown in the facing table include certain items, properly chargeable to capital, estimated at £80,000 per annum. In theory, the necessary renewals are included in the working expenses, but no provision has been made for meeting wasted and wasting assets year by year, and there is no reserve of any sort for renewals.

Provision of Funds.

26. The manner in which railway funds are provided follows British Budgeting methods. Some time before the end of the financial year, the chief officers

officers prepare estimates of expenditure on capital and revenue accounts for the coming financial year. The Chief Commissioner criticizes these estimates, together with the estimates of prospective revenue, and submits them to the Minister for Railways, who sends them on to the State Treasurer for later submission to Parliament. Mr. Fraser's evidence (Q. 158) upon this aspect of the question was to the effect that the departmental estimates of expenditure required, both on loan and revenue accounts, have generally been greater than the amounts which the Government has been able to provide, and expenditure in both connections has, therefore, been restricted to the lowest possible minimum.

27. In answer to a written request for further information, Mr. Fraser furnished a paper stating that "The Loan Estimates, upon submission to the Treasurer, were always returned to the Commissioners with an intimation that a certain sum only would be made available for their requirements. A stated amount must be allocated for new lines construction. As a consequence, the original loan programme had, of necessity, to be revised, and many urgent and necessary works deferred, while others in progress had to be stopped until funds were made available." Mr. Fraser further said that "he had to have regard to what it was possible or practicable to spend in relation to the revenue likely to be received, and the interest which must be met during the year." On this subject, the following extracts from letters to the Minister for Railways dated 16th August, 1919, 27th April, 1920, and 26th April, 1922, are illuminating.

16th August, 1919.

In reply to your communication of the 11th instant intimating the views of the Minister for Works and Railways, with regard to the Loan Estimates submitted by the Commissioners for the current financial year, I am directed to say that, as desired, the various items for which provision was made in the Loan Expenditure have been further considered by the Commissioners, who regret that they are unable while considering the urgent requirements of the community to reduce the amounts set down for the various works proposed.

Firstly it should be taken into consideration that the amount of work which can be produced for a given sum will be lower during the current financial year than during any previous period in which records have been kept owing to the higher wages now being generally paid, and to the high value at which the cost of materials is still maintained.

You question the possibility of the money asked for being expended, and in this connection I might point out that in some years before the war greater expenditure relatively was incurred than that proposed for the present year while the business to be catered for was less. In the year 1913 the total amount expended for rolling-stock and additions to lines, duplications, &c., was £2,772,030, but the work then carried out for that sum could not be carried out during the current year for a less sum than about £4,500,000. Similarly in the year 1914 works costing £3,485,279 were carried out under the headings above-mentioned. To carry out a similar amount of work to-day would cost about £5,500,000. It would appear, therefore, that as the Department was able prior to the war to, without material difficulty, expend the large sums of money mentioned, there should be no difficulty with better appliances in completing works to the amounts provided on the Estimates for the current year.

Incorporated in the amount for rolling-stock are vehicles most urgently required in the handling of the passenger business of the City, and urgently required to permit of the carriage of all the products of the State which may be offered for transport, and I am desired to stress the importance to the community of the provision of adequate rolling-stock to permit of workers in the State to produce from day to day and transport from day to day the maximum tonnage practicable, as only in this way will the financial position of the State be greatly bettered.

The Commissioners believe that the proper equipment of existing railways to enable the daily business to be satisfactorily carried on is a matter of greater urgency than any other work or works which could be submitted, for the reasons stated, i.e., that the financial position of the State depends upon maximum production, and maximum production cannot be achieved if the transport services are in any respect inadequate. To make this service adequate in all respects, rolling-stock which has been referred to in special communications must be provided, and the facilities for dealing with that rolling-stock at certain stations throughout the system where serious congestion at present exists are practically equally urgent.

There is, in addition, necessity for the housing of large numbers of the staff to prevent the serious grievance which frequently arises from the discomforts endured owing to lack of suitable accommodation. The provision of such residences will probably tend to produce greater contentment, and contentment is an essential condition to the satisfactory working of any business.

With regard to the duplication of the lines, I am directed to intimate that the completion of the works on the Illawarra Line as between Tempe and Rockdale, between Otford and Coalcliff, and between Thirroul and Wollongong, are essential to permit of the reasonably satisfactory working both of the suburban passenger business, and the heavy mineral business which is derived from that line. The work between Bowenfels and Wallerawang is also of an urgent character owing to the difficulties in operation which occur when the business is at all heavy, and a very considerable amount of the business being now a mineral business this will remain heavy despite weather conditions.

On the main Southern Line there is a weak link between Murrumburrah and Demondrille Creek, to which is due frequent irregularities and difficulties in working the heavy through business which occurs during good seasons, and also in bad seasons when live stock is being moved from place to place.

With

With regard to the amounts required for Tramways, the largest item of expenditure is the sum required to complete the erection and equipment of the new power-house at Newcastle, which work is in progress, and which should be completed at the earliest possible date.

The additional amounts suggested by the Minister have been added to the Loan Estimates, although the Commissioners are not aware of any urgent works demanding the expenditure suggested.

The Commissioners note that it is not the Government's wish that active commencement be made with works in connection with the City Railway during the current financial year, and desire me to say that the transport facilities in this City are now in such an unsatisfactory position that the decision of the Cabinet to defer for a further twelve months the commencement of the only work which can give the required relief is a decision of very grave moment to the city and suburban population, and a decision which the Commissioners think should have the most earnest reconsideration by the Cabinet before confirmation, and it is hoped is only a tentative resolution in this connection.

The suggestion of the Minister with regard to the expenditure on the Molong to Dubbo connection can perhaps be met if labour offers to a sufficient extent to enable the whole of the railway construction work being properly proceeded with, and the Commissioners are submitting a revised proposal in connection with railway and tramway construction in conformity with the Minister's desire. To accelerate the work on the Sydenham-Botany line, owing to the fact that it must be nine to twelve months before a quite considerable number of bridges on this line can be completed (owing to material having to be imported from England), the ultimate cost of the work will if now taken in hand for the speediest possible completion, be considerably increased beyond the estimate for the work previously furnished, owing to the fact that a very great deal of the earthwork on this line is filling to embankments of considerable magnitude, and that filling must be conveyed over various streets crossed on temporary bridges which will entail quite a considerable expenditure. From the point of view of economical construction the preferable course would be to complete the bridges and use them for the transport of the material required for main line construction. However, as the work is urgent, the desired acceleration could be given.

27th April, 1920.

I mentioned to you a few days ago that this Department has had to conduct its services under very serious difficulties for some years past, owing to the fact that funds have not been made available to provide necessary equipment and accommodation, and you were good enough to ask that I should set out the position so that consideration might be given by Cabinet to matters which are deemed important. Difficulties in working would naturally be due to lack of—

1. Rolling-stock,
2. Shop or shed accommodation,
3. Track,

and I will deal as briefly as possible with these matters under these headings.

Rolling-stock.

Complaints are made daily, particularly by the residents of the suburbs of this city with regard to the overcrowding of suburban trains and trams, but the remedy for such complaints must be a more drastic one than the mere provision of additional passenger cars steam operated, though pending the construction of city and suburban electric railways, additional cars hauled as at present must be put into service. The position with regard to rolling-stock generally in comparison with the business done is disclosed in the appended table:—

Year.	Passengers Carried.	Ton Miles (Goods).	Engines (No.).	Carriages (No.).	Wagons (No.).
1898 ...	23,233,206	273,400,624	498	736	9,442
1908 ...	47,487,030	617,642,314	676	937	12,110
1919 ...	98,568,768	1,237,805,869	1,280	1,705	20,798

It will be seen that though the business was about four and a half times as great in 1919 than in 1898, engines, carriages and wagons were only slightly more than doubled in number, and similarly while the business in 1919 was double that done in 1908, engines, carriages and wagons increased relatively 88 per cent, 90 per cent., and 71 per cent.

It is true that the outbreak of war made it impossible to get material for the construction of rolling-stock, and there are still serious difficulties in obtaining such materials, while prices are approximately 200 per cent. above pre-war rates. Yet it is clear that the Government must view favourably the necessity for providing funds for this work, or embarrass seriously the transport of the travelling public, and of the material produced in and required by the people of the State as a whole.

Shop and Shed Accommodation.

Some years ago the attention of the then Government was drawn to the need for additional workshop accommodation to provide adequately for the maintenance of the additional rolling-stock then in use, and the position has since become more acute. The present repairs shops at Eveleigh were erected about thirty-four years ago for the maintenance of 426 engines and 600 carriages, and without material additions are called upon to-day to maintain 1,300 engines and 1,795 carriages, and as already shown by the table which shows the increase in business each engine and each carriage has double the work to do than was done per unit when these shops were erected. Similarly in connection with country running sheds and carriage sheds, while the number of engines and carriages has more than doubled in the past twenty years, shed accommodation has been added to, to cover only a very small percentage of that increase.

Track Accommodation.

During the period between 1910 and 1916 running track was materially added to and additional working track provided at a few depot stations, but at a great number of important depots where the business has enormously increased there has been no addition either to track or other facilities for conducting that business.

In the foregoing I have briefly mentioned some of the greater matters for which money will be required, and have included information with regard to the business done in relation to the rolling-stock and equipment which should demonstrate that the allocation of funds to provide more adequately for the work is a matter of urgency. I have not specifically mentioned loco. water supplies, many of which are entirely inadequate for present business, nor have I included in the above reference to the present need for additional tramway rolling-stock, or the electrification of tramways now steam operated. External pressure may be brought upon you with regard to the latter, and the need for additional tramcars in the city is obvious.

My chief desire for the moment is to show that money is urgently required to satisfactorily equip existing railways; the construction of new lines, and the partial isolation of rolling-stock upon such lines must accentuate present working problems, and as it is I understand the policy of the present Government to rapidly complete railway extensions now in hand, it will, I trust, be your policy also to provide that equipment for existing railways without which the business cannot be much longer carried on.

26th April, 1922.

I attach, for your information, copy of a letter which I addressed to your predecessor on the 27th April, 1920, indicating to him certain difficulties under which the work of this Department was then being conducted owing to the lack of rolling-stock, to lack of suitable shops and equipment for the maintenance of rolling-stock, to lack of accommodation at certain of our larger depôts for the proper conduct of our business, and, although this point was not elaborated upon, to the serious lack of suitable water supplies for locomotive purposes throughout the State. I have to request that you might read the letter in question, and would like to submit certain further figures which demonstrate that this Department has been called upon for years past to conduct the railway and tramway services with totally inadequate facilities. It is true that we have carried on the transport services and have effected savings which may be termed colossal by demanding and getting increased efficiency in every branch of the Department, but the time is approaching, and is indeed very near, when with our present rolling-stock and present accommodation at various places for dealing with the purely departmental end of the business, we will not be able to carry on.

Rolling-stock—Railways.

Dealing first with rolling-stock, the table hereunder shows the number of engines, carriages and wagons owned by the Department in 1914 and in 1921, in comparison with the actual work done in those years :—

	1914.	1921.	Increase per cent.
Railways—			
Goods ton miles—paying	1,037,910,619	1,418,385,987	37
Goods rolling-stock—			
Goods open	14,784	16,003	9
Goods covered	980	945	(dec.) 4
Meat trucks	344	428	24
Live stock	2,504	2,889	15
Brake vans	491	605	23
Total	19,103	20,930	9
Passengers carried—			
Suburban	77,431,809	110,255,795	42
Country	8,896,612	10,479,345	18
Total	86,328,421	120,735,140	40
Passenger rolling-stock—			
Special and sleeping cars	92	96	4
First-class	391	467	19
Composites	190	218	15
Second-class	805	961	19
Brake-vans	163	138	(dec.) 15
Horse boxes, &c.	281	289	3
Total	1,922	2,169	13
Engines	1,065	1,301	22

The work increased, as you will see, by about 38½ per cent., but the wagon stock was increased by only 9 per cent., passenger rolling-stock by only 13 per cent., and engines by only 22 per cent. That there must be considerable additions to the rolling-stock is obvious from these figures.

Tramway Rolling-stock and Work.

In 1914 approximately 261 million passengers were carried, and in 1921 the passengers carried totalled 278 million, an increase of 17 million. The tramway rolling-stock owned by the Department in 1914 was 1,469 cars, while the total number of cars in 1921 had decreased to 1,424. These figures show that the Department had to carry 17 million more passengers in 1921, with actually 45 less cars, these latter having gone out of service owing to their being unfit in every respect for the services which have to be given to-day.

Railway Track.

In connection with the track and railway construction generally, I pointed out to your predecessor that the mileage had increased from 1914 to 1921 by about 30 per cent., but the business had not increased in a relative degree. The following figures with regard to construction generally seem to me to be worthy of further close consideration by yourself and your colleagues:—

	1914.	1921.	Increase.	Percentage Increase.
Route miles of line	3,967	5,018	1,051	26
Population	1,863,000	2,100,000	232,000	12
Capital cost	£81,264,869	£82,304,194	£21,039,325	34
Tonnage of Goods	13,245,842	15,563,131	2,317,289	17

The fact that from 1914 to 1921 there was very little increase in goods business carried on the railways in comparison with the increase in mileage and railway capital, is to some extent explained by the fact that the mileage of line opened for traffic increased at a much more rapid ratio than the increase in population.

I give these latter figures for two purposes, viz., to show (1) that the population of the State is relatively much better served to-day by the provision of railways than has been the case at any time previously, and (2) that money has not been made available to a sufficient extent to enable equipment and appliances to keep pace either with the increase in mileage or the increase in work.

Water Supplies.

With regard to water supplies, the position in this State, from a railway point of view, is most unsatisfactory. The quality of the water in all districts where the business is heavy is extremely bad for locomotive purposes, and the cost of boiler renewals owing to the corrosive and destructive effect of the only waters available is very great, and involves very heavy expenditure annually in repairs and renewals of boilers, which with better quality water could be very greatly reduced.

I mention these various points as briefly as possible so that you may possibly appreciate some of the difficulties under which we are working, and you may be able at a later stage to obtain sufficient funds to enable the position in respect of the various matters mentioned to be greatly improved.

28. From the letters reprinted above, and the general trend of the evidence we have received, it is evident that considerable pressure is brought to bear upon the Chief Commissioner to reduce estimates year by year in order to enable the Treasurer to produce a balanced State Budget, the inevitable result of State financial stringency. Railway expenditure and revenue looms largely in the Budget, the capital expenditure, as previously noted, accounting for nearly one-half of the total State indebtedness of, roughly, £210,000,000 sterling. From 1914–1924 inclusive the interest charges have increased by £2,570,363 per annum, and it thus becomes a vital consideration in the balancing of the State Budget as a whole. At Q. 369 Mr. Fraser produced a letter bearing upon the 1923–24 estimates, in which it is stated that the estimated revenue expenditure of all Departments of the State exceeded the revenue by fully £1,500,000, and that it would be necessary to reduce them by that amount.

Waste due to Budgeting methods.

29. Another aspect of this question is the late passing of the Budget by the Legislative Assembly. Although the financial year begins on 1st July, authority for working on the estimated basis is not given, as a rule, until October or November, the result being that in many instances moneys voted cannot be spent between the time of approval and the following June. Until the Budget is passed, Departments are debarred under the Audit Act from spending more month by month than they did on the average during the previous year. Thus, as Mr. Fraser properly said (Q. 375): "Taken in conjunction with communications of the kind I have just read, it has a deterrent effect in connection with the mapping out of a programme of expenditure during a given year. No one in an administrative position can lay out a programme of expenditure for a whole year unless he knows that the money will be made available to spend, because if you are mapping out a programme for twelve months, you really want to begin to spend on the first day of that twelve months and continue your expenditure fairly consistently throughout the whole period. That is a thing which the Railway Department has never been able to do, either from loan or on the working expenditure side."

30. Mr. Hutchinson, Chief Engineer for Railway and Tramway Construction, replied in the negative to a question (Q. 1829) as to whether he gave a date for the completion of a new line. Asked why he did not (Q. 1830) he said: "Because you never know what money you are going to get or how long it will take you to complete." The following questions and answers are also recorded.

Q. 1834.—What expenditure in your particular branch is there authorised within the next four or five years?—That is never known. I do not know to-day what amount of money I am going to get for this financial year which we have just commenced. It is impossible for anyone under the method of voting money to-day to lay down a fixed plan and arrange an organisation extending over, say, a period of two, three, or four years. It is quite impossible, because Governments change. Incoming Governments have different views about lines from other Governments, and the amount of money they vote depends just upon the will of Parliament.

Q. 1844. When it is decided that a new line shall be made in the country, is not a vote taken for your estimate of cost?—No; an Act is passed, but it does not follow at all that the line will be proceeded with at once—they might not even construct the line that is authorised by Act of Parliament. There are lines which have been authorised by Act of Parliament years ago which are not built to-day. Nor do they, when they put an Act of Parliament through, at that time raise the money for building the line. The process which is followed is—after the Act is passed the Minister will say to the Railway Commissioners, "We are going to place a certain sum of money this year on the Estimates, and we wish you to have that line started." That is the way the line is started, and only the particular amount of money is voted for that year.

Q. 1845. Apparently there is a committal by the Government more or less for an expenditure over the next few years of two or three million pounds at least?—To-day there are six lines for which there are Acts of Parliament. Presumably those lines will be built, but no instructions have yet been given to the Commissioners to build any of them. They run into a good deal of money.

Q. 1846. Upon which a good deal of money has been spent in survey?—Yes.

Q. 1847. Then what does it mean to you under the existing organisation; does it mean that when you have a railway half constructed you are suddenly told there is no more money available?—We have lines that we are finishing now that were closed down owing to the fact that there was no money to construct them. That, I think, was largely due to the conditions prevailing in war time. That would be rather abnormal, of course. But what does happen is, say I had a railway 50 miles to build at a cost of £300,000 or £400,000, I might be ordered to commence the construction of that, and on the vote £50,000 might be put down for the first year. That means that you cannot carry out your work in the most expeditious way or the most economical way, and that is one of the difficulties I always contend of carrying out the work by day labour, which is our principle to-day. If the line is let to a contractor the Government has to provide the whole of the money, otherwise the contractor would bring enormous claims if he was blocked, and quite rightly so.

Q. 1848. We have looked through some of the minutes which you have made from time to time at your monthly conferences, and of course we could not help being struck by some of the remarks which you have made. According to these minutes you have said from time to time that you could not economically carry out the work?—That is quite correct.

Q. 1849. And that you could have finished the lines very much earlier?—Yes.

Q. 1850. And have earned money by the railway, which was not possible because you were stopped for the want of money?—Yes.

Q. 1851. Does it mean that when you are stopped in that way you get rid of your staff?—No. If you have a line going on and you are so to speak dribbling through the work your organisation practically has to be the same, because you have to take the time and you have to look after the men, and you have to do everything. You might perhaps have a clerk or two less, but that is all. You have to have the engineers there, and you have to have your organisation. You will not have the number of labourers; of course you only keep the number of labourers on that you can afford to keep on—that you pay for doing the work.

Q. 1852. As far as your administrative staff is concerned, you have to keep them going; your overheads are the same?—Practically the same. You would not have quite such a large staff, but you would have pretty well near it.

Q. 1852A. With regard to your actual operating staff, those men would be got rid of—I mean your navvies?—Yes. I have two lines going on to-day. I got £50,000 last year for one of them and £83,000 for the other. I asked for a great deal more than that. During the last year I have limited the expenditure each month so as to keep within that at the close of the financial year just ended. That was not an economical way of doing it at all. If the Commissioners had been able to get it from the Government and had said to me "You go ahead as fast as you can; we will supply the funds," the lines would have been nearly finished, and economy would have been created in every way.

Q. 1853. So that it amounts to this, that the whole of your plant for the construction of your railway is lying dead, because you cannot construct continuously?—A good deal of it. As regards those two lines I mentioned, of course, I did not send the plant on to the job, because I knew the conditions when I was starting.

Q. 1853A. In your view would not it be more economical to wait until there was a certainty of getting the money and going straight ahead with the work?—My view is that it would pay the Government if they are short of money to say "We shall only begin the number of lines that we can finish, and that our money is capable of letting them go ahead at the fastest rate at which they can be done."

31. In the year 1923-24 it is to be noticed that, in accordance with Ministerial request of February last, the amount spent on electrification of suburban lines and other works was £661,000 less than the sum sanctioned under the Budget.

£2. Dr. Bradfield, Chief Engineer for Metropolitan Railway Construction, gave the following evidence:—

Q. 1883. Have you made any progress plan of the construction of the City Railway?—Showing the work from month to month?

Q. 1884. Showing when you are going to finish?—That depends upon when the money is made available.

Q. 1885. Did you make the estimate for the railway?—Yes, originally

Q.1886.

Q. 1886. When you made the estimate did not you anticipate a date?—We anticipated being able to finish the work in five years.

Q. 1887. That is to say, your estimate was based on the time it would take you to finish the construction on an economical basis?—Yes.

Q. 1888. I presume that your estimate was more or less an economical one based on time?—Yes.

Q. 1889. I gather from you that you do not anticipate finishing to time?—No. We have not the money available to start on the western side of the City. The money so far available is to go on to St. James's and open up to there.

Q. 1890. Have you up till now been held up for money?—To this extent: We asked for a certain amount of money. This year I asked for about £900,000. I am going to London on Wednesday. I do not know how much has been made available, and probably the office will not know for another two months, and probably the amount asked for will be cut down to about half; and, of course, you cannot prepare any scheme of work until you know what money is available.

Q. 1891. You started your financial year at the beginning of this month, and you will not know until the end of October or November how much money you can spend in the financial year?—That is from the 1st July to 30th June.

Q. 1892. How can you construct economically under such a system as that?—Of course, candidly we cannot. We do the best we can. We do not overload the staff in any shape or form; but I cannot expand the staff if we get more money available than we think will be made available until it is made available.

Q. 1893. It is quite possible that your date of five years may be seven?—It may be ten or twelve by the way it is going, with an estimated cost of $4\frac{1}{2}$ million, and an expenditure of £360,000 a year.

33. It is abundantly clear that the loss to the State by reliance upon a yearly budget for construction of railways is very serious, how serious that loss is we have not been able to determine with any degree of accuracy. Loss is not limited to actual cost of lines, because delay in completion—due mainly to interrupted construction, in many cases repeated over and over again—involves a postponement of revenue from these new railways and there is, as a consequence, a burden upon the funds of frozen capital which, under business-like management, would have been avoided by rapid and continuous construction. Moreover, waste does not end with completion of the works, because waste of capital is reflected in the Loan Account, upon which interest has to be found by the Railway Commissioners year by year, and we thus have the spectacle of the Consolidated Loan Account being augmented each year by large sums representing not revenue-producing expenditure, but moneys thrown away because budgeting methods will not fit the requirement of a large commercial undertaking.

34. The evidence shows that, even with a Budget passed at the commencement of each financial year, loss would arise, but when the responsible engineers have to wait four months for knowledge of the amount allotted to each line, it becomes even more embarrassing and wasteful. In effect, it means only eight months of the year within which the engineers are safe in spending such moneys as the Budget gives them.

35. The Sydney Chamber of Commerce sent us the following expression of opinion:—

“(a) They consider the management of the New South Wales railways, as at present constituted, does not give the Commissioners the effective control of the railways which they should have. It is considered desirable that the State debt, incurred on behalf of the railways and the development of same, should be allocated as the capital of the railways, and separate stock—guaranteed by the State—issued for same. All future moneys raised for railway purposes should be by railway bonds guaranteed by the State.

“(b) That the Railway Commissioners publish a balance-sheet in the ordinary way as any trading concern, in fact, that the whole accounts of the railways be prepared and conducted on similar lines to those used by railway companies in other parts of the world.

“(c) That the Railway Commissioners, when the conditions described in (a) and (b) have been brought about, should provide primarily for a return on capital so as to cover the interest chargeable on the bonds which have been issued on behalf of the railways, and at the same time provide money for replacement and depreciation, and, to a certain extent, future extensions and improvements.”

36. The Mayor of Newcastle, and General Paton, representing the Newcastle Chamber of Commerce, advocated the control of finance by the Commissioners.

Loss upon Developmental Lines.

37. The loss upon the working of developmental country lines has been the subject of a good deal of evidence, the equity of relieving the Railway Commissioners from any loss upon these lines, including interest on capital outlay, being stressed by representatives of various associations. It was urged that the country as a whole benefited by these railways and that, therefore, the loss should be borne nationally and not put upon that portion of the community who pay rates and fares. Sir Mark Sheldon (President of the Sydney Chamber of Commerce) said that the

Government

Government should not have the right to order the Commissioners to build a developmental line unless they were prepared to guarantee the Commissioners against loss. Mr. Thorby (President of the Farmers and Settlers' Association) contended that Consolidated Revenue should stand the loss on such lines, and that some of the increased income accruing to the Lands and Forestry Departments should be credited to the Railway. Mr. Kidd (Vice-Chairman, Producers' Association Central Council) (Q. 3003) instanced the Wyalong and Lake Cargellico line where the Lands Department reaped a gain of £13,000 per annum by the presence of the railway, and the Railway Commissioners showed a loss of £3,000 upon the working of the branch line. He further pointed out that increased production meant increase in taxation paid through Income Tax Commissioners. He advocated an arrangement similar to that in Victoria, where railways are relieved of some portion of loss upon non-paying lines. He would not say that the making of any of the New South Wales lines was unnecessary, but the cost during a certain developmental period was, in his opinion, "out of place in the railway profit and loss account." Mr. Binnie (President of the Stockowners' Association) stated (Q. 3113) that:—

"The Dubbo to Werris Creek line has been urgently needed for the last thirty years by the stockowners as a stock-saving line in drought time. That line took ten years to build—about 156 miles of it easy country. The live stock lost during the last twenty years that this line would have saved would have paid for this line several times over. I have seen the wastage on this line which I think might amount to 50 per cent. of the cost; and our fares and freights must be calculated on it. The earthwork done has frittered away or been blown away; the effort has been desultory and scattered and without any co-ordination. I believe that material for the Werris Creek end of this line was taken away to another line, and I have heard that this has been done on every line in the course of construction; and material has been sent to jobs without relation to the different quantities balancing one another, e.g., rails with shortage of sleepers or of fish-plates or of bolts. The patchwork system of construction is a heavy strain on the taxpayer—the capital outlay for years being without use of earning power. I should like to quote briefly from *Hansard* of November last, at page 2113—it is on the Dorrigo railway, referring to the repair of damages on unfinished lines: 'On the Dorrigo railway it has amounted to £150,000. What expenditure was incurred in connection with the repair of damages I do not know, but it can safely be said that the wastage on this line amounts to anything up to £300,000, the greater part of which is directly chargeable to damages, most of which would have been avoided had the line been pushed through as other lines have been. The cost of repairing damages, wiping off depreciation, and meeting interest, is nearly as much to-day as the estimated cost of the line.'"

38. The Commissioners' report for 1923-24 gives £1,207,824 as the loss, including interest, upon certain lines, but no credit is given in arriving at that figure for earnings upon main lines from interchanged traffic. Of these lines, 2,026 miles have been opened for traffic during the past ten years, and upon them the capital is given as £16,645,539, and the loss in 1924 £592,324. It is obvious that these figures do not represent the value to the State of the penetration of the interior by new lines, inasmuch as the augmented value of Crown lands and forests, and the increased taxable income, not only adjacent to such new lines, but generally throughout the State, is absent from the Commissioners' accounts. We are of opinion that some share of these revenues should inure to railways opened within a period of ten years. We have given consideration to the possibility of levying a rate upon lands benefited by new railways. On the face of it such a tax can be justified, but, as pointed out by the Valuer-General (Q. 3958) the difficulties of collection upon an equitable basis have rendered previous attempts in this direction impracticable. We have, therefore, fallen back upon a direct contribution from Consolidated Revenue. The simplest method of arriving at what the sum should be is by taking the actual loss and reducing it by a percentage representing the value of interchanged traffic with other portions of the railway system. We put this at 33½ per cent., which, on the figures before us, would leave the amount to be borne by Consolidated Revenue in 1923-24 at £394,892. In Victoria, we understand, the percentage paid the Railway Commissioners under a similar system of relief is 60 per cent.

39. The effect these non-paying lines have upon the financial results of railway working in New South Wales is clearly brought out in the following statement. If credit had been allowed the Department for full loss on non-paying lines, there would have been a surplus each year since 1914 inclusive, instead of a deficit in all but 1914, 1923, and 1924. The financial results over the period would have been an accrued surplus of £6,866,410 instead of an accrued deficit of £1,410,106. Even on the Victorian basis, a deficit—quite an insignificant one—would have resulted only in 1917 and 1921, and the net results would then have been an accrued surplus of £3,555,604 instead of an accrued deficit of £1,401,106.

RESULTS of working for the years ended 30th June, 1914 to 1924, allowing (a) full credit for losses on non-paying lines, and (b) credit for 60 per cent. of losses on non-paying lines.

Year ended 30th June.	Actual Result.		Result if credit had been allowed Railway Department for full loss on non-paying lines.		Result if credit has been allowed Railway Department for 60 per cent. of loss on non-paying lines.	
	Surplus.	Deficit.	Surplus.	Deficit.	Surplus.	Deficit.
	£	£	£	£	£	£
1914 ...	209,367	.....	664,205	.....	482,270	.....
1915 ...	.....	23,331	506,029	.....	294,285	.....
1916 ...	.....	223,749	270,553	.....	72,832	.....
1917 ...	.....	394,064	251,873	.....	.....	6,502
1918 ...	.....	28,916	633,319	.....	368,425	.....
1919 ...	.....	211,817	460,640	.....	191,657	.....
1920 ...	.....	129,125	596,819	.....	306,441	.....
1921 ...	.....	577,032	298,757	.....	.....	51,558
1922 ...	.....	121,164	884,298	.....	482,113	.....
1923 ...	84,056	.....	1,190,937	.....	748,185	.....
1924 ...	5,669	.....	1,108,980	.....	667,656	.....
Totals ...	299,092	1,709,198	6,866,410	.....	3,613,864	58,060

Absence of Reserves.

40. The absence of any reserve for the renewal of line and rolling-stock, already referred to, has been provided for in part by charging such renewals as have been carried out to working expenses. Particulars of these we deal with under the heads of rolling-stock and engineering expenditure. That there should be a renewal fund to provide for obsolescence as well as wasting assets and so keep the charges on a level basis, year by year, is undoubted. The accounts, as they stand, do not disclose the actual position, inasmuch as wasted assets are not represented by cash to meet original capital values. This was pointed out to the Railway Commissioners by Mr. Webster Watts in 1921, and that gentleman, in his evidence (Q. 135), stated:—

It is very necessary to equalise the charge for renewals, and it seems to me the only way to do it is to form a reserve fund. What I was, and am still, afraid of is that if there were stringent times, the Government might use the fund so created. If it were definitely under the control of the Commissioners, there would be no such possibility.

He said further (Q. 145):—

In my opinion, the problem of reserve for renewals can only be satisfactorily dealt with if such fund is absolutely under the control of the Commissioners.

Q. 146. That means that the whole of the finance would be under the control of the Commissioners? A. I should think so, or they would arrange their loans, and it might be said that they would save interest, though I do not know that.

Q. 147. If they had an adequate reserve there would be no more difficulty in their raising money than there is in the case of independent railway companies? A. That is so.

Q. 148. We should be glad to hear from you how you think it should be done? A. Provided the reserve should be under the control of the Commissioners, I think the wasting assets should be divided into groups, and an estimate made of the utility lives of the assets comprising such groups. Having obtained this table it would be a matter of calculation to find out the amount which would be properly allocable against profits. This amount would approximate a certain percentage of the total assets, and this percentage would be taken as a basis for the following year.

Q. 149. By the percentage of total assets, you mean the capital cost? A. Yes. It would be necessary to revise this percentage from year to year, as the totals comprising the respective groups would naturally vary. Apart from this there is the question of obsolescence and supersession, and I think in addition to the depreciation reserve, adequate provision should be made for the replacement and renewal of assets which may become obsolete or may be superseded before the expiry of the expected utility lives of such assets. As what should be considered an adequate reserve in this regard will be difficult to determine.

Mr. Coghlan, the Auditor-General (Q. 116A) agreed that, from his experience of the accounts generally, a reserve would be a decided advantage. Mr. Fraser also concurred.

41. In the seven years prior to the war a total surplus, after paying interest charges, of upwards of 3 millions sterling was paid into Consolidated Revenue. Had this amount been placed to reserve for renewal of rolling-stock and line which was deteriorating day by day, a very different state of affairs would have appeared at the present date.

42. Assuming that reserves upon the lines indicated elsewhere had been in operation in 1923 and 1924 the net revenue figures for those years, after giving credit for such renewals as were carried out, and capital items charged to revenue, would have been, respectively, £3,619,675 in 1923 and £3,841,749 in 1924 instead of £1,571,359 in 1923 and £4,699,086 in 1924.

43. To make up for past deficiency in reserve is more than the railway account can bear, and it should be noted that our recommendation under this head, whilst preventing a further slipping back, will not provide for the past which must be made good out of revenue as and when renewal arises.

Financial Situation of the Future.

44. In order to form an idea of the probable financial situation in the near future we have obtained estimates of the requirements, in terms of money, of lines and works under construction, as well as those to which the Government is committed, and also the capital expenditure necessary to carry out works such as suburban electrification, which is a corollary to the City Railway, and also rolling-stock and new workshops at Chullora, &c. The total figures given us, including past expenditure on existing lines, are as follow :—

(1) Expenditure on existing lines and works to 30th June, 1924	£93,355,167
(2) Expenditure to 30th June, 1924, on lines not yet completed	5,496,190
(3) Further estimated expenditure on the City Railway	5,800,000
(4) Estimated expenditure on new lines already sanctioned and those not yet approved	6,200,000
(5) Estimated expenditure on additions to existing lines, new rolling-stock, electrification of suburban railways, new workshops at Chullora, &c.	23,000,000
	£133,851,357

45. The present financial position of the railways, as disclosed by the figures, coupled with the evidence upon which we have commented in reference to absence of reserves, and waste upon constructional works, together with the effect of budgeting methods upon the management generally, is not satisfactory. It is less satisfactory from a prospective point of view. The trail of ineffective and hampering finance is in evidence throughout the railway administration. That a drastic change of method is imperative needs no elaboration.

46. New South Wales is not singular in respect of its present methods of financing State railways. We have already said it follows the principles of British Parliamentary budgeting. It is beyond doubt that when the principle of yearly State Budgets was established it was intended to apply to national establishments of army and navy, education, sanitation, and such like. It was certainly not devised to meet the needs of a commercial undertaking. It might with difficulty be made to suffice in the case of a comparatively small concern, but it, by no means, covers the financial requirements of a large railway system. Experience in India and other parts of the British Empire where there are Government-owned railways has proved that, whilst the control by means of a yearly Budget may be necessary and desirable in relation to ordinary departments of State, it does not and cannot permit of a great commercial institution being financed economically, nor enable it to render that service to the community of which it would otherwise be capable. Finance from year to year as part of a consolidated State Budget has been found altogether inadequate to meet the demands of a transport organization which needs, above all things, elasticity in dealing with money problems as and when they arise. The rigid Budget of a State has failed when applied to an organization whose functions include not only the transport of people and things from place to place, but is a building and manufacturing business of large proportions, as well as a buying and selling agency on no mean scale. Everybody in the State, either as a traveller or as a dependent upon essential supplies, is interested in its effective services. Any failure inflicts loss or discomfort upon the whole body politic.

47. Where the people own the railways, there must obviously be public control up to a point, and there will always be Parliamentary criticism of an essential

essential public service, whether State or privately owned, but there appears to be no adequate reason why ordinary business principles should be lacking in either case, more especially under State ownership, where the absence of such principles is, in a measure, responsible for the criticism which arises in the Legislative Assembly. If it is to be held that constitutional necessity blocks the way and cannot be overcome, then it fully justifies the belief of many people in Australia and elsewhere, that a Government cannot successfully manage an industrial undertaking. The form and ceremony of a yearly State Budget have no virtue if they stand in the way of efficient and economical working and management of transport, and the consideration, therefore, of some other form of control becomes necessary.

48. The railway system of New South Wales is a great and valuable asset, whether measured as a revenue-producing machine, or as the principal agency in the rapid development of the country. Despite certain deficiencies, to which we call attention, it reflects credit upon those who have been responsible for its management. It is capable, under good administration, of producing large net revenues and of providing cheap, speedy, and adequate transport throughout the State. On the other hand, in the absence of the immediately necessary and far-seeing system of finance, it may easily become ineffective as a developmental agency, as well as a serious burden upon the State.

Control of finances by the Commissioners.

49. We are unable to suggest a satisfactory solution of the disabilities suffered by the Railway Commissioners, apart from taking finance out of Treasury hands and the giving to the Commissioners control of their own funds. This means the elimination of, roughly £110,000,000 (including Tramways) from Consolidated Revenue Account, and the setting up of a separate Finance Department under the Commissioners, who will be responsible for the renewal of loans as they become due and the raising of any future capital required for extensions and equipment of line, rolling-stock or works.

50. Adopting the figures at June, 1924, as supplied to us (para. 44), the Commissioners, under such a scheme, would find themselves with, roughly, £100,000,000 on railway account represented by terminable loans guaranteed by the State, the renewal of which would lie with them. This amount includes expenditure upon lines partly constructed. They would also, under their forecast of future requirements, need, within the next seven years, to seek further capital of not less than £35,000,000. This is a large sum. The major portion of it cannot, and ought not to be postponed, because it follows upon expenditure already incurred in respect of the City Railway, the electrification of suburban lines, construction of Chullora workshops and other smaller commitments. We deal with Tramway expenditure elsewhere. Estimates of the various works making up the total further expenditure are as under:—

RAILWAYS.

Existing Lines:—

Rolling-stock :				
Engines	...	...	£3,000,000	
Carriages	...	...	£2,400,000	
Wagons	...	...	£800,000	
			<hr/>	£6,200,000
Additions to existing lines, including such works as provision of new workshops, locomotive depôts, increased accommodation at terminals and other stations throughout the system, &c.	...	...	...	£3,800,000
Electrification of Railway lines (existing suburban) and including additions to Power-houses	...	...	...	£10,000,000
Duplication of Main Lines, including completion of works on the Northern and Western Main lines and additional tracks on the Main Suburban, Illawarra, and Milson's Point lines...	...	...	...	£3,000,000
			<hr/>	£23,000,000
				Railway

Railway Construction :—

City Railway (now in progress)	£5,800,000	
New country lines already sanctioned and others not yet approved	£6,200,000	
	<hr/>	£12,000,000
		<hr/>
		£35,000,000
		<hr/>

51. Included in this estimate, it will be noted, is £6,200,000 for lines already sanctioned and others not yet approved, and also £3,800,000 for additions to stations, accommodation, &c., a portion of which may possibly be postponed for some time, but even after making some allowance for this we think that the cost of works which may reasonably be expected to be provided during the coming seven years, together with new rolling-stock, can be put down as not less than £35,000,000, or at the average rate of £5,000,000 per annum. In our view this is the limit that should be aimed at. It is possible that, with the electrification of the lines, many proposed items of expenditure will, in consequence of increased facilities, be found to be unnecessary, or, if desirable, not absolutely essential. Turning to the revenue side of the account—taking 1923-24 figures as a basis—the position, after adjustment by debiting reserves for renewals, and crediting a percentage of the loss upon unremunerative lines opened during the past ten years, as well as capital expenditure charged to revenue, shows the 1923-24 net revenue to have been £4,236,631.

52. At the end of seven years interest charges upon the above sum of £35,000,000 at 6 per cent. would be £2,100,000, but it is reasonable to expect that, although the rate at which money can be obtained here is now about 6 per cent., such a high rate will not continue throughout the period, and it should be put at a lower total figure. Even if it does so remain, past records show an increase of net revenue in seven years, from 1918 to 1924, of £2,234,361; but for reduced rates and fares in the latter year to the extent of £481,000, it would have been £2,715,361, whilst reduction of working expenses—unless any disturbing influence supervenes—should, upon the carrying into effect of our report under each head, more than make up for any difference due to the provision of reserves.

53. It would be idle for us, with the very limited knowledge we have of the State's productive and commercial probabilities, to venture upon a forecast of future revenue based upon observations of our own, but past records, even with war troubles intervening, show remarkable progress, and, given a like prosperity in the next decade, the expenditure proposed by the Railway Commissioners should prove remunerative. It may be that the City Railway and electrification of suburban lines will not overtake interest charges for two or three years from the date of opening for traffic, but that the greatly improved facilities, which are so urgently needed, will eventually repay, we have little doubt. The desideratum, above all things, is to complete them so that their full use may synchronise with the opening of the Harbour bridge.

54. There is no sign of a backward tendency in the prosperity of New South Wales. On the contrary, revenue estimates of the Chief Commissioner for the current year are for an increase over last year of £1,000,000 in gross receipts upon the railways as a minimum. New South Wales is straining at the leash for increased and improved transport. It can be relieved by statesmanlike provision to meet present needs and the probabilities of the future.

Raising of Capital.

55. It would be unwise to recommend any hard and fast rule by which further capital should be raised by the Railway Commissioners. That must depend upon money market conditions from time to time, but the obvious possibility must be considered of competition between Treasury requirements for the general purposes of the State and appeals by the Railway Commissioners to the money market for funds. It would be desirable that future capital for railways should differ from ordinary State loans and new sources should be explored by the Commissioners independent of the Treasury. It might take one of several forms to be decided upon as the necessity for issue arises. We consider that probably a loan with a sinking fund covering, say, thirty years, either by repayment at the end
of

of that time or by drawings every five years, would, at the present time, appeal to a considerable class of investors, especially as the moneys would be applied to expenditure upon reproductive works. In such a case, it might be a railway issue as a first charge on net revenue without Government guarantee. The Government would be guarantors of all loans behind it.

Yearly Balance-sheet recommended.

56. In making these recommendations, we couple therewith a continuance of the present liability of the State to meet interest during construction upon new lines. We do not suggest that the promulgation of rates, fares and charges by by-law sanctioned by the Government should be altered. We consider that if at any time the Government arbitrarily fixes rates or charges that are not reasonably justifiable, then upon a certificate of the Auditor-General any loss be recouped the Commissioners by the Treasury.

57. We advocate the submission of quarterly and yearly reports to the Legislative Assembly in accordance with past practice, together with a yearly balance-sheet showing capital, revenue, and net revenue, followed by departmental accounts in the usual company form, and a forecast of the capital commitments for the following year. This should bear the signatures of the Chief Commissioner and the Chief Accountant, and be certified by the Auditor-General.

58. We recommend that the railways be so worked and managed that the gross receipts shall not be more than sufficient to cover working expenses, reserves, and the interest on capital—including sinking funds—that in the event of a surplus it be devoted to reduction of rates and fares. If on the other hand a loss appears, that rates and fares be increased to cover the deficit.

Question of Transfer to Private Management.

59. Two representatives of important interests mentioned the question of transferring the railways to private management. We have no evidence that public policy which decreed that railways in New South Wales should be State-owned and managed is likely to change, but if at any time such should be the case a scheme somewhat similar to that shown hereunder could probably be carried out:—

SCHEME IN BROAD OUTLINE.

1. The net earnings of the railways to be capitalised at twenty-five years' purchase.
2. The amount thus arrived at to be treated as Government capital in the undertaking.
3. A company to be formed to work the line, this company to raise additional capital on the security of the line without any guarantee from the Government.
4. The net earnings of the line after the formation of the company to be divided between the Government and the company in proportion to the capital of each.

As an illustration it may be assumed that, before the formation of the company, the net earnings are £5,000,000 per annum. The assumed Government capital would be:—

£5,000,000 x 25	=	£125,000,000
Capital raised by company, say...	...	£20,000,000
		<u>£145,000,000</u>

After additional capital invested by the company, the net earnings to be divided in the proportions of:—

$\frac{125}{145}$ to the Government,
 and
 $\frac{20}{145}$ to the company.

60. With net earnings of £7,250,000, the rate of interest on the assumed Government capital and on the company's capital being always the same, the division of earnings would be as follows :—

Government share.	Company's share.
£6,250,000	£1,000,000
(5% on £125,000,000).	(5% on £20,000,000).

Such a scheme would enable the Government gradually to relieve itself of the responsibility of either providing or guaranteeing capital.

61. It must be understood that we are not recommending this, because, in addition to other reasons, we are of the opinion that, provided our recommendations are carried into effect, the value of the railway property in a few years will be such as amply to repay the State for bearing the burden during the lean years, when the system was being built up.

III.—ORGANISATION.

62. From their inception the railways of New South Wales have been controlled and managed under what is generally known as the departmental scheme of organisation, centred in Sydney. That it proved efficient while the railways were within easy reach and traffic was comparatively light is evidenced by past records. To-day, however, the line extends from Queensland to the Victorian border, a distance of 900 miles. Upon the completion of the Broken Hill connection, moreover, there will be nearly 700 miles of line between Broken Hill and Sydney, while from the latter place to other terminals in the north, south, and west are distances of 400 to upwards of 500 miles. Altogether the system comprises over 5,500 route miles of railway and serves an area having many variations of climate, with pronounced differences in regard to local conditions, products, possibilities, and transport requirements. A chart showing the present scheme of organisation is given on the following page.

Monthly Conferences.

