1945.

VICTORIA.

COUNTRY ROADS BOARD.

THIRTY-SECOND ANNUAL REPORT

FOR YEAR ENDED 30TH JUNE, 1945.

PRESENTED TO BOTH HOUSES OF PARLIAMENT PURSUANT TO ACT No. 3662

[*Cost of Report*:—Preparation—Not given Printing (850 copies), £130.]

By Authority
J. J. GOURLEY, GOVERNMENT PRINTER, MELBOURNE.

No. 13.—[1s.6d.]—11024/45.

COUNTRY ROADS BOARD.

THIRTY-SECOND ANNUAL REPORT.

Exhibition Building,
Carlton, N.3.,
3rd December, 1945.

The Honorable P. J. Kennelly, M.L.C.,
Minister of Public Works,
Department of Public Works,
Melbourne, C.2.

SIR,

In accordance with the requirements of Section 96 of the Country Roads Act (No. 3662), the Board has the honour to submit to you, for presentation to Parliament, the report of its proceedings for the year ended 30th June, 1945.

FINANCIAL POSITION.

The receipts from motor registration fees and fines paid into the Country Roads Board Fund during the year amounted to £1,501,331 compared with £1,445,987 during the preceding year, an increase of £55,344. The cost of collection and refunds totalled £106,106, leaving a net revenue of £1,395,225.

The sum of £370,789 was received under the terms of the Federal Aid Roads Agreement as against £309,748 during the previous year, representing an increase of £61,041.

The total gross amount received from both sources was, therefore, £1,872,120, an increase of £116,385 over the total for the financial year 1943–44.

From the loan authorization of £500,000 for the construction and reconstruction of metropolitan roads, passed by Parliament under Acts 4188, 4414 and 4498, no expenditure was incurred during the year. The balance of £246,742 therefore remains at the same figure as at the 30th June, 1944.

COUNTRY ROADS BOARD FUND.

As in previous war years the difficulty in securing men, plant and materials and a diversion of a number of the Board's engineers to defence works were responsible for the curtailment of maintenance works, particularly on main roads. Consequently, of the amount of £1,095,509 allocated for the State highways, main roads and tourists' roads, the sum of £361,812 remained unexpended, representing approximately 33 per cent. of the total allocations. Expenditure on the maintenance of these roads and Murray River bridges was £737,812 for the year, compared with £649,275 for 1943–44.

A substantial credit balance, therefore, is shown in the Country Roads Board Fund, viz., £1,010,745, of which £625,000 was set aside by the Government towards meeting the cost of reconstruction required to bring the roads up to a standard to meet post-war requirements. After providing £80,693 to meet commitments on contracts and direct labour works in hand at the end of the financial year, there is an actual balance of £305,052 standing to the credit of the Country Roads Board Fund at the 30th June last.

Federal Aid Roads Account.

The following amounts were expended during the year from Federal Aid Funds :—

	£
Linking up constructed sections of developmental and main roads ..	93,674
Isolated settlers' roads	18,944
Provision towards maintenance of roads previously constructed from moneys provided by the State	73,606
Restoration and re-building of bridges	17,050
Removal of drift sand and bush fire restoration works	32,145
Total	£235,419

For the maintenance and repair of public roads adjoining or of approach to properties of the Commonwealth within the State of Victoria, an amount of £1,885 was made available under the terms of the Federal Aid Roads and Works Agreement, which, together with the amount of £4,512 brought forward from the previous year, made a total amount available of £6,397. The expenditure was £3,598 and £2,799 was carried forward to the ensuing financial year.

At the 30th June, 1945, a credit balance of £786,351 is shown in the Federal Aid Roads Account, but after making provision for unexpended amounts allotted to municipalities during the year for assistance towards the maintenance of roads and bridges, commitments on contracts entered into and works in progress by direct labour, the actual credit balance is £721,474.

Defence Expenditure.

There was a considerable falling off in expenditure on defence works carried out by the Board on behalf of the Commonwealth Government as the war moved further away from Australia, the expenditure for the year under review being £725,380. Following the usual procedure advances were made by the Federal Government through the State Treasury as the works progressed. Pending reimbursement by the Commonwealth £361,465 was financed from the Country Roads Board Fund under National Security Regulations. The total expenditure during the war period was £5,759,755.

STATE HIGHWAYS.

