1930.

NEW ZEALAND.

TRANSPORT DEPARTMENT

(ANNUAL REPORT OF).

Presented to both Houses of the General Assembly by Leave.

SIR,— Transport Department, 1st October, 1930.

Herewith I have the honour to submit the annual report of the Transport Department for the year ended 31st March, 1930.

I have, &c.,

J. S. HUNTER, Commissioner of Transport.

The Hon. W. B. Taverner, Minister of Transport, Wellington.

INDEX.

REPORT.

A. INTRODUCTORY.

THE termination of the war is generally accepted as being a convenient time from which to trace the growth of motor traffic on a large scale. Before this time, in New Zealand and in most other countries, road motor transport, while by no means insignificant, was far from being the efficient and far-flung agency of transport which it is at the present time. The growth of road traffic between 1918 and 1922 was very rapid, particularly in the private-car and motor-lorry fields. As a result, in the latter year Parliament decided to institute a system whereby the construction and maintenance of the principal roads of the Dominion were placed under Government subsidy and central control. For this purpose the Main Highways Act, 1922, constituting a Main Highways Board, was established, and power was given to His Excellency the Governor-General to declare any road a main highway, thereby vesting power of control of the road in the Board, and making it in its construction or maintenance available for subsidy from funds vested in the Board by the Act. At that time the funds were principally grants from Parliament and the proceeds of the tire-tax.

This Act provided assistance to local authorities in respect of the principal roads, but the rapid growth of motor traffic and the deterioration of the roads caused thereby still remained an anxious problem for all roading authorities. In 1924, therefore, Parliament passed two measures designed to assist matters. One took the form of an amendment of the Public Works Act, under which regulations could be made fixing, in respect of commercial motor-vehicles exceeding 2 tons gross weight, heavy-traffic fees payable to local bodies for road-maintenance purposes, classifying roads, and containing other road-protective measures. These regulations were passed in 1925, and their administration was vested in the Public Works Department.

In 1924, also, Parliament passed the Motor-vehicles Act, 1924, providing for the annual licensing of all motor-vehicles (the work being done by the Post Office and the license fees being diverted to the funds of the Main Highways Board) and their drivers (this licensing being attended to by local bodies, who also receive the fees). The Act also provides severe penalties for dangerous driving, and other provisions for the regulation of traffic. The general administration of this Act was vested in the Internal Affairs Department. The foregoing measures replaced those formerly in force whereby local authorities could fix heavy-traffic license fees for heavy motor traffic by by-law, and issue annual licenses for all motor-vehicles. These powers presumably had proved satisfactory in view of the growth and wide field of movement of motor transport.

About this time the growing use of the motor-omnibus began to give concern to the tramway-owning authorities of New Zealand, and in 1926 the Government of that time provided assistance to such local authorities by passing regulations under the Board of Trade Act for the control of motor-omnibus competition with tramways. These regulations were in the same year replaced by the Motor-omnibus Traffic Act, 1926, whereby the motor-omnibus competition with the tramways was definitely regulated. This Act, and also the Constructional Regulations issued thereunder, were placed under the administration of the Public Works Department.

In 1927, the Motor-spirits Taxation Act was passed by Parliament, this providing for taxation through the Customs at the rate of 4d. per gallon on all motor-spirit consumed in motor-vehicles used on the roads. The general administration of this Act was vested in the Public Works Department, but the system of refunds necessary under the Act was entrusted to the Post Office. The proceeds from this tax were diverted by statute to the funds of the Main Highways Board, which has been enabled thereby to considerably extend the field of its operations in assisting County Councils with the construction and maintenance of main highways.

About this time, in view of the desirability of the different Acts relating to motor transport being administered by one Department, the Motor-vehicles Act, 1924, was transferred by the Government to the administration of the Public Works Department, which then proceeded to issue in draft form regulations containing one uniform code of rules for motor traffic in the Dominion. These were brought into law in 1928 after full opportunity for criticism of them had been provided to all interested parties.

In 1928 also the Motor-vehicles Insurance (Third-party Risks) Act was passed providing for the compulsory insurance of every motor-vehicle against the drivers' liability to third parties for injury or death caused by negligent use of the motor-vehicle. The general administration of this Act was attended to by the State Fire and Accident Insurance Department. This was, so far as is known, the first measure of its kind passed within the British Empire. An Act for the same purpose has been passed this year by the British Parliament.

B. MINISTRY OF TRANSPORT.

1. REVIEW OF ACTIVITIES SINCE FORMATION.

On the 12th February, 1929, the late Right Hon. Sir Joseph Ward, who was then Prime Minister, announced that the Government had decided to constitute a Ministry of Transport, as the Government considered that the very difficult transport problems which had arisen could be given much closer attention under a separate administration than was possible under the existing exigencies. The Minister of Transport first appointed was the Hon. W. A. Veitch. The Prime Minister also announced the Government's intention to form a Transport Advisory Council, representative of all those bodies closely interested in transport matters, for the purpose of advising the Minister of Transport on any subject concerning which he consulted the Council.

The Department was charged by Cabinet with the administration of the Motor-vehicles Act, 1924; the Motor-omnibus Traffic Act, 1926; the Lights on Vehicles Act, 1915; those parts of the Public Works Act, 1928, dealing with motor-vehicles or traffic (including the Heavy-traffic Regulations); the Motor-vehicles Insurance (Third-party Risks) Act, 1928; and the Motor-spirits Taxation Act, 1927.

No alteration was made to the arrangements, whereby the licensing of motor-vehicles and the refunds of motor-spirits tax is carried out by the Post Office, and the inspection of omnibuses is carried out by the Public Works Department, but these activities are subject to the supervision of the Transport Department in so far as policy questions are concerned.

One of the first steps taken by the Department was to review the transport situation, and to consider the necessity for proper co-ordination, and measures to give effect to it. The data resulting from this review, and suggestions to provide co-ordination, were placed by the Minister before the Transport Advisory Council, which held its first meeting in June, 1929 for this purpose.

The Council was unanimous in its recommendations that a national system of licensing of commercial motor services be established by the methods suggested, and at a further meeting held in September of that year the Government's legislative proposals were also approved. The Council also agreed to various legislative proposals for amendment of the Acts administered by the Department.

These proposals grew into shape in the form of the Transport Law Amendment Bill, which was presented to Parliament in the 1929 session. Owing partly to the unavoidable delay in presenting the Bill, and partly to other factors, among them being the misunderstanding by local bodies of many of the proposals, the Government decided not to proceed with the Bill in the meantime.

A short measure, the Transport Department Act, 1929, constituting the Ministry and Department, and vesting in it the administration of the foregoing Acts, was passed by Parliament; but, as the Transport Advisory Council had not been agreed to by Parliament, the latter was disbanded.

Some of the activities of the Department additional to the considerable investigation and other work necessary in connection with the foregoing proceedings may be briefly outlined as follows:—

Motor-omnibus Traffic Act, 1926.

So far as the general position under the Motor-omnibus Traffic Act is concerned, it is regretted that this is not so satisfactory as might be. A system by which one local authority is licensing authority for the whole of the area of a motor-omnibus district is itself unsatisfactory, and partly accounts for the lack of enforcement of the Act which appears prevalent in some districts, particularly when tramway protection does not provide an incentive to its enforcement.

This lack of enforcement, and also the fact that vehicles of under eight-seats capacity or charging more than 2s. single fare are not bound by the Act, results in the unfair position which exists in many cases, whereby a licensed omnibus proprietor, who has complied with the law and strict safety regulations and is bound to a time-table, is subjected to unregulated competition by vehicles of less than eight seats or by unlicensed omnibuses not subjected in either case to safety regulations or time-table. This effect of the law is also criticized by the General Manager of Railways in the Railways Statement, wherein it is alleged that, as a result of this type of competion, the Railways Department has lost several thousands of pounds in one of its omnibus services. A clause was specially inserted in last session's Transport Law Amendment Bill to meet this position.

One of the early tasks was the revision and reissue of the Motor-omnibus (Constructional) Regulations, for which purpose the Transport Advisory Council appointed a subcommittee to consult with departmental officers. As a result, these regulations were reissued in a form which appears to have given satisfaction to all concerned without in any way reducing their importance in providing for public safety and conduct.

The clauses of these regulations which have given the most trouble are the ones intended to limit the loads on an omnibus to those for which it was designed. While for various reasons the overloading of a tram is not a very serious matter, the overloading of an omnibus might easily result in a serious accident. Action has recently been taken by the Department to circularize all the important manufacturers of omnibuses concerning the designed capacity of their models, and it is hoped that thereby the manufacturers will obtain complete understanding in respect of New Zealand requirements.

The present position so far as compliance with the constructional requirements of omnibuses is concerned is also still unsatisfactory from the point of view of the administrative Department, but is being gradually improved.

There are many conflicting interests in this important and essential activity, and the Department has every respect for the needs and difficulties of each party concerned. It endeavours to secure complete regard for the regulations and an appreciation by the proprietors and others of the benefits, both direct and indirect, that do and will compensate them for an early and willing compliance with the requirements of the regulations.

Apparently some have not yet realized their obligations and responsibilities, for in several districts the overloading of licensed omnibuses to a more or less dangerous extent, and with resultant damage to the roadway, is an everyday occurrence. Again, certain proprietors have been allowed to license their omnibuses only for the number of passengers seated, instead of covering the total number of seated and standing passengers sanctioned by the Inspecting Engineer's certificate of fitness. The standing passengers are, of course, carried, although the relative heavy-traffic fees were not tendered.

The omnibus-travelling public prefer to stand within a vehicle with all its seats occupied, rather than stand on a pavement to await the arrival of the next vehicle running to a time schedule. It is in the best interests of the public and is most desirable for other good reasons that "peak-load" and such like traffic be accommodated, within limits, as an extra allowance on the maker's seated-passenger rating. Except in very special circumstances, the proprietor should be obliged to pay fees on the maximum number of passengers that his vehicle is declared fit to carry in the service for which he obtains a license.

In general, owing to indifferent enforcement of the licensing regulations, the public are not getting the standard of service they are entitled to, nor does the State or the licensing authority obtain as much in fees from the omnibus business as would be paid to them were such traffic controlled properly.

The majority of the licensed omnibuses now operating in this Dominion have chassis that were built for the carriage of goods (with a relatively light body), and it is not surprising that they have proved unsuitable for the more exacting passenger-carrying business.

One good reason for the preponderance of American-built chassis in New Zealand omnibus service is that small vehicles of eighteen to twenty-five seats were initially required, a type which England was not then offering overseas. However, the experience of the past has proved the commercial chassis a misfit, while the natural growth in passenger traffic has created a demand for larger chassis of the genuine omnibus type, with the result that the new buses meet with approval from all quarters, and will bring to the proprietor the good will of the bus-travelling public.

Motor-vehicles Act, 1924.

Early this year a conference of all interested parties was called by the Minister for the purpose of reviewing the regulations relating to general motor traffic and to motor-drivers' licenses. The conference very carefully reviewed these regulations, and as a result they have been redrafted with many amendments, and are being circulated for criticism before being finally reissued.

Some months later, owing to the serious situation indicated by the numerous motor accidents of recent times, the Minister decided to call a further conference of all interests likely to be able to help in consideration of methods of reducing these accidents. The conference has made some very important recommendations to the Government for this purpose, and these recommendations are at present either being given effect to or are under full investigation with a view to decision. One important result of the conference is that by co-operation with the insurance interests statistics covering a wide field of traffic accidents will be supplied free of cost to the Government.

The Minister of Transport has power to approve of mechanical direction-indicators, anti-dazzle devices, and other appliances for fitting to motor-vehicles, and for his guidance a committee of experts, first appointed under Public Works administration, reports on the various appliances submitted. The committee is representative of traffic authorities, police, motor interests, and the Transport Department, and its services, provided at no little sacrifice by the members, are much appreciated.

Public Works Act, 1928 (Sections dealing with Traffic).

Recently the Department has been successful in obtaining the services of a civil engineer, who was immediately called upon to review the road-classification of various local authorities, commencing with those near Auckland. As a result many of the classifications have been altered with the concurrence of the local bodies concerned, and, as revised, they are generally accepted by both local authorities and heavy-vehicle owners as being reasonable.

The rigid-framed three-axled motor-vehicle is one of the latest developments of commercial transport, and it is claimed that this vehicle goes some distance towards solving the problem of the carriage of heavy loads without undue wear on the road. The Government has recently issued regulations with a view to this type of vehicle receiving concessions in connection with maximum weight and road classifications, but these concessions do no more than make recognition of its road-saving qualities as compared with the corresponding type of two-axled vehicle. The same regulations increased by ½ ton the legal carrying-capacity of fourth-class and third-class roads to overcome an anomaly whereby certain more robust types of motor-lorry (principally of British manufacture) were unduly penalized as compared with the lighter lorry of the same class.

Motor-vehicles Insurance (Third-party Risks) Act, 1928.

What might be regarded as an anomaly in this Act has been brought to notice, in that if a motorist fails to stop after his negligence has caused an accident an injured party (or his dependants if death results) has no redress from the insurance cover provided by the Act, unless the motorist can be located. A conference of the insurance interests and the Department was held at the request of the Minister to see if some method could be devised to meet such cases without recourse being had to legislation. As a result a scheme has been evolved, and an agreement is at present being circulated to the insurance interests which, if accepted and signed by all, will result in a satisfactory solution of this difficulty.

The regulations originally issued, fixing the premiums payable and relative details, were revised and reissued recently with a view to clearing up several points which had caused difficulty. The Act has not been in force for sufficient time to enable the scale of premiums to be reviewed, but this will be done as soon as ample actuarial data exist.

Motor-spirits Taxation Act, 1927.

Apart from the general question of motor-taxation the principal work involved by the administration of this Act is the refund of the tax to applicants who have used the motor-spirit in a manner entitling them to the refund. This work is done by the Post Office, and, although complaints are received from time to time, it is considered that, in view of the volume of applications and the care necessary to minimize possibility of fraud, the work is done as efficiently and with as little inconvenience to the public as can be expected.

Tramways Act, 1908.

The Department has been charged by the Government with the administration of this Act, but arrangements have been made meantime for the engineering aspects of the administration (inspection of trams, tracks, &c.) to be attended to by the Public Works Department, while the Transport Department investigates proposals under the Act from the transport point of view.

Traffic Accidents and Breaches.

The primary object of the law relating to traffic generally, and in particular to motor-vehicles, is the protection of the public *qua* pedestrians and *qua* motorists. With the number of motor accidents and the death roll therefrom assuming bigger numbers each year, there is a danger that regulations will be relied upon more and more as a panacea for all traffic ills. Care must be taken that what is a means is not regarded in the light of an end. Attention has been directed, and rightly so, to the building-up of a code of traffic laws; but the large number of cases for breaches thereof that now occupy the Courts suggest that, in addition to keeping the laws up to date, future efforts should be concentrated firstly upon educating the motorist and the pedestrian as to traffic dangers and proper methods of minimizing them, and, secondly, upon a more complete and efficient system of enforcement of the laws.

In Britain the Ministry of Transport and local bodies are closely associated with a "safety first" organization whose objects include, *inter alia*, the education of the public in the traffic dangers. Its activities are widely spread, and are going on all the time, the problems being attacked from every possible angle. An important branch of activity is that directed to the education of the school-children. It is inevitable that a closer grasp of traffic questions by all sections of the community would react to the public benefit. Any expenditure in the direction of educating the public in every avenue possible would yield a rich harvest in a more satisfactory administration of the laws, and in a lower annual loss of life and limb, as well as in a lower aggregate of loss through damage to property.

One of the recommendations of the Traffic Accident Conference previously referred to had reference to the institution of a similar "safety" movement in New Zealand, and steps are being taken with this object in view.

A further recommendation of the Conference had reference to the second problem—namely, a more complete and efficient enforcement of the traffic laws. The proposals in this recommendation are being fully investigated, more particularly from the viewpoint of expense, and a report will be presented to the Government with recommendations as soon as possible.

Some interesting statistics relating to traffic matters follow:—

Statistical Data.

(i) CONVICTIONS.

(*a*) *Comparisons since 1923.*

The following figures are reproduced from page 255 of the 1930 Year-book, and they represent the convictions in the Magistrates' Courts in the Dominion during the calendar years 1923–1929 for breaches of traffic regulations: Calendar year 1923, 8,521 convictions; 1924, 8,759; 1925, 11,993; 1926, 14,184; 1927, 15,279; 1928, 15,651; 1929, 16,767.

Under the system of classification formerly in use the great majority of breaches of traffic laws were classed as breaches of by-laws. Consequent on the passing of the Motor-vehicles Act, 1924, a partial change was made in that year, and under a new system of classification adopted in 1926 all such offences were removed from the by-laws class, which has now sunk to insignificant proportions. Approximately 2,000 should be added to the above figures for 1923 and 1924 to make them comparable with those for subsequent years.

(*b*) *Classification of Convictions, 1929.*

The following table shows a classification of the convictions for traffic offences during the calendar year 1929, in the four principal cities and the whole Dominion:—

Traffic Offences.	Convictions in Magistrates' Courts.					
	Auckland City.	Wellington City.	Christchurch City.	Dunedin City.	Total.	Dominion Total.
(1) Negligent driving causing death*						
(2) Negligent driving endangering human life*						
(3) Unlawfully converting vehicle to own use ..	23	38	43	11	115	268
(4) Drunk in charge of motor-vehicle	45	34	27	10	116	418
(5) Drunk in charge of other vehicle	2	2	7	1	12	60
(6) Excessive speed in motor-vehicle	98	196	284	26	604	1,609
(7) Negligent or dangerous driving in motor-vehicle	877	394	379	153	1,803	3,291
(8) Riding bicycle on footpath	24	4	404	31	463	777
(9) Negligent and dangerous driving in other vehicle	8	9	12	1	30	67
(10) Breaches of regulations for the lighting of vehicle	483	249	914	161	1,807	4,164
(11) Offences relating to registration, licensing of motor-vehicles	408	366	582	208	1,564	3,232
(12) Breaches of parking regulations	504	476	280	166	1,426	1,734
(13) Other traffic offences	164	131	231	105	631	1,147
Totals	2,636	1,899	3,163	873	8,571	16,767
Deduct non-motor offences—						
Drunk in charge of other vehicle	2	2	7	1	12	60
Riding bicycle on footpath	24	4	404	31	463	777
Negligent and dangerous driving other vehicles ..	8	9	12	1	30	67
Breaches, lighting vehicle (one-third of total) ..	161	83	304	54	602	1,388
Totals	195	98	727	87	1,107	2,292
Grand totals (motors only) ..	2,441	1,801	2,436	786	7,464	14,475

* These offences (1 and 2) are generally finally tried in the Supreme Court, for which the classifications are somewhat different. For negligent driving causing death there were 3 Supreme Court convictions in the Dominion in 1930, and for negligent driving endangering human life there were no convictions.

The preceding figures should be interpreted subject to the following limitations :—

(1) They do not represent the total breaches of the law—many break the law, but few are caught, and of those caught a considerable number for evidential and other reasons are not proceeded against.

(2) There is reason to believe that outside of the principal towns enforcement is often either very cursory or entirely lacking.

(3) Evidential requirements and difficulties of proof. For instance, in cases of excessive speed 2,353 cases were brought, but only 2,142, or 91·03 per cent., were convicted ; cases of negligent and dangerous driving are even more marked, 2,921, or 83·87 per cent., only of the 3,483 cases brought being convicted. Breaches of the regulations relating to the lighting of vehicles showed 5,196 cases and 4,930, or 94·88 per cent., convictions. Altogether, out of 17,978 cases brought during 1928, 16,261, or 90·45 per cent., represented convictions. In other words, approximately one out of every ten cases brought was dismissed.

(4) Many convictions are in respect of the same offender.

(5) The convictions classed in the four largest cities are not confined to the city residents only. Country residents, &c., may commit breaches in the city area and come before the city Courts.

The convictions for traffic offences in 1929 (16,767) represented no less than 36 per cent. of the total convictions during the year, and a rate of 11·40 per 1,000 of the mean population. These figures are impressive. They show how the Magistrates' Courts have been flooded with traffic offences, and indicate the inconvenience to the Courts and motorists involved, particularly where the offence is of a trivial nature. They raise the question as to whether it is worth while employing the complicated and expensive judicial system in many of these trivial cases.

This problem has been met in certain States of the United States of America by standardizing the fines for minor offences, and enabling the culprit to pay the fine to a Traffic Bureau without Court action if he so elects. In point of economy this principle has much in its favour.

(ii) ACCIDENTS AND FATALITIES.

The statistics relating to convictions for breaches of the traffic laws are indices of the zeal with which the laws are administered, and of the delinquency in this respect of the motorists and others. The number of accidents and fatalities tend to indicate the efficacy of the laws and the extent to which they are observed.

(*a*) *Non-fatal Accidents.*

Curiously enough, there are no statistics extant in respect of the accidents occurring to motor-vehicles, save those from which death results. Negotiations are, however, in train with the insurance companies for obtaining sufficient data in respect of the accidents reported to throw some light on the principal causes, and, as mentioned earlier, it is expected from this source to get particulars of the greater proportion of motor accidents in New Zealand.

(*b*) *Fatal Accidents.*

The following table shows the deaths from traumatism in respect of railways, tramways, and motor-vehicles. In classifying deaths under these headings the Statistician has worked on the rule that, in fatalities due to collisions of railway trains and electric tram-cars with motor-vehicles, the death is assigned to the railway train or electric tram-car as being the heavier and more powerful vehicle. In the case of collisions between motor-vehicles and horse-drawn vehicles, the death is assigned to the motor-vehicle :—

Year.	Deaths from Traumatism by		
	Railways.	Tramways.	Motor-vehicles.
1921	36	14	69
1922	45	9	61
1923	69	14	59
1924	40	10	94
1925	43	8	108
1926	53	17	149
1927	42	8	138
1928	44	10	176
1929	49	5	178

Except for a slight drop in 1927 the annual death roll resulting from motor-vehicle accidents has increased very rapidly during the last five years. Averages computed over the last five years show a rate in New Zealand of 10·20 deaths per 100,000 of population.

For 1928 in Great Britain the rate worked out at 11·7 per 100,000 population, while the rate for New Zealand for 1928 showed an exceptionally high figure of 12·1 per 100,000 population. For 1929, unfortunately, New Zealand retained this high figure, the rate still being 12·1 per 100,000 of population. Of course, there are relatively more motor-vehicles, if population is taken into account, in New Zealand than in Great Britain, and the roads in the latter country are much better than this country's. Nevertheless, the traffic density is, by virtue of the greater percentage of urban population, more marked in Great Britain than in New Zealand.

It should, of course, be borne in mind that the accidents recorded represent cases where death follows directly as a result of the accidents. There must be quite a considerable number of deaths, which, although primarily due to accidents, do not occur until some time after, and in respect of which no inquest is held.

As all inquest reports on death from motor-vehicle accidents are forwarded to this Department a fairly detailed analysis of these accidents is possible, although the number of fatal accidents is insufficient to form a safe basis for conclusion. The following statistics are drawn from these reports, and cover the majority of fatal accidents occurring between the 1st April, 1929, and the 31st March, 1930 (the figures already quoted for 1929 cover the period 1st January, 1929, to 31st December, 1929) :—

Analysis of Fatal Accidents from 1st April, 1929, to 31st March, 1930.

(1) *Nature of Accident.*—Collisions: Motor-vehicle with—Pedestrian, 52; motor-vehicle, 40; train, 7; tram, 1; bicycle, 12; horse-vehicle or horse under control, 4; fixed object, 6; straying stock, 1. No collision: Went over bank, 27; otherwise, 22: total accidents, 172.

The most noteworthy point about this table is the large proportion of pedestrian fatalities.

(2) *Persons killed classified in Ages.*—0–4 years, 10; 5–9 years, 8; 10–14 years, 2; 15–19 years, 17; 20–24 years, 30; 25–54 years, 83; 55 years and over, 36: total deaths, 186.

It is of interest that the age period between ten and fourteen years is apparently much the safest so far as motor accidents are concerned.

(3) *Types of Vehicle involved.*—Motor-cycle, 59; private motor-car, 105; taxicab, 2; service-car, 5; motor-omnibus, 3; motor- lorry or van, 39; bicycle, 12; tram, 2; horse-drawn, 4; train, 7; other vehicle, 1.

The private motor-car, the motor- lorry or van, and the motor-cycle are the three main groups.

(4) *Hour of Accident.*—Midnight–1 a.m., 0; 1–6 a.m., 7; 6–7 a.m., 1; 7–8 a.m., 1; 8–9 a.m., 6; 9–10 a.m., 4; 10–11 a.m., 5; 11–12 a.m., 11; 12–1 p.m., 4; 1–2 p.m., 10; 2–3 p.m., 8; 3–4 p.m., 2; 4–5 p.m., 24; 5–6 p.m., 23; 6–7 p.m., 23; 7–8 p.m., 11; 8–9 p.m., 12; 9–10 p.m., 5; 10–11 p.m., 8; 11–12 p.m., 7.

This indicates that from 4 p.m. until 7 p.m. is the period of most danger, as might be expected.

(5) *Day of Week of Accident.* — Sunday, 26; Monday, 23; Tuesday, 17; Wednesday, 28; Thursday, 21; Friday, 22; Saturday, 35.

When it is considered that most business traffic ceases on Saturday lunch-time, the week-end is obviously a danger period.

(6) *Persons killed classified by Location.*—Pedestrians, 53; on motor-cycles, 51; on other motor-vehicles, 68; on other vehicles or horses, 14.

The high proportion of motor-cycle deaths (considering their number proportionate to other vehicles) should be a warning to the motor-cyclist.

(7) *Conditions of Light.*—Daylight, 86; dusk, 19; artificial lighting, 22; darkness or moonlight, 45.

Considering its short duration, dusk is evidently a dangerous period.

(8) *Nature of Thoroughfare.*—Intersection, 19; railway-crossing, 7; nature or condition of road (bad surface or bend, &c.) helped accident, 48; road conditions not a factor, 98.

The number due to road conditions is to be expected in the present state of the country's development.

(9) *Location.*—(*a*) North Island: Auckland City and environs, 29; Wellington City and environs, 16; other towns, 20; country, 57. (*b*) South Island: Christchurch City and environs, 13; Dunedin City and environs, 4; other towns, 8; country, 25.

The large proportion occurring in the country bears out the former remarks about general lack of traffic control outside the towns.

(10) *Causes of Accident.*—Breaches of law: Excessive speed in circumstances—(*a*) But not exceeding 20 miles per hour, 33; (*b*) Exceeding 20 miles per hour but not exceeding 35 miles, 35; (*c*) Exceeding 35 miles, 18: total, 86.*

On wrong side of road, 24. Did not comply with "off-side" rule, 7. Passing standing tram, 3. Other passing breaches, 9. Failure of driver to signal—Motor-vehicles, 3; other vehicles, 2. Breaches of law relating to railway intersections, 7. Vehicle without rear reflector or with inefficient one, 2. Faulty brakes, 8. No lights or inefficient lights (including horse vehicles and bicycles), 22. Glaring headlights, 4. Faulty steering-gear, 3. Faulty tires or wheels, 4. Driver's mild intoxication a factor in accident, 12. Driver's severe intoxication a factor in accident, 3. Driver unlicensed or inexperienced, 5. Straying stock, 1. Other breaches of law, 5.

Other causes: Bad weather conditions, 19. Vehicle being reversed, 3. Sun-dazzle, 2. Obstruction to view by parked motor-vehicle, 4. Driver's physical defect a direct cause, 4.

Motorist and pedestrian—Motorist at fault, 17; pedestrian (not intoxicated) crossing or on road, without care or getting confused, 17; pedestrian intoxicated, 5; children outside schools, 2; infant (under six) not under proper control, 9; other causes of pedestrian accidents, 6.

Causes not included above, 4.

The high proportion of fatalities arising from breaches of the general traffic law indicates that it is to everybody's own interest to learn and obey these laws.

The motor-accident is a problem which is now causing much concern to all civilized countries, and which has not yet in this country received the attention which it deserves. The fatality list of nearly two hundred per annum is estimated to represent an economic loss in life alone of £400,000 per annum, and to this must be added loss caused by personal injuries and property damage.

* As in many cases the only source of information *re* speed was the driver himself, these figures are not a safe guide.

General.

An important activity of the Department is the formation of a complete transport reference library. All the known useful periodicals in English relating to the Department's duties are regularly obtained, and their substance is thoroughly indexed. Numerous works of authority on the various problems of transport are held or being obtained, and statutes and other data relating to transport conditions in other countries are also received. It may, therefore, be stated that the Department is kept thoroughly abreast of the times in its activities. When the library is more complete, it is intended to encourage those interested in transport in New Zealand to regard the Department's library as a bureau of information available to all *bona fide* inquirers.

A task of considerable magnitude has been in progress practically from the commencement of the Department, and is still proceeding—namely, the preparation of statements and statistics showing the full position as regards the incidence of motor-taxation in New Zealand, and reviewing the whole field of such taxation. This is dealt with more fully later in this report, but it is hoped that from these activities an answer may be given to a problem which, so far as is known, has not yet been solved by any country—namely, the correct proportion of the costs of the roads which should be borne by traffic using the roads and by the different classes of such traffic.

2. FUNCTIONS OF DEPARTMENT.

The enactments administered by the Transport Department comprise the whole of the New Zealand legislation (other than local Acts) dealing with road transport and the classification and protection of roads. It will be seen, therefore, that the functions of the Transport Department are :—

(1) Co-ordination of the available means of transport :
(2) The examination of the economic position with regard to roads and road transport :
(3) Investigation of the incidence of taxation on all forms of motor transport, based upon value to community, and costs of road construction and maintenance, value of production, &c. :
(4) Protection of roads by means of classification according to weights and speeds :
(5) The fixing of standards in vehicle-design for the more economical use of roads and safety to passengers :
(6) Registration and licensing of motor-vehicles in general, and measures for the safe regulation of road traffic :
(7) The framing of legislative proposals and regulations for the administration of the Department's functions.

3. ORGANIZATION AND STAFFING.

The organization of the Department to carry out these functions has been arranged as follows :—

1 Commissioner of Transport as the administrative head of the Department.

2. *Road Engineering :* Applications were invited for the position of Civil Engineer to the Department, and this position was filled by the appointment of Mr. G. L. Laurenson, A.M.Inst.C.E., A.M.N.Z. Soc.C.E., chartered civil engineer, formerly of the Public Works Department, who will carry out all work in connection with the protection of roads by means of classification according to the transport requirements of the areas to be served, and any other action considered necessary, such as speed-restriction, &c. This officer will also be responsible for all the technical investigation work to enable information to be ascertained as to cost of construction and maintenance of roads of the various standards, with the object of arriving at an approximate index figure representing cost per ton-mile, and also as a basis for ascertaining data upon which to fix motor-taxation. Of course, other economic factors are also necessary to arrive at a reasonable basis of taxation. Generally speaking, the work of the Road Engineer includes all aspects of road construction and maintenance and the use of roads by motor-vehicles for the protection of the roads and safety of the traffic thereon.

3. *Mechanical Engineering :* The duties and responsibilities of the Mechanical Engineer embrace—

(*a*) All matters relating to the design, construction, maintenance, and proper operation of motor-vehicles ;
(*b*) Essentials in tires, fuels, accessories, and equipment.;
(*c*) The distribution of loads and the cost of operation of motor-vehicles in general :
(*d*) The requirements in road signs and warning-devices :
(*e*) The examination of motor-vehicle and other plans and specifications as a preliminary to the gazetting of approved types :
(*f*) The control of district officers in the enforcement of constructional regulations and in the issue of certificates of fitness for omnibuses that are operating in the motor-omnibus districts :
(*g*) The control of the associated correspondence :
(*h*) His advice upon motor transportation if sought by other Departments ; and
(*i*) He is the Department's Engineer representative on the Motor-vehicle Mechanical Appliances Committee.

In the fast-developing field of motor transportation it is an imperative duty of the Mechanical Engineer to attempt to keep abreast of the times by the study of technical publications and papers, also through the perusal of the selected invaluable periodicals which are received regularly from overseas.

Mr. H. C. Heays, A.M.I.Mech.E., A.M.N.Z.Soc.C.E., Chartered Mechanical Engineer, is the officer charged with these duties. He was previously Mechanical Engineer to the Public Works Department, and has, therefore, been responsible for this work from its initiation by the passing of the Motor-omnibus Traffic Act, 1926.

4. *Transport, Finance, and Statistics:* The functions of the Transport Officer and Accountant are broadly as follows:—

(*a*) To conduct economic and statistical investigations into all phases of transport in New Zealand, particularly road and rail services:

(*b*) To estimate or measure the optimum transport requirements of the various economic areas in New Zealand and in the Dominion as a whole, and to report on the existing services in the light of their adequacy or inadequacy:

(*c*) To study all the economic aspects of transport in all forms as it exists in other countries, so that development in New Zealand may be kept in line:

(*d*) To study the economic and social aspects of the problem of motor-taxation and the financing of the roads, so that the necessary capital may be obtained in the most equitable manner, having regard to the recognized principles of taxation and public finance:

(*e*) To act as Accountant to the Department.

From May to November, 1929, this position was filled by Mr. R. P. Gillies, Accountant, who was on loan from the New Zealand Railways. As from the 1st January, 1930, however, Mr. H. B. Smith, B.Com., A.R.A.N.Z., of the Census and Statistics Office, has been appointed to the position.

5. *Administrative and Legal:* The responsibilities under this heading include the following:—

(*a*) The acquisition of information concerning the situation and general laws relating to transport in other countries, and generally such other data on all of the many phases of transport as will keep the Department abreast of the times. Under this heading is included the formation of the transport library, to which reference has already been made.

(*b*) The study of the information on transport matters so obtained, and also the conditions in New Zealand, with a view to advising the Government on transport problems.

(*c*) The framing of legislative proposals and regulations to give effect to Government proposals and to facilitate administration of the law.

(*d*) The correspondence and other administrative and clerical action arising from administration of existing laws and general departmental activities. Under this heading is included the secretarial work entailed by the Motor-vehicle Mechanical Appliances Committee and the conferences to which reference has been made.

These duties, in so far as they are dissociated from those of the preceding officers, are carried out by or under the control of Mr. R. T. Dixon, a solicitor by qualification, and formerly belonging to the Public Works Department. This officer has been directly associated with transport administration since the passing of the Motor-omnibus Traffic Act in 1926.

All officers at present on the staff of the Department have been drawn from other Departments.

In this connection, of course, it is clear that if legislation is enacted to provide machinery to co-ordinate transport some additions to the staff will be unavoidable, as it is not intended to set up expensive clerical machinery in various licensing districts. It is proposed, for uniformity in administration, to have all the preparatory work in connection with applications for licenses done in Wellington, in order to secure the benefit of the services of the expert officers attached to Head Office.

4. ENFORCEMENT OF REGULATIONS, ETC.

Another very important question in connection with the organization of the Department is the enforcement of the measures that are laid down by statute, regulation, and departmental procedure for the protection of roads and traffic thereon. From the information that is supplied later in this report it will be made clear the financial savings that can be effected in the cost of construction and maintenance of roads, if reasonable steps are taken to conserve them in the public interest. At the present time there is no definite obligation placed upon local bodies for the enforcement of these measures, and when it is remembered there are over three-hundred local bodies with road-controlling powers it will be appreciated the scope that exists for differential administration and interpretation of the powers conferred upon them. This aspect is so well known that no good purpose can be served by traversing it further here. It is clear, however, that a very far-reaching development has taken place in the sphere of motor transport within the last few years, and although the necessity for central control has been generally accepted with regard to highway administration, local bodies are very slow to appreciate that road transport is now more a national question than a purely local one.

This Department has experienced the utmost difficulty in obtaining the co-operation of local bodies to carry out what is considered to be exceedingly valuable work to reduce road-costs. Certain powers exist at the present time to limit the use of roads to actual requirements by means of weight

classifications and speed-restrictions—the two most important factors in road-costs—but many local authorities, particularly in the South Island, decline to classify, and if this classification were done by the Minister of Transport no governmental machinery is available to enforce it, as, obviously, the local authority would decline to do so. In this connection attention is drawn later herein to the matter in respect of the South Island, where nearly the whole of the roading system, including main highways, is unclassified, and therefore available for gross loads up to the full statutory limit of 10 tons on two-axled vehicles and 15 tons on multi-axled vehicles. Add to this the fact that no limitation of speed exists for light traffic, and that at certain speeds ordinary motor-cars do more damage to gravel and macadam roads than the legitimate heavy traffic thereon travelling at regulation speeds, and some idea may be gained of the damage to roads owing to the lack of reasonable regulation.

5. PROTECTION OF ROADS.

Whilst local bodies in many areas are complaining of the increasing rate burden due to increased road-costs, a few are declining to take steps to administer existing powers designed specially to reduce road-maintenance costs. As is shown in this report, from the investigations already made it is abundantly clear that the financial position alone in connection with road transport is so serious as to necessitate uniform classification of roads throughout the Dominion, definite maximum-speed restrictions on gravel and macadam roads, and the regulation of commercial traffic to keep road traffic down to reasonable requirements and provide machinery for co-ordination of services. To enforce these proposals would necessitate little additional expenditure so far as the central administration is concerned, but would certainly entail a staff of Transport Inspectors for road duty, including the enforcement of all road-transport powers vested in the Government for the time being. The strength of such staff would, of course, depend on the extent to which the scheme were put into operation, and whether it incorporated all work at present carried out by local bodies and Government Departments.

Whilst that would be exceedingly desirable from an efficiency point of view, it is true that the most important sphere of action from the financial standpoint is in rural areas to obtain full observance of road-classifications and speed-restrictions; and the expenditure necesary to provide such a service would be relatively trifling when compared with the huge savings that could be effected by better preservation of our roading system.

Many people resident in the vicinity of the larger cities are apt to judge the necessity for restrictive measures on the standard of roads they are accustomed to use in those areas, but the fallacy of framing a Dominion policy on those grounds is demonstrated by a perusal of the mileage of the various classes of roads.

It will be seen that of the 40,000-odd miles of roads less than 1,000 miles are dustless, and that consequently some action to keep the cost down to something more in keeping with actual requirements is definitely essential.

The whole position is being impartially reviewed in order to show the actual conditions existing at the present time, and there can be little doubt that that review demonstrates that something must be done to stop the present drift until those responsible can by further examination more clearly weigh up the whole position.

A dispassionate survey of the maps attached to this report will clearly show to what extent dual facilities exist for our land transport, and also that if the cost of transport is considered too high a halt must be called in some directions, either by eliminating in some cases railway lines and services, in some cases by deciding to reduce the use of roads to actual requirements, and in others to encourage the improvement of feeder roads to enable closer co-ordination between road and rail services where economically possible, and in keeping with public demand.

C. ECONOMIC BASIS OF TRANSPORT IN NEW ZEALAND.

(*a*) Economic Structure of New Zealand.

The following broad points appear to be fundamental in the economic structure of the Dominion, and must have a definite bearing on our transport requirements:—

(i) New Zealand is essentially a primary producing country. We depend for the bulk of our immediate necessaries and conveniences upon import from abroad, and upon the export of our products in large quantities to pay for these and to meet our overseas debt obligations. Further, we depend upon the import of capital—that is, the contracting of overseas loans—for development and public works. In so far as it is not made up by borrowing, the interest on these loans is sent abroad in the form of commodities. It is therefore desirable to encourage exports to the greatest possible extent if we are to meet interest payments and acquire further capital.

(ii) Our competitors in the market for primary products are nearer these markets. They therefore share a definite advantage, and we have to struggle to hold our own. Moreover, the prices of our primary products, which constitute nearly the whole of our exports, are fixed in the principal world markets, and we cannot control them.

(*b*) Economic Activity.

Economic activity is directed mainly towards production from the land. The following figures, which are taken from the 1930 Year-book, show an estimation of the value of production according to certain broad classes :—

Class.	£
Agricultural products	9,300,000
Pastoral products	41,000,000
Dairying, poultry, and bees	28,400,000
Mining products	3,500,000
Fishery products	500,000
Forest products	3,300,000
Factory products	22,000,000
Builders, labourers, &c.	13,100,000
	121,100,000

As indicated by the foregoing figures, no less than £78,700,000 of the total production of £121,100,000 in 1927-28 was shown as being the products of the agricultural, pastoral, and dairying industries. A broad attempt at showing the transport requirements of each class of industry is made further on.

(*c*) Population.

According to the 1926 census, the total population of the Dominion, including Maoris, was 1,408,139, the average density being 13·02 persons per square mile. The North Island accounted for 892,679, or 63 per cent., against 515,460, or 37 per cent., in the South Island. The relative densities of population are 20·21 in the North Island against 8·70 in the South Island.

The following table sets out the classification by provincial districts, together with the relative density for each province :—

Provincial District	Population.	Density.
Auckland	469,458	16·75
Hawke's Bay	70,353	15·47
Taranaki	71,848	18·26
Wellington	281,020	25·31
Marlborough	18,793	4·34
Nelson	50,878	4·66
Westland	15,260	3·10
Canterbury	215,079	15·43
Otago—		
Otago portion	149,921	10·71
Southland	65,529	5·73
Total	1,408,139	13·02

In the administration of road transport the local authorities in the Dominion constitute an important link. It is therefore advisable to consider the population distribution by local authorities. The following figures show this distribution :—

Local District.	Population.
Cities	372,177
Boroughs	418,378
Town districts not forming part of counties	37,045
Town districts forming part of counties	10,299
Counties	562,050
Other	8,190
Total	1,408,139

The population distribution has a very definite bearing on the transport requirements in this country. It is of interest to note that no less than 517,346, or 38·48 per cent., of the total population is located in the four main centres (inclusive of suburban boroughs, &c.).

Maps 6 and 7 in the Appendix show the density of population in each county as well as in the cities, boroughs, and town districts.

Owing to geographical configuration and other causes, mainly of an economic character, the biggest centres of population in New Zealand are the termini of trunk railway-lines as well as being the principal ports. The broad movement of freights reflects these factors. During the exporting season, which commences in the spring and lasts until late autumn, the main ports are the links between the streams of primary produce which flow in from the surrounding farming-areas. The movement of population between these four main centres constitutes probably one of the main features of the passenger-traffic movement in the Dominion. Consequently we find these places linked closely in passenger-transport facilities. Fast express trains connect Auckland and Wellington, a nightly ferry service connects Wellington with Christchurch, while in the South Island special fast expresses also connect Christchurch with Dunedin. As connecting-links between these main centres the railway is, by virtue of the distances and geographical conditions, supreme.

The next category of traffic in passengers appears to be between the hinterlands of the main centres and the centres themselves, while the next group takes in the movement between the secondary towns, and between these secondary centres and their hinterlands. It is in these last two groups that competition from motor transport is being felt, and with improvement in road surfaces and in types of vehicle it is in this sphere that competition will become progressively keener.

An attempt has been made in the subjoined statement to classify the population in the Dominion into certain areas, the object of the classification being to show the distribution of the population in the various districts and the volume of passenger transport that might be expected to be found :—

Distribution of Population.

Location.	Economic Areas.	Centres with over 1,000 Population.
NORTH ISLAND.		
North Auckland	Mangonui, Whangaroa, Hokianga, Bay of Islands, Whangarei, Hobson, Otamatea, and Rodney Counties. Total population, 60,850 ; even distribution, rural areas	Dargaville, Whangarei.
Surrounding Auckland City	Waitemata, Manukau, Franklin, and Eden Counties. Total population, 247,870 ; densely populated	Auckland City and surrounding boroughs.
Waikato	Hauraki Plains, Piako, Waikato, Waipa, and Matamata Counties. Total population, 68,225 ; dense rural population	Thames, Morrinsville, Matamata, Te Awamutu, Hamilton, Huntly.
Bay of Plenty coastal region	Ohinemuri, Tauranga, and Whakatane Counties. Total population, 27,810 ; sparsely populated	Waihi, Tauranga, Whakatane, Opotiki.
Gisborne	Wairoa, Cook, Waikohu, Kawa, and Waiapu Counties. Sparsely populated rural areas	Wairoa, Gisborne.
Taranaki	Dense rural areas with a relatively large number of thickly populated centres	New Plymouth, Inglewood, Stratford, Eltham, Hawera, Patea.
Hawke's Bay	Dense rural areas	Napier, Hastings.
Wellington west coastal area	This area may be said to extend from Wellington to Wanganui, and comprises a fairly evenly and densely populated rural area with a number of larger centres	Wellington City and surrounding areas, Palmerston North, Wanganui, Otaki, Levin, Shannon, Feilding, Marton.
Wellington east or central region	This area extends from Featherston in the south to approximately Waipawa, and consists of a relatively long stretch of sparsely populated rural region	Featherston, Greytown, Carterton, Masterton, Pahiatua, Woodville, Dannevirke, Waipukurau, Waipawa.
SOUTH ISLAND.		
Northern Marlborough ..	Fairly densely populated rural area with Blenheim as centre	Picton, Blenheim.
Nelson	Fairly densely populated rural area extending along the coast from Motueka to Nelson and inland	Nelson, Motueka, Richmond.
West Coast	This is a region extending along the coast from just south of Hokitika to a strip running along the coast northwards from Westport	Hokitika, Greymouth, Runanga, Westport, Reefton.
Eastern region	This region extends from just north of Rangiora to an area on the western side of Invercargill. Throughout the whole region the rural and urban population is scattered along the coast, being densest at four points around Christchurch, Timaru, Dunedin, and Invercargill. Behind each of these centres the population runs inland a considerable way. The same movement is also found at Ashburton, Waimate, and Balclutha	Rangiora, Christchurch, Ashburton, Timaru, Temuka, Waimate, Oamaru, Dunedin, Balclutha, Mataura, Gore, Invercargill.

Broadly speaking, the outstanding difference between the population distribution in the two Islands is the clustering around certain definite areas in the North Island, against one great rural area in the South Island, extending from north of Christchurch to Invercargill, more or less definitely constituting part of the same distribution of population, and converging at certain points along the coast in bigger clusters.

(*d*) INDUSTRIAL.

As pointed out previously in this report, the outstanding point in the industrial structure of New Zealand is the almost complete dependence on the farming industries. As the population grows, and as the process of urbanization continues, it is probably certain that the secondary industries will occupy a gradually increasing position from the point of view of production. The percentage of urban population has increased from 39·1 in 1900 to 51·62 in 1926. The two principal farming industries are sheep and dairy farming.

The sheep-farming covers the mutton, wool, and by-products industries, while the cattle industry covers cattle-raising and dairying.

In the case of both industries New Zealand has to compete in the world's markets with competitors who are better favoured in point of nearness to the markets. There is a constant struggle to maintain our position on these markets, which involves a very careful control of developments in the various industries.

Sheep-farming is a relatively large-scale industry in this country, and does not involve a large volume of traffic, with the result that a typical sheep-farming district can generally be adequately served with a smaller mileage of roads of relatively lower standards than a locality supporting an industry such as dairying, which demands a high mileage of roads of reasonably good standard to support the volume of traffic necessary to the welfare of this industry.

In the case of both sheep and dairying industries there is a marked seasonal tendency. In the case of the former the transportation of the wool and the animals for mutton takes place from about the middle of summer up till about the end of March. Carting wool generally requires a high standard of road, but, as it occurs in the dry months, this traffic does not cause a great deal of damage to the roads.

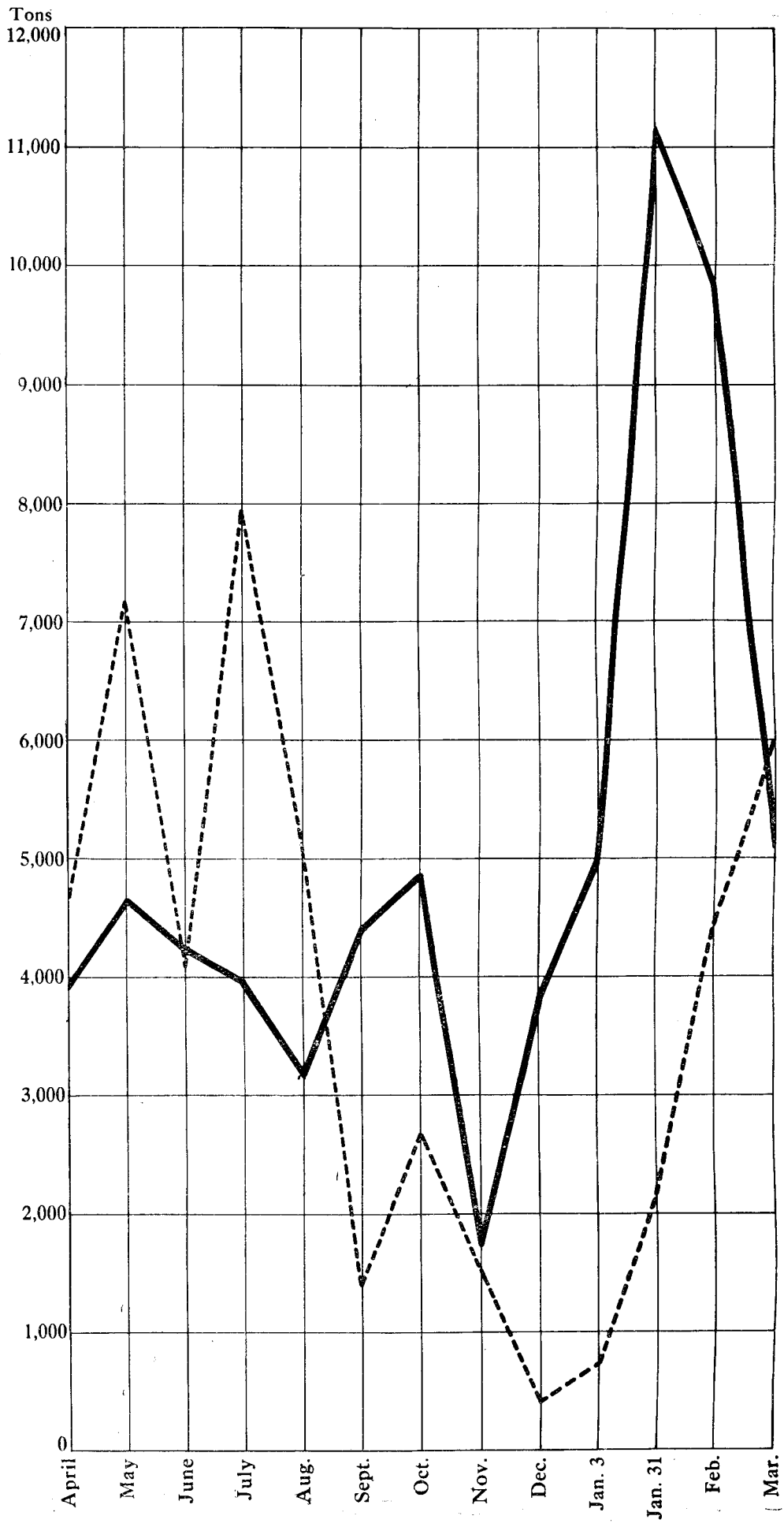
The following graphs, reproduced from the Railways Statement, 1926, show the seasonal movement in (*a*) frozen meat, and (*b*) sheep and lambs, on the New Zealand railways during the year ended 31st March, 1925 :—

SEASONAL TRAFFIC.

NORTH AND SOUTH ISLANDS, 1924-25.

(North Island—Full black; South Island—Dotted black.)

1. FROZEN MEAT.

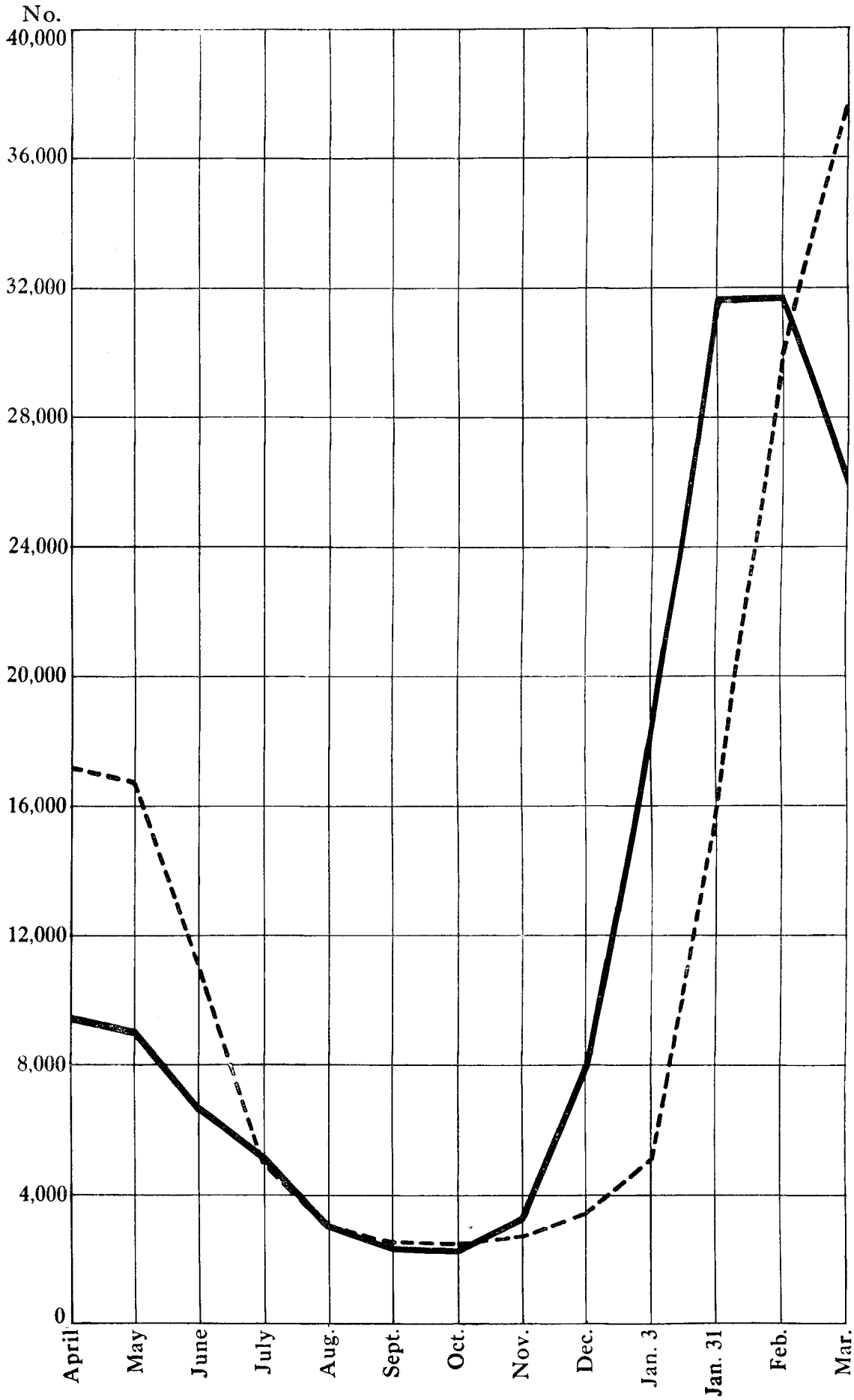


SEASONAL TRAFFIC.