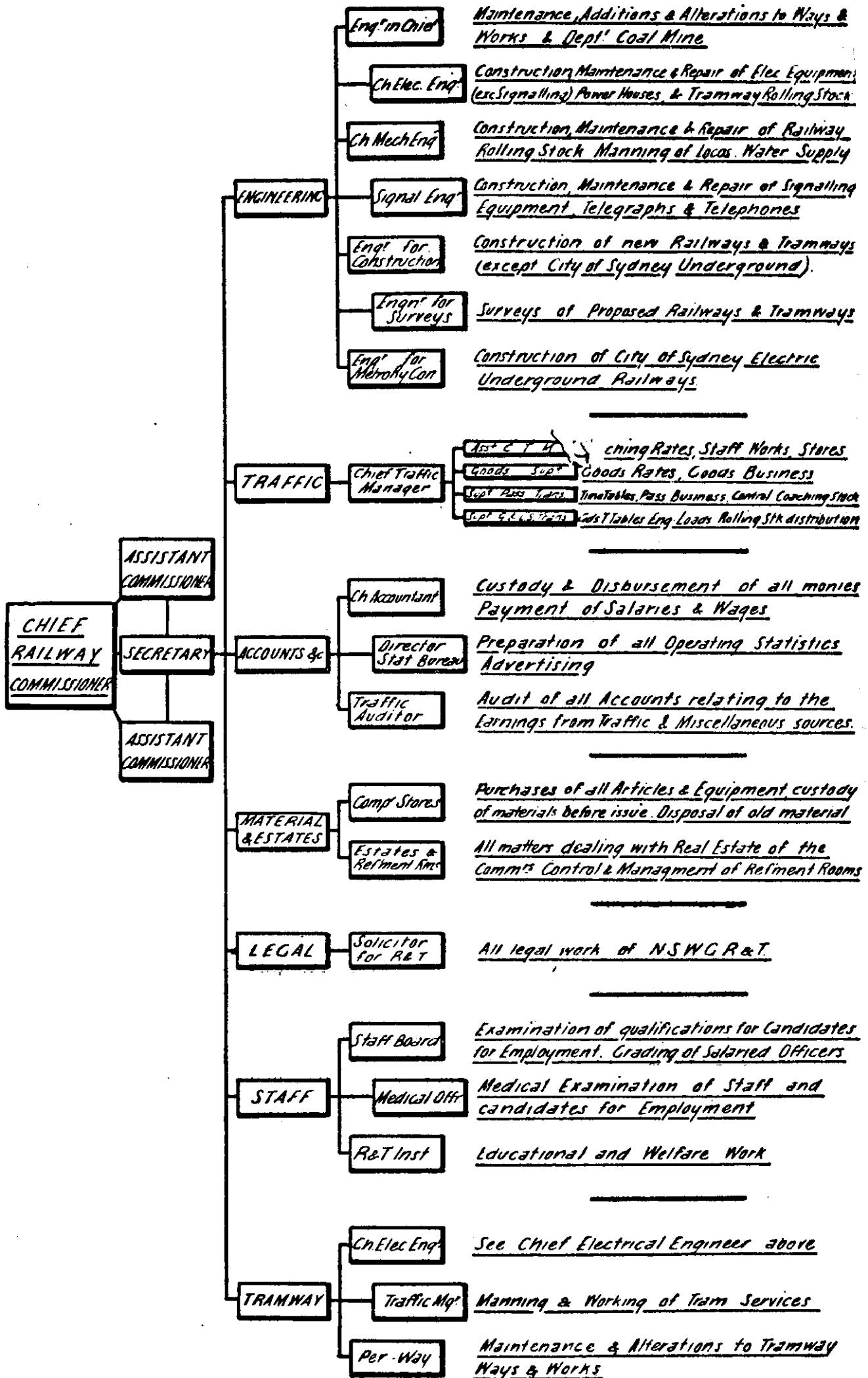
63. The control departments as at present exercised is mainly by means of monthly conferences, eleven in number, viz. :—

Permanent Way Committee,
Locomotive and Stores Committee,
Traffic Committee,
Tramway Committee,
Construction Committee,
Finance Committee,
Ticket and Fares Committee,
Medical Committee,
Staff Committee,
Institute Committee,
Ambulance Committee.

In addition there are departmental committees of traffic officers, locomotive officers, permanent way officers, construction officers, and the metropolitan railway construction conference. In order that the various departmental activities may readily be grasped, it is the practice to submit to the monthly committees and to the Board meeting information set out in graphical form. Approximately 400 graphs are prepared monthly for these meetings.

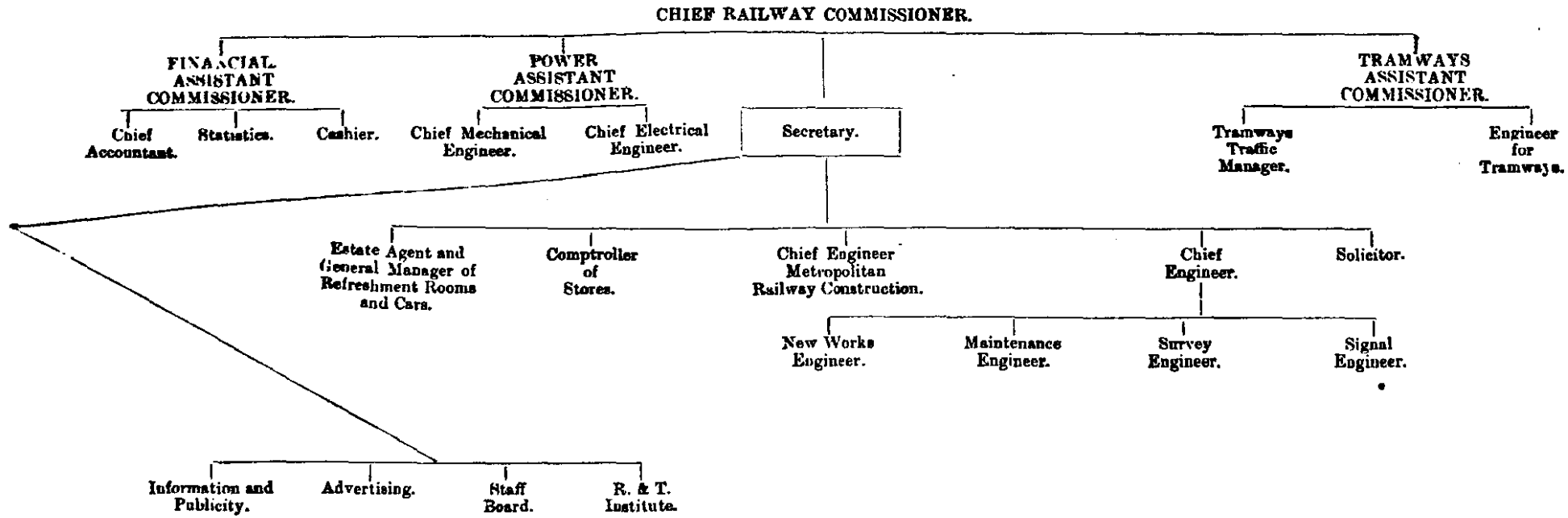
64. The aim and object of these conferences and committees are to ensure that every matter of importance is brought under review monthly and to enable the Chief Commissioner to exercise personal supervision over the work of his departmental officers. In the words of the Chief Commissioner "the spirit of the organisation is that personal supervision is exercised throughout."

65. Where important works are in progress or large expenditures proposed, frequent visits are necessary, and apart from day to day distractions, urban and suburban problems press for solution, inter-State communications demand time and thought, while the growth of mechanical and electrical manufacture in railway workshops has followed increased mileage and increasing traffic density. Thus, however much time and energy a Chief Commissioner may be able to devote to the co-ordination of organisation as a whole, the calls upon him in a variety of other directions are such as to render it impossible for a single mind to keep the personnel in step or meet to the full public demands from distant centres.

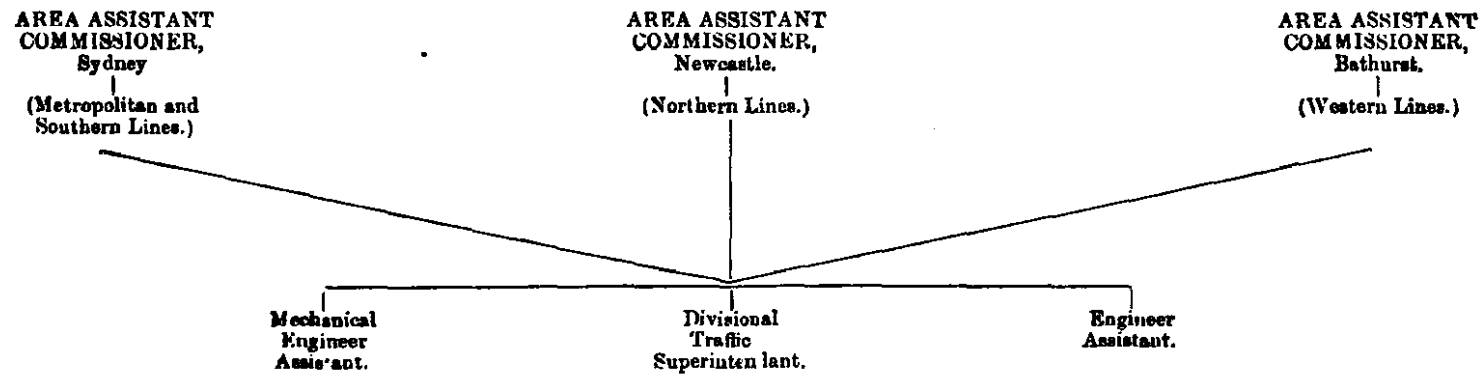


Present Organisation of the New South Wales Government Railways and Tramways.

PROPOSED HEAD-QUARTERS ADMINISTRATION.



PROPOSED AREA ORGANISATION.



Suggested Scheme of Reorganisation.

Defects of Centralisation.

66. Centralisation leads distant officers to lean too much upon the central organisation thus divorcing them from the responsibility which is theirs, and for which they are appointed and paid. They are not afforded that opportunity for the display of initiative and diligence so important to a "live man." Centralised management fosters the division of responsibility and control of train movement and of commercial effort, and it results in the frequent calling to head-quarters of distant officials to discuss questions of failure or complaint which could far better be dealt with locally. The loss of many days per annum of valuable time and the absence of these officials from their districts are points of importance in this connection.

67. Examination of Board and Conference Minutes, together with evidence submitted to us, shows that centralisation with its attendant circumlocution no longer enables the Commissioners to manage the various interests committed to their charge as effectively as would be the case under a system of decentralisation. We are, therefore, of opinion—and Messrs. Fraser and Fox concur in our view—that the time has come for New South Wales to follow other countries where extensive systems of railways under a single management are subdivided in respect of operation and maintenance, thus leaving the supreme head of the administration free to devote his attention to matters of broad policy, planning of developments and general control, and allocating responsibility on the transportation side to competent area officers and on the technical side to system officers stationed at head-quarters.

68. That the defects of centralisation have not escaped the notice of members of the public who are acquainted with railways abroad is shown by evidence tendered on behalf of the Producers' Association Central Council, the Mayor of Newcastle, and the Sydney and Newcastle Chambers of Commerce.

Composition of Railway Commission.

69. Dealing first with the composition of the Commission we consider that, having regard to all the circumstances surrounding transportation in New South Wales, there should be:—

1. A Chief Railway Commissioner,
2. A Financial Assistant Commissioner,
3. A Power Assistant Commissioner,
4. A Tramway Assistant Commissioner,

and that there should also be appointed three Area Commissioners, responsible to the Chief Commissioner, and acting under regulations and instructions applicable to the system as a whole, for operation, commercial matters and maintenance within their respective areas, the keynote being centralisation of principles with decentralisation of details, thus making for greater economy, more effective working, and improved relations with freighters and the public.

Area Management.

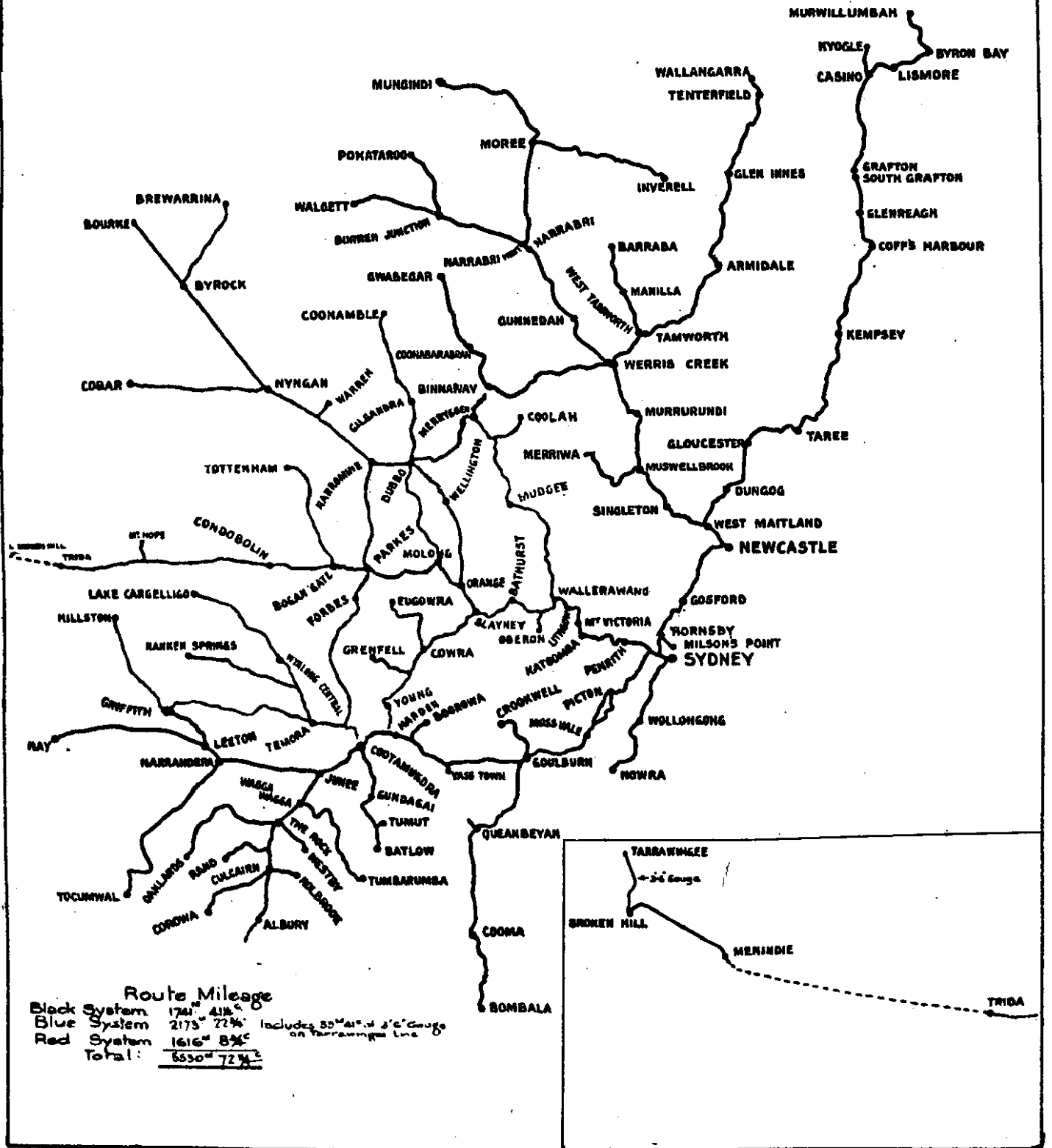
70. We suggest that one Area Assistant Commissioner with offices at Sydney should take charge of the metropolitan and southern area, as shown on the map. This area comprises approximately 1,616 miles and has a traffic density of 96,575 tons per mile per day on passenger, goods, and departmental trains. The time-tables and the distribution of rolling-stock throughout the system should be co-ordinated through the Assistant Commissioner of the metropolitan and southern area.

71. A second Area Assistant Commissioner, with offices at Newcastle, to take the area from Hornsby northward as shown on the diagram. This area comprises approximately 1,741 miles, and has a traffic density of 73,195.

72. A third Area Assistant Commissioner with offices at Bathurst to take the lines from Lithgow westward as shown in the diagram. This area covers approximately 2,173 miles and has a traffic density of 29,090.

NEW SOUTH WALES RAILWAYS

Scale of Miles



Area Scheme of Management recommended.

Black—Northern Lines. Blue—Western Lines. Red—Metropolitan and Southern Lines.

The Chief Commissioner and the Financial, Power and Tramway Assistants.

73. The Chief Commissioner to have responsibility to the Government for carrying into effect the provisions of the Railways Acts, and his decision upon all matters coming within those Acts should be final in all respects.

74. The Financial Assistant Commissioner, being specially qualified in financial and accountancy matters, to have general supervision of the banking, accountancy, audit, and statistical offices. We advocate an enlargement of the Chief Accountant's responsibilities. The Chief Accountant should be Chief Accountant in fact and not merely in name, and should have included in his department all the Branch Accountants, the present working arrangements between the head of each branch and the appropriate section of the Accountant's Department being maintained.

75. The Power Assistant Commissioner should control all establishments connected with the production of power, whether steam, electric, or otherwise, workshops, line installations, and the coal-mine. The changed and changing character of modern power appliances, coupled with the recommendations we make elsewhere, invest this appointment with special significance, and we attach great importance to it in view of the bearing that an experienced and wise decision will have on the traction problems in sight.

76. The Tramway Assistant Commissioner to control the tramways, electric and steam.

Chief Officers at Head-quarters.

77. The Chief Officers at head-quarters would be as follow :—

- (1) A Secretary, under whom should be the Information and Publicity Officers, together with Advertising and Institute matters ;
- (2) A Solicitor to deal with the whole of the legal work of the Department ;
- (3) A Chief Engineer who, with the necessary assistance, would supervise the survey and construction of new lines and works (the City Railway excepted), and the maintenance and renewal of existing lines, including signalling ;
- (4) A Chief Engineer for Metropolitan Railway Construction, his duties remaining as at present ;
- (5) A Chief Mechanical Engineer, responsible for the design, maintenance, and renewal of rolling-stock, the management of locomotive workshops and plant, and the supervision of running sheds ;
- (6) A Chief Electrical Engineer in charge of power-houses, electrical workshops, the design and equipment of electrical appliances and plant ;
- (7) A Chief Accountant, responsible, with proper assistants, for all accountancy and audit work ;
- (8) A Cashier to deal with all cash receipts and payment of wages ;
- (9) A Comptroller of Stores, responsible for the purchase—under the instructions of the Commissioners—of all stores, and the custody and distribution thereof ;
- (10) An Estate Agent and Manager of Railway Refreshment Rooms and Cars.

78. The staff of each Area Commissioner would comprise an Engineer Assistant, selected by the Chief Engineer, a Mechanical Assistant, selected by the Chief Mechanical Engineer, and a Traffic Superintendent (Operating and Commercial). The Engineer and Mechanical Assistants to report monthly through their Area Commissioner to the Chief Engineer and Chief Mechanical Engineer respectively upon work performed, the state of works and machinery under their charge, and take instructions thereon. In addition to this the responsibility of the Chief Engineers, civil and mechanical, to be exercised by frequent inspection by themselves or their principal assistants.

79. The Area Assistant Commissioners, given a wide discretion with encouragement to develop the areas under their charge, and being clothed with the necessary authority to deal with problems as they arise or seek advice when in doubt, would relieve head-quarters from a mass of detail and correspondence.

Being

Being in direct contact with freighters and the people in general, they would be enabled to familiarize themselves with the conditions, ideas, and needs of each town and district, and obviate formal communications and orders from the Chief Commissioner. They should make management personal, as distinguished from distant management, which tends to appear impersonal. Many of the local grievances to which our attention has been directed could promptly be dealt with, or would probably never arise, under the more direct and authoritative supervision of the Area Assistant Commissioners. We suggest that formal conferences at head-quarters should not be held more often than once in three months. Monthly conferences, apart from taking officers from their daily duties, consume much time and thought in the preparation of details, and often develop into a series of inquests, with resultant irritation to the staff, who had far better be employed in studying future requirements rather than in bemoaning the past.

80. The District Superintendents would continue as at present, with such geographical adjustment as may be necessary within their districts. We refer elsewhere to their particular duties. Whilst the Area Commissioners require a competent head-quarters' staff, it is considered that there need be little, if any, increase in the total personnel, having regard to the release from the present central organization of a number of able officers available to fill positions in the areas. It is notable that when a somewhat similar form of decentralisation was introduced upon the South African Railways a reduction was effected in the number of officers.

Selection and Appointment of Commissioners.

81. With regard to the selection and appointment of Commissioners, the desideratum is to secure harmony and team work in its fullest sense at head-quarters. If that is attained its influence for good will be felt from the top to the bottom of the Railway Service. Its absence means the reverse. Viewing the making of the appointment, not as a function of Government in the ordinary sense, but as the selection of a general manager to run a business undertaking, we are convinced that the appointment of a Chief Commissioner by the Government should begin and end at that appointment. It should be left to the Chief Commissioner to select his own assistants.

82. We do not overlook the fact that this places all appointments in the hands of one man, but his is the responsibility and upon him would fall the result of failure. Moreover, his share of the work and his personal comfort are so involved in the choice of competent and tactful assistants that he is not likely to be influenced by any motive other than that of securing the very best man for each position. This suggestion follows practice in Canada and elsewhere, and none can say that the outcome has been anything but satisfactory. If politics enter into appointments of this character, apart from other obviously objectionable features, it leaves a loophole for blame being distributed over several heads in the case of failure, and thus becomes detrimental to the entire undertaking.

83. As a general proposition we may say—Governments come and Governments go, policies change and are reversed according to the political hue of the Ministry of the day, but the transport needs of a State are constant, they are vital factors in the everyday life of all the people and should not be made in any way the shuttlecock of politics. They should be free from influence of either party, and when once a Chief Commissioner is appointed he should be trusted to carry on his duties to the best of his ability in his own way, subject solely to the limitation of his powers in regard to rates and fares, staff, and other matters of defined State policy.

84. We do not think that the practice of making appointments for a definite term of years is calculated in the long run to produce the best results. A Chief Commissioner should have a vision and an aim beyond seven years. There is a risk of a good showing being made at the end of such a period without due regard for the future of the business. As an alternative to the present system, we suggest that the appointments should be without limitation as to time, and that the Commissioners should be deprived of office only on proof of misbehaviour or incompetence. In the latter event compensation should be given on the basis of five years' full salary. As justification for giving such compensation, we regard the

the

the Government as responsible for an incompetent Chief Commissioner, and the latter as responsible for incompetence in his assistants. It is not the fault of the man; it is his misfortune if he proves incompetent for the post he has been selected to fill. It may be said that he should pay the penalty of failure to fill the position satisfactorily, but such a man is not circumstanced as an artisan or labourer. He cannot walk into the next street and get a job. Failure to a Commissioner of Railways means ruin. There are no similar positions open to him, and the railway undertaking should pay for the mistake made in his appointment.

Salaries of Commissioners.

85. It may not be within our province, but we venture to offer some remarks upon the question of salaries. Hitherto the rates fixed by Parliament as remuneration to the Commissioners have been altogether out of proportion to that given in other countries for positions of similar responsibility. Apart from the Commissioners' salaries as such being upon a low scale they have an effect upon the pay of the principal technical officers who cannot obtain even as much as an Assistant Commissioner, although the pay of the latter is below the figures easily secured in industries outside the railway by engineers of known capability and experience. In recent years there has been a general recognition of the fact that the difference in value between a first-class man and a mediocrity as head of a large industrial undertaking or section thereof is not to be measured by a few thousand pounds per annum. Furthermore, in the past few years there has been a general rise throughout the world in salaries as well as in wages. This is a question of securing and keeping the best men it is possible to obtain in Australia, and, reviewing it in the light of official salaries in this part of the world, we think that, as a minimum, they should be, as to the:—

Chief Railway Commissioner...	...	...	£5,000 per annum.
The Financial Assistant	...	...	£4,000 " "
The Power Assistant	...	...	£4,000 " "
The Tramway Assistant	...	...	£3,000 " "
Each of the Area Assistant Commissioners	...	...	£2,500 " "

86. The carrying into effect of the various recommendations we make in this section of our report will, we have every reason to believe, achieve the best results with the least expenditure of time and money.

IV.—MANAGEMENT.

(a) PERMANENT WAY AND WORKS.

Mileage.

87. The route mileage of line for the maintenance of which the Chief Engineer for Existing Lines is responsible, totalled, at June of this year, 5,523, with a track mileage of 6,261, consisting of 4,876 single, 1,197 double, 28 triple, 155 quadruple, and 5 quintuple tracks. The total track mileage, average single track, including sidings, maintained for the year 30th June, 1924, was 7,316 miles.

Grades and Curves.

88. The striking features of the line are sharp curves and steep gradients. The main route from Sydney southwards has many short sections of 1 in 40 to 1 in 66, and there are considerable lengths of 1 in 75. The Western main line to Bathurst is even worse, with portions as stiff as 1 in 31, and, in the reverse direction, 1 in 40. On the Northern route 1 in 40 is common. It may be said that until the plains are reached there is no section without abnormal gradients and curves. The configuration of the country is such that without enormous expenditure these disadvantages cannot entirely be overcome. Here and there some alleviation may ensue by re-alignment, but not sufficient to permit of any material reduction in the cost of working and maintenance.

Rails, Sleepers and Ballast.

89. The standard rail is of the "T" type, and varies in weight from 100 to 60 lb. per yard. Rails of 100-lb. section are laid within the metropolitan area, while 90-lb. section rails are the standard on the main trunk lines to Cootamundra, Wollongong, Orange, and Werris Creek, the remaining mileage on the trunk lines being renewed with 80-lb. section rails. The latter section is adopted as standard for the principal branch lines, but there is still a lot of 71½-lb. rails, while pioneer lines are laid with 60-lb. section rails. When re-laying is necessary, pioneer lines are re-laid with 80-lb. section recovered rails.

90. The standard road provides for ironbark or other selected hardwood sleepers, 8 ft. x 9 in. x 4½ in., laid eighteen to a 40-ft. rail length. The general world standard is 9 ft. x 10 in. x 5 in., but experience over many years has shown that the Australian heavy wood sleepers of a smaller size are satisfactory. The rail joints are staggered, with sleepers spaced 2 ft. 3½ in. and 1 ft. 8 in. at joints. Ballast is, as to the bottom, hard sandstone, 3 in. gauge, and at the top 2½ in. blue-metal. Pioneer lines are ballasted with earth, strengthened where necessary with gravel, sand or ashes. Quarries for the provision of ballast have been opened up in each division, the ballast being dealt with in hopper wagons and plough-spread. The permissible axle-load is 20 tons 7 cwt. on main lines and from 17 tons 7 cwt. to 13 tons 4 cwt. on branch and pioneer lines, according to the weight of rail in use. The track is noisy. We suggest that experiments be made to overcome this.

Construction and Maintenance Costs.

91. As representative of constructional and maintenance cost per mile, we have been given the following examples:—

PERMANENT WAY CONSTRUCTION AND MAINTENANCE COSTS.

Section.	<i>Double Track.</i>				Constructional cost per mile.	Maintenance cost per mile.
					£	£
Southern Line—						
Granville to Goulburn	42,528	794
Sydenham to Bankstown	25,292	504
Western Line—						
Granville to Kelso	45,272	890
Sydney to Newcastle—						
Strathfield to Hamilton	37,150	692
						Permanent

Permanent Way Construction and Maintenance Costs.—*continued.*

<i>Single Track.</i>						Constructional cost per mile.	Maintenance cost per mile.
Section.							
Southern Lines—							
Wagga to Albury	...	...	...	...	...	12,278	487
Southern Branch Lines—							
Junee to Hay, and Culcairn to Corowa	...	...	...	...	...	6,347	261
Western Line—							
Bathurst to Bourke	...	...	...	...	...	7,840	216
Western Branch Lines—							
Blayney to Demondrille, Nyngan to Cobar, and Orange to Forbes.						7,212	317
Northern Line—							
Branxton to Wallangarra	...	...	...	...	...	13,579	350
Northern Branch Lines—							
Werris Creek to Narrabri	...	...	...	...	...	6,785	247
North Coast Line—							
West Maitland to South Grafton	...	...	...	...	...	15,305	208
<i>Pioneer Lines.</i>							
Southern Branch Lines—							
Yanco to Griffith, Wyalong to Lake Cargelligo, Stockingal to Caragabal, Galong to Boorowa.						4,973	102
Western Branch Lines—							
Dunedoo to Coonabarabran and Coolah, Parkes to Trida, Parkes to Narromine, Bogan Gate to Tottenham, Dubbo to Coonamble and Merrygoen, Nevertire to Warron, Byrock to Brewarrina.						3,908	136
Northern Branch Lines—							
Muswellbrook to Merriwa, Narrabri to Inverell and Mungindi, Narrabri to Walgett and Pokataroo, Tamworth to Barraba.						3,818	184

92. Constructional costs follow the heavy character of works over the mountains, and to a certain extent maintenance is under a similar influence, plus traffic density. Re-laying, re-railing, and re-sleepering are the subjects of yearly estimates by district engineers, and are checked by the Chief Engineer for Existing Lines.

Re-laying, Re-railing and Re-sleepering.

93. For the year 1922-23 25½ miles were re-laid, while 47½ miles were re-railed and 192 miles re-sleepered. In 1923-24 the programme covered 44½ miles re-laid, 86 miles re-railed, and 190 miles re-sleepered, but this was not fully carried out. A statement showing the cost per mile of re-sleepering, re-railing, and re-laying complete for the years 1922-23 and 1923-24 is appended.

STATEMENT showing cost per mile of Re-sleepering and Re-railing, and total cost and length of work done of Re-laying complete of 100-lb., 90-lb., 80-lb., and 75-lb. track for the years ended 30th June, 1923 and 1924.

Year ended 30th June.	Cost per mile.		Relaying complete—Total cost and work done.														
	Re- sleeper- ing.	Re- railing.	100 lb. rails.			90 lb. rails.			80 lb. rails.			75 lb. rails.			Total.		
			Total cost.	Work done.	Cost per mile.	Total cost.	Work done.	Cost per mile.	Total cost.	Work done.	Cost per mile.	Total cost.	Work done.	Cost per mile.	Total cost.	Work done.	Cost per mile.
1923 ...	£ 1,152	£ 2,309	£ 6,514	m. ch. 1 66½	£ 3,563	£ 10,479	m. ch. 3 11½	£ 3,330	£ 56,863	m. ch. 18 6½	£ 3,145	£ 5,879	m. ch. 2 33	£ 2,437	£ 79,735	m. ch. 25 37½	£ 3,132
1924 ...	£ 1,039	£ 2,321	£ 19,992	m. ch. 5 46½	£ 3,584	£ 39,728	m. ch. 11 66½	£ 3,357	£ 49,204	m. ch. 15 13½	£ 3,243	£ 18,368	m. ch. 7 43½	£ 2,438	£ 127,292	m. ch. 40 9½	£ 3,172

94. Since 1888, 1,094 miles of track have been completely re-laid, 3,261 re-sleepered, and 1,244 re-railed.

95. The average life of rails is given as :—“ 100-lb. section, eighteen years; 90-lb. section, no experience of life, as such rails were first laid in 1915; 80-lb. section, twenty years; 71½-lb. section, forty years, and 60-lb. section, twenty-five years.”

96. No cash reserves exist to meet re-laying, the work done year by year as a result of inspection being relied upon to keep the lines up to standard. This means irregular expenditure in one year as against another. Calculated upon the life of rails, there should be an average of at least 200 miles re-laid each year. Future costs cannot be determined. Based, however, on present price of materials and labour costs, a figure may be given of £3,000 per mile, a total of 200 miles of £600,000 per annum. In the event of a less mileage being re-laid in any one year, we consider that a reserve, representing wastage, should be set up to provide for the future and to keep accounts under this head level year by year.

Permanent Way Workshops.

97. There are five workshops for meeting permanent way and other requirements. At White Bay, Sydney, the preparation of structural steelwork for power-houses and workshops is carried out, as well as a variety of other things such as steelwork for upcast and downcast shafts and screening plant for the coal-mine. Repairs to pumps and winches, concrete mixers, steam shovels, and a number of articles for tramways and concrete articles of sorts are also manufactured at White Bay.

98. At Lidcombe the manufacture of fish-plates, crossing gates, barrows, and permanent way tools is carried on. The preparation and in many cases the assembly of all wood materials in connection with erection and repairs of buildings and bridges, including refreshment-room fittings, is also done. These shops form a despatching centre for nearly all oregon and redwood required for railway and tramway construction and repair, approximately 3,000,000 super. feet being handled, milled and dispatched to the various districts each year.

99. At Newcastle the fabrication of steelwork for bridges, gantry and jib cranes, switches and crossings, trolley wheels, dog spikes, fishbolts, nuts, rivets, insulator pins, railbending for City railway, &c., &c., is carried out together with castings—brass and iron—the latter up to 5 tons in weight. General repair work for the Newcastle Division also comes here.

100. At Goulburn the workshops provide for the manufacture of cart weighbridges, wirewoven work, corrugated-iron tanks, cisterns, galvanised baths, stove-pipes, tools, small iron, brass, gunmetal, and aluminium castings, and general repair work for the Goulburn Division. A concrete plant turns out water-troughs, foundation blocks, posts, and other articles. The use of ferro-concrete on the railways of New South Wales is a distinct feature (and has undoubtedly done much to reduce the cost of many articles hitherto having a short life owing to climatic and other conditions).

101. At Bathurst, in addition to repairs and the preparation of points and crossings, fencing material, &c., &c., plumbing work for railway and tramway needs, such as tanks, guttering, down pipes, stove-pipes, fire buckets and so on is dealt with.

102. Speaking generally, these shops are well equipped and managed, the class of work turned out being good.

103. In addition to maintenance and duplication of lines, the erection and maintenance of power-houses, station buildings and workshops, the supervision of the departmental coal-mine comes within the duties of the Chief Engineer for Existing Lines, but he is not concerned with survey work or the construction of new lines, for which the Engineer for Surveys and the Engineer for Railway and Tramway Construction are respectively responsible. The upkeep of stations and buildings is satisfactory.

Organisation of Branch.

104. The technical staff of the Chief Engineer for Existing Lines includes a Chief Assistant Engineer, Supervising Engineer, Inspecting Engineer, Principal Designing Engineer, two head office Surveyors, Inspector of Bridges, Inspector of Timber, and a Superintending Engineer of the coal-mine.

105. For engineering purposes the system is divided into four divisions, each controlled by a divisional engineer, stationed at Sydney, Goulburn, Bathurst, and

and Newcastle respectively. The sections of the North Coast line, Grafton to Murwillumbah, and Casino to Kyogle, a distance of 167 miles, are under the control of a Chief Inspector. The section from Broken Hill to Menindie (73 miles) being isolated from the general system, is controlled by the Tramways Manager in conjunction with the Broken Hill-Tarrawingee Tramways.

106. The Metropolitan Division, with Sydney as head-quarters, extends to North Goulburn on the Southern Line, Raglan and Werris Creek on the Western Line, and the Illawarra Line (South Coast) to Nowra, including branch lines, a distance of 1,379 miles. The Southern Division extends from North Goulburn to Albury, (Victorian border) and all branch lines, a distance of 1,731 miles. The Western Division extends from Raglan to Bourke and all branch lines, a distance of 1,382 miles. The Northern Division extends from Gosford to Wallangarra (Queensland border) including branch lines to Mungindi, Walgett, Pokataroo, and Inverell on the north-west, and South Grafton on the North Coast, a distance of 1,490 miles.

107. Each Divisional Engineer has an inspector for permanent way, an inspector of buildings and bridges, and sub-inspectors for each district into which his section is divided. There are also timber inspectors and the necessary surveyors and draughtsmen attached to each division. Resident engineers are employed for new works of magnitude, as occasion arises.

108. The average number of men in a line gang varies. In the metropolitan suburban area six men are employed; on the main lines four, and on branch lines three. Where necessary motor trolleys are provided to enable the maintenance staff to move easily and quickly over their lengths. The average length of line maintained by each gang is main line, single track, 8 miles, and branch lines, second class, single track, 10½ miles.

Monthly Conference.

109. A conference, of which the Engineer for Existing Lines is chairman, is held at the head office each month, with the principal officers responsible for the maintenance of way and constructional works, including Assistant Engineer-in-Chief, Supervising Engineer, Principal Designing Engineer, Divisional Engineers, and Resident Engineers, when matters appertaining to maintenance and constructional works are reviewed, and consideration is given to suggestions for improvements in the methods of carrying out the works in the most economical manner, number of staff employed, and the necessity for increasing or decreasing requirements as the work demands.

110. Generally the upkeep of the line is sufficient for the present traffic requirements, but with electrification a higher standard of maintenance will probably be found necessary in the Sydney area.

Railway Construction Branch.

111. The engineering staff for the construction of new lines was formerly under the Minister for Public Works, the lines being handed over to the Railway Commissioners for working upon completion. In 1917 constructional work was handed over to the Commissioners. New lines come into being as the result of local application to the Public Works Department, which takes evidence through a standing committee. Trial surveys are made, estimates prepared, and reports forwarded to the Minister by the Commissioners. The standing committee having reported in favour of new lines, and Parliamentary sanction being given, the Commissioners may be instructed to proceed with the work, when a permanent survey and plans and sections are prepared—and upon the necessary money being provided for a year's work construction is commenced.

High Cost of Surveys.

112. Surveys appear to be exceptionally high in cost, the estimate for the Glenreagh to Dorrigo line, for example, being given as £22,158. It was explained, however, that the country through which the line passes presented abnormal difficulties. In this connection we are of opinion that benefit would accrue from the supervision of this work by the Chief Engineer for Existing Lines, as recommended in Part III of our report.

Speedy

Speedy Construction Essential after Line is Sanctioned.

113. Estimates of total cost of constructing lines are of little value, having regard to the practices described in Part II of our report, but there can be no doubt that the final costs have been inflated quite unduly by the long-drawn-out methods of construction. These uneconomic methods should certainly be avoided in future. Once a line has been sanctioned the money should be made available for its speedy completion, thus enabling the capital spent to be interest-bearing and not unproductive.

114. Constructional plant to the value of £150,000 is in use upon these lines, and additional tools, stores, and material required are requisitioned from the Comptroller of Stores. Locomotives are supplied by the Chief Mechanical Engineer. Rails and fish-plates are supplied under contract. Dog spikes and bolts are made in the workshops of the Chief Engineer for Existing Lines, or at Eveleigh Shops. Sleepers are bought directly from the cutters, preferably in the neighbourhood of the new lines.

Construction Branch Technical Staff.

115. The technical staff under the Chief Engineer for Railway and Tramway Construction consists of a Principal Designing Engineer, two Inspecting Engineers, two Inspectors of Machinery and Plant, and twenty draughtsmen. In addition, Resident Engineers in charge of each line under construction are employed, of whom there are at present ten.

116. The Engineer for Surveys has a staff of sixteen Surveyors, of whom two are Inspecting Surveyors, and twenty-one draughtsmen.

117. It is probable that but for the fact that the Construction and Survey Engineers were transferred as separate departments from the Public Works Department to the Commissioners, all their work would have been under the supervision of the Chief Engineer for Existing Lines. It is certainly desirable that the engineer who takes over responsibility for maintenance of the new lines should also be the authority for survey and construction, and in our report upon organisation we recommend this. Moreover, the employment of three engineers independent the one of the other makes head-quarters engineering staff top-heavy.

118. The City and Suburban Railway Construction is a very special work, and is properly under a separate and expert engineer. His technical staff includes a Principal Designing Engineer, a Designing Engineer, a Supervisor of Construction, a Supervising Engineer, and the necessary complement of draughtsmen.

Early Completion of Metropolitan Electric Railways urged.

119. The total expenditure on the City Railway and the Eastern and Western Suburbs Railways was, at 30th June, 1924, £1,091,112. An increasing sum of money will be lying idle on these works until they are available for traffic, and the desirability of bringing them to completion at the earliest possible date needs no other demonstration. The saturation of tramway services is calling for relief as well as the suburban steam-train services. Even under the speediest possible construction, congestion of existing facilities promises to be far more serious than at present before the city lines and the electrification can be completed.

IV.—MANAGEMENT.

(b) SIGNALLING.

120. In accordance with the Commissioners' policy this Branch has been considerably enlarged during recent years, more particularly in the direction of automatic and power devices. Increased expenditure consequently arises, but the railway has been vastly improved from the point of view of safety and facility of operation, a total of 300 miles being under automatic control. Automatic signalling is at present being installed at various places, while improved methods have recently been introduced at Sydney.

Responsibility

Responsibility of Signal Engineer.

121. The Signal Engineer is responsible for the installation and maintenance of all signalling and interlocking apparatus on the railways and tramways. Line wires and poles for telegraph, telephone and safe working instruments are also in his charge, the line wires in the Sydney and Newcastle areas excepted, these being under the Electrical Engineer. Telephones throughout the system are also maintained, with the exception that certain telephones in Sydney and Newcastle are maintained by the Electrical Engineer, as are also telegraph instruments and batteries throughout the line. We think it would be an advantage to place all these under one control. Power for signalling purposes is supplied by the Electrical Branch up to the transformers used for signalling, the Signalling Branch taking over from the secondary side of such transformers.

Signal Branch Workshops.

122. Workshops—to be transferred to Chullora—exist at Sydney and Auburn, for the manufacture of apparatus required for signalling and interlocking purposes. Certain articles appertaining to signals are made in the electrical engineering workshops or at the Newcastle engineering shops. Wire is purchased under contract, as are also signal point mechanisms, relays and transformers. In the signal shops are made station indicators, office furniture, luggage barrows, lamps, footwarmers and other things. At Auburn a ferro-concrete plant supplies material not only for signalling but for station buildings. The decision of the Commissioners to concentrate manufacture at Chullora is evidently wise, and in the interests of economy, not only in this particular case, but in others where the making of similar articles is going on at a number of places under separate branch control.

Signal Branch Technical Staff.

123. The signal engineering technical staff comprises two Assistant Outdoor Engineers, one for electrical and the other for mechanical work, one Assistant Engineer, a Chief Draughtsman and eighteen draughtsmen. There are also two electrical supervisors, two inspectors and two sub-inspectors for Sydney, one inspector and two sub-inspectors for the Metropolitan Area, an inspector at Goulburn, an inspector and sub-inspector at Cootamundra, similar staff at Bathurst and Newcastle, an inspector at Tamworth, and a relief inspector. For construction work in Sydney there are two inspectors and one sub-inspector, and on the Molong-Dubbo Railway one inspector and one sub-inspector. The total number of employees in the Department is 1,357.

124. For the workshops there is a Works Manager, Assistant Works Manager, and twelve sub-foremen, supervising 451 men. There are also an Assistant Engineer for steelwork and ferro-concrete, two sub-foremen and draughtsmen.

Safe Working Equipment.

125. The safe working equipment in use on the lines now includes 433 signal-boxes, 23,679 lever units, 475 blocks instruments, 496 electric staff and tablet instruments, 16,372 miles of line wire, 1,132 power worked points and signals, and 423 automatic signal arms.

Advantages of Automatic Signalling.

126. The policy of installing automatic signalling on certain country lines, in some cases where the traffic is comparatively light, would at first sight appear somewhat extravagant, but actually it is a direct economy. Although the initial cost and maintenance of automatic signals are slightly higher than that of manual signalling, it must be borne in mind that the eight-hour day and the relatively high rate of wages in New South Wales have an important bearing on the subject. With manual signalling three shifts of men are required at every station and crossing loop, whereas automatic signalling necessitates personnel only at the more important stations. As an illustration, the Molong to Dubbo line may be cited. This line, 80 miles in length, under manual signalling would require the staffing of sixteen stations and crossing loops, but with the automatic installation only five stations need be manned. Further, with light traffic and under special circumstances, the whole 80 miles could be controlled by one man stationed at a convenient point.

Signalling Developing on Sound Lines.

127. It is an admitted fact that the replacement of the human element by safe mechanical operation increases the safety of working which, apart from the question of cost, should be the first consideration in determining the method to be used. We consider the Commissioners are justified in continuing along the lines they have adopted, and that the system of signalling generally is proceeding on sound lines, varying in accordance with the importance and density of the traffic. We suggest, however, that before determining upon the power to be employed for signalling the City Railways, consideration should be given to the advantage of using one power only, viz., electric. To extend the system at the Sydney terminal with an auxiliary power in the shape of pneumatic is unnecessary, and cannot be used or maintained without expense. On an electrically operated line ample power is available, and should suffice for all signalling requirements.

Signal Branch should form part of Chief Engineer's organisation.

128. In connection with the organisation of the Signal Engineer's Branch we think economy and improvement would result from a combination of the electrical and mechanical assistants under one head. Further we consider that, as this branch is so mixed up with the engineering generally, not only in the workshops but upon the line, it should form part of the Chief Engineer's organisation as indicated in Part III of this report.

IV.—MANAGEMENT.

(c) MECHANICAL.