Over the total length of State highways which now comprise 2,910 miles, maintenance operations were, as in recent years during the war, governed by the limited labour, plant and material available, and were generally confined to the barest essential patrol maintenance, very light types of resealing of bituminous surfaces on sections where deterioration and ravelling required to be temporarily arrested, to extensive patching of sections where failures were occurring under traffic, accompanied in some cases by reconstruction and resheeting of the most seriously affected sections, and to repair or renewal of dilapidated bridges and culverts.

Supplies of bitumen were again very limited and the length of light resealing completed during the year was 210·8 miles compared with 160·9 miles during the previous year.

In addition, the bituminous surface was restored on 4·3 miles where resheeting was carried out.

The total expenditure on maintenance and repairs was £251,048, including the cost of improvements required to meet urgent needs ; £3,200 was expended on the erection of new bridges and £3,000 on the restoration of dilapidated structures. Of the total, £250,319 was provided from the Country Roads Board Fund and £729 from Federal Aid Funds.

When the State highways system was originally planned, it was decided to omit the sections through townships as the Board considered that the maintenance of these sections was of considerable importance to the local authorities and that on account of the larger rate revenue derived from the area provision of funds on the basis of the maintenance conditions of the Country Roads Act as applying to main roads was reasonable. Generally, the roads had been main roads and the sections through towns were continued under that category.

In some cases, however, it was noted by the Board that the main road sections were not being adequately maintained and it was also felt by the Board that the original conditions had changed as a result of the increase of through traffic, thus throwing an extra burden on the municipalities. The Board therefore decided to recommend that the township sections be declared as portions of the State highways. In several cases, the roads had not previously been declared main roads, but these also were included. This has involved the extension of the State highway system by 106 miles, affecting 61 municipalities. The action taken will have the effect of relieving the municipalities of their contributions towards the cost of maintenance estimated at £4,000 per annum as well as making it possible to adopt a system to ensure uniform maintenance of the highways without regard to the township lengths.

MAIN ROADS.

In recent reports reference has been made to the difficulties experienced in adequately maintaining the main roads on account of the shortage of manpower and materials and the absence in many instances of the municipal engineers. This condition has continued during the year, but it is anticipated that there will be an improvement in the near future when special attention will be given to the arrears of maintenance.

As in the case of State highways, resealing of main roads was strictly confined to essential works. The length of reseals for the twelve months extended over 446·3 miles, whilst new seals on sections needing urgent attention was restricted to 14·6 miles. The total lengths dealt with show an increase of 172·3 miles.

It is unlikely that supplies of bitumen coming forward will be adequate for other than urgent maintenance work for the next two seasons, so that for a time it will not be possible to contemplate any general extension of sealed surfacing of gravel roads, nor will the resealing of existing bitumen roads with plant-mix or road-mix types of treatment, which call for large quantities of bitumen, be resumed for some time. Representations have, however, been made by the Government to the Commonwealth authorities in control of bitumen supplies, so that works designed to relieve traffic by elimination of dust and by improvement of rough and worn out sections of bitumen roads may be included in later maintenance programmes.

Only those bridges which were becoming unsafe for traffic were replaced or repaired during the year. Nineteen new bridges were built and eight existing bridges strengthened at a total cost of £21,650.

An amount of £693,338 was allocated during the year to municipalities for the maintenance, improvement and reconditioning of 8,364 miles of declared main roads, but, for the reasons previously stated, the amount expended was £480,954 only, approximately 70 per cent. of the total allocation. Provision of £649,613 was made from the Country Roads Board Fund and £43,725 from moneys available under the Federal Aid Roads Agreement.

A section of the Healesville-Alexandra Road passing through the catchment area of the Melbourne and Metropolitan Board of Works between Fernshaw and the Dom Dom saddle, a distance of 3·6 miles, was reconstructed, primed and sealed at a cost of £12,500, the work having been commenced in the previous financial year. The cost of this work was borne by the Melbourne and Metropolitan Board of Works. The road is a deviation of the Black Spur constructed in 1936 to a standard which had proved quite adequate for traffic on this important road until intensive carting of logs and timber involving heavy wheel loads occurred during the war years. In order to obtain the material for resheeting and strengthening required, it was necessary to engage in crushing operations by day labour as conditions had rendered it impossible for the local contractors to operate their plants.

In connexion with the proposed construction by the Melbourne and Metropolitan Board of Works of a large dam on the Yarra River near McVeighs it will be necessary to construct an extensive deviation of the Warburton-Woods Point Road, which will be inundated when the dam is completed.