NORTH AND SOUTH ISLANDS, 1924-25.

(North Island—Full black; South Island—Dotted black.)

2. SHEEP AND LAMBS.



The question of transporting sheep to the freezing-works for the purpose of being prepared for shipment overseas is a factor of great importance in this country. Particular attention has been paid to this branch of traffic in the development of the railway system, a number of branch lines handling big volumes of this traffic. The transfer of sheep and lambs to the freezing-works is again of a seasonal nature, reaching a peak in most districts at approximately the same time. The rail facilities for dealing in bulk with this traffic when it arises afford some justification for the continuation of a number of branch lines until it is clear that motor transport can deal economically with this traffic and more cheaply than the railways.

The rail-heads of these branch lines generally extend into the middle of a sheep-farming area. The animals are transported on foot or by motor-lorry to the rail-head, and thence carried to the freezing-works. After being dealt with at the freezing-works, it is necessary to transport the carcasses, under special conditions, to the ports for shipment overseas. Here again the railways, with special facilities, are in a position to deal with this traffic effectively. The average haul from the farm to the freezing-works is in the vicinity of seventy-two miles, while that from the freezing-works to the ports or to the ship is only twenty-six miles. This short haul, which requires the provision of special facilities, is the main reason why the average revenue for meat, as shown in the annual railways statistics, is amongst the relatively high-rated traffic.

The rail also acts in some localities as the connecting-link between the cattle-raising farm and the freezing-works. This traffic, in so far as it relates to the overseas side of the business, and not the supplying of meat for consumption in the main centres in New Zealand, is of a seasonal nature. It also requires special traffic facilities as well as terminal facilities for loading and unloading the stock.

The dairying industry is a relatively small-scale industry in this country. The population directly connected with the industry is, in comparison with sheep-farming, relatively high. The average dairying season in New Zealand commences approximately in September, and closes about June. The highest point of activity is reached in December or January, and on either side of this period activity is either sharply on the increase or decrease, as the case may be.

This movement is, of course, reflected in the traffic springing from this industry. The two principal products, butter and cheese, occupy a very important position in the flow of traffic during the late summer and autumn months. Special facilities are not required for the transportation of butter and cheese; and this, combined with the fact that the dairying industry is in general confined to the coastal regions, is a reason why competition from the motor will be keener as time goes on.

The graph appearing on the following page, which has been taken from the Railways Statement of 1926, shows the swing of the seasonal movement in butter and cheese in the North and South Islands.

Although these figures relate to the year 1924–25, they are quite valid for the purpose of indicating the seasonal trend. The seasonal element alters but little from year to year. Any particular season, however, may be late or early, as the case may be, but the length of the season does not undergo much change from season to season.

The flow of dairy-products from the farm to the ports for shipment overseas commences with the transport over the rural roads connecting the dairy-farms with the factories. Horse-drawn vehicles are used to a considerable extent in this connection, but the motor-vehicle is being more extensively used in this field.

In quite a number of districts where the roading-facilities are reasonably good, dairy companies have gone in for motor-trucks which collect the milk or cream from the farms, and deliver it in bulk at the factories. Particularly is this the case in respect of cream. Milk is a fairly bulky product, but cheese occupies much smaller bulk, and can be handled on a larger scale in so far as transport is concerned.

The cartage of cream by motor-lorry affords an excellent example of the impetus given to production by the utilization of the motor-vehicle. Speedy motor-trucks have brought many outlying districts within reach of a butter-factory that was quite economically inaccessible by means of horse-drawn transport. The result is that producers in these outlying districts have been able to find a market for their cream and other kindred products which under horse-drawn transport would not have been possible.

The following figures show the expenditure by dairy companies on the cartage of cream and milk in vehicles operated by the companies: year ended 31st March, 1927, £238,885; 1928, £281,149; 1929, £297,693.

It is readily seen that the movement towards transportation of milk and cream in bulk, particularly cream, has shown a considerable increase over the last few years. With improvements to the roads and to motor-vehicles, there appears to be a very extensive avenue for sound economic development of motor transport in connection with the dairying industry.

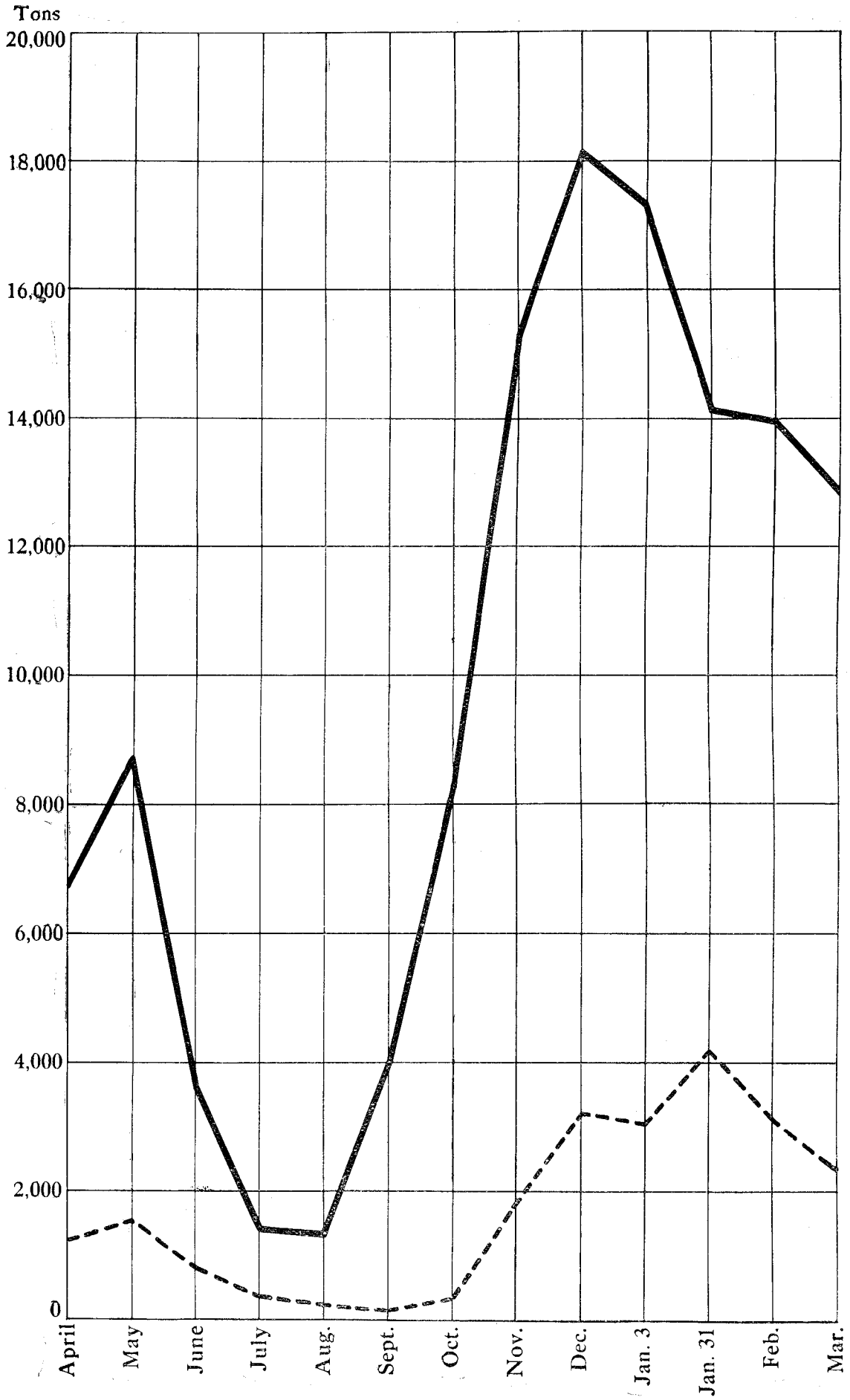
This centripetal flow of milk from the farm has its centre in the butter or cheese factory. There is a certain amount of back-loading from the factory to the farm, in respect of skimmed milk from butter-factories, and whey from cheese-factories. There is also the smaller items of actual butter and cheese.

SEASONAL TRAFFIC.

NORTH AND SOUTH ISLANDS, 1924-25.

(North Island—Full black; South Island—Dotted black.)

3. BUTTER AND CHEESE.



The conversion of milk or cream into cheese or butter results in a reduction of the bulk. In a good few instances in New Zealand butter and cheese factories are situated on the rail route, and the question of transportation from the factory to the rail is generally not a very big item. On the railways special rates are quoted for the carriage of butter and cheese. The following table shows a number of these rates, together with the mileages involved, and the rate per ton-mile in each case :—

North Island Main Line and Branches.

BUTTER AND CHEESE—LOCAL RATES.

From	To	Rate per Ton.	Miles.	Per Ton-mile.
		s. d.		d.
Okoia	Wanganui	6 2	7	10·6
Manutahi	Patea	5 6	8	8·2
Hawera	Patea	11 1	18	7·4
Normanby	Patea	12 9	21	7·3
Mangawhero Road ..	Patea	18 6	29	7·7
Eltham	Patea	14 11	30	6·0
Midhirst	Moturoa	15 5	30	6·2
Pihama	Patea	20 7	35	7·1
Toko	Moturoa	14 8	40	4·4
Te Horo	Wellington	20 0	43	5·6
Douglas	Moturoa	15 8	44	4·3
Otaki	Wellington	21 8	47	5·5
Manakau	Wellington	21 8	52	5·0
Ohau	Wellington	21 8	56	4·6
Levin	Wellington	24 6	59	5·0
Shannon	Wellington	24 6	69	4·3
Ashhurst	Wanganui	22 8	72	3·8
Tokomaru	Wellington	24 6	76	3·9
Palmerston North ..	Wellington	24 10	87	3·4
Eketahuna	Wellington	31 6	88	4·3
Bruntwood	Auckland or Southdown ..	31 6	97	3·9
Feilding	Wellington	26 8	99	3·2
Morrinsville	Auckland or Southdown ..	31 8	103	3·7
Woodville	Wellington, via Palmerston North	33 0	105	3·8
Pahiatua	Wellington or Lower Hutt	31 6	106	3·6
Tatuanui	Auckland	33 2	107	3·7
Waitoa	Auckland	33 2	109	3·7
Waihou	Auckland	33 10	113	3·6
Te Aroha	Auckland or Southdown ..	30 0	115	3·1
Dannevirke	Wellington, via Palmerston North	36 11	121	3·7
Paeroa	Auckland or Southdown ..	30 0	129	2·8
Whangarei	Auckland, Newmarket, or Southdown	28 8	131	2·6
Hikurangi	Auckland or Southdown ..	34 0	142	2·9
Tauranga	Auckland or Southdown ..	35 6	180	2·4
Te Puke	Auckland or Southdown ..	40 0	193	2·5
Taneatua	Auckland or Southdown ..	40 0	240	2·0

During the 1928–29 season the production of butter at dairy factories in New Zealand amounted to 99,411 tons, and cheese to 89,117 tons. For the year ended 31st March, 1929, which may be taken as roughly corresponding to the 1928–29 dairying season, the railways handled 101,846 tons of butter, or 2,435 tons more than the total production at the factories. The production of butter on farms would account, no doubt, for a certain amount of the difference, but it would appear that a certain quantity is probably handled twice by the railways, or else there is only a small proportion carried from the factory to the ports by motor transport. According to the figures published by the Census and Statistics Office in respect of motor transport over defined routes during the month of January, 1930, motor transport handled no less than 21,465 tons of dairy-produce during that period. These figures are fairly large, but it should be borne in mind that a certain amount of this transport is between the factories and the rail, and not necessarily between the factories and the ports.

The tonnage of butter and cheese handled by the railways during the year ended 31st March, 1929, represented 1·34 per cent. and 1·31 per cent. respectively of the total of 7,613,445 tons of freights handled altogether. The average haul in the case of butter was sixty-six miles, or twenty-three miles greater than that for cheese, which showed forty-three miles. The average revenue per ton mile for butter was 4d., against 5·04d. for cheese; while the average revenue per ton works out at £1 1s. 11d. for butter and 17s. 11d. for cheese.

Dairy by-products for the same period showed a gross tonnage of 16,989 tons, or 0·22 per cent. of the total handled on the rail; the revenue from the carriage of these commodities amounted to £16,641, or 0·34 per cent. of the total revenue. The average haul in this case was seventy-eight miles—more than double the average haul for cheese, and twelve miles above that for butter.

Having regard to the fact that the average hauls for both butter and cheese are within the operating zone of the motor-vehicle, and also to the fact that both butter and cheese are relatively high-class commodities, there is reason to believe that improvements in the roads and motor-vehicles will be followed by increasing competition in respect to the carriage of these commodities. In certain localities an increasing volume of the work of motor transport is being utilized to connect the factories with the nearest ports. Particularly is this so in Taranaki, where practically the whole of the dairying industry is between thirty and forty miles distant from the ports of New Plymouth or Patea. The same conditions, on a slightly less favourable scale, are to be found in the Manawatu, South Auckland, Wairarapa, and Hawke's Bay districts.

Allowing for handling charges of 3s. 6d. per ton at each end of a rail journey, this means a loading for a haul of thirty miles of approximately 2·8d. per ton-mile; for forty miles, 2·1d.; and for fifty miles, 1·68d.

Coal Industry.

The coal industry shows to advantage the superiority of the railways in handling commodities in bulk over long hauls. From the point of view of ton-miles, the coal business accounted for no less than 155,075,028 ton-miles during 1928–29 out of a grand total of 487,753,398 ton-miles. This represented the haulage of 1,105,509 tons of New Zealand hard coal over an average haul of thirty-one miles and 999,017 tons of New Zealand brown coal over an average distance of 121 miles.

The production of coal during the calendar year 1928 was as follows:—

Class of Coal.	Northern District (North Island).	West Coast District (South Island).	Southern District (South Island).	Totals.
	Tons.	Tons.	Tons.	Tons.
Bituminous and sub-bituminous	179,460	1,169,272	..	1,348,732
Brown	602,429	31,408	339,401	973,238
Lignite	..	159	114,624	114,783
Totals	781,889	1,200,839	454,025	2,436,753

Some idea of the part played by the railways in the distribution of coal throughout the Dominion is to be gained from the fact that, while 2,436,753 tons were produced during the calendar year 1928, approximately 2,105,000 tons, or 96 per cent., of this figure were handled by the railways during the year ended 31st March, 1929.

On the tonnage basis New Zealand coal represented for 1928–29 27·64 per cent. of the total tonnage handled on railways while the revenue from the carriage of coal constituted 17·55 per cent. of the total revenue. The average revenue per ton-mile of New Zealand brown coal, with an average haul of 121 miles, was 1·14d.; the same figure for the New Zealand hard coal, with an average haul of thirty-one miles, was 2·02d.

The average cost of New Zealand coal to gasworks in the Dominion during the year ended 31st March, 1929, was £2 1s. 11d. The retail selling-price is, of course, considerably in excess of this figure, being approximately £3 10s. per ton. The average railway revenue per ton of coal handled during 1928–29 was 5s. 2d. for New Zealand hard coal and 11s. 6d. for New Zealand brown, showing that rail transport charges, excluding a certain amount of handling, are important items of cost in the coal industry. On this account substantial alterations in the railway charges for this commodity would bring about serious repercussions in the coal industry and other industries dependent on a supply of coal.

By virtue of the length of haul and its bulky nature, the transport of coal in bulk is essentially suitable for the railways.

The retail distribution of coal is carried out principally by motor-trucks, although horse-drawn vehicles have survived to a certain extent in this field.

Timber Industry.

By the force of economic circumstances the distance between the sawmills and the timber-markets in the main centres has been widened as the more accessible stands of timber have been depleted, with the result that the question of transport has loomed larger and larger in importance to the industry.

It is estimated that the volume of standing timber in the Dominion measures 6,032·6 million cubic feet, and that it comprises 3,561·2 millions of cubic feet of merchantable or accessible timber.

During the year ended 31st March, 1929, the production of rough-sawn timber at sawmills in the Dominion amounted to 270,214,420 ft. board measure, with a wholesale value based on the selling-price at the mill of £925,392.

Over the same period the railways carried 538,252 tons of New Zealand timber, representing 242,213,400 ft. board measure, for a revenue of £495,929. The average haul was 113 miles, a relatively long haul in this country, while the ton-miles aggregated 60,980,958, or approximately 12 per cent. of the total ton-miles worked by the railways. In addition to this, 126,693 tons of firewood, posts, &c., were handled, with an average haul of seventy-nine miles, respresenting 10,002,510 ton-miles. The revenue from this business amounted to £50,936, or 1·04 per cent. of the total revenue for the railways.

The fact that there is not much difference between the timber-production and the volume handled on the railways indicates that the great bulk of timber haulage is effected as far as possible per medium of the rail. The bulky nature of rough-sawn timber and the relatively long haul make this commodity suitable for rail haulage.

The general rate for the haulage of timber on the railways for a haul of 113 miles is 4s. 8d. per 100 superficial feet. Taking this figure in conjunction with the average wholesale selling-price of O.B. rimu in the four main centres, of approximately 27s. 2d., it is readily seen that rail transport is an important factor in the timber industry in New Zealand. Further evidence of this is to be found in the fact that the revenue from the haulage of timber on the railways amounted in 1928–29 to £495,929, or just over 50 per cent. of the value of the timber at the mill—viz., £925,392.

Motor transport provides practically the sole means of transport (excluding of course, sea transport) in the distribution of timber from the railways to the consumers. Many firms in the timber industry provide their own transport facilities in the form of light or heavy lorries, according to the volume and nature of business carried on. During the month of July, 1929, motor-transport services operating over defined routes handled 6,035 tons of timber, while in January of this year 10,132 tons were hauled. On these figures these motor services would probably handle approximately 100,000 tons of timber per annum. These figures are, of course, quite exclusive of haulage effected by carriers or by firms with their own transport facilities.

Manure Industry.

The manure industry is closely related to the national prosperity of the Dominion. It represents, broadly speaking, under the present state of development in agricultural and pastoral farming, the most important economic weapon employed in meeting the tendency to diminishing returns that is ever present in a primary-producing community. Generally speaking, the more that is taken out of land, the more must be put back into it, in the form of manures and cultivation. The use of fertilizers in New Zealand has increased fairly rapidly during recent years, and promises to increase further as time goes on.

In the transport industry the manure trade is characterized by the following main points:—

(*a*) By virtue of its close relationship to the national volume of production, it has received special treatment in the way of railway freight charges.

(*b*) On account of its bulky nature and low intrinsic value in proportion to bulk, it cannot support high freight charges.

(*c*) It constitutes one of the principal items in the flow of commodities from the centres of population to the farms.

(*d*) The main movement in the fertilizers occurs in the late autumn, winter, and early spring months, when the outflow of primary products from the rural areas to the centres is at a relatively low ebb.

(*e*) By virtue of its distribution in large quantities and its low value in proportion to bulk it can be handled in the most economic way by the railways.

During the year ended 31st March, 1929, the total quantity of fertilizers produced in the Dominion (including superphosphates) was 301,622 tons; 310,797 tons were imported during the calendar year 1928, making a total of 612,419 tons for distribution throughout the rural areas of the Dominion. During the year ended 31st March, 1929, the railways handled 712,741 tons of manures, showing that apparently the whole of the fertilizer-distribution is effected as far as possible by rail.

The average haul for manures was sixty-six miles, which corresponds roughly to the average haul of primary products from the rural areas to the ports. In actual tonnage handled, the manure business constituted 9·36 per cent. of the total tonnage handled by the rail authorities, while the revenue of £326,939 received from this business amounted to 6·67 per cent. of the total revenue. The ton-miles worked aggregated 47,242,949, or approximately 10 per cent. of the grand total, while the average revenue per ton-mile was 1·66d. This latter figure compares with 4·00d. for butter, which required the same average length of haul of sixty-six miles.

Like manures, the distribution of agricultural lime is made, wherever possible, on the rail for practically the same reasons that have been outlined for manures. During 1928–29 the railways handled 142,213 tons of this commodity, for an average haul of sixty-two miles, the aggregate ton-miles amounting to 8,839,383. The revenue for this business amounted to £45,668 in the aggregate, and to 1·24d. per ton-mile, or appreciably less than the corresponding figure for manures.

Motor Industry.

The fact that too much stress is at times laid on the competitive aspect of road and rail facilities has led to a great deal of misunderstanding as to the position of both facilities in the whole transport system. There is little doubt that by its speed and mobility the motor-vehicle constitutes a very valuable aid to production, and has been a definite factor in extending the productive field in this country. By increasing the volume of production motor transport has played a part in bringing new and more business to the railways. Time has precluded a full investigation into this question, but by considering the available statistics relating to the movement of benzine, gasoline, and kerosene on the railways some light is shed on the interrelation of the two services.

The following table sets out the principal statistics relating to the haulage of benzine, gasoline, and kerosene on the railways during the years ended 31st March, 1927, 1928, and 1929:—

Year ended 31st March,	Tonnage carried.	Percentage of Gross.	Ton-miles.	Average Haul.	Revenue.			
					Total.	Percentage of Gross.	Per Ton.	Per Ton-mile.
	Tons.		Number.	Miles.	£		£ s. d.	d.
1927	61,753	0·85	5,022,954	81	118,694	2·56	1 18 5	5·67
1928	89,977	1·22	7,635,276	85	172,747	3·66	1 18 10	5·42
1929	123,937	1·63	9,030,982	73	200,239	4·09	1 12 4	5·32

Between 1927–28 and 1928–29 the tonnage of benzine, &c., handled increased from 61,753 tons to 123,937 tons, or approximately doubled, while the revenue from this business increased from £118,694 to £200,239, or by 68 per cent.

Here again are found the two main economic advantages of rail transport—viz., distribution in bulk of relatively long hauls. And here again motor transport is found in the distribution beyond the railways, where, of course, both the bulk and the length of haul are on much smaller scales.

Having outlined the principal facts concerning the relationship between the principal industries and the transport services, and indicated more or less roughly the part played by motor transport and rail services in each, it is proposed to conclude this industrial review by referring to the distribution of manufactured articles. This field constitutes the main flow of commodities outwards from the main centres to the rural areas, and represents in the main relatively high-class freights—*i.e.*, commodities the intrinsic value of which is relatively high in proportion to bulk. The average haul for this business is relatively short, and the average revenue, due to the shortness of the haul and the nature of the goods, is relatively high.

The following table sets forth the principal statistics relating to this miscellaneous group of commodities for the years ended 31st March, 1927, 1928, and 1929:—

Year ended 31st March,	Tonnage carried.	Percentage of Gross.	Ton-miles.	Average Haul.	Revenue.			
					Total.	Percentage of Gross.	Per Ton.	Per Ton-mile.
	Tons.		Number.	Miles.	£		£ s. d.	d.
1927 ..	1,684,899	23·08	61,158,246	36	1,269,806	27·38	0 15 1	4·98
1928 ..	1,520,195	20·66	62,035,702	41	1,199,940	25·43	0 15 10	4·64
1929 ..	1,450,430	19·05	66,414,678	46	1,241,859	25·35	0 17 1	4·48

Since 1926–27 the volume of miscellaneous commodities handled has shown a decline from 1,684,899 tons to 1,450,430 tons, or by 14 per cent., while the revenue has decreased from £1,269,806 to £1,241,859, or by 3 per cent. At the same time, it is rather significant that the average haul has gained from thirty-six miles to forty-six miles, indicating either that the haul of these commodities has increased, or that competition from motor transport has accounted for some of the shorter-haul freights, thus increasing the average haul for the remainder. In view of the decrease in tonnage, this would appear to be the more probable.

It is significant in view of the present financial position of the railways that they depend on this class of freights, which for reasons that will be outlined hereafter is most vulnerable to competition from road transport, for just over 25 per cent. of their total revenue.

Broadly speaking, the results of the preceding review may be briefly stated as follows:—

(*a*) By virtue of our economic structure the prosperity of New Zealand is closely allied to the existence of up-to-date and efficient transport facilities.

(*b*) In the coal and timber industries rail transport, by reason of its suitability for handling large quantities over long hauls, shows to advantage, and plays an essential part in the welfare of these industries. Similar facilities could not under existing conditions be furnished by road transport.

(*c*) In the primary industries, particularly in the carriage of live-stock and manures, rail transport does the bulk of the long haulage. Motor transport, however, connects many outlying districts with the railways or the ports, as the case may be, and in a number of instances has offered effective competition to the rail, in the haulage of commodities such as butter, cheese, meat, &c.

(*d*) Generally speaking, the road and rail facilities are utilized in the timber, coal, and manure industries as complementary units, the rail being utilized for the long haul and the road for the short haul.

(*e*) There are, however, more or less definite areas where the road and rail are in competition. These areas exist mainly around the overseas ports, their traffic comprising, *inter alia*, the haulage of high-class manufactured commodities, outwards from the main centres; this allows what is known as back-loading at competitive rates with primary or other products available.

(*f*) Although it would appear that there are more or less definite spheres for the road and rail, and that for economic reasons these spheres have been roughly observed up to the present, it is clear, with the improvements to vehicles and roads, that the debatable margin of traffic being competed for by both services is rapidly increasing as the operating field of motor transport is extended.

(*g*) The time has arrived when some regulatory authority is necessary to define, from time to time, in a general way, the field of activity for road and rail services. This would enable the question of existing and potential wasteful competition to be dealt with, and would ensure that the community would receive the best transport services available at the least cost.

(*h*) There is ample room for both road and rail facilities working in complementary manner, but it is very doubtful if this country could afford to allow motor transport to duplicate, to any appreciable extent, the rail services.

D. SURVEY OF LAND TRANSPORT FACILITIES.

(*a*) LAND TRANSPORT SERVICES IN NEW ZEALAND—GENERAL.

The first steps in the direction of a comprehensive investigation into land transport services in the Dominion were taken by a departmental Committee that was set up in 1927. The original data collected by that Committee have been amplified and brought up to date, and are dealt with hereunder.

The investigations have been hampered somewhat through lack of reliable data relating to motor-transport and road finance, but the information and statistical data that have been collected and analysed appear to be sufficient to show broadly the past development, and the existing position, sufficiently clearly to serve as a basis for meeting the positions that will arise in a future which promises even greater developments and more far-reaching economic reactions than those that are found to-day.

It is unfortunate from many points of view that the Great War coincided with the developmental stage of motor transport, and that post-war problems have diverted attention from it until recently. Meantime unprecedented developments have been recorded. Motor transport has presented itself in a new aspect, which has two outstanding points: first, it has completely outgrown the conditions that surrounded its predecessor, the horse-drawn transport; and, second, it has demonstrated that it affords effective competition in many directions to the railways, which in New Zealand, at any rate, have enjoyed, up till now, an unassailable monopoly.

The data has been treated under two main headings—viz. (*a*) Capital cost; (*b*) annual expenditure in respect of the various services—*i.e.*, railways, tramways, and road transport (horse and motor).

Capital Cost.

The term "capital cost" as used hereunder implies the expenditure involved in obtaining the permanent-way, and what, for want of a better expression, may be called the rolling-stock or working equipment or machinery for the various services, as distinct from the annual expense of keeping this equipment in operation.

The fundamental object of transport is the creation in the strict economic sense of time and place utility, which implies the creation of wealth. It has, therefore, been considered advisable to relate the transport data to the national volume of production. Owing to certain deficiencies in the data relating to both transport and production, there are certain obstacles which make it impossible to produce a high degree of accuracy in the coefficients used to express the relationship between the figures. Sufficient accuracy has, however, been obtained to warrant practical use.

The following summary shows the estimated capital cost of the rail, tramways, and road (motor and horse) services in the Dominion for the years ended 31st March, 1914, 1927, and 1929, together with the estimated value of national production during the same periods:—

——	A. Capital Cost (Land Transport).		B. National Production.		C. Capital Cost, A, expressed as a Percentage of National Production, B.
	Amount.	Index (1914=100).	Amount.	Index (1914=100).	
	£		£		Per Cent.
1914	75,261,000	100	60,000,000	100	125
1927	143,203,000	190	114,000,000	190	126
1929	171,452,000	228	121,000,000	202	148

The outstanding point in these figures is that between 1914 and 1927 the capital cost of transport and national production showed the same relative increase, but that the former outstripped the latter in 1929, the relative increase being 128 against 102 per cent. These comparisons suggest two possibilities—either that between 1927 and 1929 transport services were overdeveloped, or production was not maintained. There is evidence that 1927–28 was a good year for production, but there is also unmistakable evidence that 1928-29 was a period of expansion in both rail and motor transport facilities.

The main point is that whereas the capital cost of transport facilities increased between 1914 and 1927 at approximately £5,000,000 per year, the increase between 1927 and 1929 was at the rate of £14,000,000 per year. It is true that the last few years have been accompanied by considerable expansion in both road and rail facilities, but the point to be noted here is the relatively abnormal increase since 1927.

The following summary shows a classification of the capital cost of the rail, tramways, and road (motor and horse) services in the Dominion during the years ended 31st March, 1914, 1927, and 1929, together with percentages indicating the relative positions occupied by each form of transport over the period concerned:—

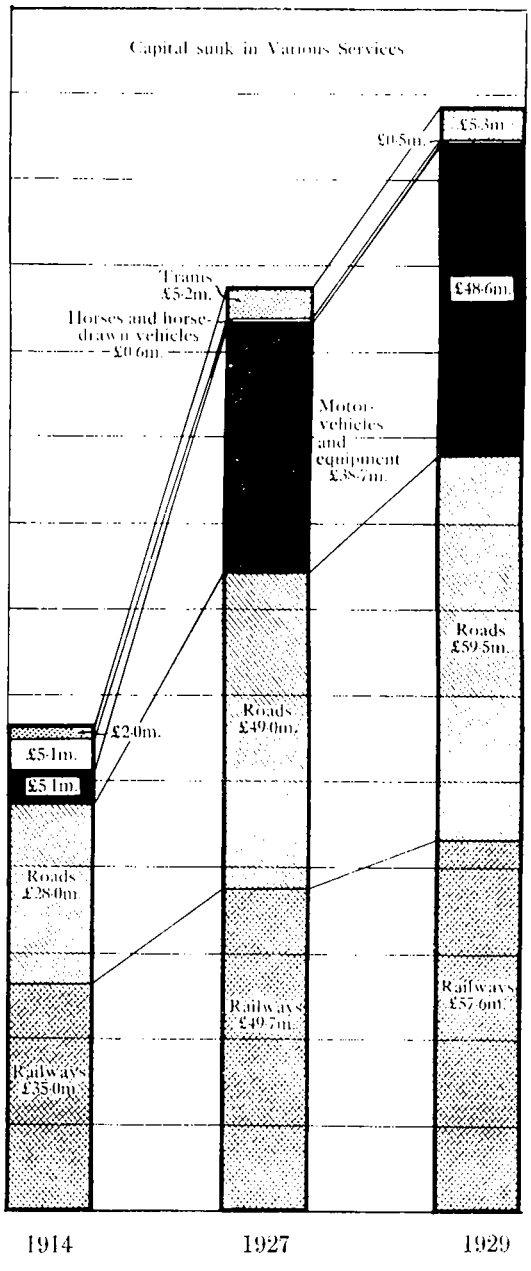
——	1914.	1927.	1929.
	CAPITAL COST.		
	£	£	£
(*a*) Railways	34,980,576	49,740,793	57,607,337
(*b*) Tramways	2,047,424	5,177,026	5,250,379
(*c*) Roads	28,000,000	49,000,000	59,500,000
(*d*) Motor-vehicles and equipment ..	5,138,500	38,709,068	48,629,300
(*e*) Horses and horse-drawn vehicles ..	5,095,000	575,860	465,200
(*f*) Totals (road transport)—(*c*), (*d*), (*e*)	38,233,500	88,284,928	108,594,500
Grand totals	75,261,500	143,202,747	171,452,216

	1914.	1927.	1929.
	PERCENTAGES—EACH FIGURE OF TOTAL.		
(*a*) Railways	46·48	34·73	33·60
(*b*) Tramways	2·72	3·62	3·06
(*c*) Roads	37·20	34·22	34·70
(*d*) Motor-vehicles and equipment ..	6·83	27·03	28·36
(*e*) Horses and horse-drawn vehicles ..	6·77	0·40	0·28
(*f*) Totals (road transport)—(*c*), (*d*), (*e*)	50·80	61·65	63·34
Grand totals	100·00	100·00	100·00

The following graph has been plotted from the figures in the upper half of the foregoing table:—

TRANSPORT DEVELOPMENT IN NEW ZEALAND.

DEVELOPMENT OF LAND TRANSPORT—CAPITAL COST.



In the broadest sense the economic application of the theory of indirect returns may be roughly measured by the capital value of the land. This value has been described as representing the fair selling-value, which in turn is based upon the market price of the products produced from the land.

When the world-price level is rising, as it was during the generation preceding the Great War, the theory of indirect returns had a wide application. More particularly was this the case if, as in New Zealand, national development was in a highly dynamic state.

The capital and unimproved value of land and improvements in New Zealand in 1913, 1927, and 1929 is given hereunder :—

Year.	Capital Value.	Indexes (1913 = 100).	Unimproved Value.	Indexes (1913 = 100).
	£		£	
1913	340,559,728	100	212,963,468	100
1927	618,264,093	182	341,519,107	160
1929	655,906,887	193	344,757,796	162

Although between 1913 and 1927 the capital value of land showed an increase of 82 per cent., which was not very far behind the increase of 90 per cent. in the capital cost of the transport facilities, there is a considerable lag between 1927 and 1929. Over this period land-values increased by approximately 6 per cent., while the capital cost of transport advanced by somewhere in the vicinity of 20 per cent.

Comparisons based on the unimproved values, which would reflect more closely the accretions in value due to improved transport facilities, show an even greater lag over the whole period than that disclosed by the capital cost of these facilities.

Broadly speaking, the law of diminishing returns applies to the transport developments in any state. As developments proceed, the theory of indirect returns becomes less and less applicable, until a point is reached when, taking into account the existing state of affairs, further development may actually result in burdening the productive machine. It is impossible to say whether this point has been reached in New Zealand, but it would appear that we have some distance to go before we do reach it. Nevertheless, the rapid development that has been proceeding in the provision of road and rail facilities during recent years, at a time when immigration has been on a fairly low scale, and when, owing to the falling tendency in world prices, the impetus in transport development has not been accompanied by a concomitant increase in the value of production, raises the question as to whether the developments will not be overdone. To the extent that developments proceed too far in excess of actual and reasonable future requirements, the national productive machinery will be impaired. Economic history affords a number of examples of the evils attending overdevelopment or unscientific development of transport facilities.

It is considered that the time has arrived when road and rail facilities cannot, in the national interests, be developed entirely on the theory of indirect returns, particularly in view of the fact that there is, and will be, increasing competition between road and rail. New developments should only be proceeded with after the most searching investigation into the economic aspects relating to existing services and the transport requirements of the existing standards of industrial and social development.

On the basis of estimated capital cost the relative position of road and rail facilities have undergone big changes since 1914. The preceding graph shows the growth of road transport, and its place amongst all land-transport services, in a very striking manner. Between 1914 and 1929 the relative position of the railways shrank from 47 per cent. to 34 per cent., while road transport gained as a result of the expansion in motor transport from 51 per cent. to 63 per cent.

Assuming that the rail routes were well chosen in the first place, it would appear that the development referred to in the preceding paragraph is to be expected—*i.e.*, that the railway capital cost will remain relatively stationary, while that of the services complementary to the rail will expand as population and trade increases. The figures, however approximate they may be, should serve to dispel much of the loose thinking that exists to-day in connection with the transport situation, particularly that type of thought which regards the road and rail as entirely competitive services. It is true that there is competition between road and rail, but this competitive area is only a relatively small part of the whole transport field, wherein the services are, in the main, complementary. Moreover, the figures demonstrate that in estimated capital equipment road transport (*i.e.*, value of roads, motor-vehicles, and horses, and horse-drawn vehicles using the roads) now totals approximately £108,000,000 against £58,000,000 for railways.

Expressed in relation to the population, the capital cost of transport services in use in 1914 represented £66 per head, in 1927 £100, and in 1929 £117.

Annual Costs.

Full details showing the method of calculating both the capital cost and annual costs of the land transport services in New Zealand are shown in Table 26 of the Appendix to this report.

The following figures show the relationship between the annual cost of land transport services, the annual volume of production, and the population :—

Year.	Annual Cost of Land Transport Services.		National Production.		Population.	
	Amount.	Index (1914 = 100).	Value.	Index (1914 = 100).	Number.	Index (1914 = 100).
	£		£			
1914 ..	17,756,973	100	60,000,000	100	1,140,172	100
1927 ..	40,528,808	228	114,000,000	190	1,438,814	126
1929 ..	43,825,862	247	121,000,000	202	1,472,925	129

The capital cost of transport services, owing to the developmental factor, would probably be in excess of actual requirements from time to time, in accordance with the transport policy of the day. The annual cost, however, except for the reflection of the developmental factor in the way of extra interest and sinking-fund charges, should afford a better indication of the actual position of transport development at any given time.

Broadly speaking, the cost of transport services is reflected in the national volume of production, since the value of commodities or services at any given point includes transport costs up to that point. It would be possible in a country wisely provided with transport facilities, and with no great changes in the transport facilities, to show a greater relative increase in production than in the capital sunk in these facilities.

The revolution in land transport following the introduction of motor traction has raised transport to a new level in modern life. Far-reaching changes in the social and economic structure have been recorded in quick succession. Both town and country dwellers have had their horizons extended, while the pulse of industry and commerce has been quickened to a remarkable degree.

The following figures show the estimated annual cost of land transport corrected for changes in the value of money, and expressed in terms of the pound sterling in 1928 :—

Year.	Annual Cost of Land Transport Services.		Per Head of Population.
	Uncorrected.	Corrected for Price Changes.	
	£	£	£
1914	17,756,973	26,172,205	23
1927	40,528,808	38,902,990	27
1929	43,825,862	43,825,862	29

The above figures when reduced to a population basis show that the annual amount paid for transport services has risen from £23 per head in 1914 to £29 per head in 1929, or by 26 per cent., and from £27 to £29 between 1927 and 1929.

Since the cost of all services, whether transport or otherwise, must come from the annual yield of production, it is of interest to note that whereas £29·59 out of every £100 of production in 1914 went towards defraying the annual transport bill, these services had risen to £36·22 for every £100 produced in 1928–29.

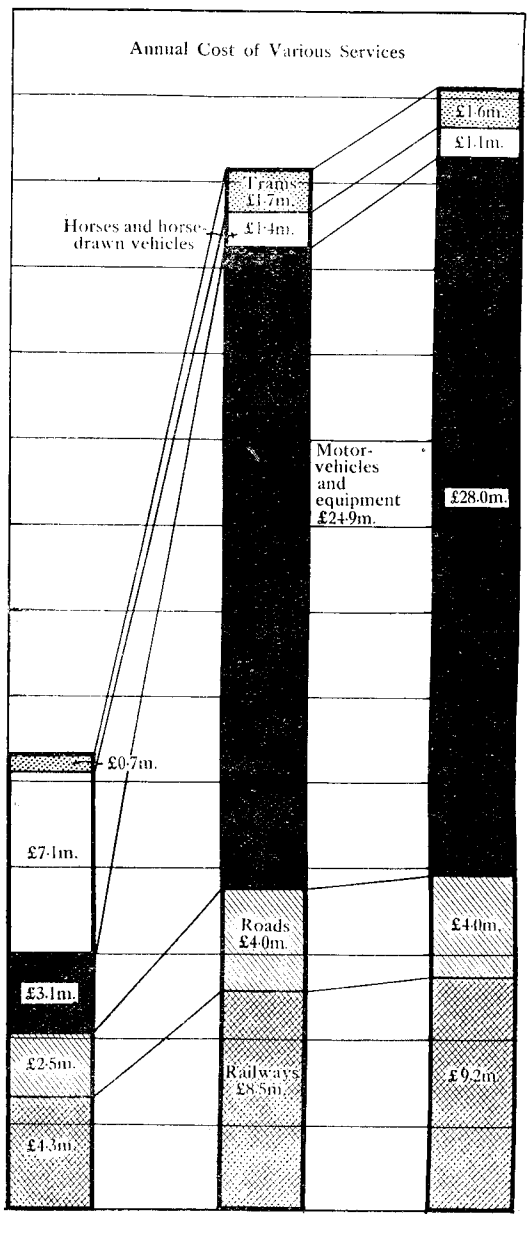
The following table shows the estimated cost of each of the land transport services in New Zealand during the years ended 31st March, 1914, 1927, and 1929 :—

Service.	1914.	1927.	1929.
ANNUAL COST.			
	£	£	£
(*a*) Railways	4,317,382	8,534,313	9,180,718
(*b*) Tramways	705,800	1,710,700	1,577,361
(*c*) Roads	2,490,047	4,005,896	3,979,705
(*d*) Motor-vehicles	3,110,284	24,882,275	27,960,633
(*e*) Horses and horse-drawn vehicles ..	7,133,460	1,395,624	1,127,445
Totals, road transport—(*c*), (*d*), (*e*) ..	12,733,791	30,283,795	33,067,783
Grand totals	17,756,973	40,528,808	43,825,862
PERCENTAGES—EACH FIGURE OF TOTAL.			
	Per Cent.	Per Cent.	Per Cent.
(*a*) Railways	24·32	21·06	20·95
(*b*) Tramways	3·97	4·22	3·60
(*c*) Roads	14·02	9·89	9·08
(*d*) Motor-vehicles	17·52	61·39	63·80
(*e*) Horses and horse-drawn vehicles ..	40·17	3·44	2·57
Totals, road transport—(*c*), (*d*), (*e*) ..	71·71	74·72	75·45
Grand totals	100·00	100·00	100·00

The following graph has been plotted from the figures in the upper half of this table :—

TRANSPORT DEVELOPMENT IN NEW ZEALAND.

DEVELOPMENT OF LAND TRANSPORT—ANNUAL COST.



The most outstanding feature in the foregoing figures is the huge increase in the amount paid annually in connection with the operation of motor-vehicles. From a modest £3,000,000 (or less than half of the figure for horse traffic) in 1914, this figure has grown to £28,000,000 in 1929. In 1914 the annual operating bill of motor-vehicles was approximately 75 per cent. of that for railways, while the figure for 1928-29 approximately trebled that for the railways, without taking into account the annual road-maintenance figure of £4,000,000.

Stated broadly, New Zealand now pays approximately £32,000,000 per annum as the cost of road motor transport, against just under £9,000,000 for rail transport.

The following statements summarize the conclusions emerging from the foregoing :—

(1) Extensive developments in road and rail facilities have taken place during recent years.
(2) These developments appear on the whole to have been launched without the principle of co-ordination between road and rail having been taken into account.
(3) In view of the rapid developments in the motor-vehicle, that have extended its field of activity in respect of both traffic and distance, there is and will be increasing competition between road and rail.
(4) Taken in its entirety in respect of both capital investment and annual costs of operation, road transport facilities now exceed the rail facilities.

From the foregoing, it is clear that the following are urgently desired if the present unsatisfactory situation is to be met :—

(*a*) A co-ordinated policy of rail and road-construction :
(*b*) Machinery to ensure, particularly in respect of road-development, that traffic requirements are the basis of future development.

(*b*) DEVELOPMENT OF MOTOR TRANSPORT IN NEW ZEALAND.

Prior to the passing of the Motor-vehicles Act, 1924, the local authorities dealt with the registration of motor-vehicles. Under that Act, however, provision was made for the Post and Telegraph Department to take over this work. Since then a central register has been kept showing the vehicles classified under the following headings: Cars, Trucks, Omnibuses, Trailers, Tractors, Motor-cycles, and Others.

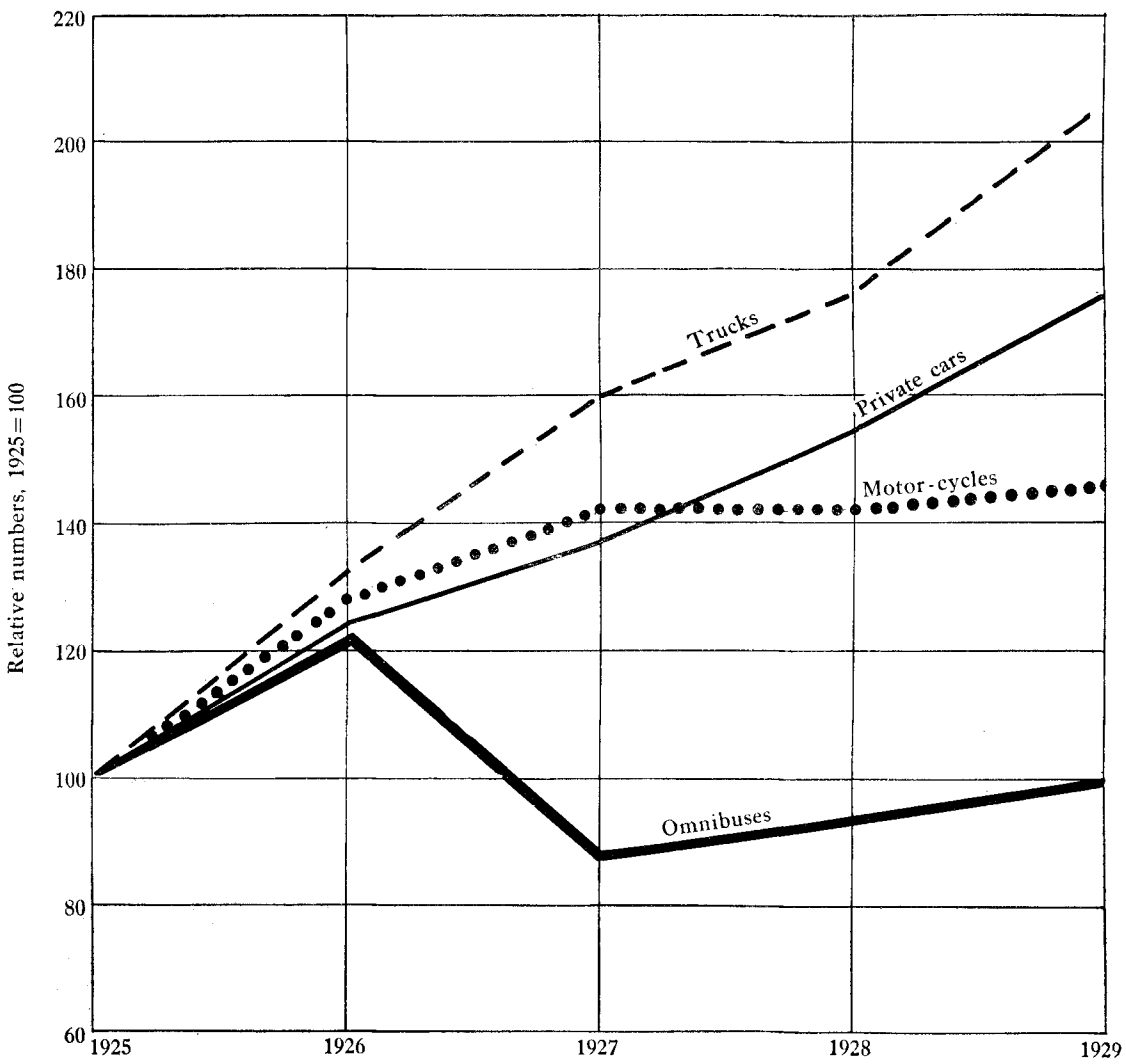
By 1924 motor transport was extensively utilized in the Dominion, but it would appear that the greatest development up to that time had taken place in the private motor-car. When the central register first came into existence it showed the following figures:—

Kind of Vehicle.	Number.
Cars	71,403
Trucks	11,330
Omnibuses	1,032
Trailers	358
Tractors	129
Motor-cycles	21,585
Others	298
Total	106,135

Since 1924, development has been rapid, notwithstanding an economic depression in 1927–28. The most outstanding development appears to have taken place in respect of trucks. This class of vehicle slightly doubled in numbers, while cars gained by 76 per cent., and motor-cycles by 47 per cent. Between 1925 and 1926 omnibuses showed an increase on a par with the private car, but when the Motor-omnibus Act, 1926, came into operation the number of buses declined from 1,590 to 1,143 in 1927. Since that time omnibuses have gained steadily, but the number on the register in December, 1929, was slightly below that in June, 1925.

The following graph shows curves plotted from the relative numbers of vehicles equating the absolute numbers in each to the figures for 1925:—

GRAPH SHOWING RELATIVE GROWTH IN MOTOR-VEHICLES IN NEW ZEALAND, 1925–29.
(Number of each kind of vehicle in 1925 = 100.)



Broadly speaking, motor transport falls into three distinct groups—viz., the private motor-cars, the public passenger-carrying vehicle, and the goods-vehicle. The development of each group and the major economic and social effects thereof are dealt with hereunder:—

MOTOR-CARS.

For the following reasons New Zealand has proved an exceptionally good market for motor-cars, and consequently development has been rapid:—

(*a*) The existence of a relatively high standard of living.
(*b*) The distribution of the population into relatively small towns and rural areas:
(*c*) The existence of a relatively large foreign trade, which has brought us into contact with Great Britain and America, two of the most highly "motorized" countries in the world:
(*d*) The existence of a relatively long road-mileage, and the presence in most districts of good and cheap roading materials.

The following figures show the number of motor-cars on the register at 31st December during each of the past five years:—

	Number of Cars.	Relative Numbers (1925 = 100).
1925	81,662	100
1926	101,462	124
1927	111,641	137
1928	125,656	154
1929	143,814	176

Expressed in relation to the population, the ratio of population per car has decreased from 17 in 1925 to 10 in 1929.

The following figures represent the population per private motor-car from 31st December, 1925, to 31st December, 1929: 1925, 17; 1926, 14; 1927, 13; 1928, 12; 1929, 10.

Geographical Distribution.

Table 2 in the Appendix to this report shows the number of motor-cars on the register at 31st December for each of the last five years, classified according to highway districts.

The number of persons per motor-car in each highway district on the 31st December, 1929, is given below in reverse order of magnitude, together with the population and the number of motor-cars:—

Highway District.	No. of District.	Population (including Maoris).	Motor-cars.	Persons per Car.
Wellington East	10	34,105	4,823	7·1
Canterbury North	13	10,065	1,292	7·8
Canterbury South	15	79,090	10,003	7·9
Hawke's Bay	5	75,250	9,083	8·3
Taranaki	7	64,430	7,489	8·5
Southland	18	66,600	7,421	9·0
Gisborne	4	32,515	3,359	9·7
Wanganui	8	60,710	6,144	9·9
Nelson	11	42,775	4,085	10·5
Canterbury Central	14	158,465	14,293	11·1
Auckland South	2	301,680	24,874	12·0
Wellington West	9	200,990	16,512	12·2
Tauranga	3	36,450	2,834	12·9
Otago Central	16	22,535	1,709	13·2
Otago South	17	110,675	7,726	14·3
King-country	6	27,720	1,605	17·0
Auckland North	1	100,415	5,637	17·8
West Coast	12	36,470	1,667	21·9
Totals	..	1,460,940	130,556	11·2

Roads.

The number of motor-cars at 31st December, the mileage of formed roads at 31st March each year, and the number of cars per mile of road are given hereunder:—

Year.	Motor-cars (31st December).	Miles of Formed Roads.	Number of Cars per Mile of Road.
1925	81,662	46,148	1·8
1926	101,462	46,777	2·2
1927	111,641	47,352	2·4
1928	125,656	47,660	2·7
1929	143,814	48,321	2·9

Effects of Development of Private Car.

(*a*) *Social.*—In the words of an economist, the motor-vehicle has "abbreviated space by annihilating time." The principal social effects of the development of the private car are as follow:—

(1) It has inculcated the "travel" habit, and by so doing has broadened the horizon of the public.