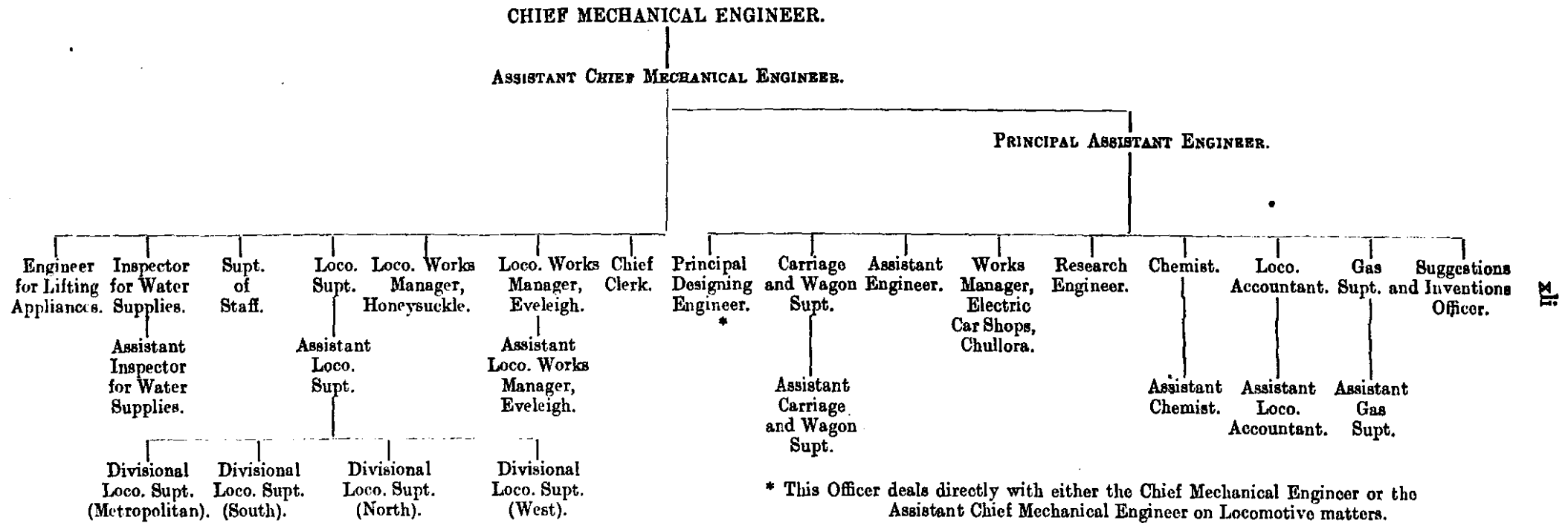
129. As the biggest spending department of a railway undertaking, the branch administered by the Chief Mechanical Engineer requires special attention in an inquiry of this nature. A correct appreciation of the relative efficiency of the Department calls for close observation and inspection of the workshops, running sheds, locomotives, and rolling-stock generally, and a critical examination of cost figures in the light of existing conditions, and in comparison with other railways. The views and recommendations advanced in this section are, therefore, of special importance, as they directly affect expenditure and have a vital bearing upon economical and efficient railway operation.

130. This Branch is under the control of the Chief Mechanical Engineer, who is responsible to the Railway Commissioners for the proper maintenance and upkeep of rolling-stock, pumping stations, cranes and machinery in outside places such as docks, &c., running sheds, and the control of engines at those places, together with the running staff connected therewith. He is also responsible for the supply of all water for railway purposes, except where supplies are available from shires or town councils, and for the operation and maintenance of the hydraulic power station at Newcastle and the mechanical portion of the loading cranes. In addition, he is responsible for the electrical equipment of the electric trains to operate the Sydney Suburban Services and Underground Railways.

131. The gas required for carriage lighting is manufactured in gasworks controlled by the Chief Mechanical Engineer, these being established at McDonaldtown (adjacent to Eveleigh), Junee (on the main Southern Line), Bathurst (on the main Western Line), Newcastle and Werris Creek (on the main Northern Line), but, as it has been arranged to convert all gas-lighted carriages to electric lighting within five years as from January, 1924, these gasworks will be dismantled within that period.

Organisation.

132. The accompanying chart shows the organisation of the Chief Mechanical Engineer's Branch. This indicates that the Department has two broad divisions, both functioning under the head of the Branch through an Assistant Chief Mechanical Engineer. One branch is primarily concerned with locomotive matters, and the other, under a Principal Assistant Engineer, with carriages, wagons, research, &c. The Head Office staff numbers 277, 112 being officers, 132 clerks, and 33 wages staff.



Organisation of the Chief Mechanical Engineer's Branch .

133. For operating purposes, the system is divided into four divisions—Metropolitan, Southern, Northern, and Western—as shown on the accompanying map, which also indicates the various locomotive depots.

134. The rolling-stock to be maintained by the Chief Mechanical Engineer's Branch included, as at 30th June, 1923, 1,341 steam locomotives, 2,188 coaching vehicles, 21,577 freight vehicles, and 1,906 service vehicles as shown below :—

STATEMENT showing Locomotives, Coaching Stock, Goods Stock, and Service Stock on the Books at 30th June, 1923.

Vehicles.	Number.	Tractive Power.		Vehicles.	Number.	Capacity.	
		Total.	Average per Loco.			Total.	Average per Vehicle.
LOCOMOTIVES.				GOODS STOCK.			
		lb.	lb.			tons.	to n
Steam	1,341	31,970,297	23,841	Box Goods Wagons			
				Open Goods Wagons	14,050	216,853	15
				Cattle Wagons	1,280	7,840	6
				Sheep Wagons	1,607	10,530	6
				Coal Wagons	1,550	20,244	13
				Louvrred Vans	1,006	12,598	13
				Refrigerator Vans	241	3,494	15
				Powder Vans	61	440	7
				Fiat Wagons	83	984	12
				Bolster Wagons	915	37,215	33
				Brake Vans	644		
				Other Vehicles	70	735	11
				Total	21,577	303,933	14
COACHING STOCK.				SERVICE STOCK.			
		Capacity (Passengers).				Number.	
		Total.	Average per Vehicle.				
Passenger Cars—				Casualty or Break-down Vans.....		39	
1st Class	470	26,013	55	Water Trucks		164	
2nd Class	982	59,507	61	Loco. Coal Trucks		284	
Composite	220	11,732	53	Ballast Wagons		712	
Sleeping Cars—				Gas Vehicles		26	
1st Class	86	2,260	26	Workmen's Vans.....		26	
2nd Class				Store Vans		32	
Special Cars	13	28	2	Cranes (not Locomotive).....			
Parlour Cars				Plough Vans		11	
Dining Cars	1	38	38	Motor Inspection Cars		8	
Mail Vans	25			Pay Cars			
Luggage Vans				Other Vehicles.....		604	
Carriage Trucks	65						
Horse Boxes	172						
Hearses	4						
Motor Passenger Vehicles	2	82	41				
Brake Vans	139	78					
Other Vehicles	9						
Total	2,188	97,738	46	Total		1,906	

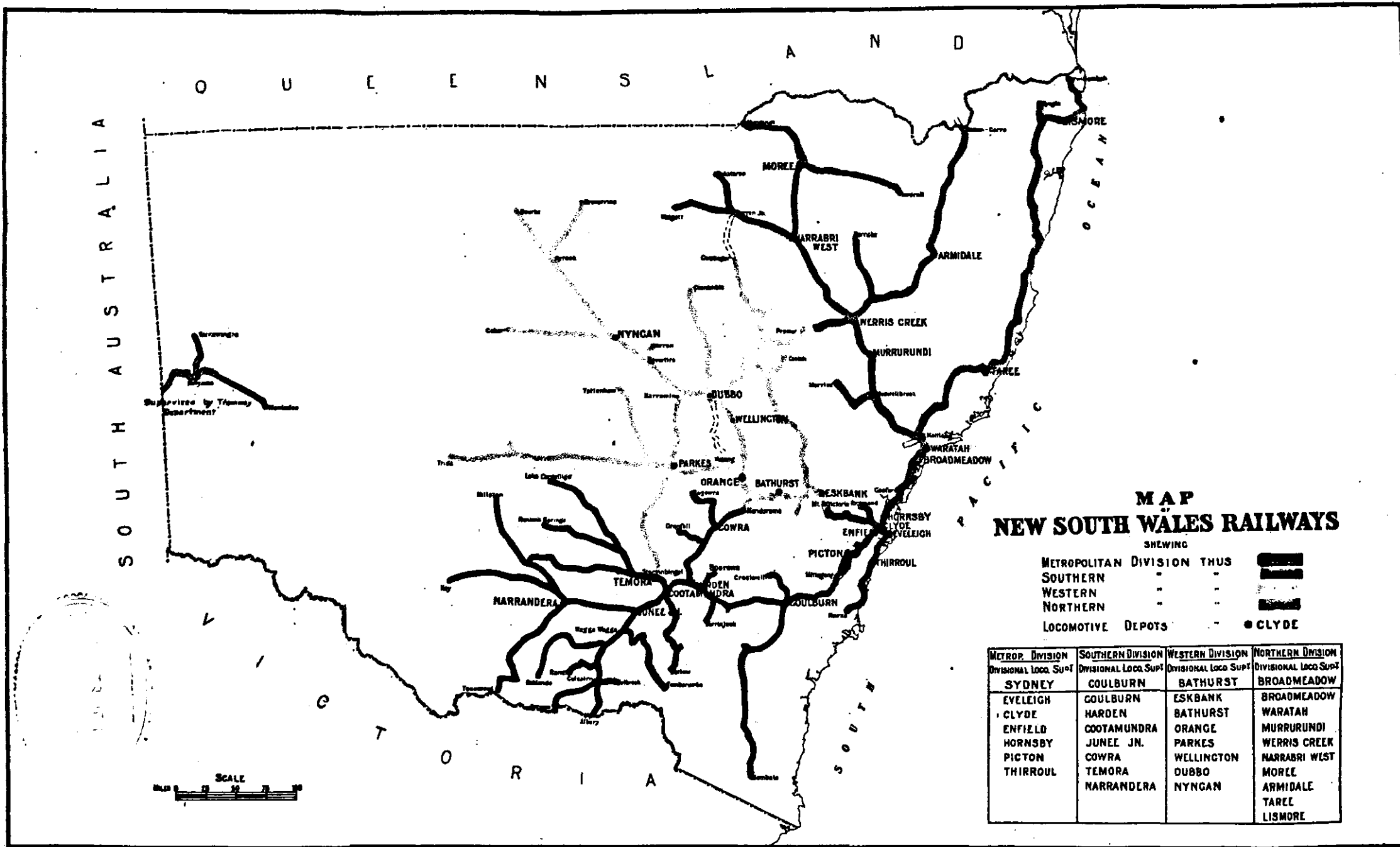
As the figures for the twelve months ended 30th June, 1924, were not available when sections of this part of the Report were prepared, it was necessary to utilise those for the previous twelve months. The 1924 figures would not materially affect the position.

135. The head-quarters of the Branch are at Eveleigh, (Sydney), where also the principal locomotive and carriage shops are established. Wagon shops are situated at Clyde in the suburbs of Sydney. While the major portion of the repairs are executed at these places, a fair amount of such work is performed at Honeysuckle Point, (Newcastle), and, especially in connection with locomotives, at various running sheds.






Locomotive, Carriage and Wagon Works.

136. The principal locomotive shops are situated at Eveleigh. They deal with the building, renewals and heavy repairs of locomotives, and also execute new boiler work for any of the other shops in which repairs are carried out.

137. At Eveleigh there is a very complete and up-to-date foundry, both for cast-iron and steel, together with a section for non-ferrous metals. This foundry is equipped with tools for machine-made castings, and over 60 per cent. of the work is performed under a bonus system of payment, which seems to give satisfaction to the men and enables the work to be carried out speedily and economically.

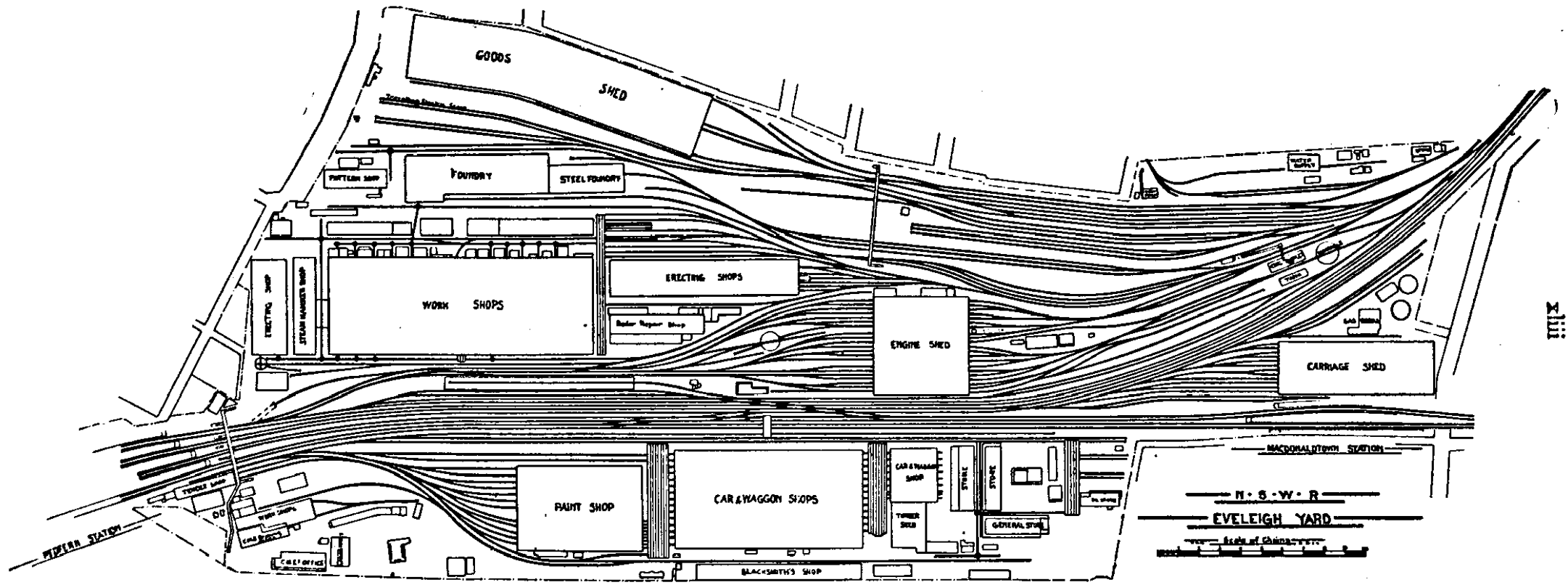


MAP NEW SOUTH WALES RAILWAYS

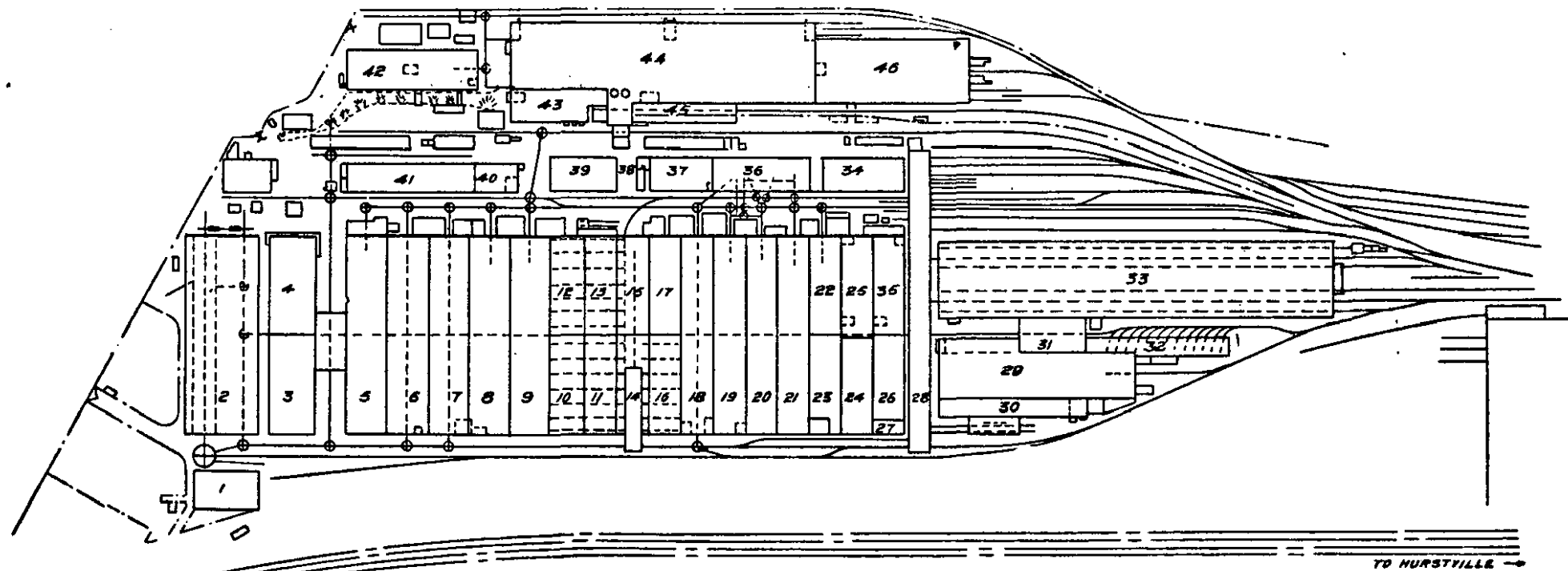
SHOWING
 METROPOLITAN DIVISION THUS 
 SOUTHERN " " " " 
 WESTERN " " " " 
 NORTHERN " " " " 
 LOCOMOTIVE DEPOTS " "  CLYDE

METROP. DIVISION Divisional Loco. Supt	SOUTHERN DIVISION Divisional Loco. Supt	WESTERN DIVISION Divisional Loco. Supt	NORTHERN DIVISION Divisional Loco. Supt
SYDNEY	COULBURN	BATHURST	BROADMEADOW
EVELEIGH	HARDEN	BATHURST	WARATAN
CLYDE	COOTAMUNDRA	ORANGE	MURRURUNDI
ENFIELD	JUNEE JN.	PARKES	WERRIS CREEK
HORNSBY	WELLINGTON	NARRABRI WEST	
PICTON	TEMORA	DUBBO	MOREE
THIRROUL	NARRANDRA	NYNCAN	ARMIDALE
			TAREE
			LISMORE

Locomotive Districts, New South Wales Railways, indicating Locomotive Depots.



General Lay-out of Yard at Eveleigh, showing Location of Various Shops.



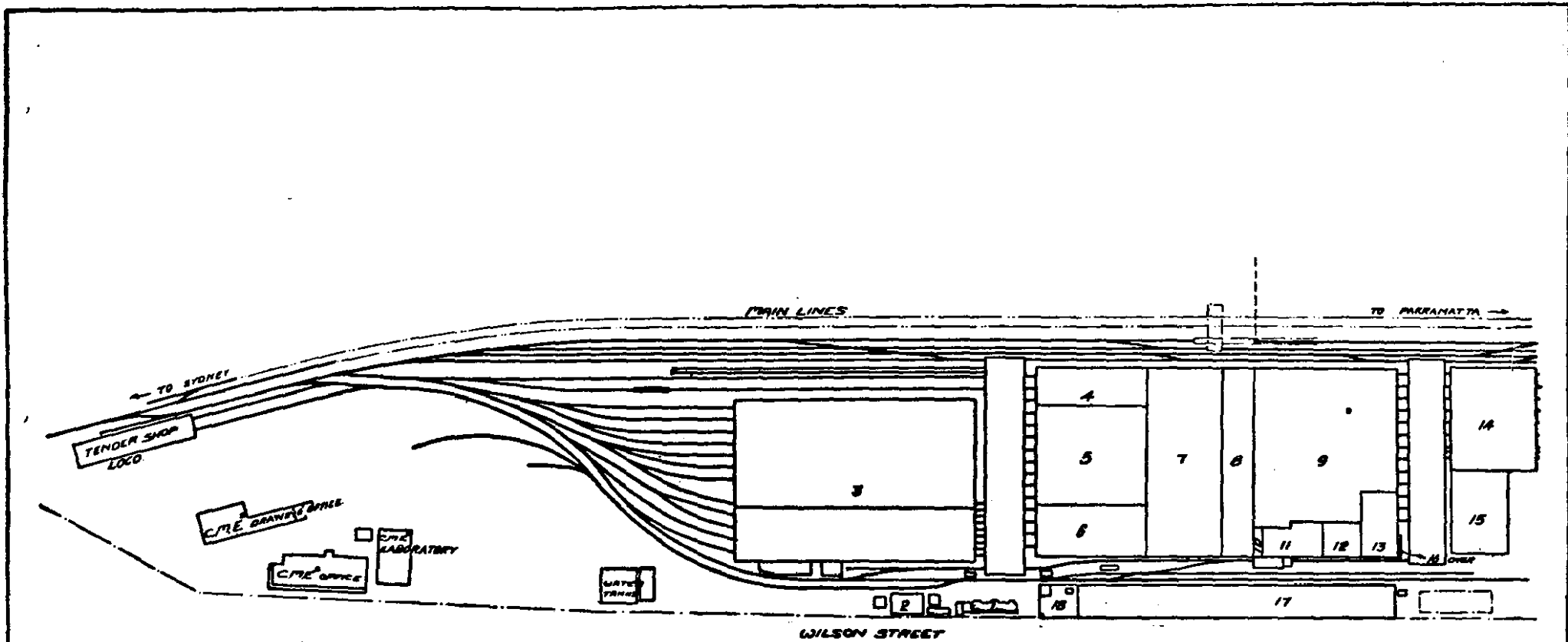
- | | | |
|-------------------------|-------------------------------|-------------------------|
| 1 WORKS MANAGERS OFFICE | 17 AXLEBOX SECTION. | 33 LARGE ERECTING SHOP. |
| 2 NEW LOCO SHOP | 18 MACHINE SHOP. | 34 POTASH WASHING. |
| 3 SPRING SHOP. | 19 DO DO. | 35 MAIN STORE |
| 4 FORGE SHOP. | 20 DO DO. | 36 HYDRAULIC PRESS. |
| 5 BLACKSMITHS SHOP | 21 DO DO. | 37 TINSMITHS SHOP. |
| 6 DO DO. | 22 DO DO. | 38 COPPER-PLATING SHOP. |
| 7 BOILER SHOP. | 23 COUP AND CON. ROD SECTION. | 39 COPPERSMITHS SHOP. |
| 8 DO DO. | 24 TOOL ROOM. | 40 WELDING SHOP |
| 9 DO DO. | 25 BRASSFINISHERS SHOP. | 41 OLIVERSMITHS SHOP. |
| 10 OLD ERECTING SHOP | 26 MILLWRIGHTS SHOP. | 42 PATTERN SHOP. |
| 11 DO DO. | 27 ELECTRICIANS SHOP. | 43 BRASS FOUNDRY. |
| 12 TENDER SHOP. | 28 TRAVERSER ROAD | 44 IRON FOUNDRY. |
| 13 DO DO. | 29 BOILER REPAIR SHOP | 45 DRESSING SHOP. |
| 14 TRAVERSER. | 30 TUBE SHOP | 46 STEEL FOUNDRY |
| 15 WHEEL SHOP. | 31 WORKS ASSEMBLY DEPOT. | |
| 16 TENDER SHOP. | 32 BOILER MOUNTING SHOP | |

N S W G R.
LOCOMOTIVE WORKSHOPS EVELEIGH.

SCALE

 0 50 100 150 200 FEET

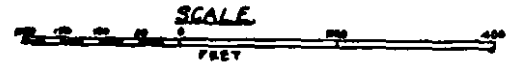
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- | | |
|---------------------------|-------------------------|
| 1 SUPERINTENDENTS OFFICE. | 10 PLATING SHOP. |
| 2 COMPRESSOR HOUSE. | 11 BRASS FINISHING SHOP |
| 3 PAINT SHOP | 12 PLUMBERS' SHOP |
| 4 N° 2 CAR SHOP. | 13 TRUST STORE. |
| 5 N° 3 DO | 14 N° 1 CAR SHOP |
| 6 BOILER SHOP. | 15 TIMBER STORE. |
| 7 MILL. | 16 TRIMMING SHOP. |
| 8 MACHINE SHOP. | 17 SMITHS' SHOP. |
| 9 N° 1 CAR SHOP. | 18 GAS PRODUCER. |

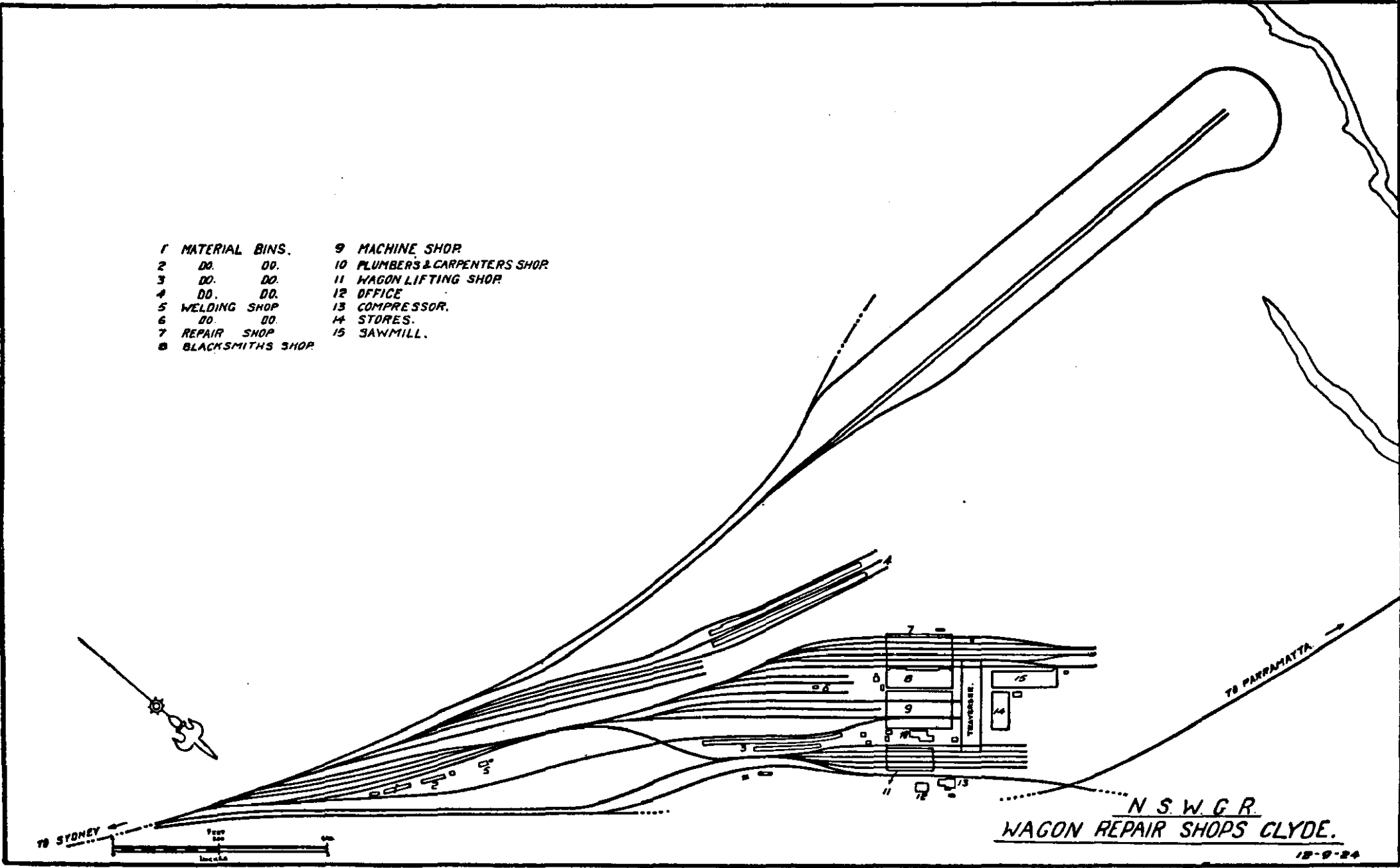
N. S. W. G. R.
CARRIAGE AND WAGON SHOPS.

EVELEIGH.



AIX

- | | |
|--------------------|-------------------------------|
| 1 MATERIAL BINS. | 9 MACHINE SHOP |
| 2 DO. DO. | 10 PLUMBERS & CARPENTERS SHOP |
| 3 DO. DO. | 11 WAGON LIFTING SHOP |
| 4 DO. DO. | 12 OFFICE |
| 5 WELDING SHOP | 13 COMPRESSOR. |
| 6 DO. DO. | 14 STORES. |
| 7 REPAIR SHOP | 15 SAWMILL. |
| 8 BLACKSMITHS SHOP | |



121

Iron Foundry.

138. All cast-iron required for locomotive and carriage and wagon maintenance is made in the foundry, as also a considerable quantity of cast-iron for the Permanent-way, Electrical and Signal Branches. The heaviest castings dealt with in average work weigh about 30 cwt., but castings up to 17 tons have been made satisfactorily, and no difficulty would be experienced in casting up to 25 tons. There is very little hand-carrying of metal, as the foundry is divided by portable tracks of about 20 inch gauge, which are arranged to serve rows of moulders on either side of each track. These tracks carry ladles of from 5 cwt. to 3 tons capacity which are filled from the cupola receivers. By the use of this method of metal pouring and moulding machines, the output of brake-shoes for one machine moulder and labourer has been brought to 300 per day of eight hours, which is, we are given to understand, six times the rate obtained when the work was done on the floor and metal was hand-poured. The machines for fire-bar moulding and piston ring moulding have been developed and built in the Eveleigh Works. We are informed by the Department that, on the former, two moulders produce per day, with the assistance of a labourer for half a day, moulds for 168 fire-bars, whereas previously two moulders produced 28 per day. The average cost of completed castings, including all shop charges, is 13s. 9d. per cwt. Recently, the practice of using semi-steel was introduced for all more important castings, such as cylinders and superheated headers. Considerable experimental work has still to be done with semi-steel, but at the present time much better metal is being obtained at lower cost than when grey iron was exclusively used.

Steel Foundry.

139. The present steel foundry occupies about 12,400 square feet of area, but roughly 60 per cent. of this will be taken over by the iron foundry after the completion of an extension covering 22,000 square feet which will become the steel foundry. The steel foundry equipment includes:—

- 1 1-ton stock oil-fired converter.
- 4 moulding machines.
- 1 core-making machine.
- 1 drilling machine.
- 1 sawing machine.
- 2 double floor grinders.
- 1 rumbler.
- 3 chilian mills.
- 1 annealing furnace.
- 1 brick core oven.

The heaviest steel casting produced to date weighed 31 cwt. Gallery or multiple moulding is adopted extensively for small castings, and the process has been completely successful. The output for twelve months ended June, 1924, was 462 tons, equal to 11.8 lbs. of serviceable castings per man-hour. The average cost of completed castings, including all shop charges, is £1. 13s. per cwt.

140. In the new section of the steel foundry, a Greaves-Etchell 3-ton electric furnace has been installed. The addition of this furnace will enable all requirements for steel castings to be made, including a large proportion of steel centres to be supplied to contractors for the manufacture of new rolling-stock.

141. The area of the whole of the foundry—embracing iron, steel, and brass—is 69,330 square feet, but this excludes the extension of 22,000 square feet previously mentioned. The foundry should be able to deal with all the railway castings required, no matter which department calls for them. Such a scheme of concentration presents advantages from more than one point of view, and, although it has been suggested that this might mean delay to certain classes of work, we see no reason for this, provided the work is properly conducted.

Pattern Shop.

142. The Eveleigh pattern shop stores and deals with all the patterns for the foundry. These patterns, in the aggregate, are extremely valuable, and it is unfortunate, therefore, that a better scheme of storage is not employed. In many sections the patterns are untidily stacked, and, to say the least, it must
be

be a matter of difficulty and expense for required patterns to be obtained. On the New South Wales Railways, owing to the number of different classes of locomotives, coaches, wagons, and machines requiring renewal, there is necessarily a large stock of patterns, and it is our view that they should be stored on a systematic—and adequately catalogued—basis in a commodious and well protected building. We recommend that an improved arrangement along these lines should be brought into operation immediately.

Forge.

143. The forge is well laid out and equipped, and is capable of supplying all the necessary work, up to the largest forgings, in a cheap and economical manner. We noticed, however, that some of the heavy forgings were not made near enough to the template and, therefore, carried too much weight. This, no doubt, is due to the heavy press having only recently been brought into use, and the matter will probably soon be rectified.

Smith's Shop.

144. The smith's shop seems to be well equipped, and should meet all the needs of the Department. Drop-hammer work, however, might be done with advantage.

Spring Shop.

145. We understand that the spring shop supplies all the springs for the rolling-stock—locomotives, carriages, and wagons—and we find that the cost of manufacture, as compared with bought springs, is greatly in favour of the Railway Department doing the work. The spring failures, however, appear to be heavy, and this will be remarked upon in another part of the Report.

Machine Shop.

146. The machine shop has a good proportion of up-to-date and satisfactory machines. A good deal of attention, we should judge, has been given to this. The machines are driven by electric motors, the shafting being arranged in groups where one machine is not of sufficient size to require a separate motor. The layout of these seems in every way suitable.

Method of Dealing with Locomotives coming in and under Repair.

147. The method of dealing with locomotives under repair, and of following up the work may be described as follows:—

148. The general condition of engines is reported monthly by steam shed inspectors to the Locomotive Superintendent, and, in addition, special reports are forwarded whenever necessary, advising the exact condition of engines in need of general repairs. When the Locomotive Superintendent directs that an engine shall be stopped, a repair sheet—giving particulars of all visible necessary repairs—is prepared by the steam shed inspector concerned and forwarded to the Chief Mechanical Engineer, who holds complete records of the history of each locomotive and its boiler. After the addition of information concerning mileage and time since last repair, the repair sheet is forwarded to the Works Manager, and by him to the foreman erector of the shop in which the repairs are to be undertaken.

149. The works at Eveleigh contain three separate erecting shops, known as the new locomotive shop, the old erecting shop, and the large erecting shop. The work in the machine and fitting shops is sectionalised as far as possible, complete equipment being installed in each section to deal with all operations necessary within that section. After an engine is stripped, the wheels, axle-boxes, side-rods, valve motion, piston valves, air pumps, boiler mountings, &c., are delivered to the respective sectional sub-foremen, each of whom is responsible for completely repairing one particular part or group of parts.

150. As an aid to the speedy execution of locomotive repairs, a number of spare parts are maintained so that an engine need not be kept waiting for the repair of the particular parts stripped from it. This applies more especially to boilers, axle-boxes, and wheels.

151. If, from the information given on the repair sheet the necessary repairs are of a light nature, such as repairing a fractured frame or renewing tyres, or any light work not involving the complete stripping of the engine, the foremen of any shops where parts for such an engine are to be repaired are advised (form marked "A") of the fact that the engine is to be treated as a running job, and they have instructions that work for such engines is to take precedence of other work in order to get the engine speedily back into traffic.

FORM "A."

Foreman _____

Please note that Eng. _____ is a running job.

Will you please notify Sub-Foremen in charge of sections to have material for same expedited as soon as possible.

Loco. Works Manager.

Progress System.

152. If the information on the repair sheet shows that repairs of a medium or heavy nature are necessary, the engine is stripped, after which the sub-foreman-in charge makes out a defect list (form "B") showing defects which can only be

FORM "B."

New South Wales Government Railways—Locomotive Branch.

SCHEDULE OFFICE.

1924.

Part of Repair List, Engine No. _____ Class _____ Nature of Repairs _____	
Date in Shops _____	Scheduled out _____ Sub-Foreman _____
Frame _____	Springs _____
Cylinders _____	Spring links _____
Cylinder covers _____	Spring pins _____
Cylinder cocks _____	Compensating beams _____
" cock shaft and rod _____	Compensating pin _____
Steam chest _____	Compensating shaft _____
Steam chest covers _____	Compensating brackets _____
Piston heads and rods _____	Bogie centre _____
Slide valves _____	Bogie cradle _____
" back rings, &c. _____	Bogie post and sleeve _____
Slide bars _____	Bogie cradle links _____
Slide bar brackets _____	Bogie pins _____
Valve chambers _____	Radial arm _____
Motion _____	Pin and bracket _____
Reversing W. shaft _____	Rocker firebar gear _____
Reversing shaft bracket _____	Steam pipes _____
" nut screw and wheel _____	Blast pipe _____
Reversing screw bracket _____	Blast pipe Btm. section _____
Reversing rod _____	Blast pipe blower nozzle _____
Brake shaft _____	Silencer _____
Brake shaft bracket _____	Flooring plates _____
Brake hangers _____	Smokebox front and door _____
Brake thrust rods _____	Chimney _____
Brake pull rods _____	Boiler mountings _____
Brake screw and nut _____	Injectors _____
Brake cylinder _____	Exhaust injectors _____
Brake air drums _____	Lubricators _____
Copper pipes _____	Release valves _____
Snifter valves _____	Draw hook _____
Buffers _____	Buffer beam _____
Sandboxes _____	Sandboxes vales and seatings _____
Sandbox levers and rods _____	Superheaters _____
Superheater elements _____	Firehole fittings _____
Cab-roof and floor _____	
Sundries.	

Foreman.

observed after stripping. From the information made available by the engine repair sheet, by the defect list, and from his own personal observation, the Locomotive Works Manager fixes the time considered by him as reasonable for the completion of repairs. These times vary from eighteen days for the smaller engines to fifty days for re-building or converting from simple to superheated engines of the heavier classes. After the scheduled time for the engine repair

has been determined, copies of form "C" are made out covering all the parts of the locomotive to be repaired in the sectional shops, and showing the dates on which the part or parts must be supplied in completed state to the erection shop. As far as practicable, the sequence is fixed to ensure delivery most advantageous to the foreman erector. When sectional work is completed, the subforeman fills in the form and delivers it to his foreman. Should there have been any delay, the reason is noted.

FORM "C."
New South Wales Government Railways.
X2479
MATERIAL TO BE DELIVERED.

By _____ Shop

To _____

New Loco. Shop.
 Old Erecting Shop.
 Large Erecting Shop.

Material _____

Engine No.	Class.	Date to be delivered.	Date completed.

NOTE.—This slip is to be returned to No. 1 Room, Loco. Works Manager's Office, immediately work is completed.

Loco. Works Manager.

153. The schedule officer maintains two records of the progress of repairs, one made up from the return of completed forms, similar to form "C," and a record card, "D," which is kept posted daily from his own personal observation. These records are analysed periodically by the Works Manager and his assistant, and any sections in default for late delivery of material are discovered and suitable action taken. The Assistant Chief Mechanical Engineer holds a meeting weekly with the Locomotive Superintendent and Works Manager, and reviews the output of repaired engines for the previous week and all delays to engines under repairs.

154. A complete system of inter-shop transport has been developed to facilitate delivery of material between erecting shops and machine and fitting shops, and includes an elevated electric runway cantilevered from the shop front, and having branch access to all necessary shops. There are three electric storage battery shop delivery trucks and a caterpillar tractor in service for moving parts from shop to shop, whilst a further three electric trucks are on order. Five high-speed standard gauge steam locomotive cranes are employed to do all the heavy lifting to and from shop trucks outside the shops and in places not served by shop cranes.

155. Assuming the arrangements outlined are followed and the progress system is carefully supervised, the repairs should be dealt with in such a way as to get the maximum quantity carried out within the works. The practice in force in New South Wales has been dealt with in some detail, as it is felt that the organisation for bringing in engines for repair and carrying them through is of the greatest importance.

No Standard Gauges in Use.

156. It is, however, noted with regret that no system of standard gauges obtains, either in the machine shop or in the fitting shop, and no interchangeability of parts can, therefore, be relied upon. This, of course, reflects itself in delay and high maintenance costs.

FORM "D."

PARTICULARS OF REPAIRS

Eng. No. _____ Class _____

Shop Order _____

Section _____ Sub-Foreman _____ Date in _____ Date out _____ Sched. Date _____

	Stripped.	Smiths Shop.		Machine Shop.		Fitting Shop.		Welding Shop.		Coppersmith's Shop.		Tinmith's Shop.		Delivered Complete.				
		In.	Out.	In.	Out.	In.	Out.	In.	Out.	In.	Out.	In.	Out.	Assem. Depot.	Erect. Shop.	Erect. Shop.	Sched. Date.	
Boiler allotted																		
Brake shaft (weld)																		
Brake shaft bkts (weld)																		
Reversing shaft (weld)																		
Horn blocks (weld)																		
Axle-boxes (fitting)																		
Sand gear (mach)																		
Brake shaft (mach)																		
Comp. beams and pins																		
Engine frames																		
Brake shaft bkts (mach)																		
Bogie frames (mach)																		
Reversing shaft (mach).....																		
Reversing shaft bkts (mach)...																		
Horn cheek plates																		
Cylinders or covers																		
Slide bars																		
Horn blocks (mach)																		
Pistons (complete).....																		
Slide valves and buckles																		
Brake hangers																		
Springs																		
Spring links																		
Piston valve liners																		
Wheels from mach. shop.....																		
Axle-boxes (boring)																		
Blast pipe (bottom)																		
Blast pipe (top)																		
Steam pipes and cones																		
Bogie boxes																		
Steam chest covers																		
Boiler mountings																		
Piston valves (complete)																		
Exhaust injectors																		
Motion gear																		
General brass fittings																		
Wheels (complete)																		
Bogie wheels (mach)																		
Coupling rods (complete)																		
Connecting rods (complete) ...																		
Brake beams																		
Brake rods																		
Westinghouse air-pump																		
Super. elements (weld)																		
Flue tubes																		
Super headers (mach)																		
Bogie post and sleeve																		
Bogie centres																		
Reversing screw																		
Reversing nut.....																		
Tanks																		
C.I. S'box front and door.....																		
Silencers																		
Buffer beam																		
Super elements (mach)																		
Boiler mounted for test																		
Copper pipes																		
Boiler fitted to frame																		
W'house brake pipes.....																		
Cab floor																		
Cab roof																		
Spark arresters																		
Engine to weighbridge																		

Boiler Shops.

157. The boiler shops are quite inadequate, and are costly, but we shall not deal with these in any detail, as they will shortly be transferred to an entirely new site at Chullora. The plans, layout, and buildings for the new boiler shop—which we have seen—appear generally satisfactory and of sufficient size to account fully for all the present and immediate needs, inasmuch as the electric traction proposed will mean a reduction rather than an increase in boiler requirements for some considerable time.

New Engines.

158. So far as the building of new engines is concerned, this is not being attempted seriously owing to the large amount of repairs required, which the shops at Eveleigh cannot at present deal with fully.

Honeysuckle and Out-Stations.

159. There are a certain number of repairs of a light, medium, and heavy nature carried out at Honeysuckle (Newcastle). We consider these shops are inadequately laid out and equipped for economically dealing with the work, and if the repairs now carried out there cannot be dealt with at Eveleigh—which is only 100 miles away—new and better arranged and equipped works should be provided at or near Honeysuckle. There is also a power station at Bullock Island, Newcastle, and six electric cranes of 15 tons capacity, and seventeen hydraulic cranes, also of 15 tons capacity, to deal with the coaling at the docks. The staff employed in the power-house, and also on the maintenance of the mechanical portion of the cranes, is controlled by the Locomotive Branch. The coal shipped approximates 5,000,000 tons annually.

Staff Comparisons.

160. Before leaving the locomotive workshops at Eveleigh and Honeysuckle, it is interesting to compare the number of men employed at these places with those at Horwich, Crewe, Derby, and St. Rollox on the London, Midland and Scottish Railway of Great Britain. It will be seen from the following statement that the staff employed per engine repaired on the British Railway was about half the number required in New South Wales. This should be given very careful consideration by the Chief Mechanical Engineer. Unless the position in New South Wales is due to the old and varied classes of locomotives it would appear that a considerable reduction could be made in the staff. For instance, comparing with Horwich, where there are practically similar works to Eveleigh (including manufacture of steel castings), it will be noticed that, while the staff is much the same, the number of repairs carried out at Eveleigh is about half, and that, in addition, twenty-one engines were built at Horwich compared with five at Eveleigh. It is important to note that, while less than half the work is done at Eveleigh as compared with Horwich, the amount paid in wages is approximately 80 per cent. more:—

LOCOMOTIVE WORKSHOPS—STAFF AND OUTPUT—1923.

Workshop.	Staff.	Engines which underwent heavy repair.	Staff employed per heavy repair.	Engine Repairs (Heavy and medium).	Staff employed per engine repaired.	Engines built.
<i>London, Midland and Scottish Railway—</i>	No.	No.	No.	No.	No.	No.
Horwich	3,885	808	4.81	888	4.38	21
Crewe	7,687	1,478	5.20	1,841	4.18	30
Derby	4,659	1,300	3.58	1,347	3.46	10
St. Rollox	1,779	359	4.96	407	4.37	...
<i>New South Wales Railways—</i>						
Eveleigh	3,476	352	9.88	447	7.78	5
Honeysuckle	410	35	11.71	49	8.37	...

161. The following are the particulars of the staff employed in connection with the repairs to locomotives at the workshops at Eveleigh, Honeysuckle and Lismore. Lismore is a small shop dealing with the repairs which, owing to its isolated

isolated position between Murwillumbah and Grafton—a distance of 147 miles—are obliged to be carried out there until the bridge is built which is in contemplation over the River Clarence.

Workshop.	Officers.	Clerical Staff.	Wages Staff (other than running).	Total.
Eveleigh Locomotive shops	93	46	3,430	3,569
Honeysuckle	16	8	402	426
Lismore	5	2	38	45
Newcastle Power Station ... ..	...	...	27	27

162. A number of light and medium repairs are done at the out-stations. This is neither desirable nor economical, and cannot be excused on account of the distance from head-quarters, as engines requiring repairs can always be arranged to work trains to the place where the workshops are situated.

Running Department.