By crossing the river below the dam, it was possible to keep the location of the new road almost entirely out of the catchment area and at the same time serve a large area of State forests on both sides of the divide, from which the extraction of timber has, in the meantime, become extremely urgent. During the year, the Board's location staff made detailed reconnaissances of this route, and the final survey is now proceeding.

The construction of the dam will involve heavy road cartage from the rail head. As the existing Warburton–Woods Point Road in this vicinity is not suitable for such cartage, the Melbourne and Metropolitan Board of Works has re-surveyed the road and plans for six miles of it between MacMahon's Creek and the dam site have been prepared by the Country Roads Board's staff in readiness for construction, which will be undertaken at the cost of the Melbourne and Metropolitan Board of Works at a later date.

The following statement shows the annual expenditure on main road maintenance since the financial year 1938–39, from which it will be noted that last year's expenditure was only 63 per cent. of that of the pre-war year.

EXPENDITURE ON MAINTENANCE OF DECLARED MAIN ROADS.

—	Country Roads Board Fund.	Federal Grant.	Total.
	£	£	£
1938–39	718,009	51,153	769,162
1939–40	623,914	46,996	670,910
1940–41	585,596	46,500	632,096
1941–42	372,335	24,813	397,148
1942–43	295,230	22,732	317,962
1943–44	360,647	26,515	387,162
1944–45	456,490	24,464	480,954

In accordance with the powers conferred on the Board under the provisions of the Country Roads Act, municipal contributions towards the cost of maintenance were reduced below one-third of the total cost in the case of declared main roads carrying traffic not of local origin or timber traffic. The assistance given in this way amounted to £26,960 for the year.

Under Act No. 4415, relief to the extent of £221,040 was granted to country municipalities on account of interest and sinking fund payments in respect of main roads and developmental roads for the year.

The Board continues to receive applications for the declaration of new main roads, but since the extensive additions to the system which were made in 1940 and the large commitments before it in carrying out post-war works, it has refrained from undertaking further financial responsibilities involved in declaring additional main roads at present. However, the Board has obtained particulars of comparatively short lengths of roads which it would be necessary to declare in order to connect up existing main roads, particularly in townships, in order to avoid breaks in the continuity of the main road system, thus permitting more efficient maintenance organization to be established. Further consideration will be given to this matter as early as possible.

The extension by the Department of Civil Aviation of the Essendon aerodrome has necessitated a special deviation of a section of the Lancefield Road forming a boundary between the Keilor and Broadmeadows Shires. The route for the deviation adopted by the Department follows generally the western and southern boundaries of the new aerodrome area, and rejoins the Lancefield Road near the boundary of the City of Essendon. Land for this route was obtained by the Commonwealth Government. The total length of deviation involved is 2½ miles, but as a satisfactory alignment at the east end could not be obtained without traversing sub-divided land on which residences were erected, the Department arranged that at the outset only the section following the western boundary of the aerodrome should be constructed and a temporary connexion should be made to the Melbourne–Bendigo Road via Treadwell Road, thus avoiding demolition of any houses for the present.

The alignment and layout of the deviation have been designed to assure a smooth flow of traffic to the aerodrome from Mt. Alexander Road, the width of reserve secured by the Commonwealth being in general sufficient to allow for " service " roads in residential areas and a divided roadway for the through traffic. The route will also avoid following any tram-line, the tramway access to the aerodrome being located somewhat to the west of the roadway. Figure 1. indicates the eventual lay-out proposed along the western boundary of the aerodrome. For the present, only one of the 24 ft. pavement strips planned has been constructed. It is anticipated that the road will be called upon to bear not only the traffic associated with the air transport of passengers and freight, but also much heavy traffic arising from the establishment of extensive repair facilities within the aerodrome boundaries.

Laboratory and field tests indicated that a very poor foundation exists at the site, so that, for the new permanent road, a concrete pavement was adopted seven inches thick with a base course of thirteen inches of rough gravel.

The temporary connexion to the Melbourne-Bendigo Road via Treadwell Road was surfaced with fine crushed rock, which it is intended to prime and seal in the coming summer. The total cost of the portion of the deviation so far constructed is approximately £39,000, of which the major portion will be borne by the Department of Civil Aviation.