(2) It has brought the country into closer touch with the town.

(3) It has accentuated the urbanization of the population.

(4) It has assisted in solving the housing problem in the more thickly populated centres.

(*b*) *Economic.*—(1) Horse-drawn vehicles as a means of passenger transport have been replaced by motor-cars.

(2) The direction of the consuming-power of the community has undergone an extensive change.

(3) The unsuitability of the roads that served horse traffic for motor traffic has been emphasized, and the provision of roads has now been raised as one of the foremost problems of the day.

(4) The community has had to face a heavy loss of life, due to motor accidents.

(5) The private car has offered effective competition to the tramways and railways, and complicated railway finance.

(6) It has called forth special authorities to control motor traffic in the interests of the public.

TRUCKS.

As indicated previously, the most rapid development during the last five years has taken place in connection with motor-trucks. Since 31st December, 1925, the number of trucks on the register has increased from 13,673 to 28,189, or by 106 per cent. Table 2 sets forth a classification of the trucks on the register at 31st December for each of the last five years.

Capacity.

Assuming annual mileages as follows for the various classes of trucks—

Class of Truck (Pay-load).	Assumed Annual Mileage.
1 ton and under	10,000
Over 1 ton and under 2 tons	9,000
„ 2 „ 3 „	8,300
„ 3 „ 4 „	7,100
„ 4 „ 5 „	6,300
„ 5 „ 6 „	6,300
6 tons and over	6,300

and assuming, further, that each vehicle would run to half capacity for the year, it is possible to arrive at the effective ton-mile capacity of motor-trucks. The figures arrived at in this way are given hereunder:—

31st December.	Ton-miles.
1925	48,355,000
1926	122,817,000
1927	146,576,300
1928	164,235,350
1929	195,983,750

For the purposes of this analysis motor-trucks may be grouped as follows:—

(*a*) Light delivery vans employed in distribution in the more densely populated areas—*e.g.*, bakers' vans, laundry vans, &c.:

(*b*) Heavier types of vehicles engaged in collecting materials for and distributing products of factories—*e.g.*, dairy factories, brickworks, sawmills, woollen-mills, &c.:

(*c*) Both heavy and light types of vehicles employed by local carriers and Customs agents:

(*d*) Vehicles with minimum pay-loads of between 2 and 3 tons which are operated on regular services over definite routes some of which extend for over 100 miles.

Operating Zones.

Broadly speaking, the truck development has so far in New Zealand been confined principally to the densely populated areas. Here the truck has replaced the horse-drawn vehicle, except in those classes of work where horse-drawn vehicles still have many advantages. As far as the vehicles comprising classes (*a*), (*b*), and (*c*) are concerned, it would appear that in so far as their activities are confined to handling goods within the centres of population they are complementary to and not competitive with the railway. By virtue of their flexibility, however, the operations of these vehicles have been extended into the surrounding districts. As the roads improve and the desire for the amenities of motor transport increases, this development, under existing conditions, is bound to continue. According to information received from companies that operate motor-vehicles on defined routes, there is very keen competition for the higher classes of freights from what may be termed unorganized operators—*i.e.*, operators who own, say, one vehicle, and transport goods on fairly long routes as opportunity offers. The expenses of the return journey are generally included in the charges made for the outward freight, so that they are in a position on the return journey to under-quote the rates of organized services, as well as the railways, for any class of goods that may be offering.

Broadly speaking, the operating zones of motor-vehicles are in the first instance determined by their physical characteristics, and may be divided into three main groups:—

(*a*) The zone of unorganized transport: This is the zone which surrounds the home town of the operator. Its radius is determined by the mileage that can be covered in one day, allowing for loading and unloading and the return journey in sufficient time to enable the operator to be fit for

work next day. Taking the day of eight hours and allowing two hours for loading and unloading, there are approximately six hours' travelling-time, so that a distance of approximately 120 miles both ways, or a journey of sixty miles one way, could be fairly comfortably covered.

(*b*) The second or middle zone of road competition implies a certain amount of organization, since for competition for this zone to be effective it is necessary that there should be some system of securing return loads for the lorries. The effective radius of this zone is a distance which it is possible for a lorry to run loaded for one day and unload at the journey's end. A night is then spent away from home, and on the following day a return load is found either to the home town or to some town in the immediate neighbourhood of the home town if no more suitable load is actually available. This radius consists roughly of places sixty to a hundred miles from the larger centres, although it may be possible for the unorganized zone to touch places outside the sixty-mile radius. Geographical configuration and the economic structure beyond the main centres are largely the determining factors of this zone.

(*c*) The third or outer zone requires a very high degree of organization. The vehicles in this category run to a definite time-table, and it is necessary to have depots for collecting goods and satisfactory arrangements at the terminals for distributing them. This outer zone has not for various reasons been built up as yet to any great extent in New Zealand, but as evidence of the possibilities in this direction it is rather interesting to note that according to returns collected last January there were thirty-seven freight vehicles engaged on definite routes of over 100 miles in length.

Public Passenger-vehicles.

(*a*) *Omnibuses.*

The number of omnibuses on the register at 31st December during each of the last five years is given hereunder:—

	Number of Omnibuses.
31st December, 1925	1,285
,, 1926	1,590
,, 1927	1,143
,, 1928	1,190
,, 1929	1,271

The sharp decrease in the number in 1927 is due to the coming into operation of the Motor-omnibus Traffic Act, 1926, which, *inter alia*, put an end to the unlicensed competition between trams and buses. This resulted in a considerable number of passenger vehicles going off the road either to the scrap-heap or other routes, or being fitted with bodies for use in the carriage of commodities.

As a means of transport connecting the suburbs and outlying areas with the main centres, omnibuses have proved serious competitors to the railway in the realm of suburban passenger traffic. Their mobility has enabled them to comb very effectively residential areas, while their flexibility has enabled a very comprehensive time-table to be offered to their patrons.

(*b*) "*Service*" *Cars (long-distance Passenger Service).*

The type of vehicle used in this class of work is in physical characteristics midway between the private car and the omnibus. As a general rule, it is specially constructed for this class of work.

Statistics are available from the Census and Statistics Office covering the operations of 597 service cars in operation during the month of January last. These services tap a large number of areas not touched by the rail, and in this manner have acted as very useful complements to the railways. As competitors with the rail the main strength of these services lies in greater flexibility of service, rather than in lower fares. Following experience in Britain and the United States of America, it would appear that with improvements in roads and in vehicle design, as well as in organization of services, these services will become more serious competitors in actual fares in due course.

Motor Transport Services running to Time-table on Defined Routes.

In its earlier forms motor transport, in both the passenger and goods field, was conducted principally on an unorganized basis. The growth of organization, as measured by the number of services running according to time-table on defined routes, has been fairly rapid. The following table shows the principal statistics relating to regular public services on defined routes during the month of January, 1930:—

Motor Transport Statistics, January, 1930.

—		Omnibus Services.	Passenger-car Services.	Freight Services.	Combined Passenger and Freight Services.	Total.
NORTH ISLAND.						
Number of vehicles	No.	502	393	809	77	1,781
Approximate value	£	359,959	139,544	305,655	22,173	827,331
Persons employed—						
Males	No.	825	436	978	84	2,323
Females	No.	22	44	59	2	127
Total mileage run	Miles	982,973	987,038	781,533	87,287	2,838,831
Passengers carried	No.	2,010,281	82,202	..	2,474	2,094,957
Freight carried	Tons	..	..	69,857	1,597	71,454
Total receipts	£	55,779	34,041	54,103	3,155	147,078

—		Omnibus Services.	Passenger-car Services.	Freight Services.	Combined Passenger and Freight Services.	Total.
		SOUTH ISLAND.				
Number of vehicles	No.	173	204	249	45	671
Approximate value	£	126,829	78,478	103,175	10,945	319,427
Persons employed—						
Males	No.	187	246	297	46	776
Females	No.	5	33	17	..	55
Total mileage run	Miles	257,084	393,089	201,446	50,833	902,452
Passengers carried	No.	269,432	25,798	..	969	296,199
Freight carried	Tons	..	..	19,854	614	20,468
Total receipts	£	13,781	18,803	13,289	1,461	47,334
		DOMINION.				
Number of vehicles	No.	675	597	1,058	122	2,452
Approximate value	£	486,788	218,022	408,830	33,118	1,146,758
Persons employed—						
Males	No.	1,012	682	1,275	130	3,099
Females	No.	27	77	76	2	182
Total mileage run	Miles	1,240,057	1,380,127	982,979	138,120	3,741,283
Passengers carried	No.	2,279,713	108,000	..	3,443	2,391,156
Freight carried	Tons	..	..	89,711	2,211	91,922
Total receipts	£	69,560	52,844	67,392	4,616	194,412

N.B.—The above table does not include vehicles engaged in the private business of owners, local carriers, and taxi-services.

Number and Value of Vehicles.

For the whole Dominion an increase of 273 vehicles was recorded by comparison with July, 1929. The North Island had 75 per cent. of the omnibuses, 65 per cent. of the passenger-service cars, 77 per cent. of the freight vehicles, and 63 per cent. of the combined passenger and freight vehicles.

Persons employed.

The total number of persons engaged in connection with the services enumerated (inclusive of proprietors actively engaged) was 3,281, comprising 3,099 males and 182 females, compared with 2,740 males and 160 females in July, 1929, the increase being proportionate to the increase in the number of vehicles in commission during January.

Employees per vehicle for the various classes of service were as follows: Omnibuses, 1·5; passenger-service cars, 1·3; freight vehicles, 1·3; and combined passenger and freight vehicles, 1·1.

Mileage.

Of the total mileage of almost three and three-quarter millions, over two and three-quarter millions were covered in the North Island. The average distance covered by each class of vehicle during the month was: Omnibuses, 1,837 miles; passenger-service cars, 2,312 miles; freight vehicles, 929 miles; and combined passenger and freight vehicles, 1,132 miles.

The average trip (out and home) was: Omnibuses, 14·2 miles; passenger service cars, 81·1 miles; freight vehicles, 32·3 miles; and combined passenger and freight vehicles, 45·1 miles.

Passengers and Freight carried.

Omnibuses carried 2,279,713 passengers for £69,560 (an average fare of 7d.); passenger-service cars, 108,000 passengers for £52,844 (average, 9s. 9d.); and freight vehicles, 89,711 tons for £67,392 (average, 15s. per ton). Gross receipts per mile were 13·4d., 9·1d., and 16·4d. respectively. The considerably increased receipts per mile in the case of passenger-service cars was due to increased traffic on routes on which the fare per mile is comparatively high.

The following table shows the quantities of the principal classes of freight carried for the North and South Islands separately, and for the Dominion:—

Classes of Freight carried.

—	North Island.	South Island.	Dominion.
	Tons.	Tons.	Tons.
Wool	3,290	1,776	5,066
Dairy-produce	20,449	1,016	21,465
Hides, skins, and tallow	539	134	673
Live-stock	2,104	719	2,823
Grain	891	320	1,211
Fruit	540	311	851
Flax (*Phormium tenax*) fibre or tow	271	73	344
Manures	2,563	646	3,209
Timber	2,862	7,270	10,132
Lime and cement	2,121	429	2,550
Coal	2,216	2,721	4,937
Metal, stone, gravel, &c.	17,987	908	18,895
Fuel oils—benzine, kerosene, &c.	1,667	530	2,197
Furniture-removals	526	158	684
General merchandise	10,817	2,695	13,512
Other	2,611	762	3,373
Totals	71,454	20,468	91,922

Length of Routes covered by Motor Transport.

Passenger Services.

(*a*) *North Island.*—Of 776 vehicles engaged over definite routes in the North Island during January, 1930, 402, or 51·8 per cent., were engaged on routes under 15 miles in length between one terminal point and another. These vehicles accounted for 873,935, or 44·36 per cent., of the total vehicle-miles, and carried 1,939,769, or 92·7 per cent., of the total passengers carried. The aggregate receipts from this business, however, accounted for £45,778, or 50·96 per cent. of the total receipts.

The largest among the remaining groups were the 50- to 75-miles group, with 63 vehicles, and the 100- to 200-miles group, with 70 vehicles.

The average mileage per vehicle for the month covered increases as the journey lengthens, the figures showing approximately 2,000 for the under-10-mile group; 3,700 for the 100 to 200; and 7,900 for the 200 miles and over.

The average receipts per vehicle-mile for all journeys works out at 11d. per vehicle-mile. Broadly speaking, the receipts must, in the long-run, cover operating-costs and profit, so that it is reasonable to assume that the operating-costs would be slightly lower than 11d. per vehicle-mile.

It is unnecessary to point out that the flatness of the route, the surface of the road, and a number of other considerations affect the operating costs.

(*b*) *South Island.*—The distribution of services according to routes is very different in the South Island from that in the North. There is not the same clustering about the shorter routes, and a much more even spread over all routes.

Of a total of 308 vehicles engaged in passenger services, 96, or 31·17 per cent., were engaged on routes of under 15 miles. These vehicles accounted for 120,673, or 18·56 per cent., of the total vehicle-mileage, and 244,110, or 82·68 per cent., of the total passengers carried. The receipts from this business, however, account for only £7,013, or 21·53 per cent., of the total receipts.

The largest of the remaining groups was the 50 to 75 miles with 36 vehicles employed; and the 100 to 200 miles, with 42 vehicles, representing 11·69 per cent. and 13·64 per cent. respectively of the total vehicles for the South Island.

The figures over all vehicles for the South Island show an average mileage per vehicle of 2,110 miles; receipts per vehicle, £106; receipts per passenger, 2s. 2d.; and receipts per vehicle-mile, 1s.

Freight Services.

(*a*) *North Island.*—In January, 1930, there were 757 vehicles engaged in the freight business over defined routes. Of these vehicles, 290, or 38·31 per cent., were engaged on routes under 15 miles in length, in respect of which 198,196 vehicle-miles were recorded, and 38,894 tons of freight were carried. Routes from 15 to 40 miles accounted for 335, or 44·26 per cent., of the total vehicles, and carried 23,409, or 33·51 per cent. of the total freight carried.

The average mileage per month per vehicle showed approximately 800 for the 10- to 20-mile routes, and from 1,750 to 2,600 for the 50- to 200-mile groups. The average receipts per ton of freight range from 4s. 6d. per ton on routes up to 5 miles in length, to £2 9s. 4d. per ton on routes between 100 and 200 miles.

The average per vehicle-mile over all vehicles was 1s. 5d.; this figure for the various classes of routes covered shows a declining tendency as the route lengthens, from about 1s. 9d. to 1s. 1d. for the longest and shortest routes respectively.

The average carrying-capacity per vehicle engaged works out at 2·4 tons. Assuming the average load was 2 tons, this would mean that the cost per ton-mile is approximately 8·5d.

(*b*) *South Island.*—The statistics show that there were 238 vehicles engaged on freight services in the South Island during January, 1930. Like the passenger-vehicles, the freight business in the South Island shows a more even distribution according to the length of route operated upon, indicating that the average haul is probably a bit longer in the South Island than in the North.

Eighty-three out of these 238 vehicles were engaged on routes up to 15 miles in length, while 110 were engaged on routes between 15 and 50 miles.

The average mileage per vehicle worked out at 846 miles, the receipts at £56, the receipts per ton at 13s. 5d., and per vehicle-mile at 1s. 4d. This makes the average cost per ton-mile approximately 10d.

Full statistics relating to the operations of organized transport according to length of routes is given in Tables 17 to 20 in the Appendix to this report.

Motor Transport Routes radiating from the Four Main Centres.

In order to show to what extent motor transport is engaged in the business radiating from the four main centres, a special table has been prepared showing the number of vehicles engaged on routes which have one terminal in one of the four main centres—namely, Auckland, Wellington, Christchurch, and Dunedin.

The following is a summary of the full data in this connection which are given in Tables 21 to 24 of the Appendix.

Frequency of Service.	Kind of Vehicle.				
	Omnibus.	Service Car.	Freight.	Passenger and Freight.	Total.
Auckland—					
Hourly or less	38	..	..	..	38
Daily, but not hourly ..	13	33	82	..	128
Other services	1	7	26	..	34
Totals (Auckland) ..	52	40	108	..	200
Wellington—					
Hourly or less	57	..	..	..	57
Daily, but not hourly ..	7	33	62	..	102
Other services	..	..	15	..	15
Totals (Wellington) ..	64	33	77	..	174
Christchurch—					
Hourly or less	4	..	..	..	4
Daily, but not hourly ..	20	22	32	..	74
Other services	4	..	17	..	21
Totals (Christchurch)..	28	22	49	..	99
Dunedin—					
Hourly or less	9	..	..	..	9
Daily, but not hourly ..	13	13	7	..	33
Other services	2	3	8	1	14
Totals (Dunedin) ..	24	16	15	1	56
Totals—					
Hourly or less ..	108	..	..	..	108
Daily, but not hourly	53	101	183	..	337
Other services ..	7	10	66	1	84
Grand totals ..	168	111	249	1	529

It should be noted that services operating within city boundaries—that is, Auckland Transport Board, and Wellington, Christchurch, and Dunedin City bus services—have not been included in the above figures.

Operating-costs.

A considerable amount of information was collected under this heading during the year. The Department, however, has no power at present to collect any information, and that collected has been purely on a voluntary and confidential basis. It is quite clear that the unit costs of operation fluctuate according to the length of route operated upon, the nature of work, the nature of the road-surface, the topography of the locality, and a number of other factors. Generalizations relating to operating-costs in this country are, for practical purposes, worthless.

An organization in Britain covering a wide field prepares from time to time comprehensive tables of operating-costs, showing the costs per mile for different classes of vehicles. These costs have been carefully examined and adapted as regards taxation, wages, and the cost of petrol to meet New Zealand conditions, and show the following results for a 2-ton (pay-load) truck fitted with pneumatic tires :—

(*a*) Standing charges in pence per week :—

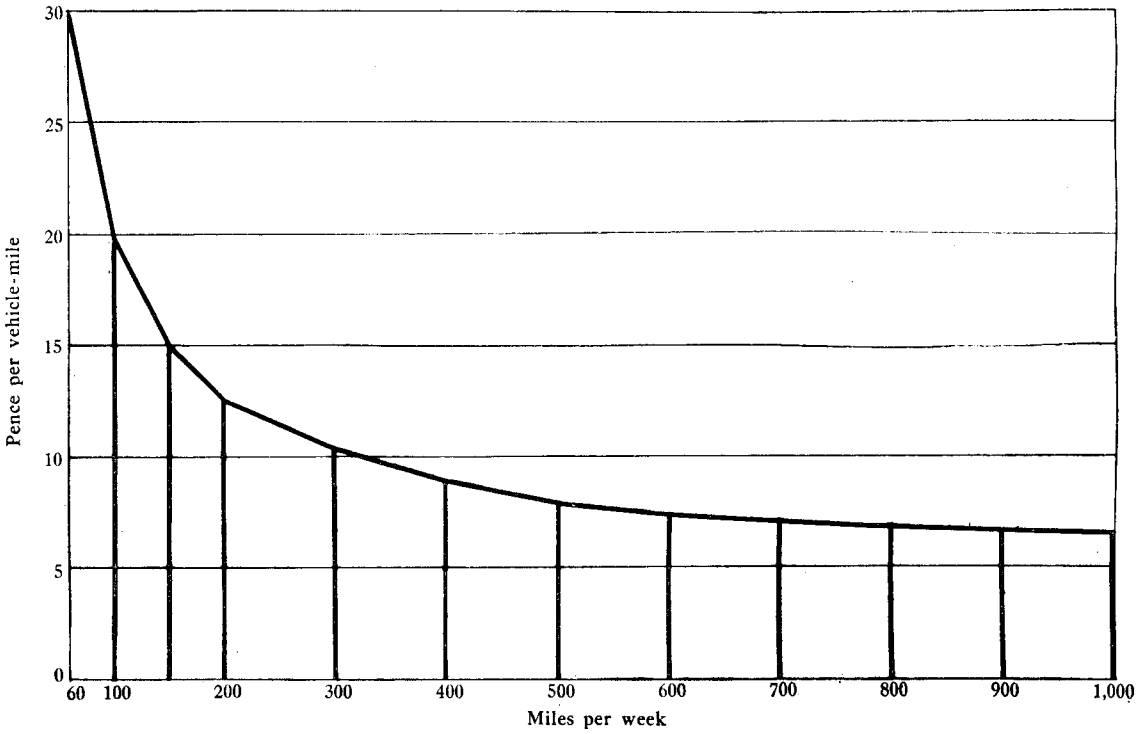
	d.
Licenses	100
Wages (one man)	1,122
Rent and rates	90
Insurance	84
Interest	130
Total	1,526

(*b*) Standing charges and running-costs in pence per vehicle-mile :—

Miles per Week.	Standing Charges. d.	Running-expenses. d.	Total. d.
60	25·43	4·84	30·27
80	19·08	4·84	23·92
100	15·26	4·84	20·10
120	12·72	4·84	17·56
150	10·17	4·84	15·01
200	7·63	4·84	12·47
300	5·42	4·84	10·26
400	3·82	4·84	8·66
500	3·05	4·84	7·89
600	2·54	4·84	7·38
700	2·18	4·84	7·02
800	1·91	4·84	6·75
1,000	1·53	4·84	6·37

The following graph, which has been plotted from the foregoing figures, sets out what may be called the "Curve of decreasing costs," according to the mileage run per vehicle.

GRAPH SHOWING RELATIVE COST PER VEHICLE-MILE FOR VARIOUS MILEAGES PER WEEK FOR MOTOR-TRUCK OF 2-TON PAY-LOAD CAPACITY.



This question of decreasing costs according to mileages has a very important bearing on the future development of motor transport, since as organization increases, mileage increases, with the result that operating-costs are greatly brought down also.

DORMANT AND CANCELLED REGISTRATIONS.

The Motor-vehicles Act, 1924, and the Motor-vehicles Amendment Act, 1927, provide that where any registered motor-vehicle is destroyed, or becomes permanently useless as a motor-vehicle, or is removed permanently beyond New Zealand, or an annual license in respect of any vehicle was not issued for the preceding year or for some portion of that year, and if registration was effected before the beginning of that year, the registration of the vehicles in question may be cancelled.

The statistics relating to registrations do not include cancelled registrations. Particulars, however, of "dormant" registrations are included. The term "dormant" covers those registrations in respect of which annual licenses have not been taken out or renewed for any time during the present or the immediately preceding licensing year.

At the 31st August each year detailed figures are extracted from the central register in respect of these "dormant" registrations. The latest figures available—viz., those for the period ending 31st August, 1929—are given in the following table:—

Kind of Vehicle.	Registrations at 31st August, 1929.	Dormant Registrations included in Column A.			Percentages: Total Dormant Registration, Column D, of Total Registrations, Column A.
		1927–28.	1928–29.	Total.	
	A	B	C	D	E Per Cent.
Cars	135,487	4,055	14,162	18,217	13·45
Trucks—					
1-ton pay-load	17,988	774	2,492	3,266	18·16
2-ton pay-load	5,577	191	466	657	11·78
3-ton pay-load	1,545	79	167	246	15·92
4-ton pay-load	819	51	106	157	19·17
5-ton pay-load	343	20	39	59	17·20
6-ton pay-load	50	2	10	12	24·00
Over 6-ton pay-load	22	1	2	3	13·64
Total	26,344	1,118	3,282	4,400	16·70
Omnibuses	1,196	60	169	229	19·15
Traction-engines	370	85	147	232	62·70
Trailers—					
Two-wheel	760	78	212	290	38·16
Three or more wheel	250	57	52	109	43·60
Tractors	424	72	72	144	33·96
Motor-cycles	35,790	3,682	9,217	12,899	36·04
Others	490	23	34	57	11·63
Total	201,111	9,230	27,347	36,577	18·19

Section 8 of the Motor-vehicles Amendment Act, 1927, provides that in the case of a license applied for and granted for a period less than a year, the license fees prescribed shall be reduced by the one-twelfth part thereof for every complete month by which the term of the license is less than one year.

The regulations under the Public Works Amendment Act, 1924, also allow certain abatements of heavy-traffic fees where the vehicles are not in use for stated periods and the registration plates are surrendered.

As the percentages in the last column of the preceding table indicate, the practice of "laying-up" vehicles for part of the year, particularly in the winter months, is fairly common in New Zealand. Excluding traction-engines, the use of which is in many instances impossible and unnecessary in the winter months, the figures show that of the total registrations at the 31st August, 1929, for omnibuses, trucks, and cars, 19·15 per cent., 16·70 per cent., and 13·45 per cent. respectively were dormant registrations. Of the total registrations of trailers with two wheels and trailers with over two wheels 38·16 per cent. and 43·60 per cent. respectively represented dormant registrations. Tractors, which, like trailers, are subject to seasonal fluctuation, showed 33·96 per cent.; while motor-cycles, for some other reasons, showed 36·04 per cent.

Up to 31st July, 1930, 29,839 registrations had been cancelled, involving vehicles as follows: Cars, 12,587; trucks, 3,725; omnibuses, 285; traction-engines, 247; trailers, 377; tractors, 174; cycles, 12,234; other vehicles, 210: total, 29,839.

Table 7 in the Appendix shows a fuller analysis of cancellations in each highway district.

The number of dormant 1927–28 registrations which were not received on 1st June last, the beginning of the new licensing year, numbered 8,338, and covered the following vehicles: Cars, 3,605; trucks, 1,016; omnibuses, 53; traction-engines, 77; trailers, 114; tractors, 67; motor-cycles, 3,385; other, 21: total, 8,338.

Fuller details regarding these dormant 1927–28 registrations that were cancelled on the 1st June, 1930, are given in Table 5 of the Appendix.

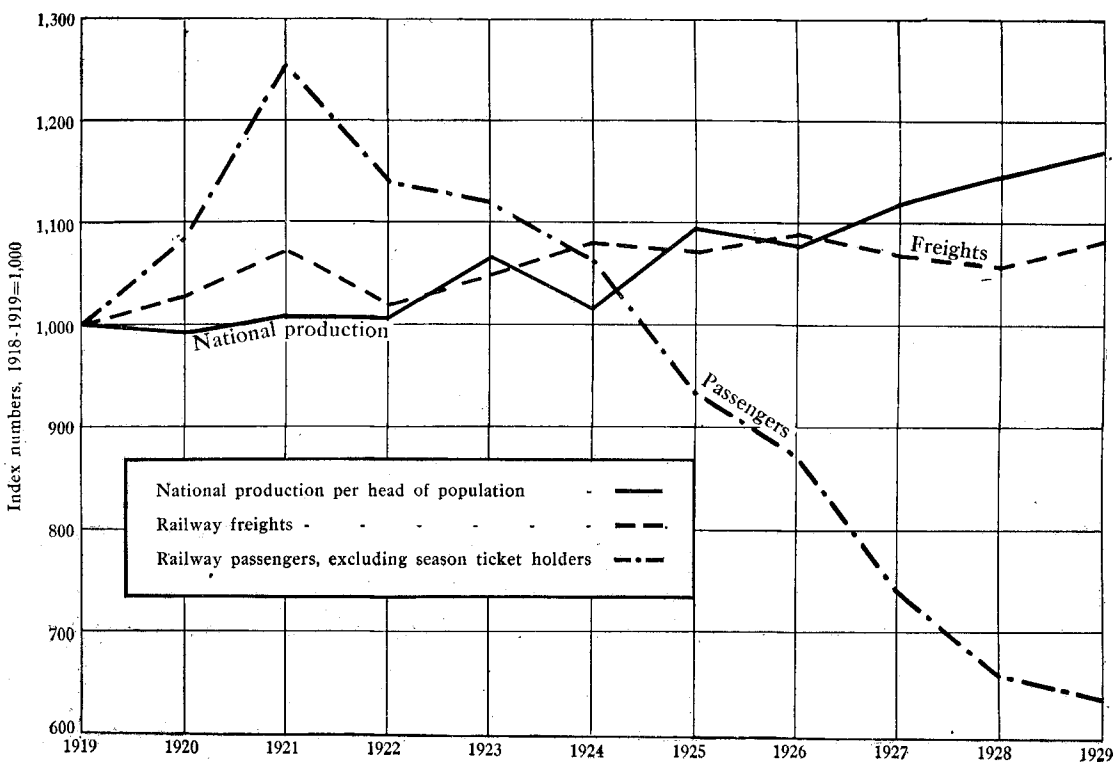
(*c*) SALIENT POINTS IN EXTERNAL ECONOMY OF RAILWAYS AND MOTOR TRANSPORT.

Before dealing with the question of road and rail competition it has been considered advisable to draw attention to the principal outstanding features of the external economy of the railways and motor transport:—

(*a*) Railways.

1. *National Production and Railway Business.*—The following graph has been plotted from relative numbers (1919 = base year) computed in respect of the data given in Table 25 of the Appendix, and shows the trends over the last ten years in (*a*) national volume of production per head of population, (*b*) the volume of freights handled on the railways per head of population, and (*c*) the number of ordinary passengers carried on the railways per head of population:—

Graph showing Production and Railway Activity, 1918–19 to 1929–30.



The decline in passenger business since 1921 is so marked that explanation is superfluous. The freight business has moved in line with the national volume of production, but there is a somewhat significant lag from 1926 onwards. This may be due to an increase in the productive area of the Dominion beyond the sphere of the railway, or to the fact that the railways are not maintaining their relative position in this business. Bearing in mind the increasing competition from motor transport, it is difficult to turn from the suggestion that the latter is the principal cause of the relative decline.

2. *Railways and Law of Decreasing Costs.*—Broadly speaking, the railways operate under the law of decreasing cost, or, in other words, that a greater volume of traffic can be handled without a corresponding increase in the operating-costs. The result is that unit costs of operation tend to decline as business increases, the principal reason being the huge capital outlay required in the first instance.

The decline in the passenger business has already been referred to, but the following figures show the position in respect of the two principal classes—viz., ordinary and season ticket holders from 1921–22 to 1928–29 :—

Year.	Ordinary Passengers.	Season-ticket Holders.	Total.
	Passengers carried.		
1921–22	14,262,440	472,865	28,121,763
1922–23	14,256,610	485,681	28,221,362
1923–24	13,836,311	525,744	28,436,475
1924–25	12,424,012	537,554	26,106,859
1925–26	11,787,273	600,272	27,653,414
1926–27	10,274,878	585,078	26,002,137
1927–28	9,272,547	632,741	25,379,665
1928–29	9,046,267	656,155	25,574,843
	Revenue.		
	£	£	£
1921–22	2,212,633	205,594	2,418,227
1922–23	2,216,514	204,106	2,420,620
1923–24	2,136,999	212,601	2,349,600
1924–25	2,077,625	210,946	2,288,571
1925–26	2,271,498	265,549	2,537,047
1926–27	2,045,348	258,832	2,304,180
1927–28	1,886,833	258,463	2,145,296
1928–29	1,868,047	256,699	2,124,746

Viewed from the broad aspect of the railway industry, this relative decline in passenger traffic would apparently have the effect, unless the goods traffic was increased by more than an equivalent proportion, of decreasing the aggregate volume of business and predisposing the industry to the tendency already referred to—viz., a relative increase in the unit cost of operation. The following figures show the revenue from both goods and passenger business from 1921–22 to 1928–29, and indicate broadly the extent to which the falling-away in the latter has been supplemented by expansion in the former :—

Year.	Passenger Revenue (including Season Tickets).	Goods Revenue.	Excess of Goods Revenue.
	£	£	£
1921–22	2,418,227	3,646,594	1,228,367
1922–23	2,420,620	3,671,008	1,250,388
1923–24	2,349,600	3,953,213	1,603,613
1924–25	2,288,571	4,122,017	1,833,446
1925–26	2,537,047	4,499,160	1,962,113
1926–27	2,304,180	4,596,166	2,291,986
1927–28	2,145,296	4,680,135	2,534,839
1928–29	2,124,746	4,846,125	2,721,379

Comparing three yearly averages at the beginning and end of each of the series for passenger and goods revenue, it would appear that the former has fallen away by 8·54 per cent., while the latter has gained by 25·31 per cent. These comparisons extend over the whole period. Since 1925–26, however, the decline in passenger revenue has been more marked than over the whole period.

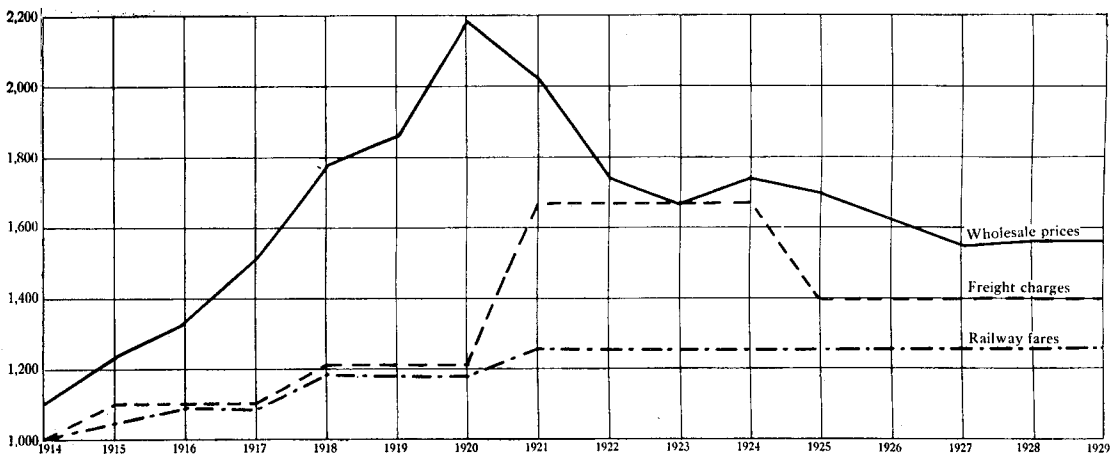
It is quite clear that since 1921–22 the railways have been forced to rely on a relatively greater volume of revenue from the goods traffic as compared with the passenger business.

3. *Railway Charges and the Price-level.*—Changes in the price-level are related to railway finance. These changes are soon reflected in the operating-costs. As the cost of living rises, wages follow, while increased costs for materials (coal, timber, repairs, &c.) very soon present themselves, when the price-level changes. If the revenue does not follow the changes in prices, allowing, of course, for increases of business, there is a tendency that operating-expenses will loom relatively large in comparison with

earnings. Herein lies a fruitful source for maladjustment in railway finance if the price-level is not considered in alterations to the tariff which forms the basis of the railway revenue. The following graph shows the major movements in the wholesale-price level, passenger fares and freight charges, between 1914 and 1929 :—

GRAPH SHOWING RAILWAY CHARGES AND THE PRICE-LEVEL.

Wholesale prices, 1909–13 = 1000. Rail fares, second single, 200 miles, per mile. Freight charges, Class E, general merchandise, 50 miles, per ton.



The curves in the graph show that passenger fares and freight charges have not moved in correspondence with the price-level, with the inevitable result that the relationship between operating-costs and revenue has been deranged. Corroboration that this actually occurred is to be found in the percentage of working-expenses to earnings, which moved from 60·97 per cent. in 1918 to 71·36 per cent. in 1920 and 81·59 per cent. in 1921.

4. *Classification of Freight Business according to Average Revenue per Ton-mile.*—Under the law of decreasing cost the longer the haul for any commodities the lower is the cost per ton-mile; and under the railway tariff certain commodities are required to pay higher relative rates.

The following table shows the ton-miles and revenue for the year ended 31st March, 1929, classified according to the average revenue per ton-mile :—

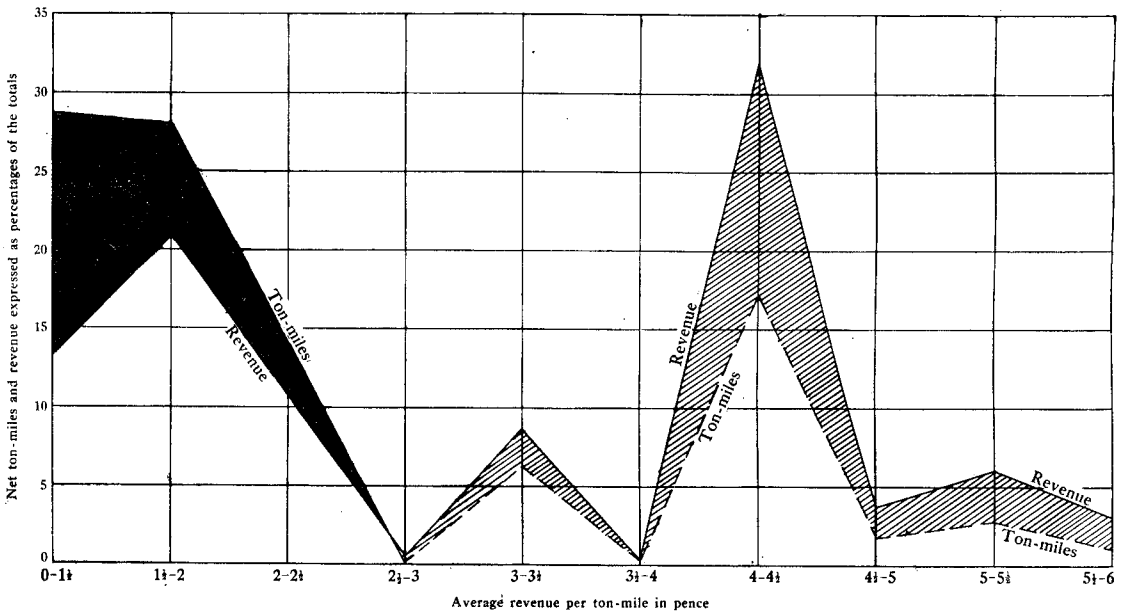
Classification according to Average Revenue.

Average Revenue per Ton-mile.	Ton-miles.		Revenue.	
	Number.	Per Cent. of Total.	Amount.	Per Cent. of Total.
			£	
Under 1½d.	139,755,197	28·65	668,872	13·65
1½d. and under 2d.	136,848,199	28·06	1,036,161	21·15
2d. ,, 2½d.	64,227,939	13·17	568,680	11·61
2½d. ,, 3d.	1,361,771	0·28	16,138	0·33
3d. ,, 3½d.	30,958,711	6·35	425,378	8·68
3½d. ,, 4d.	1,652,598	0·34	25,432	0·52
4d. ,, 4½d.	84,762,283	17·38	1,549,917	31·64
4½d. ,, 5d.	8,992,452	1·84	173,647	3·55
5d. ,, 5½d.	13,271,380	2·72	289,377	5·91
5½d. ,, 6d.	5,922,868	1·21	144,789	2·96
Total	497,753,398	100·00	4,898,391	100·00

The outstanding points in this table are : (*a*) That while 56·71 per cent. of the ton-miles fall within the groups of under 2d. per ton-mile, the aggregate revenue from this business represents only 34·80 per cent. of the total goods revenue, and (*b*) that while 23·15 per cent. of the ton-miles fall within the groups of 4d. or over per ton-mile, the aggregate revenue here represents 44·06 per cent. of the total goods revenue. In other words, the railways depend for very nearly half their revenue on the higher-classed and short-haul commodities.

The following graph has been plotted from the percentages given in the preceding table, and shows the position more clearly than the bare figures :—

GRAPH SHOWING DISTRIBUTION OF REVENUE AND TON-MILES ACCORDING TO AVERAGE REVENUE PER TON-MILE FOR YEAR 1928–29, NEW ZEALAND RAILWAYS.



The area between the curves representing the relative distribution of the ton-miles and the revenue is shown as dark where that for the ton-mile exceeds that for the revenue, and is hatched where that for the revenue exceeds the ton-miles.

5. *Length of Haul.*—By virtue of geographical conditions and industrial structure, New Zealand is a country of relatively short hauls. The average haul for all commodities handled during the year ended 31st March, 1929, was sixty-four miles. Like all averages, this average tends to obscure the real position, and should be interpreted subject to the distribution about the average as can be roughly judged from the table below.

The following table shows the ton-miles and revenue for the year ended 31st March, 1929, classified according to the average length of haul in each class :—

Classification according to Average Haul.

Length of Haul.	Ton-miles.		Revenue.	
	Number.	Per Cent. of Total.	Amount.	Per Cent. of Total.
			£	
20 and under 30 miles ..	13,722,132	2·81	195,125	3·98
30 ,, 40 ,, ..	34,161,724	7·01	287,411	5·87
40 ,, 50 ,, ..	89,504,404	18·35	1,545,749	31·56
50 ,, 60 ,, ..	13,679,396	2·81	202,887	4·14
60 ,, 70 ,, ..	80,483,366	16·50	626,573	12·79
70 ,, 80 ,, ..	54,096,644	11·09	714,432	14·58
80 ,, 90 ,, ..	11,662,716	2·39	196,464	4·01
90 ,, 100 ,, ..	..	..	..	..
100 ,, 150 ,, ..	181,894,262	37·29	1,068,197	21·81
150 miles and over	8,548,754	1·75	61,553	1·26
Totals	487,753,398	100·00	4,898,391	100·00

Two outstanding conclusions emerge from the foregoing table : (*a*) That 28·17 per cent. of the ton-miles are in respect of hauls of under fifty miles, which yield 41·41 per cent. of the total revenue ; and (*b*) that 39·04 per cent. of the total ton-miles are in respect of hauls of over 100 miles, yielding only 23·07 per cent. of the total revenue.

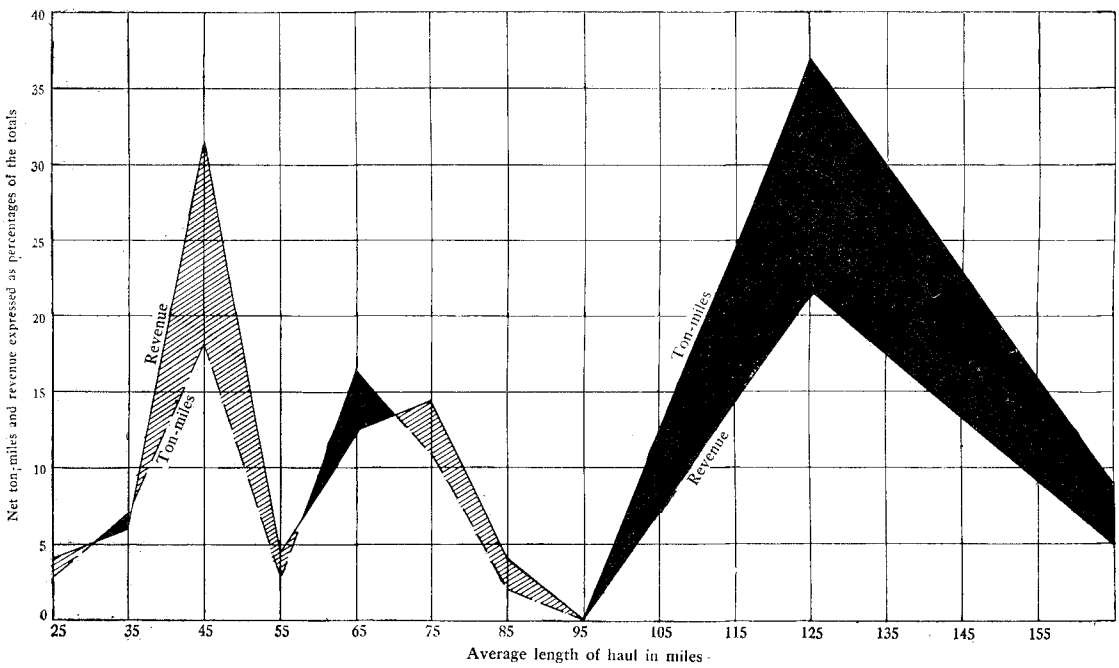
The curves in the graph given on the next page have been plotted from the percentages shown in the table above, and bring out the full import of the figures.

Where the curve representing the relative distribution of the ton-miles is above that for the revenue the intervening area has been shown in black ; where that representing the distribution of the revenue exceeds the ton-miles the intervening area has been hatched.

The important point is that the railways derive just over 40 per cent. of the total revenue from hauls of under fifty miles.

6. *Basis of Operation.*—As common carriers the railways are bound to carry any traffic offering at advertised rates. Broadly speaking, these rates, which have undergone minor alterations from time to time, have been carried forward from the time when the rail operated under monopoly conditions, and are based on the assumption that the rail will obtain a given volume of the business offering. Certain commodities can only be transported at relatively low rates because other commodities are carried at high rates.

GRAPH SHOWING DISTRIBUTION OF REVENUE AND TON-MILES ACCORDING TO AVERAGE LENGTH OF HAUL FOR YEAR 1928–29.



It would be extremely difficult to set the correct proportion of the overhead and running expenses against any particular type of traffic or against any particular consignment; hence the differential tariff rates being based roughly on the value of the commodities carried.

Losses of business in highly rated commodities must inevitably lead to the creation of numerous special rates or a recasting of the whole railway tariff.

7. *Organization.*—The railways are State owned and operated. The motivation behind this organization is not as in private enterprise—the making of profit. As a matter of fact, the policy in the past has been more on the lines of using the railways as an economic weapon for development of the country.

8. *Scope of Operation.*—Excluding motor subsidiary services at terminals, rail transport is obviously limited to the miles of track. In New Zealand there were at the 31st March, 1929, 3,287 miles of railways open for traffic. The total formed roads at the same date measured 48,843 miles.

(*b*) MOTOR TRANSPORT.

1. *Scope.*—Motor transport follows the road. As indicated above there are 48,843 miles of formed roads, against 3,287 miles of rail-track.

2. *Flexibility and Mobility.*—Motor transport can effect transport from terminal to terminal in the case of both passenger and goods traffic, and can be quickly moved to meet individual requirements in any localities.

3. *Operating-costs.*—Like the railways, motor transport, in the broadest sense, operates under the economic law of decreasing costs. Up to the point of maximum efficiency a given number of vehicles and a given standard of roads can carry increased traffic at a decreasing cost per unit.

4. *Operating Unit.*—The operating unit in motor transport is the single vehicle, which varies in speed and size.

5. *Nature of Service.*—Motor transport units do not, generally speaking, operate in New Zealand for the carriage of all classes of goods. Privately-owned vehicles fulfil the requirements of their owners. Freight services over defined routes, generally speaking, confine their activities to certain classes of commodities. Of the public passenger vehicles, omnibuses, licensed taxis, and service cars are the only vehicles that are open for general hire.

6. *Basis of Charges.*—Passenger-carrying concerns base their charges on mileage, and do not have differential facilities for which different charges are made, as in the case of first and second class fares on the railways. Freight concerns that operate for casual hire base their charges on the estimated costs of each job, while "hauliers," or concerns engaged on defined routes, charge flat rates based on mileage and tonnage, irrespective of the nature of the consignment. Internal competition has been the principal cause for creating a number of special rates. Different charges are made for small lots and parcels.

7. *Frequency of Service.*—Owing to the small size of the operating unit, motor transport is able to offer frequent services in both the goods and passenger business.

8. *Speed.*—By reason of its greater mobility and flexibility, motor transport can effect more speedy hauls over short distances than the railways.

9. *Length of Haul.*—Except for very short hauls in particular industries—*e.g.*, breweries—where horse transport still preponderates, motor transport carries out the bulk of the short-haul transport in this country.

On account of the elimination of handling-charges in comparison with the railways, which amount to approximately 7s. per ton (counting both terminals), motor transport is able to offer effective competition to the railways on hauls sufficiently short to make the handling-charges relatively important. This 7s. per ton handling-charges amounts to a loading of 3·36d. per ton-mile for a twenty-five-mile haul, 1·68d. for a fifty-mile haul, and 0·84d. for a hundred-mile haul.

10. *Organization.*—Motor transport is, with the exception of services operated by the State and local authorities, operated by private enterprise in New Zealand. For the year ended 31st March, 1929, the New Zealand Railways operated 58 buses and 20 trucks, while local authorities operating electric tramways also operated 155 buses. There are in addition to the latter number, a considerable number of buses operated by local authorities that do not operate electric trams.

11. *Permanent-way.*—Unlike the railways, motor transport does not enjoy the exclusive use of its permanent-way, and accordingly does not pay the full cost thereof. The Department has investigations in hand for the purpose of ascertaining the share of the cost that should be borne by motor transport; but this is a difficult problem, and it will take some time to complete the investigations. The following remarks by the Ministry of Transport in Britain before the Royal Commission on Transport are of interest on this point:—

> It should be admitted at once that data do not exist for forming any accurate estimate of the proportion of the present cost of the improvement and maintenance of highways which should properly be borne by the users of motor-vehicles. Figures have already been furnished to the Royal Commission showing the present total annual cost of highways and the yield of taxation of motor-vehicles. From these summary figures it is open to any one to form an opinion whether the users of motor-vehicles do, or do not, bear too high a proportion of the cost of highways, in view of the value of the highway system to them and the use which they make of it. But it is a far more difficult matter to attempt to strike a balance between the value of the highway system to motor-users as a class, and its value to the community as a whole, as a general means of communication and of social intercourse. Nor is it easy to decide whether the burden of taxation is fairly and properly distributed between the users of different classes of motor-vehicles in proportion to the use which they make of the highway system, the wear-and-tear they cause, and the cost of meeting their requirements in respect of such matters as strength of construction, width, ease of gradient, alignment, &c.

12. *Private Ownership.*—Private ownership of cars and trucks by business organizations gives an economic independence that amounts to a definite competitive advantage in certain avenues of industry.

13. *Taxation.*—Contributions towards the maintenance of the roads are made in the case of motor transport per medium of State in the form of special taxation. Motor transport is also subject to all existing forms of taxation where these apply—*e.g.*, during the last ten years Customs duty on importations of vehicles and parts has amounted to £8,588,956.

14. *Standards of Service.*—Excluding omnibuses that come under the provisions of the Motor-omnibus Traffic Act, 1926, motor transport services, both passenger and goods, are not required to comply with standards that exist in other services (railways, tramways, and shipping) for ensuring public safety and convenience. There are approximately 600 service cars, 500 buses, and 1,200 goods-vehicles engaged on defined routes according to some kind of time-table that are subject to practically no supervision in the public interest whatsoever.

15. *State of Development.*—Happenings in other countries show that the motor industry is in a highly dynamic state. Rapid developments are being recorded in both vehicles and roads. The area of activity for the motor is being constantly widened at an increasing rate.

16. *Relationship between Road Standards and Costs.*—The better the roads the lower are the operating-costs of motor-vehicles. The following figures, compiled by an authentic American authority, show the cost of operating a motor-vehicle in cents per mile over high-type, intermediate, and low-type roads: High-type road, 5·44 cents per mile; intermediate, 6·43 cents; low-type, 7·50 cents.

It costs 18 per cent. more to operate a motor-vehicle on intermediate as compared with high-type roads, and 38 per cent. more on low-type roads than on the high-type.

(*c*) Road and Rail Competition.

Competition between road and rail is of two kinds; (*a*) Competition in comparative service; (*b*) Competition in comparative cost.

The former covers such factors as speed, safety, frequency of service, convenience, &c., while the latter is reflected in the rates required for the carriage of passengers or goods.

In certain kinds of passenger traffic (over relatively short routes) and in the carriage of certain classes of commodities (high-class goods where speed and convenience in delivery are the principal factors, and where the intrinsic value is relatively high in comparison with bulk) it is generally recognized that competition hinges principally on comparative service, the question of cost being of minor consideration. By virtue of its mobility and flexibility, motor transport offers serious competition to the rail in point of comparative service; indeed it offers transport amenities that are quite impossible by the rail. To this extent competition by road is for the national good, since the community reaps the benefit of services which were not formerly available. In other words, it is clear that the motor has a definite place in any complete and efficient system of transport.

With improvement in roads and motor-vehicles and organization, it is inevitable that the zone of activity in comparative service will expand, and competition with the rail for the higher classes of freight will become increasingly effective.

Regarding competition in comparative costs, it has been indicated under the heading of operating costs that unit costs of operation of motor-vehicles, both passenger and goods, tend to decrease as the zone of activity is widened, and as improvements are effected in road-surfaces, and in vehicle-design. There is in this country a definite connection between the competition in comparative service and in comparative costs in the field of goods traffic, since outward journeys from and between the main centres can be supplemented by back loading at cheap rates with other commodities lower down the scale. Effective competition in service in this manner puts motor transport in a stronger position as regards comparative costs.

Broadly speaking, the road and rail routes in this country were laid out before motor transport as it exists to-day was even contemplated; for geographical and economic reasons, which need not here be considered, the main arterial roads and the rail routes were paralleled. Inventors have since presented us with the motor-vehicle, which, naturally enough, has been developed where the traffic offered the most remunerative returns. This has naturally been found to exist in the traffic radiating from the main centres and ports. Here the traffic consists, *inter alia*, of high-class freights, and commodities where distribution is tending to be made in relatively small lots. By means of its greater relative mobility, motor transport has offered effective competition to the rail in this zone of activity in three major directions: (*a*) By providing a means of direct store to store or door delivery, thus eliminating handling; (*b*) by being able to make deliveries, subject to certain limitations, when required and at relatively short notice; and (*c*) by being able to effect direct deliveries to destinations not on the rail.

Road-improvements in this country are, generally speaking, being proceeded with more rapidly in the roads radiating from the main centres. It follows, therefore, that competition in these localities will become more effective both in lower costs, thus enabling a wider range of commodities to be carried, and in length of haul. When it is considered that the railways work on a tariff the essential characteristics of which are higher charges for the high-class freights and lower charges for the lower-grade goods, and, further, that the average length of haul for the former class falls roughly within fifty miles as against longer hauls for the second class, it is clear that the railways will tend to lose more and more of the high-class freights as competition becomes more effective.