163. The Running Department is directly under the supervision of the Locomotive Superintendent, who is responsible to the Chief Mechanical Engineer for the whole of the running sheds, and the repairing and maintenance of the locomotives stabled there. He has under him one principal assistant and four divisional locomotive superintendents, as shown on the organisation chart at paragraph 132. The running of the passenger engines is arranged by the Locomotive Superintendent, but running control of goods engines is entirely in the hands of the Traffic Department.

Repairs at Out-Stations.

164. A considerable amount of repair work is done at the out-stations, and many of them are equipped with the necessary machinery for this work. The value of this machinery is put down as approximately £90,000. It is uneconomical and in every way undesirable that repair work should be carried out at many separate places the methods at which might vary considerably, and, as stated elsewhere, it is recommended that repair work should be concentrated as far as practicable.

165. The system has grown up in New South Wales by reason of the difficulties in the direction of enlarging the accommodation at Eveleigh, which was built in 1888 when there were only some 400 engines in service. Land was more readily available at places outside Sydney, and, in addition, it was then the policy to instal certain machinery in the existing running sheds as being less expensive than the erection of suitable workshops. As a result, the practice adopted has led to increased maintenance costs and has also had a great effect upon standardisation. In the case of Honeysuckle Works, these were built prior to the Eveleigh Shops in connection with the separate railway then in existence from Newcastle to the north. The following statement clearly shows how engine repair work has grown at the out-stations and decreased at Eveleigh during recent years.

TOTAL WAGES CHARGED TO ENGINE REPAIRS.

Date.	Eveleigh.	Honeysuckle.	Other Depôts.
	%	%	%
1910-11	60·44	5·77	33·79
1911-12	59·63	5·72	34·65
1912-13	58·41	5·36	36·23
1913-14	55·89	5·16	38·95
1914-15	53·31	5·01	41·68
1915-16	55·32	5·37	39·31
1916-17	54·71	5·27	40·02
1917-18	50·92	4·11	44·97
1918-19	50·00	4·36	45·64
1919-20	49·52	4·84	45·64
1920-21	51·18	4·66	44·16
1921-22	50·74	4·68	44·58
1922-23	50·65	5·19	44·16
1923-24	49·50	5·94	44·56

166. There is very little covered-in accommodation at the running sheds, which are principally of the round-house type, but, on account of the climate, a good deal of the work can conveniently be dealt with outside. In time, when the repairs are removed to head-quarters, as has been suggested, the present covered-in portion will in most cases be sufficient, as it is thought that nothing but ordinary running repairs should be effected at out-stations.

Number of Running Sheds.

167. It is an advantage to reduce the number of running sheds as far as possible, with due consideration to traffic conditions, and the exigencies of the working. While we consider it advisable to draw attention to the point, we make no definite recommendations in this regard.

Future Control of Loco. Running.

168. In our view, the Traffic Superintendent, together with the Mechanical Assistant in each area, should be responsible for the economical working of all the locomotives when out in traffic, and, to this end, under the suggested area scheme of organisation, the Mechanical Assistant should be responsible to the Area Assistant Commissioner as well as to the Chief Mechanical Engineer.

169. It will be seen from the following statement that quite a substantial staff is employed at the various running sheds in connection with the repair of locomotives, and, if such repairs were transferred to head-quarters, it is considered that saving in staff would be effected. The statement also includes the number of drivers, firemen, cleaners, &c., stationed at the several sheds:—

Running Shed.	Officers.	Clerical Staff.	Wages Staff (other than running).	Running Staff.			Total Staff.
				Drivers.	Firemen.	Cleaners and shed hands.	
<i>Metropolitan Division</i>							
<i>Running Sheds—</i>							
Eveleigh	50	27	304	268	283	517	1,449
Clyde	1	3	22	43	52	49	170
Enfield	20	12	218	121	132	234	737
Thirroul	5	3	28	41	43	49	169
Hornsby	5	3	25	52	66	69	220
Picton	5	2	11	15	18	24	75
<i>Southern Division</i>							
<i>Running Sheds—</i>							
Goulburn	16	12	207	69	74	161	539
Harden	6	4	68	31	33	60	202
Cowra	4	3	26	20	21	38	112
Temora	3	2	17	12	14	36	84
Cootamundra	2	2	13	9	13	30	69
Junee	10	8	121	52	62	124	376
Narrandera	1	1	13	11	12	19	57
<i>Western Division</i>							
<i>Running Sheds—</i>							
Lithgow	11	6	59	44	56	124	300
Bathurst	11	10	183	50	55	134	443
Orange	2	2	18	17	21	27	87
Parkes	3	2	24	13	17	32	91
Wellington	4	1	25	8	10	24	72
Dubbo	5	2	22	19	27	66	141
Nyngan	1	1	5	5	8	15	35
<i>Northern Division</i>							
<i>Running Sheds—</i>							
Broadmeadow	17	14	173	107	123	202	636
Port Waratah	8	6	77	86	97	119	393
Taree	2	2	14	19	24	47	108
Murrurundi	3	2	15	15	18	34	87
Narrabri West	4	2	25	14	18	43	106
Werris Creek	9	7	94	37	44	127	318
Moree	1	1	9	7	9	16	43
Armidale	7	4	46	25	35	93	210

Carriage Shops.

170. The carriage shops, which are also situated at Eveleigh, are congested, and are laid out in a way which makes it difficult to pass a large number of vehicles through with the speed desirable. When the alterations to the railway in connection with the electrical service are completed, the difficulties in the carriage shops will largely be increased.

171. There are a number of up-to-date and useful machines in the carriage shops, and, on the whole, no exception can be taken to the work done, but, as before stated, they are congested and consequently not laid out so as to deal with the work in sequence and in the most approved way, thus causing a certain amount of delay and expense which would otherwise be avoided.

172. In view of the carriage stock being inadequate—even for existing requirements—and of the defects in the present shops, it is very desirable that these should be the next removed to the new site at Chullora, more especially as the shops for the new electrical stock are at present being put up there.

173. Details of the staff engaged in the repairing of carriages are set out hereunder:—

Workshop or Running Shed.	Officers.	Clerical Staff.	Wages Staff.	Total.
Eveleigh Carriage Shops	39	27	1,213	1,279
Honeysuckle	46	46
Lismore	13	13
Sydney	3	4	90	97
<i>Metropolitan Division Running Sheds—</i>				
Thirroul	2	2
Hornsby	2	2
<i>Southern Division Running Sheds—</i>				
Goulburn	6	6
Harden	2	2
Cowra	1	1
Cootamundra	1	1
Junee	4	4
<i>Western Division Running Sheds—</i>				
Lithgow	5	5
Bathurst	8	8
Orange	1	1
Parkes	2	2
Dubbo	2	2
Nyngan	1	1
<i>Northern Division Running Sheds—</i>				
Broadmeadow	1	1
Taree	1	1
Murrurundi	1	1
Narrabri West	1	1
Werris Creek	4	4
Armidale	2	2

Wagon Shops.

174. The principal wagon shops are situated at Clyde. No building of new stock is carried out there, the whole of the works being devoted to wagon repairs. Most of the wagon repairing is done in the open—only one small shop, 166 feet long by 61 feet wide, with four roads, being reserved for extra heavy repairs. The other shops are devoted to wheel turning and to such blacksmith and carpentry work as is necessarily attached to wagon repairing. We are assured that, on account of the climate, it is unnecessary to have shops for wagon repairs, but we are of the opinion that at the principal wagon repair depôt more covered accommodation would be an advantage.

175. Certain repairs are carried out at different parts of the railway system, such as Enfield, Bathurst, Lismore, &c., and, so far as wagon repairs are concerned, this is an advantage, as it is very desirable to deal with them speedily and as near as possible to the place at which they are required.

176. The staff employed in connection with repairs to wagons is as follows:—

Workshop or Running Shed.	Officers.	Clerical Staff.	Wages Staff.	Total.
Clyde Wagon Shops	18	10	726	754
Honeysuckle	46	46
Lismore	12	12
Darling Harbour	1	...	39	40
Alexandria	1	...	17	18
<i>Metropolitan Division Running Sheds—</i>				
Enfield	29	29
Thirroul	2	2
Hornsby	3	3
<i>Southern Division Running Sheds—</i>				
Goulburn	8	8
Harden	4	4
Cowra	1	1
Temora	1	1
Cootamundra	2	2
Junee	7	7
Narrandera...	1	1
<i>Western Division Running Sheds—</i>				
Lithgow	7	7
Bathurst	20	20
Orange	2	2
Parkes	2	2
Dubbo	2	2
Nyngan	1	1
<i>Northern Division Running Sheds—</i>				
Broadmeadow	2	2
Taree	1	1
Murrumbidgee	1	1
Nafrabri West	1	1
Werris Creek	5	5
Moree	1	1
Armidale	2	2

city of Locomotive Types.

177. In visiting the workshops and running sheds and noticing the various of engines, both ready for work and undergoing heavy and light repairs, cannot help being struck with the great variety of types—some of which are antiquated—and also with their dirty and untidy condition. Some of these engines have been in existence for fifty-nine years, and the average age of those on line to-day, viz., 1,391, is twenty-two years. When it is pointed out that 8 per cent. of these engines have been built during the last ten and three-quarter years, it will be understood what ancient machines some of the remainder must be, with an average age of twenty-eight years.

new Locomotives and Maintenance Considerations.

178. During the period of ten years prior to and including June, 1923, the Commissioners have found it possible to increase their locomotives from 998 to 1,341, or 34·37 per cent. of the stock in 1913, and, in view of this, it is difficult to understand

understand the complaint of the great difficulty in getting materials, &c., for the necessary repairs and maintenance of their locomotives. A statement showing the increases is given hereunder :—

Twelve months ended June.	Number of Locomotives.	Miles open for traffic.
1913	998	3,930
1914	1,065	3,967½
1915	1,162	4,134½
1916	1,211	4,188
1917	1,275	4,437
1918	1,282	4,679½
1919	1,279	4,824½
1920	1,279	5,015½
1921	1,301	5,042½
1922	1,321	5,116
1923	1,341	5,317½
Inc. 1923 over 1913	34·37%	35·31%

It is true that in 1919 and 1920 nothing was done in the way of increasing the stock, and it may be assumed that at that time difficulties arose with regard to material, but in 1921 the stock again began to increase. The railway lines open for traffic, it will be noticed, have also increased by 35·31 per cent. in the same period. The opening and equipping of these lines for traffic must have meant a considerable usage of material of various kinds, and it might fairly be argued that the maintenance should have been of first importance. The Chief Mechanical Engineer himself states "that the whole locomotive position has been considerably influenced, firstly, by the incidence of the war and the high prices which obtained after the armistice and until quite recently."

Locomotive Branch Efficiency Factors.

179. In considering the Locomotive Department, there are three factors which stand out pre-eminently, and certainly require special consideration. These are (1) the high cost of maintenance, (2) the unusually large number of engine failures, and (3) the excessive coal consumption.

180. Maintenance costs can be reviewed from two points of view—by comparing a period in 1913 with 1923, and judging the results after making due adjustments for the increase in cost, both of wages and material, and also by using the maintenance figures of New South Wales and drawing a comparison with other railways, either in Australasia, in Great Britain, or even in America. The difficulty of justly comparing operations on railways working under different conditions is appreciated, but it is only by such comparisons that avenues of inquiry may be opened up.

181. As a result of our tours over the system and inspection of various running sheds, we are forced to the conclusion that high maintenance costs must be the consequence of the many classes of engines—some quite out of date—and the conditions under which they were being overhauled. It was quite common to see hot smoke-box doors, while an unusually large number of locomotives were seen with the gear taken down for heated or worn brasses, &c.

182. An examination of the costs fully justifies the conclusions at which we had arrived. Locomotive maintenance cost for the twelve months ended 30th June, 1914, was £612,521, and the stock of locomotives 1,065, giving an average cost per engine in stock of £575. For the twelve months ended 30th June, 1923, the maintenance cost was £1,671,400, the stock 1,341, and the average cost per engine £1,246. To the 1914 figures should be added the 1923 increased percentages in respect of the higher wages and dearer material. These are, wages 66·13 per cent. and material 69 per cent., making the maintenance cost £1,023,009 and the average cost per engine £961, which compares with the figure of £1,246, for the twelve months ended 30th June, 1923.

Cost

Cost Comparison with 1914.

183. These figures show that the costs have increased, when worked out on a similar basis, as much as £285 per engine, and this unsatisfactory result follows the institution of a bonus system in 1917 and the expenditure of a large sum in new machinery. The only explanation given to us was the larger engines which had had to be repaired, but it must not be overlooked that those engines are the latest built, and ought to require a comparatively small amount of repair for some years after being put into traffic. If even the same cost per engine as in 1914 had been upheld—after due allowance for the higher wages and dearer material—the saving to-day would have been £396,435 per annum.

184. We now pass to the differences which may be discovered between the New South Wales cost and that of other railways in Australasia and in Great Britain. These are given in the following table:—

Maintenance of Locomotives, 1923.

Company.	Cost of Maintenance.	No. of Locomotives.	Average cost per Locomotive.	Revised on basis of English Costs.
	£		£	£
New South Wales	1,671,400	1,341	1,246	721*
Victoria... ..	669,666	789	849	491†
Queensland	457,974	698	656	380†
South Australia	394,437	494	798	462†
Western Australia	222,282	421	528	306†
New Zealand	501,172	639	784	454†
Great Western	2,043,309	3,944	518	.....
London and North-Eastern ...	3,742,859	7,398	506	.....
London, Midland and Scottish	5,358,986	10,292	521	.....
Southern	1,135,477	2,258	503	.....

* This figure has been compiled on the basis of wages being 100 per cent. higher than in England and material 35 per cent.

† Reduced in the same ratio as in the case of New South Wales.

From the English costs must be deducted the cost of painting the locomotive.

185. The figures in the foregoing table show that the maintenance costs in New South Wales are high when compared with those of other railways. When questioned on these costs (Q. 2514), the Chief Mechanical Engineer said the only explanation he could give—outside the present methods of dealing with repairs and the ancient rolling-stock—was that more powerful engines had been put into service during recent years, and also that engines had been improved by superheating. As, however, we have previously pointed out, these larger engines are the latest built, and consequently should require small repairs, if any, to their boilers, and certainly be the lowest in general repairs on account of the short time they have been in traffic. Consequently the explanation given is one we cannot accept. So far as superheating is concerned, moreover, all the British railways have done more in this direction than the New South Wales railways.

High Average Age of Boilers.

186. Reference has also been made to the fact that the water is bad, and that this has a serious effect on the locomotives. At the same time it is agreed that the matter has been investigated carefully, and that various methods have been adopted to deal satisfactorily with the water. While it is admitted that bad water is detrimental to effective and economical locomotive maintenance on any railway, the fact remains, as shown in the following table, that the life of the boilers condemned in 1923 averaged over sixteen years, this being a longer average life than is usual on British railways. Most railways have considerable trouble with water on various parts of their system, with which they have to deal to prevent disastrous results, but, from the evidence we have received, and our own observations, we cannot agree that this is a sufficient reason for the relatively high maintenance costs.

Details

Details of Boilers Condemned—Year ended 31st December, 1923.

Boiler No.	Class.	Date Condemned.	Age.		Boiler No.	Class.	Date Condemned.	Age.	
			Years.	Months.				Years.	Months.
784	T.	2nd Jan.	15	...	440a	L.	17th May	15	8
473a	P.	2nd Jan.	18	6	408a	B.	26th May	19	...
278a	D.	2nd Jan.	20	3	450a	O.	12th June	20	...
65a	B.	8th Jan.	15	8	34a	CG.	28th June	18	...
532	T.	8th Jan.	17	10	389a	B.	13th July	16	7
659a	S.	11th Jan.	14	5	265a	D.	13th July	18	10
763	T.	17th Jan.	14	6	475a	P.	19th July	14	3
229b	D.	24th Jan.	18	6	30a	E.	25th July	16	1
229a	B.	20th Jan.	19	2	682	P.	2nd Aug.	17	9
270a	D.	18th Jan.	20	1	820a	S.	30th July	11	2
629	T.	25th Jan.	19	6	1013	S.	1st Aug.	10	8
52a	M.	3rd Feb.	16	6	460a	P.	7th Aug.	17	8
37a	E.	3rd Feb.	16	3	305a	L.	13th Aug.	20	8
474a	P.	8th Feb.	16	9	1000	S.	20th Aug.	11	2
55a	B.	8th Feb.	16	4	692	P.	1st Sept.	17	8
687	P.	24th Jan.	17	3	114b	A.	18th Sept.	14	10
807	S.	14th Feb.	14	7	1010	S.	17th Sept.	10	11
7a	P.	17th Feb.	16	10	729	T.	17th Sept.	16	...
519a	P.	19th Feb.	18	5	996	S.	2nd Oct.	11	6
467a	P.	27th Feb.	18	5	151a	C.	15th Oct.	19	7
368a	D.	27th Feb.	16	1	177a	CG.	15th Oct.	21	7
479a	P.	27th Feb.	18	5	697	P.	15th Oct.	16	...
832	P.	5th Mar.	13	11	782	T.	15th Oct.	15	...
110a	A.	6th Mar.	16	10	334a	D.	18th Oct.	20	3
242a	B.	12th Mar.	20	...	718	P.	26th Oct.	12	2
813	S.	10th Mar.	13	3	660a	S.	29th Oct.	15	2
16a	E.	19th Mar.	16	1	681	P.	31st Oct.	17	10
209a	B.	21st Mar.	19	10	850	P.	8th Nov.	14	...
410a	B.	28th Mar.	19	9	424a	E.	12th Nov.	13	5
508a	P.	14th Apr.	14	8	861	T.	17th Nov.	14	7
759	T.	2nd May	14	10	930	N.	21st Nov.	13	9
752	T.	7th May	12	11	1005	S.	4th Dec.	11	5
683	P.	12th May	17	8	1016	S.	15th Dec.	11	...
674	T.	12th May	19	6					

Total—67 boilers.

Average age 16 years 4 months.

Engine Failures.

187. The question of engine failures requires close attention. A failure is measured in railway practice when time is lost by a train due to the engine having some defect which prevents it from keeping the scheduled time, no matter what the cause may be. This is usual on most railways, and on those in New South Wales if a passenger train loses five minutes, or a freight train ten minutes, through the fault of the locomotive, a failure is recorded against it. On the London and North-Eastern Railway, Great Britain, with which line we propose to make comparisons, the practice is five minutes delay all round—both passenger and freight.

188. The comparison is by the number of failures to the train miles run. On the New South Wales railways the train mileage has added to it light and assisting miles, while on the British railway both these are eliminated. This gives a greater advantage in mileage to the Australian railways, while they also get the allowance of ten minutes instead of five so far as freight trains are concerned. The figures are for the twelve months ended 30th June, 1923, in the case of New South Wales, and for the London and North-Eastern Railway the year 1923. They show that in New South Wales there was one failure for every 4,225 miles run, and in the case of the British railway one failure for every 39,863 miles run. This confirms the opinion we had formed when considering the condition of the locomotives that the failures would be high.

189. Bad water is given as one of the reasons for these failures, but, in our view, the water which causes failures can be dealt with. It was stated in evidence by the Chief Mechanical Engineer (Q. 2581) that means had been taken to deal with the water at various places.

190. In a statement handed in by the Australian Federated Union of Railwaymen they draw very forcible attention to the dirty condition of engines and point out the impossibility of making a close examination. Our own observation bears this out.

191. The question of lubrication has been raised and careful consideration has been given to the points brought out. In all the circumstances we see no reason to make any departure from the practice now adopted, which appears to give satisfaction to the Chief Mechanical Engineer.

192. Notice must be taken of the spring failures, which appear to be unusually high. In ten months there were found broken in the locomotives of New South Wales 2,912 springs, and, as will be seen from the evidence of the Chief Mechanical Engineer, he does not consider it a large quantity (Q. 2563). We can hardly agree with this. What is exactly the cause should be the subject of very serious investigation, as we feel confident that means can be found to reduce this number very materially.

Coal Consumption.

193. In dealing with the question of coal consumption, it was found that no system is in force for the weighing of coal to be used by locomotives. This is also brought out in the evidence given by the Chief Mechanical Engineer (Q. 2586A). He stated (Q. 2593) that the existing practice is to accept the estimate of the fuelman who puts the coal on the tender. No kind of record is kept of his estimate and little reliance can, therefore, be attached to it from the point of view of estimating coal consumption for any particular engines. In our opinion it is both desirable and necessary to introduce a means by which coal supplied to individual locomotives can properly be weighed or closely estimated. This should not involve any great expense, and we are convinced that some expenditure would be justified by the results obtained.

Comparative Costs of Coaling Engines.

194. The method adopted in regard to the placing of coal upon the tenders varies at several of the depots. In certain instances the coal is loaded by hand from truck or stage; in others, hand-filled skips are tipped to the tender; again bunkers are filled by conveyor belts and the coal gravitates to the tenders by chutes, &c., as will be seen from the statement set out hereunder:—

Handling of Coal, May, 1924.

Depôt.	Method of Loading Coal into Tender.	Tonnage placed on Tenders.	Handling Costs per ton.
Eveleigh Elevator ...	Bunker filled by conveyor belt—Gravitates to tender by chutes.	19,953	d. 4.7
Eveleigh ...	Hand-filled skips tipped to tender ...	5,045	23.2
Hurstville ...	By hand from truck or stage to tender ...	726	11.4
Homebush ...	By hand from truck or stage to tender...	807	10.3
Sydney ...	By hand from stage to tender ...	2,255	17.2
Enfield ...	Coal bunker filled by trucks propelled up ramp and coal gravitates to tender by chute.	9,573	3.1
Penrith ...	Coal bunker filled by conveyor buckets. Gravitates to tender by chute.	1,023	6.4
Valley Heights ...	Coal bunker filled by trucks propelled up ramp, and coal gravitates to tender by chute.	1,642	2.8
Thirroul ...	Coal bunker filled by trucks propelled up ramp, and coal gravitates to tender by chute.	2,422	2.1
Clyde ...	By hand from truck or stage to tender ...	1,547	18.8
Hornsby ...	By hand from truck or stage to tender ...	3,263	17.5
Milson's Point ...	By hand from truck or stage to tender ...	1,199	11.8
Picton ...	By hand from truck or stage to tender ...	484	17.3
	Total, Metropolitan ...	49,939	8.5

Handling of Coal—continued.

Depot.	Method of Loading Coal into Tender.	Tonnage placed on Tenders.	Handling Costs per ton.
South Goulburn ...	Coal bunker filled by trucks propelled up ramp, and coal gravitates to tender by chute.	2,965	d. 5·8
Goulburn ...	Priestman's Coal Crane, with grab and buckets (partly by hand).	2,778	11·9
Harden ...	Coal bunker filled by trucks propelled up ramp, and coal gravitates to tender by chutes.	3,760	1·8
Demondrille ...	Coal bunker filled by trucks propelled up ramp, and coal gravitates to tender by chute.	1,878	2·4
Cowra ...	Coal bunker filled by truck propelled up ramp, and coal gravitates to tender by chutes.	1,987	1·9
Cootamundra ...	By hand from truck or stage to tender	912	11·7
Temora ...	By hand from truck or stage to tender	721	16·4
Junee ...	By coal crane with buckets, and partly by hand	5,344	18·1
Albury ...	By hand from truck or stage to tender	750	16·4
Culcairn ...	By hand from truck or stage to tender	418	12·8
Narrandera ...	By hand from truck or stage to tender	716	11·6
Total, Southern		22,229	9·5
Lithgow ...	Hand-filled coal skips tipped to tender from elevated stage...	5,612	11·3
Wallerawang ...	By hand from truck or stage to tender	743	15·0
Mudgee ...	By hand from truck or stage to tender	904	12·4
Bathurst ...	Hand-filled coal skips tipped to tender from elevated coal stage.	4,158	14·7
Orange ...	By coal crane with clam-shell bucket (partly by hand) ...	1,356	13·9
Parkes ...	By hand from truck or stage to tender	988	16·2
Wellington ...	By air hoist, and buckets hand filled	1,496	13·8
Dubbo ...	By hand from truck or stage to tender	1,508	15·4
Nyngan ...	By hand from truck or stage to tender	575	13·8
Total, Western		17,340	13·5
Broadmeadow ...	Coal bunker filled by trucks propelled up ramp, and gravitate coal to tender by chute.	12,176	5·1
Singleton ...	By hand from truck or stage to tender	762	14·0
Port Waratah ...	Coal bunker filled by trucks propelled up ramp, and gravitate coal to tender by chutes.	5,801	1·6
Taree ...	By hand from truck or stage to tender	2,664	15·0
Murrurundi ...	By hand from truck or stage to tender	934	21·4
Werris Creek ...	Coal bunker filled by trucks propelled up ramp, and gravitates coal to tender by chute.	5,565	4·4
West Tamworth ...	By hand from truck or stage to tender	294	12·7
Narrabri West ...	By coal crane and clam-shell buckets (partly by hand) ...	1,272	12·2
Moree ...	By hand from truck or stage to tender	481	16·6
*Armidale ...	By "Holman" coaling plant conveyor belt to bin, and gravitates to tender.	2,741	15·4
Tenterfield ...	By hand from truck or stage to tender	790	22·6
Total, North		33,480	7·4
Grand Total		122,988	9·1

* Armidale is also supplied with coal crane and clam-shell bucket.

195. It will be observed that the handling costs per ton of coal placed on the tenders differs very considerably at the several depots, ranging in respect of the month of May, 1924, from 1·6d. at Port Waratah, where the coal bunker is filled by trucks propelled up the ramp, the coal gravitating to the tender by chutes, to 23·2d. at Eveleigh, where hand-filled skips are tipped to tender. In our opinion it is desirable to arrange as far as possible for the standardisation of the method of loading coal into tenders, and as, generally speaking, the handling costs appear to us to be excessive, we consider that close attention should be given to this point.

Cost

Cost of Coaling Appliances.

196. The cost of coal loading appliances is set out below :—

Depot.	Nature of Appliance.	Capacity of Bunker.	Cost of Appliance.	Remarks.
		tons.	£	
Eveleigh Elevator ...	Bunker filled by conveyor belt. Coal gravitates to tender by chutes.	1,500	20,703	The only mechanical handler on the system.
Enfield ...	Bunker filled by trucks propelled up ramp. Coal gravitates to tender by chute.	1,600	15,013	.....
Valley Heights ...	" "	300	6,294	.....
Thirroul ...	" "	400	4,871	.....
Demondrille...	" "	1,000	20,024	Also includes expenses in connection with ash handling pits, &c.
South Goulburn ...	" "	800	13,603	Expensive earthworks necessary.
Harden ...	" "	1,200	10,527	.....
Cowra ...	" "	800	11,927	.....
Broadmeadow ...	" "	1,000	14,343	.....
Port Waratah ...	" "	550	7,623	.....
Werris Creek ...	" "	800	9,902	.....

197. Excluding the Eveleigh Elevator, the cost of the appliances installed amounted to £114,127, and the coal placed on tenders during May, 1924, at the ten depots enumerated was 47,769 tons, the handling costs averaging 3·65d. per ton. At the other depots (excluding Eveleigh Elevator) the coal placed on tenders was 55,266 tons, and the handling cost 15·42d. per ton. The difference in the costs is so noticeable that it would appear desirable for immediate consideration to be given the installation of these appliances at certain other depots, especially where large quantities of coal are handled as at Hornsby, Sydney, Dubbo, Clyde, Taree, &c.

Coal Consumption Comparisons.

198. As a means of emphasising our view that the coal consumption on the New South Wales Railways is excessive, comparisons have been made on an engine mile basis with certain other railways in Australasia and in Great Britain, with the following result :—

Consumption of Coal, 1923.

Company.	lbs. per Engine Mile.
New South Wales ...	85·18
Victoria ...	73·19
Queensland ...	60·70
South Australia ...	51·43
Western Australia ...	93·80
New Zealand ...	56·76
Average, Australasia ...	72·00
Great Western ...	46·19
London and North-Eastern ...	58·05
London, Midland, and Scottish ...	58·61
Southern ...	45·71
Average, Great Britain ...	54·85

199. When it is realised that if the coal consumption per engine mile in New South Wales had been at the same rate as the average for Australasia—the latter being much higher than the average for Great Britain—the annual saving would be at the rate of £122,258, it will be recognised that there is urgent need for considerable improvement.

200. The reasons given for the excessive consumption of coal in New South Wales are :—(1) The large tractive effort of the engines; and (2) the difficult roads to be negotiated both with regard to curves and grades. These reasons, however, do not appear to us to justify the high coal consumption.

Tractive Effort in Relation to Coal Consumption.

201. The tractive effort on the New South Wales Railways is 23,751 lbs. (Q. 2603), and on the London and North-Eastern Railway 20,120 lbs. Increasing the coal consumption figure on the latter railway in the same ratio as the tractive effort bears to that of the New South Wales Railways, the result would be a consumption of 68.53 lbs. per engine mile, as against 85.18 lbs. in the case of New South Wales. It will be seen that the difference is still considerable, and, on the engine mileage run during the twelve months ended 30th June, 1923, there would have been a saving of £154,446 if the New South Wales consumption had been on the same level as the amended L. and N.E.R. figure.

Curves and Grades.

202. We do not overlook the difficulty of a frequent decrease or increase of load over varying grades, but if all possible regard be had to the grades and curves of the sections over which engines have to run, we are of opinion that the coal consumption per engine mile, as compared with other systems, is not accounted for by the physical aspect of the New South Wales Railways. There is no doubt a certain amount of punishing of engines—due in all probability to the age of a number of them rendering them unfit for strenuous service—and this is reflected in the number of burnt smoke-box doors we have observed, while it has a bearing not only upon maintenance costs, but also upon coal consumption.

203. It will be seen in the evidence given by the Chief Mechanical Engineer (Q. 2596) that he is not at all satisfied with a comparison made on an engine mile basis. The coal consumption per 1,000 gross ton-miles, which he suggested as a more accurate basis of comparison, is not kept on the railways of Great Britain, but, as the Chief Mechanical Engineer had referred to the Eastern District of the United States of America (Q. 2606), as being more nearly comparable with the railways here, we have obtained the figures relating to that district, the comparison being as follows :—

Consumption of Coal per 1,000 Gross Ton-miles (including Engine and Tender).

	lbs.
Eastern District of United States of America	159.00
Western District of United States of America	160.00
Southern District of United States of America	165.00
Average—United States (Class 1 Railways)	161.00
New South Wales Government Railways	290.33

204. Steam blowing from packing and various parts of the locomotives, as also from wasting steam through the safety valves, the latter due to neglect in having the steam pressure too high, add to the coal consumption. We have noticed a very large number of engines wasting steam in this way, and suggest that special instructions be given to prevent such unnecessary consumption.

205. We are undoubtedly of opinion that the consumption of coal is excessive, and that no means exist of discovering which locomotives or groups of locomotives are the worst offenders, inasmuch as no attempt is made to find out the coal consumption except as a whole. As this is a weakness which should be cured before it develops more seriously, we recommend that careful consideration should be given to the question, as we are confident the coal consumption can be reduced.

Coaching Stock.

206. We are of opinion that the railways are inadequately equipped with coaching stock at the present time, and this is borne out by the evidence of the Chief Mechanical Engineer and the Chief Traffic Manager. The Chief Mechanical Engineer states further that, by the end of 1926, the Commissioners anticipate obtaining 300 suburban carriages for the electrical service, by which time they expect to dispose of an equal number of old vehicles. It is true that the seating and standing accommodation of the new stock will be greater than that which will

will be retired, nevertheless, if electrification bears out past experience—and traffic density increases as a direct consequence of improved facilities—then the better seating accommodation will not put the Department in any stronger position so far as stock is concerned.

207. There are at the present time 107 different types of coaching stock, some of which are very old and should be replaced. The Chief Mechanical Engineer in his evidence (Q. 2867) stated that he expects to reduce these to twenty different classes. In view of this, it must be acknowledged that a number of carriages should be built without delay over and above those to be used on the electrical service.

208. It has already been pointed out that the shops are quite unfit to deal with the maintenance and renewals required at present, and, as the number of vehicles should be increased, the position will become more acute. The building of new carriage shops at Chullora is, therefore, vital, and cannot be too strongly urged.

209. The cost of maintaining the carriage stock is high, as will be seen from the following particulars:—

Maintenance of Coaching Vehicles—1923.

Company.	Cost of Maintenance.	No. of Coaching Vehicles.	Average cost per Vehicle.	Revised on basis of English Costs.
	£		£	£
New South Wales	419,789	2,188	192	112*
Victoria	405,252	2,587	157	92†
Queensland	151,663	1,042	140	85†
South Australia	128,491	716	179	104†
Western Australia	60,141	485	124	72†
New Zealand	191,774	1,498	128	74†
Great Western	809,984	10,139	80	.....
London and North Eastern	1,804,814	21,218	85	.....
London Midland and Scottish	1,998,406	26,603	75	.....
Southern	715,561	10,073	71	.....

* This figure has been compiled on the basis of wages being 100 per cent. higher than in England and material 35 per cent.
 † Reduced in the same ratio as in the case of New South Wales.
 From the English costs must be deducted the costs of painting the vehicles.

210. In his evidence, the Chief Mechanical Engineer quoted a figure of £112 (Q. 2822) as the average cost per vehicle for the coaching stock in Great Britain. He has, however, since agreed that he had included items which were not at all comparable, and the figure as now accepted stands at £80. No doubt, if suitable shops were provided and the old stock replaced, a considerable reduction in the maintenance costs would result.

Wagons.

211. It is not the practice for the Railway Department to build new wagons. When they are required, the construction is let out to contractors who deliver the trucks as early as possible. The Estimates, however, are passed so late in the year that, as the contractors have to get their material from abroad, it seems from the evidence given by the Chief Mechanical Engineer that sufficient trucks cannot be procured. We consider this should be obviated, but, in view of the comparatively small number required annually to keep up the stock, it would not be economical to build and equip shops to carry out their own manufacture.

212. The erection of shops and equipping them with up-to-date machinery for the economic building of wagons would involve a very considerable outlay, and, unless the shops were constantly filled with work, a large capital would necessarily remain idle. This would more than outweigh any extra cost which might be incurred through the purchasing of trucks from outside sources, and we think improved purchasing arrangements, in anticipation of requirements, should be introduced.

213. It has been brought out in evidence that at certain periods of the year—especially during droughts—there is a shortage of sheep trucks. This requires careful attention and it is thought that consideration might with advantage be given to the designing of a combined truck to get over the difficulty. It is, however, desirable in developing a vehicle of this description that it should have the approval of the traders who are going to make use of it, and they should be consulted both during the design of the truck and its trial before putting any number of them in hand.

214. On some railways trucks with end doors are used, thus enabling cattle to be loaded at one end of a train and run through from truck to truck. The suitability of such a method for New South Wales might well be considered. Ordinary open goods wagons have on occasion been used, and, although causing certain suffering, have eased the position in the movement of starving stock.

215. The Chief Mechanical Engineer in his evidence (Q. 2929) gave a figure of £11. 8s. as the average maintenance cost per wagon in Great Britain. Here, again, he subsequently agreed that he had included items which were not at all comparable. The figure as now accepted is £7. 4s. In the Chief Mechanical Engineer's evidence (Q. 2930) reference is made to various comparisons between Great Britain and New South Wales, but it was later agreed that the figures were not accurate. It will be observed from the following comparison that the maintenance cost per wagon is higher in New South Wales than elsewhere in Australasia, with the exception of Victoria, and is higher than in Great Britain :—

Maintenance of Goods Wagons (excluding service vehicles) year 1923.

Company.	Cost of Maintenance.	No. of Goods Wagons.	Average cost per Wagon.	Revised on basis of English Costs.
	£		£	£
New South Wales	429,186	21,577	20	12*
Victoria	393,190	19,211	20	12†
Queensland	188,467	13,840	14	8†
South Australia	154,606	9,231	17	10†
Western Australia	85,773	9,670	9	5†
New Zealand	343,847	25,576	13	8†
Great Western	744,530	86,249	9	.....
London and North Eastern	2,914,029	281,748	10	.....
London Mid. and Scottish	1,921,979	302,550	6	.....
Southern	305,669	35,905	9	.....

* This figure has been compiled on the basis of wages being 100 per cent. higher than in England and material 35 per cent.

† Reduced in the same ratio as in the case of New South Wales.

216. The wagon stock generally is in very good condition, and, in connection with the comparisons made, consideration should be given to the fact that the average carrying capacity of the New South Wales wagons is greater than on some of the railways quoted. It should also be borne in mind that all freight vehicles in New South Wales are fitted with automatic brakes. This does not apply generally in the case of the British railways, and would have an effect upon maintenance costs.

Automatic Couplings.

217. It was decided to adopt the automatic coupling in Australia with the expectation of being able to increase the loads and to deal with the coupling and uncoupling of trains in a more rapid manner than at present. It was also expected to reduce the total weight of the vehicle and the maintenance costs. This form of coupling had been decided upon in conference between the Commissioners of the various States, and the necessary alterations are being carried out as funds permit in each of the States. We have looked through the correspondence and have examined the coupler, and are satisfied that everything possible is being done having regard to the funds at the disposal of the Department.

High Maintenance and Running Costs.

218. It will be noted from the foregoing remarks that the maintenance costs, failures, and coal consumption so far as locomotives are concerned are considered high. This is largely attributable to the fact that many of the engines are old and obsolete. They are, therefore, not up to their work and should have been renewed some years ago. It is not wise to keep locomotives in existence by indefinitely renewing their various parts. This was an old practice but experience has taught railway managers that it is undesirable and in every way uneconomical. The only way adequately to meet the necessary changes due to obsolescence and other causes is to wholly renew a certain number of locomotives annually or, on the basis of the expected life of the stock, allocate a sum every year to a reserve fund in order to meet renewals as and when it is convenient to carry them out.

219. Part II of the Report makes reference to the absence of any renewal fund to provide for obsolescence and wasting assets. After having given careful consideration to the utility life of rolling-stock, we have come to the conclusion that, on the New South Wales Government Railways, the renewal life of a locomotive should average thirty-five years, for coaching stock twenty-eight years, and for wagons twenty-five years. The capital cost of locomotives in 1923, was £6,937,260, carriages £3,514,054, and wagons £5,224,316. On the utility life bases mentioned above, and on the capital value of the stock in existence in 1923, this would mean the setting aside of £198,207 annually in respect of locomotives or the provision of thirty-eight engines; the setting aside of £125,502 in the case of coaching stock, or the provision of seventy-eight vehicles; and £208,973 in the case of goods stock, or the provision of 939 new wagons, making a total of £532,682. As we have emphasised elsewhere, nothing like a sufficient amount has been spent on renewals, and we understand this has been largely influenced, so far as locomotives and carriages are concerned, by the proposed electrification of the suburban lines which will release 157 engines and 300 carriages.

220. It is also absolutely essential that adequate workshops should be provided in order to deal with locomotive repairs at headquarters, as it is not economy to carry out repairs at small and outlying shops scattered over the line where various methods may be adopted, and where the constant supervision of those in responsibility at headquarters is impossible. It may be difficult and unnecessary to build new locomotive shops at once, and it would probably be wise, after moving the boiler shops and also the carriage shops to Chullora, to rearrange Eveleigh, and concentrate the repairs at that place, in the meantime purchasing new locomotives outside.

221. In the course of time the locomotive works should also be moved to the new site and laid out in such a way as to allow of all the repairing and building to be carried out there. Until this is done and the old stock replaced, little hope may be expected of any considerable reduction in the maintenance costs so as to be able to compare satisfactorily with an up-to-date and well-equipped railway. The number of engine failures on the New South Wales Railways should also be brought down to a normal basis with improved maintenance. Further reason for the abnormal quantity of failures which exists at present is the fact that there is an insufficiency of locomotives to deal with the work, as shown by the small number in reserve and the large proportion under repairs or waiting to go into the shops. An improvement in this respect will also have to be made before satisfactory results can be expected.

222. It is also noticeable that some of the engines with small wheels of 51 inches diameter are timed to run at too high a speed, and this, coupled with the rough roads that have to be traversed in certain sections, probably tends to break the springs and wear out the moving parts.

223. The excessive coal consumption is due no doubt to the difficulty in maintaining the engines, but, apart from this, arrangements should be made so as to enable those responsible to have definitely brought before them the classes of engines and also the depots which are the highest users of coal.

224. In concluding this Section we desire to emphasise the fact that out of the total working expenditure, the department supervised by the Chief Mechanical Engineer spends at least 50 per cent. On the New South Wales Railways

in 1923, although nothing was spent for renewals, a sum of £5,247,980 is shown as the cost of the Chief Mechanical Engineer's Department out of a total expenditure of £10,649,974. This conclusively shows that special attention must at all times be paid to this Department, as it is vital, in the highest interests of the undertaking, that the Mechanical Engineering Branch should be governed in the most approved and economical way.

Proposed Standard Locomotives.

225. The number of different classes of locomotives is thirty-nine (Q. 2478), many of them being of obsolete types. It has, therefore, been essential to consider what types should be perpetuated so far as can be determined with a knowledge of the traffic, and the gradients and curves of the railways over which it has to be hauled. The conclusion we have arrived at, after going into the matter carefully with the Chief Mechanical Engineer, is that the engines which might be standardised as useful and of modern construction could be reduced to ten different classes. Eight classes now existing are enumerated as follows and are shown in diagrammatic form:—

	Class.	No.
Passenger.	S	145
	P	191
	N	5
	NN	35
	NN2	25
Total Passenger ...	...	401
Goods.	T	280
	TF	190
	K	150
Total Goods ...	...	620
Grand total ...		1,021

226. There are to-day 1,391 engines, of which thirty-four are not worth repairing and twenty are used by the engineer on construction work, thus leaving 1,337 for the purpose of working the traffic. This would mean that 316 would be left as old obsolete engines at present in traffic which would not be considered as standards. Of these, 157 will be thrown out of traffic when the electric scheme in connection with the new bridge is finished and the lines up to Hornsby, Parramatta, Bankstown and Sutherland are electrified, thus leaving 159 to be replaced, which should be done within the next four years. At the end of this time a standard class of engine will be adopted, and the costs of maintenance, &c., which are now high, should then be greatly reduced.

227. Amongst the ten standard classes will be two newly designed locomotives, one passenger and the other goods, which will deal with the heaviest class of traffic, and which appear to be in every way suitable. The designs of these have been examined and substantially approved by us. They will be powerful engines, and, so far as can be seen, should be able to deal satisfactorily with the heavier class of traffic carried over the New South Wales Railways. Diagrams of these are also shown.

Standard Carriages.

228. There are at present 107 types of coaching stock. These have been considered very carefully and, so far as passenger-carrying vehicles are concerned, it is our opinion that they might be reduced to eight different designs which are shown in diagrammatic form. Those selected as the future standard are of the latest types, but it will take many years to get these established, as the total passenger-carrying stock to-day is 1,760, made up of eighty-nine sleeping cars, 710 ordinary main line, and 961 suburban coaches. The number of those in the standard types is 210, leaving 1,550 to be replaced. A large number of these will be replaced with the new suburban electric service, but it will

will still leave many to be dealt with in course of time. From an economic standpoint, the aim should be to reduce the standards to as few as possible, and, when they can be brought down to our proposals, considerable saving should result, while the Traffic Department would be assisted materially.

Electric Traction essential for dense Suburban Traffic.

229. Electric traction has been carried out in many countries, and, from an operating point, with complete success in every case. It has not always, in the first instance, been adopted with the hope of immediate financial reward, but for the reason that on urban and suburban lines conditions have arisen with which steam traction cannot effectively cope. If the transport needs of the public are to be met in thickly populated areas, speedy and constant train services must be provided by those responsible.

230. The growth of suburban travel and requirements, especially at the rush hours, is so great that it can only be met by trains carrying a large number of passengers at frequent intervals. It, therefore, requires a means of transport giving quick acceleration and high speed, while, from the point of view of economical working, it is desirable that trains may readily be divided and run in smaller units at such times as the traffic requirements are relatively light. This necessity is met by substituting electric for steam traction, and it has usually been found that electric working leads to substantial economies in operation and other incidental advantages which in the end fully justify the capital outlay necessitated by the change. It may also be stated that, where heavy gradients exist, electric traction is most advantageous as the maximum power and even over load can be exerted without doing any harm to the machine. This cannot take place with the steam locomotive, as great care has to be exercised in order that the steam may not be allowed to drop.

City and Suburban Railway.

231. The New South Wales Railway system around Sydney lends itself in a most remarkable way to electrification, from its dense and congested traffic, its steep gradients, and the proximity of coal-fields. It has long been realised by the Railway Commissioners that the ever-increasing growth of the passenger requirements in and around Sydney must be met by improved railway and tramway services, and various Royal Commissions have been appointed to consider the matter and report thereon. It is understood this dates back as far as 1890, but nothing was finally submitted to Parliament until the end of 1915, when a part only of the scheme was sanctioned. This scheme, which was prepared by Mr. Bradfield, was for the City and Suburban railway to be electrically operated.

232. The work was commenced under an agreement with Messrs. Norton Griffiths & Co., in 1916, but, on the agreement terminating in May, 1917, work was resumed under the control of the Railway Commissioners. This continued only until July of that year when it was stopped by the direction of the Government. The work was again started in February, 1922, but with authority for only a part which is progressing at a very slow rate, and is only dealing with a section of the City railway barely sufficient to accommodate the traffic from one of the suburban systems. As only the eastern portion of the City railway has been authorised, great difficulty would have been experienced in crossing western traffic over eastern tracks, and, therefore, it has become necessary in the first place to electrify the most easterly lines, viz., the Illawarra, instead of those between Sydney and Strathfield, over which the traffic density is greatest.