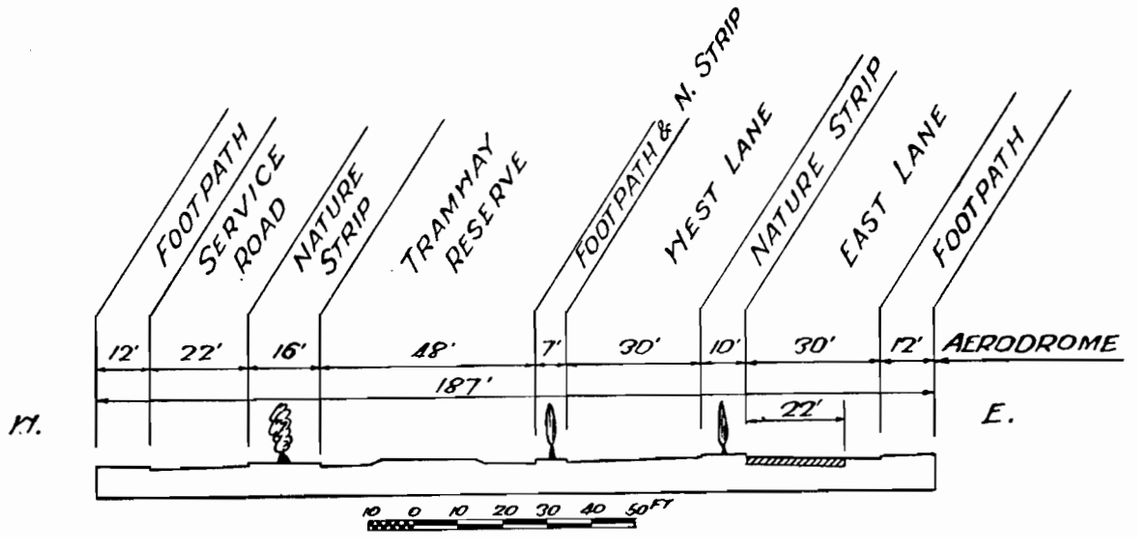

Fig. 1.—Cross-section of new Lancefield-road opposite aerodrome. (The part of the pavement shown hatched has been completed in the first stage of construction.)

FOREST ROADS.

Under the *Country Roads (Forest Roads and Stock Routes) Act* 1943, provision is made, inter alia, for the proclamation of forest roads in areas of the State within or adjacent to State forests or in timbered, mountainous, or undeveloped areas. The whole cost of maintenance of such roads is to be treated as a charge against the Country Roads Board Fund without any contributions from municipalities.

Up to the present the following roads have been proclaimed by the Governor-in-Council on the recommendation of the Commissioner of Public Works and the Board, and after consultation with the Minister of Forests and Commissioner of Crown Lands and Survey, as provided by the Act :—

1. Alberton Shire .. .. Carrajung–Woodside Road.
2. Bet Bet Shire .. .. .. Bealiba-Moliagul Road
3. Glenlyon and Newstead and Mt. Alexander Shires — Drummond-Vaughan Road.
4. Korong Shire .. .. .. Inglewood-Rheola Road.
5. Otway Shire .. .. .. Forrest-Apollo Bay Road.
6. Otway Shire .. .. .. Beech Forest-Mt. Sabine Road. From the junction with Lardners Track to the junction with the Forrest-Apollo Bay Road.
7. Otway and Heytesbury Shires .. Lavers Hill-Cobden (Kennedys Creek) Road.
8. Winchelsea Shire .. .. Dean Marsh-Lorne Road.

The Act provides that the Board shall be charged with the construction and maintenance of forest roads, but it may contract with the Council of any municipality for the carrying out by the Council of the necessary works. Accordingly the Board has arranged, in nearly all cases, for the Councils to undertake the maintenance on its behalf.

Owing to the urgent necessity for exploiting the timber resources of the State which, generally, are situated in un-roaded mountainous areas, or where unsuitable roads only exist at present, the Board has been in close consultation with the Forests Commission with a view to undertaking the location and construction of suitable roads in forest areas required for the transport of timber so urgently needed for the building of houses, and providing the most satisfactory routes to serve general traffic. In carrying out this work, modern roadmaking plant and earth-moving equipment will be used.

During the year the Board's location staff carried out reconnaissance surveys in several timbered areas in which roads are to be constructed. With the additional information secured from aerial surveys arranged by the Surveyor-General, the selection of suitable routes will be greatly facilitated.