Tonnage handled by Road and Rail.

The following figures show a classification of the estimated gross tonnage of goods handled by organized motor transport services running to time-table over defined routes and the railways during the year ended 31st March, 1930:—

Class of Goods.	Gross Tonnage.		Percentage, Each Figure of Total.	
	Road.	Rail.	Road.	Rail.
	Tons.	Tons.	Per Cent.	Per Cent.
Wool	32,544	124,156	3·61	1·59
Dairy-produce	145,848	592,121	16·20	7·60
Hides, skins, and tallow	7,482	32,366	0·83	0·42
Live-stock	19,386	565,778	2·15	7·26
Grain	16,380	434,844	1·81	5·60
Fruit	7,512	41,772	0·83	0·53
Flax (*Phormium tenax*)—Fibre or tow	2,862	26,159	0·31	0·33
Manures	52,998	681,458	5·88	8·75
Timber	97,002	724,785	10·77	9·31
Lime and cement	27,054	319,336	3·00	4·10
Coal	64,284	2,228,888	7·14	28·62
Metal, stone, gravel, &c.	204,492	413,551	22·72	5·31
Fuel-oils—Benzine, kerosene, &c.	23,232	144,418	2·59	1·85
Furniture removals	9,030	..	22·16: 1·00	
General merchandise	141,744	..	22·16: 15·74	
Other	48,798	1,459,341	22·16: 5·42	18·73
Totals	900,648	7,788,973	100·00	100·00

It should not be overlooked that the figures given for the road in the above table cover approximately a thousand vehicles engaged on defined routes. This number represents approximately 4 per cent. of the total number of trucks on the register at 31st March, 1929 (29,218), so that it is reasonable to assume that the total tonnage handled by motor-trucks, to say nothing of the smaller lots transported in buses and private cars, would be in the vicinity of 20,000,000 tons. A large proportion of freights handled once by the railways are handled twice or more by motor transport.

The percentages in the foregoing table direct attention towards three main differences in the classes of commodities handled by the railways and organized motor transport services:—

(*a*) Dairy-produce amounts to 16·20 per cent. of the total tonnage handled by motor transport, against 7·60 per cent. of the rail tonnage.

(*b*) Live-stock accounted for only 2·15 per cent. of the motor total, against 7·26 per cent. of the rail total.

(*c*) Grain accounted for only 1·81 per cent. of the motor total against 5·60 per cent. for the rail.

(*d*) Coal comprises 7·14 per cent. of the motor total against 28·62 per cent. of the rail tonnage.

(*e*) Metal, stone, and gravel account for 22·72 per cent. of the tonnage handled by motor transport, against 5·31 per cent. of the rail figure.

(*f*) General merchandise and miscellaneous commodities represent 22·16 per cent. of the motor tonnage against 18·73 per cent. for the railways.

Road and Rail Charges.

The following table shows the rail charges under the various classes in the railway tariff where the charge is based on a ton, for various hauls, (*a*) per ton, and (*b*) per ton-mile; together with the terminal charges (estimated at 3s. 6d. per ton at each terminal for a haul of one mile and handling at each terminal) :—

RAIL CHARGES.

Hauls.	Terminal Charges: 3s. 6d. per Ton Each End.	A.	B.	C.	D.	E.	F.	N.	P.	Q.	R.
					(*a*) Per Ton.						
Miles.	s.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
20 ..	7	18 8	16 10	14 10	12 10	5 2	3 2	6 9	5 2	3 10	5 0
30 ..	7	28 0	23 10	20 4	17 5	7 0	4 4	9 1	7 0	5 3	6 6
40 ..	7	37 1	30 10	26 0	20 11	8 3	4 11	11 5	8 10	6 5	7 9
50 ..	7	44 1	37 7	32 1	24 5	9 5	5 6	13 9	10 9	7 7	9 0
60 ..	7	50 8	42 11	36 8	27 11	10 7	6 1	14 11	11 8	8 9	10 4
70 ..	7	56 3	47 4	40 2	31 3	11 9	6 8	16 1	12 7	9 4	11 0
80 ..	7	60 11	50 10	42 8	33 7	12 4	7 3	17 0	13 4	9 11	11 7
90 ..	7	65 7	54 4	45 0	35 4	12 11	7 10	17 7	13 9	10 6	11 10
100 ..	7	69 1	57 9	47 0	37 1	13 6	8 5	18 2	14 3	11 1	12 3
150 ..	7	86 7	69 9	56 1	45 10	16 5	11 4	21 1	16 7	14 0	13 5
200 ..	7	97 1	77 8	61 4	51 1	19 4	14 3	24 5	19 10	16 11	15 6
					(*b*) Per Ton-mile.						
		d.	d.	d.	d.	d.	d.	d.	d.	d.	d.
20 ..		4·2	11·2	10·1	8·9	7·7	3·1	1·9	4·0	3·1	2·3	3·0
30 ..		2·8	11·2	9·5	8·1	7·0	2·8	1·7	3·6	2·8	2·1	2·9
40 ..		2·0	11·1	9·2	7·9	6·3	2·5	1·5	3·4	2·6	1·9	2·3
50 ..		1·6	10·6	9·0	7·7	5·9	2·3	1·3	3·3	2·6	1·8	2·2
60 ..		1·3	10·1	8·6	7·3	5·6	2·1	1·2	3·0	2·3	1·7	2·1
70 ..		1·1	9·6	8·1	6·9	5·4	2·0	1·1	2·8	2·2	1·6	1·9
80 ..		1·0	9·1	7·6	6·4	5·0	1·8	1·1	2·5	2·0	1·5	1·7
90 ..		0·9	8·7	7·2	6·0	4·7	1·7	1·0	2·3	1·8	1·4	1·6
100 ..		0·8	8·3	6·9	5·6	4·4	1·6	1·0	2·2	1·7	1·3	1·5
150 ..		0·5	6·9	5·6	4·5	3·7	1·3	0·9	1·7	1·3	1·1	1·1
200 ..		0·4	5·8	4·7	3·7	3·1	1·2	0·9	1·5	1·2	1·0	0·9

As road and rail distances do not always correspond, and as the motor-transport organizations charge a flat rate that varies with the mileage, it has not been possible to prepare a table corresponding to the foregoing for motor-transport services. The following figures, however, represent averages of charges made on some of the services running in the Wellington Province: 30 miles' haul, 1s. per ton-mile; 40, 9·5d.; 50, 9d.; 70, 7·5d.; 100, 6·5d.

Comparisons between these figures and the rail charges show the following, if the terminal charges are added to the rail rates :—

(*a*) Hauls up to 20 miles: The road rates are lower than the rail charges for Classes A, B, C, and practically identical with Class D.

(*b*) Hauls of 30 miles: The road rates are lower for Classes A and B, and not very much higher than Class C.

(*c*) Hauls of 40 miles: The road rates are lower for classes A, B, and C, and are 1·2d. above Class D.

(*d*) Hauls of 50 miles: The road rates are lower for classes A, B, and C, and are 1·5d. above Class D.

(*e*) Hauls of 70 miles: The road rates are lower for classes A, B, and C, and are 1d. above Class D.

(*f*) Hauls of 100 miles: The road rates are lower than Classes A and B, and are only 0·1d. and 1·3d. above Classes C and D.

It would be dangerous to generalize too much from the foregoing comparisons, as a number of factors, such as standard of road, nature and volume of traffic, &c., would tend to affect motor charges, while the traffic would have a bearing on the rail charges. Nevertheless, it seems pretty clear that under existing conditions motor transport offers serious competition to the railways for the goods falling within Classes A, B, C, and D for the shorter hauls, and for the goods falling within Classes A, B, and C for hauls up to at least one hundred miles.

Road and Rail Charges on certain Routes.

The following table shows the advertised road charges per ton, and the classified charges shown in the railway tariff, (excluding special rates) per ton for Classes A, B, and C, on certain routes radiating from Wellington City :—

Wellington to	Miles by Rail.	Rail Rates.*						Miles by Road.	Road Rates.		Differences in Favour of Road.					
		A.		B.		C.					A.		B.		C.	
		s.	d.	s.	d.	s.	d.		s.	d.	s.	d.	s.	d.	s.	d.
Paekakariki	27	32	2	28	8	25	9	31	30	0	2	2	†1	4	†4	3
Paraparaumu	33	37	10	32	11	28	11	37	30	0	7	10	2	11	†1	1
Otaki	47	49	0	42	8	37	4	51	40	0	9	0	2	8	†2	8
Levin	59	57	1	49	6	43	3	64	40	0	17	1	9	6	3	3
Palmerston North ..	87	71	2	60	4	51	4	96	55	0	16	2	5	4	†3	8
Feilding	99	75	9	64	5	53	11	105	55	0	20	9	9	5	†1	1
Foxton	104	77	6	66	0	54	9	76	55	0	22	6	11	0	†0	3

* Includes 7s. per ton to cover cost of cartage to rail and delivery at destination. † Indicates difference in favour of rail.

For the purposes of comparison, the sum of 7s. has been added to the rail rate in each case to cover a haul of one mile, and handling at each terminal.

On account of its mobility and flexibility motor transport plays a big part in the carriage of goods in small lots and parcels. Between the main centres and the rural areas, organized motor services over defined routes represent direct channels of distribution from the big central stores to the consumer. In most cases the parcels and goods are collected at the close of the business day, in the big centres, transported to a rural centre during the night, and delivered early the next morning.

The following table shows the classified rail and road rates for small lots of 1 cwt. and 2 cwt. respectively, on routes radiating from Wellington City :—

Route.	Distance by Rail.	Rail Rates.*				Distance by Road.	Road Rates.				Difference in Favour of the Road.			
		1 cwt.		2 cwt.			1 cwt.		2 cwt.		1 cwt.		2 cwt.	
Wellington to—	Miles.	s.	d.	s.	d.	Miles.	s.	d.	s.	d.	s.	d.	s.	d.
Paekakariki	27	3	6	6	6	31	2	9	4	6	0	9	2	0
Paraparaumu	33	4	3	7	3	37	2	9	4	6	1	6	2	9
Otaki	47	4	3	7	3	51	3	0	5	0	1	3	2	3
Levin	59	5	0	8	0	64	3	0	5	0	2	0	3	0
Palmerston North	87	5	0	8	0	96	4	0	6	0	1	0	2	0
Feilding	99	5	0	8	0	105	4	0	6	0	1	0	2	0
Foxton	104	7	6	12	6	76	4	0	6	0	3	6	6	6
Turakina	127	7	6	12	6	128	5	0	8	6	2	6	4	0
Wanganui	150	7	6	12	6	142	5	0	8	6	2	6	4	0

* The rates for rail carriage include 1s. per hundredweight to cover cost of collection and delivery of goods.

It is interesting to note that in every case shown above the road is very substantially below that for the rail.

The classified road and rail rates for small lots weighing up to 1 cwt. are set out hereunder :—

Weight.	Paekakariki.		Paraparaumu.		Otaki.		Levin.		Palmerston North.		Feilding.		Foxton.		Turakina.		Wanganui.	
	Road. Miles 31.	Rail. Miles 27.	Road. Miles 37.	Rail. Miles 33.	Road. Miles 51.	Rail. Miles 47.	Road. Miles 64.	Rail. Miles 59.	Road. Miles 96.	Rail. Miles 87.	Road. Miles 105.	Rail. Miles 99.	Road. Miles 76.	Rail. Miles 104.	Road. Miles 128.	Rail. Miles 127.	Road. Miles 142.	Rail. Miles 150.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
3 lb.	1 0	0 6	1 0	0 6	1 0	0 6	1 0	0 6	1 0	0 6	1 0	0 6	1 0	0 6	1 0	0 6	1 0	0 6
7 lb.	1 0	0 6	1 0	0 6	1 0	0 6	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 0	1 6	1 0	1 6	1 0
14 lb.	1 0	0 6	1 0	0 9	1 3	0 9	1 3	1 0	1 6	1 0	1 6	1 0	1 6	1 6	2 0	1 6	2 0	1 6
28 lb.	1 3	0 9	1 3	1 0	1 6	1 0	1 6	1 6	2 0	1 6	2 0	1 6	2 0	2 0	2 6	2 0	2 6	2 0
56 lb.	1 9	1 6	1 9	2 0	2 0	2 0	2 0	2 6	3 0	2 6	3 0	2 6	3 0	3 9	3 6	3 9	3 6	3 9
84 lb.	2 0	2 0	2 0	2 9	2 6	2 9	2 6	3 6	3 6	3 6	3 6	3 6	3 6	5 6	4 3	5 6	4 3	5 6
112 lb.	2 9	2 6	2 9	3 3	3 0	3 3	3 0	4 0	4 0	4 0	4 0	4 0	4 0	6 6	5 0	6 6	5 0	6 6

In making use of the above figures, it should be noted that the rail figures cover rail transport only. An amount varying from 6d. to 1s. according to the size of the parcel should be added to cover terminal charges.

Competition in the small lots and parcels business is not so much a matter of comparative cost as comparative service. Consequently motor transport, on account of its greater mobility and flexibility, can offer a service that can be better adapted than the rail to customers' requirements, and which involves less handling, a factor of considerable importance in this business.

Extent of Competition.

Motor-transport competition with the railways falls under the following main headings: (*a*) Passengers—(1) Private cars; (2) public vehicles—omnibuses, service cars. (*b*) Goods—(1) Privately owned vehicles; (2) public vehicles—General carriers operating over no defined routes, and concerns operating over definite routes.

No actual data are extant regarding the extent to which private cars, or privately owned goods-vehicles are in competition with the rail, but the extent to which omnibuses, service cars, and freight services over defined routes are operated on roads that substantially parallel the rail routes can be judged from the following table:—

Motor Transport Services over Defined Routes, January, 1930.

		Routes paralleling Rail Routes.	Routes partially paralleling Rail Routes.	Routes which do not parallel in Whole or in Part Rail Routes.	Total.
Vehicles	Number	717	167	1,288	2,172
Mileage	Miles	1,604,689	376,526	1,760,068	3,741,283
Passengers	Number	800,497	24,042	1,566,617	2,391,156
Freight	Tons	28,545	3,594	59,786	91,922
Receipts	£	77,151	20,416	96,845	194,412
	PERCENTAGES OF TOTALS.				
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
Vehicles		33	8	59	100
Mileage		43	10	47	100
Passengers		34	1	65	100
Freight		31	4	65	100
Receipts		40	10	50	100

Because a service is operated on a road that parallels the rail route it is not always safe to assume that it is competing with the railways. The goods handled may be picked up in areas lying between rail stations and transported to the nearest big rail station, in which case the services are complementary to the rail services. A certain amount of this is no doubt found in practice, but there is reason to believe that it would be the exception rather than the rule.

Of the 2,172 vehicles operated over defined routes in January last, approximately 41 per cent., or 884, were run on routes that paralleled in whole or in part rail routes. These vehicles accounted for 35 per cent. of the physical volume of passenger and goods business handled, and £97,567, or 50 per cent., of the total revenue.

No statistics are available regarding the operations of motor carriers, but there is probably a certain amount of casual long-haul business done on routes that parallel in whole or in part the rail routes.

E. FURTHER FACTORS RELATING TO ROADS.

1. CONSTRUCTION, MAINTENANCE, AND CLASSIFICATION OF ROADS.

In considering the road-transport problem of this country as far as the actual roads are concerned, the roading system may be investigated under two main classes—viz., Rural roads and urban roads. The former include all those roads in the country controlled by the County Councils and Road Boards, and all those main highways controlled by the Main Highways Board outside of borough and town districts; while the latter comprise all those roads and streets under the control of City Councils, Borough Councils, and Town Boards.

Last year the expenditure on the whole system amounted to £7,708,000, and of this sum—which, by the way, amounts to £5 5s. 10d. per head of the population—£5,685,000 was spent on the rural roads and £2,023,000 on the urban roads.

The following figures give some idea of the roading system under the two classes as regards standards, mileages, population, and cost, and from these figures it will be seen that New Zealand's real problem as far as road transport is concerned is the maintenance of and improvement to the rural roads.

MILEAGES AND STANDARDS OF ROADS.

	Rural.	Urban.	Totals.
Unformed roads	20,135	487	20,622
Unsurfaced roads	15,132	361	15,493
Surfaced in gravel or metal	28,815	2,808	31,623
Dustless surfacing	852	875	1,727
	64,934	4,531	69,465

MILEAGES IN RELATION TO POPULATION.

	Total Formed Roads.	Population per Mile of Road.
Rural roads	44,799	11·7
Urban roads	4,044	215·9

EXPENDITURE IN RELATION TO POPULATION.

	Total Expenditure. £	Expenditure per Head of Population. £ s. d.
Rural roads	5,685,000	10 17 0
Urban	2,023,000	2 6 5
Whole system	7,708,000	5 5 10

The Department proposes, therefore, to deal with the rural roading system in this report, although most of the conclusions arrived at will apply equally to the urban roads.

RURAL ROADS.

As previously stated, there are 44,799 miles of formed rural roads, of which 15,132 miles, or 34 per cent., are unsurfaced; 28,815 miles, or 64 per cent., are surfaced in gravel or metal; and 852 miles, or 2 per cent., are dustless; while on these roads the country expended last year the sum of £5,685,000. Since the advent of the motor-vehicle the yearly road bill has been steadily increasing, and it is essential that all the avenues of expenditure be explored in order to discover whether it is not possible to check this regular increase in the road bill without unduly restricting the development of road transport.

It is proposed to deal with the subject under the main headings of construction and maintenance, which represent the two avenues of expenditure.

CONSTRUCTION.

Under this heading are included the construction of new roads and road-structures, the surfacing and widening of existing roads, improvements to alignment, and the renewal of bridges, culverts, &c., on existing roads.

In the early days of this country, when such large areas of rich country were untapped, it was practically impossible to spend money on new roads which was not fully justified; but New Zealand has now reached that stage in its development when all new road-construction programmes should be carefully considered, and the following factors must be taken into consideration:—

(1) The transport-requirements of the district.
(2) Other transport facilities available.
(3) Probable growth of traffic in, say, five years.

It would then be possible to adopt definite standards as regards construction (including formation, surfacing, and structures), making reasonable provision for probable further development, and thus avoid the expenditure of large sums on unnecessarily high standards of roads.

The surfacing of and improvements to existing roads should also be dealt with in the same manner, and in this connection a traffic census taken at regular intervals of time would not only be of great assistance in formulating a definite policy of improvements, but is practically an absolute necessity if the expenditure on roads is to be carried out on an economical basis.

The following table, showing the cost of the various types of surfacing, together with their traffic-carrying capacity, as laid down by the Main Highways Board, indicate what an important item of the road bill surfacing is, and how essential it is not to adopt unnecessarily high standards.

Type of Surface (18 ft. wide).	Cost per Mile.	Traffic-carrying Capacity in Vehicles per Day.
Water-bound macadam	£1,500 to £2,500	Up to 300
Gravel	£1,000 to £1,500	Up to 500
Third-coat sealing	£2,700 to £3,900	500 to 1,500
Penetration	£3,500 to £4,900	500 to 1,500
Bituminous concrete (5 in.)	£5,500 to £6,000	Over 1,500
Portland-cement concrete	£6,500 to £8,000	Over 1,500

However, although unnecessarily high standards are to be avoided, yet the large majority of the rural roads of this country require improvement. When the motor-vehicle first made itself felt as a factor in road transport the rural roading system consisted of from thirty to forty thousand miles of narrow roads, partly gravel-surfaced, and, as maximum mileage for minimum cost had been the governing factor in road-construction, the alignment was generally bad and curves of 1 chain radius, sudden changes of grade, and narrow bridges were the rule rather than the exception—that is, the rural roads of New Zealand were built to accommodate traffic consisting of slow-moving horse-drawn vehicles and of a very low density, and were more or less unsuited for the fast-moving motor-vehicles and relatively dense road traffic of to-day.

This country will, therefore, not only have to find funds for new roads, but also have to find large sums each year for improvements to existing roads, and it is essential that this latter amount be spent on those roads which by the amount of traffic using them justify the expenditure. In other words, as there are not enough funds available to carry out all more or less necessary improvements to the

rural roads, the improvements should be put in hand in order of urgency, and conform to a definite national programme. The fact that any county or road-controlling authority has a large revenue, and is thus able to find the amount of money necessary to obtain a large subsidy from the Main Highways or Consolidation Fund, should not be considered in allocating moneys for road-improvements, but all allocations should be based as already stated on the relative urgency of the work.

To sum up, as regards construction it appears desirable that definite standards of construction and type and width of surfacing should be laid down, having regard to the following: (1) Density of traffic; (2) weight of traffic units; (3) maximum vehicle-speeds; (4) cost of suitable surfacing-materials; (5) character of subgrade; (6) climate.

These standards could then be adopted throughout the country, and roads suited to the traffic requirements would result. As traffic increased, these roads would be progressively improved in conformity with this increase, and thus the expenditure of large sums of money for the construction of or improvements to roads greatly in excess of traffic requirements would be avoided.

Maintenance.

Maintenance of roads represents the work required to maintain road facilities in a reasonable state of repair, and principally consists of the work required to make good the damage done to the road by traffic.

The wear of a road is governed by the impact effect of the vehicles using it, and the magnitude of the impact forces are influenced by four major factors: (1) The wheel-load; (2) the vehicle-speed; (3) the tire equipment; (4) the roughness of the road-surface.

That is, three of the major factors are associated with the vehicle and one with the character of the road-surface; and, as far as motor-lorries are concerned, the regulations governing their use are based on these three factors. These regulations give road-controlling authorities power to limit the wheel-load by classifying the roads under their control, and the classification of motor-lorries limits the speed of the vehicle and also takes into account the tire equipment.

Classification of Roads.

Although the power to classify roads was given to all road-controlling authorities in April, 1925, yet to-day only 27·5 per cent. of the rural roads of this country have been classified. When it is remembered that all unclassified roads are available for gross loads of 10 tons on two-axled motor-lorries and 15 tons on multi-axled vehicles, it will be seen that 73·4 per cent. of the roads of this country are open for these loads. The following table gives the present position as regards road-classification in the North and South Islands as far as the counties are concerned:—

——	First Class or Unclassified.	Second Class.	Third Class.	Fourth Class.	Fifth Class.
North Island	13,471	1,023	2,820	4,192	2,345
South Island	19,398	251	710	390	199
Totals	32,869	1,274	3,530	4,582	2,544

Table 29 included in the Appendix gives the details for each county.

The following table gives the numbers and licensed gross weights of the motor-lorries as registered in New Zealand in December, 1929, for the North and South Islands:—

——	1 Ton.	2 Tons.	3 Tons.	4 Tons.	5 Tons.	6 Tons.	Over 6 Tons.	Total.
North Island	13,112	4,764	1,194	632	236	23	18	19,979
South Island	5,680	1,689	464	220	113	28	6	8,200
Totals ..	18,792	6,453	1,658	852	349	51	24	28,179

During the year fifty different local authorities were visited, the roads under their control inspected and the question of classification discussed with the officers concerned.

By means of these inspections and discussions various anomolies in the existing road-classifications were removed, and a reasonably uniform system of classification adopted for the various counties, &c., visited.

Several of the Otago counties were also visited in an endeavour to bring about a co-ordinated system of road-classification for that area; but, unfortunately, some of these Councils failed to see the necessity for classification, and apparently propose to wait until the heavy motor traffic develops before classifying their roads.

In the North Island there are 19,979 motor-lorries, while road-surfacing materials are generally costly, and consequently the maintenance and construction problems facing road-controlling authorities there are much more serious than those of the South Island, where there are only 8,200 motor-lorries and gravel and metal is generally easily procurable. It is, therefore, not surprising that road-classification has received far more attention from local authorities in the North Island than from those in the South Island. However, road-classification is really just as important relatively in the South Island, and it is most desirable that the roads in this Island be classified before the heavy traffic develops, and not after the vehicles are on the road.

The essence of road administration from the point of view of both the cost of maintenance and the co-ordination of transport facilities is road-classification, and, seeing that the local authorities have in a large measure failed to classify the roads under their control, it is necessary for Government to take immediate steps to bring about a general road-classification of the rural roads of this country.

This classification would be based on the transport requirements of the district, the other transport facilities available, and the loads the road is capable of carrying.

In this connection it is interesting to note that apparently the same problem exists in Britain. Mr. Morrison, the Minister of Transport, in speaking on the clause in the Traffic Bill which empowers the Minister to restrict the use of vehicles on specified roads said: "The whole purpose of the clause was to secure the enforcement of certain national standards in regard to the restriction of the use of roads just as there were national standards in regard to highway signs. It was very important that the motoring community and the travelling community should know that the restriction of the use of the highway was to conform to some national system and plan, and there would not be the state of chaos that would result if local authorities pursued different policies without the Minister having the opportunity of hearing objections."

The map showing the present position as regards the classification of the main highways in the North Auckland district gives some idea of the necessity for a national system. For instance, on a trip from Auckland to Kaitaia the present classification allows the following gross loads: Through the Waitemata County, 4½ tons; through the Rodney, Otamatea, and Hobson Counties, 2½ tons; through Whangarei, 6½ tons; through the Bay of Islands, 4½ tons; through Whangaroa, 6½ tons; and through Manganui, 4½ tons.

Taking the road connecting the two principal towns—viz., Whangarei and Dargaville—where there is no rail connection, the road is classified from Whangarei to the county boundary as third class, open for 6½-ton gross loads, and there drops to a fifth-class road, open for 2½-ton gross loads to Dargaville.

To deal with the transport system of North Auckland on more general gounds, the position is as follows: The whole area is approximately 200 miles long and has a maximum width of approximately fifty miles, and is well served by a trunk railway from Auckland to Rangiahua, with two branch lines one to Opua and one to Kirikopuni, while there is also an isolated section of railway between Dargaville and Donnelly's Crossing. In addition there are numbers of small ports, of which the principal are Awanui, Mangonui, Russell, Hokianga, Whangarei, Kaipara, and Mangawai, which handle, in the aggregate, 50,000 tons inward and 150,000 tons outwards. With these transport facilities available, road transport as far as goods are concerned should be all comparatively short hauls, and, except in small isolated cases where the circumstances are exceptional, there is absolutely no necessity for roads of a high class in this area. Generally, it appears that fourth-class roads, available for gross loads of 4½ tons on two-axled motor-lorries and of 6½ tons on multi-axled vehicles, would meet all reasonable requirements for road transport for many years to come.

The building of high-class roads through this area will not only encourage the introduction of heavy motor-lorries which will run in direct competition with the railway, but will also mean a considerable increase in maintenance costs over all the roads in the district. That is, as far as North Auckland is concerned, the construction of first-class highways of unnecessarily high standards will have the following results: (1) Large and unnecessary increase in construction-costs; (2) increased yearly maintenance-costs on all roads; (3) loss of revenue on railways in this district.

The Department proposes to take up the question of a general review of the road-classification in this district as soon as time permits.

By an amendment to the regulation governing this classification of roads the use of the multi-axled machine is encouraged, for the reason that a vehicle of this type will do less damage to the roads even when carrying heavier loads than the ordinary two-axled motor-lorry. Data from impact tests indicate that for two trucks carrying the same load and identical, except for the rear-end construction, the unsprung component of the impact reaction of the six-wheeled vehicle is about one-half that of the four-wheeled vehicle. From this it will be seen that by means of the increased use of this type of vehicle, in place of the two-axled motor-lorry, the carrying-capacity of all of our roads would be greatly increased without any increase in the construction or maintenance costs.

Speed.—This is the most important factor as regards the effect of traffic on roads, especially on roads surfaced in gravel or macadam and unsurfaced. When it is realized that provided both vehicles are similarly tired and sprung, a truck of a gross load of 2½ tons travelling at thirty miles per hour will do as much damage as a truck of a gross load of 10 tons travelling at fifteen miles per hour, the necessity for speed-restriction is apparent.

An ordinary private motor-car travelling at thirty-five miles per hour will do more damage to a gravel or macadam road than will a 10-ton-pneumatic-tired motor-lorry travelling at twelve miles per hour. In addition to the damage factor, the question of safety has to be considered; and, as the majority of the roads of this country are quite unsuited for excessively high speeds, both as regards surfacing and alignment, some form of speed-restriction is not only justified, but, in view of the alarming increase in motor accidents, essential.

If a definite maximum speed-restriction of, say, thirty-five miles per hour were placed on the ordinary motor-car and rigidly enforced, this Department is satisfied that it would materially decrease the road-maintenance bill, and also decrease the number of motor accidents, without materially affecting the efficiency of passenger transport by road. In this connection the service-car proprietors are generally in favour of a definite speed-restriction.

Tire Equipment.—The importance of this factor on the road-maintenance bill will be realized after reading the following extract: "With pneumatic tires the magnitude of impact seldom exceeds

twice the static wheel-load. With new solid tires it may reach three or four times the static wheel-load, and with badly worn solid tires the impact may be as much as six or eight times as great as the static wheel-load." The use of pneumatic tires is encouraged by allowing increased speeds to motor-lorries fitted with them, and the motor-vehicle owner himself now realizes that they are a payable proposition by reducing vehicle-maintenance costs.

The Roughness of the Road-surface.—In order to make full use of the 800-odd miles of dustless roads in the rural roading system the Department proposes to recommend an increase of four miles per hour for all motor-vehicles on approved roads of this type. Owing to their smoothness when compared with the average gravel or macadam road this increase in speed will not mean any increase in the impact effect, and will materially increase the carrying-capacity of these roads.

General.

"The motor-vehicle is the fastest and most efficient machine which has yet run on the face of the earth." In order that this country may take full advantage of this wonderful means of transport it is essential that our roading system be improved and that all roads be well maintained; but in view of the large and ever-increasing cost it is also essential that all moneys expended be spent in developing a national system on a well-formulated plan. It is also essential that any unnecessary and wasteful use of the roading system by commercial vehicles be eliminated.

The following conclusions have therefore been arrived at:—

(1) The rural roading system of this country must be dealt with from the national viewpoint, and the roads under each controlling authority must be constructed and maintained so as to form an integral part of New Zealand's road system. The radius of the motor-vehicle is not confined to county boundaries.

(2) By means of road-classifications and the licensing of commercial motor services unnecessary and wasteful use of the roads would be reduced, and only those services allowed on the road that are required to meet the transport-requirements of the district.

(3) By means of a road census taken at regular intervals of time, and a general investigation into the traffic-requirements of the district and other traffic facilities available, the construction of roads of unnecessarily high standards would be avoided, and also a definite national programme of improvement and development could be adopted.

(4) By regulations governing speeds, tire equipment, and types of vehicles, and by the classification of all roads, maintenance costs would be reduced without unduly restricting the development of road transport.

(5) By the encouragement of the multi-axled motor-vehicle the present carrying-capacity of all rural roads would be materially increased without increase in the construction or maintenance costs.

2. ROAD COSTS AND THE MOTOR IN NEW ZEALAND.

Introductory.

The roading problem in a young country such as New Zealand may be said to exhibit three distinct phases—

(1) The initial period, when the provision of some measure of road facilities is of paramount importance, and the roading programme is limited only by the ability to pay. During this period it is to be expected that, as the land to which access is given becomes productive, the ability to pay will increase, and roading costs *per capita* will show an upward tendency.

(2) The cost *per capita* obviously cannot go on increasing indefinitely, and sooner or later a period will arrive when *per capita* costs will remain more or less constant, financial considerations preventing its rising, and the demand for more and improved roads rendering any reduction impracticable.

(3) When the point of saturation is reached, and expenditure is necessary only for maintenance and occasional construction and reconstruction, the total annual expenditure should theoretically show a decline, but even if in actual practice it remains stationary (assuming a still increasing population) the *per capita* cost should be lessened.

Mr. C. T. Brunner, M.A., an English authority on transport economics, assumes that in Great Britain the third phase had been reached prior to the advent of the motor. Since of New Zealand's 69,465 miles of legal roads 20,622 miles are either unformed or merely bridle-tracks, and of the 48,843 miles which are formed 15,493 miles are not paved or surfaced, it seems extremely doubtful if we can be considered to be out of the first phase, or could have been so considered if the transition had not been postponed by the requirements of the motor.

Increases in Road Expenditure.

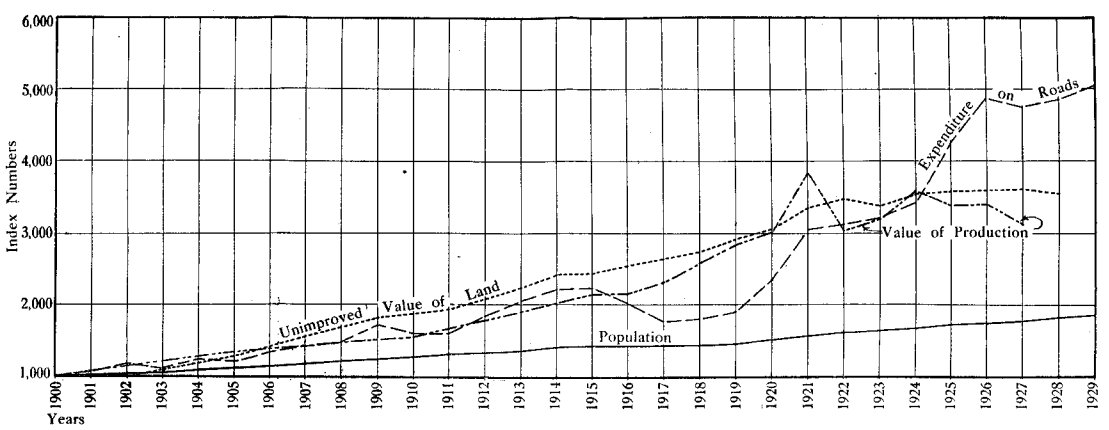
Using the unimproved value of land and the annual volume of national production as indexes of the production of wealth, it is possible to relate the road expenditure to production, which may be regarded as a guide to ability to pay for roads. Complete data have not been available, but every effort has been made to make the best use of that in official records.

The following table shows the unimproved value of land, the value of production, and the expenditure on roads (exclusive of interest and sinking-fund charges, and the cost of upkeep of road-making machinery) from 1900 to 1929, together with index numbers relating each series to the base year 1900 :—

Year.	Absolute Figures.				Index Numbers.			
	Unimproved Value of Land.	Value of Production.	Expenditure on Roads.		Unimproved Value of Land.	Value of Production.	Expenditure on Roads.	
			Actual.	Adjusted.			Actual.	Adjusted
	£	£	£	£				
1900 ..	..	33,431,447	1,130,315*	1,130,315*	..	1000	1000	1000
1901 ..	..	..	1,209,443*	1,209,443*	..	..	1070	1070
1902 ..	94,847,727	..	1,349,385*	1,349,385*	1000	..	1194	1194
1903 ..	..	..	1,274,561*	1,255,725*	..	..	1128	1111
1904 ..	..	..	1,413,272*	1,393,759*	..	..	1250	1234
1905 ..	122,937,126	45,034,025	1,377,186*	1,351,507*	1296	1347	1218	1196
1906 ..	..	..	1,524,925*	1,497,962*	..	..	1349	1326
1907 ..	149,682,689	..	1,621,486*	1,588,135*	1578	..	1435	1405
1908 ..	..	..	1,692,019*	1,642,737*	..	..	1497	1454
1909 ..	172,759,948	..	1,946,087*	1,851,653*	1821	..	1722	1639
1910 ..	..	52,622,746	1,816,662*	1,718,696*	..	1574	1607	1521
1911 ..	184,062,798	..	1,812,247*	1,704,842*	1941	..	1603	1509
1912 ..	..	..	2,106,964*	1,974,662*	..	..	1864	1748
1913 ..	212,963,468	..	2,358,610*	2,198,145*	2245	..	2087	1945
1914 ..	228,493,376	..	2,498,709*	2,263,323*	2409	..	2211	2003
1915 ..	230,705,147	71,783,197	2,478,922	2,153,712	2432	2147	2233	1906
1916 ..	241,322,255	72,836,180	2,291,481	1,881,347	2544	2179	2027	1665
1917 ..	251,087,708	77,423,246	2,032,203	1,619,285	2647	2316	1798	1499
1918 ..	260,921,812	86,800,536	2,054,551	1,563,585	2751	2596	1818	1384
1919 ..	275,988,409	94,622,635	2,162,824	1,577,559	2910	2839	1913	1396
1920 ..	290,880,264	100,757,354	2,666,137	1,816,170	3067	3014	2359	1607
1921 ..	317,631,245	94,290,946	3,469,408	2,058,996	3349	3820	3069	1822
1922 ..	329,174,337	101,331,100	3,534,566	1,934,628	3471	3031	3127	1712
1923 ..	330,790,991	106,994,158	3,630,122	2,045,139	3382	3200	3212	1810
1924 ..	333,869,581	119,668,702	3,857,861	2,212,076	3520	3580	3413	1858
1925 ..	339,310,260	113,130,393	4,818,076	2,720,540	3577	3384	4263	2408
1926 ..	341,047,952	113,611,575	5,521,019	3,063,829	3596	3398	4884	2711
1927 ..	341,519,107	121,053,912	5,366,705	2,945,502	3601	3121	4748	2606
1928 ..	335,217,075	..	5,480,995	3,001,640	3534	..	4849	2656
1929 ..	344,757,796	..	5,696,732	3,429,714	..	..	5040	3034

* Including figures interpolated for expenditures by Borough Councils, which are not available.

The trends in the four series are clearly outlined in the following graph, the curves in which have been constructed from the index numbers shown in the table :—



The outstanding point in the table and graph is that road expenditure in New Zealand increased *pari passu* with " ability to pay " up to 1925, but that since that year road expenditure has increased at a greater relative rate than has " ability to pay."

It is true that in earlier years road expenditure may have been below our " ability to pay." This, however, is hardly likely, particularly if it is borne in mind that New Zealand is a relatively young country. The outstanding *prima facie* conclusion emerging from these figures is that, judged by the standards of previous years, our road expenditure at the present time is more than we can afford.

Road Expenditure per Head of Population.

Road expenditure *per capita* from 1900 to 1911 shows a definite and fairly regular trend increasing from £1·4 to £1·7 (or £1·6 adjusted). The years 1912, 1913, and (to a lesser extent) 1914 saw a decided upward movement followed by a drop which in 1916 came below the " apparent normal," which it did not again exceed until 1925.

Since 1925 expenditure has risen above what may be regarded as the normal figure established by those for preceding years.

The following table shows the mean population and the expenditure (excluding interest and capital charges and the cost of upkeep of roadmaking machinery) for the years 1900 to 1929 :—

Year.	Mean Population.	Expenditure on Roads *per Capita*.		Year.	Mean Population.	Expenditure on Roads *per Capita*.	
		Actual.	Adjusted.			Actual.	Adjusted.
		£	£			£	£
1900	792,501	1·4	1·4	1915	1,145,027	2·2	1·8
1901	808,811	1·5	1·5	1916	1,150,318	2·0	1·6
1902	824,501	1·6	1·6	1917	1,149,225	1·8	1·4
1903	845,566	1·5	1·5	1918	1,152,748	1·8	1·4
1904	870,047	1·6	1·6	1919	1,166,482	1·9	1·4
1905	895,108	1·5	1·5	1920	1,207,660	2·2	1·5
1906	920,615	1·6	1·6	1921	1,252,206	2·8	1·6
1907	949,650	1·7	1·6	1922	1,285,711	2·8	1·5
1908	973,459	1·7	1·7	1923	1,311,381	2·8	1·6
1909	1,000,692	1·9	1·8	1924	1,334,029	3·0	1·7
1910	1,025,638	1·8	1·7	1925	1,359,995	3·5	2·0
1911	1,045,706	1·7	1·6	1926	1,392,073	3·9	2·2
1912	1,069,828	1·9	1·8	1927	1,420,762	3·8	2·1
1913	1,096,467	2·2	2·0	1928	1,443,323	3·8	2·1
1914	1,125,628	2·2	2·0	1929	1,459,983	3·9	2·3

Road Expenditure chargeable to Motor Traffic.

It is believed by a number of authorities that the measure of special motor-taxation should be the difference between what may be regarded as the normal aggregate of road expenditure, as judged by pre-motor days, when the State and local authorities provided the annual maintenance and capital charges, and the construction money was generally, as now, found out of loans and the present expenditure. Applying the average expenditure for the decade 1910–20, due allowance being made for fluctuations in the value of money, it would appear that the normal expenditure, excluding the increase due to motor transport, would be in the vicinity of £2,800,000. Excluding loan-expenditure, the road expenditure during the year ended 31st March, 1929, amounted to approximately £5,700,000, leaving approximately £2,900,000 as an estimate of the additional expenditure due to motor traffic. Special motor-taxation in the form of license fees, fines, &c., petrol-tax, tire-tax, and heavy traffic fees amounted to approximately £1,470,000 in 1928–29, and to £1,780,000 in 1929–30. Customs duties and primage on motor-vehicles and parts aggregated £1,332,000 in 1929–30.

Public Indebtedness on Account of Roads, Streets, Bridges, etc.

The following figures show the outstanding public indebtedness in respect of roads, streets, and bridges at 31st March, 1927, 1928, and 1929 :—

Year ended 31st March,	General Government.	Local Authorities.	Total.
	£	£	£
1927	16,017,253	13,465,876	29,483,129
1928	17,075,387	14,908,741	31,984,128
1929	18,395,183	15,375,893	33,771,076

Actual data are not available showing a division of the indebtedness of the General Government into rural and urban roads. It would appear, however, that the greater portion of the debt represents expenditure on rural roads.

The local authorities' portion of the indebtedness at 31st March, 1929, is divided between the various classes of authorities, as follows :—

	£
Counties	6,117,324
Boroughs	8,785,413
Town districts	280,073
Road districts	193,083
Total	£15,375,893

TOTAL ANNUAL EXPENDITURE ON ROADS, STREETS, BRIDGES, ETC.

The following table shows, according to the channel through which it was made, the total expenditure (covering both interest and sinking-fund charges) during the years ended 31st March, 1927, 1928, and 1929 :—

Channel through which Expenditure made.	1926–27.	1927–28.	1928–29.
Local authorities—			
Counties—	£	£	£
Main highways	998,590	915,206	1,113,508
Other roads	1,483,398	1,428,012	1,241,693
Total	2,481,988	2,343,218	2,355,201
Boroughs	1,782,264	1,748,896	1,518,538
Town districts	95,212	92,620	75,031
Road districts	180,826	154,917	58,310
Interest and sinking-fund charges (all local authorities)	875,282	969,068	999,511
Totals, local authorities ..	5,415,572	5,308,719	5,006,591
General Government—			
Main Highways Board—			
Construction	289,237	305,176	649,465
Maintenance	157,886	192,815	263,089
Public Works Department—			
Construction	347,422	599,303	752,634
Maintenance	31,870	44,050	24,464
Interest and sinking-fund charges on public debt	880,949	939,176	1,011,735
Totals, General Government ..	1,707,364	2,080,520	2,701,387
Grand totals, Dominion expenditure	7,122,936	7,389,239	7,707,978

The above figures should not be confused with those given earlier in this report from 1900 onwards; these figures were available for the three years only, and include interest and sinking-fund charges, which were not available for the years previous to 1926–27.

Expressed in relation to the population and the miles of formed roads the total expenditure on roads given above shows the following figures :—

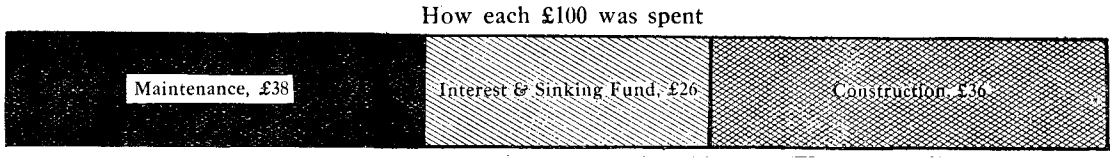
Year ended 31st March,	Per Head of Population.	Per Mile of Formed Road.
	£ s. d.	£
1927	5 0 3	150
1928	5 2 5	155
1929	5 5 10	160

Owing to the absence of data relating to interest and sinking-fund charges it was not possible to give the above figures for more than the three years shown.

The difference between the roading problem in densely and sparsely populated countries is to be seen in the figures for England, Scotland, and Wales, which show a much higher expenditure per mile of road (£380), but an expenditure per head of population (£1 10s. 6d.) that represents only 30 per cent. of the corresponding New Zealand figure.

Nature of Expenditure.—The relevant data available show that of the total expenditure on roads, streets, and bridges for the year ended 31st March, 1929, 38 per cent. was expended on maintenance, 26 per cent. on interest and sinking-fund charges, and 36 per cent. on construction. The following graph shows how each £100 of the total expenditure for 1928–29 was spent :—

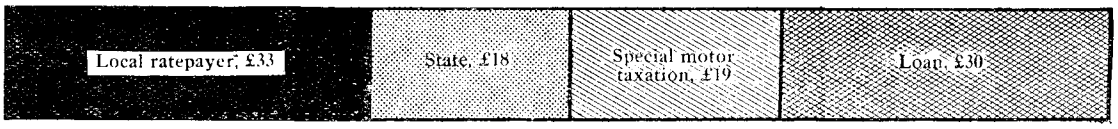
EXPENDITURE ON ROADS, ETC.,
1928–29,
How each £100 was spent



It should be noted that in the foregoing figures it has been assumed that the expenditure of local authorities' revenue from rates represents maintenance expenditure.

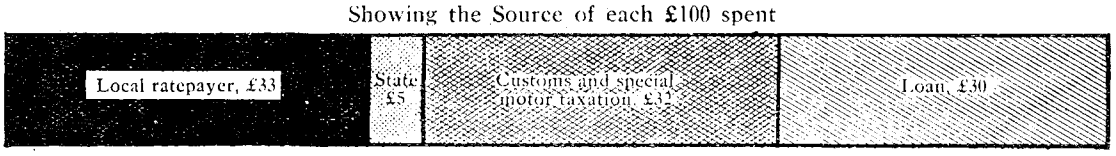
Source of Revenue.—The following graph shows the principal sources of revenue that provided the money involved in the expenditure on roads, streets, and bridges during the year ended 31st March, 1929 :—

EXPENDITURE ON ROADS, STREETS, ETC.,
1928-29,
Showing the Source of each £100 spent



If Customs duties paid in respect of motor-vehicles and parts during the calendar year 1928 are added to the special motor-taxation the portion of the annual road bill contributed by the motor per medium of these channels of taxation is 32 per cent. The following graph has been prepared from these changed figures :—

EXPENDITURE ON ROADS, ETC,
1928-29,
Showing the Source of each £100 spent



ROAD STANDARDS AND VEHICLE-OPERATING COSTS.

Some idea of the effects of road standards on the costs of operating motor-vehicles is to be had from the following table :—

Table showing the Relative Cost of operating an Imaginary "Average" Automobile on various Classes of Roads. (Annual Mileage, 11,000 Miles.)

(N.B.—Data prepared by Iowa University, United States of America.)

Item of Cost.	Approximate Relative Cost of Operation in Cents per Mile.		
	High-type Roads.	Intermediate-type Roads.	Low-type Roads.
	Cents.	Cents.	Cents.
Gasoline	1·09	1·31	1·61
Oil	0·22	0·22	0·22
Tires and tubes	0·29	0·64	0·84
Maintenance	1·43	1·72	2·11
Depreciation	1·26	1·39	1·57
License	0·14	0·14	0·14
Garage at 4 dollars per month	0·44	0·44	0·44
Interest at 6 per cent.	0·36	0·36	0·36
Insurance	0·21	0·21	0·21
Total cost	5·44	6·43	7·50

As indicated by the above figures, it costs 18 per cent. and 38 per cent. more to operate a motor-vehicle on an intermediate type of road and a low type of road respectively, than on a high type of road. Bearing in mind the fact that the annual cost of motor transport (excluding the costs of the roads) in all its phases in this Dominion is approximately £28,000,000, it is readily seen that improvements in road standards may be followed by enormous reductions in the annual cost of motor transport.

Of the 48,843 miles of formed roads in New Zealand at 31st March, 1929, 1,727 miles may be regarded as high type ; 31,623 as intermediate type, and 15,493 as low type. It would be difficult to attempt any estimation of the reduced operating-costs due to road-improvements, as all roads are not used to the same extent.

This problem of reducing operating-costs of motor transport is probably the most important aspect of the road problem, but strangely enough more attention has been directed towards the more direct side of the question—namely, expenditure on roads. The question of reduced operating-costs has not been considered to any great extent in this country.

These figures are sufficiently illuminating to indicate that there are two definite angles from which the roading question may be examined. They also direct attention to the possibilities in the direction of applying actual economic and financial principles to the provision of roads.

The following extract from a publication by Mr. E. W. James, Chief, Division of Design, United States Bureau of Public Roads, is of interest:—

> Roads should be built only to the extent and of such types as will pay for themselves. Sound economic, financial, and technical principles should prevail over the exigencies of transitory political conditions.
>
> Finally, it must be clear . . . that any highway expenditure to be justified must be earned by the road in the form of cheaper transportation. This means that there must be enough traffic, and the type of improvement shall be such that the actual saving in cost of transportation shall at least equal the cost of the improvement. This alone justifies the cost of highway construction.
>
> During its life a highway must pay for itself; otherwise it will be a luxury, whereas our entire discussion of the creation, design, construction, maintenance, and financing of a national highway system has been from the point of view that highways are fundamental requirements in a healthy, progressing, prosperous, and ambitious nation.

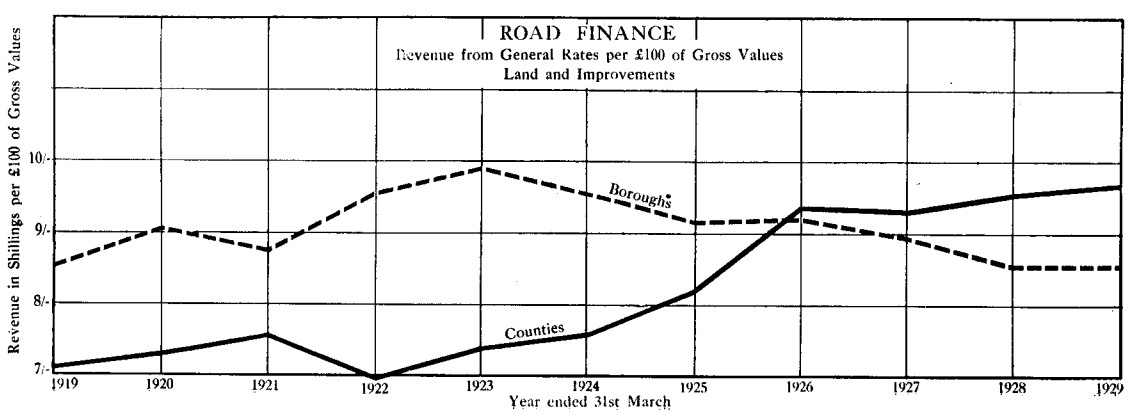
Growth of Urban and Rural Rates.

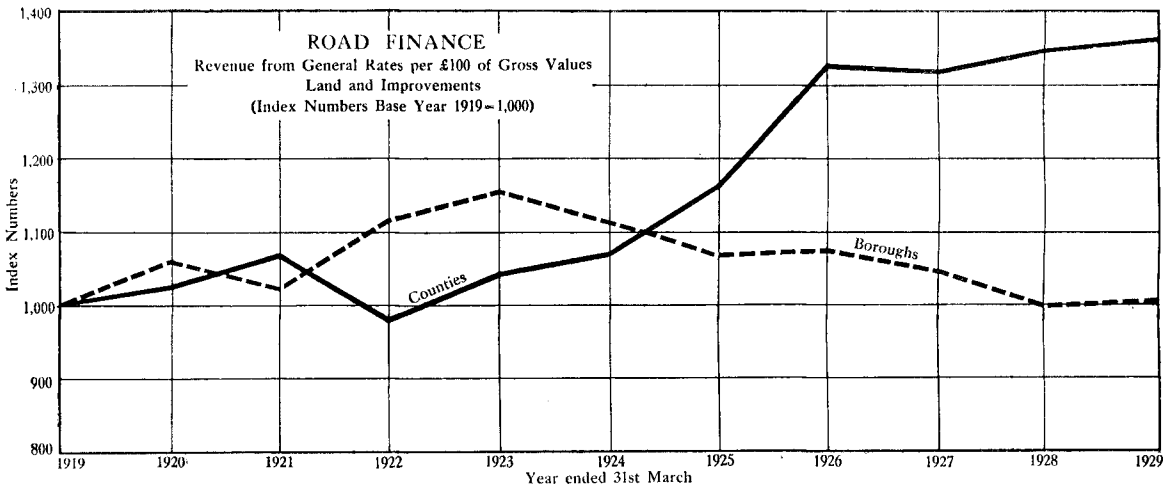
Lack of the necessary data at the present time has precluded showing the actual amount collected in rates by local authorities and expended on roads, streets, and bridges. The best indications available at the present time are the annual receipts from general rates. It is true that, in the case of boroughs, particularly, other avenues of local-body activity beside roads, streets, and bridges may obscure the position from the roading point of view. Nevertheless, the information available points to the fact that the growth of the general rates in the case of the counties at least may be regarded as reasonably reflecting the increasing rural road bill.