233. A study of the map showing the original proposals instances clearly how valuable would have been the immediate electrification of :—

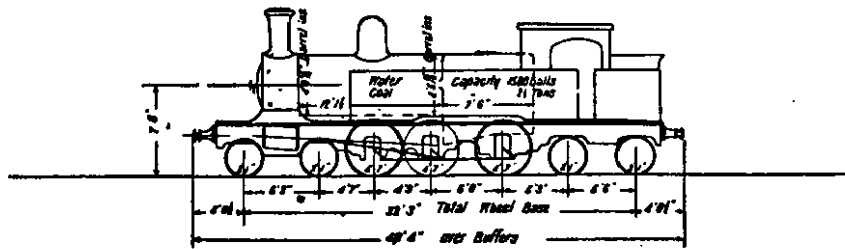
Main Suburban Lines to Parramatta.

Strathfield to Hornsby.

Hornsby to Milson's Point.

Illawarra to Sutherland.

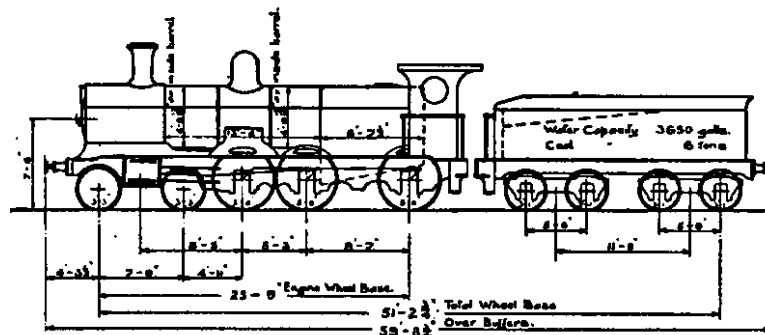
N.S.W.G.R.



	T.C.G	T.C.G	T.C.G	T.C.G	T.C.G	T.C.G
Weight Empty	12-14-3	11-14-2	12-10-1	10-0-8	10-0-9	57-14-3
Do in Steam	13-17-3	13-7-0	14-10-3	14-2-2	18-18-1	72-3-1

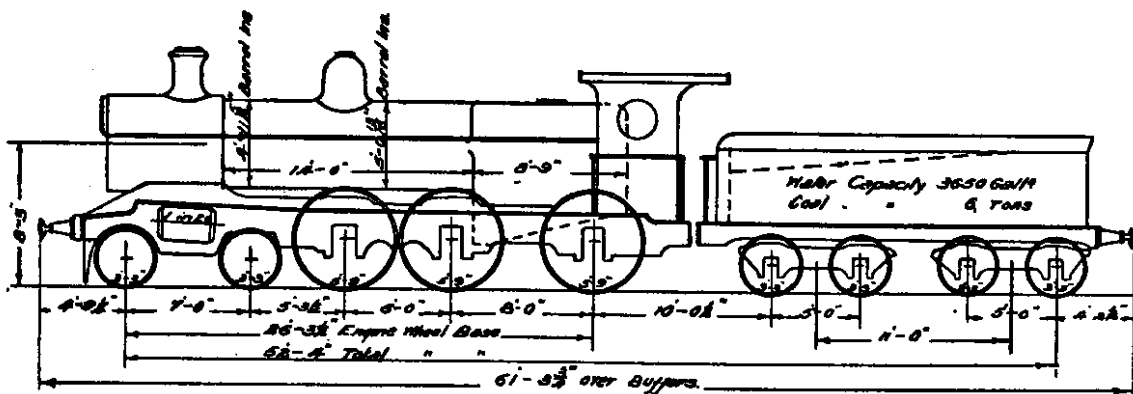
Cylinders--19 $\frac{1}{2}$ " x 24 stroke. Slide Valve Tractive Power--19120 lbs. Grate Area--24 sq ft B.P = 160 lbs/sq
 Boiler Heating Surface (sq ft) Firebox--118. Tubes--1339. Total--1457.
 Suburban Passenger Engine-- S Class.

N.S.W.G.R.



Cylinders--21" x 26 stroke. Piston Valve--9" Tractive Power--26000 lbs. Grate Area--27 sq ft B.P = 160 lbs/sq
 Boiler Heating Surface (sq ft) Firebox--130. Tubes--1354. Sup. Heater--429. Total--1913.
 Passenger Engine-- P Class.

N.S.W.G.R.



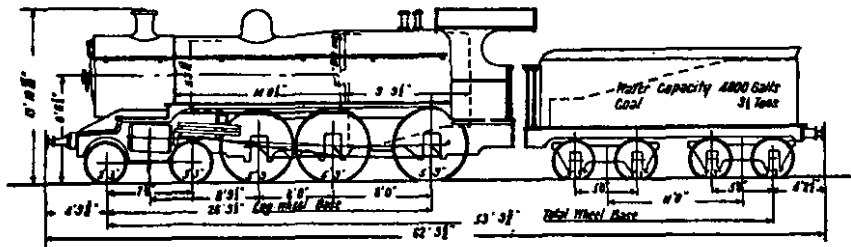
	T.C.G	T.C.G	T.C.G	T.C.G	T.C.G	T.C.G	T.C.G	Total
Weight Empty	7-13-0	7-16-2	15-8-2	15-13-0	13-10-0	10-0-2	10-3-2	80-7-0
in Steam	9-4-0	9-8-0	16-0-0	16-13-0	13-5-0	21-12-0	13-12-0	108-12-0

Cylinders--21 $\frac{1}{2}$ " x 26 stroke. Piston Valve--9" Tractive Power--26649 lbs. Grate Area--26.9 sq ft. B.P = 180 lbs/sq
 Boiler Heating Surface (sq ft) Firebox--155. Tubes--1468. Sup. Heater--436. Total--2059.

Passenger Engine-- N Class.

Standard Locomotives-- Existing Types.

N.S.W.G.R.



	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0
Weight Empty	8-14-2	10-7-0	15-17-0	17-11-0	17-16-0	11-10-0	10-3-0	9-18-2
Do in Steam	8-12-0	10-12-0	15-19-0	20-0-0	19-18-0	23-7-0	23-4-0	12-5-0

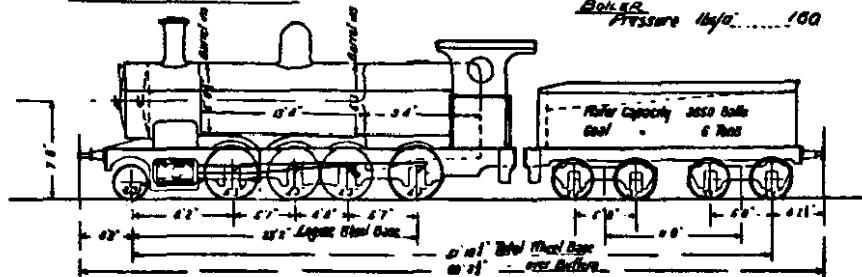
Cylinders -- 22" x 26 stroke. Piston Valve -- 10" Tractive Power -- 29180 lbs. Grate Area -- 30.5 sq ft. B.P. = 180 lbs/sq in.
 Boiler Heating Surface (sq ft) Firebox -- 195 Tubes -- 2040. Sup. Heater -- 547. Total -- 2782.

Passenger Engine -- NN Class.

HEATING SURFACE
 FIREBOX 367-166
 TUBES 1659-7
 SUP HEATER 391-37
 TOTAL 2217-07

N.S.W.G.R.

CLASS T 524 SUPERHEATED
 CYLINDERS
 Diam (inches) 22
 Stroke 26
 TRACTIVE POWER 33600
 BOILER
 Pressure (lbs) 160

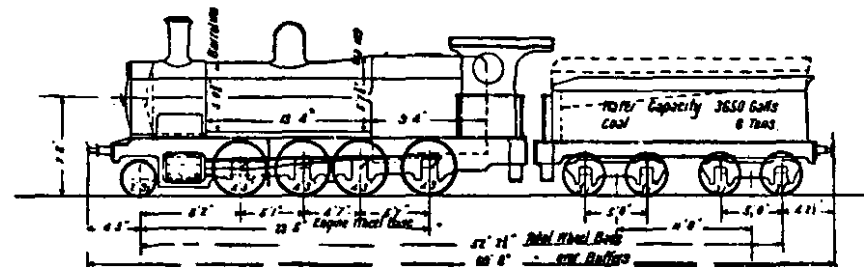


	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0
Weight Empty	5-18-0	10-10-0	13-10-0	13-10-0	12-10-0	10-3-2	9-10-0	7-9-2
Do in Steam	5-8-0	14-2-0	15-10-0	15-8-0	14-8-0	20-18-0	20-18-0	10-7-0

Cylinders -- 22" x 26 stroke. Piston Valve -- 11" Tractive Power -- 33600 lbs. Grate Area -- 29.75 sq ft. B.P. = 160 lbs/sq in.
 Boiler Heating Surface (sq ft) Firebox -- 186 Tubes -- 1600. Sup. Heater -- 391. Total -- 2217.

Goods Engine -- T Class

N.S.W.G.R.



	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0
Weight Empty	8-7-0	10-13-2	15-7-0	14-5-0	14-7-0	10-17-0	8-5-2	8-6-2
Do in Steam	8-10-0	14-16-0	16-7-0	17-7-0	16-1-0	23-0-0	18-15-0	11-3-0

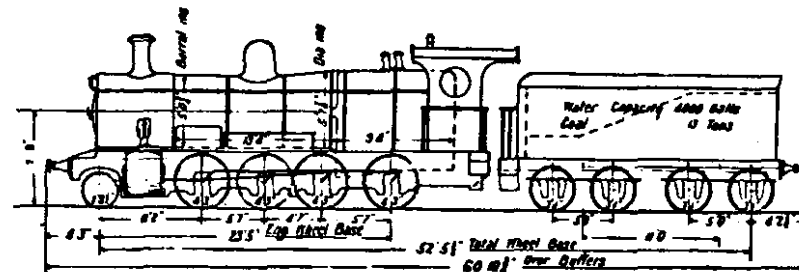
4000 gals. Tender

	11-18-3	10-12-3	8-6-0
	20-13-0	24-7-0	12-4-7

Cylinders -- 22" x 26 stroke. Piston Valve -- 10" Tractive Power -- 33600 lbs. Grate Area -- 29.75 sq ft. B.P. = 160 lbs/sq in.
 Boiler Heating Surface (sq ft) Firebox -- 174 Tubes -- 1583. Sup. Heater -- 448. Total -- 2201.

Goods Engine -- TF Class.

N.S.W.G.R.



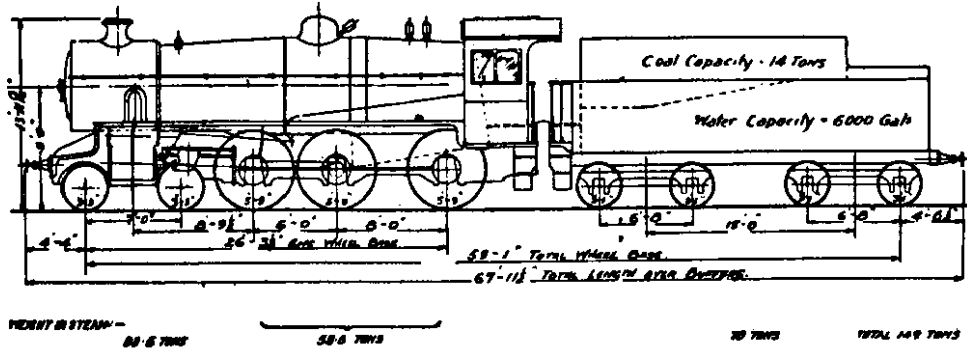
	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0	T-C-0
Weight Empty	6-10-3	14-11-2	14-13-2	14-18-2	14-10-1	12-8-3	11-15-3	9-10-1
Do in Steam	6-18-3	15-9-3	16-10-1	16-10-3	17-5-2	27-4-2	26-11-3	12-7-1

Cylinders -- 22" x 26 stroke. Piston Valve -- 10" Tractive Power -- 33600 lbs. Grate Area -- 28.75 sq ft. B.P. = 160 lbs/sq in.
 Boiler Heating Surface (sq ft) Firebox -- 174 Tubes -- 1583. Sup. Heater -- 448. Total -- 2201.

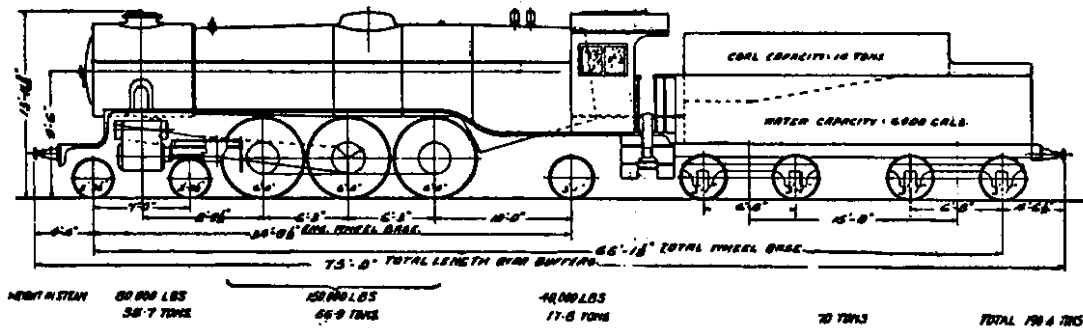
Goods Engine -- K Class

Standard Locomotives—Existing Types.

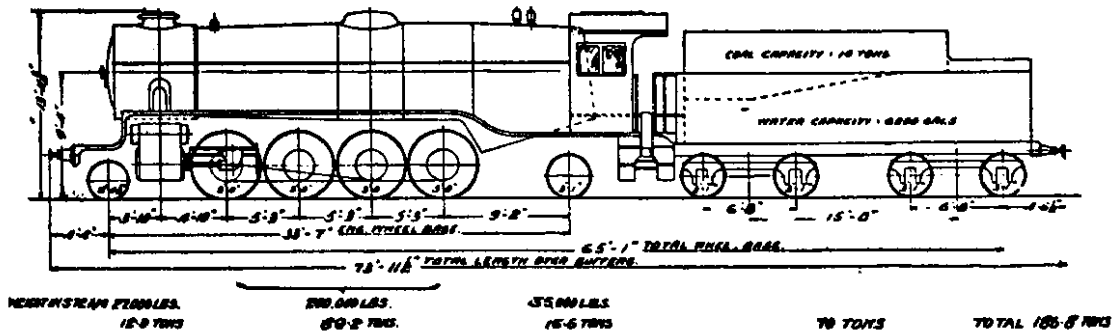
NSW.G.R.



CYL. 2 29" STROKE, PISTON VALVES 1 1/2" DIA., TRACTIVE POWER 30,000 LBS., GRATE AREA 30.5 SQ. FT., B.P. 180 LBS. PER SQ. INCH
TUBE HEATING SURFACE 1800 SQ. FT., FIREBOX 150 SQ. FT. SUPERHEATER 650 SQ. FT. TOTAL 2500 SQ. FT.
PASSENGER ENGINE MINN. CLASS

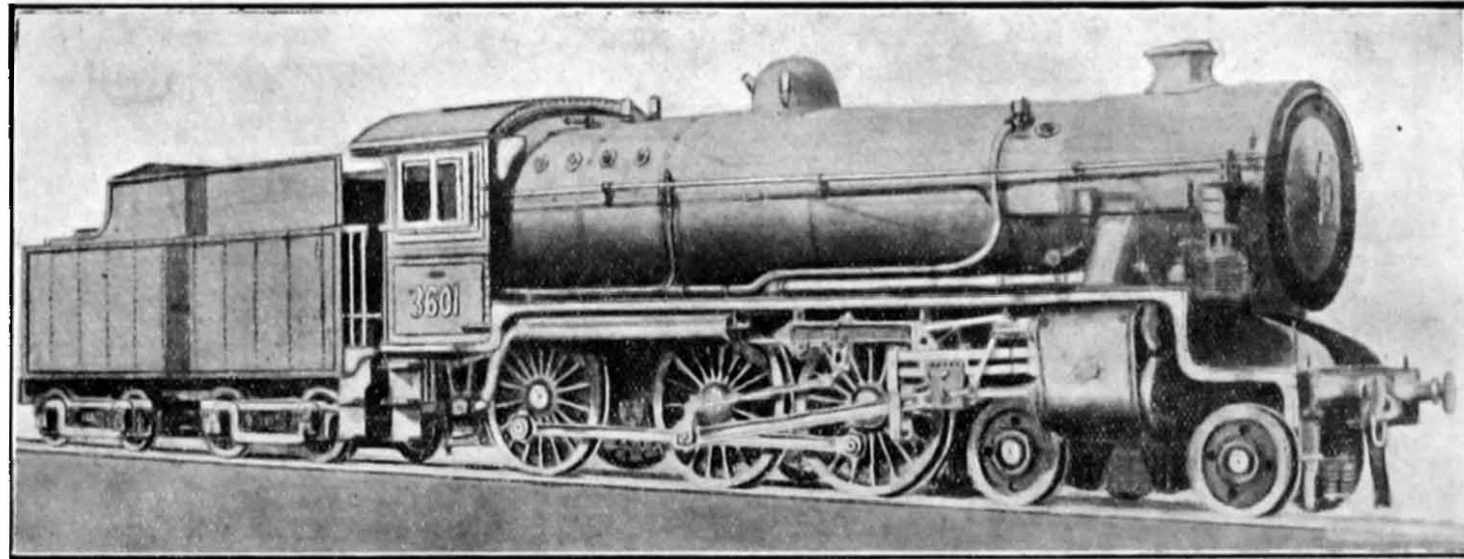


CYL. 3 16 1/2" STROKE, PISTON VALVES 1 1/2" DIA., TRACTIVE POWER 30,000 LBS., GRATE AREA 56 SQ. FT., B.P. 200 LBS. PER SQ. INCH
TUBE HEATING SURFACE 1800 SQ. FT., FIREBOX AND COMBUSTION CHAMBER 320 SQ. FT., SUPERHEATER 800 SQ. FT., TOTAL 2920 SQ. FT.
PASSENGER ENGINE PACIFIC TYPE

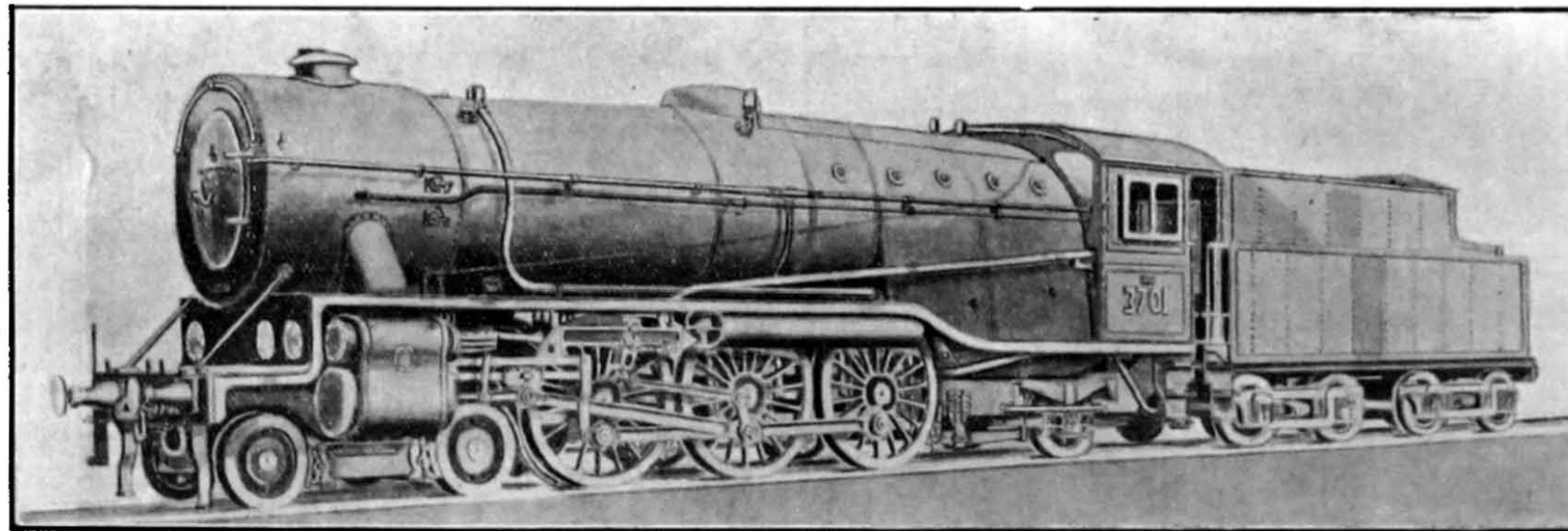


CYL. 3 16 1/2" STROKE, PISTON VALVES 1 1/2" DIA., TRACTIVE POWER 45,000 LBS., GRATE AREA 56 SQ. FT., B.P. 200 LBS. PER SQ. INCH
TUBE HEATING SURFACE 1,800 SQ. FT., FIREBOX AND COMBUSTION CHAMBER 320 SQ. FT., SUPERHEATER 800 SQ. FT. TOTAL 2,920 SQ. FT.
GOODS ENGINE MUHADO TYPE

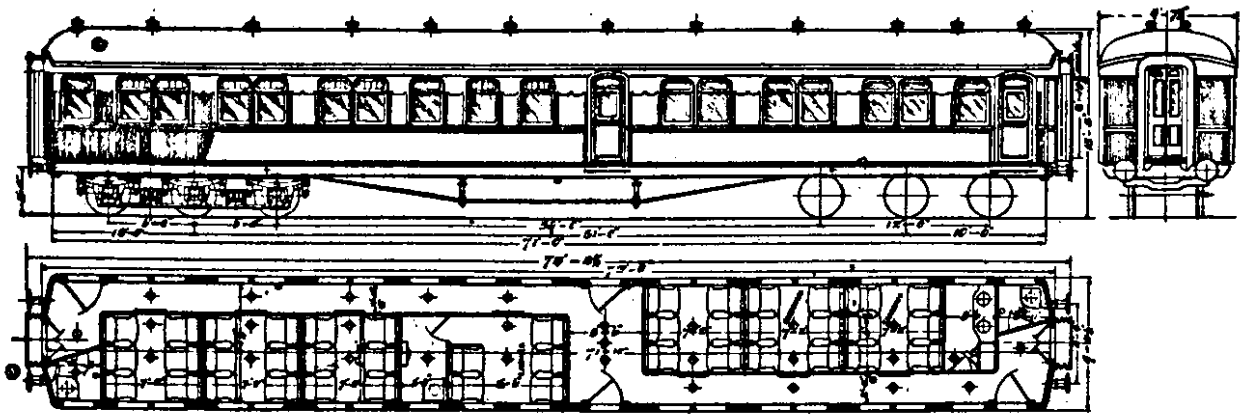
Standard Locomotives—Existing type at top. The lower two are projected types.



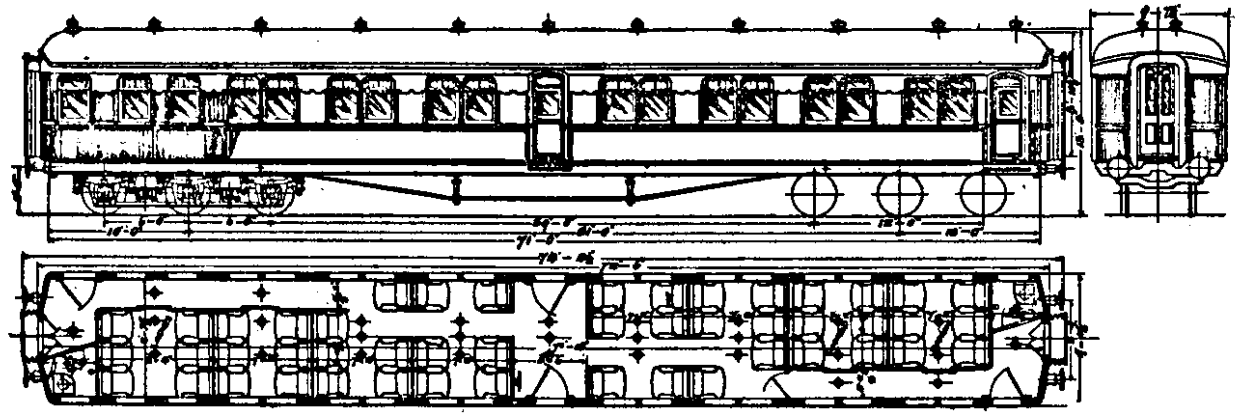
Class NN2 Express Passenger Engine—Existing Type.



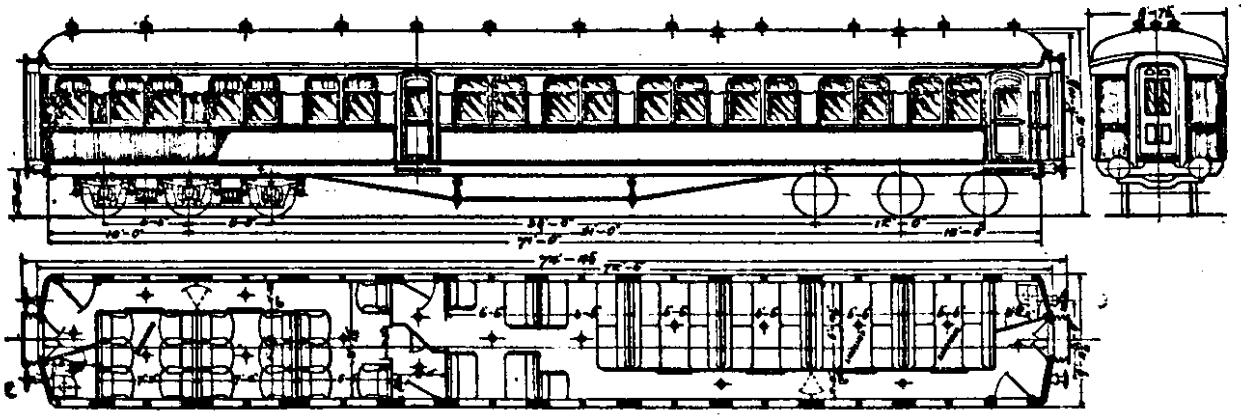
Proposed 3-cylinder "Pacific" type Express Passenger Engine.



— 72-6 First Class Coach Car—Case T.B.C.—
 — Recommendation for 41 Passengers Seated —
 — Average Tone 42-4-3 —

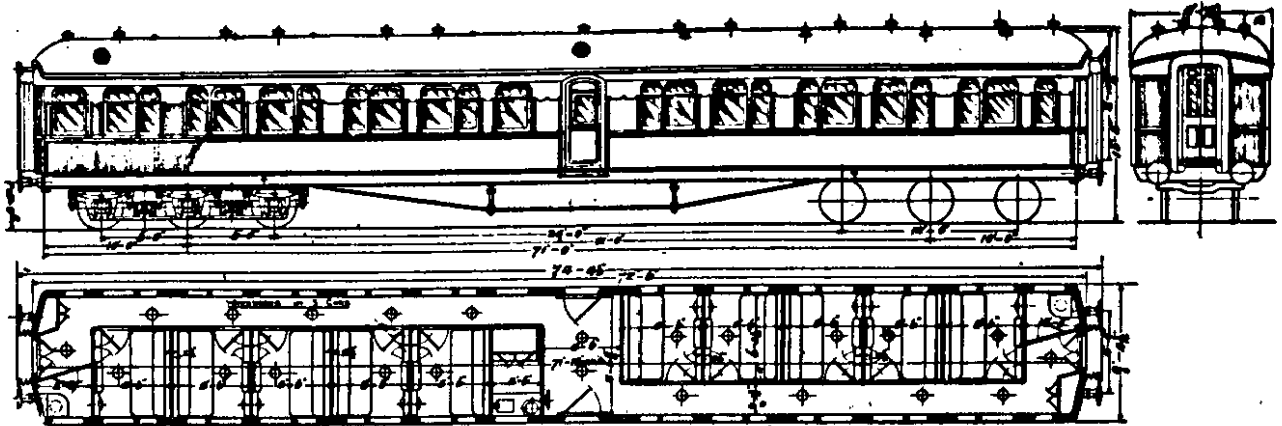


— 72-6 First Class Main Line Coach Car—Case M.B.X.—
 — Recommendation for 48 Passengers Seated —
 — Average Tone 43-13-0 —

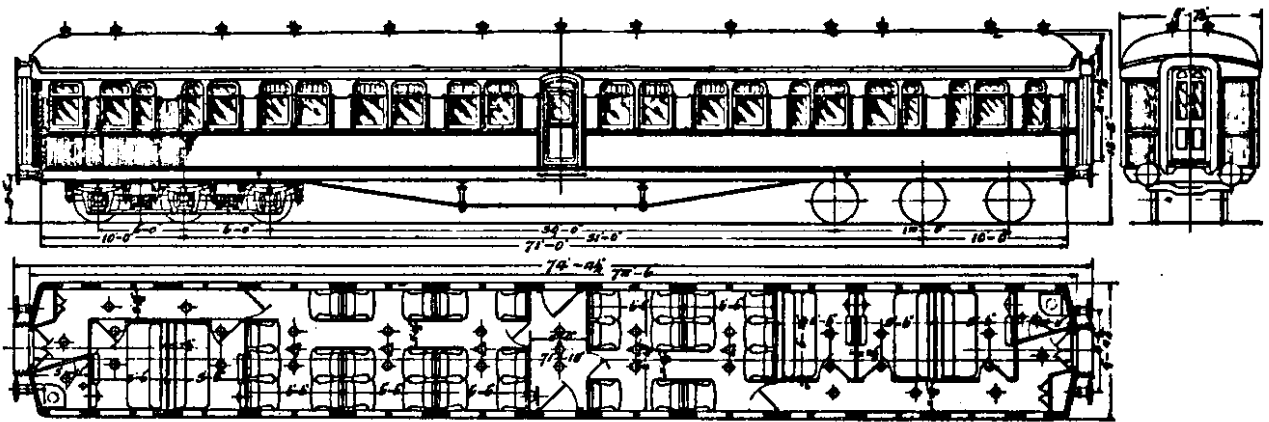


— 72-6 Main Line Coach Car—Case M.C.X.—
 — Recommendation for 17 First and 46 Second Class Passengers Seated —
 — Average Tone 43-11-2 —

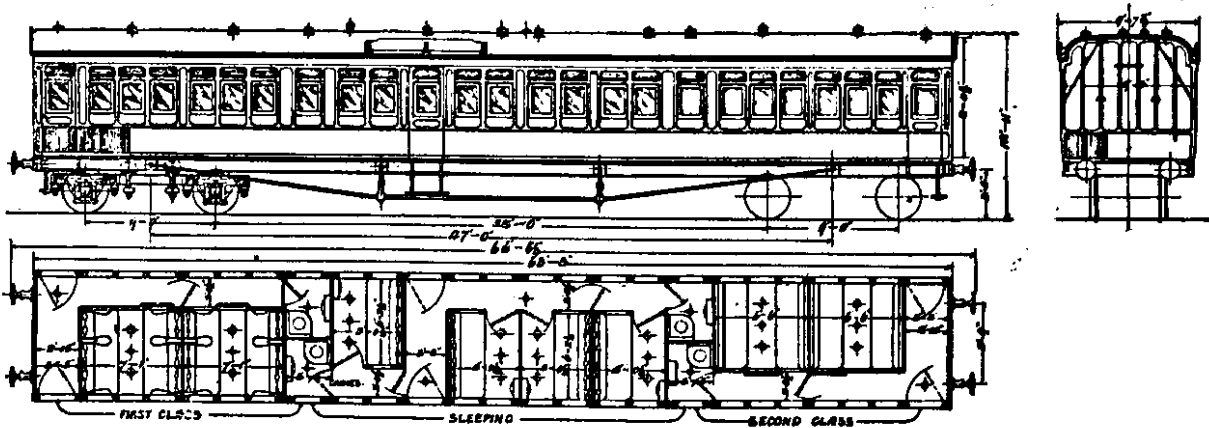
Standard Types of Coaches.



— 72-6 SLEEPING CAR—CODE T.M.—
 — RECOMMENDATION FOR 20 PASSENGERS SLEEPING —
 — RECOMMENDATION FOR 30 PASSENGERS SEATED —
 Average Time 44-15-0

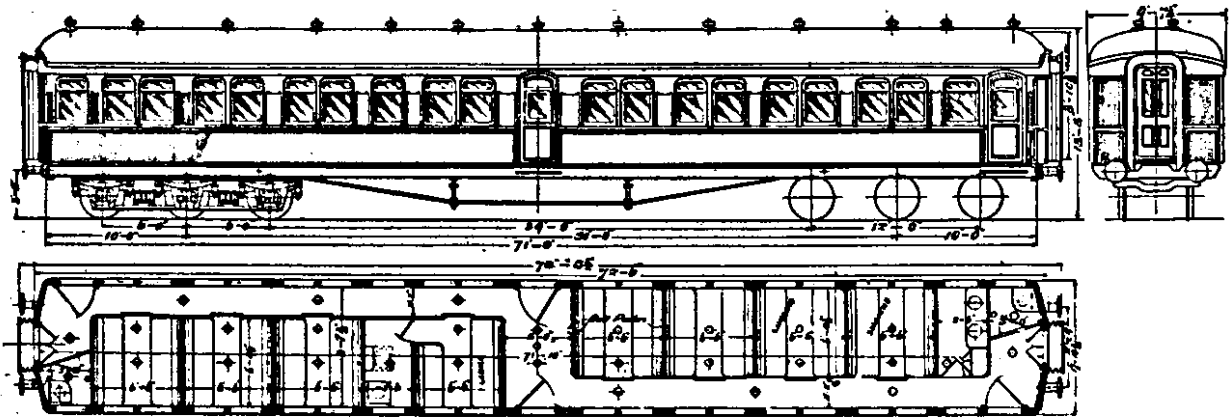


— 72-6 FIRST AND SLEEPING COACH CAR—CODE C.M.—
 — RECOMMENDATION FOR 10 PASSENGERS SLEEPING —
 — RECOMMENDATION FOR 30 PASSENGERS SEATED OR 45 SEATED —
 Average Time 43-5-0

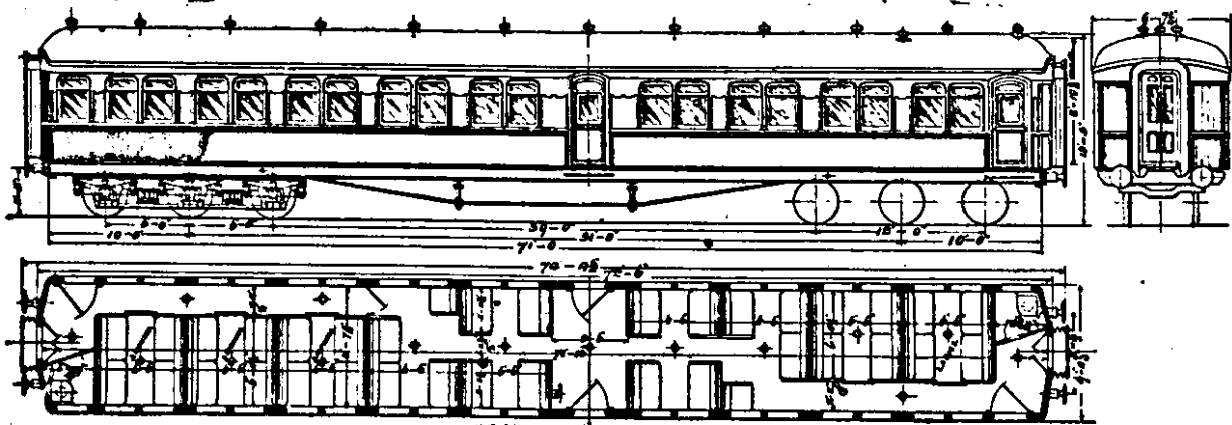


— COMPOSITE SLEEPING CAR FOR BRANCH LINES—CODE R.C.X.—
 — RECOMMENDATION FOR 9 PASSENGERS SLEEPING —
 — RECOMMENDATION FOR 12 FIRST AND 16 SECOND CLASS PASSENGERS SEATED —
 Average Time 31-6-0

Standard Types of Coaches.



— 72-6 Second Class Corridor Car - Camb. T. & N. —
 — RECOMMENDATION FOR 63 PASSENGERS SEATED —
 Average Time 42-0-1

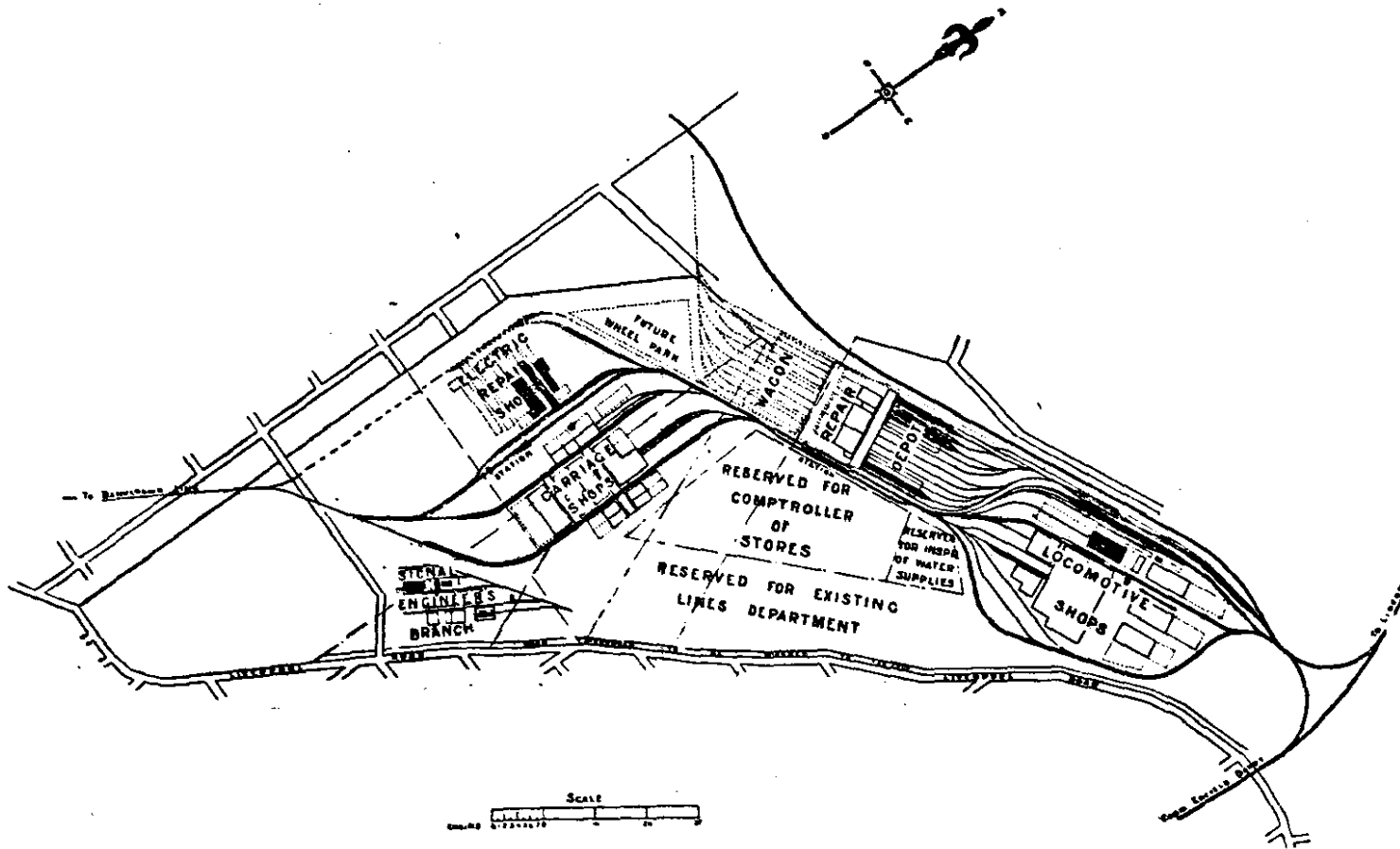


— 72-6 Second Class Main Lines Corridor Car - Camb. M. & N. —
 — RECOMMENDATION FOR 70 PASSENGERS SEATED —
 X C O
 Average Time 43-0-3

Standard Types of Coaches.

N. S. W. GOVERNMENT RAILWAYS.
DISPOSITION OF WORKSHOPS, CHULLORA.

WORKS UNDER CONSTRUCTION SHEWN



LXXV

234. The plan of the lines proposed to be electrified and constructed shows that a very comprehensive view was taken of the whole situation so far as suburban traffic is concerned. The need for carrying this out at an early date is apparent, when it is pointed out that between 1910 and 1924 the increase in railway passengers has been 146·33 per cent., and in tramways 61·20 per cent., and, should the increase continue at the same rate, the passengers to be carried in 1930 will, it is estimated, number at least 183,000,000. Attention will be drawn to this more especially in the section of our Report dealing with "Operation," but it is mentioned here from the bearing it has upon rolling-stock, both engines and carriages. It is stated that there are to-day 157 locomotives employed in the transport of suburban passengers to and from the city, all of which would be released by the electrification of the inner group of suburban lines.

235. The number of railway cars in daily use in the suburban area totals 835, 80 being main line coaches which would be returned to main line work on completion of electrification. It is proposed to retire 250 of the older type of suburban cars, to construct 450 new cars and motor cars for the electric service and 145 new cars as trailers. With these and with 100 cars already built (which will ultimately become motor cars) 405 of the more modern existing cars will be used. This will give 1,100 cars, both motor and trailer (of which 345 will be additional vehicles to be charged to capital) for the suburban traffic, and with their greater seating accommodation it is hoped they will meet the increase which may be expected in the passenger service in the suburban area. It will be seen, however, that the only relief given to the replacement of old locomotive and carriage stock is 157 engines and 250 carriages—and this at the end of six years. It will, therefore, be necessary at the same time further to replace old and obsolete stock working on other portions of the railway.

236. Too much importance cannot be given to the necessity of pressing forward with the proposed City railway electrification, as it is absolutely essential that this should be completed by the time that the new bridge is built. As has already been pointed out, if the necessary accommodation is to be given to the increased suburban population from their homes to the city, the electrification, as shown on the plan, should be pushed forward at the earliest possible date. If this is not done, an increased number of locomotives would have to be built to deal with the suburban traffic, which afterwards would be of little use on the lines elsewhere.

237. Over and above the proposed electrification, we think it well to suggest that later on great advantages might be gained by carrying forward electric traction from Penrith to Lithgow, over the Blue Mountains, where there are very heavy gradients, and where there is an increasing demand for more frequent service, especially in the summer time. It is considered that the current ought to be generated cheaply owing to the adjacent coal, and that the gradients would enable the method of regeneration to be used with great economy.

238. It is also of interest to point out the mechanical disadvantages of the steam locomotive under the conditions prevailing in and around Sydney, which may briefly be summarised as follows:—

The locomotive being a complete independent unit, its power cannot be greater than the capacity of its boiler.

To increase the boiler capacity, obviously implies increased dimensions and weight, both of which offer grave difficulties in regard to clearances and strengthening of bridge structures.

It is known that on many railways the limit of weight has been reached, and further development of power is only possible at enormous expense.

The costly maintenance of boiler cylinders, valve gear, crank shaft, and all reciprocating parts.

The provision of turntables, water supplies, &c. That it radiates heat and uses coal all the time steam is up, i.e., during many hours when the engine is doing no work, either standing by or coasting.

239. The case for the electric locomotive may be set out by the brief statement that it is not hampered by any of the abovementioned objections. In addition, it possesses other important qualities, such as simplicity of mechanical construction and operation; increased acceleration and retardation; greater scheduled speed and consequently more frequent service, resulting in increased

use of existing track and rolling-stock; uniform turning effort and greater starting effort, facilities for driving from either end of locomotive, and also accessibility of mechanical parts.

240. It is common knowledge that to-day most of the countries utilise electric locomotives on their main lines. For instance, France has adopted the principle. America, Switzerland, Italy, and Norway have long used this method, and are still extending. It was recently stated in a railway publication that Sweden has the longest electrified railway in Europe at the present time. It may, therefore, be taken as an accepted fact that, where traffic is heavy and circumstances are suitable, traction with electric locomotives instead of steam is considered to be the most efficient way of working traffic. Having regard to the heavy grades to be negotiated, and to the availability of cheap coal for generating purposes, we consider that electric locomotives are eminently desirable over the district suggested.

IV.—MANAGEMENT.

(d) ELECTRICAL.

241. The Chief Electrical Engineer is responsible for the power supply and distribution on the tramways; lighting; the design of cars and equipments for the electric and steam tramway rolling stock; the repair and manufacture of parts for the repair of tramcars; the installation and maintenance of the telegraph and telephone systems; stationary electric motors and equipment; the purchase and maintenance of motor-cars, typewriters, clocks, watches, &c. He has under his control three main generating stations, situated at Ultimo (Sydney), White Bay (Sydney), and at Newcastle.

Ultimo Generating Station.