During the winter of 1942, when a serious shortage of fuel occurred, special arrangements were made by the Government to increase supplies of firewood from State forest areas and, at the request of the Forests Commission, the Board commenced an extensive programme of road improvement in the vicinity of Broadford and Wandong where the roads leading to the railway stations from the borders of the State forest were unserviceable. A large amount of reconstruction and a considerable length of new formation and surfacing were necessary on the Broadford Spur Road, and the reforming and surfacing of considerable lengths of the Sunday Creek and Magpie and Stump Road. In order to improve access within the forest area, 7½ miles of clearing and forming on the Strath Creek-Mt. Disappointment Road were carried out for the Commission during last financial year at a cost of £18,015 ; in all the expenditure from Government funds on the road system in this area has amounted to £35,167, in addition to which several bridges over Sunday Creek and its tributaries have been reconstructed from Federal Aid Funds provided by the Board at a total cost of £2,794.

TOURISTS' ROADS.

In general the traffic on tourists' roads during the war period was greatly reduced, and only essential maintenance, including repair of bridges, was undertaken. However, on the Ocean Road approaching Lorne there has been an increase in the amount of regular bus traffic, whilst the operations of a timber mill at Kennet River brought especially heavy traffic on to the section between that point and Lorne en route to the rail head at Dean Marsh. Accordingly, sections of the road subjected to a large number of repetitions of relatively heavy wheel loads showed considerable signs of distress, and a good deal of heavy patching of failures, especially along the edges of the road, had to be undertaken. In addition, a commencement was made with the resheeting of a length of 3·25 miles between the Kennet River and the Wye River. The material for resheeting is being obtained by crushing the local sandstone and, as in other cases where contractors were unable to operate owing to the difficulty of procuring skilled men, it was necessary for the Board to undertake the crushing by direct labour using such employees as could be diverted to the work.

As a result of timber traffic on the Acheron Way, a section of one mile of road which had been surfaced with bitumen prior to the declaration of the road as a tourists' road required reconstruction. The fine crushed rock for this work was obtained from the Acheron quarry operated by the Board, the cost of the work being £1,825.

The total amount expended on tourists' roads was £26,888 provided from the Country Roads Board Fund.

DEVELOPMENTAL ROADS.

Provision of £111,501 was made available from Federal Aid funds to municipal councils for linking up roads on which funds had already been expended and for completion of short lengths of constructed roads of an urgent nature. Funds were also provided for other urgent works mainly consisting of reconstruction and restoration of bridges and approaches, together with commitments brought forward from the previous year ; £66,403 was expended during the year, supplemented by an amount contributed by the Councils from their own funds.

An amount of £51,622 was allocated to Councils to assist in the maintenance of roads of a developmental character on which Federal Aid or other funds had previously been expended on their construction ; £37,606 was expended, in addition to which municipal contributions totalled £13,727.

BRIDGES.

During the year, apart from minor maintenance and repair, 54 bridge projects to a total value of £34,100 were initiated, bringing the total number of structures constructed or in course of construction by the Board and municipal councils to 2,962.

Of the 54 new projects, 24 to a total value of £19,600 were completed under the Board's direct supervision and 30 to a value of £14,500 were supervised by municipalities. On some of the larger structures constructed under municipal supervision labour and plant made available by the Board were utilized.

In addition to the new projects, 14 to a value of £13,100, commenced in the latter part of the previous financial year, were completed, the majority being erected under the supervision of the Board. Of that amount, £5,500 was expended to complete the replacement of bridges burnt out by bush-fires towards the end of the previous financial year.

The total expenditure for the year on the construction of new bridges and the strengthening of existing structures was £47,200.

The most important structures completed during the year were :—

PRINCES HIGHWAY WEST, SECTION 4.—BRIDGE OVER THE SURRY RIVER NEAR HEATHMERE.

The old timber bridge at this site was replaced by a standard reinforced concrete slab bridge 90 feet long and 22 feet wide. Short spans 12 feet to 15 feet carried on reinforced concrete column piers supported on driven timber piles were used, the thickness of the slab deck being 10 inches. The original alignment was very poor with reverse approach curves of approximately 300 feet radius ; the new bridge is on a new straight alignment.

DANDENONG SHIRE.—SPRINGVALE ROAD, SOUTH OF PRINCES HIGHWAY, BRIDGE OVER THE MAIN DRAIN.

The 154 feet long timber bridge at this site was in a state of collapse and was replaced by a standard reinforced concrete slab bridge 80 feet long and 22 feet wide similar in general details to the Surry River bridge, together with a two-cell 7 feet x 6 feet reinforced concrete box culvert. The old alignment was retained and traffic detoured during construction.

YEA SHIRE.—UPPER GOULBURN ROAD, BRIDGE OVER KING PARROT CREEK.