The following table shows the annual receipts of general rates per £100 of gross capital values for counties and boroughs for the years ended 31st March, 1919, to 1929, together with relative numbers showing the percentage variation from the base year, 1919:—

Year ended 31st March,	General Rates per £100 Gross Capital Values.		Relative Numbers (1919=1000).	
	Counties.	Boroughs.	Counties.	Boroughs.
	s. d.	s. d.		
1919	7 1	8 7	1,000	1,000
1920	7 3	9 1	1,028	1,061
1921	7 7	8 9	1,068	1,023
1922	7 0	9 7	980	1,117
1923	7 5	9 11	1,042	1,157
1924	7 7	9 7	1,071	1,117
1925	8 3	9 2	1,161	1,070
1926	9 5	9 2	1,329	1,075
1927	9 4	9 0	1,317	1,049
1928	9 7	8 7	1,348	1,000
1929	9 8	8 7	1,365	1,005

The following graphs show the position quite clearly, the first showing the general rates per £100 of gross capital values, and the second showing the percentage movements for both counties and boroughs:—





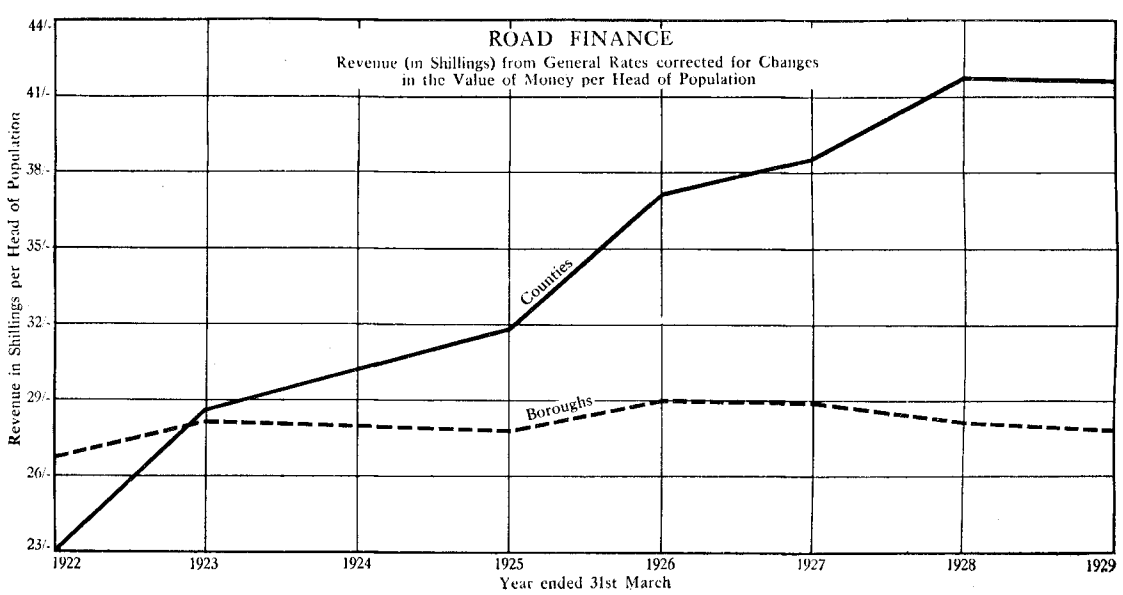
The first graph shows that since 1926 the annual receipts from general rates per £100 of gross capital values have been higher for counties than boroughs.

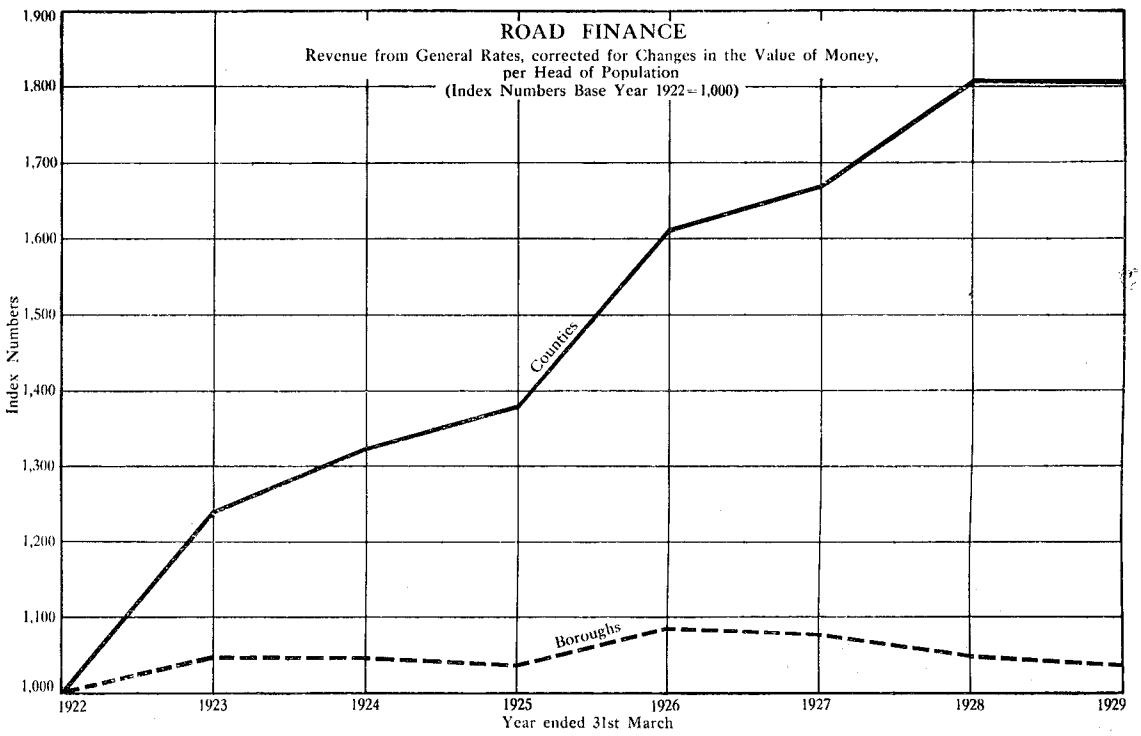
The second graph shows that while urban general rates were declining, relatively to gross capital values from 1923 onwards, the corresponding figure for rural or county areas was increasing at a fairly sharp rate until 1926, since when a very slight upward movement has been manifest. The figure for counties in 1929 was 36·5 per cent. greater than that for 1919, while that for the boroughs showed an increase of only 0·5 per cent.

From the point of view of ability to pay, the relationship between capital values and rates is of more significance than that between rates and population. The following figures showing the annual receipts from general rates (corrected for changes in the value of money) for counties and boroughs for the years ended 31st March, 1922 to 1929, are, however, of interest :—

Year ended 31st March,	General Rates per Head of Population.		Relative Numbers (1922=1000).	
	Counties.	Boroughs.	Counties.	Boroughs.
	£ s. d.	£ s. d.		
1922	1 3 1	1 6 11	1,000	1,000
1923	1 8 8	1 8 2	1,241	1,047
1924	1 10 7	1 8 1	1,324	1,044
1925	1 11 10	1 7 10	1,380	1,035
1926	1 17 2	1 9 1	1,610	1,083
1927	1 18 6	1 8 11	1,669	1,075
1928	2 1 7	1 8 2	1,806	1,048
1929	2 1 9	1 7 10	1,802	1,034

The following graphs show the absolute and relative movements in the annual receipts from general rates per head of population, as shown above :—





The two foregoing graphs show that since 1923 the annual receipts from general rates per head of population have been higher in counties than boroughs, and that while the relative burden of the rates from the population aspect has remained on a fairly even level for boroughs, it has been increasing rapidly in counties. The figure for counties in 1929 was 80·2 per cent. greater than that for 1922, whereas that for the boroughs showed a gain of only 3·4 per cent.

Granting that the foregoing remarks do not definitely establish that the evolution in motor transport in recent years has been the sole cause of the rise in county rates, there is reason to believe that it has been the major cause. The outstanding point of practical importance in this is that, as the prosperity of New Zealand is dependent on the state of the farming industry, we cannot afford to allow the present position to pass unnoticed if it is discovered that an undue burden has been allowed to develop on the farmer. The matter is considered of sufficient importance to warrant special detailed investigation, and a departmental Committee that has been set up for the purpose of investigating the whole question of road finance will give special attention to this matter. By means of actual surveys covering typical farms in all counties, it is anticipated that it will be possible to show the real position and enable any economic adjustments that may be considered necessary to be made. The Department is being assisted on this Committee by representatives from the Treasury, Public Works Department, and Agriculture Department.

Special Motor-taxation.

In pre-motor days the annual expenditure necessary in connection with roads, streets, and bridges, was derived from three main sources—viz., the local ratepayers, the general Government, and loans. A certain amount of revenue was also derived from special licenses charged in respect of the use of certain of the heavier types of vehicles.

The introduction of the motor was followed by increased maintenance costs of roads, and a demand for higher-standard roads. Following the experience of other countries, a fourth source of revenue was created to meet the increased costs of maintenance—viz., special motor-taxation. This special taxation is now represented by the motor-spirits tax, the tire-tax, registration and license fees, heavy-traffic fees, and drivers' license fees.

The following summary shows the receipts from the various sources of special motor-taxation for the years ended 31st March, 1923 to 1930:—

Year ended 31st March,	Tire-tax.	Motor-spirits Tax.	Fees, &c., under Motor-vehicles Act, 1924.	Heavy-traffic Fees.	Drivers' Licenses.	Total.
	£	£	£	£	£	£
1923	121,092	..	..	..	..	121,092
1924	123,568	..	..	..	..	123,568
1925	152,303	..	257,500	..	..	409,803
1926	228,711	..	86,681*	114,009	33,162	462,563
1927	190,575	..	395,797	220,616	50,650	857,638
1928	227,451	143,516	345,510	157,651	52,495	926,623
1929	196,747	802,232	244,598	190,789	36,830	1,471,196
1930	155,910	961,907	391,368	220,000	50,000†	1,779,185
Totals up to 31st March, 1930	1,396,357	1,907,655	1,721,454	903,065	223,137	6,151,668

* Alteration in licensing period. † Estimated.

All the special taxation shown in the first three columns of the preceding table is earmarked for expenditure on roads that have been classified as main or secondary highways. Revenue from heavy-traffic fees is required to be spent on the maintenance of roads, but that from drivers' licenses goes into the General Fund of the local authorities.

Heavy-traffic Fees.

The following table shows the amounts paid in heavy-traffic fees in respect of each class of vehicle during the years ended 31st March, 1926, 1927, 1928, and 1929:—

Type of Vehicle.	Type of Tire.	Year ended 31st March, 1926.	1927.	1928.	1929.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Carrying passengers and luggage only	Pneumatic ..	13,334 2 9	25,568 9 11	28,582 17 9	31,265 15 3
	Super-resilient ..	..	..	..	..
	Solid	375 0 0	1,041 13 6	92 0 0	..
	Total ..	13,709 2 9	26,610 3 5	28,674 17 9	31,265 15 3
Carrying goods only ..	Pneumatic ..	13,680 16 5	28,951 15 3	40,344 8 8	57,181 15 10
	Super-resilient ..	..	..	2,374 9 3	2,042 16 6
	Solid	45,743 5 6	76,604 12 4	77,034 0 4	81,818 7 9
	Total ..	59,424 1 11	105,556 7 7	119,752 18 3	141,043 0 1
Carrying both passengers and goods	Pneumatic ..	2,500 7 6	3,114 6 0	3,577 17 11	3,890 12 0
	Super-resilient ..	..	..	20 5 4	67 10 7
	Solid	1,962 9 8	984 1 0	1,259 5 10	593 6 4
	Total ..	4,462 17 2	4,098 7 0	4,857 9 1	4,551 8 11
Total, all classes of vehicles	Pneumatic ..	29,515 6 8	57,634 11 2	72,505 4 4	92,338 3 1
	Super-resilient ..	..	..	2,394 14 7	2,110 7 1
	Solid	48,080 15 2	78,630 6 10	78,385 6 2	82,411 14 1
	Total ..	77,596 1 10	136,264 18 0	153,285 5 1	176,860 4 3

The figures given in the above table and in Tables 12 to 14 of the Appendix to this report are exclusive of four counties, four boroughs, and one town district, which did not supply the necessary information.

The regulations empowering the collection of heavy-traffic fees by local authorities provide that the revenue therefrom must be spent on the maintenance of roads. It is commonly believed that the object of the heavy-traffic fees is to make good the damage wrought on the roads by the heavier types of vehicles. This is erroneous, since if the regulations relating to speed and classification of roads are observed, the heavier vehicles do not, as far as existing knowledge goes, cause any greater damage to the roads.

Heavier vehicles call for expenditure on the strengthening of foundations to bear their weight and the easing of gradients to enable heavy loads to be carried, and the heavy-traffic fees represent their contribution towards these extra road costs, which would not, except where traffic is dense, be justified for use by the lighter types of vehicles.

The following diagram shows the differences in the estimated annual costs per mile per annum for 2½, 6½, and 10-ton-capacity roads, with gravel and dustless surfaces respectively:—

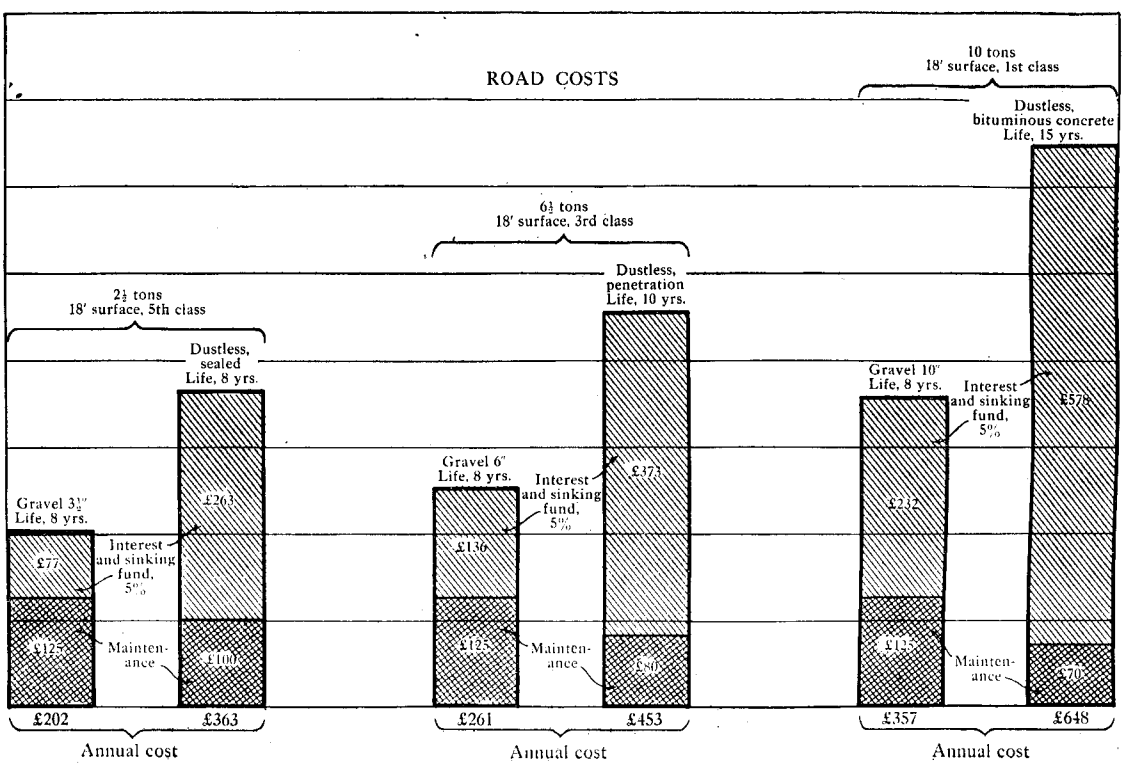


Table 27 of the Appendix shows the yield from Customs taxation on motor-vehicles and parts for the calendar years 1919 to 1929.

Heavy Traffic Fees in United States of America.

Reference has already been made to the existence, in most countries employing motor transport to any great extent, of systems of taxation that impose higher rates on the heavier types of vehicles. The following figures show comparisons on the pay-load capacity of trucks in New Zealand and the average for trucks in ten American States where the structure of the taxation scale made comparisons possible :—

Pay-load Capacity.	New Zealand.	United States (Averages for Ten States).	Difference.
	£ s. d.	£ s. d.	£ s. d.
Under 1 ton	..	3 2 0	..
1 –1½ tons	5 2 0	4 18 0	0 4 0
1½–1¾ „	10 4 0	6 3 0	4 1 0
1¾–2 „	13 12 0	6 10 0	7 2 0
2 –2½ „	18 14 0	9 19 0	8 15 0
2½–3 „	25 10 0	12 10 0	13 0 0
3 –3½ „	32 6 0	16 0 0	15 16 0
3½–4 „	40 7 6	20 9 0	19 18 6
4 –4½ „	48 17 6	30 1 0	18 16 6
4½–5 „	59 10 0	34 18 0	24 12 0
5 –6 „	..	54 4 0	..

N.B.—It should be noted that the above figures do not cover petrol-tax ; in New Zealand the petrol-tax is now 6d. per gallon, whereas the average of this tax in the ten States covered was equivalent to 2d. per gallon.

An outstanding difference between the American and New Zealand scales is that the former provides for all classes of trucks, observing no minimum, whereas the New Zealand scale observes the gross load minimum of 2 tons which is equivalent to a pay-load capacity of approximately 1 ton. The American monetary expressions have been converted into equivalent English money on the assumption that 4·83 dollars = £1.

The New Zealand scale is higher than the American throughout, the differences ranging from £4 1s. per annum for a 1½ tons to 1¾-tons truck to £24 12s. for the largest two-axle vehicles allowed on New Zealand roads—viz., those having a gross load weight of 10 tons, which is equivalent to a pay-load capacity of approximately 5 tons.

It should be noted that there are relatively more trucks in the United States than in New Zealand, that the volume of traffic on the roads is much greater, and that the road costs per unit of traffic are consequently much lower there than in this country.

Basis of Taxation.

Broadly speaking the "user" principle is generally recognized in countries using motor transport to any appreciable extent as the best practicable basis for special motor-taxation. It is found for the most part in the form of a motor-spirits tax supplemented by special fees, generally on a sliding scale, for the heavier types of vehicles.

Use as measured by mileage is reflected in the petrol consumption, so that with the petrol-tax the amount paid moves with the mileage run. From the point of view of use as indicated by weight, the petrol-tax varies according to the weight and type of vehicle, since the petrol-consumption is relatively lower for a light than a heavy vehicle. Assume a light vehicle in the form of a private car, the gross weight of which is one ton, doing twenty miles per gallon, and a 3-ton lorry with a gross weight of 6 tons, doing eight miles to the gallon ; assume further, a petrol-tax of 6d. per gallon. This means on a ton-mile basis that the tax on the private car amounts to 0·3d. per mile, while in the case of the lorry, it amounts to 0·75d., or two and a half times that for the car.

Yet the gross load of the lorry is eight times that of the car.

The ton-mile formula, however, does not cover the whole question. It is estimated, for instance, that the road that will carry the car will involve an additional annual expenditure of £150 if it is gravel and £280 if it is dustless to carry the lorry.

The following extract from the report of the Departmental Committee on the Taxation and Regulation of Motor-vehicles set up by the Ministry of Transport in Britain in 1924 is of particular interest in the Dominion to-day :—

We have said enough to indicate that it is not in our opinion possible to accept without qualification the argument that, because the proceeds of the tax are intended to be applied to the maintenance and improvement of the highways, the use which any vehicle makes of the road should be the sole measure required to determine the rate of duty to be paid in respect of that vehicle. There are other factors to which, when we last reported, we thought regard should be had, and which we still think cannot be left out of account, though we do not feel it incumbent upon us to assign specific weight to each.

There is, however, one point with which it appears to us particularly relevant to deal in short detail.

It is often suggested that the use made of the roads by any vehicle is measured by the wear-and-tear due to such use, but a brief consideration of the facts will show that this is not a complete statement of the case.

At the present moment and during the past few years much of the excessive wear-and-tear of the roads has been due to the breaking-down of foundations which have not yet been put into proper condition to stand the increased traffic. When once this initial work has been completed wear-and-tear will tend to be confined in a much greater degree to the actual surface, and the dead weight of the vehicle will not count for so much. Broadly, it may be said that the heavier vehicles call for expenditure on the strengthening of foundations to bear their weight, and the easing of gradients to enable heavy loads to be carried, whilst the lighter and faster vehicles call for expenditure on the improvement of surfaces and the widening and better alignment of the carriageway, so as to allow higher speeds with safety and comfort.

It will thus be seen that a simple ton-mile formula would not afford a true measure of the user of the roads, and, in order to be even approximately accurate, any formula for the calculation of this quantity could only be settled after the examination of a considerable volume of statistics as to the cost of upkeep of and the traffic passing over a number of selected lengths of road over a number of years. From a consideration of these statistics, which would need to discriminate between expenditure on surfacing, foundations, widenings, alignment, and regrading, it might be possible to formulate co-efficients to indicate the user of the roads in relation to the following factors: (*a*) Type of tire; (*b*) maximum and average speed; (*c*) unsprung weight; (*d*) maximum and average laden weight; (*e*) distribution of weight; (*f*) impact effects.

International Comparisons, Special Motor-taxation per Vehicle.

Table 28 in the Appendix to this report shows the taxation per vehicle for the principal kinds of vehicles in New Zealand, Great Britain, Australia, and 11 certain States in the United States of America. The figures have been prepared upon a uniform basis and cover petrol-tax, tire-tax, and all registration fees, and any other forms of special taxation.

The following summary shows the comparisons for the places named in respect of the annual taxation payable for a private car, a 3-ton pay-load truck fitted with pneumatic tires, and a motor-omnibus with seating-capacity for twenty-five persons, also fitted with pneumatic tires:—

Country. (18 h.p., 1 ton, Gross.)	Private Car. (18 h.p., 1 ton, Gross.)	3-ton Pay-load Truck. (Pneumatic tires.)	Omnibus with Seating Capacity for Twenty-five Persons. (Pneumatic tires.)
	£ s. d.	£ s. d.	£ s. d.
New Zealand	9 15 0	60 9 0	161 15 0
Britain	23 13 4	54 18 4	118 0 0
New South Wales	13 16 11	51 2 8	144 10 0
West Australia	14 6 11	57 12 8	175 0 0
Victoria	14 0 11	56 2 8	197 17 6
South Australia	14 16 11	75 7 8	160 5 0
Queensland	13 8 3	62 10 2	139 7 4
United States of America—			
Florida	5 9 2	33 10 0	143 12 0
Montana	4 13 9	18 4 7	75 0 0
North Carolina	3 2 6	26 0 10	42 18 4

The above table shows that the annual taxation per private car is considerably lower in New Zealand than in either Britain or any of the Australian States, but is higher than for the three States of America given. That for trucks is higher in New Zealand than in Britain or America, and is only exceeded by the figures for South Australia and Queensland.

The following basis has been used for calculating the petrol and tire taxes:—

Petrol-tax—

Vehicle.	Annual Mileage.	Miles per Gallon.
Car	4,500	18
3-ton truck	10,000	10
Omnibus (seating capacity, twenty-five persons)	30,000	10

Tire-tax on foreign tires—

New Zealand	35 per cent. *ad val.*
Britain	33 „
Australia	40 „

N.B.—The New Zealand rate was raised to 40 per cent. in 1930.

The tax for an omnibus is also much higher in New Zealand than in Britain and America. The Australian States, however, are, with the exception of New South Wales and Queensland, on about the same level as New Zealand.

Systems in other Countries.

An examination of the systems of motor-taxation in force in 144 countries, States, and provinces throughout the world has been made. Approximately 75 per cent. of these adopt a graduated as opposed to a flat tax in respect of each of the three main classes of vehicles (private cars, trucks, and hackneys). The following summary shows the results of a tabulation that has been made:—

	Number of Countries, &c., adopting		
	Flat Tax.	Graduated Tax.	Total.
Cars	37	107	144
Trucks	40	104	144
Hackneys	40	104	144

The graduated systems have been further analysed, as follows:—

Basis.	Number of Instances.			
	Cars.	Trucks.	Hackneys.	Total.
Horse-power	36	20	25	81
Horse-power and weight	10	12	12	34
Horse-power and seating-capacity	5	..	4	9
Weight	35	60	38	133
Seating-capacity	12	..	18	30
Pay-load	..	7	..	7
Wheel-base	4	2	4	10
Value	2	1	1	4
Value × weight	1	1	1	3
Number of cylinders and length × track	1	..	..	1
Petrol-tax only	1	1	1	3
Totals	107	104	104	315

A number of countries, &c., have more than the one graduated system in operation, hence the number of instances given in the preceding table exceeding the number of countries referred to previously as 144. Weight is the most popular factor, being employed in no less than 133 instances, while horse-power comes next, with eighty-one instances.

F. MECHANICAL DEVELOPMENT IN MOTOR TRANSPORT.

Three-axle Vehicles.

As stated earlier the active development of and increase in the use of the three-axle rigid-frame type of vehicle, which is giving satisfaction in service on all classes of roads overseas, has proved that relatively heavy loads can be transported economically with less damage to the roadway than is caused by the orthodox two-axle type on tires of the same kind—*e.g.*, the published data covering a series of special tests in the United States of America under normal and identical running conditions show that the impact effect of a loaded 2-ton pay-load two-axle truck was 4·3 per cent. more than that of a loaded 5-ton pay-load three-axle truck.

The six-wheel three-axle omnibus is a very popular type in England, and one of these buses, carrying a total load of fifty-two passengers, has been recently put into service in Wellington. However, few proprietors in New Zealand have need to-day for vehicles so large as this one.

The three-axle omnibus-chassis with a suitable body is now being extensively used in many parts of Australia for the carriage of live-stock of all kinds, from pigs and lambs to cattle and racehorses. Those who have experience in the movement and marketing of live-stock from the farm predict a rapid expansion in the transportation of live-stock by such means.

One well-known English firm has recently produced a commercial three-axle vehicle which has an exceptional tractive effort: the draw-bar pull is given at 10,000 lb. Each of the three axles is power-driven, but the drive to the front axle can be disconnected at will by the driver, as would be the case when travelling along a good roadway. This vehicle will take a net load of 8 tons, and will at the same time haul a trailer loaded with 5 tons. The pay-load of 13 tons can be taken along ordinary roads at a travelling speed of twenty-five miles an hour. During the trials road speeds much higher than this were attained, and it can be taken also at relatively high speed across uneven country, chains being used on all wheels, if necessary, when crossing soft grassy farm land. This firm has received an order for nine six-wheel-drive six-wheeler tractors from the War Office as a result of the satisfactory performances of a tractor of this type which was given a one-year trial. The draw-bar pull of these units is 12,600 lb.

Trailers.

Perhaps the most interesting development during the year in the articulated-lorry class is the English-made fourteen-wheeler, which is now in regular service in England carrying single loads up to 104 tons. The owner is at present using it for the delivery of nearly 200 railway-engines, varying in weight from 50 to 104 tons. One engine per day will be transported intact from the maker's trial-ground to the wharf at the respective place of shipment; the time and expense incidental to the dismantling of such engines in the past for transportation either by road or by railway is thereby saved.

Another English firm has produced an 85-ton sixteen-wheeler trailer-wagon for somewhat similar service.

In many parts of England, the United States of America, and the Continent trailers are being extensively used, and there are numerous types and designs, each serving its purpose with efficiency, economy, and convenience.

The tendency in haulage by trailer units appears to be towards the separate tractor with trailer type, rather than for an extension of the use of the motor-truck with trailer for heavy loads at high speeds over long or short distances, although on good roads the motor-truck-type tractor with its semi-trailer is now well established.

In the large well-organized transport concerns overseas the tractor operates with two, and under favourable conditions with three, separate sets of trailer units; thus the tractor is kept at work while the loading and the unloading of the respective trailers is being undertaken. Similarly, trailers adapted for the carriage of box-like weatherproof lock-up containers, of special construction to meet the needs of the merchants concerned, are being universally used by certain manufacturers. This system for the bulk transportation of perishable or valuable goods has, quite naturally, developed a considerable night-time traffic in some areas.

Omnibuses.

In this Dominion there are few licensed omnibus services which could be safely compared with the services in Great Britain. However, it may be of some interest to have something in the nature of gleanings from transport journals and the like which are received regularly by the Department from England and from the United States of America.

We must not lose sight of the fact that the restrictions on gross weight and over-all length, &c., differ in these two countries—*e.g.*, the maximum length over-all for a two-axle vehicle is 27 ft. 6 in. (approximately) and for a three-axle vehicle 30 ft. under the English regulations, whereas any vehicle in most States of the United States of America may be 33 ft. over all. The restriction by regulation in New Zealand is 30 ft. for a two-axle or a multi-axle (three-axle) vehicle.

It would appear that proprietors in England prefer to use in city services the 50-seat "double-decker" or the 30–32-seat single-deck bus, according to the requirements, while for long-distance (coach) service the 25–28-seater (usually the same chassis as the 30–32-seat bus) is the most popular.

The "forward control" (drive over front axle) type of chassis is now almost universal; the higher-powered engines give faster travelling speed and better acceleration; the four-cylinder engine is slowly giving way to the six-cylinder unit; as yet a few chassis only are fitted with eight cylinders.

The vehicles in general are now relatively lighter through the use of pressed steel and special alloy metals, also because of improved methods of body construction, while the low-set chassis-frames give an attractive appearance to the finished vehicle.

In the United States comparatively few double-deckers are used, the popular types of city bus being 35–40-seater single-deck vehicles, and for the long-distance services the most popular capacity is 25–28 seats as in England. The single-deck city bus gives a faster schedule than the double-decker, chiefly through the saving of time in loading and unloading both at the terminal stations and at the intermediate stops. Very few forward-control passenger-vehicles are used in United States of America, probably because the regulation maximum over-all length allows sufficient passenger space for the present needs of this service.

The American omnibus chassis are being fitted with engines of very high power—one recent model is scheduled at 175 h.p. Six-cylinder engines are the most popular, although several "eights" are now in service; the four-cylinder engine for passenger and for commercial work is being quickly superseded. The rigid-frame three-axle omnibus is not yet on the American market, but petrol electric passenger-vehicles are being used to a considerable extent.

Goods-vehicles.

There are some marked contrasts in the field of commercial transport when one compares the data available from England and from the United States of America. In England the 2-3-ton pay-load vehicle, apparently, is the most popular and next comes the 6-ton, while in the United States of America 45 per cent. of the vehicles are 1 to 1½ ton capacity, followed by 35 per cent. of 1½ to 2 ton. The tendency in England is to use the "omnibus chassis" for long-distance haulage, while in the United States of America relatively small but fast-travelling trucks are favoured.

The two-axle commercial truck is allowed a total gross weight of 12 tons and the three-axle type is allowed a gross weight of 19 tons in England; hence many of the latter type are operating with a pay-load of 12 tons. Vehicles of this capacity are not made in the United States of America.

In both countries pneumatic tires are fitted as standard equipment on practically all vehicles, except the heaviest classes, and in the United States of America the latter are offered with "pneumatics" as optional equipment. In several countries solid tires for motor-vehicles are prohibited because they are liable to seriously damage the roadway. Under normal conditions a badly-worn solid tire has an impact effect as much as six or eight times the static wheel-load, while that of a pneumatic tire has seldom exceeded twice the static wheel-load.

"Diesel" Type Engines.

The progress made and satisfaction obtained in England and elsewhere particularly during the past year with the heavy-oil internal-combustion engine is remarkable. Many vehicles (buses, tractors, and lorries) with this type of engine are in regular service, while many others are being run experimentally in both large and small vehicles, most of which are giving very encouraging and economical performances.

In other cases existing petrol-engines have been fitted with special carburettors and other essential parts for the use of heavy oil. There is considerable activity in this conversion of existing units, but the engine specially designed for heavy oil will, of course, prove the more economical.

It is claimed and tests have shown that the so-called "Diesel" engine gives much better vehicle acceleration; an all-round smoother and more flexible performance; allows of both faster and slower speeds in top gear; is better on hill-climbing; has a better thermal efficiency and runs cooler than the petrol-engine; uses less fuel—about half as much—for a given job; has an exhaust practically free from carbon monoxide; also, in addition, has the advantage of the comparatively low price of its fuel. Such chassis will reach New Zealand in due time.

TIRES.

Motorists, if not the general public, appreciate the dependability of the pneumatic tire of to-day and the added comfort brought by those of "balloon" variety, but few have read or heard of the "roadless" tire, which is of a unique cross-section, has a normal inflation-pressure of 10 lb. per square inch only, and is considered suitable for soft surfaces or deep sandy country.

Such a tire should give an exceptionally comfortable journey with an entire absence of skidding, and is at present being tested in England.

OVERSEA MECHANICAL TRANSPORT COUNCIL.

The question of the development of mechanical transport in some form to act as economical feeders to the main lines of railway, and the possibilities of opening up undeveloped areas within the Empire by means of specially designed motor-vehicles, was discussed at the last Colonial Office Conference in 1927. The recommendations then made were confirmed in principle by a further Conference summoned by the Empire Marketing Board during 1928.

These conferences led to the appointment by the Secretary of State of a Directing Committee who started work in November, 1928, to study, in a practical way, every aspect of mechanical transport likely to further the economic development of the Oversea Empire.

The Council to whom the Directing Committee is responsible was constituted some months later and includes representatives of the Governments that were prepared to render financial support to the scheme. By arrangement, our Consulting Engineer in London (Mr. Ranald J. Harvey) represents the Government of this Dominion, which has promised to contribute £250 per annum for four years, making £1,000 in all. The estimate of the expenditure that seems likely to be necessary in order that the Directing Committee may achieve satisfactory results in this experimental work and in order to carry the programme right through during the four-years period—including the practical tests of the special vehicles in oversea territories—is approximately £130,000. Initially the Empire Marketing Board declared its willingness to contribute by subsidizing on a £1-for-£1 basis all moneys received from the Governments oversea. Such a proposition merited the spontaneous support which it obtained from all parts of the Empire, and appears to be worthy of all the support, financially and otherwise, that this Dominion can offer.

As an immediate and direct help to members of the Government Departments concerned and to those in whose interest this work has been undertaken, the Directing Committee decided to issue a confidential bulletin each quarter. Judging from the four copies already received, the Departments on the mailing-list will regularly receive invaluable up-to-date information gleaned from world-wide sources on transportation in general, and also will obtain progress reports concerning the design, construction, and developments arising from the trials of the special vehicles which the Directing Committee is now concentrating its energy upon for the economical transportation of loads of 15 tons to a probable 100 tons upon inferior roads.

These bulletins will materially help to bring officers of the Public Works, Railways, Main Highways Board, Scientific and Industrial Research, and Transport Departments abreast of the times in regard to the best authoritative literature on new methods of road-construction, new features in the design of motor-engines, carburettors, transmissions, steering, and springing; also regarding developments in the design and construction of special vehicles, chassis, bodies, brakes, tractors, trailers, couplings, wheels, tires, and tracks; and will also bring them into touch with the trend towards the development of road cum railway transport.

The information on the committee's investigation into engines which have been recently designed or adapted to use heavy oil, on the results of trials run by special experimental vehicles, and on others fitted with engines of the heavy-oil (so-called "Diesel") type is of particular interest. In this connection the present indications are that the characteristic row of kerbside pumps so common in this Dominion, will be extended in the near future by the erection of heavy-oil pumps, which under tax-free conditions as existing to-day, would deliver a tax-free fuel at a very low price.

G. TRANSPORT CO-ORDINATION.

The term "co-ordination" has come to be used somewhat loosely in connection with the transport problem. In the technical sense it implies the elimination of competition—(*a*) either by the arrangement of the road and rail services in such a manner that wasteful competition, due to duplication of services, is, as far as possible and desirable, eliminated; and (*b*) restricting the number of operators in the field of motor transport so that the full requirements in the way of transport are afforded by the least number of vehicles.

As Dr. Fenelon, M.A., a prominent British authority, puts it, "As a possible solution of the transport problem, there has been an increasing tendency to search for some compromise whereby the various methods may be co-ordinated to their mutual advantage, and to the benefit of the public. Such co-ordination implies that each form of transport would be used in the economic conjuncture best suited to its characteristics." The same writer goes on to point out that the economic basis of co-ordination rests upon the fact that the various types of transport have each certain advantages and limitations for the carriage of particular items of transport, or for use in certain circumstances. In other words, it appears that one type of transport in itself is far inferior, from a national point of view, to a system which covers all the best types available, but working as far as possible in a complementary manner to each other and to the country's requirements as regards transport. We have become so familiar with the situation in New Zealand that the full import of much of the transport development is not fully realized.

In the case of the electric tramways, which were threatened by motor-omnibus competition, it was quickly realized by the authorities concerned that where the tram offered satisfactory facilities it would be quite unsound to allow motor-buses to develop on a purely competitive basis. The very nature of the transportation involved and the mobility and flexibility of the bus, as compared with the tram, give it certain advantages that would have enabled it to compete very effectively with the trams.

Expressed briefly, the Motor-omnibus Traffic Act, 1926, put an end to wasteful competition between buses and trams, and introduced the principal of regulation in respect of motor-buses in the more populous localities. Licenses permitting concerns to operate buses on given routes are granted subject to given standards relating to time-tables, safety of vehicles, &c., being complied with. Further, licenses are not granted indiscriminately. Where a concern maintains an efficient and sufficient service, additional licenses to operate on the same route are not granted. In determining whether or not an application for operating a service should be granted, the licensing authorities under the Act consider the existing or proposed facilities for the transport of passengers within the area proposed to be served, as well as the condition of the roads or streets proposed to be traversed, and the normal traffic thereon, and all other relevant considerations.

From an economic point of view the principle of regulation as applied in the Motor-omnibus Traffic Act, 1926, is recognized, and has been adopted in the great bulk of the countries where motor transport has developed to an appreciable extent.

If it were advisable from the economic point of view to introduce the principle of co-ordination as between trams and motor-buses, it would appear even more necessary to introduce the same principle in connection with rail and road transport, where the amount of capital competitively employed is, no doubt, much greater than was the case in connection with the trams and buses. Having regard to the fact that the annual cost of motor transport in New Zealand in all its forms is approximately £32,000,000, and that rail services are costing approximately £9,000,000 per annum, it would appear that the transport problem has assumed a magnitude that calls for regulation in the public interest. More especially is this so owing to the fact that the railways are operated by the State, and the growing annual deficit in connection therewith is a cause of serious embarrassment in our public finance.

A well-defined scheme of regulation would ensure that the road and rail facilities were utilized in the sphere for which they are best suited. Competition, insofar as it was found to be in conflict with national interests, would be eliminated, and the result would be reflected in the growing burden on account of the railway deficit on the general taxpayer being arrested or alleviated as much as it would be possible to do so. It is recognized that to restrict the development of motor transport and unduly bolster up the railways would result in diminishing the taxable area from which the taxation necessary to make up the railway deficit is taken, while there is no guarantee that the railway deficit would be correspondingly decreased. It is said that regulation would mean a restriction on private enterprise. This, however, is only one aspect of the matter, the paramount consideration being the economic welfare of the Dominion. It has long been recognized by the protagonists of both State and private enterprise that there are certain industries which, by virtue of technical conditions, are best carried on under a system of regulation whereby the wasteful competition which is inseparable from unregulated competition is eliminated. It is generally admitted by economists that transport comes within this definition. The practice of modern States is to recognize this principle, as is evidenced by the world-wide adoption of the principle of regulation.

In short, the question of the regulation of the transport industry has been adopted because it is cheaper and more efficient from a national point of view than wholesale competition. Moreover, transport facilities are so interwoven with every aspect of economic activity that almost every country has taken some special steps to ensure that the best facilities are available, and that they operate in the most efficient manner possible.

Attention has already been drawn to the fact that New Zealand is peculiarly dependent on efficient transport services, and that, by reason of the country's comparative youth, the developmental costs in connection with the transport services account for a relatively large proportion of the national volume of production. This has always been the case, but the enormous development in motor transport during the last decade has complicated matters, and raised transport to a new level of public importance.

The following figures show broadly the capital sunk in the main land transport services of the Dominion:—

	£
Railways	60,000,000
Roads	60,000,000
Motor transport	50,000,000
Tramways	5,000,000
	£175,000,000

The national wealth of New Zealand is estimated to be £920,000,000. This means that approximately 26 per cent. of the national wealth of New Zealand is represented by capital sunk in transport facilities.

Before the advent of the motor the rail, tram, and shipping facilities had settled down to more or less definite spheres of activity. Now that motor transport has been thrust upon the transport world, the old equilibrium has been severely shaken. Railways are losing an increasing volume of business to the quickly improving motor transport; coastal shipping has also suffered; while special steps have been taken to guard the tramways against unnecessary and wasteful competitive losses of business.

In addition to the question of competition motor transport has made it necessary to increase the annual expenditure on roads. The railway system of operating under the principle of joint costs, which has had such beneficial results to countries in the developmental stage such as New Zealand, has made the railways peculiarly prone to severe competition in those commodities which have been rated high in the railway tariff. Broadly speaking, motor transport makes no discrimination according to the classes of goods carried, mainly, no doubt, for the reason that the principle of direct costs is capable of being applied in its operation, and further, as the motor operators generally pick and choose their business.

Ignoring for the moment the question as to whether or not motor transport demands regulation in the public interest, it is rather significant to note that whereas railways are operated by the State, and are subject to very high standards of physical operating efficiency, that whereas coastal shipping is also required to comply with standard time-tables, mechanical fitness, &c., and that whereas the tramways are also required to conform to definite requirements of a similar nature, motor transport in the realm of both goods and passenger services (excluding, of course, buses which come under the operations of the Motor-omnibus Traffic Act, 1926), at the present time functions without any standards of time-table, mechanical fitness, &c. A well-known English administrator has attributed lack of regulation in the motor industry to the fact that its major developments took place while States as a whole were deeply concerned with war, and post-war problems. It is only recently that the question of regulation in connection with motor transport has presented itself. It has arisen as a result of the unsatisfactory conditions that have followed on unregulated competition.

The advent of the motor, and its expansion in the sphere of goods and passenger public services has increased competition between the railways and coastal shipping. In more than one instance the weight of the State as a competitor in the economic field has been thrown against private enterprise, causing the operations of the latter to be curtailed, with the result, as indicated previously, that the taxable area, whence are drawn the taxes to make up the deficit on the railways, is being diminished.

It has been shown that co-ordination in transport facilities is, now that there are four competitors—namely, shipping, rail, road, and trams—in the transport field, a matter of paramount importance to the prosperity of this country. Unless this is brought about, the grim tragedy of public moneys being invested in competitive services must continue. How long this can be continued will be determined by the ability of our production to carry the extra burdens involved.

Co-ordination within the Motor Industry.

It is now generally recognized that motor transport should be subject to regulation by the State if maximum efficiency is to be maintained within the industry. Regulation in this sense implies two main considerations :—

(1) Regulation of the actual physical characteristics, and physical operation of motor-vehicles as common carriers.
(2) Regulation of the business engaged in by motor-vehicle common carriers.

If regulatory provisions are enforced on vehicles engaged in public business the question arises as to the steps to be taken to ensure that these vehicles will not be subjected to unduly severe competition from the private operators and private-contract carriers. If an operator is tied down to definite regulations as to time-table, fares, mechanical fitness, &c., over a given route, it is quite clear that steps should be taken to see that carriers from the neighbouring towns do not " pirate " his business. Experience in other countries shows that there are, in normal circumstances, definite limits to this " pirating," and that the operator concerned has only to prove the existence of systematic " pirating," to have the " pirate " brought in under the regulatory provisions.

Co-ordination in United States of America.

The regulation of public motor-vehicles has undergone considerable development during the last few years. The first instance of regulation occurred in 1914, when the State of Pennsylvania definitely segregated motor-vehicles when used as common carriers, and placed them under the State's Public Service Commission. To-day, the laws of forty-seven States and the District of Columbia regulate passenger-carriers to a comparatively complete degree, and thirty-seven States, and the District of Columbia regulate property-carriers to a greater or less degree.

The Motor-vehicle Conference Committee, representing the American Automobile Association, the National Automobile Chamber of Commerce, the Motor and Equipment Association, the National Automobile Dealers' Association, and the Rubber Manufacturers' Association, has adopted the following as sound and equitable principles for the regulation within each State of motor transport :—

(1) Control over intra-State transportation of persons and property for hire over regular routes or between fixed points, if adopted, should be exclusively in the hands of some agency of the State. No power, whatever, in the premises should be vested in the governing bodies of any political subdivision of the State.

(2) Such State control over motor-vehicle common carriers should be placed in existing commissions, such as the Public Utility Commissions or other appropriate State regulatory bodies of the various States.

(3) As the prerequisite to the operation of the motor-vehicle common carrier, the owner thereof should be obliged—

(*a*) To receive a certificate of public convenience and necessity, provided that lines in *bona fide* operation on the first calendar day of the legislative session at which the law is passed shall be presumed to be necessary to public convenience and necessity, and such lines, in the absence of evidence overcoming such presumption, shall receive a certificate for routes established by them.

(*b*) To take out liability insurance adequate to indemnify injuries to persons or damage to property resulting from negligent operation.

(4) The State regulatory bodies having control over motor-vehicle common carriers should be vested with the powers they exercise in controlling other forms of public utilities.

(5) Taxes on motor-vehicle common carriers should consist of—

(*a*) Those imposed in the particular State upon motor-vehicles, the proceeds from such taxes being first applied to the maintenance, and any surplus thereof to all other costs, of highways of general motor use.

(*b*) Proper and equitable taxes in exchange for franchise rights, provided that if such taxes are adopted an amount equivalent to those paid under (*a*) should be deducted.

(6) Legislation should be enacted enabling steam railroads, trollies, shipping companies, and other public utilities to acquire, own, and operate motor-vehicles in conjunction with their regular lines of business.

Co-ordination in Britain.

The findings of the Royal Commission on Transport make clear the necessity for devising appropriate machinery for regulating the vehicles used in the modern highly developed passenger-carrying services.

The following extract is of interest:—

The existing system of licensing, based upon Acts passed at a time when the internal-combustion engine was unknown, is from almost every point of view totally unsuited to present-day requirements. It not only entails great inconvenience upon both licensing authorities and operators, but, in not a few instances, imposes a heavy and unnecessary burden upon highway authorities who, *per se*, have no voice in licensing matters. In addition to this, the unnecessary multiplication of competing vehicles adds largely to congestion, and is a fruitful source of danger to the public. So urgent do we consider the need for reform that we have thought it desirable to deal with the subject without delay.

Co-ordination in South Africa.

The Road Motor Competition Commission (1929) recommended the adoption of regulation of motor-transport services, and recommended, *inter alia*, as follows:—

We consider that standard conditions should cover the following broad principles which are regarded as being of fundamental importance, and that they should be applied to all public services operating in transportation areas or over transportation routes:—

(*a*) The general standards of construction of vehicles and the safety devices to be employed should be defined.

(*b*) All public-service vehicles, whether for the conveyance of passengers or of goods, should be examined by qualified Inspectors and passed as suitable for the service for which they are intended before licenses are issued; they should be reinspected as prescribed, and in the case of passenger-vehicles at frequent intervals. This we regard as essential in the interests of public safety, and we emphasize the importance of the stringency of the examinations, especially in the case of passenger-vehicles.

(*c*) The route or routes over which, and the termini between which, a vendor of public transport will operate—otherwise the general scope of the service to be rendered—should be clearly defined.

(NOTE.—It is realized that in the case of goods services, a greater degree of latitude may be necessary than in the case of passenger services.)

(*d*) An applicant should submit with his application for a certificate, and thereafter make public and exhibit on request, his schedule of fares and/or rates, and be compelled to adhere thereto. The period of notice to be given of any alteration of tariffs should be prescribed, as should also the manner in which information as to alterations in rates or fares is to be communicated to the public.

(NOTE.—The practice of "payment in kind" for transport services is one which we unhesitatingly condemn as pernicious in principle.)

(*e*) (i) In the case of passenger services of a regular nature, time-tables should be submitted to the body authorized to issue certificates and, after approval, the time-tables should be adhered to.

(ii) Carriers should be licensed either as "common" carriers or as "contract" or "casual" carriers. The common carrier should be required to give regular and consistent services over defined routes, or in defined areas, and the contract or casual carrier to give service in accordance with his contract. The contract carrier should not be allowed to cater for intermediate traffic when operating over a route on which regular service is given.

(*f*) The use of goods-lorries for the conveyance of persons should not be permitted.

(*g*) The wages and hours of duty of drivers and conductors of public vehicles should, subject to local conditions, be standardized.

We accordingly recommend that standard conditions, which shall govern all public road-transport undertakings and embrace the foregoing broad principles, be formulated by the regulatory body.

Present conditions in New Zealand and in other countries have shown that competition is too costly a solution of the transport problem. The most efficient transport services in the world to-day have been evolved subject to regulatory control by the State.

In conclusion, it would appear that the conditions peculiar to the motor-transport industry make it desirable that the principle of regulation by the State, which has already been applied to other transport facilities and in the realm of suburban passenger traffic should, with advantage, be applied. Regulation in this sense would mean a better utilization of the enormous advantages attached to the motor industry.

A measure of regulation is also necessary as the best possible means of securing co-ordination between motor transport and the other facilities already in existence. Indeed, it is no exaggeration to say that no system of co-ordination could survive without statutory regulatory powers.

POSSIBILITY OF CO-ORDINATION UNDER EXISTING CIRCUMSTANCES.

The only form of co-ordination reasonably possible under existing circumstances is what is known as voluntary co-ordination. This consists of a number of operating units which, while maintaining their separate identities, place their facilities at the disposal of each other in the form of common use of each other's booking-offices, mutual use of stations, dovetailing of time-tables, and the issue of through

and interavailable tickets. The complementary, as opposed to the competitive, aspects of road and rail are stressed in this type of co-ordination. Although co-ordination along these lines may be possible, and it is believed is now in practice in certain areas in New Zealand as a means of linking up road and rail passenger services, there appears to be no possibility of this type of co-ordination successfully dealing with the competition between road and rail. If there appears to be profit to be made on any route, in either passenger or goods business, it is hardly likely, and experience corroborates this, that private enterprise will concern itself with the position of the railways. Even though agreements were effected between the Railways Department and private enterprise over any particular routes, these agreements would be ineffectual against competition from outside sources, and would soon break down.

In Germany, before road transport was highly developed, a definite attempt was made to co-ordinate rail, road, air, and inland-water transport by similar agreements. Recently, however, greater progress has been made in the extension of road services throughout Germany, and it would seem that this development has introduced complications into the problem of voluntary co-ordination.

Fundamentally, it would be necessary to reconcile the motivation behind private enterprise—*i.e.*, profit—with that behind the railways as a State concern, and this would, as experience has shown, be extremely difficult, if not wholly impracticable.

Desirability of Co-ordination.

The importance of an economically efficient transport system to the national welfare has been regarded in other countries as sufficient reason for eliminating competition between existing services of the same and differing types of facilities. In addition to this, the following factors in this country make it even more desirable that co-ordination between road and rail services should be brought about:—

(*a*) For geographic and economic reasons that need not here be considered, New Zealand is in possession of a road and railway reticulation the main or trunk routes of which parallel each other (see maps 3 and 4 in the Appendix).

(*b*) New Zealand is a primary producing country. Broadly speaking, our primary products are transported from the farms to the nearest available overseas ports, and thence shipped abroad.

The main characteristics of this flow of commodities to overseas ports, from the transport point of view, are its extremely seasonal nature and its demand for special facilities in the way of freight, wagons, &c.

In 1928 70 per cent. of the Dominion's exports, the bulk of which comprise primary products, were concentrated in and shipped from the four main ports—Wellington, Auckland, Lyttelton, and Dunedin. Approximately 8 per cent. of the remaining 30 per cent. was shipped from New Plymouth and Napier, while the remaining 22 per cent. found its way out of Gisborne, Wanganui, Timaru, Invercargill, and a number of other ports.

(*c*) The inward flow of commodities from abroad consists, with the exception of such commodities as phosphate rock, &c., of manufactured articles, which are rated for traffic purposes as high class, because their intrinsic value is relatively great in comparison with their bulk.

The outstanding point in connection with this inflow is its relative concentration in the four main ports, which, of course, entails its distribution therefrom to consumers throughout the country. No less than 91 per cent. of the value of imports into New Zealand during the calendar year 1928 came in through these four main ports.

(*d*) The best roads are to be found radiating from the four main centres, and consequently it is here that competition with the railway will be most severe.

(*e*) By virtue of geographical configuration, New Zealand is, like the United Kingdom, a country of relatively short hauls. The average railway haul for the year ended 31st March, 1929, was sixty-four miles. In four instances only—namely, fruit, fish, New Zealand brown coal, and New Zealand timber—was the average haul of any of the commodities in excess of 100 miles. The miscellaneous group which covers general merchandise and other high-class traffic showed an average haul of only forty-six miles.

Briefly stated, the fact that the percentage of the higher-class freight in the Dominion has relatively short hauls, and that road-development has been most extensive in those localities where this traffic-flow is densest, have, rightly or wrongly, been instrumental in creating a steady drift of the best-paying traffic from the railways to the road. If consideration is taken of the loss in passenger business as well, it is evident that the railway's losses in business due to competition have been greater than is generally realized.