242. Dealing in the first place with Ultimo Generating Station, during the twelve months ended April, 1924, the total output was 67,653,864 kW. hrs. and the maximum hour-load 22,029 kW. The total normal capacity of the turbo-alternators is 36,500 kW., and the operating costs for the year ended April, 1924, were .5851d. per kW. hr. The Ultimo Power-house, which is the oldest of the three stations, operates at lower boiler pressure and is not fitted with economisers. Its plant consists of :—

Description.	No.	Normal Rating (each).	Heating Surface.	Normal Evaporation.
		kW.	sq. ft.	lbs.
6,600-volt 25-cycle Turbo-alternators	1	7,500	.....	.....
	4	5,000	.....	.....
2,200-volt 50-cycle Turbo-alternators	2	2,000	.....	.....
	2	2,500	.....	.....
Boilers	20	.....	3,140	10,000
	38	.....	2,852	8,000

The staff numbers 223.

White Bay Generating Station.

243. The total output from the White Bay Generating Station during the twelve months ended April, 1924, was 76,585,600 kW. hrs., and the maximum hour-load 18,088 kW. The following plant is installed :—

Description.	No.	Normal Rating (each).	Heating Surface.	Normal Evaporation.
		kW.	sq. ft.	lbs.
6,600-volt 25-cycle Turbo-alternators	3	7,000	.....	.....
Boilers	8	.....	8,280	27,000

244. The plant set out hereunder is at present on order for White Bay :—

Description.	No.	Rating (each).	Voltage.	Frequency.	Heating Surface.	Evaporation.
Turbo-generators	2	kW. 18,750 (normal continuous).	6,600	25	sq. ft.	lbs.
Turbo-generators	2	22,000 (maximum continuous).	11,000	50	.....	.....
Boilers	6	.....	.....	.....	11,979	100,000 (max.)
Boilers	8	.....	.....	.....	8,774	70,000 (max.)

245. The normal rating of the plant already installed is 21,000 kW., and that of the plant on order 81,500 kW., making a total normal rating of 102,500 kW. The operating costs were 4096d. per kW. hr. There is a staff of 120 employed in the White Bay Power-house.

Zara-street Generating Station (Newcastle).

246. The total output for the year ended April, 1924, was 27,233,808 kW. hrs., and the maximum hour-load 6,944 kW. The plant installed in the power-house is set out below :—

Description.	No.	Normal Rating (each).	Heating Surface.	Normal Evaporation.
		kW.	sq. ft.	lbs.
6,600-volt 25-cycle Turbo-alternators	{	1	7,500	.....
		2	2,500	.....
		1	1,500	.....
11,000-volt 50-cycle Turbo-alternator	1	2,500	.....	.....
Frequency changer	1	2,000	.....	.....
Boilers	6	.....	8,280	27,000

247. There is in course of erection a generating plant with a normal rating of 7,500 kW., voltage 11,000, and frequency 50. The total normal rating of the installed generating plant is 16,500 kW., and when the plant in course of erection is in working order the figure will be 23,500 kW. The operating costs at Zara-street were 4564d. per kW. hr. The staff employed numbers 71.

Conversion of Current for Tramway Purposes, Sydney.

248. In the Sydney and Suburban area there are twenty-two sub-stations, with a total of fifty-five converters and a total normal rating of 40,350 kW., where 25-cycle 6,600-volt current supplied from Ultimo and White Bay is converted to 600-volt direct current for tramway purposes, &c. Three further sub-stations are either in course of erection or have been approved. In five of the sub-stations six batteries are installed, and there are also five battery houses. These batteries are used in connection with the supply to the tramway system, the total capacity being 6,600 ampere hours, at the one-hour rate.

Transformer Houses.

249. There are fifteen transformer houses for the purpose of transforming 25-cycle 6,600-volt and 50-cycle 11,000-volt current to lower secondary voltages for workshop and signalling services principally.

Sub-Stations,

Sub-Stations, Newcastle District.

250. Two tramway sub-stations are in course of erection at Newcastle. These will be equipped with four rotary converters, the total normal capacity being 4,000 kW. 11,000-volt 50-cycle supply is obtained from Zara-street Power-house.

251. A sub-station with a capacity of 450 kW. and with 6,600-volt 25-cycle current from Zara-street is in service for supplying 600-volt direct current to the electric cranes, &c., used in connection with coal shipment.

Railway Electrification.

252. In connection with the proposed railway electrification, provision has been made for the following sub-stations:—

Sub-station.	No. of Converters.	Total Normal Capacity.
		kWs.
Prince Alfred	3	13,500
Meek's-road	3	9,000
Hurstville	3	6,000
Sutherland	2	3,000
Waterfall	1	1,500
Total	12	33,000

These sub-stations will receive current for conversion to 1,500-volt direct current.

Supply of Current in bulk.

253. Current is supplied in bulk from Ultimo and White Bay Power-houses to several municipalities and shires, including the Sydney City Council, and to the Parramatta Electric Supply Company. An agreement has been entered into for the supply of current in bulk to meet the future needs of the City Council, which will require an increasing supply each year, the estimate for 1930 being 70,000 kW. To meet this increasing demand, it is proposed to instal an additional 20,000 kW. turbo-alternator, provision having been made at White Bay to accommodate 60,000 kW. of plant over and above that previously mentioned.

254. Current is also supplied from Zara-street Power-house to a number of municipalities in the Newcastle District, including the City Council. The supply to the Municipality of Singleton involves a transmission line of approximately 51 miles long. Supply is obtained from the power-house through the Newcastle City Council for several of the large industrial undertakings in the Newcastle district.

255. During the twelve months ended April, 1924, the revenue received from the sale of electricity in bulk (including the Newcastle area) amounted to £133,604.

New Power-house to meet increasing demands.

256. As it is anticipated that the power-house at White Bay will be fully loaded in 1930 to meet requirements for railway electrification and for bulk supplies, the provision of a new power-station (with a total effective capacity of 240,000 kW.) to be located on the South Coast near the coal-mines is under consideration. In our view, having regard to the increasing requirements of the City Council—which the Railway Commissioners are under obligation to meet, and to the proposed railway electrification—the provision of the new power-house is essential.

Supply of Current to Public Bodies.

257. Current is supplied to several Government Departments, the principal being the Water and Sewerage Board (for the operation of low-level pumping stations), the Public Works Department (for the operation of bridge spans, &c.), the Department of Agriculture (for operating the terminal wheat elevator at Glebe Island), the Commonwealth Postal Department (for operating radio station at Pennant Hills), &c.

258. We are of opinion that the generating stations which we have seen are maintained in a thoroughly efficient condition. The oldest station is that at Ultimo, where there are no economisers, where there are a number of smaller units, and where there is a certain difficulty in connection with the circulating water. There is no question of extending Ultimo in the same way as at White Bay, but consideration should be given to the installation of larger units, larger boilers, and economisers.

Lighting Section.

259. New installations for electric lighting, stationary power requirements, radiators, &c., and the provision of low voltage services to meet the power requirements for railway signalling are undertaken from the electric light depot at Sydney, as also the maintenance of the existing installations and equipment set out below :—

Premises lighted Electrically.	No. of Installations.	Connected load in kW.	Source of Supply.
Railway stations ...	34	397	Departmental.
	74	151	Local (Council or private company).
Railway yards ...	12	263	Departmental.
	16	61	Local Council.
Loco. Depots ...	7	50	Departmental.
	14	90	Local Council.
Workshops	9	123	Departmental.
	6	167	Local Council.
Tramway ...	.....	726	Departmental.
	.....	12	Local Council.
Miscellaneous ...	.....	17	Departmental.
	.....	7	Local Council.

Total connected Lighting Load—3064 kW.

No.	Utilities.	Aggregating.
21	Lifts (7 passenger, 14 goods) ...	.....
350	Service transformers ...	1,810 kVa.
6	Isolated generating plants ...	100 kW.
156	Fans ...	16 kW.
359	Radiators ...	270 kW.
1,503	Miscellaneous electrical appliances ...	124 kW.

260. The train lighting depot at Sydney deals with the installation of equipments on rolling-stock for electric lighting as approval is received to proceed with the work. This work is performed at the Eveleigh Workshops in conjunction with the Chief Mechanical Engineer's staff. At the moment, the conversion of 648 main line cars from gas to electric lighting is in progress, and when this is completed the whole of the existing main line passenger stock will be lighted electrically. This depot also maintains electric lighting equipment on rolling-stock already in the service as set out below :—

No.	Class of Stock Equipped.
100	Main line cars.
150	Suburban cars.
31	Brake-vans.
10	Rail motor-cars.
120	Railway locomotives.
23	Tramway steam motors.
5	Breakdown cranes.

261. The lighting of steam rolling-stock is under the control of the Chief Electrical Engineer, but in the case of the new electrical stock this will be under the charge of the Chief Mechanical Engineer, the Chief Electrical Engineer being regarded as an electrical consultant.

Randwick Workshops.

262. The Randwick Tramway Workshops (Sydney) comprise a section of the Chief Electrical Engineer's Branch, and are supervised by a works manager who has under him a staff of 1,070. The following work is undertaken at Randwick :—

- Manufacture of special fittings—electrical and mechanical—required for the installation of plant in the various electric power-stations.
- Repair of fittings and manufacture of parts required in the overhaul of units from the electric power-stations.
- Repair and manufacture of parts for the repair of 1,574 electric tram cars, 22 steam motors, 40 steam cars, and 91 motor-cars and lorries operating in the city and suburban area, and the manufacture of parts required for the repair of 36 electric tramcars, 70 steam motors, and 151 steam trailer cars operating in the Newcastle and Broken Hill areas.
- Supply of light brass castings for the Carriage and Wagon Department, and solder to the Stores Branch, &c.

Tool Shop.

263. The tool shop appeared to be adequately supplied with up-to-date machinery and tools, and it was observed that there was a very complete system of gauges in operation, thus rendering parts interchangeable and tending to economy.

Pattern Shop.

264. The pattern shop deals with the manufacture and repair of all patterns for iron, steel, and non-ferrous metal castings used in the Chief Electrical Engineer's Branch. The stock of patterns is as follows :—

- 11,156 ordinary patterns for brass, iron and steel.
- 1,076 plate patterns for brass, iron and steel.

Foundry.

265. In the foundry the work of manufacturing non-ferrous metal castings in standard alloys such as bronze, gunmetal, brass, copper, aluminium alloy, white metal, solder and plumbers' metal is undertaken. The Hawley furnace installed is used for melting scrap copper, &c., into the marketable form of ingots. Scrap brass is also reduced to ingots in this furnace, each melt being treated as a separate cast and numbered. Samples of each cast are analysed so that when used it can be brought back to standard alloys. The castings made are used for car manufacture and repairs, copper castings for electrical work, &c. The output is approximately 4.66 tons castings and 4.60 tons ingots per week.

Smith's and Boiler Shop.

266. The smith's and boiler shop undertakes such work as the manufacture of under-frames for new cars and parts for the trucks of new cars; the manufacture and repair of parts for the repair and maintenance of all steam and electric tramway rolling-stock; the manufacture and repair of materials required for the repair and maintenance of the power-station and sub-station machinery; the development and manufacture of materials for the railway and tramway overhead lines—service and transmission; the manufacture of copper bonds and fishplates for the Engineer for Tramways, and the repair of stationary, locomotive, and steam roller boilers for the tramway services. The machinery and plant appear to be well suited for the requirements.

Other Shops.

267. Other shops in the Randwick works are the welding shop, truck shop, car shop, paint shop, woodworking shop, machine shop, electrical fitting shop and the electrical repair shop. In each of these shops we are satisfied that the plant is of a reasonably up-to-date character and is adequate to meet the demands put upon it.

Workshops Committee.

268. A similar scheme to the Whitley Workshops Committee is in operation at the Randwick Shops. As a result of meetings of this committee certain small adjustments have been made, and it is considered that the arrangement tends to harmonious relations between the management and the staff.

Cadets and Apprentices.

269. A cadet system is in operation for the purpose of training officers for the Chief Electrical Engineer's Branch. We are of the opinion that this serves a useful purpose and might with advantage be extended to other branches; for instance, that of the Chief Mechanical Engineer. Educational attainments and personality are taken into consideration when selections are made, and there is also an examination to be passed.

270. Apprentices are selected by a Staff Board, and a roster is provided for each trade, which it is considered allows of a complete training. Technical instruction is given by the Railway and Tramway Institute and the Technical College.

Bonus System.

271. The bonus system of payment was first introduced at the workshops in 1905 for armature winding only, and was applied generally in 1919. There are 3,906 bonus items in operation, and over 60 per cent. of the staff are now working under the bonus arrangement. As an incentive to additional effort, the system provides for an extra percentage payment over the rates of pay fixed by the Industrial Court Awards.

Newcastle Shops and Shed.

272. The Gordon Avenue Workshops and car shed and the Parnell-place running shed at Newcastle form a section of the Chief Electrical Engineer's Branch. There are at the present time in Newcastle and Maitland 36 electric cars, 59 steam motors, 103 steam trailer cars, and 14 miscellaneous vehicles. The electric cars are operated from the car shed, the repairs being carried out in the works, except ordinary running repairs, which are dealt with in the shed. The cars are all of one type and are fitted with the same equipment. All repair parts are manufactured at Randwick and are requisitioned as required. As the electric service in Newcastle has only been in operation since December, 1923, no heavy repairs have yet become necessary. At the present time the works are mainly engaged on the overhaul and running repairs of steam motors and cars in the service, the heavy repairs being carried out at Honeysuckle Point.

273. The depot at Parnell-place is a steam motor and car running shed only, and will be displaced when the electric service is in full operation.

Tramway Comparisons.

274. It is interesting to compare the tramways in New South Wales with those in Great Britain, particularly in respect of maintenance costs. These are as follows:—

Item.	New South Wales.		London County Council.	Manchester Corpora- tion.	Sheffield Corpora- tion.	Glasgow Corpora- tion.
	Actual.	Revised Basis.*				
Cost of car repairs.....	£411,925	£250,887	£557,532	£152,554	£81,587	£101,814
Cost of car repairs per car-mile	3.42d.	2.08d.	2.11d.	1.80d.	1.97d.	.91d.
Cost of car repairs per car in stock..	£307	£187	£277	£183	£214	£105
Number of units used per car-mile...	3.06	...	2.13	1.75	2.33	1.59
Schedule speed (miles per hour) ...	8.85	...	9.29	7.5	...	7.46
Average miles of motor-cars per day	66.5	...	121.49	84	...	97
Average motors per car	2.92	...	2	2	2	2

* This figure has been reduced on the basis of wages being 100 per cent. higher than in England and material 35 per cent.

275. One of the principal differences between New South Wales trams and those elsewhere is the large number of stops required and the very speedy acceleration demanded necessitating an excessive use of current and consequent powerful motors.

276. The weight of cars would affect the comparison, but, as we have no accurate figures of weight before us, it is considered wise to omit them. The electrically operated air-brake also accounts for some extra energy consumption, and, no doubt, has a bearing upon the increased number of units used per car-mile.

277. The more severe operating conditions resulting from the much more frequent starting and stopping of the Sydney cars, have a very material effect upon the wear and tear and cost of upkeep of the whole equipment of the rolling-stock. Much more work is thereby thrown upon the motors, the control equipment, the brake mechanism, and the brake shoes and tyres. It is considered to have been established that it is impossible to meet the traffic demands of the public of Sydney without a car of large seating capacity, maximum means of ingress and egress, and means of coupling in pairs. As the high acceleration and the heavy grades upon which these cars must be operated involve all driving wheels, the result is four motors per car, and eight motors per pair of coupled cars, calling for complicated multiple unit control. The latter involves very much extra cost for inspection and upkeep. The coupling of cars also necessitates the use of air-brakes, with their attendant consumption of power and additional cost of maintenance for motors, compressors, and control.

278. Taking everything into consideration, the comparisons are considered favourable to the New South Wales trams.

279. At the present time there are fourteen classes of cars in service, but it is the intention to build only three of these types for the future, and these which are reproduced in diagrammatic form are as follows :—

Type.	Seats.	Truck.	Cars.	Weight in tons.	No. in Service.
P	80	Bogie	Cross-seat	16.30	192
LP	70	M.T.	„	14.87	46
J	50	4 W.H.	„	11.40	47

280. The “ P ” type car has a carrying capacity of eighty passengers, in cross seats, equal wheel bogie trucks, each axle carrying a motor of 40 h.p., and multiple unit control. These characteristics are necessary in order to meet the severe service, including high acceleration and heavy grades, of Sydney.

281. The “ LP ” type car has a carrying capacity of seventy passengers, in cross seats, and is provided with maximum traction trucks, each carrying one 55 h.p. motor. This equipment, with platform control, meets the requirements of Newcastle, where the grades are uniformly lighter than those of Sydney, and the service much less severe.

282. The “ J ” type car will be used on the very heaviest grades, where the conditions present very special risks, and track brakes are considered necessary. These cars have a carrying capacity of fifty passengers, and will be fitted with a 50 h.p. motor on each of the two axles.

Renewals.

283. So far as the machinery in the power-houses and sub-stations is concerned, it will be seen from the following statement that in our calculations we have regarded the utility life basis as being eighteen years, and in the case of tramcars as twenty-five years. It is not, however, clear when the high-power electric machines will become obsolete, and in such circumstances—beyond emphasising the need of a renewals fund, as in the case of the permanent-way and

and rolling-stock—it is not possible at present to fix a definite life basis. The statement, therefore, is reproduced principally to show the practice which has ruled in the last few years in respect of the renewal of machinery and tramcars.

Machinery at Randwick.

Twelve months ended 30th June.	Capital Value.	Value of Renewals on 18 years' life basis.	Amount actually spent on Renewal of old Machinery.
	£	£	} No figures readily available.
1920	130,555	7,253	
1921	135,797	7,544	
1922	147,247	8,180	
1923	148,874	8,271	
1924	149,977	8,332	

Machinery in Power-houses and Sub-stations.

Twelve months ended 30th June.	Capital Value.	Value of Renewals on 18 years' life basis.	Amount written off Capital.
	£	£	£
1920	1,084,384	60,244	10,000
1921	1,200,113	66,673	37,244
1922	1,364,298	75,794	36,079
1923	1,588,370	88,243	44,896
1924	1,698,034	94,335	61,290

Electric Tramcars.

Twelve months ended 30th June.	Capital Value.	Value of Renewals on 25 years' life basis.	Amount actually spent on Renewal of Rolling-stock.
	£	£	£
1920	1,644,637	65,785	.....
1921	1,699,835	67,993	30,000
1922	1,764,240	70,570	.....
1923	1,899,852	75,994	30,000
1924	2,230,929	89,237	15,000

Car Sheds.

284. Car sheds are situated at Rozelle, Waverley, Ultimo, Newtown, Tempe, Dowling-street, Military-road, Fort Macquarie, Rushcutters' Bay, Manly, Enfield, and Rockdale. The work carried out in the sheds consists mainly of brake adjustments, examination and replacement of faulty equipment, examination of wheel flanges, rectification of loose bolts or broken frames, and the cleaning of cars.

Mains Sections.

285. The main depot, which is at Leichhardt (Sydney), deals with pole erection, installation of feeders and cables, overhead trolley wires and network, telephone cables and wiring—Metropolitan and Newcastle areas—and the testing and repairs of electric welding plant, electric grinding plant and rail bond. There are twelve maintenance depots consisting of buildings for housing vehicles, horses, and stores, and fifteen pole storage yards used for stacking poles at convenient locations throughout the Metropolitan area, being adjacent to railway or tramway sidings. There exist at the present time 199 miles of high-tension underground cable, 204 miles of high-tension overhead transmission lines, 66 miles of low-tension underground cables, 1,320 miles of low-tension overhead feeders, and 345 miles

of trolley wires and supporting wires (tramways), while over 100 miles of feeders and transmission lines are under construction. This section is also responsible for the installation and maintenance of the telegraph and telephone system, as follows :—

Telephone cables, lead-covered, and telephone wires—

Laid underground and in boxing on concrete pegs	...	110 miles.
Pot-heads and testing points	... ..	139
Telephone wires	... ..	412 miles.

Engineer of Tests Section.

286. An Engineer of Tests is attached to the Chief Electrical Engineer. He deals with the standardisation and maintenance of all portable and sub-standard electrical testing instruments and meters, the supervision of the repair and calibration after repair of all portable and switchboard instruments and meters, the inspection and testing of electrical materials used throughout the service, the performance of acceptance lists on electrical machinery and apparatus, &c.

Telegraph Maintenance.

287. The Chief Electrical Engineer is responsible for the installation and maintenance of telegraph instruments, telephone and telephonette instruments, Morse batteries, electric clocks, electric intercommunication on trains, burglar and fire alarm circuits, electric bell circuits, magneto telephone switchboards, automatic telephone exchanges, and selector telephone systems. These are installed throughout the railway and tramway systems, divided into city and country areas, and are maintained by a staff of mechanics, &c., under the supervision of an inspector.

Clocks and Watches.

288. The Chief Electrical Engineer is responsible for the purchase and maintenance of all clocks (except those electrically operated), watches, time-recorders, and watchmen's tell-tales. The number in service at the present time is as under :—

Clocks	...	2,106
Watches	...	4,816
Bundy and autograph recorders	...	66
Tell-tales	...	37

The actual repairs to time-pieces, &c., are carried out by a contractor under the supervision of this Branch.

289. In our view the purchase and maintenance of clocks, watches, &c., is more closely allied to the Comptroller of Stores Branch than to that of the Chief Electrical Engineer.

Typewriters.

290. The Chief Electrical Engineer is also responsible for the maintenance of typewriters, the actual work of repair being undertaken by a contractor. A stock of machines is available to take the place of those under repair. We are of the opinion that this section might be transferred to the Comptroller of Stores.

General.

291. We are satisfied with the general equipment of the shops and with the work turned out. The Branch appears to be very well staffed—in fact, a criticism might be levelled that the technical staff is somewhat too elaborate. This staff consists of the Chief Electrical Engineer, the Chief Assistant Electrical Engineer, the Works Manager, the Power Superintendent, the Supervising Engineer, the Chief Telegraph Inspector, the Engineer of Tests, the Rolling-stock Superintendent, the Engineer, the Chief Inspector of Boilers, the Mains Superintendent, the Sub-station Superintendent, the Lighting Superintendent, the Assistant Engineer, and the District Electrical Superintendent (Newcastle).

IV.—MANAGEMENT.

(e) STORES.

292. The Stores Branch is in the charge of a Comptroller of Stores, who is responsible to the Commissioners for the purchase, conservation, and distribution of all stores for railway and tramway purposes, including the disposal of coal from the State Colliery, but excepting perishables, &c., required by the General Manager of the Refreshment Rooms.

293. The headquarters of the Branch are at Eveleigh, and at the date of the inquiry the authorised staff numbered 403. This number includes a chief stores assistant, 8 inspectors, 153 clerks, 126 storemen and boys, and 103 labourers, together with 11 motor lorry drivers, gangers, &c. The Branch is divided into five main sections, Purchasing, Receiving and Issuing, Accounts, Records, and Correspondence.

294. The major portion of the material required for general use is received and issued at the main store depot at Eveleigh, while branch stores are situated at all railway and tramway workshops and depots throughout the system.

Means of Obtaining Stores.

295. Stores are obtained either on manufacturing orders from departmental workshops, from local manufacturers, usually through a merchant or broker, or, in the case of overseas supplies, through the Agent-General in London, or the local agents of foreign firms in Australia.

296. Annual tenders are let for the period of the financial year in connection with those items in general use; while other stores having a slower out-turn are purchased as required. The quotations are usually sent into the Stores Branch, the Commissioners' authority being obtained before the acceptance of tenders, but in the case of special plant or technical materials, the head of the Branch concerned obtains quotations and makes recommendations to the Commissioners. In this case, however, the Stores Branch follows the matter to completion in connection with delivery arrangements, &c.

297. Direct delivery to the various branch stores or works is arranged in the case of heavy bulky articles in order to prevent unnecessary handling and to secure certificates for machinery, plant, &c. Issues from the main store are made for locomotive depot trust stores once monthly, while traffic station stores are forwarded every two months by stores railway vans, and stationery is issued quarterly.

298. The method adopted for dealing with materials manufactured departmentally is as follows:—The Chief Accountant sets up a division of the Stores Advance Account designated a Manufacturing Account, and this operates between the Chief Accountant and the head of each manufacturing branch. The Chief Accountant debits the branch concerned with the cost of the materials used and the wages expended in connection with the manufacture of the various articles. The Stores Department takes over the manufactured articles through the Stores Advance Account at the end of each month, and gives credit to the particular manufacturing branch for the value of the articles. The general principle adopted in connection with the charge to be made to the Department is for the whole cost to be debited to the Stores Advance Account, and from that an average cost per pound or per hundredweight is calculated for retail charging to the branch supplied. In addition to manufacturing for direct stores order, the branches also make some of their own requirements without such an order, but the adjustment of charges is made through the Stores Advance Account.

Issue of Stores.

299. Stores are issued from the main stores under the control of the Stores Branch upon receipt of requisitions signed by officers who have been authorised in that regard. At branch and workshop stores authorised by the Stores Branch, a requisition from an authorised officer, or an issue docket signed by the foreman

or

or sub-foreman, as the local circumstances necessitate, is insisted upon. At the Trust Stores, *i.e.*, those under the head of the branch concerned, a docket from the officer-in-charge or an authorised foreman, sub-foreman, or officer of other designation is required before the storeman will issue the goods.

300. Oils for enginemen are supplied from the Loco. Trust Stores as required, and the total quantity taken out is noted on the running sheet for the trip, as well as a record being kept in a special book in the Running Shed Store Office. The difference between the actual quantity at the commencement of a run and that returned on its conclusion, after making allowance for receipt at foreign depots, is treated as actual issue. The question of coal issue and accounting is discussed in Part IV (c).

301. Detailed records of issues from the Trust Stores are not kept by the Stores Branch, but by the particular branch accountants concerned. The Comptroller, however, keeps in touch with the whole business through the monthly committees.

Trust Stock.

302. The value of stores is debited to the Stores Advance Account until the stores are issued. About half of the stock debited thereto is held under the direct control of the Comptroller of Stores in main and branch stores, and in some workshops. The balance is held in Trust Stores by the various branches under the control of the head of the branch concerned, through his local officer-in-charge, *e.g.*, Divisional Engineer, Steamshed Inspector, and so on. The value, however, is still debited to the Stores Advance Account until issued. Details of the items on hand, with their value, are kept by the head of the branch holding the stock, and the total only kept in the books of the Stores Branch. A summary is sent the Comptroller of Stores monthly showing the total amount issued from the Trust Stock.

303. Coal is despatched direct from the collieries to the point where it is to be used, and is under the control of the using officer. Excepting coal for locomotive and power-house use, the cost is charged to the receiving branch immediately. Only the quantity consumed by the Locomotive and Power Branches is debited, the figures being verified by a check stocktaking. The stock of such coal, although held by other branches, is recorded on the Stores Books, together with the value, and is cleared by the monthly requisitions for the coal used in that period.

Charging out of Stores.

304. The general practice is that stores are not charged out until issued for use. In some cases the value of materials obtained for capital works, *viz.*, rolling-stock construction, is debited to the vote for such works, although the material is usually retained by the Stores Branch until actually wanted. A Suspense Account is opened in the ledger to which the amount charged in advance is credited, and this account is debited, and the account for the item credited, as the materials are issued on account of the work. The amount so charged in advance is generally less than 5 per cent. of the total value of the stores held.

305. Stores are charged out at actual prices in the majority of items, although at Trust Depots average prices are taken for small issues of such items as bolts and screws. There are a few exceptions, such as engine coal, which is obtained in about four different localities, and sent throughout the system. An average price is charged based on the total purchases, taken in conjunction with the quantity and value of starting stock, except at Lismore, where the actual cost, plus shipping charges from Newcastle to port of unloading, is charged. In the near future, however, Lismore coal will be despatched by rail, *via* ferry at South Grafton, and the average price system will be extended to that depot.

306. New iron, brass, and steel castings (rough) manufactured in the foundry at Eveleigh Workshops are also issued at an average price. The Store Advance Account is debited with three totals for these castings, and the average is based on the output of each class. There are a few other items in which averages are taken.

307. It is not the practice to re-value all the stock on hand. With items obtained under annual contracts, however, the stock on hand at the end of one year is re-valued at the next year's rate, but the amount involved would not be great. As stock is reported as obsolete, the value (less any scrap allowance) is written off against the branch for which it was obtained, or, if for general purposes, against Stores Working Expenses, which are spread over the cost of the principal branches. Surpluses at stocktaking are generally used to write down the book value of slow-moving items.

Stocktaking and Inspection.

308. Stocktaking is carried out by inspectors under the Comptroller of Stores, five inspectors being engaged on this work. As a general rule, stocktaking is done once a year, although there are exceptions, viz., seasoning timber at the Main Store, Eveleigh, where the check is made every two years. Besides stocktaking, the inspectors also ascertain whether surplus stocks are being held, after comparison of the stocks with the average issues, and in consultation with the local officer arrange for the return, usually to the Main Store, of quantities not required at the particular depot.

309. As regards the quantity of stock on hand, the endeavour of the Department is to maintain equal to approximately one month's estimated consumption; having regard to the ease and speed with which an item can be obtained, and whether it is cheaper to purchase large quantities at a lower rate or smaller quantities as required at a higher rate.

310. As regards coal, a reserve stock sufficient for two months is considered adequate.

311. The following statement shows the stores purchased, issued, and on hand for the years 1913-24 inclusive, and indicates that a marked improvement has been effected in the proportionate quantity of stores on hand to yearly issues. While price factors cover this to some extent, the figures represent a satisfactory development.

312. A comparison of the turnover of stock for the years 1912-13 to 1923-24, as given below, also indicates the existence of an effective form of control. While the turnover of coal has declined, due to the building up of a larger (and necessary) coal reserve, the turnover of general stores has improved very considerably.

STATEMENT of Purchases, Issues, and Ending Stock for Years 1913-24 inclusive.

Year ended 30th June.	Purchases.			Issues.			Ending Stock.		
	Other than Coal.	Coal.	Total.	Other than Coal.	Coal.	Total.	Other than Coal.	Coal.	Total.
1912	£	£	£	£	£	£	£	£	£
1913	3,487,411	372,844	3,860,255	3,063,208	378,147	3,441,355	1,058,955	31,213	1,082,865
1914	3,885,962	431,684	4,317,646	3,707,195	428,341	4,135,536	1,235,722	29,253	1,264,975
1915	2,861,350	451,490	3,312,840	2,804,340	440,328	3,244,668	1,292,723	40,414	1,333,147
1916	2,173,445	507,346	2,680,791	2,431,175	488,032	2,919,207	1,031,823	62,868	1,094,691
1917	2,570,487	569,898	3,139,885	2,258,430	550,434	2,808,864	1,343,880	81,332	1,425,212
1918	2,414,327	800,056	3,214,383	2,271,966	818,133	3,090,099	1,486,241	63,255	1,549,496
1919	2,980,144	759,710	3,739,854	2,859,227	687,581	3,545,808	1,608,158	135,384	1,743,542
1920	4,154,030	898,758	5,052,788	3,839,494	953,310	4,772,804	1,922,694	100,832	2,023,526
1921	4,914,731	1,171,754	6,086,485	4,521,259	1,155,023	5,676,282	2,316,166	117,563	2,433,729
1922	5,369,225	1,191,514	6,560,739	5,462,455	1,174,572	6,637,027	2,222,936	134,505	2,357,441
1923	4,192,864	1,185,378	5,378,242	4,861,489	1,154,633	6,016,122	1,554,311	165,250	1,719,561
1924	5,019,348	1,249,014	6,268,362	5,162,283	1,227,108	6,389,391	1,411,376	187,156	1,598,532

During 1917-18 period £204,292 value of coal was purchased as the nucleus of a reserve stock of 300,000 tons of large coal.

The debit was accepted by the Government, through the Public Works Department, and the value is also included in the issues for the same period. During 1922-23 and 1923-24 large coal to the value of £33,422 and £22,195 was similarly dealt with.

Of the £187,156 value of coal on hand as at 30th June, 1924, £32,050 represents the value of the reserve of small coal held at Rozelle for power-house requirements.

The figures given include Railway, Stationery, and Tramway transactions: those for 1923-24 are approximate.

The ending stock of one period is the starting stock for the succeeding period, and has only been shown once.

On and after 1st May, 1919, Railway revenue was credited with freight, at the rate applicable to private consignments, on coal conveyed by rail for the Tramway Department, and the value thereof was added to the purchase cost, and issue rate increased accordingly. The additional amounts included in value of coal purchased for the years ended 30th June were :-

	£		£
1919	15,099	1922	59,269
1920	37,359	1923	76,571
1921	62,753	1924	82,698

COMPARISON

COMPARISON of Turnover of Stock for Years 1912-13 to 1923-24 inclusive.

Year ended 30th June.	Other than Coal.			Coal.			Total.		
	Average Stock.	Issues.	Turn- over.	Average Stock.	Issues.	Turn- over.	Average Stock.	Issues.	Turn- over.
	£	£		£	£		£	£	
1913	844,853	3,063,208	3·6	28,561	378,147	13·2	873,414	3,441,355	3·0
1914	1,146,338	3,707,105	3·2	27,581	428,341	15·5	1,173,919	4,135,536	3·5
1915	1,264,227	2,804,340	2·2	34,833	440,328	12·6	1,299,060	3,244,668	2·5
1916	1,162,283	2,431,175	2·1	51,641	488,032	9·6	1,213,924	2,919,207	2·4
1917	1,187,851	2,258,430	1·9	72,100	550,434	7·6	1,259,951	2,808,864	2·2
1918	1,415,060	2,271,966	1·6	72,293	818,133*	8·5	1,487,353	3,090,099	1·9
1919	1,547,009	2,858,227	1·9	99,319	687,581	6·9	1,647,018	3,545,808	2·2
1920	1,765,426	3,839,494	2·2	118,108	933,310	8·2	1,883,534	4,772,804	2·5
1921	2,119,430	4,521,259	2·1	109,197	1,155,023	10·7	2,228,627	5,676,282	2·5
1922	2,269,546	5,462,455	2·4	126,034	1,174,572	9·3	2,395,580	6,637,027	2·7
1923	1,888,623	4,861,489	2·6	149,877	1,154,633	7·7	2,038,500	6,016,122	3·0
1924	1,482,843	5,162,283	3·5	176,203	1,227,108	7·0	1,659,046	6,389,391	3·8

* As the issues of coal in 1917-18 included £204,292 on account of debit for reserve stock of coal accepted by Public Works Department, turnover of coal has been calculated on an issue of £103,941, and on the total issues of £2,885,807.

Elimination of Item in Capital Account for Stores.

313. There is a financial matter connected with stores which it would be well to put upon a better footing. Stores bear 5 per cent. interest upon about £1,500,000, representing an advance made by the Treasury for purchases. This amount should be eliminated from Capital under the rearranged scheme of finance which we recommend.

314. The Stores Branch is at present undergoing a measure or reorganisation on lines designed to give the Comptroller direct supervision over all stores. This will abolish the trust stock system, which obviously has certain defects in that a large proportion of unallocated stores is not under the direct supervision of the Comptroller. We recommend that this change should be effected as speedily as possible, as we are of opinion that the staff attending stores conservation and issue at all places should be under the direct supervision of the Comptroller. In this connection it is noted, from observations made at various Board meetings that there has been a certain laxity of supervision that would have been obviated if the Comptroller had been directly responsible for the stock all over the system.

315. We are quite satisfied with the manner in which the items held in the main and subsidiary stores are classified and stocked, and also with the "Card" system of recording issues and receipts. The stores were found to be clean and generally adequate for the work.

316. The Comptroller is very much alive to his responsibilities, and judging from the all-round improvement in the administration of the Branch since he assumed office, we are of opinion that, following the abolition of the trust stock system, the Commissioners may have confidence that the stores under their charge are being economically and effectively controlled.

IV.--MANAGEMENT.**(f) OPERATION.**

317. In any criticism of traffic movement, whether of passenger or freight, as at present existing upon the railways of New South Wales, two outstanding factors—one permanent, the other, it is to be hoped, temporary—must be borne in mind. The exceptional number of steep grades and sharp curves upon each of the main routes adversely affect speed and cost, while the shortage of rolling stock in certain directions curtail at one and the same time train services and public facilities.

Supervision of Working.

318. The supervision of operation is under a Chief Traffic Manager, stationed at Sydney. This officer is assisted at headquarters by a Chief Assistant Traffic Manager, three Outdoor Assistants, and three officers designated respectively Superintendent of Passenger Transportation, Superintendent of Goods and Livestock Transportation, and Goods Superintendent. For purposes of local

local control the system is divided into nine districts, each in charge of a District Superintendent, aided by an Assistant and a number of Inspectors. The district headquarters are at Sydney, Goulburn, Junee, Eskbank, Orange, Parkes, Newcastle, Murrurundi, and Lismore.

319. The Chief Assistant Traffic Manager controls the Staff, Coaching, Season Ticket, New Works, Claims and Investigation Sections, and also supervises the work of the Country Ticket Examiners. The Superintendent of Passenger Transportation compiles and issues timetables of all classes, is responsible for the weekly special notices, controls the composition, marshalling and car allocation for all passenger trains, supervises the movements of carriages and sleeping cars, and generally has charge of all work associated with the transport of passengers. The Superintendent of Goods and Livestock Transportation supervises the freight train service generally, this including the control of goods engines, the adjustment of engine load tables (in conjunction with the Chief Mechanical Engineer), and the control of goods and livestock wagons throughout the system. He also regulates the supplies of locomotive coal, supervises the work of the tarpaulin factory, and acts as Chairman of the Assistant District Superintendents' Conference held monthly. The Goods Superintendent's responsibilities embrace the control of the goods business throughout the State in connection with the loading of vehicles, undue delay to goods traffic, average loads, rates and freight charges and conditions, and a general oversight of all matters pertaining to goods transactions.

Duties of District Superintendents.

320. We have dealt with head office organisation in Part III under a proposed scheme of decentralisation, but the detailed duties of the District Superintendents demand consideration. They are, to some extent, responsible for the work of their districts, so far as the Traffic Branch is concerned, on both the operating and commercial sides. Theoretically they control all train working, supervision of traffic staff, the handling of rolling-stock, and the working of the stations. Their assistants are mainly engaged in the supervision of train running throughout the district and in exercising control over the Inspectors. The latter officials directly supervise the working of all stations in their allotted areas and make half-yearly inspections of each station. They also investigate public complaints, as they may be directed by the District Superintendent. As a matter of fact, the District Superintendents do not supervise train working excepting during daylight hours. At night, station-masters may and do order out engines and advise the running of trains without the knowledge of the District Superintendents. Records show that delays are not infrequently caused by special train advices being improperly timed as the result of inexperience or want of knowledge as to the actual conditions on the line. The trains should be controlled by District Superintendents as to the stations at which trains are to cross on single lines, and generally as to train movements through the district. We consider it desirable that a system of control should be set up in each District Superintendent's office, open day and night, and instructions issued from that source alone.

Extension of Train Control Recommended.

321. It may be added that centralised train control is now in operation in two areas, on the Illawarra Line and in the Sydney Metropolitan Suburban area, the latter being the first part of a much larger scheme which will ultimately embrace a considerable mileage of line. The Sydney scheme has not been in operation for a sufficient length of time for any figures of operating economy to be compiled, but we are informed that the installation on the Heathcote-Kiama section, 52 miles in length, has resulted in a definite saving of £11,757 per annum, in comparison with results in non-control days. The Control Office for this section is located at Thirroul, and the system adopted is a simple one which we commend. The essence of successful control working is simplicity, and for that reason we deprecate the provision of elaborate appliances. In view of the operating economy admittedly effected as the result of the installation of control working on the Illawarra Line some years ago, it is advisable to extend the system on a
wider

wider basis as speedily as possible. Obviously, increased telephonic facilities will be requisite, but the scope for economy is so great that the cost of such additional telephones should be faced immediately.

General Instructions should be Revised.

322. General instructions to the operating staff appear to be on the elaborate side. The Superintendent of Passenger Transportation admitted in evidence (Q. 2110) that it was not possible for an employee to keep them in his head. They might with advantage be simplified during the process of decentralisation. On many railway systems considerable economies have resulted from a general overhaul of office work by a committee representative of the various branches. Duplication of returns and forms that have outlived their utility have often by this means been cancelled, and the paper aspect of railway business reduced to a minimum. It would be advisable to keep an eye upon this also with decentralisation.

Statistics of Traffic Districts.

323. The staff in the Traffic Branch numbers over 10,000 in all. The Chief Traffic Manager's headquarters staff numbers 418, this including the principal departmental officers, while the remainder of the personnel is distributed over the system as shown below. Particulars of line mileage, number of stations, unattended sidings and traffic volume are also given for each district for general reference purposes.

District.	Mileage approx.	No. of Staff.	No of Stations.	Unattended Platforms.	Traffic Density. Tons per mile per day. April, 1924.
Sydney	272	3,723	159	109	46,808
Goulburn	652	721	90	50	27,178
Junee	814	658	72	89	18,532
Eskbank	604	748	69	65	21,117
Orange	687	449	51	66	7,712
Parke	794	218	42	76	4,341
Newcastle	113	1,480	62	24	52,637
Murrurundi	929	766	99	68	13,686
Lismore	579	292	46	90	5,858

Passenger Train Services.

324. The general scheme of passenger train services provides first for the fixing of Mail and Interstate train times, and the building up of other train services round them. Suburban trains are an exception, these being governed by the density of passenger movement into and out of the cities.

325. In order to meet Post Office requirements, Mail trains leave Sydney in the evening, and in the reverse direction, departures from the termini are fixed to enable the trains to arrive in Sydney in the early morning. Interstate trains between New South Wales and Victoria and Queensland are also night trains on the New South Wales system. Sleeping accommodation is, therefore, a necessity on each of these trains, and very special consideration should be given to it in the interests of comfortable travel. Under any type of equipment in respect of sleeping and lavatory compartments, a night journey is bound to be tedious, especially so to women and children in hot weather, and the more complete and comfortable the night trains are the greater may the traffic be expected to grow.

326. On the South African State Railways, where night travel and transport conditions generally have many points in common with New South Wales, special attention is given to up-country travel. It is claimed that there the carriages are among the best extant. A modern first-class main line saloon coach provides seating accommodation for thirty-nine passengers and sleeping berths for twenty-six, and other stock is in proportion. No extra charge is made for sleeping accommodation. Dining cars are attached to all except short distance trains.

327. Sooner or later public opinion will force recognition of the claims by second-class passengers for sleeping berths on the New South Wales railways similar to the accommodation given elsewhere. At present it cannot be done; it is to be hoped, however, that with augmented rolling-stock provided by the expenditure foreshadowed in the Commissioners' estimate of future Capital commitments, this very desirable improvement in night travel will be accomplished.

Interstate Trains.

328. On Interstate trains, which, from a revenue point of view, are very valuable, carriages constructed upon the side of what may be termed luxury may be expected to pay handsomely. To make these trains equal to the best in other countries would require much better rolling-stock than is at present provided, and an improvement by the provision of breakfast, luncheon or dining cars would be desirable, not only as a convenience but in order to effect a saving in transit time by the reduction of stops at refreshment-room stations. Nothing better can be done than is being done with the rolling-stock available, but, as new carriages are built, we suggest that a superior type should be introduced on the Mail and Interstate trains, the receipts from which show that cultivation of this traffic is likely to pay well and give satisfaction to the public. It may be that additional trains will be necessary to carry out these suggestions, but the traffic can well bear the expenditure thus involved. As remedying an inconvenience felt by passengers in Mail trains reaching Sydney at an early hour of the morning, it would be well, if possible, during the remodelling of sidings at the Central Station, to make room for trains to stand in order that passengers may remain undisturbed in their sleeping berths until a reasonable hour. This is a practice adopted at many places abroad where trains arrive very early in the morning.

Sleeping Berths.

329. Inconvenience due to delay in allotting berths, to berths being given to others after allotment, and uncertainty as to whether berths had or had not been provided, formed the subject of many complaints. There would certainly appear to be grounds for these complaints, and they point to necessity for the overhaul of instructions as well as the carrying out of them by the staff.

Mail and Interstate Trains.

330. The speed of Mail trains, governed as to stops by the Post Office, is about 30 miles per hour, and cannot well be improved, having regard to gradients, curves and refreshment time. Interstate trains run at 36 miles per hour, including stops, and these also cannot be expedited to any appreciable extent for the same reasons. The exceptionally heavy grades are noted in the permanent-way section, but it may here be mentioned that there are 162 miles of a grade at 1 in 40 or less, and 1,654 miles of 1 in 100 or less out of a total of 5,523 route miles of line.

331. According to the records, the timekeeping of the Interstate trains has not been good. In one month the Sydney-Melbourne Limited was seriously late on fourteen occasions on arrival at Albury, and nineteen times late on reaching Sydney. Locomotive failures were mainly responsible for these delays (see Part IV. Section (e)). Delays from a similar cause have occurred to trains on the Northern section. Unpunctual running of these important trains reacts on other trains and upsets the services over a wide area. Delays of this character to Mail trains have not been so numerous, but there have been very late arrivals occasionally.

Train Services on Country Branches.

332. The trains run on the country branches give a very poor service. It is said that the population and consequent traffic do not warrant more trains. In this connection, however, it may be observed that in Great Britain and other countries a similar argument could be advanced in respect of many branch lines which do not pay *per se*; nevertheless, numerous trains are run, the policy and accepted obligation being the provision of a reasonable train service to enable inhabitants to travel to and from civic centres for marketing, medical, legal, and other

other purposes. It cannot be termed a reasonable service if one mixed train only is run each way on two or three days per week, leaving no opportunity for a return journey the same day. Such a service invites competition by motor vehicle, of which signs are evident in several directions (Q. 861). Moreover, it is not calculated to develop travel. Most of the lines with such a poor service are non-paying, but obviously the few trains run do not give the lines a fair opportunity of showing the full value of railway communication. Railways should not only be made but equipped, and the evidence (Q. 167) is that for monetary reasons they are not equipped.