It is impossible to say how far we are off saturation-point in the development of commercial motor transport, but, judging from experience in other countries, this point does not yet appear to be capable of being even estimated. Developments in motor transport have so far been rapid and extensive, and will continue in this way for a long time yet.

This future expansion will be assisted by the whole drift of modern economic development to pay increasing attention to the problem of distribution, rather than production.

It is, therefore, clear that if the existing unco-ordinated conditions are continued, the railway's financial position will be subject to further drift, and the amount of economic waste due to unnecessary competition following on duplicated services will mount higher each year. This will mean higher national-transport costs, and a harder struggle to compete in the overseas markets with our primary products.

H. REGULATION OF COMMERCIAL ROAD TRANSPORT.

1. POSITION IN OTHER COUNTRIES AND IN NEW ZEALAND.

(*a*) Britain.

Until recently public passenger-vehicles were under licensing control in some areas only, and there by local by-laws of the different local authorities. The control, while enabling a service to be refused, was otherwise very limited and did not cover routes and other important aspects. There was power to appeal to the Minister of Transport against the refusal (but not the granting) of a license by a local authority.

A Royal Commission, which is still sitting, was set up by the former Government in 1928 to investigate the whole field of transport problems in Britain, and considered that a recasting of the public passenger motor-vehicle laws was so urgent that it brought in a special interim report bearing on the subject.

In this report the Commission indicated that in its opinion the system of licensing by local authorities was obsolete and unsatisfactory for modern conditions, owing principally to the wide field of movement of modern motor transport; and it recommended that the present system be replaced by another whereby Britain would be divided up into ten traffic areas, each area being under the control of three Traffic Commissioners—one, the Chairman, being a Government appointee, and the other two being appointed on the recommendation of the local authorities within the area. For services running between two or more areas the licenses are to be backed by each respective group of Commissioners.

In granting or refusing licenses various considerations are to be taken into account by the Commissioners, the more important being the adequacy of the existing services, and the desirability of co-ordinating transport services. The Royal Commission suggested that the power of appeal to the Minister against the refusal of licenses be preserved.

The present Government in Britain has adopted the recommendations of the Commission practically entirely, and they are now incorporated in the Road Traffic Act, which has recently been passed by the British Parliament. The strong resemblance between the public motor-service regulation proposals in this Act and those in this country's Transport Law Amendment Bill of last session are worthy of note, as each Bill was drafted quite independent of information concerning the other.

(*b*) United States of America.

(1) *Within each State.*—The present State laws for the control of public motor traffic are based on a decision of the Supreme Court of the United States of America in 1876—*Munn* v. *Illinois* (94 U.S. 113)—which decided that it was within the provisions of the States to regulate public warehouses for the common good. The following basic principles of law are set forth in the case, and are stated by the learned Judges to be based on a consideration of the English common law, which still forms the backbone of the law in the United States of America:—

> It has in exercise of these powers been customary in England from time immemorial and in this country from its first colonization to regulate ferries, common carriers, hackmen, &c., and, so doing, to fix a maximum charge to be made for services rendered, &c.
>
> When the owner of property devotes it to a use in which the public has an interest he in effect grants to the public an interest in such use, and must to the extent of that interest submit to be controlled by the public for the common good as long as he maintains the use. He may withdraw his grant by discontinuing the use.
>
> The limitation by legislative enactment of the rate of charge for services rendered in public employment or for the use of property in which the public has an interest establishes no new principle of law, but only gives a new effect to an old one.

Arising from this historic judgment, the State Governments in United States of America are now enabled by their own laws to regulate all public utilities within the State. All except one of the States have taken advantage of this power (and even there the regulation is exercised by other methods), and four-fifths of the States have done so with special reference to public motor traffic since the growth of the latter. In thirty of the States the regulation is carried out by special quasi-judicial authorities, known as Public-utility Commissions, and their activities are directed almost entirely to the regulatory work indicated by their title, the duties being full-time. In the other States the powers are vested in different bodies (such as the Department of Law Enforcement, the Commissioner of Motor Transportation, &c.), but for the same purpose.

The regulatory powers of the Commissions or similar bodies are carried out by means of the granting or withholding of certificates of public convenience and necessity. In considering applications for such certificates the Commissions are required to consider principally the existing transportation facilities and their adequacy, and the financial ability of the applicant and financial prospects of the service. The services regulated are chiefly public passenger and goods services of a more or less regular nature. Some States include even the irregular goods services.

The above system has been in force in the United States of America for many years now, and appears to have given satisfaction to all the various authorities interested in public motor transport as is shown by the proposed extension of the system to inter-State traffic explained as follows:—

(2) *Inter-State.*—The foregoing principles, in the absence of Federal law on the subject, apply only to traffic entirely within the respective States. It is very probable that inter-State traffic will shortly be brought under similar control, through the apparent imminence of the passing by the United States of America Federal Parliament of what is known as the Parker Bill, which has the support of most of the interests concerned. This Bill broadly extends the intra-State regulation of public motor transport, as above outlined, to inter-State traffic, save that only passenger vehicles are covered, and the regulating agency is the inter-State Commerce Commission. This Commission, when the service is between only two or three States, is required to operate through joint Boards of the Public Service Utility Commissions in the States concerned. Operators *bona fide* in service on the 1st March, 1930,

are subject to certain conditions) entitled to licenses as of right. Transfers, consolidations, and mergers of any service can be effected only with the consent of the Commission, and, in considering rates, fares, and charges the Commission is not allowed to take into account goodwill, earning-power, or the existence of the certificate to run. The Commission is to give consideration to permitting competition, and, in particular, when a road service is owned by a railway company, is to consider the granting of a further service not owned by the railway company.

(*c*) Australia.

In Queensland, New South Wales, Victoria, South Australia, and Tasmania measures are in force for the control of public passenger traffic, both in town and country. In Queensland and Tasmania this control extends to all public motor transport, and in Victoria a Bill is before the Parliament to establish a Ministry of Transport having direct control or supervision over all the kinds of commercial land transport. In all these States the control is exercised through authorities of a public or semi-public nature, and in most cases constituted for the special purpose.

(*d*) Canada.

In the various provinces of Canada public motor-transport services may be operated only under a license issued by a special Department, there being one for each province. In general, it might be stated that co-ordination and traffic requirements are the main factors taken into account by the different Departments.

(*e*) South Africa.

In South Africa the railways and harbours are State-owned, being under the control of the one Ministry, which is also empowered to run road services, and has done so to a limited extent. A Royal Commission was set up in 1929 to investigate and report upon the transport situation, &c. This Commission, after very exhaustive inquiries, has recommended that there should be reasonable control and regulation of public road transport. For this purpose it recommends that a Road Transportation Board (independent in character, representative of diverse interests, and free from political control) should be created with regulatory power. For local short-distance services it is suggested that subsidiary boards be set up having regulatory power, and that there be right of appeal from the decisions of these subsidiary boards to the Road Transportation Board. The factors to be taken into account in considering the granting of licenses, and the other suggestions of the Commission under this heading, are generally along the lines of the principles in force in the United States of America, and proposed in Great Britain. The Commission also recommends the creation of a National Road Board, which would have, *inter alia*, the framing and carrying-out of a general national road policy, including classification of roads, co-ordination in collaboration with the Railways and Harbour Board of the road and railway construction policies, and advice on matters pertaining to motor-taxation, &c. It is understood that the Motor Carrier Transportation Act now passed by the South African Parliament gives effect to the majority of the Commission's recommendations, although details of its provisions are not yet to hand.

(*f*) Non-English Speaking Countries.

In Germany, Italy, Norway, Sweden, and Portugal information is available showing that public motor services are under strict control, and possibly this is so in other countries concerning which information has not yet been obtained. In Hungary, Austria, and other countries the institution of some such control is being considered, and may at any time become effective. In the foreign countries named as having instituted control, the licensing authority is of a Government or quasi Government nature.

(*g*) New Zealand.

Until 1926 the control over public motor-vehicles was practically non-existent. Each local authority had, and still has, power to license vehicles plying for hire, and to collect a small license fee therefor, but there is no power for any application for such a license to be refused, save on the grounds of bad character of the applicant, &c. The local authorities' power, therefore, under this heading is a great deal more limited than that of the British local authorities.

In 1926, as a result of omnibus competition with the trams, the Motor-omnibus Traffic Act was passed. This Act applies only in certain districts of the Dominion, particularly near the tramway centres; and even in those districts it does not apply to any vehicle of seven seats or less, or charging more than 2s. for a single journey; and, of course, it does not deal with goods vehicles. Each licensing authority under the Act must be a single local authority in the omnibus district, and in most cases this authority is a tramway-owning authority. For the North Shore district, near Auckland, a special licensing authority has been authorized by the Transport Department Act of last year, this licensing authority being made up of representatives of each of the local authorities in the North Shore district.

By provision of the Auckland Transport Board Act, 1928, the Auckland Transport Board is the licensing authority for all passenger services by separate seats in the Auckland Transport District, and there is no Transport Appeal Board as is the case under the Motor-omnibus Traffic Act.

It is quite safe to state that by reason of the limitation of the Motor-omnibus Traffic Act to services charging only 2s. per single fare or less, and for other reasons, some of which are dealt with elsewhere, the foregoing statutory provisions are quite ineffective for the purpose of rationalizing transport in general and railway competition in particular. In fact, it is clear that none of the legislation was intended for that purpose.

Other legislation, relating to the licensing of motor-vehicles, motor-lorries, motor-omnibuses, &c., is principally for taxation and safety purposes, and there is no authority for licenses to be refused upon the license fee being tendered.

SUMMARY.

In consideration of the foregoing it will be gathered that—

(1) The principle of the regulation of public motor-vehicle services is not a new phase in Government administration, but is part of that same principle by which services using public privileges in a public way for private gain have since time immemorial been regulated in the public interest. It is under this principle that the private railway companies in England and the tramways in New Zealand are subjected to such strict Government supervision and control.
(2) In Great Britain and South Africa Royal Commissions have as recently as last year sat to consider the public motor-transport problem, and in both cases a method of regulation was recommended (and in Great Britain has already been brought into force) similar in basic principles to that proposed by the Transport Law Amendment Bill of last session.
(3) In practically every country where motor transport is of any extent the control of public motor services in the public interest is either accomplished or appears imminent.
(4) In New Zealand there is no regulation of any description of motor services in competition with the railways, nor is there any existing legal machinery by which such regulation could be put in hand.

Some of the considerations which have urged the foregoing action by other countries may be outlined as follows:—

2. PRINCIPAL MOTIVES FOR REGULATION OF COMMERCIAL ROAD TRANSPORT.

(1) *Road and Traffic Protection.*—One of the most important motives for regulation of the public motor carrier is the necessity for protecting the roads and other traffic. The main factors in the destruction of roads are the weight of vehicles and the speed at which they travel. The goods and passenger vehicles for public hire are necessarily of the larger and heavier types (taxis are in a different category, and are not included in these remarks), and nowadays both classes are capable of very high speed. Lack of regulation means high speeds, and vehicles in excess of the number required for traffic requirements, while this in turn means heavy road maintenance and construction costs, and increased danger to the other traffic on the roads.

(2) *Passenger Safety.*—Moreover, the regulation of the public passenger-vehicle enables control to be exercised over its construction from the aspects of public safety and comfort, and a system of periodical inspection to be introduced for the same purposes. In New Zealand such safeguards have already been instituted (apart from the railways, which are State-owned) in respect of the tramways, which, of course, require to be authorized by Order in Council, and also such motor-omnibuses (a small proportion only) as are covered by the terms of Motor-omnibus Traffic Act, 1926.

(3) *Rational Competition.*—The desirability of regulating competition in such an industry as transportation is also a motive which has caused other countries to institute this control. It is stated that, while healthy competition is desirable in trade, too much of it in transport results in a checking of the capital available for instituting pioneer services and improving established services. This aspect of control is naturally of first-class importance in New Zealand, owing to the fact that the railways are State-owned and represent approximately £63,000,000 of public money invested in transport, and that also many local bodies run public transport services. On this subject of regulating competition it has been argued that in other business undertakings (groceries, drapers, manufacturers, &c.), limitation of competition has been found unnecessary and not in the public interest, and therefore why limit competition in road transport? One reply to this argument is that the undertakings referred to do not make use as a principal factor in their operations of the immensely valuable public property comprised in our public roads; another is that transportation of passengers and goods is an industry of such vital interest to every person, individually and collectively (*e.g.*, in New Zealand, as a suburban resident dependent on a local omnibus service, and also as a taxpayer liable to be taxed for losses on the railways) that the uncertain elements introduced by uncontrolled competition into other branches of industry are not desirable in transport; yet another may be set forth by quoting an extract as follows, from a recent speech touching on this subject by the present Minister of Transport in England:—

"The old theory that invitation for keen competition would secure the provision of transport at a cheap rate is no longer regarded favourably. . . An empty seat in a tram, a bus, or a train has to be paid for by some one—either by the owners, who do not get a fair return; by the passengers, who have to pay high fares; by miserable rolling-stock; or by the employees who receive a low rate of wages."

(4) *Stability of Services.*—This brings up a further motive which has induced other countries to introduce regulation of commercial transport—namely, to ensure to the public adequate, safe, and proper transport services suited to the public needs and purse, and having a reasonable degree of stability. It is such questions as are implied in the foregoing sentence that require to be taken into account by the regulating authorities in granting or withholding in the United States of America certificates of public convenience and necessity. Many factors are to be taken into account in considering these questions, the principal ones, perhaps, being whether the service will fill a public need not supplied by existing services, whether it is justifiable on economic grounds (no country can afford to supply all public needs), and whether the financial position of the owner and the prospects of the service give reasonable assurance of stability. The economic aspect is dealt with at some length in other parts of this report.

(5) *Public Financial Protection.*—Insurance against liabilities to the public is generally insisted on by the regulating agencies in other countries before granting public carriers the right to ply, and, although in New Zealand present legislation provides compulsory insurance cover for passengers in public motor-vehicles, there is no such insurance required of a goods carrier to meet the very heavy financial obligations for which he may become liable to the consignor. Regulation of commercial transport would enable the licensing authorities to see that ample protection against public risk is provided by the transport agency.

In conclusion, it is desired to emphasize that the only organization to raise serious objection to the Government's Bill of last session, in connection with the regulation of commercial transport, was the Municipal Association, or, at least, the executive of that association; and that objection was not to the principal of regulation, but to the proposal to change the system of licensing. All other bodies directly interested supported the regulation of commercial motor transport, as a perusal of the evidence before the parliamentary Committee set up to consider the Bill will show.

Dealing with the objection of the Municipal Association, as already explained, under the Motor-omnibus Traffic Act, 1926, it is definitely laid down that omnibus licensing-authorities shall in every case be the Council or Board or a borough, county, or town district situated in whole or in part within the boundaries of the motor-omnibus district. Consequently, in practice, the local authorities that have been appointed as licensing authorities are generally themselves owners and operators of competing transport services, a system that has been condemned both in New Zealand and England. In the latter country the Royal Commission already referred to went thoroughly into this question, and the following relative extracts from their report apply equally to New Zealand conditions:—

"We have carefully weighed and considered all this evidence and the various proposals, in many respects conflicting, which have been put before us. In doing so we could not fail to observe that the majority of the witnesses advocated the division of the country into large areas for licensing purposes with a view to obtaining a proper control and co-ordination of road services. The principal exceptions were those witnesses who represented the various associations of local authorities, all of which appeared to be anxious to retain or to obtain licensing powers, though there was a great divergence between the proposals they put forward.

"For example, the County Councils Association proposed that licensing powers should be confined to County Councils and County Borough Councils, while the Association of Municipal Corporations would retain them for all boroughs and urban districts with a population of 20,000 or over (as proposed in the draft Road Traffic Bill), and also for boroughs with a smaller population if they had their own Police Forces. The Urban District Councils Association suggested that certain non-county boroughs, urban districts, and rural districts with less than 20,000 should have these powers if they were adjoining and the combined populations amounted to 20,000. In such cases the association proposed the formation of joint committees. This association also suggested that any Urban District Council with a population of under 20,000 which has obtained powers to run motor-omnibuses should retain its licensing powers. The Rural District Councils Association suggested that the powers should be conferred on all Councils of rural districts with a population of 20,000 or over. On the other hand, the witnesses appearing for the Association of County Councils in Scotland agreed to the principle of licensing areas larger than the county.

"As a result of our deliberations we have unanimously come to the definite conclusion that, as modern road passenger-transport has grown to such importance (an importance which is certain to increase), the present chaotic system of licensing, which is based upon obsolete laws passed long before mechanical traction existed, must disappear and be replaced by an entirely different system more suited to present-day needs.

"The evils of the present system, or lack of system, are patent to the most casual observer. First, the public service vehicle of to-day operates over large areas which bear little or no relation to the relatively small areas of existing licensing authorities. Every local authority naturally looks to securing efficient transport facilities within its own boundaries and the district immediately surrounding, and has comparatively little interest in long-distance through services or even in services to and from towns some distance off. From their point of view, such services merely add to the congestion of the streets and to some extent compete with local services.

"Second, although there are over 1,300 licensing authorities in Great Britain, in many parts of the country there is no such authority at all. Even in those areas where licensing laws may be put into operation, we are very doubtful whether in certain cases the licensing authorities exercise their powers as fully as they might. As a result, almost anybody can obtain a license somewhere, or else, owing to inadequate penalties, it may be profitable for a proprietor to operate unlicensed vehicles in spite of the fines inflicted for this breach of the law (see paragraph 18). It follows that in many places the congestion on the roads is increased by unnecessary vehicles, which, by running just in advance of regular services and tapping their traffic, render them unremunerative. In order to do this, racing and cutting-in take place to the serious danger of the public. Further, by skimming the cream off the best-paying routes they prevent the regular operators from providing services on less remunerative routes, thereby depriving a section of the public of convenient facilities. In circumstances such as these it is obvious that no sort of co-ordination of transport is possible. In addition, there can be no proper inspection of these public service vehicles, with the result that there are undoubtedly at the present time an appreciable number of vehicles on the road which are in an undesirable condition, if not actually unfit for use. This state of affairs must, of necessity, increase the risk of deplorable accidents such as those which have of late shocked the public.

"A third objection to the present system is that many local authorities are themselves owners and operators of transport, and, although no definite case of unfair discrimination has been put before us, there can be no doubt that when functioning as licensing authorities their actions are suspect to many of their competitors. This aspect of the case was insisted upon by several witnesses (Howley, M., 17/42–3, Q. 5262, 5612–4; Spencer, Q. 4540, 4602). We consider that it is undesirable that a Judge should be open to suspicion on the ground that he is interested in an organization that may be in rivalry with the applicant.

"For such reasons we were forced to the conclusion that for the present system must be substituted something radically different. It is true that in the draft Road Traffic Bill the Ministry proposed to reduce the number of licensing authorities from the present number of about 1,300 to approximately 350, and to give licensing powers to County Councils so as to cover those parts of the country where there is now no licensing authority. But this proposal does not, in our opinion, go nearly far enough, since it does not meet the objections set out above.

"The problem confronting us involves two distinct questions. First, there is the question of the traffic area, and second, that of the licensing authority. . . .

"A reference to the suggestions which have been made to us shows clearly that the principle of the establishment of traffic areas, which was frequently recommended to us for adoption, is generally acceptable. In some cases (*e.g.*, Urban District Councils Association) it was proposed that these areas should be allowed to shape themselves naturally as a result of voluntary association of neighbouring local authorities rather than that they should be determined arbitrarily, but the association did admit that in certain exceptional cases provision should be made for the constitution of Traffic Boards for extensive areas (Postlethwaite, M. 38/17).

"We are in complete agreement with the principle of large traffic areas—indeed, we fail to see any other practical and satisfactory alternative—and, following upon the general conclusion at which we have arrived, we recommend that for the purposes of the licensing of public service vehicles and the co-ordination of all passenger-carrying services Great Britain shall be divided into traffic areas.

"We do not consider that it is within our province precisely to delimit the actual areas which should be prescribed; this duty falls more properly to the Minister of Transport when preparing the Bill which will be necessary to give effect to our recommendations. We attach, however, as appendices to this report, two maps upon which are indicated the areas which we consider should be substantially adopted. On the map of England and Wales we show ten areas and four on that of Scotland. Although in the main the boundaries of these areas coincide with those of counties, our primary concern has been to define areas upon traffic considerations, and not to be influenced unduly by the existence of the boundaries of local authorities.

"In our view, the delimitation of the areas which are ultimately fixed should form part of the Bill, subject to power being given to the Minister to vary or adjust the boundaries, after holding an inquiry, where experience may show that variation or adjustment is desirable."

As has been shown in this statement, the Motor-omnibus Traffic Act, 1926, by reason of its application only to short-distance services, and vehicles in excess of seven-passenger capacity, it is useless for regulating transport over long distances, and obviously it would be quite impracticable to so expand it to do so if local bodies were to be the licensing authorities. This system has already been the subject of a very interesting Supreme Court decision in the Dominion, as shown in the following extract:—

The learned Judge quoted the following extract from a House of Lords decision—"If there is one principle which forms an integral part of the English law, it is that every member of a body engaged in a judicial proceeding must be able to act judicially; and it has been held over and over again that if a member of such a body is subject to a bias—whether financial or other—in favour of or against either party to the dispute, or is in such a position that a bias must be assumed, he ought not to take part in the decision or even to sit upon the tribunal. This rule has been asserted not only in the case of Courts of Justice and other judicial tribunals, but in the case of authorities which, though in no sense to be called Courts, have to act as Judges of the rights of others," and then went on to state that "There can be no question that the functions imposed on licensing authorities by the provisions of the Motor-omnibus Traffic Act, 1926, come well within that principle. It is quite clear, therefore, that in order to properly discharge the duties imposed on the Council as licensing authority, the members must be in a position to exercise their functions judicially."

In addition to this objection, the experience of the Transport Department, and the Public Works Department, which administered the Motor-omnibus Traffic Act, 1926, previously, goes to show that some local bodies fail to efficiently administer the Act as licensing authorities, on account of the fact that their own vehicles are involved, and consequently they could not properly enforce the provisions of the Act with regard to vehicles operated by competitors.

In other cases the licensing authorities only exercise the powers in respect of vehicles in competition with their own services, whilst others decline to act as licensing authorities altogether.

In one case—Invercargill—the Borough Council, by resolution, asked to be relieved of the work; but nothing has been done in this direction, pending the passing of new legislation.

It can be definitely shown, therefore, that the proposals contained in the Transport Law Amendment Bill, 1929, are in keeping with the proved experience of the United States of America over a long period of years, also with the findings of the Royal Commissions in Great Britain and South Africa; and have been specially adapted to meet the position as it exists in the Dominion to-day.

INDEX OF STATISTICAL TABLES ACCOMPANING ANNUAL REPORT OF THE MINISTER OF TRANSPORT, 1929-30.

MAPS.

APPENDIX.

TABLE 1.—INCOME AND EXPENDITURE ACCOUNT AND BALANCE-SHEET.

Income and Expenditure Account for the Year ended 31st March, 1930.

Expenditure.	£	s.	d.	*Income.*	£	s.	d.
To Salaries	3,331	10	3	By Balance	5,147	18	4
Advertising, books, newspapers, and other publications	24,16	8					
Expenses of advisory council (now disbanded)	271	14	0				
Fuel, light, power, and water	63	4	0				
Grant to Overseas Mechanical Transport Council, England (on account research)	250	0	0				
Printing, stationery, and office requisites	267	18	4				
Postage, telegrams, and telephones	154	8	8				
Rent on office accommodation	474	0	0				
Services of Post and Telegraph Department in preparation of statistics regarding motor-vehicles	23	12	6				
Travelling allowances and expenses	225	17	4				
Depreciation	60	16	7				
	£5,147	18	4		£5,147	18	4

Note.—The above account includes assessed rental of office accommodation for which the Department possesses no parliamentary appropriation.

Balance-sheet as at 31st March, 1930.

Liabilities.	£	s.	d.	£	s.	d.	*Assets.*	£	s.	d.
Sundry creditors—							Office furniture and fittings	618	17	2
Departmental	8	4	2				Departmental library	21	2	2
Other	104	7	4				Typewriters and other mechanical office appliances	138	0	0
				112	11	6	Sundry payments in advance	12	14	2
Depreciation Reserves				60	16	7	Official stamps on hand	6	16	7
Treasury Adjustment Account				5,787	0	4	Forms and stationery on hand	15	0	0
							Income and Expenditure Account	5,147	18	4
				£5,960	8	5		£5,960	8	5

H. B. Smith, B.Com., A.R.A.N.Z.,
Accountant.

I hereby certify that the Income and Expenditure Account and Balance-sheet have been duly examined and compared with the relative books and documents submitted for audit, and correctly state the position disclosed thereby, subject to the above departmental note.—G. F. C. Campbell, Controller and Auditor-General.

TABLE 2.—MOTOR-VEHICLE REGISTRATIONS, BY MONTHS, 1925-1929.

TABLE SHOWING THE TOTAL NUMBER OF VEHICLES REGISTERED UNDER THE MOTOR-VEHICLES ACT, 1924, FROM THE TIME THAT ACT CAME INTO FORCE IN JUNE, 1925, UP TO JUNE, 1930.

(N.B.—Dormant, but not Cancelled, Registrations are included in this Table.)

Month and Year.	Cars.	Trucks (classified according to Pay-load Capacity).							Omnibuses.	Traction Engines.	Trailers.		Tractors.	Others.	Motor-cycles.	Grand Total.
		1-ton.	2-ton.	3-ton.	4-ton.	5-ton.	6-ton.	Over 6-ton. Total.			Three or More Wheels.	Two Wheels.				
1925.																
June ..	71,403	7,915	1,705	761	651	241	42	15 11,330	1,032	314	135	223	129	298	21,585	106,449
September ..	77,077	8,952	1,911	827	684	259	45	15 12,693	1,157	357	171	263	164	347	23,614	115,843
October ..	78,698	9,234	1,962	844	695	265	48	16 13,064	1,186	367	180	276	168	358	24,238	118,535
November ..	80,566	9,521	2,027	863	706	265	48	17 13,447	1,247	385	193	282	184	364	24,890	121,558
December ..	81,662	9,671	2,077	879	713	268	48	17 13,673	1,285	386	198	291	193	369	25,339	123,396
1926.																
January ..	84,153	9,943	2,124	897	724	275	48	17 14,028	1,342	391	200	303	204	380	26,112	127,113
February ..	86,091	10,182	2,163	919	736	281	48	21 14,350	1,364	399	201	310	208	386	26,624	129,933
March ..	88,005	10,456	2,201	944	746	285	48	21 14,701	1,395	414	201	313	224	397	27,161	132,811
April* ..	..	..	..	..	..	..	..	.. ..	..	..	..	..	..	..	..	..
May	90,962	10,914	2,321	988	767	290	48	21 15,349	1,446	432	213	335	248	426	28,189	137,600
June ..	92,813	11,321	2,397	1,023	781	294	48	21 15,885	1,471	450	225	358	273	434	28,887	140,796
July	93,931	11,567	2,440	1,037	785	296	48	21 16,194	1,484	455	226	384	286	436	29,282	142,678
August ..	95,365	11,856	2,529	1,064	793	297	48	22 16,609	1,507	457	229	392	294	439	29,917	145,209
September ..	96,814	12,186	2,601	1,087	802	299	48	22 17,045	1,520	458	233	396	305	444	30,436	147,651
October ..	98,414	12,537	2,684	1,114	807	303	48	24 17,517	1,539	460	235	408	314	446	31,023	150,356
November ..	99,710	12,807	2,750	1,133	816	308	48	26 17,888	1,557	462	239	417	321	451	31,528	152,573
December ..	101,462	13,056	2,827	1,155	824	314	48	27 18,251	1,590	465	241	432	328	455	32,101	155,325
1927.																
January ..	103,046	13,248	2,884	1,171	828	318	49	27 18,525	1,612	465	247	442	335	461	32,610	157,743
February ..	104,491	13,460	2,944	1,187	836	319	49	27 18,822	1,626	477	248	449	341	464	33,054	159,972
March ..	105,913	13,712	3,012	1,200	839	323	49	27 19,162	1,636	483	248	501	350	466	33,582	162,341
April.. ..	103,490	13,831	3,049	1,214	843	326	49	27 19,339	1,655	489	260	514	358	352	33,917	163,374
May	107,950	14,149	3,136	1,230	847	326	51	27 19,766	1,673	494	266	527	377	366	34,660	166,079
June ..	103,808	14,368	3,194	1,241	851	327	51	27 20,059	1,691	495	266	522	381	372	35,046	167,640
July	103,091	14,706	3,363	1,246	849	338	40	17 20,559	1,094	471	304	480	328	397	32,718	162,442
August ..	103,873	14,867	3,404	1,252	848	338	40	17 20,766	1,093	473	305	484	331	407	32,964	163,696
September ..	107,662	15,031	3,464	1,260	846	338	40	17 20,996	1,099	474	305	488	336	410	33,312	165,082
October ..	108,729	15,210	3,541	1,277	848	339	40	17 21,272	1,104	475	310	495	339	410	33,682	166,816
November ..	109,981	15,428	3,595	1,304	851	340	41	17 21,576	1,123	475	312	509	342	414	34,100	168,822
December ..	111,641	15,601	3,643	1,322	850	340	41	18 21,815	1,143	477	314	535	345	422	34,593	171,285
1928.																
January ..	112,654	15,699	3,685	1,324	851	340	43	18 21,960	1,145	477	316	545	347	423	34,931	172,798
February ..	113,616	15,818	3,735	1,337	852	338	44	20 22,144	1,156	481	320	550	353	429	35,273	174,322
March ..	114,450	15,931	3,777	1,345	855	337	44	20 22,309	1,158	484	320	563	359	432	35,540	175,615
April.. ..	113,538	15,783	3,742	1,320	821	330	45	20 22,061	1,102	410	247	560	359	437	33,177	171,891
May	114,628	15,899	3,771	1,325	825	331	45	20 22,216	1,110	419	251	564	369	439	33,533	173,529
June ..	115,701	16,015	3,821	1,330	836	332	46	20 22,400	1,125	422	252	572	372	441	33,766	175,051
July	116,631	16,141	3,893	1,346	838	333	46	20 22,617	1,136	422	252	585	381	447	34,136	176,607
August ..	117,796	16,294	3,985	1,366	842	333	46	21 22,887	1,146	422	253	593	392	449	34,481	178,422
September ..	119,212	16,456	4,050	1,387	843	336	46	21 23,139	1,146	422	254	606	395	454	34,824	180,452
October ..	120,786	16,607	4,123	1,410	850	340	47	21 23,398	1,156	421	258	620	400	457	35,171	182,667
November ..	122,987	16,816	4,216	1,436	857	344	48	21 23,738	1,166	421	268	633	413	459	35,613	185,698
December ..	125,656	17,057	4,302	1,465	866	347	48	21 24,106	1,190	421	269	689	422	460	36,116	189,329
1929.																
January ..	127,612	17,213	4,403	1,481	869	347	48	21 24,382	1,194	422	269	704	428	464	36,448	191,473
February ..	128,971	17,453	4,590	1,514	873	347	48	21 24,846	1,204	427	273	721	430	470	36,832	194,174
March ..	130,556	17,652	4,751	1,527	875	350	48	21 25,224	1,215	427	273	733	433	474	37,244	196,579
April.. ..	132,001	17,817	4,919	1,540	875	350	49	21 25,571	1,216	428	276	742	435	478	37,553	198,700
May	133,433	17,973	5,039	1,555	875	349	49	21 25,861	1,225	429	276	750	437	483	37,767	200,661
June ..	132,633	17,661	5,196	1,496	815	343	49	22 25,582	1,171	372	244	722	407	484	35,274	196,889
July	134,016	17,831	5,354	1,513	816	343	49	22 25,928	1,183	374	247	735	414	490	35,517	198,904
August ..	135,487	17,988	5,577	1,545	819	343	50	22 26,344	1,196	370	250	760	424	490	35,790	201,111
September ..	137,203	18,219	5,816	1,582	824	346	50	23 26,860	1,215	370	253	783	431	496	36,138	203,749
October ..	138,982	18,362	6,031	1,609	831	347	51	23 27,254	1,231	371	255	820	432	496	36,480	206,321
November ..	141,098	18,553	6,242	1,646	844	349	51	23 27,708	1,238	371	256	847	443	497	36,877	209,335
December ..	143,814	18,792	6,453	1,668	852	349	51	24 28,189	1,271	372	262	945	449	501	37,349	213,152
1930.																
January ..	145,220	18,907	6,591	1,690	857	349	51	24 28,469	1,271	373	268	974	454	504	37,674	215,207
February ..	146,849	19,095	6,781	1,710	862	355	51	24 28,878	1,279	375	271	998	456	505	38,015	217,626
March ..	148,090	19,243	6,943	1,728	870	358	52	24 29,218	1,288	375	276	1,017	464	507	38,367	219,602
April.. ..	149,220	19,393	7,073	1,745	876	358	52	24 29,521	1,297	375	275	1,044	466	507	38,661	221,366
May	150,443	19,530	7,213	1,752	881	359	52	24 29,811	1,300	375	275	1,054	468	509	38,859	223,094
June ..	148,410	19,084	7,222	1,712	847	345	51	23 29,284	1,263	303	234	1,033	423	492	35,907	217,349

* No schedule prepared.

TABLE 3.—MOTOR-VEHICLE REGISTRATIONS, BY HIGHWAY DISTRICTS.

TABLE SHOWING ACCORDING TO HIGHWAY DISTRICTS THE NUMBER OF PRIVATE MOTOR-CARS, OMNIBUSES, AND MOTOR-TRUCKS (INCLUDING DORMANT, BUT NOT CANCELLED, REGISTRATIONS) REGISTERED AT 31ST DECEMBER IN THE YEARS 1925, 1926, 1927, 1928, AND 1929.

Districts.	District No.	Private Cars.					Omnibuses.					Motor-trucks.				
		1925.	1926.	1927.	1928.	1929.	1925.	1926.	1927.	1928.	1929.	1925.	1926.	1927.	1928.	1929.
North Auckland	1	9,969	12,987	14,838	5,394*	6,310*	334	412	264	21*	37*	2,638	3,575	4,241	1,600*	1,893*
Auckland South	2	7,534	9,454	10,656	23,826*	28,015*	145	165	78	329*	343*	1,431	1,970	2,457	5,836*	6,663*
Tauranga	3	1,652	2,079	2,359	2,704	3,222	40	52	26	25	23	328	469	624	698	835
Gisborne	4	2,000	2,471	2,837	3,225	3,648	34	40	29	30	36	257	361	426	458	546
Hawke's Bay	5	5,917	7,217	7,857	8,728	9,834	69	94	69	73	72	989	1,274	1,553	1,649	1,896
King-country	6	925	1,134	1,257	1,478	1,826	35	44	24	22	28	256	357	463	523	721
Taranaki	7	4,724	5,787	6,332	7,221	8,184	44	52	40	43	42	678	891	1,055	1,223	1,491
Wanganui	8	3,939	4,820	5,313	5,897	6,652	31	40	37	39	41	695	905	1,027	1,110	1,263
Wellington West	9	9,742	12,535	13,715	15,830	18,503	143	187	184	187	192	1,971	2,596	2,988	3,340	3,800
Wellington East	10	3,413	4,048	4,146	4,646	5,223	24	31	36	35	39	493	634	699	745	881
Nelson	11	2,656	3,198	3,566	3,945	4,513	57	66	48	49	49	346	469	577	637	778
West Coast	12	901	1,197	1,392	1,590	1,891	49	60	44	52	58	229	326	421	459	567
Canterbury North	13	931	1,128	1,103	1,243	1,416	6	6	9	9	10	109	138	149	179	226
Canterbury Central	14	9,369	11,466	12,582	13,870	15,475	66	84	58	65	72	1,189	1,573	1,841	2,001	2,339
Canterbury South	15	6,872	8,266	8,835	9,695	10,684	73	83	83	91	97	572	744	911	1,008	1,235
Otago Central	16	1,216	1,447	1,459	1,647	1,869	19	21	16	16	18	138	181	203	238	291
Otago South	17	4,853	6,130	6,771	7,491	8,485	63	85	58	63	67	885	1,162	1,377	1,494	1,707
Southland	18	5,049	6,098	6,623	7,226	8,064	53	68	40	41	47	478	626	803	908	1,057
Totals	..	81,662	101,462	111,641	125,656	143,814	1,285	1,590	1,143	1,190	1,271	13,673	18,251	21,815	24,106	28,189

* Alterations in boundaries invalidate horizontal comparisons for the North Auckland and South Auckland Districts beyond 1927.

TABLE 4.—MOTOR-CYCLE REGISTRATIONS, BY HIGHWAY DISTRICTS.

TABLE SHOWING THE NUMBER OF MOTOR-CYCLES REGISTERED IN THE DOMINION, ACCORDING TO HIGHWAY DISTRICTS, AT 31ST DECEMBER, 1925, 1926, 1927, 1928, AND 1929.

Highway Districts.	District No.	1925.	1926.	1927.	1928.	1929.
Auckland North	1	2,272	3,241	3,923	1,890	2,107
Auckland South	2	2,222	2,893	2,812	5,718	6,236
Tauranga	3	398	556	646	688	736
Gisborne	4	240	329	432	480	518
Hawke's Bay	5	1,605	1,948	2,135	2,108	2,036
King-country	6	281	364	356	375	404
Taranaki	7	1,733	2,228	2,412	2,650	2,759
Wanganui	8	1,318	1,651	1,742	1,706	1,696
Wellington West	9	3,241	4,060	4,383	4,617	4,614
Wellington East	10	815	992	937	939	946
Nelson	11	1,013	1,298	1,426	1,434	1,486
West Coast	12	375	493	609	632	657
Canterbury North	13	278	336	311	335	352
Canterbury Central	14	4,174	5,127	5,411	5,495	5,686
Canterbury South	15	2,071	2,457	2,566	2,583	2,622
Otago Central	16	369	420	365	373	371
Otago South	17	1,550	1,996	2,291	2,317	2,346
Southland	18	1,384	1,712	1,836	1,776	1,777
Totals	..	25,339	32,101	34,593	36,116	37,349

TABLE 5.—DORMANT MOTOR-VEHICLE REGISTRATIONS.

TABLE SHOWING THE NUMBER OF "DORMANT"* 1927–28 REGISTRATIONS, INCLUDED IN THE REGISTER OF MOTOR-VEHICLES ON THE 31ST MAY, 1930, AND WHICH WERE CANCELLED ON THE 1ST JUNE, 1930, IN ACCORDANCE WITH REGULATION 3, GAZETTED ON THE 8TH MARCH, 1928, UNDER THE MOTOR-VEHICLES AMENDMENT ACT, 1927.

Highway District.		Cars.	Trucks.							Motor-buses.	Traction-engines.	Trailers.		Tractors.	Other Motor-vehicles.	Cycles.	Totals.
Name.	No.		1-ton.	2-ton.	3-ton.	4-ton.	5-ton.	6-ton.	Over 6-ton.			3-wheel.	2-wheel.				
Auckland North ..	1	132	48	7	3	2	..	..	..	5	..	..	3	1	1	115	317
Auckland South ..	2	663	170	54	18	10	1	..	..	17	8	2	7	10	1	453	1,414
Tauranga ..	3	83	26	8	1	..	..	..	..	1	..	..	3	2	..	50	174
Gisborne ..	4	122	15	7	..	2	1	..	..	3	..	1	3	1	..	44	199
Hawke's Bay ..	5	224	50	15	6	4	1	..	..	3	4	2	9	7	5	309	639
King-country ..	6	54	24	6	3	..	..	..	..	2	..	..	..	2	..	33	124
Taranaki ..	7	199	31	8	3	2	1	..	..	2	1	..	1	..	..	230	478
Wanganui ..	8	211	48	8	7	3	2	..	..	2	..	..	4	1	1	187	474
Wellington West ..	9	418	82	28	11	9	1	..	..	6	5	6	4	21	3	420	1,014
Wellington East ..	10	141	32	7	2	1	..	1	..	2	2	1	6	..	..	105	300
Nelson	11	119	21	3	2	..	2	..	..	1	4	1	..	4	1	140	298
West Coast ..	12	65	26	1	1	4	..	..	..	2	..	..	2	3	1	67	172
Canterbury North	13	22	4	2	..	..	..	..	..	..	3	4	1	5	..	35	76
Canterbury Central	14	341	40	4	3	2	..	..	..	2	10	13	14	5	5	480	919
Canterbury South	15	256	22	9	1	..	2	..	..	3	20	13	4	2	..	257	589
Otago Central ..	16	42	5	..	1	..	2	..	..	..	4	..	1	1	..	29	85
Otago South ..	17	239	51	2	2	2	2	..	1	..	13	2	3	1	3	219	540
Southland ..	18	274	25	2	1	1	1	..	..	2	3	..	4	1	..	212	526
Totals ..	..	3,605	720	171	65	42	16	1	1	53	77	45	69	67	21	3,385	8,338

* "Dormant" means vehicles which, although registered, have not been licensed during the years 1928–29 and 1929–30.

TABLE 6.—MOTOR-VEHICLE REGISTRATIONS, JULY, 1930.

TABLE SHOWING THE NUMBER OF MOTOR-VEHICLE REGISTRATIONS, INCLUDING "DORMANT"*, BUT EXCLUDING CANCELLED REGISTRATIONS, UP TO AND INCLUDING THE 31ST JULY, 1930.

Highway District. Name.	No.	Cars.	Trucks. 1-ton.	2-ton.	3-ton.	4-ton.	5-ton.	6-ton.	Over 6-ton.	Motor-buses.	Traction-engines.	Trailers. 3-wheel.	2-wheel.	Tractors.	Other Motor-vehicles.	Cycles.	Totals.
Auckland North	1	6,646	1,375	590	29	9	7	..	..	37	3	7	51	22	14	2,140	10,930
Auckland South	2	29,450	4,587	1,670	357	194	62	10	6	334	9	18	90	27	97	6,318	43,229
Tauranga ..	3	3,418	642	209	28	14	3	..	..	24	..	..	12	22	11	733	5,116
Gisborne ..	4	3,738	297	196	52	22	4	..	..	34	5	..	11	15	3	510	4,887
Hawke's Bay ..	5	10,120	1,247	475	151	83	26	4	4	74	7	11	43	29	52	1,824	14,150
King-country ..	6	1,915	443	286	26	3	1	1	..	29	4	3	10	3	4	394	3,122
Taranaki ..	7	8,501	1,013	389	91	39	36	1	1	42	7	..	16	13	18	2,676	12,843
Wanganui ..	8	6,798	835	312	86	34	13	..	..	40	2	1	20	14	20	1,559	9,734
Wellington West..	9	19,544	2,323	1,025	341	203	75	7	7	196	5	14	84	73	70	4,409	28,376
Wellington East..	10	5,410	600	220	54	30	8	..	..	38	16	7	58	28	24	903	7,396
Nelson	11	4,726	551	200	53	23	12	6	..	49	13	1	24	25	17	1,440	7,140
West Coast ..	12	2,080	381	185	30	18	4	1	..	59	3	2	25	12	14	628	3,442
Canterbury North	13	1,452	161	70	9	5	..	1	..	11	9	4	5	12	4	345	2,092
Canterbury Central	14	16,010	1,752	504	148	50	30	10	3	70	54	57	276	40	54	5,537	24,595
Canterbury South	15	10,915	912	273	77	37	21	5	2	96	132	90	176	26	42	2,485	15,289
Otago Central ..	16	1,919	221	57	23	7	3	..	..	20	7	3	15	11	5	370	2,661
Otago South ..	17	8,682	1,166	394	118	52	23	4	..	68	22	19	93	35	26	2,228	12,930
Southland ..	18	8,171	710	317	54	30	13	1	..	46	5	3	46	24	19	1,636	11,075
Totals ..	..	149,495	19,216	7,372	1,727	853	345	51	23	1,267	303	240	1,055	431	494	36,135	219,007

* "Dormant" means vehicles which have been registered, but not licensed, for the current year.

TABLE 7.—CANCELLED MOTOR-VEHICLE REGISTRATIONS.

TABLE SHOWING THE NUMBER OF CANCELLED MOTOR-VEHICLE REGISTRATIONS UP TO AND INCLUDING THE 31ST JULY, 1930.

Highway District. Name.	No.	Cars.	Trucks. 1-ton.	2-ton.	3-ton.	4-ton.	5-ton.	6-ton.	Over 6-ton.	Motor-buses.	Traction-engines.	Trailers. 3-wheel.	2-wheel.	Tractors.	Other Motor-vehicles.	Cycles.	Total.
Auckland North ..	1	768	239	44	18	13	3	..	..	41	1	6	19	15	26	552	1,745
Auckland South ..	2	2,020	547	127	56	35	6	..	..	70	16	7	17	38	34	1,371	4,344
Tauranga ..	3	290	89	17	9	1	1	..	..	8	..	..	8	5	3	179	610
Gisborne ..	4	328	41	15	3	2	4	..	..	13	..	2	8	2	11	130	559
Hawke's Bay ..	5	873	185	44	22	21	2	..	..	15	8	9	12	16	25	987	2,219
King-country ..	6	178	69	19	7	6	1	..	..	6	..	..	1	3	3	129	422
Taranaki ..	7	672	108	30	15	10	11	..	..	6	2	..	1	1	13	839	1,708
Wanganui ..	8	589	120	34	22	10	5	1	..	5	6	3	17	12	8	634	1,466
Wellington West ..	9	1,773	396	104	73	42	7	3	..	44	7	9	13	35	20	1,674	4,200
Wellington East ..	10	431	85	25	10	7	..	1	..	12	7	9	19	1	3	431	1,041
Nelson	11	354	62	14	5	3	2	1	..	12	15	5	3	11	4	478	969
West Coast ..	12	197	71	6	6	9	..	..	..	6	1	3	7	6	6	202	520
Canterbury North	13	80	14	4	1	2	..	..	..	..	7	9	3	6	3	105	234
Canterbury Central	14	1,288	207	29	14	10	3	..	..	11	53	61	39	8	29	1,765	3,517
Canterbury South	15	856	75	20	3	5	5	..	..	19	71	52	11	6	5	941	2,069
Otago Central ..	16	168	15	2	1	2	3	..	..	2	6	..	2	2	..	136	339
Otago South ..	17	842	182	29	11	9	2	..	2	7	26	7	5	2	11	823	1,958
Southland ..	18	880	97	9	7	10	8	..	..	8	21	1	9	5	6	858	1,919
Totals ..	..	12,587	2,602	572	283	197	63	6	2	285	247	183	194	174	210	12,234	29,839

TABLE 8.—LENGTHS OF ROADS.

TABLE SHOWING LENGTHS OF ROADS UNDER THE CONTROL OF LOCAL AUTHORITIES FOR THE YEARS ENDED 31ST MARCH, 1922–29.

Year.	Roads and Streets formed to not less than Dray-width, and paved or surfaced with—				Roads and Streets formed to not less than Dray-width, but not paved or surfaced.	Total Formed Roads.	Bridle-tracks.	Unformed Legal Roads.	Total of all Roads.
	Bituminous or Cement Concrete.	Bitumen or Tar.	Metal or Gravel.	Other and Unspecified Material.					
	Miles.	Miles.	Miles	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
1922 ..	26,787¾*				17,456¼	44,244	5,095½	13,631½	62,971
1923 ..	27,815½*				17,791½	45,607	5,377½	13,613	64,597⅛
1924 ..	28,553¼*				17,222¾	45,776	5,218¼	13,630½	64,624¾
1925 ..	58¾	639	28,243¾	458¼	16,748	46,147¾	5,181½	15,676¾	67,006
1926 ..	97¾	836	28,981½	340¼	16,521¾	46,777¼	5,009¾	15,792½	67,579½
1927 ..	133	1,012	29,726½	373½	16,107¼	47,352¼	5,093	15,795	68,240¼
1928 ..	217	1,262½	30,669¾	129¼	15,381¼	47,659¾	5,040½	15,669¼	68,369½
1929 ..	254	1,472	31,334	125¾	15,135½	48,321	5,399¾	15,197½	68,918½

* Detailed figures not available.

NOTE.—Figures for earlier years, particularly in regard to unformed legal roads, are not claimed to be entirely accurate.

TABLE 9.—LENGTHS OF BRIDGES.

TABLE SHOWING LENGTHS OF BRIDGES UNDER THE CONTROL OF LOCAL AUTHORITIES FOR THE YEARS ENDING 31ST MARCH, 1922–29.

Year.	Bridges, 25 ft. and over in Length, constructed with											
	Iron and Steel.		Stone and Concrete.		Australian or other Hardwood.		Native Timbers.		Other and Unspecified Material.		Totals.	
	Number	Total Length.	Number	Total Length.	Number	Total Length.	Number	Total Length.	Number	Total Length.	Number	Total Length.
		Ft.		Ft.		Ft.		Ft.		Ft.		Ft.
1923	*	*	*	*	*	*	*	*	*	*	†2,955	†328,766
1924	*	*	*	*	*	*	*	*	*	*	†3,297	†362,034
1925	131	20,315	408	36,840	1,466	180,529	2,035	167,557	74	8,601	4,114	413,842
1926	175	26,227	431	39,127	1,665	197,735	2,029	161,084	83	8,656	4,383	432,829
1927	193	26,144	489	42,804	1,850	217,600	1,959	148,427	156	14,041	4,647	449,016
1928	171	24,779	545	47,833	2,013	229,208	1,994	153,078	111	12,844	4,834	467,742
1929	206	29,089	608	52,761	2,137	242,474	2,181	165,525	118	9,590	5,250	499,439

* Detailed figures are not available. † 30 ft. and over in length.

TABLE 10.—PETROL-TAX.

TABLE SHOWING PARTICULARS RELATING TO THE IMPORTS OF MOTOR-SPIRITS AND CUSTOMS DUTY RECEIVED DURING THE YEARS ENDED 31ST MARCH, 1928, 1929, AND 1930.

——		1927–28.	1928–29.	1929–30.
Imports	Gallons	53,113,367	51,134,303	66,465,474
Value of imports	£	1,948,671	1,645,826	2,201,548
Amount of duty at 4d. per gallon	£	143,548	851,336	1,029,248
Amount of refunds	£	32	49,105	67,341
Net amount of duty received	£	143,516	802,231	961,907
Number of gallons on which refund allowed ..	Gallons	1,920	2,946,300	4,040,460
Net number of gallons on which duty paid ..	Gallons	53,111,447	48,188,003	62,425,014

TABLE 11.—PETROL-TAX ALLOCATION TO BOROUGHS WITH 6,000 OR MORE POPULATION.

TABLE SHOWING THE DISTRIBUTION OF THE PETROL-TAX TO BOROUGHS WITH A POPULATION OF 6,000 AND OVER.

Name of Borough.	Year ending 31st March, 1928.						Year ending 31st March, 1929.												Year ending 31st March, 1930.												Grand Total.		
	Amount of Tax.						Amount of Tax.												Amount of Tax.														
	March.			Total.			June.			September.			December.			March.			Total.			June.			September.			December.			March.			Total.					
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
Wellington ..	1,662	12	0	1,662	12	0	2,748	13	0	2,004	19	6	2,512	7	3	3,236	6	2	10,502	5	11	3,035	19	1	2,905	14	4	2,920	19	7	3,448	10	10	12,311	3	10	24,476	1	9
Auckland ..	1,621	16	0	1,621	16	0	2,699	15	0	1,962	3	8	2,458	15	0	3,167	5	0	10,287	18	8	2,935	12	3	2,809	13	8	2,828	13	10	3,339	11	9	11,913	11	6	23,823	6	2
Christchurch ..	1,387	4	0	1,337	4	0	2,317	3	0	1,684	1	5	2,110	5	9	2,718	7	6	8,829	17	8	2,522	16	0	2,414	11	5	2,441	10	10	2,882	10	2	10,261	8	5	20,478	10	1
Dunedin	1,060	16	0	1,060	16	0	1,771	6	0	1,287	7	3	1,613	3	6	2,078	0	4	6,749	17	1	1,926	10	0	1,843	17	1	1,859	11	3	2,195	8	5	7,825	6	9	15,635	19	10
Wanganui ..	397	16	0	397	16	0	662	0	0	481	2	2	602	17	5	776	11	9	2,522	11	4	715	19	11	685	5	4	688	13	6	813	1	2	2,902	19	11	5,823	7	3
Mount Albert ..	316	4	0	316	4	0	516	0	0	375	0	7	469	18	10	605	7	1	1,966	6	6	567	12	7	543	5	7	545	13	6	644	4	7	2,300	16	3	4,583	6	9
Mount Eden ..	316	4	0	316	4	0	515	12	0	374	15	5	469	11	6	604	17	9	1,964	16	8	562	12	3	538	9	6	541	4	10	638	19	11	2,281	6	6	4,562	7	2
Invercargill ..	306	0	0	306	0	0	518	10	9	376	17	7	472	5	1	608	6	9	1,976	0	2	567	1	2	542	14	8	547	12	4	646	10	5	2,303	18	7	4,585	18	9
Palmerston North ..	306	0	0	306	0	0	514	0	0	373	11	2	468	2	3	603	0	0	1,958	13	5	566	18	3	542	11	10	541	7	7	639	3	2	2,290	0	10	4,554	14	3
Napier	255	0	0	255	0	0	425	3	0	309	0	10	387	4	3	498	15	9	1,620	3	10	461	11	2	441	15	1	444	2	1	524	6	4	1,871	14	8	3,746	18	6
Timaru	255	0	0	255	0	0	423	14	0	307	18	10	385	17	5	497	1	2	1,614	11	5	465	2	10	445	3	9	451	14	6	533	6	3	1,895	7	4	3,764	18	9
New Plymouth ..	244	16	0	244	16	0	396	11	0	288	3	11	361	2	9	465	4	0	1,511	1	8	432	17	10	414	6	4	414	17	4	489	15	11	1,751	17	5	3,507	15	1
Hamilton ..	234	12	0	234	12	0	393	15	0	286	2	11	358	11	7	461	18	0	1,500	7	6	426	8	10	408	2	11	410	3	2	484	4	9	1,728	19	8	3,463	19	2
Gisborne ..	224	8	0	224	8	0	361	10	0	262	14	5	329	4	4	424	1	7	1,377	10	4	392	15	1	375	18	1	377	17	5	446	2	5	1,592	13	0	3,194	11	4
Onehunga ..	173	8	0	173	8	0	293	0	0	212	19	6	266	16	8	343	14	5	1,116	10	7	321	1	8	307	6	2	304	16	11	359	18	1	1,293	2	10	2,583	1	5
Lower Hutt ..	173	8	0	173	8	0	287	0	0	208	11	2	261	7	0	336	13	1	1,093	11	3	333	5	4	318	19	5	322	3	4	380	7	1	1,354	15	2	2,621	14	5
Hastings ..	173	8	0	173	8	0	285	6	0	207	6	3	259	15	4	334	12	4	1,086	19	11	314	4	1	300	14	6	300	13	9	354	19	11	1,270	12	3	2,531	0	2
Nelson	163	4	0	163	4	0	278	16	0	202	12	8	253	18	4	327	1	8	1,062	8	8	303	3	4	290	3	2	293	4	2	346	3	3	1,232	13	11	2,458	6	7
Petone	163	4	0	163	4	0	272	13	0	198	3	6	248	6	3	319	17	3	1,039	0	0	305	6	4	292	4	4	291	10	11	344	4	0	1,233	5	7	2,435	9	7
Devonport ..	163	4	0	163	4	0	272	18	0	198	7	2	248	11	1	320	3	7	1,039	19	10	293	16	11	281	4	10	283	12	11	334	17	6	1,193	12	2	2,396	16	0
Masterton ..	132	12	0	132	12	0	224	5	0	162	19	2	204	4	1	263	1	0	854	9	3	243	13	9	233	4	8	234	3	7	276	9	5	987	11	5	1,974	12	8
St. Kilda	122	8	0	122	8	0	226	15	0	157	9	7	197	7	8	254	5	2	835	17	5	233	12	11	223	12	5	225	6	2	266	0	1	948	11	7	1,906	17	0
Oamaru	122	8	0	122	8	0	196	11	0	142	16	7	178	19	9	230	11	2	748	18	6	213	11	7	204	8	4	207	3	2	244	11	5	869	14	6	1,741	1	0
Whangarei ..	112	4	0	112	4	0	186	0	0	135	10	8	169	7	2	218	3	2	709	1	0	204	19	7	196	3	8	195	13	1	230	19	8	827	16	0	1,649	1	0
Takapuna ..	112	4	0	112	4	0	181	0	0	131	11	8	164	17	0	212	7	0	689	15	8	196	16	1	188	7	3	189	8	5	223	12	8	798	4	5	1,600	4	1
Greymouth ..	..			..			..			..			..			..			..			172	17	5	165	9	1	167	13	4	197	18	11	703	18	9	703	18	9
Totals ..	10,200	0	0	10,200	0	0	16,967	16	9	12,332	7	7	15,452	17	3	19,905	12	8	64,658	14	3	18,716	6	3	17,913	7	5	18,029	11	6	21,285	18	1	75,945	3	3	150,803	17	6

TABLE 12.—HEAVY-TRAFFIC LICENSE FEES, PASSENGER VEHICLES.

TABLE SHOWING IN RESPECT OF THOSE LOCAL AUTHORITIES THAT FURNISHED RETURNS TO THE TRANSPORT DEPARTMENT THE AMOUNTS COLLECTED ON ACCOUNT OF MOTOR-VEHICLES CONVEYING PASSENGERS AND LUGGAGE ONLY.

Type of Vehicle.	Class of Tire.	Year ended 31st March, 1926.	1927.	1928.	1929.
		£ s. d.	£ s. d.	£ s. d.	£ s. d.
Seating not more than twenty passengers	Pneumatic ..	8,405 16 3	13,596 6 11	12,941 14 0	13,367 13 1
	Solid ..	..	30 0 0	40 0 0	..
	Total ..	8,405 16 3	13,626 6 11	12,981 14 0	13,367 13 1
Seating twenty to thirty passengers	Pneumatic ..	4,062 11 6	9,529 2 4	13,047 18 9	14,615 6 3
	Solid ..	..	319 3 6	52 0 0	..
	Total ..	4,062 11 6	9,848 5 10	13,099 18 9	14,615 6 3
Seating over thirty passengers	Pneumatic ..	865 15 0	2,443 0 8	2,593 5 0	3,282 15 11
	Solid ..	375 0 0	692 10 0	..	..
	Total ..	1,240 15 0	3,135 10 8	2,593 5 0	3,282 15 11
Totals, all classes ..	Pneumatic ..	13,334 2 9	25,568 9 11	28,582 17 9	31,265 15 3
	Solid ..	375 0 0	1,041 13 6	92 0 0	..
	Grand totals..	13,709 2 9	26,610 3 5	28,674 17 9	31,265 15 3

TABLE 13.—HEAVY-TRAFFIC LICENSE FEES, GOODS VEHICLES.

TABLE SHOWING IN RESPECT OF THOSE LOCAL AUTHORITIES THAT FURNISHED RETURNS TO THE TRANSPORT DEPARTMENT THE AMOUNTS COLLECTED ON ACCOUNT OF MOTOR-VEHICLES CONVEYING GOODS ONLY.

Type of Vehicle.	Classification.	Class of Tire.	Year ended 31st March, 1926.	1927.	1928.	1929.
			£ s. d.	£ s. d.	£ s. d.	£ s. d.
2–2½ tons weight, vehicle and load	A	Pneumatic ..	6,005 6 10	10,532 14 10	13,433 14 9	15,189 9 10
		Super-resilient	..	..	169 19 3	205 4 0
		Solid ..	1,762 10 8	2,255 14 10	1,789 11 2	1,613 5 0
		Total ..	7,767 17 6	12,788 9 8	15,393 5 2	17,007 18 10
2½–3 tons weight, vehicle and load	B	Pneumatic ..	1,924 9 11	4,101 10 1	5,912 18 10	9,082 1 8
		Super-resilient	..	..	77 7 6	74 17 9
		Solid ..	908 2 0	1,318 2 3	1,012 8 9	847 4 0
		Total ..	2,832 11 11	5,419 12 4	7,002 15 1	10,004 3 5
3–3½ tons weight, vehicle and load	C	Pneumatic ..	1,967 6 0	4,207 11 5	5,609 1 9	7,608 19 4
		Super-resilient	..	..	404 10 0	102 16 6
		Solid ..	1,135 4 0	2,126 16 10	1,760 10 8	1,733 8 2
		Total ..	3,102 10 0	6,334 8 3	7,765 2 5	9,445 4 0
3½–4 tons weight, vehicle and load	D	Pneumatic ..	965 16 5	2,802 16 11	4,452 0 5	7,035 0 4
		Super-resilient	..	..	148 14 8	167 11 4
		Solid ..	2,442 14 6	3,679 0 9	3,639 15 1	3,341 3 2
		Total ..	3,408 10 11	6,481 17 8	8,240 10 2	10,543 14 10
4–4½ tons weight, vehicle	E	Pneumatic ..	538 9 6	1,542 8 7	3,380 8 3	4,879 14 7
		Super-resilient	..	..	24 7 4	203 15 0
		Solid ..	2,599 10 6	4,067 12 3	3,909 7 0	3,402 9 2
		Total ..	3,138 0 0	5,610 0 10	7,314 2 7	8,488 18 9
4½–5 tons weight, vehicle and load	F	Pneumatic ..	598 2 7	1,327 16 6	2,322 12 8	3,516 6 4
		Super-resilient	..	..	133 8 0	189 7 8
		Solid ..	2,352 18 7	4,275 6 2	3,608 16 0	3,877 5 6
		Total ..	2,951 1 2	5,603 2 8	6,064 16 8	7,582 19 6

TABLE 13.—HEAVY TRAFFIC LICENSE FEES, GOODS VEHICLES—*continued.*

TABLE SHOWING IN RESPECT OF THOSE LOCAL AUTHORITIES THAT FURNISHED RETURNS TO THE TRANSPORT DEPARTMENT THE AMOUNTS COLLECTED ON ACCOUNT OF MOTOR-VEHICLES CONVEYING GOODS ONLY—*continued.*

Type of Vehicle.	Classification.	Class of Tire.	Year ended 31st March, 1926.	1927.	1928.	1929.
			£ s. d.	£ s. d.	£ s. d.	£ s. d.
5–5½ tons weight, vehicle and load	G	Pneumatic ..	347 12 0	961 13 10	1,144 12 6	1,972 4 5
		Super-resilient	..	..	159 1 6	127 16 0
		Solid ..	2,685 19 2	4,232 15 4	4,110 2 8	4,446 4 2
		Total ..	3,033 11 2	5,194 9 2	5,413 16 8	6,546 4 7
5½–6 tons weight, vehicle and load	H	Pneumatic ..	530 16 2	1,045 16 0	1,126 3 4	2,393 3 3
		Super-resilient	..	..	184 12 0	262 4 0
		Solid ..	3,048 1 8	6,422 14 7	5,706 14 8	6,320 9 3
		Total ..	3,578 17 10	7,468 10 7	7,017 10 0	8,975 16 6
6–6½ tons weight, vehicle and load	I	Pneumatic ..	224 2 0	517 10 0	768 13 0	978 5 0
		Super-resilient	..	..	94 0 0	127 13 0
		Solid ..	2,142 0 0	4,087 1 2	5,360 1 8	5,926 5 8
		Total ..	2,366 2 0	4,604 11 2	6,222 14 8	7,032 3 8
6½–7 tons weight, vehicle and load	J	Pneumatic ..	81 10 0	975 3 4	561 14 4	1,339 3 10
		Super-resilient	..	..	131 0 0	98 0 0
		Solid ..	3,987 19 0	4,912 13 0	5,323 4 8	6,983 2 8
		Total ..	4,069 9 0	5,887 16 4	6,015 19 0	8,420 6 6
7–7½ tons weight, vehicle and load	K	Pneumatic ..	..	36 18 9	447 10 0	1,212 18 10
		Super-resilient	..	..	132 6 3	20 13 9
		Solid ..	3,241 14 9	5,928 17 3	5,518 0 3	4,559 5 0
		Total ..	3,241 14 9	5,965 16 0	6,097 16 6	5,792 17 7
7½–8 tons weight, vehicle and load	L	Pneumatic ..	200 0 0	472 10 0	740 16 8	1,179 4 6
		Super-resilient	..	..	153 0 0	125 6 8
		Solid ..	4,061 13 4	6,346 17 2	6,664 3 8	6,991 2 4
		Total ..	4,261 13 4	6,819 7 2	7,558 0 4	8,295 13 6
8–8½ tons weight, vehicle and load	M	Pneumatic ..	182 5 0	262 0 0	391 3 8	270 10 10
		Super-resilient	..	..	51 0 0	47 10 0
		Solid ..	3,545 5 10	5,406 3 9	5,346 8 3	6,444 6 9
		Total ..	3,727 10 10	5,668 3 9	5,788 11 11	6,762 7 7
8½–9 tons weight, vehicle and load	N	Pneumatic ..	115 0 0	30 0 0	30 0 0	65 11 4
		Super-resilient	..	..	133 10 0	80 0 0
		Solid ..	3,679 10 0	5,956 0 0	5,788 10 0	6,257 16 8
		Total ..	3,794 10 0	5,986 0 0	5,952 0 0	6,403 8 0
9–9½ tons weight, vehicle and load	O	Pneumatic ..	..	135 5 0	..	89 8 0
		Super-resilient	..	..	126 15 0	20 11 8
		Solid ..	2,799 12 6	4,571 13 3	3,624 2 11	3,395 9 5
		Total ..	2,799 12 6	4,706 18 3	3,750 17 11	3,505 9 1
9½–10 tons weight, vehicle and load	P	Pneumatic ..	..	..	31 18 6	353 15 0
		Super-resilient	..	..	250 17 9	186 9 2
		Solid ..	5,350 9 0	10,726 3 9	12,990 2 11	15,224 10 10
		Total ..	5,350 9 0	10,726 3 9	13,272 19 2	15,764 15 0
10–15 tons weight, vehicle and load (six-wheelers)	Q	Pneumatic ..	..	..	..	15 18 9
		Solid ..	..	291 0 0	882 0 0	455 0 0
		Total ..	..	291 0 0	882 0 0	470 18 9
Totals, all classes ..	..	Pneumatic ..	13,680 16 5	28,951 15 3	40,344 8 8	57,181 15 10
		Super-resilient	..	..	2,374 9 3	2,042 16 6
		Solid ..	45,743 5 6	76,604 12 4	77,034 0 4	81,818 7 9
		Grand totals	59,424 1 11	105,556 7 7	119,752 18 3	141,043 0 1

TABLE 14.—HEAVY-TRAFFIC LICENSE FEES, PASSENGERS AND GOODS VEHICLES.

TABLE SHOWING IN RESPECT OF THOSE LOCAL AUTHORITIES THAT FURNISHED RETURNS TO THE TRANSPORT DEPARTMENT THE AMOUNTS COLLECTED ON ACCOUNT OF MOTOR-VEHICLES CONVEYING BOTH PASSENGERS AND GOODS.

Type of Vehicle.	Classification.	Class of Tire.	Year ending 31st March, 1926.	1927.	1928.	1929.
			£ s. d.	£ s. d.	£ s. d.	£ s. d.
2–2½ tons weight, vehicle and load	A	Pneumatic ..	584 4 5	560 15 6	523 7 0	470 19 2
		Solid ..	39 0 0	6 0 0	6 0 0	..
		Total ..	623 4 5	566 15 6	529 7 0	470 19 2
2½–3 tons weight, vehicle and load	B	Pneumatic ..	389 1 6	498 13 11	593 10 7	578 15 2
		Solid ..	34 13 0	89 13 0	..	..
		Total ..	423 14 6	588 6 11	593 10 7	578 15 2
3–3½ tons weight, vehicle and load	C	Pneumatic ..	383 10 5	458 15 5	436 2 3	713 8 0
		Solid ..	24 0 0	39 4 0	22 4 0	..
		Total ..	407 10 5	497 19 5	458 6 3	713 8 0
3½–4 tons weight, vehicle and load	D	Pneumatic ..	270 6 11	484 3 0	740 14 6	671 6 2
		Solid ..	77 6 8	16 0 0	7 10 0	..
		Total ..	347 13 7	500 3 0	748 4 6	671 6 2
4–4½ tons weight, vehicle and load	E	Pneumatic ..	365 5 9	302 3 10	379 5 10	201 1 9
		Solid ..	96 6 8	80 0 0	30 0 0	28 0 0
		Total ..	461 12 5	382 3 10	409 5 10	229 1 9
4½–5 tons weight, vehicle and load	F	Pneumatic ..	275 6 6	445 7 10	372 4 1	617 19 8
		Super-resilient	..	..	..	25 18 0
		Solid ..	244 16 0	42 0 0	48 0 0	58 13 0
		Total ..	520 2 6	487 7 10	420 4 1	702 10 8
5–5½ tons weight, vehicle and load	G	Pneumatic ..	90 0 0	117 6 0	128 15 0	414 2 3
		Solid ..	108 0 0	166 0 0	177 11 8	32 13 4
		Total ..	198 0 0	283 6 0	306 6 8	446 15 7
5½–6 tons weight, vehicle and load	H	Pneumatic ..	46 16 0	126 10 0	84 2 8	82 7 2
		Super-resilient	..	..	20 5 4	5 1 4
		Solid ..	359 17 4	144 4 0	102 3 6	53 6 8
		Total ..	406 13 4	270 14 0	206 11 6	140 15 2
6–6½ tons weight, vehicle and load	I	Pneumatic ..	..	33 3 0	3 0 0	..
		Solid ..	36 0 0	..	45 0 0	9 0 0
		Total ..	36 0 0	33 3 0	48 0 0	9 0 0
6½–7 tons weight, vehicle and load	J	Pneumatic ..	..	49 17 6	174 16 0	103 2 8
		Solid ..	20 0 0	74 0 0	28 6 8	46 13 4
		Total ..	20 0 0	123 17 6	203 2 8	149 16 0
7–7½ tons weight, vehicle and load	K	Pneumatic ..	40 16 0	22 10 0	98 0 0	37 10 0
		Solid ..	..	60 0 0	45 0 0	97 10 0
		Total ..	40 16 0	82 10 0	143 0 0	135 0 0
7½–8 tons weight, vehicle and load	L	Pneumatic ..	..	..	44 0 0	..
		Super-resilient	..	..	..	36 11 3
		Solid ..	322 10 0	..	100 0 0	..
		Total ..	322 10 0	..	144 0 0	36 11 3
8–8½ tons weight, vehicle and load	M	Solid ..	55 0 0	60 0 0	67 10 0	..
8½–9 tons weight, vehicle and load	N	Pneumatic ..	55 0 0	..	..	..
		Solid ..	395 0 0	189 0 0	480 0 0	105 0 0
		Total ..	450 0 0	189 0 0	480 0 0	105 0 0
9–9½ tons weight, vehicle and load	O	Pneumatic ..	..	15 0 0	..	..
9½–10 tons weight, vehicle and load	P	Solid ..	150 0 0	18 0 0	100 0 0	162 10 0
Total, all classes ..	..	Pneumatic ..	2,500 7 6	3,114 6 0	3,577 17 11	3,890 12 0
		Super-resilient	..	..	20 5 4	67 10 7
		Solid ..	1,962 9 8	984 1 0	1,259 5 10	593 6 4
		Grand totals	4,462 17 2	4,098 7 0	4,857 9 1	4,551 8 11

TABLE 15.—CONSUMPTION OF MOTOR-SPIRITS.

COMPARATIVE STATEMENT SHOWING THE ESTIMATED QUANTITIES OF MOTOR-SPIRIT USED BY VARIOUS CLASSES OF VEHICLES FOR YEAR ENDING 31ST MARCH, 1930.

—	Number of Vehicles (excluding dormant registrations).	Annual Mileage.	Total Vehicle-miles per Year.	Total Petrol on which Duty was paid, less Refunds.	Net Amount of Duty received.	Average Number of Miles per Gallon.
				Gallons.	£	
Cars	117,270	5,000	586,350,000	32,575,000	542,917	18
Trucks	21,944	10,000	219,944,000	18,328,666	305,478	12
Omnibuses	967	30,000	29,010,000	2,901,000	48,350	10
Tractors	280	2,000	560,000	46,666	778	12
Motor-cycles	22,891	7,000	160,237,000	3,204,740	53,412	50
Domestic use and destroyed ..	..	..	..	658,348	10,972	..
	163,352	54,000	996,101,000	57,714,420	961,907	..

TABLE 16.—IMPORTS OF MOTOR-SPIRITS.

TABLE SHOWING THE QUANTITIES AND VALUES OF MOTOR-SPIRITS IMPORTED INTO NEW ZEALAND FROM 1914 to 1929.

Calendar Year.	Quantity in Gallons.	Value.	Average Value per Gallon.
		£	d.
1914	6,799,625	414,626	14·6
1915	7,171,965	398,829	13·3
1916	9,214,524	544,821	14·2
1917	8,259,404	585,759	17·0
1918	10,725,149	829,869	18·6
1919	8,906,185	783,134	21·1
1920	17,970,995	1,845,550	24·7
1921	19,138,846	2,031,630	25·5
1922	16,585,616	1,701,551	24·6
1923	20,364,065	1,621,546	10·9
1924	28,989,126	2,222,055	18·4
1925	33,307,588	2,353,511	16·9
1926	44,817,512	2,654,482	14·2
1927	48,042,640	2,005,983	9·1
1928	54,540,416	1,655,451	7·3
1929	62,448,092	2,130,835	8·2

TABLE 17.—MOTOR-TRANSPORT STATISTICS, JANUARY, 1930—PASSENGER SERVICES, NORTH ISLAND.

PASSENGER SERVICES RUN TO TIME-TABLE OVER DEFINED ROUTES (CLASSIFICATION ACCORDING TO LENGTH OF ROUTE).

Length of Route (One Way only).	Vehicles.	Mileage.	Passengers.	Receipts.
(a) Absolute Figures.				
	Number.	Miles.	Number.	£
Under 5 miles	114	218,991	725,221	10,404
5 and under 10 miles	150	295,546	770,415	18,359
10 ,, 15 ,,	138	359,398	444,133	17,015
15 ,, 20 ,,	45	85,785	61,546	4,570
20 ,, 30 ,,	48	74,680	17,229	3,374
30 ,, 40 ,,	38	112,341	19,595	4,185
40 ,, 50 ,,	46	104,302	16,707	4,261
50 ,, 75 ,,	63	169,776	11,888	7,235
75 ,, 100 ,,	54	208,391	12,678	8,587
100 ,, 200 ,,	70	261,817	10,871	8,646
200 miles and over	10	78,984	2,200	3,184
Totals	776	1,970,011	2,092,483	89,820
(b) Percentages—Each Figure of Totals.				
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Under 5 miles	14·69	11·12	34·66	11·58
5 and under 10 miles	19·33	15·00	36·82	20·44
10 ,, 15 ,,	17·78	18·24	21·22	18·94
15 ,, 20 ,,	5·80	4·36	2·94	5·09
20 ,, 30 ,,	6·18	3·79	0·82	3·76
30 ,, 40 ,,	4·90	5·70	0·94	4·66
40 ,, 50 ,,	5·93	5·29	0·80	4·74
50 ,, 75 ,,	8·12	8·62	0·57	8·06
75 ,, 100 ,,	6·96	10·58	0·61	9·56
100 ,, 200 ,,	9·02	13·29	0·52	9·63
200 miles and over	1·29	4·01	0·10	3·54
Totals	100·00	100·00	100·00	100·00

(c) Miscellaneous Averages.

	Mileage per Vehicle.	Receipts per Vehicle.	Receipts per Passenger.	Receipts per Vehicle-mile.
	Miles.	£ s. d.	£ s. d.	s. d.
Under 5 miles	1,920	91 5 3	0 0 3	0 11
5 and under 10 miles	1,970	122 7 10	0 0 6	1 3
10 ,, 15 ,,	2,604	123 5 11	0 0 9	0 11
15 ,, 20 ,,	1,906	101 11 1	0 1 6	1 1
20 ,, 30 ,,	1,555	70 5 10	0 3 11	0 11
30 ,, 40 ,,	2,956	110 2 8	0 4 3	0 9
40 ,, 50 ,,	2,267	92 12 7	0 5 1	0 10
50 ,, 75 ,,	2,694	114 16 10	0 12 2	0 10
75 ,, 100 ,,	3,859	159 0 4	0 13 7	0 10
100 ,, 200 ,,	3,740	123 10 3	0 15 11	0 8
200 miles and over	7,898	318 8 0	1 8 11	0 10
Averages	2,538	115 14 11	0 0 10	0 11

TABLE 18.—MOTOR-TRANSPORT STATISTICS, JANUARY, 1930—PASSENGER SERVICES, SOUTH ISLAND.

Passenger Services run to Time-table over Defined Routes (Classification according to Length of Route).

Length of Route (One Way only).	Vehicles.	Mileage.	Passengers.	Receipts.
(a) Absolute Figures.				
	Number.	Miles.	Number.	£
Under 5 miles	38	39,085	149,324	2,568
5 and under 10 miles	36	49,740	70,662	2,752
10 ,, 15 ,, ...	22	31,848	24,124	1,693
15 ,, 20 ,, ...	19	21,458	4,838	879
20 ,, 30 ,, ...	29	43,871	11,082	2,039
30 ,, 40 ,, ...	23	38,390	9,051	2,315
40 ,, 50 ,, ...	19	42,153	6,306	1,731
50 ,, 75 ,, ...	36	77,465	7,913	3,764
75 ,, 100 ,, ...	22	66,254	3,995	2,851
100 ,, 200 ,, ...	42	174,759	5,850	8,431
200 miles and over	22	65,150	2,087	3,561
Totals	308	650,173	295,232	32,584
(b) Percentages—Each Figure of Totals.				
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Under 5 miles	12·34	6·01	50·58	7·88
5 and under 10 miles	11·69	7·65	23·93	8·45
10 ,, 15 ,, ...	7·14	4·90	8·17	5·20
15 ,, 20 ,, ...	6·17	3·30	1·64	2·70
20 ,, 30 ,, ...	9·41	6·75	3·75	6·26
30 ,, 40 ,, ...	7·47	5·90	3·07	7·10
40 ,, 50 ,, ...	6·17	6·48	2·14	5·31
50 ,, 75 ,, ...	11·69	11·92	2·68	11·55
75 ,, 100 ,, ...	7·14	10·19	1·35	8·75
100 ,, 200 ,, ...	13·64	26·88	1·98	25·87
200 miles and over	7·14	10·02	0·71	10·93
Totals	100·00	100·00	100·00	100·00

(c) Miscellaneous Averages.

	Mileage per Vehicle.	Receipts per Vehicle.	Receipts per Passenger.	Receipts per Vehicle-mile.
	Miles.	£ s. d.	£ s. d.	s. d.
Under 5 miles	1,028	67 11 7	0 0 4	1 4
5 and under 10 miles	1,381	76 8 11	0 0 9	1 1
10 ,, 15 ,, ...	1,447	76 19 1	0 1 5	1 1
15 ,, 20 ,, ...	1,129	46 5 3	0 3 8	0 10
20 ,, 30 ,, ...	1,512	70 6 2	0 3 8	0 11
30 ,, 40 ,, ...	1,669	100 13 1	0 5 1	1 2
40 ,, 50 ,, ...	2,218	91 2 1	0 5 6	0 10
50 ,, 75 ,, ...	2,151	104 11 1	0 9 6	1 0
75 ,, 100 ,, ...	3,011	129 11 10	0 14 3	0 10
100 ,, 200 ,, ...	4,160	200 14 9	1 8 10	1 0
200 miles and over	2,961	161 17 3	1 14 2	1 1
Averages	2,110	105 15 10	0 2 2	1 0

TABLE 19.—MOTOR-TRANSPORT STATISTICS, JANUARY, 1930—FREIGHT SERVICES, NORTH ISLAND.

FREIGHT SERVICES RUN TO TIME-TABLE OVER DEFINED ROUTES (CLASSIFICATION ACCORDING TO LENGTH OF ROUTE).

Length of Route (One Way only).	Vehicles.	Mileage.	Freight.	Receipts.
	(*a*) *Absolute Figures.*			
	Number.	Miles.	Tons.	£
Under 5 miles	24	14,464	5,085	1,144
5 and under 10 miles	149	101,377	21,998	8,998
10 ,, 15 ,, ...	117	82,355	11,811	7,040
15 ,, 20 ,, ...	96	80,846	7,090	6,476
20 ,, 30 ,, ...	166	138,099	10,813	9,381
30 ,, 40 ,, ...	73	98,579	5,506	5,621
40 ,, 50 ,, ...	29	31,563	1,421	1,999
50 ,, 75 ,, ...	44	77,025	2,497	4,561
75 ,, 100 ,, ...	30	80,017	1,894	4,583
100 ,, 200 ,, ...	29	77,208	1,742	4,300
200 miles and over	..	..	..	..
Totals	757	781,533	69,857	54,103
	(*b*) *Percentages—Each Figure of Total.*			
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Under 5 miles	3·17	1·85	7·28	2·11
5 and under 10 miles	19·68	12·97	31·49	16·63
10 ,, 15 ,, ...	15·46	10·54	16·91	13·01
15 ,, 20 ,, ...	12·68	10·34	10·15	11·97
20 ,, 30 ,, ...	21·93	17·67	15·48	17·34
30 ,, 40 ,, ...	9·65	12·61	7·88	10·39
40 ,, 50 ,, ...	3·83	4·04	2·03	3·70
50 ,, 75 ,, ...	5·81	9·86	3·58	8·43
75 ,, 100 ,, ...	3·96	10·24	2·71	8·47
100 ,, 200 ,, ...	3·83	9·88	2·49	7·95
200 miles and over	..	..	..	..
Totals	100·00	100·00	100·00	100·00

(*c*) *Miscellaneous Averages.*

	Mileage per Vehicle.	Receipts per Vehicle.	Receipts per Ton of Freight.	Receipts per Vehicle-mile.
	Miles.	£ s. d.	£ s. d.	s. d.
Under 5 miles	602	47 13 4	0 4 6	1 7
5 and under 10 miles	680	60 7 9	0 8 2	1 9
10 ,, 15 ,, ...	703	60 3 5	0 11 11	1 9
15 ,, 20 ,, ...	842	67 9 2	0 18 3	1 7
20 ,, 30 ,, ...	831	56 10 3	0 17 4	1 4
30 ,, 40 ,, ...	1,350	77 0 0	1 0 5	1 2
40 ,, 50 ,, ...	1,088	68 18 7	1 8 2	1 3
50 ,, 75 ,, ...	1,750	103 13 2	1 16 6	1 2
75 ,, 100 ,, ...	2,667	152 15 4	2 8 5	1 2
100 ,, 200 ,, ...	2,662	148 5 6	2 9 4	1 1
200 miles and over	..	..	..	..
Averages	1,032	71 9 5	0 15 6	1 5

TABLE 20.—MOTOR-TRANSPORT STATISTICS, JANUARY, 1930—FREIGHT SERVICES, SOUTH ISLAND.

FREIGHT SERVICES RUN TO TIME-TABLE OVER DEFINED ROUTES (CLASSIFICATION ACCORDING TO LENGTH OF ROUTE).

Length of Route (One Way only).	Vehicles.	Mileage.	Freight.	Receipts.
(a) Absolute Figures.				
	Number.	Miles.	Tons.	£
Under 5 miles	17	8,896	2,656	752
5 and under 10 miles	28	12,930	3,637	1,128
10 ,, 15 ,, ...	38	23,568	3,953	1,988
15 ,, 20 ,, ...	25	21,397	1,729	1,229
20 ,, 30 ,, ...	36	26,227	2,130	1,789
30 ,, 40 ,, ...	30	31,987	1,867	1,913
40 ,, 50 ,, ...	19	19,037	1,243	1,036
50 ,, 75 ,, ...	30	28,726	1,387	1,844
75 ,, 100 ,, ...	7	10,896	510	634
100 ,, 200 ,, ...	7	13,482	691	873
200 miles and over	1	4,300	51	103
Totals	238	201,446	19,854	13,289
(b) Percentages—Each Figure of Total.				
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
Under 5 miles	7·14	4·42	13·38	5·66
5 and under 10 miles	11·76	6·42	18·32	8·49
10 ,, 15 ,, ...	15·97	11·70	19·91	14·96
15 ,, 20 ,, ...	10·50	10·62	8·71	9·25
20 ,, 30 ,, ...	15·13	13·02	10·73	13·46
30 ,, 40 ,, ...	12·61	15·88	9·40	14·39
40 ,, 50 ,, ...	7·98	9·45	6·26	7·80
50 ,, 75 ,, ...	12·61	14·26	6·98	13·88
75 ,, 100 ,, ...	2·94	5·41	2·57	4·77
100 ,, 200 ,, ...	2·94	6·69	3·48	6·57
200 miles and over	0·42	2·13	0·26	0·77
Totals	100·00	100·00	100·00	100·00

(c) Miscellaneous Averages.

	Mileage per Vehicle.	Receipts per Vehicle.	Receipts per Ton of Freight.	Receipts per Vehicle-mile.
	Miles.	£ s. d.	£ s. d.	s. d.
Under 5 miles	523	44 4 8	0 5 8	1 8
5 and under 10 miles	461	40 5 9	0 6 2	1 9
10 ,, 15 ,, ...	620	52 6 4	0 10 1	1 8
15 ,, 20 ,, ...	855	49 3 2	0 14 3	1 2
20 ,, 30 ,, ...	728	49 13 11	0 16 10	1 4
30 ,, 40 ,, ...	1,066	63 15 4	1 0 6	1 2
40 ,, 50 ,, ...	1,001	54 10 6	0 16 8	1 1
50 ,, 75 ,, ...	957	61 9 4	1 6 7	1 3
75 ,, 100 ,, ...	1,556	90 11 5	1 4 10	1 2
100 ,, 200 ,, ...	1,926	124 14 3	1 5 3	1 4
200 miles and over	4,300	103 0 0	2 0 5	0 6
Averages	846	55 16 9	0 13 5	1 4

TABLE 21.—MOTOR-TRANSPORT SERVICES RADIATING FROM AUCKLAND CITY.

TABLE SHOWING FOR JANUARY, 1930, THE NUMBER OF VEHICLES ENGAGED ON DEFINED ROUTES, ONE TERMINAL POINT OF WHICH WAS SITUATED WITHIN THE BOUNDARIES OF AUCKLAND CITY.

Route.	Kind of Vehicle.			Total.
	Omnibus.	Service Car.	Freight Vehicle.	
Service: Hourly or Less.				
Auckland to—	Number.	Number.	Number.	Number.
Penrose	1	..	..	1
Papatoetoe	10	..	..	10
Otahuhu	4	..	..	4
Panmure	4	..	..	4
Ellerslie	2	..	..	2
Te Papara	5	..	..	5
St. Heliers Bay	12	..	..	12
Totals	38	..	..	38
Services at Intervals greater than One Hour, but not greater than Twenty-four Hours.				
Auckland to—				
Helensville	..	2	3	5
Devonport	..	..	3	3
Howick	3	..	..	3
Glenfield	..	..	1	1
Hamilton	2	9	8	19
Cambridge	..	..	2	2
Te Awamutu	..	..	1	1
Birkenhead	..	..	4	4
Oratia	..	..	1	1
Takapuna	..	..	4	4
Castor Bay	..	..	1	1
Ellerslie	..	..	3	3
Rotorua	..	4	..	4
Puhoi	..	2	..	2
Pukekohe	3	..	1	4
Bucklands Beach	1	..	1	2
Panmure	1	..	..	1
Titirangi	2	..	..	2
Albany	..	..	1	1
Otahuhu	..	..	13	13
Onehunga	..	..	15	15
Remuera	..	..	2	2
Penrose	..	..	1	1
Clevedon	..	..	2	2
Parakai	1	..	..	1
Wharepapa	..	..	1	1
Swanson	..	..	1	1
Henderson	..	..	1	1
Te Atatu	..	..	1	1
Manuera	..	..	1	1

Route.	Kind of Vehicle.			Total.
	Omnibus.	Service Car.	Freight Vehicle.	
Services at Intervals greater than One Hour, but not greater than Twenty-four Hours—continued.				
Auckland to—*continued.*	Number.	Number.	Number.	Number.
Papakura	..	..	4	4
Papatoetoe	..	..	4	4
Tuakau	..	2	1	3
Silverdale	..	..	1	1
Orewa	..	1	..	1
Waiuku	..	2	..	2
Warkworth	..	1	..	1
Waihi	..	6	..	6
Thames	..	2	..	2
Hastings	..	1	..	1
New Plymouth	..	1	..	1
Totals	13	33	82	128
Other Services.				
Auckland to—				
Oneroa	..	..	1	1
Brown's Bay	..	..	1	1
Te Aroha	..	2	..	2
Hobsonville	1	..	..	1
Henderson	..	..	4	4
Swanson	..	..	1	1
Massey	..	..	1	1
Papakura	..	..	1	1
Papatoetoe	..	..	1	1
Patumahoe	..	..	2	2
Mauku	..	..	1	1
Silverdale	..	..	1	1
Takapuna	..	..	2	2
Maraetai	..	..	1	1
Whitford	..	..	1	1
Beachlands	..	..	1	1
Rotorua	..	4	..	4
Putaruru	..	..	2	2
Hamilton	..	1	..	1
Cambridge	..	..	2	2
Ngatea	..	..	1	1
Waitoa	..	..	2	2
Totals	1	7	26	34
Grand totals	52	40	108	200

TABLE 22.—MOTOR-TRANSPORT SERVICES RADIATING FROM WELLINGTON CITY.

TABLE SHOWING FOR JANUARY, 1930, THE NUMBER OF VEHICLES ENGAGED ON DEFINED ROUTES, ONE TERMINAL POINT OF WHICH WAS SITUATED WITHIN THE BOUNDARIES OF WELLINGTON CITY.

Route.	Kind of Vehicle.			Total.
	Omnibus.	Service Car.	Freight Vehicle.	
Service: Hourly or Less.				
Wellington to—	Number.	Number.	Number.	Number.
Petone and Lower Hutt	37	..	..	37
Johnsonville	4	..	..	4
Eastbourne	10	..	..	10
Khandallah	6	..	..	6
Totals	57	..	..	57
Service at Intervals greater than One Hour but not greater than Twenty-four Hours.				
Wellington to—				
Petone	..	..	8	8
Titahi Bay	4	..	..	4
Lower Hutt	..	..	14	14
Johnsonville	..	..	9	9
Eastbourne	..	..	2	2
Upper Hutt	3	..	6	9
Palmerston North	..	3	8	11
Wanganui	..	10	3	13
Feilding	..	..	2	2
Levin	..	..	2	2
Masterton	..	10	6	16

Route.	Kind of Vehicle.			Total.
	Omnibus.	Service Car.	Freight Vehicle.	
Services at Intervals greater than One Hour, but not greater than Twenty-four Hours—continued.				
Wellington to—*continued.*	Number.	Number.	Number.	Number.
Tawa Flat	..	..	1	1
Pahautanui	..	..	1	1
Martinborough	..	4	..	6
Napier	..	6	..	6
Totals	7	33	62	102
Other Services.				
Wellington to—				
Palmerston North	..	..	4	4
Pahiatua	..	..	1	1
Dannevirke	..	..	1	1
Wanganui	..	..	3	3
Featherston	..	..	2	2
Otaki	..	..	2	2
Martinborough	..	..	1	1
Mauriceville	..	..	1	1
Totals	..	..	15	15
Grand totals	64	33	77	174

TABLE 23.—MOTOR-TRANSPORT SERVICES RADIATING FROM CHRISTCHURCH CITY.

TABLE SHOWING FOR JANUARY, 1930, THE NUMBER OF VEHICLES ENGAGED ON DEFINED ROUTES, ONE TERMINAL POINT OF WHICH WAS SITUATED WITHIN THE BOUNDARIES OF CHRISTCHURCH CITY.

Route.	Kind of Vehicle.			Total.
	Omnibus.	Service Car.	Freight Vehicle.	
Services: Hourly or Less.				
	Number.	Number.	Number.	Number.
Christchurch to North Beach ..	4	..	..	4
Services greater than One Hour but not greater than Twenty-four Hours.				
Christchurch to—				
Timaru	2	3	..	5
Sumner	..	..	3	3
Redcliffs	..	..	3	3
Rangiora	..	..	4	4
Methven	2	..	..	2
Teddington	..	..	2	2
Southbridge	2	..	1	3
Kaiapoi	3	..	1	4
Kaikoura	..	5	..	5
Hanmer	3	1	..	4
Lake Coleridge	..	1	..	1
Ashburton	1	1	6	8
Sockburn	..	..	4	4
Akaroa	1	6	4	11
Oxford	2	..	..	2
Belfast	1	..	..	1
White Cliffs	1	..	..	1
Nelson	..	5	..	5
Islington..	..	..	3	3
Templeton	..	..	1	1
Amberley	2	..	..	2
Totals	20	22	32	74

Route.	Kind of Vehicle.			Total.
	Omnibus.	Service Car.	Freight Vehicle.	
Other Services.				
Christchurch to—	Number.	Number.	Number.	Number.
Rangiora	..	..	2	2
Akaroa	..	..	2	2
Waikuku	..	..	1	1
Oxford	..	..	1	1
Mayfield	..	..	2	2
Lyttelton	..	..	1	1
Leeston	..	..	1	1
Kaikoura	1	..	1	2
Amberley	..	..	1	1
Sefton	..	..	1	1
Culverden	..	..	1	1
Methven	..	..	1	1
Springston	1	..	..	1
Kowai Bush	1	..	..	1
Coalgate	1	..	..	1
Cheviot	..	..	1	1
Timaru	..	..	1	1
Totals	4	..	17	21
Grand totals ..	28	22	49	99

TABLE 24.—MOTOR-TRANSPORT SERVICES RADIATING FROM DUNEDIN CITY.

TABLE SHOWING FOR JANUARY, 1930, THE NUMBER OF VEHICLES ENGAGED ON DEFINED ROUTES, ONE TERMINAL POINT OF WHICH WAS SITUATED WITHIN THE BOUNDARIES OF DUNEDIN CITY.

Route.	Kind of Vehicle.			Total.
	Omnibus.	Service Car.	Freight Vehicle.	
Services: Hourly or Less.				
	Number.	Number.	Number.	Number.
Dunedin to Macandrew's ..	9	..	..	9
Services greater than One Hour but not greater than Twenty-four Hours.				
Dunedin to—				
Pembroke	..	4	..	4
Berwick	1	..	..	1
Brighton..	1	3	..	4
Taieri Mouth	1	..	..	1
Lawrence	..	1	..	1
Tapanui	..	1	..	1
Milton	2	..	..	2
Waitati	..	..	1	1
Portobello	3	..	2	5
Tomahawk	1	..	..	1
Sandymount	1	..	..	1
Middlemarch	..	1	..	1
Palmerston	1	..	..	1
Mosgiel	..	..	3	3
Wingatui	..	..	1	1
Roxburgh	2	..	..	2

Route.	Kind of Vehicle.			Total.
	Omnibus.	Service Car.	Freight Vehicle.	
Services greater than One Hour but not greater than Twenty-four Hours—continued.				
Dunedin to—*continued.*	Number.	Number.	Number.	Number.
Timaru	..	2	..	2
Oamaru	..	1	..	1
Totals	13	13	7	33
Other Services.				
Dunedin to—				
Kaitangata	..	..	3	3
Balclutha	..	..	2	2
Taieri Mouth	..	..	1	1
Kaik	1	..	..	1
Timaru	..	3	..	3
Mosgiel	1	..	2	3
Roxburgh	..	..	1	1
Totals	2	3	9	14
Grand totals ..	24	16	16	56

TABLE 25.—TRENDS IN RAIL TRANSPORT.

TABLE SHOWING TRENDS IN RAILWAYS PASSENGER AND FREIGHT BUSINESS, 1918–19 TO 1928–29.

Year.	Mean Population (including Maoris) March Year.	Freight.			Passengers.					
		On Railways.	Per Head of Population.	Index of Tons per Head of Population. (1918–19 =1000.)	Excluding Season-ticket Holders.	Including Season-ticket Holders.	Per Head of Population.		Index of Figures per Head of Population. (1918–19=1000.)	
							Excluding Season-ticket Holders.	Including Season-ticket Holders.	Excluding Season-ticket Holders.	Including Season-ticket Holders.
		Tons.	Tons.							
1918–19 ..	1,166,482	5,611,738	4·81	1,000	11,374,521	22,030,327	9·75	18·89	1,000	1,000
1919–20 ..	1,207,660	6,000,279	4·97	1,033	12,760,814	24,582,186	10·57	20·36	1,084	1,078
1920–21 ..	1,252,206	6,487,279	5·18	1,077	15,315,640	28,821,783	12·23	23·02	1,254	1,219
1921–22 ..	1,285,711	6,321,351	4·92	1,023	14,262,440	28,121,763	11·09	21·87	1,137	1,158
1922–23 ..	1,311,381	6,618,588	5·05	1,050	14,256,610	28,221,362	10·87	21·52	1,115	1,139
1923–24 ..	1,334,029	6,925,517	5·19	1,079	13,836,311	28,436,475	10·37	21·32	1,064	1,129
1924–25 ..	1,359,995	7,033,459	5·17	1,075	12,424,012	26,106,859	9·14	19·20	937	1,016
1925–26 ..	1,392,073	7,256,142	5·21	1,083	11,813,480	27,653,414	8·49	19·86	871	1,051
1926–27 ..	1,409,762	7,308,449	5·14	1,069	10,305,065	26,002,137	7·25	18·30	744	969
1027–28 ..	1,443,323	7,366,762	5·10	1,060	9,299,157	25,379,665	6·44	17·58	661	931
1928–29 ..	1,459,983	7,622,631	5·22	1,085	9,074,993	25,574,843	6·22	17·52	638	927

N.B.—The index of the volume of production used in the graph on page 34 is taken from page 975 of the Official Year-book, 1930.

TABLE 26.—LAND-TRANSPORT SERVICES IN NEW ZEALAND.

Development of Land Transport in New Zealand.

1914.

Capital Cost.

	£
Railways (from Railways Statement)	34,980,576
Tramways, electric and cable (from Year-book)	2,047,424
Roads (Public Works Engineer's figures)	28,000,000
Motor-vehicles (estimated), 21,500 (including motor-cycles) at £200 each	4,300,000
Garage accommodation, motor-repair shops, spare parts, and bowsers, at £39 per vehicle	838,500
Draught horses (estimated), 86,500 at £30, half of total	2,595,000
Other horses—excluding thoroughbreds and trotting (estimated), 100,000 at £10, half of total	1,000,000
Horse-vehicles (estimated), 75,000 at £20	1,500,000
	£75,261,500

Annual Cost.

	£
Railways: Revenue expenditure (from Railways Statement)	2,880,323
Tramways, electric and cable (from Year-book)	705,800
Roads (Public Works Engineer's figures)	2,490,047
Interest on capital, railways (estimated)	1,437,059
Operation of motor-vehicles, including depreciation, interest, petrol, licenses, garage, and driving (estimated), one-eighth of 1927 figure	3,110,284
Depreciation: Horses and vehicles, 10 per cent. of £5,095,000	509,500
Interest: Horses and vehicles, 5 per cent. of £5,095,000	254,750
Fodder, stabling, and shoeing—	
93,250 horses at £30	2,797,500
93,250 horses at £15	1,398,750
Wages of horse-drivers (1916 census)—	
Carriers, &c., 5,058; carters, &c., 3,865; coachmen, 155; cab-drivers, 1,319; drivers, &c., 1,028; livery-stables, 647: total, 12,072, at £180	2,172,960
	£17,756,973
Value of national production (estimated)	60,000,000
Percentage-cost of land transport to value of production	29·59

1927.

Capital Cost.

	£
Railways (from Railway Statement)	49,740,793
Tramways, electric and cable (from Year-book)	5,177,026
Roads (Public Works Engineer's figures)	49,000,000
Motor-vehicles (figures as at 31st July)—	
106,091 cars at £200	21,218,200
20,559 freight at £400	8,233,600
1,094 omnibuses at £750	820,500
32,718 cycles at £50	1,635,900
328 tractors at £450	147,600
1,181 trailers at £30	35,430
Steam-vehicles (figures as at 31st July): 471 traction-engines at £600	282,600
Garage accommodation, motor-repair shops, spare parts, and bowsers, at £39 per vehicle	6,335,238
Draught horses (estimated), 11,450* at £30	343,500
Other horses—excluding thoroughbreds and trotting (estimated), 13,236* at £10	132,360
Horse-vehicles (estimated), 10,000* at £10	100,000
	£143,202,747

Annual Cost.

	£
Railways: Revenue expenditure (from Railways Statement)	6,490,880
Tramways, electric and cable (from Year-book)	1,710,700
Roads (estimated)	4,005,896
Interest on capital, railways (from Railways Statement)	2,043,433
Operation of motor-vehicles (31st July, less dormant registration)—	
97,026 cars, each 5,000 miles at 6d. per mile	12,128,250
20,559 freight, each 10,000 miles at 1s. per mile	10,279,500
1,094 omnibuses, each 25,000 miles at 1s. 3d. per mile	1,709,375
24,214 motor-cycles, each 3,000 miles at 2d. per mile	605,350
799 traction-engines, &c., 2,000 miles at 2s. per mile	159,800
Depreciation, horses and vehicles, 10 per cent. of £575,860	57,586
Interest, horses and vehicles, 5 per cent. of £575,860	28,793
Fodder, stabling, and shoeing—	
12,343 horses at £50	617,150
12,343 horses at £25	308,575
Wages of horse-drivers (estimated),* 1,598 at £240	383,520
	£40,528,808
Value of production (estimated)	114,000,000
Percentage-cost of land transport to value of production	35·55

1929.

Capital Cost.

	£
Railways (from Railways Statement)	57,607,337
Tramways, electric and cable (from Year-book)	5,250,379
Roads (estimated)	59,500,000
Motor-vehicles (figures as at 31st August)—	
135,487 cars at £200	27,097,400
26,344 freight at £400	10,537,600
1,196 omnibuses at £750	897,000
35,790 motor-cycles at £50	1,789,500
424 tractors at £450	190,800
1,500 trailers at £30	45,000
Steam-vehicles (as at 31st August)—370 traction-engines at £600	222,000
Garage accommodation, motor-repair shops, spare parts, and bowsers at £39 per vehicle	7,850,000
Draught horses (estimated) 9,250* at £30	277,500
Other horses—excluding thoroughbreds and trotting (estimated) 10,692* at £10	106,920
Horse-vehicles (estimated) 8,078* at £10	80,780
	£171,452,216

Annual Cost.

	£
Railways: Revenue expenditure (from Railways Statement)	6,849,383
Tramways, electric and cable (from Year-book)	1,577,361
Roads (estimated)	3,979,705
Interest on capital, railways (from Railways Statement)	2,331,335
Operation of motor-vehicles (as at 31st August, less dormant registration)—	
119,062 cars, each 5,000 miles at 6d. per mile	14,882,750
20,792 freight, each 10,000 miles at 1s. per mile	10,396,000
11,196 omnibuses, each 25,000 miles at 1s. 4d. per mile	1,993,333
21,190 motor-cycles, 3,000 miles at 2d. per mile	529,750
794 traction-engines, &c., each 2,000 miles at 2s. per mile	158,800
Depreciation, horses and vehicles, 10 per cent. of £465,200	46,520
Interest, horses and vehicles, 5 per cent. of £465,200	23,260
Fodder, stabling, and shoeing—	
9,971 horses at £50	498,550
9,971 horses at £25	249,275
Wages of horse-drivers (estimated),* 1,291 at £240	309,840
	£43,825,862
Value of production (estimated), 1927–28	121,000,000
Percentage-cost of land transport to value of production	36·22

* Reductions in same ratio as increase of motor-vehicles.

TABLE 27.—MOTOR IMPORT TRADE AND CUSTOMS DUTIES.

TABLE SHOWING THE RATES OF DUTY PAYABLE ON THE IMPORTS INTO NEW ZEALAND OF, AND THE AMOUNTS OF DUTY COLLECTED UNDER (*a*) THE BRITISH PREFERENTIAL TARIFF, AND (*b*) THE GENERAL TARIFF ON MOTOR-VEHICLES FOR ROAD TRAFFIC AND TIRES FOR, AND PARTS OF SUCH VEHICLES, DURING EACH CALENDAR YEAR FROM 1919 TO 1929, INCLUSIVE.