Rail Motor-car Services should prove Successful.

333. Several rail motor-cars have been built, but unfortunately engine design has proved faulty, and, with the exception of one at Lismore, which runs a service over two branches and pays well, the others, for the reasons stated, have not given the increased facilities they might otherwise have done. As an influence in the amenities of bush life, apart from the question of reasonable facilities, it is desirable that this method of serving branch and country lines generally should be developed, and that, as engines become available, the country train services augmented. Rail motor-cars are utilised to an increasing extent in many countries, notably in the United States, where it is estimated that approximately 7,000 miles of track are operated by this means. There is every reason to expect that well-designed cars will prove equally successful in New South Wales.

Characteristics of Sydney Suburban Traffic.

334. The Sydney suburban train service (the district between Milson's Point and Hornsby excepted) differs from that serving most large cities, inasmuch as it is centred on one station only. As a rule, suburban lines distribute passengers at a number of city stations, and at several termini, but in Sydney the concentration of traffic to and from all lines is an inevitable source of congestion. So much is this so, that, at the peak hours of traffic, the approach lines, as well as the station, are nearing the saturation point. The population of Metropolitan Sydney is increasing, according to statistical records, at the rate of from 25,000 to 30,000 per annum. The number of passenger journeys on the railway increased from 45,557,506 in 1910 to 73,180,876 in 1914, and in the year ended 30th June, 1924, were 111,964,774. It is estimated that, by 1930, over 180,000,000 passenger journeys will be made annually, this representing an increase in travel of over 200,000 journeys per week-day as compared with 1924. If this eventuates, and unless the City Railway is carried through to completion and the suburban lines are electrified by that time, a state of affairs verging on the chaotic may be expected.

First and Second Class Fares should be Revised.

335. Notwithstanding the heavy traffic and the use of "a fairly large number of goods engines" (Q. 675) the suburban trains as a rule keep good time, but there is occasional overcrowding, while numerous complaints arise from the alteration of first-class compartments into second and *vice versa*. This is said to be due mainly to a shortage of carriage stock and to the fact that unsuitable main line stock has, in consequence, to be used on suburban trains. There is, however, another feature noticeable in the suburban as well as in the country passenger traffic which accounts for some of this trouble, viz., the drifting of first-class passengers to the second-class. The increase in fares, being on a percentage basis, has introduced too wide a difference between the respective classes, with a resultant loss of first-class traffic. There is a point of difference between the cost of first and second class fares which defeats the object in view of increased price, i.e., the securing of more revenue. Results show that that point of difference between first and second class has been passed, and we therefore suggest a review of the fares.

Milk, Fruit and Butter Traffic.

336. The parcels traffic conveyed by passenger train is considerable, yielding a revenue of £600,000 per annum. The volume of milk, fruit and butter conveyed by passenger trains is large, adequate arrangements being made to give speedy transit. Milk in cans of 5 to 10 gallons, and in fixed vats of a capacity of
of

of 500 to 700 gallons, or portable vats holding 250 gallons, is to some extent loaded in private milk vans. Departmental vans with fixed vats are also provided. This commodity travels considerable distances up to 235 miles.

337. Fruit special trains are run under a guaranteed minimum load of 75 tons. Fruit conveyed by passenger trains to Sydney is transferred to Darling Harbour, adjacent to the Municipal Fruit Markets. Small consignments are delivered from the Central Station. Butter is loaded in louvered vans on passenger trains, and in refrigerating cars on mixed trains. The longest haul is about 340 miles. These important commodities are dealt with in a satisfactory manner, and the same may be said of parcels traffic in general.

Goods Traffic.

338. As in the case of the passenger, so goods traffic demands a service mainly to and from Sydney as the centre of marketing and exporting business. The tonnages inward and outward do not balance, and, as a result, there is considerable running of empty vehicles from Sydney to the country, the annual figures being 280,000 empty to 180,000 loaded wagons. The maximum load of any goods train is 900 tons. The trains are run at about 16 miles per hour, and, under all the circumstances of single line crossings, the presence of numerous special trains and delay by passenger trains out of course, are fairly punctual and give satisfaction to freighters.

339. There is, however, complaint of delay to small consignments too light for a truck-load to destination. This indicates detention at transshipping stations, due to laxity of local supervision. In addition to selected transfer stations, it is the practice to accept goods for certain stations on two or three days only each week in order to concentrate loads as far as possible in truck loads from one or two places. With such a large number of empty wagons going out to country stations it would appear advisable to give more direct loading even at the expense of light loads, the empty vehicles having in any case to be hauled to the country for back-loading with grain and other produce.

Transfer over Clarence River at Grafton.

340. As the lines north of Grafton are cut off from rail access southward, arrangements are made to transfer small consignments across the Clarence River, but for any bulk traffic consignees have to make their own arrangements for effecting an exchange between the two railheads. We understand that progress is being made in the direction of providing a punt with the necessary landing appliances capable of transporting railway vehicles from one side of the river to the other. This is certainly desirable, pending the construction of a bridge, which, especially in view of the decision to construct the Kyogle-South Brisbane Line on the 4 ft. 8½ in. gauge, should not be delayed.

Grain Traffic.

341. Grain traffic in successful seasons is calculated to tax rolling-stock resources to the utmost. But for the well-arranged and rapid movement of this traffic and the return of empty wagons, many complaints would undoubtedly have arisen. There has been complaint of non-acceptance of grain, brought about by irregular arrival of grain ships, numerous wagons having been held up at the port in consequence, thus leading to a restriction on loading at the country centres. Blame cannot, however, be attached to the Railway Department for this difficulty, and we are satisfied from our investigations that every attempt is made to meet all reasonable demands.

Livestock Traffic.

342. In New South Wales—mainly dependent, as it is, upon its flocks and herds—the running and equipment of trains for livestock traffic demands special consideration. Prior to December last complaints of slow movement, with consequent loss, deterioration and suffering of animals, were numerous. Since that date, however, livestock trains with limited loads have been run at passenger train speed, but there is still need for better transport of smaller numbers. Although this request means extra cost it is reasonable to expect that it should be dealt with.

Comparison with the Argentine.

343. In the Argentine where, as in New South Wales, large numbers of sheep and cattle are conveyed by railway, Government regulations are drastic. The transport of livestock must be effected within the specified times laid down in the regulations under penalty of forfeiting a part of the freight proportionate to the extent of the delay. The time for transport begins to count as from two hours after receipt of the animals, *i.e.*, after they have been loaded into the wagons and these made ready to go forward. The hour from which the time begins to count is registered on the invoice. Apart from the carriers' liability to lose part of the freight, any delay stands against the carrier in the event of mishap overtaking the animals. The fact of there having been a delay is assumed to imply that the transport was not effected under normal conditions. The maximum time allowed for livestock transport is as under:—

Distance. Kilometres	Time Allowed.	
	Hours.	Minutes.
50	5	...
100	10	...
150	13	15
200	16	45
300	20	45
400	24	45
500	28	45
600	32	45
700	36	45
800	40	45
900	44	45
1,000	48	45

344. It is strictly forbidden to keep animals in the wagons over thirty hours, save in cases of *force majeure*. In such an event the animals are unloaded at a convenient place where fodder and water are provided on account of the freighter. The charge for this service varies according to the season of the year. The carrier simply charges what the contractor collects for supplying the hay. The carrier supplies the water free of charge. The contractor's charge for the hay is inserted on the waybill and is payable at destination before the livestock is withdrawn. All the stations loading livestock are equipped with suitable installations for the purpose, *viz.*, a fairly large-sized pen and loading stage, drinking troughs, &c. The party loading livestock must have the animals at the station in time to enable them to be loaded into the wagons two hours before the appointed hour of departure.

345. We mention these regulations because of the similarity between the movement of livestock in New South Wales and the Argentine. An idea of the importance of livestock traffic in the two countries may be gathered from the record of numbers conveyed per annum, *viz.*, New South Wales (1924), sheep, 8,000,973; cattle, 780,558; Argentine, sheep, about 14,000,000; cattle, 5,000,000 to 6,000,000.

Insufficient Vehicles to meet full needs of Livestock Traffic.

346. It is admitted that there is an insufficient number of trucks to meet the full demands of livestock traffic in time of drought. We do not think such a shortage should exist. Vehicles should be available either for conveying sheep and cattle to market or for the transfer of starving stock from one district to another. In countries where companies own and manage railways, the Legislature insists upon all transport needs being met, and such would undoubtedly be the case in New South Wales but for the fact that the railways are State owned and managed. Clearly what a State would require public companies to do, it should itself perform where it controls the means. The type of truck that should be built to meet drought emergencies should be solved, and we refer to this elsewhere in the Report.

347. We suggest that instead of a general instruction to stationmasters and guards to see that loss and suffering of animals *en route* do not occur, it would be preferable to equip certain stations on each route for examination, watering and attention, the necessary interval being allowed in the timetable for this purpose.

Coal Traffic.

348. Coal traffic accounts for 53 per cent. (8,354,479 tons in 1924) of the total freight tonnage conveyed, and, being slow-moving traffic, calls for powerful engines in the interests of economy, and strict time-keeping to avoid delay to other trains. New South Wales is blessed with good coal measures over a wide area, the principal output at present being from the Newcastle field. Of 6,635,552 tons lifted, 3,622,824 tons were shipped at that port as freight or for bunkering. Complaint is made of the times at which trains are fixed to leave the collieries, but there would not appear to be undue delay in dealing with coal generally, excepting as the result of engine failures and the absence in times of pressure of sufficient berths and cranes to deal promptly with tonnages; for the latter, the Railway Department is not responsible. The Colliery Companies provide wagons for shipping coal, but for inland consumption railway departmental vehicles are used. There is at times a shortage of these wagons. The weight of trains hauled having regard to engine capacity and the loading of wagons is satisfactory.

349. From the Illawarra field 1,106,088 tons were conveyed, and from Western pits 644,983 tons. The former is shipped at Sydney and Port Kembla, and home consumption is for the most part in Sydney. Colliery wagons are available for the major tonnages, country districts excepted. Western pits supply Sydney and shipping, as well as country requirements in competition with the Illawarra field. No complaint has been made of movement in these areas.

Tonnage of Coal Handled.

350. The coal tonnage hauled from all coalfields in the Newcastle district from October, 1921, to June, 1924, is as under:—

October, 1921	...	...	...	449,480 tons.
March, 1922	...	...	...	478,444 „
June, 1922	...	...	...	426,728 „
September, 1922	...	...	...	427,022 „
December, 1922	...	...	...	393,281 „
March, 1923	...	...	...	476,469 „
June, 1923	...	...	...	274,522 „ (Maitland field strike).
September, 1923	...	...	...	574,212 „
December, 1923	...	...	...	574,212 „
March, 1924	...	...	...	541,761 „
June, 1924	...	...	...	491,183 „

and it will be seen that, although the coal output appears to have a slight tendency to increase, it is by no means regular, one month varying considerably as against another.

351. In regard to the Maitland field, which includes the Maitland field collieries served by the South Maitland Railway Company, and, in addition, those collieries north of Maitland, viz.:—South Greta, Whitburn, New Greta, Great Greta, Central Greta, and Rothbury, the following outputs were recorded:—

October, 1921	...	...	...	265,547 tons.
December, 1921	...	...	...	284,477 „
March, 1922	...	...	...	319,425 „
June, 1922	...	...	...	287,465 „
September, 1922	...	...	...	281,652 „
December, 1922	...	...	...	254,735 „
March, 1923	...	...	...	278,155 „
June, 1923	...	...	...	34,761 „ (Maitland strike).
September, 1923	...	...	...	348,819 „
December, 1923	...	...	...	249,303 „
March, 1924	...	...	...	356,818 „
June, 1924	...	...	...	311,586 „

The same variation in output is noticeable in these figures as is found in those quoted earlier. While there would appear to be a slight tendency to increase, the output varies from month to month, and the increase falls a long way short of the 50 per cent. increase in output stated in evidence.

Improved Facilities for Coal Traffic.

352. In regard to the allegation that the Railway Department has made no provision to meet any increased output, the Chief Traffic Manager states that during the last two years, eight additional trains daily were tabled to meet the output of the Maitland field served by the South Maitland Railways Company alone, and most of these were to meet the increased output from the Aberdare Collieries. The whole of the collieries on this field have more than an ample train service to carry their present output.

353. In addition to this, engine power working in coal traffic has been improved. For example, in September, 1922, 51·24 per cent. of the coal trains from East Greta Junction were worked by heavy engines. This has gradually been increased. In August, 1923, the number reached 85·24 per cent.; in December, 1923, 85·05 per cent, and in June, 1924, 81·67 per cent, while the load has been increased practically from 535 tons to a maximum of 610 tons.

354. The regulations permit every colliery to despatch each day one train with 50 per cent. of its load. Taking the collieries as a whole in this district, this means that quite a number of them, having only one train per day, fall short of a full load. This applies more to collieries outside the South Maitland field, although there is a fair percentage of the collieries within this field which takes advantage of this concession, and it is said that the average coal load from the Maitland field will not exceed 530 tons, while the engine power is in the vicinity of an average of 50 tons higher.

Special Trains.

355. A very large number of special trains is run across country, notably in times of stock movement. Water trains also account for many trains not shown in the working time-tables. As an indication of the measure of these irregular trains, it is noted that 51·10 per cent. special to ordinary run in the Parkes district in one year. The presence of such a number of unscheduled trains must adversely affect the time-keeping of regular services, especially on single lines. It is desirable that, where possible, conditional timings should be printed in the working time-tables in order to give the best possible service, and also for the information of the staff. It is stated that difficulty exists in foreseeing the times at which these trains will be required, particularly so where water trains are concerned—the latter amounting to as many as 329 per month under drought conditions—and these, no doubt, are difficult to deal with; but, at any rate, some of the remainder could with advantage be given conditional running time-tables.

Facilities at Terminal Stations.

356. The terminal stations and depots at Sydney are in the main managed in a satisfactory manner. The Central Station, now under rearrangement in connection with the City railway, has, however, reached that stage when it is subject at intervals to congestion, which electrification and the opening of the City railway should cure. It is a matter for congratulation that those who were responsible for the building and lay-out of this important terminus looked far ahead and gave Sydney a station not only architecturally good, but so effectively laid out as to be able to deal easily with a much larger passenger traffic than appeared probable at the time it was erected. A minor improvement in operating efficiency would result from the employment of electric luggage barrows now common at most large terminal stations.

357. The outwards goods depot at Darling Harbour is comparatively new, the handling, loading, and despatch of traffic giving general satisfaction. Accommodation for inwards traffic needs laying out afresh, but, notwithstanding obvious disadvantages due to traffic having outgrown shed and stage capacity, there is little public complaint. An application for extension of time during which goods are received at Darling Harbour had better be left as it is in the interests of throughout rapid conveyance. †

Defects at Newcastle.

358. At Newcastle the same record cannot be claimed. The whole lay-out, both of passenger and goods accommodation, calls for rearrangement. The Commissioners have long recognised this, but absence of funds has been an obstacle to any considerable expenditure in that direction. Valuable land which could well be sold to the advantage of the railway and the amenities of the town is the site of old buildings and yards, which could better be placed elsewhere (Q. 3507). At present North and South bound Mail and Interstate trains run into and out of a dead-end station, this involving delay to through passengers. A preferable arrangement would be an improvement of Broadmeadow as a through line station with connecting services to and from the terminal station. Newcastle is the second town in importance and size in New South Wales; its traffic and population are increasing rapidly, and deserve far better railway facilities than exist to-day. Many of the complaints originating there should yield to the local management recommended in Part III of our Report under the head of "Organisation."

Traffic Exchange Points and Facilities.

359. At Albury, Wallangarra, and Tocumwal the transfer of passengers from and to Victorian and Queensland trains is as good as can be devised under the circumstances attending the break of gauge. With regard to the loading and unloading of goods traffic at Albury, improved mechanical or electrical appliances would lead to quicker despatch of traffic. If there be any prospect of uniformity of gauge linking up the capitals of the States, it would scarcely be worth while to alter existing machinery, but if the imaginary line dividing Victoria from New South Wales is to perpetuate the break of gauge, which would not be tolerated within the confines of a single State, then the expenditure necessary to replace hand-worked cranes and other appliances will be justified.

360. Other terminals meet public requirements and are free from complaints.

Movement of Rolling Stock.

361. Passenger stock generally is admittedly short in number, the best being done in the composition and arrangement of trains under the circumstances prevailing. This shortage affects not only existing services, but prevents the running of additional trains desired on many parts of the system.

362. Goods and live-stock wagons are controlled as to movement by the Superintendent of Goods and Live Stock Transportation. The former are said to be sufficient for present tonnages, although it is certain that, but for the very efficient way in which these vehicles are manipulated to and from producing centres, a shortage would be felt. Loaded goods wagons from Sydney numbered in twelve months 177,383, as against 272,710 run away empty. The record for live-stock vehicles in the same period gives 15,958 loaded outward and 55,503 empty. Throughout the railway unbalanced wagon movement is apparent. This makes supply difficult of adjustment; it is well done, however.

Weighbridges.

363. Complaints of inconsistency between weighings at forwarding and receiving stations were voiced by several witnesses, some of them originating from a desire to make use of railway weights for buying and selling purposes. Railway weighbridges are tested by official inspectors under general law, they are subject to periodical overhaul, repair and test by competent railway men, and there should be no question of their accuracy. In cases where it is proved that a greater weight has been charged for than is actually conveyed, the overcharge should immediately be refunded.

Cleaning of Carriages.

364. There appears to be justification for complaint of dirty carriages on certain trains. It must be recognised, however, that, with a shortage such as exists in this class of vehicle, it is not easy to do full justice to the whole of the carriage

carriage stock. Still the importance of cleanliness cannot be put too high, and by the provision of vacuum cleaners for interiors, the carriages of trains at the starting point should lack nothing in that direction.

Accidents.

365. The record of New South Wales Railways in comparison with other countries is good under this head. It applies to accidents to employees as well as to the public. Propaganda by "Safety first" rules, with the constant reminder of need for caution has no doubt had a beneficial influence in this direction during recent times. ' '

Lighting of Trains.

366. The complaint under this head will, we gather, be obviated by the provision of electric light in place of gas, which the Commissioners are proposing gradually to instal on all but the very oldest stock.

IV.—MANAGEMENT.

(g) RATES AND FARES.

367. Under the Railway Acts a clause dealing with tolls provides that :—

" (1) The Commissioners may carry and convey upon the railways all such passengers and goods as are offered for that purpose, and may demand reasonable tolls and charges in respect thereof.

" (2) Subject to the provisions of this Act, all such tolls shall, at all times, be charged equally to all persons, and after the same rate, whether per ton, per mile, or otherwise, in respect of all passengers and of all goods or carriages of the same description, and conveyed or propelled by a like carriage or engine passing over the same portion of the line of railway and under the same circumstances; and no reduction or advance in any such tolls shall be made, either directly or indirectly, in favour of or against any particular company or person travelling upon for using the railway."

Passenger Fares.

368. The scale of ordinary fares in operation for passengers travelling within the Suburban Area, *i.e.*, to places radiating for a distance of 34 miles from Sydney and Newcastle respectively and including Richmond, 38 miles on the Western Branch Line, is :—

Second Class (Single)	First mile	...	...	...	...	...	2d.
	2. to 8 miles (per mile)	...	...	...	...	...	1d.
	Each succeeding mile	...	...	...	...	...	$\frac{3}{4}$ d.

First Class.—Second Class plus one-third.

The return fares are :—

First Class.—Double the Single.

Second Class.—Double the Single less 1d. except in regard to a few short distances.

369. The fares between all Stations outside the Metropolitan and Newcastle Suburban Areas (Single fares only) are based on the following scale :—

<i>Miles.</i>	<i>Fare per mile Second-class.</i>
1 to 100	1.75
101 ,, 200	1.52
201 ,, 300	1.5
301 ,, 400	1.32
401 ,, 500	.85
501 ,, 600	.85
601 ,, 700	.85
701 ,, 800	.85
801 ,, 900	.85
901 ,, 1,000	.85

The first-class fares are the second-class fare, plus 50 per cent;

Suburban

Suburban and Country Fares.

370. The fares from Sydney or Newcastle, also from stations in the Metropolitan and Newcastle Suburban Areas to all stations outside these areas and *vice versa* are computed by adding the fare for the distance travelled over the Metropolitan and Newcastle Suburban Areas to the fare for the distance outside. For example :—

		<i>Single.</i>	
		First Class.	Second Class.
		s. d.	s. d.
Sydney to Katoomba, 68 miles—			
Metropolitan Area : 34 miles—“ A ”	... ..	3 2	2 4
Country „ 34 „ —“ B ”	... ..	7 5	4 11
		10 7	7 3

The fares between Sydney and Melbourne, and Sydney and Albury are—First-class £4 and £3 14s., and second-class £2 13s. and £2 9s. 7d. respectively.

Anomalies in Fares.

371. Anomalies in the list of fares charged for passengers, both first and second class, as between interstate and local, and also between the suburbs and the country, have been the subject of complaint. The justification for lower fares between State capitals is sea competition, the arbitrary sum of the reduced fares being divided between the several State railways in proportion to the mileage run over each. It is held that a passenger from a station other than the capital should not expect to travel at the same proportionate rate as a fare fixed for the purpose of obtaining revenue which would not accrue to the railways, but for the inducement offered by a lower fare to prefer the rail to the sea. Accepting this as a reasonable proposition, it cannot be said that the difference in the ordinary fare for suburban and country travel is accounted for by the cost of conveyance in the country being higher than in the suburbs. Neither can it be demonstrated that a country passenger receives a greater benefit by way of speed or comfort in travel; rather the contrary, especially in the case of mixed trains, of which so many are run. The measure of disparity is brought out forcibly by the instance given of fares from Sydney to Katoomba. The fare for 34 miles on suburban lines is 3s. 2d. first, and 2s. 4d. second class as against 34 country miles 7s. 5d. first and 4s. 11d. second.

372. It is not quite clear how the difference in charge as between town and country was established. It has existed for many years. Unfortunately, to adjust the fares at this juncture by making the rates per mile identical would involve a loss of revenue too heavy to be borne. We suggest, however, that at the earliest opportunity, and as revenues improve, the country fares should be reduced, such reduction being regarded not as a total loss, but as a means of inducing increased travel by a cheaper fare, thus offsetting to some extent the loss in revenue that must be faced.

373. A large number of reduced fares for workmen's and week-end tickets to popular resorts are in operation. Probably an extension of week-end tickets to and from the country would increase revenue, and we think that cheap market tickets by certain trains issued on one day of the week, preferably in the middle of the week, would prove as popular and pay as well as such facilities do in other parts of the world.

Increases in Passenger Fares.

374. Increases in passenger fares since 1914 are shown hereunder :—

Date.	Suburban Scale.	Country Scale.	Periodical.
	Per cent. Increases.	Per cent. Increases.	Per cent. Increases.
8 August, 1917	10	10	10
1 November, 1918	7½	7½	7½
1 January, 1920	20	20	20
1 November, 1920	16⅔	16⅔	16⅔
Actual percentage on 1st November, 1920, over pre-war bases	66	66	66

Reduction in Fares and Parcel Rates.

375. Reductions in passenger fares and parcel rates, involving a loss of revenue exceeding £100,000 per annum, have been made since 1922. Various reductions have been made since 1st May, 1922, as follows:—

- 1 May, 1922—1st class periodical fares adjusted to 2nd class, plus 50 per cent., representing reductions ranging to 13 per cent. for mileages over 30, and up to about 600 miles.
- 12 Dec., 1923—2nd class country single fares decreased for mileages over 500, ranging up to 6½ per cent. 1st class country fares slightly decreased up to 100 miles, up to 6 per cent. to 200 miles, and from about 7 to 15 per cent. for distances over 200 miles.
- 1 May, 1924—2nd class suburban fares up to 34 miles decreased 3 to 11 per cent.; 1st class, 7 to 25 per cent. Over 34 suburban miles 2nd class decreased 8 to 18 per cent.; 1st class 23 to 27 per cent.
- 1 May, 1924—New scale introduced for periodical tickets within the Metropolitan and Newcastle Suburban areas, representing a reduction on previous charges ranging to about 2 per cent. up to 50 miles, 2nd class. Reductions on 1st class tickets ranged from 11 to 13 per cent.—rates being fixed at 2nd class, plus one-third, instead of 2nd class plus one-half as formerly.

Parcels Rates.

376. No complaints have been raised with regard to the parcels rates. These are reasonable, especially so in regard to milk, butter and fruit. Consignments of milk and cream are carried under "Owners' Risk" conditions, and, if carried in owners' vans, are charged at the rate of 1s. 2d. per four wheels, minimum 41s. 6d., and the van is returned free. If Departmental louvered vans are used, a hiring charge of £1. 0s. 9d. per week additional is enforced.

377. Milk carried in cans in passenger train brakevans is charged for on a sliding scale for distances from 7 to 300 miles, the rate from 201 to 300 miles being 3½d. plus one-sixth per gallon, while for 301 miles and upwards 4½d. plus one-sixth per gallon is charged. The carrying capacity of the cans used is 5 and 10 gallons each. In regard to the vats, the capacities differ, but this does not affect the freight, as it is charged on a mileage basis per van. The capacity of fixed vats in Departmental and private vans varies from 500 to 700 gallons, while portable vats will hold 250 gallons.

378. Seasonal fruits are conveyed in bogie louvered vans by passenger trains, under "Owners' Risk" conditions, and at goods rates, viz., miscellaneous in full truck loads, plus 25 per cent., minimum, 6 tons per 4-wheeled vehicle, 12 tons per bogie truck; and for smaller quantities "A" class on the actual weight. Fruit specials are run when a guarantee is given for a minimum load of 75 tons, ordinary goods rates as shown above being charged.

379 Fruit is charged at half parcel rates on the bulk weight. If cheaper, the following rates are charged for any distance conveyed at the convenience of the Department:—

	Per case.
	s. d.
In cases not exceeding half-bushel size	1 0
In cases exceeding half-bushel, but not exceeding bushel size	2 0
In cases over bushel size, approximately 2½ cubic feet in measurement	2 9

When two or more cases secured together as one consignment do not exceed the capacity of one half-bushel or bushel case respectively, the charge is as for half-bushel (1s.) or bushel case (2s.).

380. Butter is conveyed by passenger and mixed trains. Bogie louvered vans are used on passenger trains, and refrigerating cars on mixed trains. Consignments are carried under "Owners' Risk" conditions, and at ordinary goods rates, viz.:—

Full truck loads "A" rate (Subject to a maximum charge of 1s. 9d. per box, not exceeding 66 lb. gross).

Smaller quantities, "B" class rate, minimum 4 tons per 4-wheeled, and 8 tons for bogie refrigerator cars.

Goods Rates.

381. The pre-war classification of merchandise was in the main based upon what the traffic would bear in the shape of a conveyance charge. Other factors such as the encouragement of wheat production, development of industries, and to some extent the cost of haulage, were elements in the decision to include articles in

in a particular class. The objective of a goods classification is to secure a given amount of Revenue, *i.e.*, general railway expenditure, including interest, by an equitable division of conveyance charge as between the various classes of traffic having regard to the character, value, and other considerations attaching to each item. No one has yet been able to devise a classification to please everybody. Comparisons are constantly being made between the value, cost of conveyance, or the national importance of one article and another, with the object of bringing an article into a lower scale. Revisions of classifications are frequent, and New South Wales affords no exception to this rule. The present classification with many modifications introduced during the last two years is as follows:—

NUMBER of Commodities carried under various Classification Rates:—

- | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. Crude Ores—
Antimony.
Bismuth.
Crude fuller's earth.
Crude ochre.
Crude silica.
Gold.
Lead.
Iron.
Copper.
Silver.
Manganese.
Tin (lode and stream).
Ores.
Oxide of iron.
Pyrites.
Magnesite. | 6. Miscellaneous (<i>con'td</i>)
Lead (bullion, scrap,
or pig).
Molasses.
Wire-netting.
Drain-pipes.
Rock salt.
Stone.
Tiles.
Timber.
Lime. | 10. "A" (<i>continued</i>).
Wines and cider, made
in Commonwealth.
1 ton lots. | 13. 1st—
Animals and poultry in
crates, alive.
Bread.
Candles.
Ceilings, metal
sheets.
Dates.
Dried fruits.
Dyes.
Furniture, in vans.
Houses, wood, port-
able.
Jam, packed.
Meat, preserved.
Pork, beef, mutton.
Rope, grass.
Sheep's tongues, tinned. |
| 2. Gravel—
Ashes.
Clay.
Soil.
Gravel.
Road metal.
Screenings.
Sandstone.
Rubble.
Ballast. | 7. Hay, Straw, Chaff,
&c.—
Hay.
Straw.
Chaff.
Greenfodder.
Ensilage. | 11. "B"—
Aerated waters.
Agricultural imple-
ments.
Cheese made in Com-
monwealth.
Currants, raisins, and
almonds, grown in
Commonwealth.
Dried fruits, grown in
Commonwealth.
Dripping and lard, in
casks.
Tallow.
Dross metal.
Fish (dried in Common-
wealth.)
Flax (in bundle).
Greases.
Hides (dry).
Galvanised iron, packed
local.
Rolled, stamped, or
wrought iron, local.
Machinery.
Contractors' plant.
Milk, fresh.
Kerosene (unrefined).
Kerosene, benzine, &c.
Pipes, galvanised.
Soap, soft, common,
sand.
Stone.
Sugar. | 14. 2nd—
Bottles and jars, drug-
gist.
Biscuits and cakes.
Boilers.
Boots and shoes.
Cables and wires, in-
sulated.
Catering (material).
China and glassware.
Coffins.
Confectionery.
Cordials and lime juices.
Cotton (in bales).
Cutlery.
Drapery and mercery.
Drugs and medicines.
Electroplate ware.
Enamelware.
Floorcloth.
Linoleum.
Furniture.
Groceries.
Hardware.
Instruments, musical
and scientific.
Joinery.
Lead, white and red.
Personal luggage.
Electric supplies and
dynamos.
Paints.
Baths.
Sundries.
Tobacco, manufactured.
Tools. |
| 3. Manure—
Lime, agricultural.
Artificial and other
manures. | 8. "M," plus 50 per
cent.—
Fencing wire (black,
including barbed.)
Fencing wire, (galvan-
ised), declared for
fencing purposes. | 12. "C"—
Ale, beer, porter, in
bulk
Cotton—ginned.
Galvanised iron, packed
imported.
Rolled, stamped, or
wrought iron and
steel, imported.
Iron or steel manufac-
tured or cast local.
Lubricating oil in casks
and cans.
Piping declared for
agricultural and
pastoral purposes.
Skins, sheep's and
goat's, loose.
Spirits, made in Com-
monwealth.
Twine, harvesting. | |
| 4. Agricultural Produce—
Flour and mill offal.
Vegetables
Grain. | 9. Mileage Rates—
Motor and road vehicles.
Boats.
Theatrical material.
Circus material. | | |
| 5. Coal rates—
Coal.
Coke.
Cement—clinkers.
Cemorta (sand and
cement mixed).
Charcoal.
Firewood. | 10. "A."—
Bags in bales and
bundles.
Bluestone (kegs or
cakes).
Bottles (common).
Butter.
Empty cases.
Cotton, unginned.
Flooring composition.
Hides (wet).
Honey.
Meat (preserved), made
in Commonwealth.
Pitch and Tar (coal or
gas).
Pottery.
Salt, fine.
Sausage skins and ox
casings.
Sheep's tongues, packed
in Commonwealth.
Spraying compounds.
Tobacco, leaf and stalk. | | |
| 6. Miscellaneous.
Artificial foods, live-
stock and poultry
Asbestos, cement slates
and sheets.
Blocks.
Bricks.
Cement.
Fruit (green-packed).
Horns and hoofs.
Iron (<i>scrap</i>). | | | |

382. Additional revenue had, perforce, to be obtained during and after the war in order to balance the increased cost of operation, and a gradual advance in goods rates was made in New South Wales as in all other countries. The subsequent adjustment and reduction of many of these rates have proved very difficult, inasmuch as the mileage rates prior to 1913 under the different classes were made up by scales, the rate per mile decreasing as the distance increased; but the scales for one class did not depend on the scale for another, therefore, the increase or decrease of one rate compared with another might be 30 per cent. at 50 miles and 60 per cent. at 500 miles.

New Scales of Rates.

383. The various percentage increases effected between 1913 and 1921 destroyed these scales, and, in the issue of the Merchandise and Livestock Rates Book, dated 11th January, 1922, new scales were introduced. The object was to make the scales for one particular rate, and to work all other rates on that scale by increasing or decreasing on a percentage basis. It was considered advisable to make the Miscellaneous Class Rate the basis for the scale, and this was introduced. From this scale—

" A " rate was taken as 1.75 of the Miscellaneous Class Rate.
 " B " " " 2.50 " "
 " C " " " 3.50 " "

and it was found that these could be introduced without any material increase or decrease on the rates then in operation; but in respect of manures, coal, first and second class rates the intention was to make—

Manure rate, .375 of the Miscellaneous Class Rate
 Coal rate, .75 " "
 1st class, five times " "
 2nd class rate, six times " "

It was discovered, however, that the increase or decrease which would be caused in respect of manures and coal up to 200 miles, and first and second class rates up to 250 miles was too great, as it meant a large decrease in revenue which the Department could not bear, or, as an alternative, a large increase on the coal and general goods, which latter mostly would be sent to the country for the use of settlers there, and, as a temporary measure, rates had to be adopted which had no dependence on the Miscellaneous Class Rate up to the distance shown above.

384. The same was found to exist in regard to the rates on hay, straw, and chaff, agricultural produce, and wool and crude ores where new bases had to be adopted, but the declared intention is at the earliest possible moment to base these on a percentage of the scale adopted for the Miscellaneous Class Rate.

385. The percentage increases in freight rates since 1913 have been as follows :—

Description of Traffic.	Percentage Increase.	Date Increased from—
	Per cent.	
Manure, to 229 miles	10	12-12-16
Manure (all distances)	7½	1-11-18
Coal, in Departmental trucks	10	8-8-17
Do do	7½	1-11-18
Coal, in owner's trucks	15	8-8-17
Do do	7½	1-11-18
Both	10	1-1-20
Miscellaneous class	10	12-12-16
Do	7½	1-11-18
Do	10	1-1-20
" A," " B," and " C " classes... ..	10	1-3-14
Do	10	12-12-16
Do	7½	1-11-18
Do	10	1-1-20
1st and 2nd classes	10	5-7-13
Do	10	12-12-16
Do	7½	1-11-18
Do	10	1-1-20

Description of Traffic.	Percentage Increase.	Date Increased from—
Wool	10	12-12-16
Do	7½	1-11-18
Do	10	1-1-20
Livestock	10	1-3-14
Do	15	12-12-16
Do	7½	1-11-18
Do	10	1-1-20
Do	10	8-8-17
Hay, straw, and chaff	10	12-12-16
Do	10	1-11-18
Do	7½	1-11-18
Do	10	1-1-20
Crude ores and minerals (other than coal, coke, and shale)... ..	10	12-12-16
Do do do do	7½	1-11-18
Do do do do	10	1-1-20
"Up journey" rates for grain, flour, &c.	10	12-12-16
Do do do	7½	1-11-18
Do do do	10	1-1-20
Frozen meat	15	12-12-16
Do	7½	1-11-18
Do	10	1-1-20
All rates	16⅓	1-11-20

Revisions amounting to an annual loss of revenue of some £600,000 have since been made in the scales, while variations, primarily in classification on 11th January, 1922, accounted for certain slight increases and decreases.

Freight Classification.

386. Having regard to the magnitude of the goods traffic, complaints of the classification and of the rates are remarkably few. At Newcastle general complaint was made of the classification, but at Sydney the representatives of the Chamber of Manufactures asserted (Q. 3214) that no objection was raised at the present time as to the fairness of the classification.

Tapering of Rates.

387. Objections to the tapering of rates, emanating from Newcastle, we do not regard as valid inasmuch as the principle applies in all directions and is very unlikely to affect adversely as a whole the trade of any town or district. Where a loss might arise in one direction, it would stand to gain in another. It is common practice to taper rates according to distance. Unless a difference in rates be very great, it is not the general experience that trade is diverted from one centre to another solely by reason of railway charges. Sir Mark Sheldon stated the influence governing trade location very clearly when he said (Q. 1966):—

"The wool-grower is not going to send his wool to some new port or some new market simply because it happens to be near his door. It may cost him a little less in trainage, but he is going to send it to the best market where he can get the best price. The matter of trainage or freightage is a very small item compared with the competition which you can get in a big market, and although it would be very convenient for him for his personal convenience, or it may be for his district, and so on, I do not think he would be prepared to sacrifice his pecuniary interests for the sake of the district, or for the sake just of the sentiment of opening a new port."

388. A question of rates from Sydney northward being on a lower scale than from Sydney southward, and said to be to the detriment of Newcastle, has been brought about by sea competition. Rates charged from Sydney northward on a lower scale than to the south apply also from Newcastle to Sydney and intermediate stations. There is, therefore, no difference of treatment between the two cities. It is true that rates from Sydney to places north of Newcastle are on a lower scale than from Sydney southward, again indirectly in competition with the sea, but we cannot find that the sum of such rates would affect Newcastle trade with those places. If there are any instances calling for adjustment, which we have not discovered, it will be advisable to deal with them promptly.

389. There is evidently an idea that a considerable proportion of the traffic is conveyed under existing rates at cost or even at a loss. This view is incorrect. The charges yield a fair return after meeting conveyance and general costs of upkeep and administration.

390. A complaint of rates for apples being 60 per cent. higher than the rates for potatoes is met by the perishable nature of the one demanding more speedy and careful transit than the other, which travels by slow goods train.

Rates for Fodder.

391. A grievance voiced by Dr. Norman Kater, M.L.C., President of the Graziers' Association (Q. 2270) should be capable of adjustment, at any rate until sufficient wagons are available to deal adequately with fodder in times of drought. Reduced rates are in operation during drought periods for fodder destined for starving stock, but difficulty arises at that particular time by reason of wagon scarcity. It is suggested that reduced rates might be given at times when traffic upon the railway is light, a safeguard against abuse being provided in the shape of a declaration that the fodder is to be used in times of drought only. In this, as in cognate questions, the national value of primary or secondary industries demands recognition and help apart from the measure of profit at any given moment. That the Commissioners are not unmindful of this is shown by concessions given and the efforts they have made within their resources to move starving stock, but it would obviously help if fodder could be secured beforehand and thus avoid in some cases the removal of sheep from one district to another at unremunerative rates. A live sheep is a potential source of revenue to the railway, and anything in reason that can be done to keep sheep alive is to the advantage of the Railway Department, in common with the owners, and the community generally.

392. At the same time the limitation of reduced rates for fodder for starving stock to distances 100 miles beyond the seaboard might well be reviewed in the direction of reducing the limited distance somewhat. There is much to be said for Mr. Fraser's view (Q. 4072) that:—

“Many of the carters in the streets of Sydney would, if we gave concession rates on fodder brought into this area, get advantage of that low-priced fodder and use it for purposes for which the fodder was certainly not intended. The same thing applies around Newcastle, and outside of that, of course, there is the fact that almost always in drought seasons there is feed on the coast of a sort—not the very best of feed, but there is generally natural feed, and it is not necessary to feed stock within the areas mentioned here as it is in the outside areas where there is no feed of any kind whatever. The main objection, of course, is that fodder brought into areas such as the surroundings of Sydney and the surroundings of Newcastle at concession rates would undoubtedly be used by a number of people not entitled to it.”

Minimum Truck-load Rates.

393. Fixed minimum truck-loads were objected to on the ground that the bulk could not in certain commodities be loaded upon the trucks. This was met by the assertion (Q. 4540-2) that tests were made and demonstration shown to the contrary.

Differential Rates.

394. A number of witnesses deprecated very strongly the practice of charging less for certain articles of home manufacture than for imports of a similar character conveyed under like conditions. It was contended that it is not the function of the Railway Commissioners to apply what is in effect a tariff duty or preferential treatment to any industry, that being the function of the Federal Tariff Board. This view was taken by witnesses on behalf of the Producers' Association Central Council, the Apple and Pear Growers' Association, and the Australian Association of British Manufacturers and their representatives. We understand these or similar differential rates have been in operation for many years. The other side of the picture is given in a memorandum from Messrs. Lysaght Proprietary Company (see Appendix) and by Mr. Fraser (Q. 4115-9). This is a question not so much of railway management as State policy, and we must leave it at that.

Reductions in Rates.

395. That the Commissioners are alive to the desirability of bringing rates down to a point nearer pre-war is shown by reductions which, as before mentioned, result in a loss of revenue exceeding £600,000 per annum. These reductions include the following :—

Crude ores	£11,500	Ales, porter, vinegar, dried fruits, and fish, &c.	£26,000
Coal and coke	25,000	Preserved fruits, golden syrup, &c. ...	10,000
Residual oil	7,500	Fresh fruit, passenger and goods, interstate or full truck loads, &c. ...	45,000
Water and gas pipes to the country ...	5,000	Brandy, whisky, &c.	12,000
Wire rod and drawn wire	18,000	Agricultural produce	24,000
Grain, flour, vegetables, &c.	19,000	Plaster	5,000
Galvanised iron, rolled and drawn iron and steel	58,000	Stone	5,000
Gasoline, benzine, &c.	9,500	Tar	14,000
Arsenic	10,000	Tiles	7,500
Dept. Agriculture—		Timber for butter boxes, &c.	5,000
Galvanised iron, cement, metal, machinery, &c.	15,000	Butter paper	5,000
Artificial stock and poultry food ...	9,000	Single packages of butter, honey, eggs, &c.	9,000
Pig-iron	5,000	Various commodities charged at concession rates on up journey ...	15,000
Livestock for re-stocking purposes ...	5,000	Rates on Northern River Lines ...	12,500
Unprotected cast-iron and steel ...	2,500	Limestone... ..	5,500
Fencing wire	5,000	Manganese	7,750
Artificial manure... ..	2,000	Metal steel ceilings, terra-cotta air bricks, &c.	2,000
Sugar	10,000		
Road vehicles	4,350		

Coal Rates.

396. Two claims for reduction of freight charges upon coal traffic have been made, viz., (1) that increases during and since the war should have been by flat rate of increase, *i.e.*, a similar amount per ton irrespective of distance, instead of a percentage increase all round, and (2) that a charge levied recently for tipping coal at Newcastle should be abolished. With regard to the former, the acceptance of the claimants' views, on the basis of securing the same revenue as at present would result in high flat rates, thus making the rates for short distances altogether out of proportion to those for a long haul. We consider that the introduction of a percentage increase upon pre-war rates was the most satisfactory and equitable method that could be adopted. In the second case the answer of the Commissioners (Q. 4215) is that the charge for tipping is made to cover costs of power production, interest on capital invested in power-house, on the reticulation of water mains, and on maintenance as well as for actual labour in tipping of the coal. It is true that for several years no such charge was made, but, with the necessity to secure more revenue, a gratuitous service could not in justice be continued. We consider the Commissioners' views are sound.

Carriers Act.

397. Evidence was given advocating the inclusion of the Carriers Act in the Commissioners' obligations. There is evidently a misunderstanding upon this question, inasmuch as under section 33 of Act No. 30, 1912, the Railway administration come under the Carriers Act.

V.—TRAMWAYS.

398. The tramways of New South Wales are controlled by the Commissioners under the conditions and obligations applicable to railways. Services are operated in the Metropolitan and Sydney suburban areas, in Newcastle and the vicinity thereof, and at Broken Hill, the total tramway mileage, electric and steam, open for traffic being 227½ miles. The number of passengers carried during the financial year ending 30th June, 1924, was 340,957,725, and the tram miles run, 32,110,054. The capital cost, including equipment, is £10,758,958. The earnings for the year 1923-24 were £3,633,916, against working expenses, £3,091,531, leaving a balance of £542,385, or £5 4s. 8d. per cent. upon the capital expended. The percentage of working expenses to receipts was 85·07. Earnings per tram mile were 2s. 8d., and expenses, 1s. 11d., or a return of 4d. per tram mile.

399. Comparisons between 1914 and 1924 are as follows :—

ALL ELECTRIC TRAM LINES.			STEAM TRAM LINES.			
Year.	Passengers.	Mileage.	Year.	Passengers.	Motor Mileage.	Car Mileage.
1914	290,547,553	27,369,969	1914	20,045,145	1,441,774	2,821,282
*1924	323,652,752	30,675,479	1924	17,304,973	1,434,575	2,239,309
Increase ...	11·4%	12·1%	Decrease	13·7%	5%	20·6%

* Includes Newcastle (opened partly, 17th December, 1923).

COMPARISON 1914 with 1924.

Year.	Population Served.	Street Miles.	Length of Single Track.	Capital Cost.	Passengers Carried.	Revenue.	Expenditure.	Interest.	Profit or Loss.
All Tram Lines.									
1914	866,310	212 13	328 42	£ 7,628,653	310,592,698	£ 1,934,164	£ 1,669,033	£ 263,451	£ 1,680
1924	1,192,000	227 46	367 69	10,758,958	340,957,725	3,633,916	3,091,531	532,187	10,198

***All Electric Tram Lines.**

1914	722,620	145 59	252 27	£ 7,054,832	290,547,553	£ 1,781,063	£ 1,520,185	£ 242,694	£ 18,184
1924	987,000	160 41	286 10	9,209,883	320,402,789	3,391,626	2,781,148	458,054	152,424

City and Suburban Electric Tram Lines.