—		1919.	1920.	1921.	1922.	1923.	1924.	1925.	1926.	1927.	1928.	1929.
Passenger Vehicles (other than Buses).												
Rates of duty payable—												
British preferential	Per cent.	10	10	*	10 (plus body duty)†	10 (plus body duty)†	10 (plus body duty)†	10 (plus body duty)†	‡	10 (plus body duty)§	10 (plus body duty)§	10 (plus body duty)§
General	Per cent.	20	20	*	25 (plus body duty)†	25 (plus body duty)†	25 (plus body duty)†	25 (plus body duty)†	‡	35 (plus body duty)§	35 (plus body duty)§	35 (plus body duty)§
Imports‖—												
Subject to British preferential rates	Number	2,003	3,207	1,192	1,840	7,334	10,249	8,238	5,621	3,740	6,563	13,934
	Value £	257,901	600,106	309,624	360,160	1,106,856	1,818,365	1,732,771	976,262	546,725	936,018	1,914,365
Subject to general rates	Number	3,088	6,983	1,544	1,187	4,084	3,951	7,065	10,169	6,196	9,251	8,411
	Value £	693,854	1,758,174	418,360	242,651	814,854	835,255	1,278,613	1,634,130	958,024	1,295,739	1,358,288
Total duty paid—												
British preferential	£	25,704	59,745	30,890	53,046	180,980	280,623	250,871	159,075	104,359	179,406	362,183
General	£	140,634	349,476	87,807	80,647	260,624	267,474	434,470	575,963	508,192	610,702	685,434
Average rate of duty paid—												
British preferential	Per cent.	10	10	10	14·9	16·3	15·4	14·5	16·3	19·1	19·2	18·9
General	Per cent.	20	20	21	33·2	35·7	32	33·2	35·2	53	47·2	50·5
Chassis for Passenger Vehicles (other than Buses).												
Rates of duty payable—												
British preferential	Per cent.	10	10	*	10	10	10	10	‡	10	10	10
General	Per cent.	20	20	*	25	25	25	25	‡	35	35	35
Imports‖—												
Subject to British preferential rates	Number	86	200	31	210	507	1,008	2,764	3,798	638	502	797
	Value £	9,360	31,578	9,073	30,800	59,550	119,898	243,469	330,313	97,135	67,525	91,506
Subject to general rates	Number	92	121	138	217	389	351	550	734	210	106	140
	Value £	14,950	34,375	39,046	42,522	79,210	73,425	100,795	120,233	41,954	21,237	27,935
Total duty paid—												
British preferential	£	936	3,148	743	3,083	6,749	11,976	24,099	33,415	9,686	7,203	9,484
General	£	2,914	6,362	6,633	10,527	20,153	18,392	25,377	30,067	14,139	9,382	8,898
Lorries, trucks, vans, and buses—												
Rates of duty payable—												
British preferential	Per cent.	10	10	*	10	10	10	10	‡	10	10	10
General	Per cent.	20	20	*	25	25	25	25	‡	35	35	35
Imports‖—												
Subject to British preferential rates	Number	576	1,020	560	329	1,118	2,122	2,075	1,257	1,066	724	2,704
	Value £	75,862	290,395	246,153	101,459	197,320	384,569	393,010	276,489	165,979	152,313	370,359
Subject to general rates	Number	244	387	355	165	442	797	1,320	1,392	1,129	1,512	3,003
	Value £	76,075	164,208	165,943	68,081	144,756	271,708	337,242	311,564	195,941	266,528	463,468
Total duty paid—												
British preferential	£	7,575	28,773	21,886	9,616	20,071	37,792	37,651	26,821	16,370	14,921	36,357
General	£	14,960	32,116	30,662	16,642	36,309	67,726	81,966	88,053	76,506	104,722	156,193
Motor-cycles.												
Rates of duty payable—												
British preferential	Per cent.	10	10	*	10	10	10	10	‡	10	10	10
General	Per cent.	20	20	*	25	25	25	25	‡	35	35	35
Imports‖—												
Subject to British preferential rates	Number	310	682	238	148	736	1,364	3,196	3,130	2,848	2,994	3,277
	Value £	20,427	59,947	23,111	11,393	42,571	72,627	142,167	127,550	129,910	145,504	161,026
Subject to general rates	Number	1,282	1,928	579	646	1,667	913	1,623	1,521	695	560	546
	Value £	70,605	112,608	40,415	41,471	97,528	57,402	85,240	76,318	35,390	27,737	28,333
Total duty paid—												
British preferential	£	2,010	5,649	2,488	1,161	4,270	7,258	14,192	12,633	13,154	14,670	16,083
General	£	14,428	22,156	8,098	10,197	23,734	15,176	20,386	23,674	12,767	10,085	9,898

Tires, Covers, and Tubes for Motor-vehicles and Motor-cycles.¶												
Rates of duty payable—												
British preferential	Per cent.	Free	Free	*	10	10	10	10	‡	10	10	10
General	Per cent.	Free	Free	*	25	25	25	25	‡	35	35	35
Imports‖—												
Subject to British preferential rates..	Value £	326,205	760,918	325,770	145,629	307,442	301,697	656,209	645,717	789,894	796,583	1,071,961
Subject to general rates	Value £	556,387	1,104,895	429,002	338,920	442,683	303,910	487,046	279,551	263,541	194,439	89,932
Total duty paid**—												
British preferential	£	..	..	..	13,647	29,975	29,821	65,666	64,881	78,388	76,033	107,188
General	£	..	..	..	87,726	104,961	77,317	121,308	75,633	91,995	65,617	29,533
Undercarriage-springs and Materials for and Parts of Motor-vehicles (as approved by the Minister of Customs) for the Manufacture or Repair in New Zealand of Motor-vehicles.												
Rates of duty payable—												
British preferential	Per cent.						Free	Free	Free	Free	Free	Free
General	Per cent.						10	10	10	10, 20	10, 20	10, 20
Imports‖—												
Subject to British preferential rates..	Value £			Not separately recorded.			13,089	12,838	9,240	8,351	5,313	6,804
Subject to general rates	Value £						7,815	10,993	12,817	8,678	6,030	7,927
Total duty paid—												
British preferential	£						..	..	..	..	..	..
General	£						783	1,100	1,287	1,096	1,048	1,163
Parts of Motor-vehicles n.e.i.												
Rates of duty payable—												
British preferential	Per cent.	10	10	*	10	10	10	10	‡	10	10	10
General	Per cent.	20	20	*	25	25	25	25	‡	35	35	35
Imports‖—												
Subject to British preferential rates..	Value £	32,370	105,807	86,334	34,478	60,348	105,613	151,387	133,766	109,509	119,404	114,567
Subject to general rates	Value £	102,814	164,072	107,357	70,606	109,654	159,986	178,629	217,052	156,464	120,419	153,584
Total duty paid—												
British preferential	£	3,200	10,427	8,546	2,923	6,056	10,458	15,226	13,838	11,021	10,756	11,313
General	£	20,710	33,038	21,802	18,502	27,862	40,020	44,456	57,727	54,182	41,393	52,879
Grand totals—												
Values—												
Subject to British preferential rates	£	722,125	1,848,751	1,000,065	683,919	1,774,087	2,815,858	3,331,851	2,499,337	1,847,503	2,222,660	3,730,588
Subject to general tariff rates ..	£	1,514,685	3,338,332	1,200,123	804,251	1,688,685	1,709,501	2,478,558	2,651,665	1,659,992	1,932,129	2,129,467
Total	Value £	2,236,810	5,187,083	2,200,188	1,488,170	3,462,772	4,525,359	5,810,409	5,151,002	3,507,495	4,154,789	5,860,055
Duty—												
British preferential	£	39,425	107,742	64,553	83,476	248,101	377,928	407,705	310,663	232,978	302,989	542,608
General	£	193,646	443,148	155,002	224,241	473,643	486,888	729,063	852,404	758,877	842,949	943,998
Total	£	233,071	550,890	219,555	307,717	721,744	864,816	1,136,768	1,163,067	991,855	1,145,938	1,486,606

NOTE.—The above figures do not include primage duty.

* From 1st January to 3rd November inclusive, same rates as in 1920; from 4th November to 31st December inclusive, same rates as in 1922.

† Additional duty on bodies: British preferential—Single-seated bodies n.e.i., £5 each; double-seated bodies n.e.i., £10 each; bodies with fixed or movable canopy tops, £15 each. General—Single-seated bodies n.e.i., £7 10s. each; double-seated bodies n.e.i., £15 each; bodies with fixed or movable canopy tops, £22 10s. each.

‡ From 1st January to 31st August inclusive, same rates as in 1925; from 1st September to 31st December inclusive, same rates as in 1927.

§ Additional duty on bodies: British preferential, 10 per cent. on the value of the vehicle, including the body; general, 15 per cent. on the value of the vehicle including the body: Provided that where the value for duty of the vehicle exceeds £200, the additional body duty is—British preferential, 10 per cent.; general, 15 per cent., on £200 of such value; and on the remainder of such value, British preferential, 5 per cent.; general, 7½ per cent.

‖ Not including imports free of duty for New Zealand Government.

¶ Tires: The figures shown do not include tires attached to or imported with motor-vehicles. The imports of and the duty paid on tires imported with or attached to vehicles are included under the figures shown for the complete vehicles. Separate details of the imports of such tires are not available, but the estimated amounts of duty collected on these tires since 1st April, 1924, are as follows: Years ended 31st March—1925, £32,500; 1926, £39,200; 1927, £48,100; 1928, £50,968; 1929, £51,899; 1930, £41,392. These amounts have been paid to the Main Highways Account or Motor-vehicles Duties and Licenses Account.

** Being the duty collected as tire-tax to be paid to Main Highways Account or Motor-vehicles Duties and Licenses Account. Tire-tax was first collected for payment to the Main Highways Account on the 1st January, 1922.

TABLE 28.—MOTOR-TAXATION—INTERNATIONAL COMPARISONS.

CONTRAST OF TOTAL MOTOR-TAXATION ON VARIOUS CLASSES OF MOTOR-VEHICLES IN BRITAIN, NEW ZEALAND, UNITED STATES OF AMERICA, AND EACH STATE OF AUSTRALIA, COMPRISING TIRE DUTY, PETROL DUTY, LICENSE FEES, AND HEAVY-TRAFFIC FEES.

—	New Zealand.	Britain.	Australia.					United States of America.		
			New South Wales.	West Australia.	Victoria.	South Australia.	Queensland.	Florida.	Montana.	North Carolina.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Car—18 h.p., 1 ton gross	9 15 0	23 13 4	13 16 11	14 6 11	14 0 11	14 16 11	13 8 3	5 9 2	4 13 9	3 2 6
Trucks—										
Gross weight, 2 tons—										
Pneumatic tires	21 3 6	38 12 4	27 3 10	29 13 10	28 13 10	38 18 10	32 15 10	12 14 3	9 0 7	10 1 5
Solid tires	22 3 6	38 12 4	28 13 10	31 1 10	31 13 10	47 8 4	40 18 10	17 1 9	9 11 0	11 2 3
Gross weight, 4 tons—										
Pneumatic tires	41 16 0	44 5 2	40 3 9	43 3 9	44 3 9	57 8 9	48 7 9	24 8 3	13 7 3	15 19 3
Solid tires	45 4 0	44 5 2	43 3 9	45 15 9	49 15 9	70 18 3	63 5 9	29 1 7	14 10 8	18 11 5
Gross weight, 6 tons—										
Pneumatic tires	60 9 0	54 18 4	51 2 8	57 12 8	56 2 8	75 7 8	62 10 2	33 10 0	18 4 7	26 0 10
Solid tires	66 5 0	62 18 4	55 12 8	62 0 8	64 0 2	94 10 2	84 4 8	40 10 0	20 3 7	31 5 0
Gross weight, 8 tons—										
Pneumatic tires	85 15 0	67 4 8	65 5 1	83 2 7	76 15 1	97 15 1	80 2 1	41 17 6	25 10 5	54 13 9
Solid tires	92 5 0	68 16 8	71 5 1	90 18 1	92 11 4	123 0 1	108 2 7	50 12 6	28 12 11	63 15 0
Gross weight, 10 tons—										
Pneumatic tires	117 15 2	82 19 8	82 9 2	116 5 0	96 0 0	120 15 0	100 2 0	52 6 9	59 0 7	59 0 7
Solid tires	130 0 2	93 15 8	90 0 0	128 18 0	115 5 0	151 2 6	135 0 0	62 16 9	69 8 11	73 1 10
Omnibuses—										
4 tons unladen, 30 h.p., 25 seats, pneumatic tires..	161 15 0	118 0 0	144 10 0	175 0 0	197 17 6	160 5 0	139 7 4	143 12 0	75 0 0	42 18 4
6 tons unladen, 45 h.p., 35 seats, pneumatic tires	161 15 0	137 4 0	159 10 0	211 12 6	231 12 6	187 15 0	155 5 0	174 17 6	75 0 0	53 6 8

TABLE 29.—CLASSIFICATION OF ROADS.

TABLE SHOWING ROADS CLASSIFIED IN EACH COUNTY.

County.	Total Formed Roads.	Classified Roads.					Total Classified Roads.
		First.	Second.	Third.	Fourth.	Fifth.	
North Island.							
Mangonui	307	..	..	..	48	259	307
Whangaroa	122½	..	..	37	54	..	91
Bay of Islands	536	..	..	..	240	..	240
Hokianga	175	..	..	..	75	..	75
Whangarei	800	..	..	305	..	..	305
Hobson	401	..	..	..	..	225	225
Otamatea	326	..	..	..	..	206	206
Rodney	525	..	..	..	..	525	525
Waitemata	678	15	17	27	196	380	635
Great Barrier	30½	..	..	..	..	..	..
Manukau	280¾	6	28	66	102	68	270
Franklin	544	..	..	135	119	288	542
Raglan	496	..	..	..	392	..	392
Waikato	595	..	..	32	173	10	215*
Waipa	530¾	..	..	9	230	..	239
Otorohanga	341	..	..	..	126	..	126*
Kawhia	129	..	..	..	..	..	..
Waitomo	1,050½	..	..	..	549	..	549
Taumarunui	308	..	..	..	24	177	201
Matamata	489½	..	..	95	235	20	350*
Piako	445	..	..	6	379	..	385
Ohinemuri	140¾	..	..	36	97	..	133
Hauraki Plains	205	..	..	..	205	..	205
Thames	103	..	..	..	..	..	..
Coromandel	130¼	..	..	..	..	..	..
Tauranga	616	..	..	..	109	..	109
Rotorua	357	..	..	..	142	25	167
Taupo	245	..	..	..	103	..	103*
Whakatane	365	..	22	35	44	..	101
Opotiki	290¼	..	..	21	61	..	82
Matakara	68	..	..	23	..	..	23
Waiapu	237¾	..	..	192	..	..	192*
Uawa	106	..	..	51	..	..	51
Waikohu	337	..	..	337	..	..	337
Cook	444½	..	..	64	..	.	64
Wairoa..	445	..	50	27	..	..	77
Hawke's Bay	993	..	20	22	10	..	52
Waipawa	475	60	160	185	..	..	405*
Waipukurau	80	27	43	..	..	..	70
Patangata	295	41	254	..	..	..	295
Dannevirke	392	..	58	179	..	..	237
Woodville	182	18	114	30	20	..	182
Weber	56	..	..	25	..	..	25
Ohura	206	..	..	..	..	..	..
Whangamomona ..	178	..	..	..	..	..	..
Clifton	315¾	..	..	44	71	..	115
Taranaki	276	37	..	170	45	..	252
Inglewood	223¼	..	..	..	..	..	..
Egmont	180	..	..	..	..	..	..
Stratford	303	10	24	155	73	..	262
Eltham	192¼	29	70	79	..	..	178
Waimate West	85	46	..	42	..	..	88
Hawera	211	..	..	..	..	..	..
Patea	303	..	..	..	..	..	..
Kaitieke	248½	..	..	..	80	152	232
Waimarino	294¼	..	..	52	36	..	88
Waitotara	225	..	..	..	..	..	..
Wanganui	239½	..	40	25	65	..	130*
Rangitikei	1,022¾	..	41	57	..	..	98
Kiwitea	275	..	..	..	..	..	..
Pohangina	189	38	..	143	8	..	189
Oroua	253	..	..	..	..	..	..
Manawatu	267½	..	15	79	10	..	104
Kairanga	214¾	..	..	..	..	..	..
Horowhenua	350½	..	..	..	..	..	..
Pahiatua	327	20	20	35	25	10	110*

* Estimated.

TABLE 29.—CLASSIFICATION OF ROADS—*continued.*

TABLE SHOWING ROADS CLASSIFIED IN EACH COUNTY—*continued.*

County.	Total Formed Roads.	Classified Roads.					Total Classified Roads.
		First.	Second.	Third.	Fourth.	Fifth.	
North Island—continued.							
Akitio	185¼	..	..	..	..	..	..
Eketahuna	252¼	..	..	..	..	..	..
Mauriceville	65	..	..	..	..	..	..
Masterton	324	..	..	..	..	..	..
Castlepoint	85	..	..	..	..	..	..
Wairarapa South	247	..	..	..	..	..	..
Featherston	296¼	..	..	..	..	..	..
Hutt	252	..	47	..	46	..	93
Makara	90¼	..	..	..	..	..	..
Totals	23,851	347	1,023	2,820	4,192	2,345	10,727
South Island.							
Sounds	9	..	..	..	..	..	..
Marlborough	539	..	..	..	..	..	..
Awatere	254	..	..	..	..	..	..
Kaikoura	151	..	..	29	..	..	29
Amuri	299	..	..	..	..	..	..
Cheviot	169	..	..	..	..	..	..
Waimea	796	32	23	72	53	..	180
Takaka	128	..	..	..	..	..	..
Collingwood	86	..	24	35	12	3	74
Buller	441	..	..	177	53	26	256
Murchison	230	..	..	68	..	..	68
Inangahua	198	..	7	15	101	16	139*
Grey	301	57	46	11	87	62	263
Westland	493	..	83	142	78	76	379
Waipara	300	..	..	..	..	..	..
Kowa	177	..	..	..	..	..	..
Ashley	164	..	..	..	..	..	..
Rangiora	135	..	..	..	..	..	..
Eyre	147	..	..	..	..	..	..
Oxford	228	..	..	..	..	..	..
Tawera	195	..	..	..	..	..	..
Malvern	395	..	..	..	..	..	..
Paparua	490	..	..	..	..	..	..
Waimairi	165	..	..	14	..	..	14
Heathcote	54	..	..	..	..	10	10
Halswell	64	..	..	..	..	..	..
Mount Herbert	46	..	..	..	..	..	..
Akaroa	174	..	12	18	..	..	30
Wairewa	123	..	..	..	..	..	..
Springs	103	..	..	..	..	..	..
Ellesmere	263	..	..	..	..	..	..
Selwyn	1,685	..	..	..	..	..	..
Ashburton	418	..	..	..	..	..	..
Geraldine	565	..	..	..	..	..	..
Levels	452	..	..	..	..	..	..
Mackenzie	628	..	..	..	..	..	..
Waimate	802	..	..	..	..	..	..
Waitaki	922	..	..	..	..	..	..
Waihemo	262	..	..	..	..	..	..
Waikouaiti	315	..	..	..	..	..	..
Peninsula	141	..	..	..	..	..	..
Taieri	444	..	..	65	..	..	65
Bruce	385	..	56	..	..	..	56
Clutha	852	..	..	45	..	..	45
Tuapeka	600	..	..	..	..	..	..
Maniototo	820	..	..	..	..	..	..
Vincent	620	..	..	..	..	..	..
Lake	348	..	..	..	..	..	..
Southland	2,364	..	..	..	6	6	12
Wallace	832	..	..	19	..	..	19
Fiord	..	..	..	..	..	..	..
Stewart Island	17	..	..	..	..	..	..
Totals	20,707	89	251	710	390	199	1,639

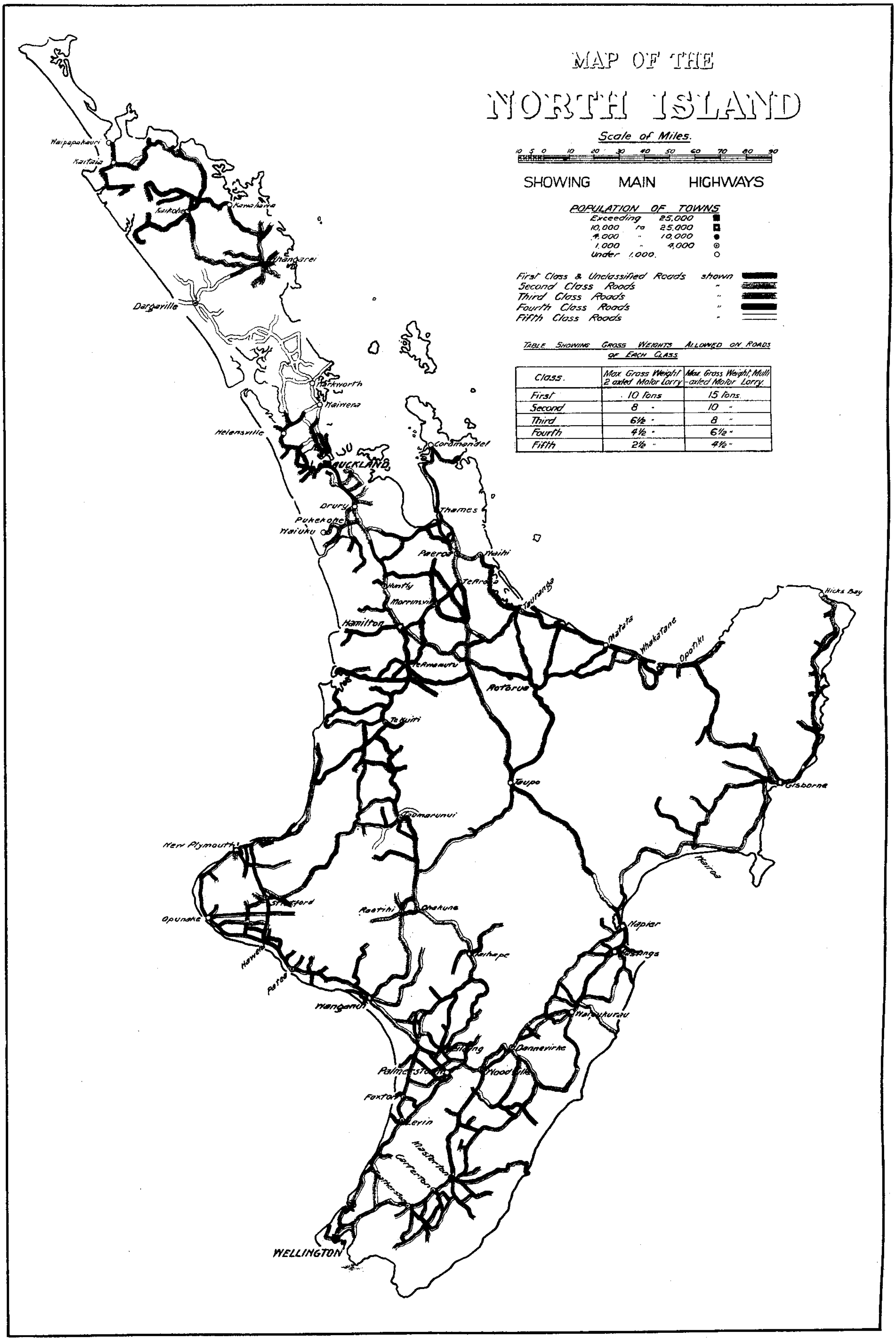
* Estimated.

NOTE.—Bridle-tracks are included under unformed roads.

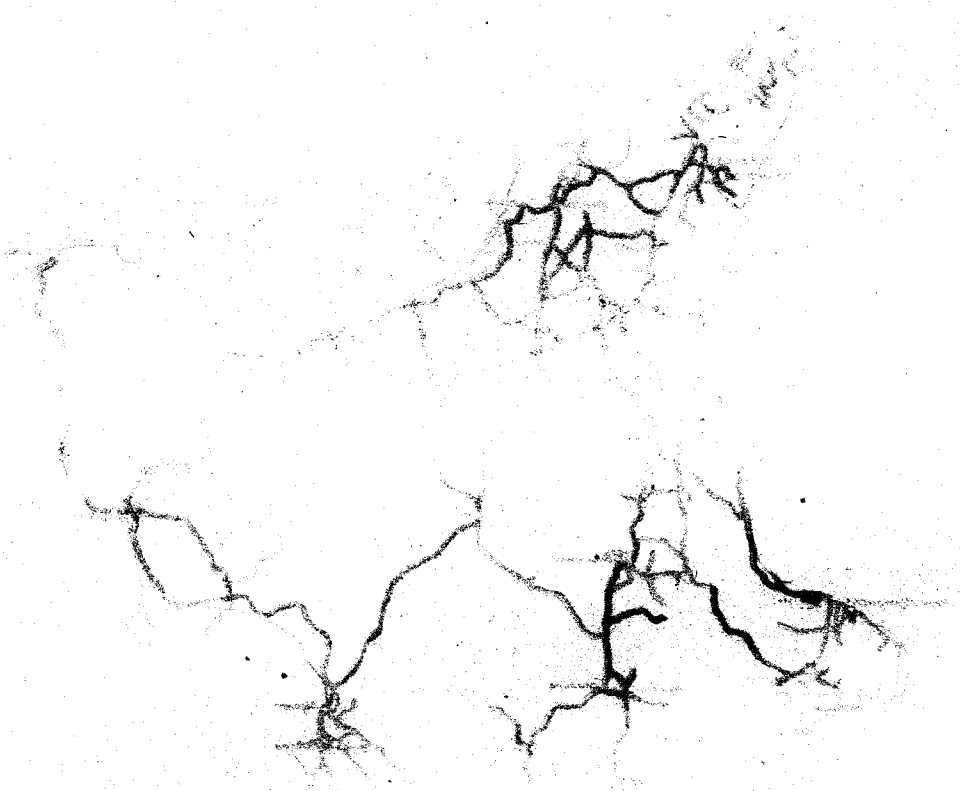
Approximate Cost of Paper.—Preparation, not given; printing (800 copies, including graphs and maps), £255.

By Authority: W. A. G. SKINNER, Government Printer, Wellington.—1930.

Price, 4s.]



Class.	Max. Gross Weight 2 axled Motor Lorry	Max. Gross Weight, Multi-axled Motor Lorry.
First	10 tons	15 tons.
Second	8 "	10 "
Third	6½ "	8 "
Fourth	4½ "	6½ "
Fifth	2½ "	4½ "



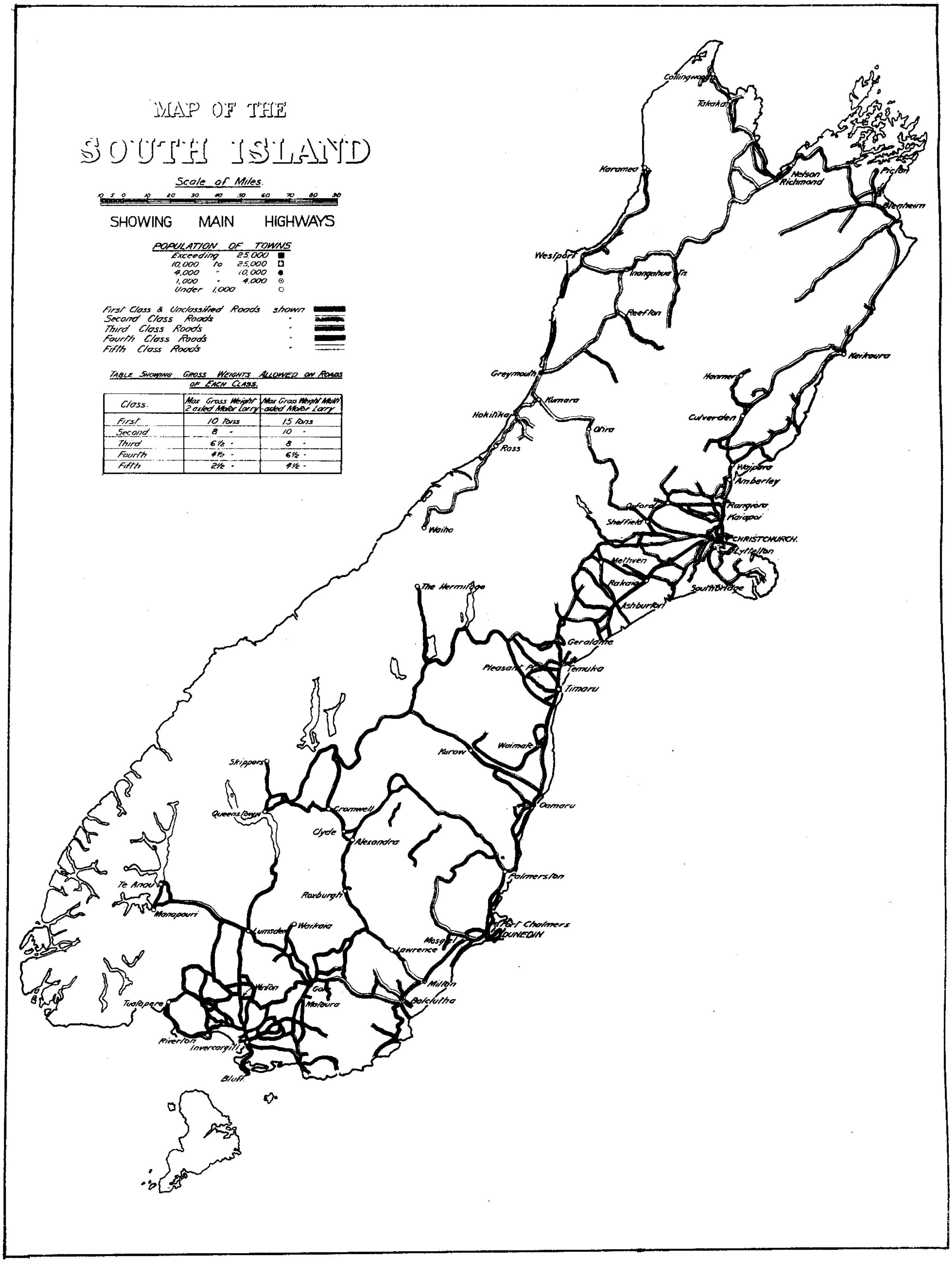
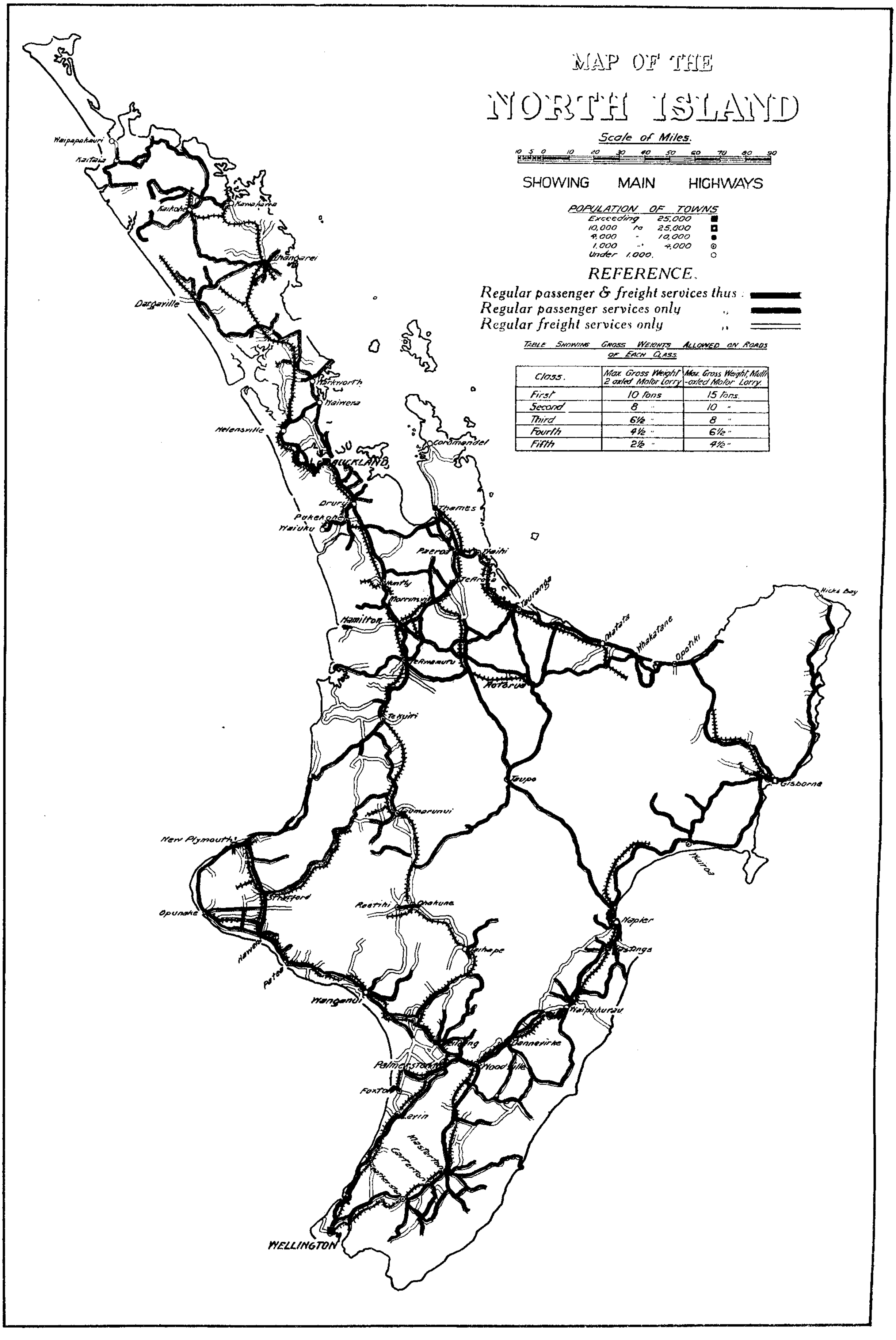
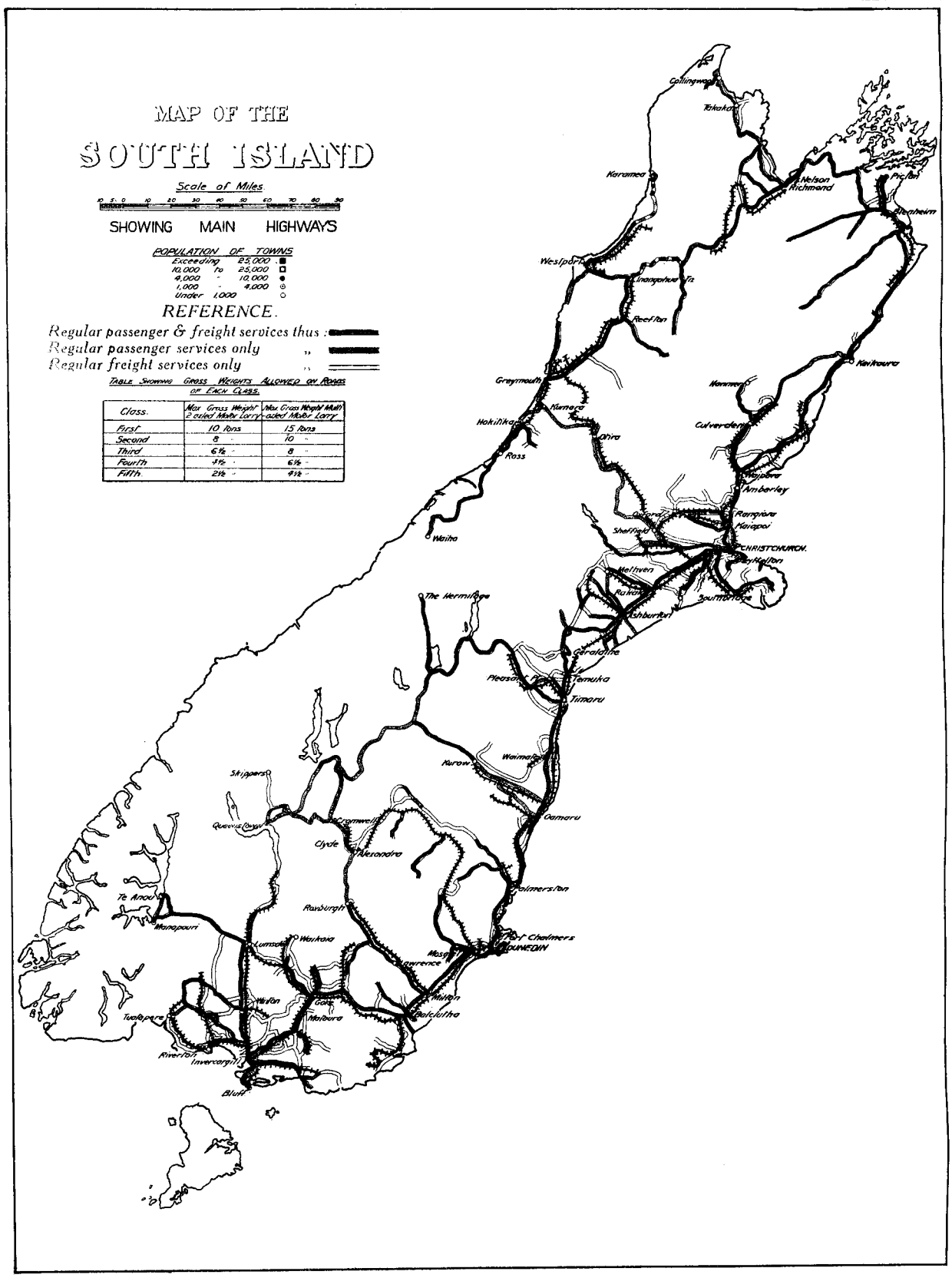
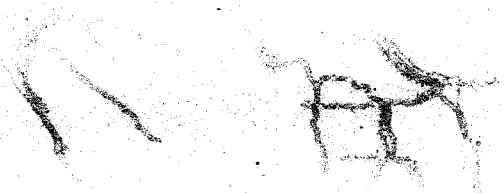


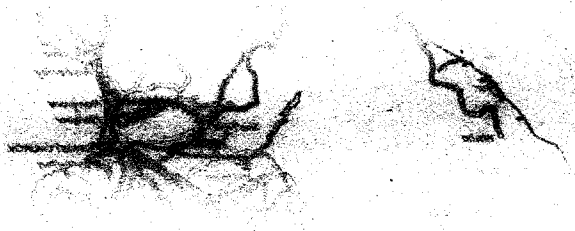
TABLE SHOWING GROSS WEIGHTS ALLOWED ON ROADS OF EACH CLASS.

Class.	Max Gross Weight 2 axled Motor Lorry	Max Gross Weight Multi-axled Motor Lorry
First	10 Tons	15 Tons
Second	8 "	10 "
Third	6½ "	8 "
Fourth	4½ "	6½ "
Fifth	2½ "	4½ "


MAP OF THE
NORTH ISLAND
Scale of Miles.
10 5 0 10 20 30 40 50 60 70 80 90
SHOWING MAIN HIGHWAYS
POPULATION OF TOWNS
Exceeding 25,000
10,000 to 25,000
4,000 " 10,000
1,000 " 4,000
Under 1,000.
REFERENCE.
Regular passenger & freight services thus :
Regular passenger services only "
Regular freight services only "
TABLE SHOWING GROSS WEIGHTS ALLOWED ON ROADS OF EACH CLASS
Class. | Max. Gross Weight 2 axled Motor Lorry | Max. Gross Weight, Multi-axled Motor Lorry.
First | 10 Tons | 15 Tons.
Second | 8 " | 10 "
Third | 6½ " | 8 "
Fourth | 4½ " | 6½ "
Fifth | 2½ " | 4½ "
Waipapakauri
Kaitaia
Kaikohe
Kawakawa
Whangarei
Dargaville
Warkworth
Waiwera
Helensville
AUCKLAND
Coromandel
Drury
Pukekohe
Waiuku
Thames
Paeroa
Waihi
Huntly
Te Aroha
Morrinsville
Tauranga
Hamilton
Matata
Whakatane
Opotiki
Hicks Bay
Te Awamutu
Rotorua
Te Kuiti
Taupo
Gisborne
Taumarunui
New Plymouth
Wairoa
Stratford
Opunake
Raetihi
Ohakune
Napier
Hastings
Hawera
Taihape
Patea
Wanganui
Waipukurau
Feilding
Dannevirke
Palmerston N.
Woodville
Foxton
Levin
Masterton
Carterton
WELLINGTON

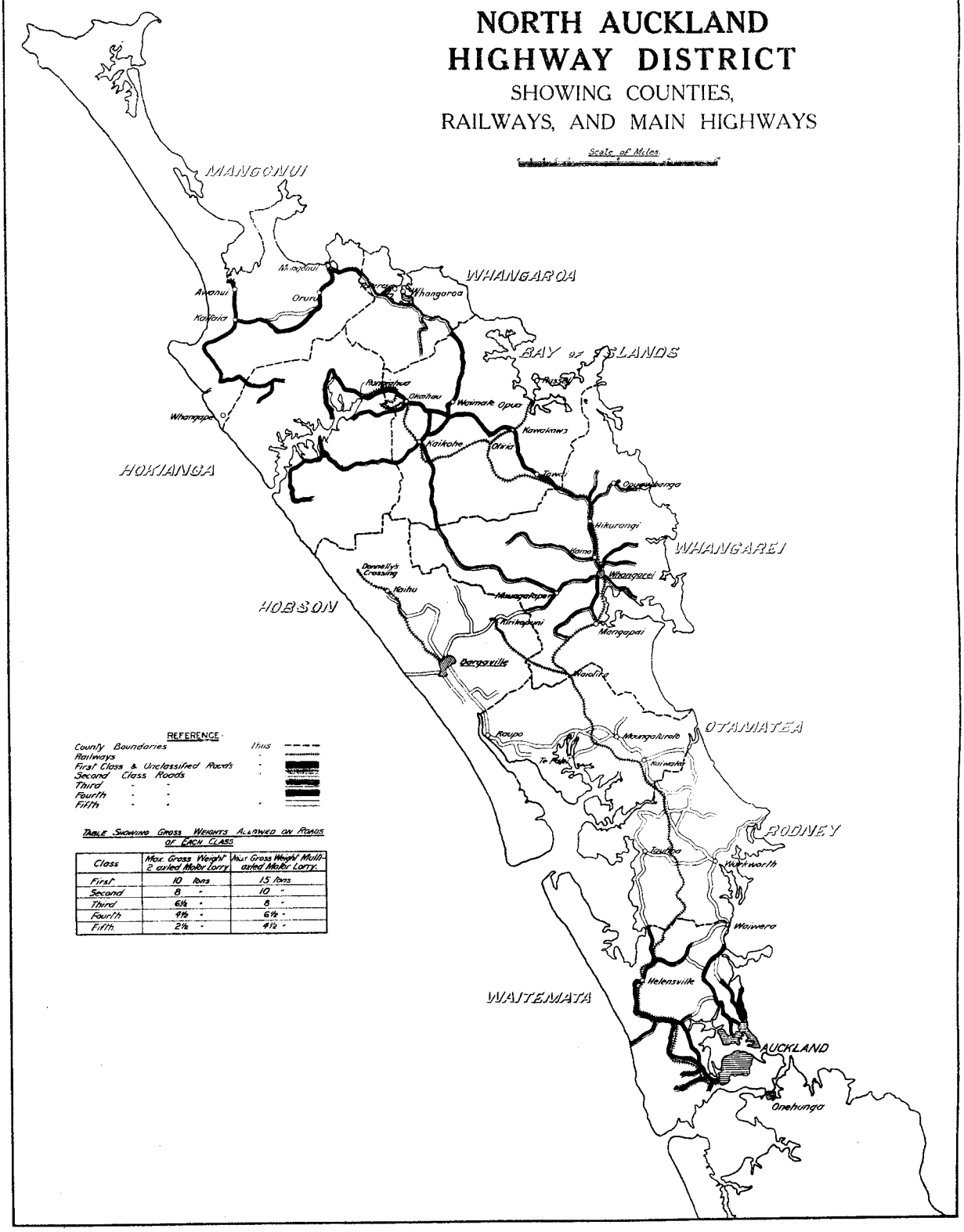

MAP OF THE
SOUTH ISLAND
Scale of Miles
10 5 0 10 20 30 40 50 60 70 80 90
SHOWING MAIN HIGHWAYS
POPULATION OF TOWNS
Exceeding 25,000
10,000 to 25,000
4,000 " 10,000
1,000 " 4,000
Under 1,000
REFERENCE.
Regular passenger & freight services thus :
Regular passenger services only "
Regular freight services only "
TABLE SHOWING GROSS WEIGHTS ALLOWED ON ROADS OF EACH CLASS.
Class. | Max Gross Weight 2 axled Motor Lorry | Max Gross Weight Multi axled Motor Lorry
First | 10 Tons | 15 Tons
Second | 8 " | 10 "
Third | 6½ " | 8 "
Fourth | 4½ " | 6½ "
Fifth | 2½ " | 4½ "
Collingwood
Takaka
Karamea
Nelson
Richmond
Picton
Blenheim
Westport
Inangahua Jn.
Reefton
Greymouth
Kaikoura
Hanmer
Hokitika
Kumara
Ohira
Culverden
Ross
Amberley
Rangiora
Kaiapoi
Sheffield
CHRISTCHURCH.
Lyttelton
Waiho
Methven
Rakaia
Ashburton
Timaru
The Hermitage
Geraldine
Temuka
Pleasant Point
Waimate
Karoa
Skippers
Queenstown
Cromwell
Oamaru
Clyde
Alexandra
Palmerston
Te Anau
Manapouri
Roxburgh
Waikaia
Lumsden
Mosgiel
Port Chalmers
DUNEDIN
Lawrence
Milton
Balclutha
Waipahi
Gore
Wyndham
Tuatapere
Riverton
Invercargill
Bluff





MAP OF
NORTH AUCKLAND
HIGHWAY DISTRICT
SHOWING COUNTIES, RAILWAYS, AND MAIN HIGHWAYS

Scale of Miles.



REFERENCE

	Thus
County Boundaries	
Railways	
First Class & Unclassified Roads	
Second Class Roads	
Third " "	
Fourth " "	
Fifth " "	

TABLE SHOWING GROSS WEIGHTS ALLOWED ON ROADS OF EACH CLASS

Class	Max. Gross Weight 2 axled Motor Lorry	Max. Gross Weight Multi-axled Motor Lorry.
First	10 Tons	15 Tons
Second	8 "	10 "
Third	6½ "	8 "
Fourth	4½ "	6½ "
Fifth	2½ "	4½ "

NEW ZEALAND.

Map of the NORTH ISLAND,

showing the

DENSITY OF POPULATION IN EACH COUNTY.

Rural population is indicated by dots, each red dot (•) signifying 500 persons other than Maoris, and each blue dot (•) signifying 500 Maoris.

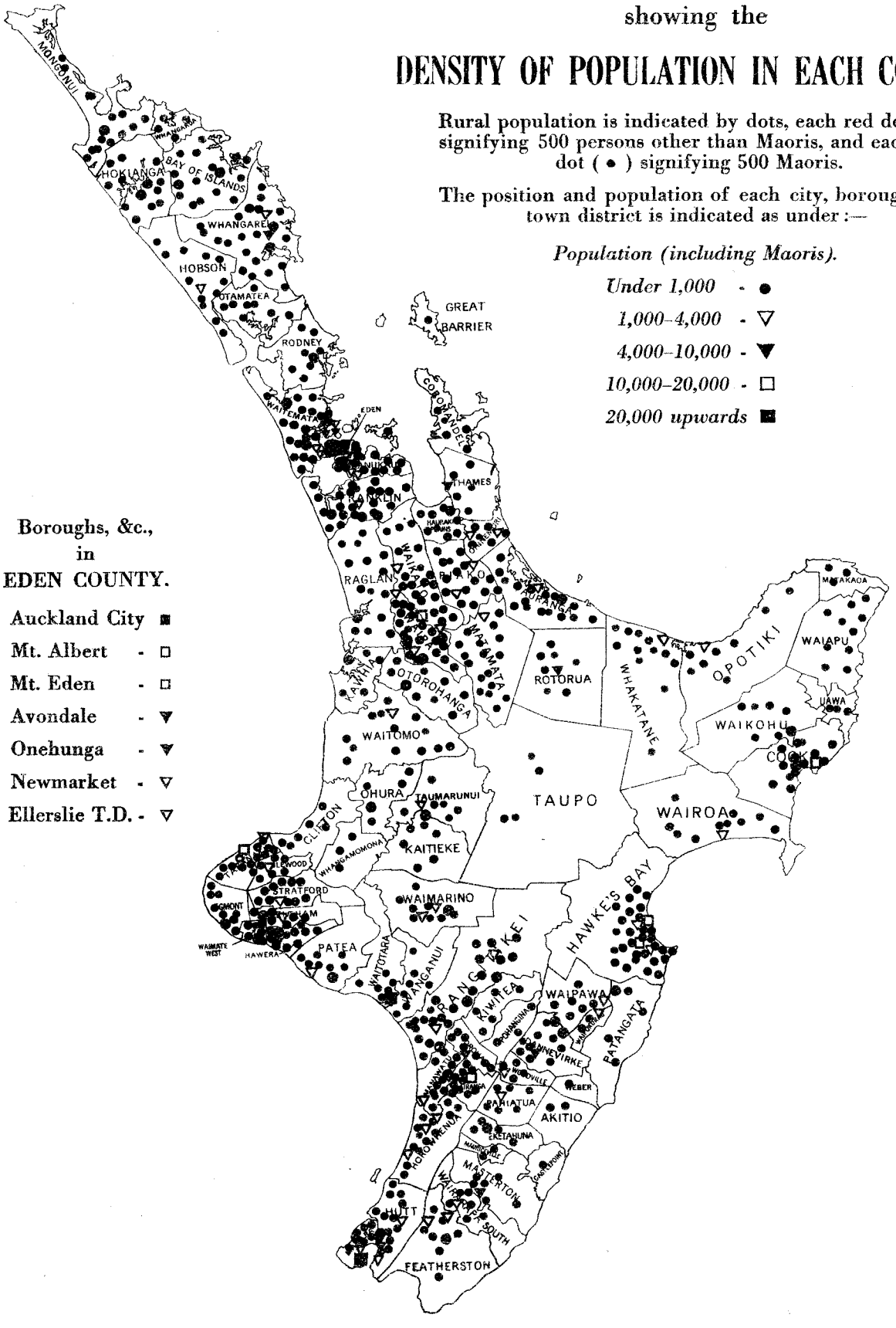
The position and population of each city, borough, and town district is indicated as under :—

Population (including Maoris).

Under 1,000 - ●
1,000–4,000 - ▽
4,000–10,000 - ▼
10,000–20,000 - □
20,000 upwards ■

Boroughs, &c., in EDEN COUNTY.

Auckland City ■
Mt. Albert - □
Mt. Eden - □
Avondale - ▼
Onehunga - ▼
Newmarket - ▽
Ellerslie T.D. - ▽



NEW ZEALAND.

Map of the SOUTH ISLAND,

showing the

DENSITY OF POPULATION IN EACH COUNTY.

Rural population is indicated by dots, each red dot (•) signifying 500 persons other than Maoris, and each blue dot (•) signifying 500 Maoris.

The position and population of each city, borough, and town district is indicated as under:—

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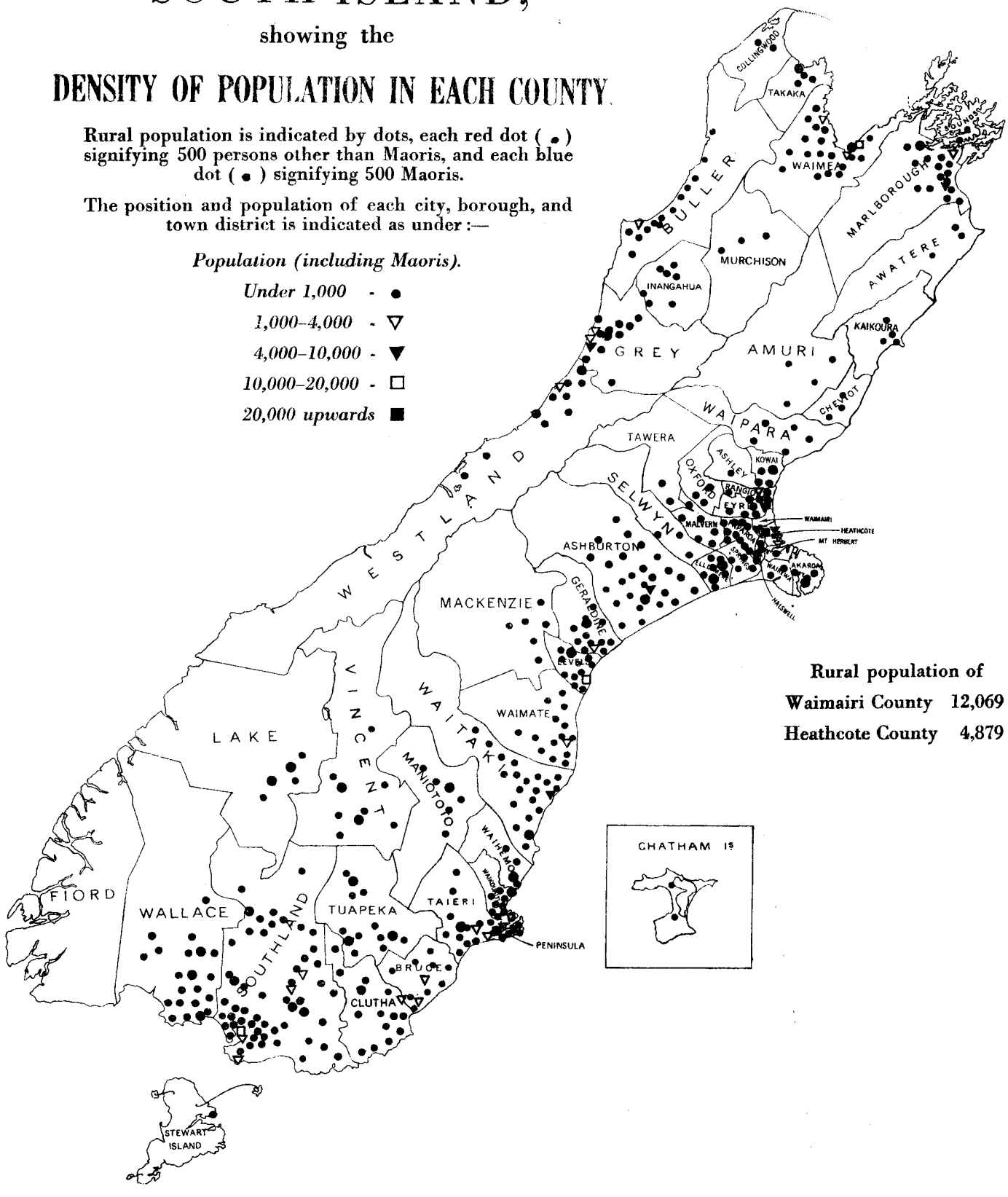
Under 1,000 - •
1,000–4,000 - ▽
4,000–10,000 - ▼
10,000–20,000 - □
20,000 upwards ■



Rural population of

Waimairi County	**12,069**
Heathcote County	**4,879**