1914	553,220	105 35	192 79	£ 5,966,961	250,696,726	£ 1,603,532	£ 1,349,428	£ 205,385	£ 48,719
1924	731,000	116 69	213 17	7,573,320	280,312,845	2,969,698	2,404,565	376,661	188,472

All Steam Tram Lines.

1914	143,690	66 34	76 14	£ 573,820	20,045,145	£ 153,101	£ 148,848	£ 20,757	£ 16,504
1924†	199,000	67 5	81 59	1,549,075	20,554,936	242,290	310,383	74,133	142,226

* Newcastle Electric excepted.

† Includes Newcastle, part Electric.

Profitable Tramway Services.

400. The Sydney City and Suburban lines, with 116 miles of tram line, and the Rockdale to Brighton-le-Sands (1 mile 20 chains), provided a profit over working expenses of over £568,000, and carried the burden of other sections, which exhibit a loss of £25,804, North Sydney (23 miles) and Manly to Narrabeen, and Manly to Spit (10 miles) excepted, these yielding a profit over working expenses, the former of £36,372, but a loss of £15,874 after meeting interest, and the latter a profit of £11,965, but a loss after paying interest of £4,701.

Tramways Working at a Loss.

401. The following services were operated at a loss :—

- Ashfield to Mortlake and Cabarita (8 miles) lost £6,047 on the working—£17,199 including interest.
 Parramatta to Northmead (2 miles, steam) lost £4,485 after paying working expenses, and £5,419 including interest.
 Arncliffe to Bexley (2 miles 50 chains, steam), lost £2,786 on working and £3,940 after meeting interest.
 Kogarah to Sans Souci (5 miles 45 chains, steam) lost £6,585 and including interest £8,230.
 Sutherland to Cronulla (7 miles 32 chains, steam) lost £3,671, and with interest added £6,430.
 The Newcastle City and Suburban (35 miles 19 chains, partly steam, partly electric) shows a loss of £41,380 and including interest a total of £61,322.
 East to West Maitland (4 miles 5 chains, steam) gave a loss of £766 and with interest £2,550.
 Broken Hill (10 miles 4 chains, steam) shows a loss of £8,420, and including interest a loss of £12,955.

402. Increases in the number of passengers carried in 1923-24, as compared with 1922-23 are shown on the Sydney City and Suburban tramways of 7,374,133, Manly to Narrabeen and Manly to Spit 79,251, Ashfield to Mortlake 315,429, Arncliffe to Bexley 38,348, Rockdale to Brighton-le-Sands 227,587, Kogarah to Sans Souci 94,986, Newcastle City and Suburban 2,562,341, East to West Maitland 123,347, and Broken Hill 46,191.

Steam-operated Trams cannot give Adequate Service.

403. From the foregoing figures, coupled with a study of the fluctuation in receipts over the past ten years, two facts emerge. Firstly, that motor bus competition is affecting all tramways; secondly, that steam-operated trams are out of date, cannot give an adequate service, and should be electrified at the earliest moment. Looking at the financial results in detail, and the probability of motor bus competition increasing, it would appear advisable to consider very carefully—indeed, with extreme caution—any considerable extension of the tramway system. The Commissioners recognise this by their intention to test routes already sanctioned for tramway construction by means of motor buses to be run by the Commissioners themselves.

Electrification Proceeding Slowly.

404. The loss upon steam-operated tramways may be minimised or turned into a profit by electrification. At Newcastle this is proceeding slowly, the tardy substitution of the one system for the other being due to financial difficulties. It is intended to convert the Sutherland to Cronulla tramway into an electric railway in conjunction with the Illawarra line electrification. The loss at present on this tramway is, as will be seen, serious, mainly due to bus competition. When the change is effected, coupled with the growth of the popular resort of Cronulla, a profit should result. It is proposed to electrify the Arncliffe to Bexley and the Maitland tramways also.

North Sydney Tramways and Railway Electrification.

405. The North Sydney tramways are at present a losing quantity, and with the proposed electrification of the railway—Milson's Point to Hornsby line—a further loss of fares may be expected; but, as pointed out by Mr. Doran (Q. 4390-1), the character of the traffic will change, the tramways then serving mainly as feeders to the railway instead of the ferry-boats. Furthermore, the possibility of growth in that district is great, and an increase of population should benefit the trams.

Finance.

406. Our observations and recommendations under the head of finance upon railways apply also to tramways. We recommend that the Commissioners should control their own funds and make provision for further capital requirements. We also recommend that, as in the case of railways, reserves for renewal and obsolescence be provided, based on the estimated life of line equipment and tramcars. This totals £191,000 for line, based on a life of sixteen years, and £89,237 for cars. After deducting the mileage of line actually relaid and the cars renewed in 1923-24, also Capital items charged to Revenue, the profit upon working for the latter year is reduced to £388,648. We refer elsewhere to reserves for power-house plant and machinery.

Sydney's Tramway System.

407. We are impressed with the operation of the electrically-worked tramways. Order and cleanliness are apparent within and without the depots. Timetables are well and conveniently fixed, and the method of collecting fares is simple, while the systems are amongst the best to be found anywhere. A notable feat is performed on race-days at Randwick by the movement of from a thousand to twelve hundred people per minute, and this often at times when large gatherings are catered for from other sports grounds. We think Sydney is to be congratulated upon the tramway system it possesses.

Traffic Congestion in City Area.

408. Congestion at points within the Sydney City area is a matter of complaint. Tramways while providing cheap transit for the multitude, are not popular with many people because of noise and fixed street obstruction. In every big city to-day the problem of street congestion, brought about to a great extent by the advent of the motor vehicle, is the subject of serious discussion. In London, amongst other cities, congestion is at its worst where trams do not run. So great there is obstruction to movement that omnibuses progress within the City limits at the average rate of from three to four miles per hour. The fact is that, given enough traffic of any sort in any type of vehicle converging upon a comparatively small central area congestion must ensue. Whether vehicles roaming over the streets at will are less liable to cause street obstruction than trams fixed to a line of route and conveying the same number of passengers, is questionable. That the Sydney trams carry more people during the peak hours than would be possible with a similar number of motor buses is certain, and although the former do at certain times constitute what has been called a moving platform, they do no more than is necessary to provide for the traffic offering. The stoppage at each crossing street only is a decided advantage in so far as it affects pedestrians, and other vehicles, and the prohibition against the passing by the latter of trams at rest, whilst delaying other street traffic, is in the interests of safety, and no doubt accounts in a great measure for the comparatively small number of street accidents. The signalling safeguards also help in this connection. So long as people are compelled to make use of vehicles on the streets as a means of getting to and from the City centres congestion will arise, whatever form of transport is available. The immediate remedy, as in the case of the railways, is the completion of the City Railway and the electrification of suburban lines.

Sections of Tramway Branch.

409. The Tramway Branch is divided into three sections—Traffic, Permanent-Way and Electrical—the latter being under the control of the Chief Electrical Engineer for Railways and Tramways (whose responsibilities are described elsewhere), while the others are supervised by a Tramway Traffic Manager and an Engineer for Tramways respectively.

Organisation of Traffic Section.

410. The Tramway Traffic Manager is assisted by an Assistant Manager, two Indoor Assistants, one Outdoor Superintendent, and five District Superintendents. Three of the District Superintendents are located in the Sydney area (Eastern, Western, and North Sydney divisions respectively), while one is at Newcastle and one at Broken Hill, where he also controls the short isolated section of railway in that district.

411. Traffic operations are under the control of an Outdoor Superintendent, who is also responsible for the preparation of timetables, the provision of services for special requirements and for the allocation of the rolling-stock to the different depots.

412. The total staff in the Tramway Traffic Branch numbers 5,572, 449 being salaried grades, and 5,123 wages grades. The staff of signalmen, starters, drivers, conductors, checkers, cleaners, pointsmen and flagmen is located at sixteen depots in the Metropolitan area and is controlled by the Depot Masters in relation to the allotment of work, and by the Traffic Inspectors in the various districts in which they operate.

413. The traffic requirements call for the provision of rolling-stock as follows, this being the stock on 30th June, 1924 :—

	Steam Motors.	Passenger Cars.	Service Vehicles.	Total.
Electric Lines ... ..	...	1,570	92	1,662
Steam Lines	92	191	23	306
	92	1,761	115	1,968

414. The Revenue Section is controlled by a Superintendent of Revenue, who is responsible for the collection of revenue received, the accounting in connection with the cash-fare system generally, and the provision of adequate assistance to collect the revenue in ordinary and special traffic.

Organisation of Engineering Section.

415. The total single track mileage of tramways, including sidings, loops and cross-overs, for which the Engineer for Tramways is responsible is 423 miles. The Tramway Engineering Branch carries out the maintenance of all tracks (including the road surface) in connection with the tramway systems. In addition, the branch carries out duplications of existing tracks, small additions in the way of extensions and improved facilities for the handling of cars and the erection of car sheds, workshops, and buildings required in connection with the electrical equipment of the service.

416. The drawing office section of the branch is under the direct supervision of the Chief Assistant Engineer, and is divided into three groups, viz., Surveyors and Survey Draftsmen, Engineering Construction, and Architectural :—

1. The work of the former group consists of land survey work alignment of new and re-alignment of existing tracks; precise levelling, which includes re-grading or tramway tracks, and incidentally, streets; detailed survey work; design of curves and junctions; special work computations, and the setting out of works generally, including buildings and drainage.
2. The Engineering Construction Group carries out works of a general construction nature, as distinct from track work or architectural. This consists of preliminary plans and estimates, and, in the event of approval, working drawings.
3. The third group, Architectural, has similar duties to the preceding, with the exception that the work is confined to buildings only.

Re-laying Tramway Track.

417. In connection with re-laying, lists are prepared prior to the end of each financial year showing the amount it is proposed to undertake during the following twelve months. The life of the tramway track varies from approximately ten years under dense city traffic, to about twenty-five years on outlying sections. In the re-laying now authorised it is the practice to use 80-lb. T rails, with either a guard specially rolled for the purpose or with 60-lb. T rails recovered from railway works and flanged, the latter type being used on wood-paved sections and curves of sharper radii than 100 ft.

418. The whole of the re-laying work is done without interference to tramway traffic, and with as little as possible to vehicular traffic. The permanent-way is divided into sections, numbering forty-four in Sydney and suburbs; each is under the control of a ganger, who has under his direction a number of fitters or labourers, and carts. The maintenance staff averages one for each mile of track, excluding carters, who number sixty-one for the whole of the system. Where continuous re-railing or heavy renewals are required, the work is done by a special gang.

419. Under the control of the Engineer there are in the Sydney and suburban districts four depots, the most important being at Woollah Creek, near the terminus of the Cook's River tramway. This is the principal receiving depot for permanent-way material, as well as the transferring depot for material required by other branches

branches (such as the Electrical Branch), which needs to be delivered to tramway electrical depots or workshops, or consigned from such depots to railway destinations.

Electrical Engineer's Work in connection with Tramways.

420. The work of the Chief Electrical Engineer in connection with tramways is dealt with in Part IV (d).

Separation of Railways and Tramways not desirable.

421. It appears to be the impression, from evidence tendered to us, that a separation of the tramways from the Railway Commissioners' control would be advantageous. We are unable to discover any sign of probable improvement in public service or in economy of operation by such a change of policy. The tramways to be of the greatest public benefit should, in addition to meeting transport needs within inner suburban limits, be complementary to the railways, working in conjunction with and relieving the trains of short-distance traffic where as good or better service can be given. Co-operation will be more than ever desirable when the suburban railways are electrified and the Harbour Bridge opened. Upon the side of economy the manufacture in railway workshops of various articles for tramway construction and maintenance, and the supply of power for railway requirements, as well as appliances of certain descriptions by electricity establishments now mainly engaged upon tramway work, enables both services to economise to a degree which only unified management and control could produce. We do not, therefore, recommend that the tramways should be divorced from the railways.

VI.—MISCELLANEOUS QUESTIONS.

Estate Department.

422. As indicated in the section dealing with organisation, one officer combines the duties of Estate Agent and General Manager of the Railway Refreshment-rooms. The responsibility of the Estate Agent for Railways and Tramways affects real estate, either vested in the Railway Commissioners or required for constructional work. This officer is also responsible for repairs and maintenance within the Metropolitan area. The value of the real estate, *i.e.*, the whole of the Commissioners' lands, including land for railways and tramways under construction (unimproved capital value) exceeds £4,000,000, and the value of letting properties, buildings only (improved capital value), is in the neighbourhood of £1,300,000.

423. The total annual rents from real estate collected on behalf of the Commissioners during the year 1923-24 was approximately £120,000, while the receipts from bookstalls and automatic machines was £9,000, these amounts, together with the allowance value of station-masters' and gatekeepers' free houses of £25,000, making a total of £154,000.

424. All assessments of municipalities and shires, as also water and sewerage authorities are dealt with by Railway Estate Agent. The number of municipal and shire assessments dealt with equals 4,170 annually, and water and sewerage 700, the amounts paid for 1923-24 being £65,000 municipal and shire, and £14,500 water and sewerage.

425. The Estate Agent also deals with the clearance of sites rendered necessary on account of new construction work, and with claims for fires occasioned by the working of the railways or tramways, direct investigation covering liability and valuations being made by his branch. He also deals with land acquisitions on the basis of survey information supplied by the Engineer-in-Chief and deals with the settlement of land claims.

426. The branch appears to be administered along satisfactory lines, and we have no recommendations to make in this regard.

Railway Refreshment-rooms.

427. Prior to 1916 the railway refreshment-rooms were leased to contractors, but with a view to general improvement in catering, the Commissioners, as leases fell in, took over the management of those then existing, and have since opened new rooms in various districts. We have inspected many of the refreshment-rooms, stores, kitchens, &c., and at both large and small places are satisfied with their administration. The prices charged are reasonable, the food supplied is good, the accommodation and equipment clean.

428. Certain evidence (Q. 3111) was tendered to us to the effect that the railway refreshment-rooms were not as satisfactory under present management as they were in the past, but from our own observations, and rebutting evidence (Q. 4079) received, we are not satisfied that the strictures passed upon the existing management are justified. It is difficult to cater for an intermittent and uncertain number of people, or at all times to exercise supervision over rooms at distant stations. There may on occasion be reason for complaint, and these the management is anxious to rectify. Under the conditions prevailing, we think that the provision of well-equipped accommodation at suitable places, together with good food at moderate prices, stands to the credit of the railway administration. Viewed from a business aspect, the taking over by the Commissioners of the railway refreshment-rooms has been advantageous, as the accumulated net profit after allowing for interest, maintenance and depreciation from the date on which the Department assumed control to 30th June, 1924, represents £223,673. For the financial year ended 30th June, 1924, the net profit was £23,069. Depreciation is charged at the rate of 2 per cent. on brick construction, 5 per cent. on board construction, and 7 per cent. for equipment.

Statistical Branch.

429. One officer combines the duties of Director of Statistics, Chairman of the Suggestions and Inventions Board, and Chief of the Advertising Branch. He is also head of the Australian Bureau of Statistics.

430. The Statistical Branch of the New South Wales Railways was established in 1919, when the compilation of statistical information for the various departments was centralised. The present staff numbers sixty-two, a considerable reduction having been made latterly on the introduction of additional mechanical appliances. Powers' tabulating and accounting machines were introduced in May, 1923, and eight months afterwards the whole of the stations in the service were brought under the system. The machines are now being used for compiling goods abstracts for all stations, inwards and outwards, revenue ton mileage, commodity statistics, and sectional earnings, monthly, and for the Commissioners' report. The general arrangement is for the whole of the figures relating to the previous month's working to be in the hands of the officers concerned by the 18th of the month.

Advertising Branch.

431. This branch is responsible for the letting of advertisement spaces on railway and tramway property. The present number of contracts is 1,964. The display of advertising matter, the erection of hoardings, and the placing of railway and tramway advertisements in the newspapers is included in this section. All accounting work in connection with the advertising is done by the branch, audit being made by the Traffic Auditor and the Auditor-General. The canvassing is effected by the branch staff, commission not being paid to service agents.

Australian Bureau of Statistics.

432. The Australian Bureau of Statistics was established in 1920 in order to secure uniformity in the compilation of comparative information relating to operating statistics, rates of pay and conditions of service, rates and fares and concessions allowed thereon. Quarterly and yearly bulletins of operating statistics are issued. Bulletins have also been issued referring to staff conditions and the rates of pay for each grade of employee, and the general conditions of carriage of all passenger, goods and livestock traffic. This cost of this Bureau is borne equally by the New South Wales, Victorian, South Australian, Western Australian, Commonwealth, and New Zealand Government Railways.

Suggestions and Inventions Board.

433. The Suggestions and Inventions Board was established in 1915, with the object of interesting the staff in their particular work and remunerating them for any suggestions of proved value. The suggestions adopted to date number 4,154, and during the financial year ended 30th June, 1924, 853 were adopted, these representing an annual saving of £31,700. The cumulative saving since the inception of the scheme now amounts to over £500,000, after allowing for 5 per cent. depreciation in the value of each proposal in successive years. Added to this is the advantage arising from many devices which have been employed, affecting safe working and expeditious operation, the monetary value of which cannot be ascertained. A reciprocal arrangement exists between the various States of the Commonwealth, whereby devices of outstanding merit are interchanged and appropriate awards made by the State concerned.

434. This scheme of developing interest among the railway personnel is one adopted on a wide basis, and is wholly to be commended.

Information and Publicity Work.

435. Information and publicity work is conducted by two officers attached to the office of the Chief Commissioner. The Information Officer acts as private secretary to the Chief Commissioner, and is in charge of the Bureau of Information, which, among other activities, disseminates information concerning railway operation in New South Wales to various railway administrations throughout the world.

436. The Publicity Department was established less than three years ago for the express purpose of dealing adequately on behalf of the Commissioners with reports or comments on railway matters. The Publicity Officer also controls the publication of "The Staff," a monthly magazine which is distributed free to the members of the railway and tramway personnel. The work of publicity is gradually being extended to embrace the active supervision of all departmental publications, and the preparation of announcements in various periodicals. The entire cost of the Department does not exceed £1,500 per annum.

437. In view of the increasing importance attached to an enlightened and informed public opinion, and the necessity for dealing with railway information and publicity along scientific lines, we are of opinion that both these departments are of considerable value and the expenditure involved in their administration is money well spent.

Medical.

438. In order to save time and cost, it would probably be found of advantage to have a medical officer attached to each Area Commissioner.

Appeals Board.

439. Our reference does not include staff matters, but as the question of drunkenness was mentioned in evidence we make this comment. A railway man engaged in traffic operation found drunk on duty is a danger to the public, his fellow-employees and himself. He is a criminal and should be treated as such. It remains to be said, however, that every opportunity should be given a man to disprove the charge made against him. If he is clearly guilty, then there should be no question of his retention in the railway service.

Railway and Tramway Institute.

440. The Railway Department has established a number of Railway and Tramway Institutes in various places. There are now forty-four branches and thirty-four sectional libraries. The membership of the Institute has increased to 23,733 during the year, 8,246 of this number being attached to the metropolitan institution. The expenditure for last year was £48,763, and the revenue from members' subscriptions and other sources amounted to £16,863. We consider this class of welfare work is very desirable, and would add that it is a practice extending very considerably in other parts of the world. We, have, therefore, no sympathy with those who urge that the expenditure by the Railway Department under this head is unwise. Apart from the advantages offered in regard to the education and training of the railway personnel, the social atmosphere engendered between the members of the Institute must have a good effect. Reasonable expenditure in this connection is, therefore, justifiable in view of the benefits secured by the staff.

441. The educational instruction is sufficient to take advanced students to the door of the University, but unfortunately there is not in Australia a Chair of Transport such as exists at some Universities. In England, in addition to University courses at Liverpool and Manchester, an Institute of Transport having within its scope all forms of transport, including the air, gives to students and, incidentally, to those advanced in years, every opportunity for keeping themselves in touch with the latest phases of transport science. Communication has been established between this Chartered Institute and the Railway and Tramway Institute. Some form of co-operation between these educational institutions is under consideration, and we hope this will bear fruit in the interests of the New South Wales Railway and Tramway employees.

Training of Railway Men.

442. For many years a reproach lay at the doors of railway management throughout the world that, while no expense was grudged in the purchase of improved machinery or new appliances, the human element responsible for the manipulation of the business for which such expensive machinery had been provided was left without facilities or even encouragement, if they cost money, to advance

advance in knowledge or add to experience beyond immediate local surroundings. Progressive administrations have latterly recognised that the man is at any rate equal to the machine as a desirable object in which to invest money with a view to the reduction of cost or greater efficiency of transport. Thus travelling as well as educational facilities, aided by reward where value could be shown, have taken the place of former indifference.

443. The Railway and Tramway Institute training, including competent instructors travelling with demonstration cars for teaching the Operating and Locomotive Staff, is excellent up to a point, but in order to give those who are anxious to advance in the railway service every opportunity and at the same time make certain that the good material which is evident in New South Wales is made of the greatest use to the State, we think that the scheme of practical education should be carried further by selection of those who specially qualify themselves in theory to be given work for a short time in each branch of the railway service, and later on be induced to study the railway systems of America, Great Britain, and the Continent of Europe, or alternatively, a tour in South Africa, and the Argentine, countries which are developing their railways rapidly and have many problems in common with New South Wales. We understand that some of the officers are given opportunities to study railway methods in other countries. It would be of advantage if all of them were in turn selected to visit the countries mentioned above.

Public Evidence.

444. The whole of the public evidence, as also the railway evidence, is given in the Appendix, and as will be seen from the former, several complaints regarding alleged railway failures are raised. While we have given consideration to all these pleadings, we have not dealt with the whole of them in our Report, for the reason that there has evidently been misunderstanding as to all the circumstances surrounding some of these cases, and, in other instances, official papers have shown that the information upon which the evidence was given did not disclose the whole of the facts. The Chief Commissioner at Questions 3991-4356 referred in detail to these instances.

VII.—SUMMARY OF RECOMMENDATIONS.

445. We give below a summary of our recommendations :—

Finance.

1. That Railway Finance be taken out of the control of the Treasury and the Commissioners given full control of their own funds, and that the Commissioners be responsible for the renewal of loans on railway and tramway account and the raising of future capital.
2. That reserve funds be established to provide for obsolescence and wasting assets of permanent way and rolling-stock.
3. That the Railway Commissioners be recouped by the Treasury for losses incurred upon developmental lines during a period of ten years after they have been opened for traffic.
4. That the railways and tramways be so worked and managed that the gross receipts shall not be more than sufficient to cover working expenses, reserves, and interest on capital, including sinking funds. In the event of any surplus this be devoted to reductions of rates and fares, and in case of a deficit rates and fares be increased.
5. That a yearly balance-sheet, showing capital, revenue and net revenue, followed by departmental accounts in the usual company form, and a forecast of capital commitments for the following year, be rendered to the Legislative Assembly.

Organisation.

6. That the composition of the Railway Commission be—(1) A Chief Railway Commissioner, (2) a Financial Assistant Commissioner, (3) a Power Assistant Commissioner, (4) a Tramway Assistant Commissioner, and (5) three Area Assistant Commissioners.
7. That upon the appointment of a Chief Commissioner by the Government it be left to him to select his own assistants.
8. That an area scheme of administration be introduced, and there be appointed three Area Assistant Commissioners, responsible to the Chief Commissioner and acting under regulations and instructions applicable to the system as a whole for operation, commercial matters and maintenance within their respective areas.
9. That the Engineering Branches, including Signalling and excepting the Department responsible for metropolitan railway construction, be merged under the control of the Chief Engineer.
10. That the Chief Accountant's responsibilities be enlarged, the work of the Traffic Auditor's Branch being merged in his Department, and that he assumes direct control over all the Branch Accountants.

Construction.

11. That the completion of the City Railway and electrification of suburban lines be expedited as a matter of extreme urgency.
12. That new lines be constructed without interruption.

Mechanical and Electrical Engineering.

13. That locomotive repairs, with the exception of those ordinarily connected with the running, be concentrated as soon as practicable at head-quarters.
14. That, as the average age of the existing stock of engines is very high, indicating a number of obsolete types, these be replaced as early as possible.
15. That a system of standard gauges be introduced in connection with locomotive maintenance and renewal.
16. That careful attention be given to the number of staff employed at Eveleigh.

Mechanical and Electrical Engineering—continued.

17. That early consideration be given to the standardization of the methods of loading coal into tenders.
18. That careful consideration be given to the question of coal consumption.
19. That the bulk of the work carried out at Honeysuckle Point, Newcastle, be transferred to Eveleigh or, alternatively, new works provided near Honeysuckle.
20. That six passenger and four goods engines be adopted as future locomotive standards.
21. That the carriage shops be removed to the new site at Chullora at the earliest possible date.
22. That the number of passenger vehicles be brought into line with the traffic requirements.
23. That replacement of old carriage stock be effected as speedily as possible, and the future standards arranged as recommended in the Report.
24. That improved purchasing arrangements in anticipation of requirements be introduced in connection with wagon stock.
25. That a new power-house be provided on the South Coast.
26. That the Cadet system of training officers in force in the Chief Electrical Engineer's Branch be extended to other branches.

Operation.

27. That control systems of railway traffic working be introduced.
28. That the lay-out both of passenger and goods accommodation at Newcastle be rearranged and early consideration given to the development of Broadmeadow as a through line station.
29. That improved train services be introduced on country branch lines, by rail motors or otherwise.
30. That sufficient rolling-stock be provided to meet public demands at all times, including times of drought.
31. That, in connection with live stock traffic, efforts be made to design a combined truck to combat drought supply difficulties.

Commercial.

32. That the fares charged for first and second class travel be reviewed.
33. That the difference between suburban and country fares be adjusted as soon as possible.
34. That until sufficient rolling-stock is provided to meet fully all requirements during periods of drought, reduced rates for fodder, under declaration and guarantee, be given in order to induce sheep and cattle owners to provide themselves with fodder during times of least railway traffic.

Stores.

35. That the reorganisation of the Stores Branch now in progress be expedited so that the whole of the stores be brought under the direct supervision of the Comptroller.
36. That stores be not subject to a charge for interest on loan account.

General.

37. That a graduated scheme of railway training be introduced.
38. That a programme of officers' visits to foreign railways be established.

446. In this Report, under the several headings, we make a number of suggestions which we consider should follow on the adoption of the above-mentioned recommendations.

VIII.—CONCLUDING REMARKS.

447. In concluding our Report, we would express appreciation of the manner in which the Railway Commissioners and their officers have assisted us. A great deal of statistical and other information was necessary for the purpose of our investigation; this was collated and supplied with a promptitude that merits record.

448. Our thanks are also due to the official witnesses who gave us the benefit of their opinions, and also to the representatives of public bodies and associations who gave evidence before us.

449. We desire, in conclusion, to acknowledge the valuable work performed by our Secretariat—Messrs. Chas. Travis, J. A. Warren-King, and S. E. Fay.

Your Commissioners have the honor to be,

Your Excellency's Most Obedient Servants,

(Signed) SAM FAY,

Commissioner.

(Signed) VINCENT L. RAVEN,

Commissioner.

DATED at Sydney, this 3rd day of October, 1924.

APPENDICES.

Appendix I.

Sydney, 29th August, 1924.

I UNDERSTAND that evidence was recently given before you in connection with the preferential railway rates that locally manufactured galvanized-iron receives from the New South Wales Railway Department, and that a suggestion was made that this preference should be discontinued.

I should like to respectfully bring before this Commission the following points, which I think should be taken into consideration before any recommendation is made with regard to these freights.

1. The preferential railway rates on galvanized-iron have been in force for a very long period—nearly forty years, I believe—and presumably were originally granted to encourage the manufacture of galvanized-iron in New South Wales.

2. When the question of the erection of works for sheet-rolling and galvanizing at Newcastle was first considered by my principals in England, the fact that locally made galvanized-iron was carried at preferential rates by the New South Wales railways was taken into consideration, and was, in fact, a large factor in determining the directors of my English company to put down the works.

Had there been any suspicion in my mind that this preference would be taken away, or modified, I would not have recommended the erection of the works, nor, I think, would my English principals have committed themselves to the undertaking.

3. We do not add to the prices of our Newcastle iron any advantage we receive from this preference, our prices at Sydney being the same as those of our imported iron, and at the works 10s. below this price. It is the consumer who obtains the advantage, if any.

4. If we did not receive the preference we should be at an actual disadvantage in connection with 84 per cent. of the trade we do as compared with imported galvanized-iron, as, apart from the sale of our locally manufactured galvanized-iron in Newcastle and district (to which the question of railway freights does not apply) only 16 per cent. of our sales are made in the north and north-west of New South Wales, the remaining 84 per cent. being sold in Sydney or in the western, southern, and South Coast districts.

As regards Sydney, we have to sell in competition with imported iron, and to pay 14s. a ton freight from Newcastle, so that in this large centre we are actually at a disadvantage.

In connection with the Western, Southern, and South Coast lines our Newcastle iron has to be carried 100 miles further, so that the preference in freight only places it approximately on the same terms as imported iron, when the extra freight on this 100 miles is taken into consideration.

5. If the preference did not exist we should have to sell 84 per cent. of our products at approximately 15s. per ton under the price of imported iron to compensate purchasers for the freight they would have to pay on the extra 100 miles the iron has to be carried on the railways.

6. We have expended £400,000 on the works at Newcastle, and, in addition, £100,000 of working capital is employed in the venture. The works have been in existence for three years, and, so far, the undertaking has resulted in a loss of £26,000. For the last six months a net profit of £3,800 was made.

Our output at the present time is 16,000 tons of sheets a year, and it will be seen that, if we are to sell the iron at, say, 15s. a ton less, the result would be so unsatisfactory that it would be necessary to close down our works permanently.

We have, at the present time, four mills working, and three additional mills are in course of erection and will be completed before the end of the year. This will bring our output up to 25,000 tons a year, which practically represents the total requirements of New South Wales, and 25 per cent. of the requirements of Australia. When these new mills are running we shall be employing about 600 men at high wages, and, in addition, a similar number of men will be indirectly employed in the manufacture of the raw materials used by us, the whole of which are produced in Australia.

7. The bars we use are manufactured by the Broken Hill Proprietary Company, and a regular and increasing output of these bars is a valuable adjunct to their business, which I need hardly say is a vital one to Australia.

8. The preference on locally made galvanized-iron is not an isolated one, preferential railway rates being also given to other goods manufactured in Australia.

JOHN LYSAGHT (AUSTRALIA) LIMITED,
A. R. LYSAGHT,
Managing Director.

Appendix II.

ANSWERS to Questions raised at the Legislative Assembly on 3rd October, 1923.

The two extracts from questions put to the Legislative Assembly on 3rd October, 1923, which had not been answered but which were handed over to us for consideration, have been carefully investigated, and our answers in connection therewith are set out below.

Railway Locomotives, "K" Class Engines.

Question No. 1.—Is it a fact that when an engine is ascending a grade the steam-chest pressure is almost, if not quite as great as the boiler pressure, and that therefore there is very little current of steam to carry the oil along the pipes?

Answer.—The pressure in the boiler is greater than in the steam-chest, and quite sufficient to carry the oil satisfactorily through the pipes at all times.

Question No. 2.—Is this the reason why it is important that the pipes should have a regular and continuous slope, so that the pipes "maintain a downward inclination when ascending the heaviest grade," so that the oil will flow along the pipes by gravitation to the steam-chest choke plug?

Answer.—The slope as shown on the designs submitted to us is sufficient to allow of a continual flow under any condition of gradient.

Question No. 3.—What is the value of a test on a stationary locomotive with no pressure in the steam chests?

Answer.—It is impossible to give an opinion on this unless accompanied by further particulars.

Question No. 4.—Were these pipes altered as suggested and recommended by the Board, and, if not, would the expense now being incurred have been avoided?

Answer.—We are informed that to the first part of this question the answer is "No," but no further expense has been incurred than would have been necessary had the suggestion been carried out.

Question No. 5.—Was the Board's recommendation that the pipes be altered made long before there were any complaints from drivers?

Answer.—There is not any direct evidence as to whether the drivers made their complaints before the recommendation or not.

Automatic Railway Couplings.

Question No. 1.—Were these couplings adopted in 1912; if so, how is it that only 9 per cent. of the goods stock and 11 per cent. of the passenger stock are fitted, and how long will it take to fit the remaining 90 per cent.?

Answer.—Yes. The percentages quoted are correct, and we are informed that they are not greater on account of funds not being available for further conversion.

Question

Question No. 2.—What proportion of the (a) goods stock, and (b) passenger stock, are fitted in the other States that are parties to the agreement ?

Answer.—(a) It is understood that Victoria has only 100 goods vehicles fitted with automatic couplers. South Australia has placed orders for 1,100 vehicles to be fitted with automatic couplers. All vehicles on the Commonwealth railways are fitted.

(b) So far as is known no passenger stock is fitted in other States. All passenger vehicles on the Commonwealth lines are fitted.

Question No. 3.—Were 515 cases of goods trains parting, owing to these couplings jumping off the hooks, reported during the last financial year, although only 2,112 wagons are fitted; (a) how many such cases have occurred since they were first adopted; (b) what has been the cost of the accidents resulting from this cause; (c) is every case of a train parting whilst in motion likely to cause a serious accident; (d) what delays have occurred to trains owing to this cause ?

Answer.—515 cases were reported. (a) The following cases have occurred since adoption :—

Year.	No. of cases.
1919.....	257
1920.....	305
1921.....	376
1922.....	515
1923.....	515
1924.....	400

We are informed that no records were maintained prior to 1919.

(b) We are advised that no expense has been incurred as the result of accidents from this cause.

(c) All these trains are fitted with the automatic brake, and any parting of the train applies the brake. Therefore, there should be no reason for a serious accident.

(d) We are informed that no record is kept of these details.

Question No. 4.—Does the cost quoted for automatic couplers for goods stock include the cost of the auxiliary chain coupling ?

Answer.—We are informed that it does not.

Question No. 5.—Does the cost and weights quoted for automatic couplings and shackle and pin couplings include the cost and weight of the whole drawgear ?

Answer.—We are informed that the cost and weight of the whole drawgear are not included.

Question No. 6.—Are these couplings on passenger stock only on close-coupled sets, and, if so, what necessity was there to fit them on 238 cars, when the object was "to arrive at the wear in traffic of the draw faces of the knuckle, the buffing faces and the knuckles, and the correct apportionment of the centre buffer resistance and resilience to take care of the draw-gear vibration and the brake decelerations" ?

Answer.—Yes. Trials were made on thirty-two cars coupled into four trains, and after these trials were proved satisfactory further fitting of the vehicles continued. Two hundred and thirty-eight represents the number of cars fitted up to the end of September, 1923.

Question No. 7.—Is it a fact that this investigation was made on the first two or three sets fitted? (b) Was the wear of the draw faces found to be excessive? (c) Also the knuckles? (d) Was the draw-gear vibration, both when starting and stopping these trains, found to be excessive and very annoying to passengers? (e) Was it found to be impossible to prevent this jerking without putting on side or centre buffers?

Answer.—As stated, investigations were made on the first thirty-two cars. (b) We are advised that wear was not found to be excessive. (c) We are advised that knuckle wear was not excessive. (d) We are advised that jerks due to slack in the couplings did cause annoyance. (e) Diaphragm buffers are fitted to passenger vehicles, and appear successfully to overcome the trouble complained of.

Question No. 8.—What necessity was there to fit up about forty trains to arrive at the above conclusions ?

Answer.—As stated, the forty trains were only fitted up after being satisfied with the trials made.

Question No. 9.—Is it claimed as the advantage of automatic over the shackle-and-pin coupling that it is not necessary for men to go between vehicles to attach or detach cars? (a) Is it necessary, or is it allowed, for employees to go between vehicles on close-coupled sets to attach or detach? (b) Are these sets ever uncoupled, except to effect repairs?

Answer.—No. Not in the transition stage, but finally it will be so claimed. (a) It is necessary for employees to go between vehicles on close-coupled sets to attach or detach, but this work is always done when vehicles are stationary, and invariably in the repair siding, where they are marshalled. Eventually this will not have to be done. (b) No, but when the electric service is inaugurated it will be necessary to split up the trains.

Question No. 10.—Even with automatic couplings, on either goods or passenger stock, is it necessary for men to go between vehicles to attach and detach the air hose ?

Answer.—Yes.

Question No. 11.—Will further inquiries be made, say, from the medical officer re the number of accidents to shunters and others, owing to these couplings since first adopted ?

Answer.—We are informed that during the past ten years there have been only five cases of slight injury sustained by employees for which the automatic coupling could be held responsible.

Question No. 12.—Was it proved by actual experience when suburban sets were run without buffers that the jerking was excessive, both when starting and stopping, although the engine was tight-coupled to the train? Will he ascertain whether it would be better to make proper tests now, before any further expense is incurred, with a passenger train, fitted complete, including the engine, with automatic couplings, and no side or centre buffers?

Answer.—As already stated in answer to No. 7, it has been decided to adopt diaphragm buffers, which appear to get over the trouble complained of.

Question No. 13.—What reliable results can be obtained as to what the wear will be of the knuckles, knuckle faces, and buffing faces, when they are in use after the transition period, by testing them on close-coupled sets with side or centre buffers? Is the amount of movement on these parts the same when they are tight-coupled on side or centre buffers as when running free with only the automatic coupling?

Answer.—These results were obtained under such conditions on the first four trains. The amount of sliding movement, which is the movement which causes wear, is the same with or without buffers.

Question No. 14.—Are these couplings in use on railways in Great Britain ?

Answer.—These automatic couplers are in use in Great Britain.

Question No. 15.—Is it a fact that experts who have travelled in America, where these automatic couplings are in use, state that the jolting and jarring is excessive, and would not be tolerated by passenger travellers in New South Wales ?

Answer.—We have not heard of any such statement.

Appendix III.

LIST OF WITNESSES EXAMINED

Name.	Designation.
Hartigan, T. J.	Chief Accountant, New South Wales Government Railways.
Coghlan, F. A.	Auditor-General, New South Wales Government.
Spencer Watts, J.	Messrs. Smith and Johnson, Public Accountants, Sydney.
Fraser, J.	Chief Railway Commissioner, New South Wales Government Railways.
Cann, The Hon. J. H.	Assistant Railway Commissioner, " "
Fox, H.	Assistant Railway Commissioner, " "
Denneen, W. H.	Traffic Auditor, " "
Hunt, P. S.	Estate Agent and R.R.R. Manager " "
Byles, C. B.	Signal Engineer, " "
Hodgson, C. A.	Chief Traffic Manager, " "
Ranken, R. L.	Engineer-in-Chief for Existing Lines, " "
Garside, F. C.	Comptroller of Stores, " "
Carroll, W.	Director of Statistics and Advertising, " "
Crouch, T.	Publicity Officer, " "
Spence, J.	Director of Finance, New South Wales Government.
Brain, O.W.	Chief Electrical Engineer for Railways and Tramways, New South Government Railways.
Hutchinson, W.	Engineer-in-Chief for Railway Construction, New South Wales Government Railways.
Bradfield, Dr. J. J. C.	Engineer-in-Chief, Metropolitan Railway Construction, New South Wales Government Railways.
Sheldon, Sir Mark	President, Sydney Chamber of Commerce.
Atwill, R. H. S.	Superintendent, Passenger Transportation, New South Wales Government Railways.
Quinton, W. C.	Superintendent of Goods and Livestock Transportation, New South Wales Government Railways.
Kater, Hon. Dr. N., M.L.C. ...	President, Graziers' Association of New South Wales.
Thorby, H. V., M.L.A.	President, Farmers and Settlers' Association of New South Wales.
Lucy, E. E.	Chief Mechanical Engineer, New South Wales Government Railways.
Kidd, James	Vice-Chairman, Central Council, Producers' Association.
Binnie, Charles	President, Stock Owners' Association of New South Wales.
Love, J. C.	Ex-President, Associated Chambers of Manufactures of Australia.
Newlands, S. F.	Senior Vice-President, Chamber of Manufactures, New South Wales.
Waitt, W. A. F.	Councillor, Chamber of Manufactures, New South Wales.
Herrod, E. E.	General Secretary of the Fruit Growers' Association of New South Wales.
Rothwell, W.	President, Metropolitan Retail Fuel and Produce Merchants' Association.
Edwards, A. C.	Secretary, Metropolitan Retail Fuel and Produce Merchants' Association.
Rumford, J. B.	President, Sydney Section, Australian Association of British Manufacturers and their Representatives.
Clark, Rupert	Australian Association of British Manufacturers and their Representatives.
Huie, A. G.	Secretary, Free Trade and Land Values League.
Edwards, Frank L.	Secretary, Motor Traders' Association, also representing National Roads and Motorists' Association.
Bragg, J. S.	Lithgow Coal Association.
Herring, A. E.	Apple and Pear Growers' Association.
Kilgour, R. G.	Mayor of Newcastle.
Trebeck, J. B.	Rutherford, Mayfield-Homeville, Telarah Progress Association.
Gamble, J. H.	Mayor of Hamilton.
Neal, S. M.	Mayor of Wallsend.
Griffiths, A.	Waratah Council.
Lightfoot, J. C.	Lambton Council.
Paton, John	Newcastle Chamber of Commerce.
Weyland, E. G.	Southern Coalowners' Agency and Southern Colliery Proprietors' Association.
Macdonald, C. M.	Northern Collieries Association.
Meohan, W.	Locomotive Running Superintendent, New South Wales Government Railways.
Williams, F. J.	Senior Outdoor Assistant to the Chief Traffic Manager.
Mulheron, D.	Outdoor Assistant to the Chief Traffic Manager.
Milne, E. S.	Outdoor Assistant to the Chief Traffic Manager.
Sievers, E. J.	Valuer General.
Doran, E. J.	Tramways Traffic Manager.
Cowdery, G. R.	Engineer for Tramways.
Goode, C. J.	Goods Superintendent, New South Wales Government Railways.
Morris, W. J.	Secretary, New South Wales Government Railways.

Appendix IV.

INDEX TO WITNESSES HEARD.

Date.	Day.	Name of Witnesses.	Questions.	Commencing page.
2 June	1st	T. J. Hartigan	1-105	1
26 "	2nd	F. A. Coghlan	106-132	6
28 "	3rd	J. Spencer Watts	133-157	8
4 July	4th	J. Fraser	158-240	10
4 "		Hon. J. H. Cann	250-270	14
4 "		H. Fox	271-278	14
8 "	5th	T. J. Hartigan	279-368	15
15 "	6th	J. Fraser	369-393	18
15 "		W. H. Denneen	394-407	20
15 "		P. S. Hunt	408-417	21
15 "		C. B. Byles	418-605	22
16 "	7th	C. A. Hodgson	606-1181	27
18 "	8th	R. L. Ranken	1182-1253	42
21 "	9th	F. C. Garnide	1254-1354	44
23 "	10th	W. Carroll	1355-1425	47
23 "		T. Crouch	1426-1436	49
24 "		J. Spence	1437-1468	50
24 "		O. W. Brain	1469-1806	52
24 "	11th	W. Hutchinson	1807-1881	61
24 "		J. J. C. Bradfield	1882-1915	64
30 "	12th	Sir Mark Sheldon	1916-2060	65
31 "	13th	Reginald Harry Stringwell Attwill	2061-2123	73
31 "		William Charles Quinton	2124-2235	74
1 Aug.	14th	Hon. Dr. Norman Kater, M.L.C.	2236-2284	78
1 "		H. V. Thorby, M.L.A.	2285-2469	80
5 "	15th	Ernest E. Lucy	2470-3001	95
6 "	16th	James Kidd	3002-3057	107
6 "		Charles Binnie	3058-3159	111
7 "	17th	Joseph Clifton Love	3160-3192	123
7 "		Stephen Foster Newlands	3193-3214	125
7 "		William Arthur Foster Waitt	3215-3221	126
8 "	18th	Ernest Edward Herrod	3222-3275	127
8 "		William Rothwell	3276-3328	129
8 "		Alfred Charles Edwards	3329-3345	131
11 "	19th	John Baker Rumford	3346-3361	133
11 "		Rupert Clark	3362-3395	134
11 "		Alfred George Huie	3396-3424	136
11 "		Frank Lincoln Edwards	3425-3467	137
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18 "		A. E. Herring	3482-3499	142
20 "	21st	Robert George Kilgour	3500-3544	143
20 "		James Beale Trebeck	3545-3550	146
20 "		James Henry Gamble	3551-3566	146
20 "		S. M. Neal	3567-3572	148
20 "		Arthur Griffiths	3573-3574	148
20 "		J. C. Lightfoot	3575	148
20 "		John Paton	3575-3646	149
21 "	22nd	E. G. Weyland	3647-3671	154
21 "		C. M. Macdonald	2672-3635	156
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3 "		F. J. Williams	3917-3930	163
3 "		D. Mulheron	3931-3938	163
3 "		E. S. Milne	3939-3957	164
5 "	24th	E. J. Sievers	3958-3990	165
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23 "	26th	E. J. Doran	4367-4451	194
23 "		G. R. Cowdery	4452-4504	196
25 "	27th	C. J. Goode	4505-4542	197
25 "		W. J. Morris	4543-4611	199
26 "	28th	Hon. J. H. Cann	4612-4660	201
26 "		H. Fox	4661-4671	204