The timber bridge at this site was replaced by a standard timber stringer bridge 192 feet long consisting of six 32′ spans, these being the longest spans considered desirable with timber stringers. The original alignment was poor with approach curves of approximately 100′ radius. The new bridge provides transitioned approaches with a minimum curvature of 284 feet, the bridge being superelevated to suit the approach curves.

Plates 1 and 2 show the new structures over the main drain and the King Parrot Creek.

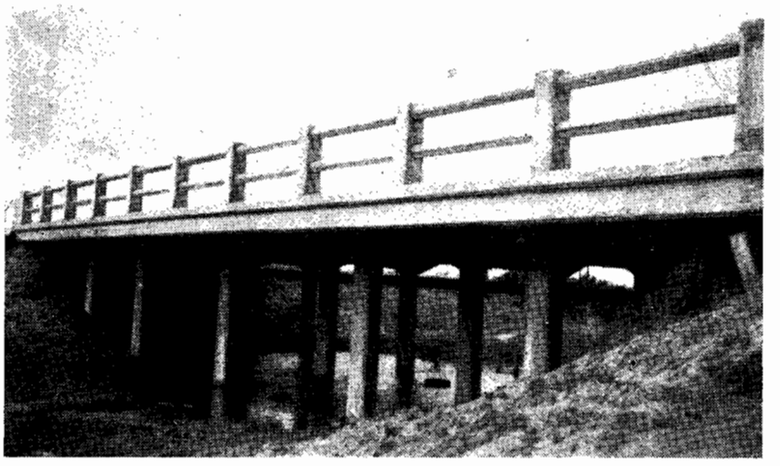

PLATE 1.—Dandenong Shire—Spring Vale Road.—Bridge over main drain (sheeting of embankment not completed).

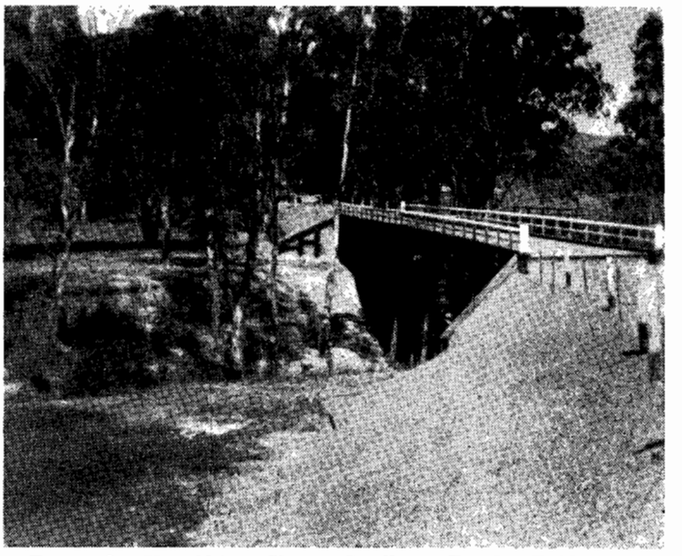

PLATE 2.—Yea Shire—Upper Goulburn Road.—Bridge over King Parrot Creek (approaches not completed).

Under the provisions of Act No. 4458 a number of bridges and ferries over the River Murray, together with approaches, was maintained by the Board in conjunction with the Department of Main Roads, N.S.W., and the Victorian Railways Department. Each State pays a moiety of the cost of the maintenance of the crossings over the river, whilst the Railways Commissioners pay a proportion where the railway crosses the stream. The amount expended from the Country Roads Board Fund was £4,116 for the year.

During recent inspections, the Board has noted that in a number of instances where new bridges have been built in recent years proper attention has not been paid to painting and initial maintenance, and structures have been allowed to remain untreated for lengthy periods, thus rendering them liable to rapid deterioration. It has been the Board's practice to provide funds for that work under the same conditions as the original grant, such work, which consists of painting, tightening of bolts, cramping of deck timbers, &c., to be carried out as required during the first two years after construction. The Board is urging Councils to avail themselves of this provision in order to prevent avoidable deteriorations of valuable structures.

The Board is faced with a very large programme of bridge renewal throughout the State consequent upon the inability to undertake these works during the war period, many of the structures being in a serious condition necessitating the reduction of load limits. In a number of cases, however, the condition is not obvious from cursory observation, but has been revealed by close examination of the bridge members. Plates 3 and 4 show two bridges in which it has been necessary to support the trusses by toms to prevent collapse.

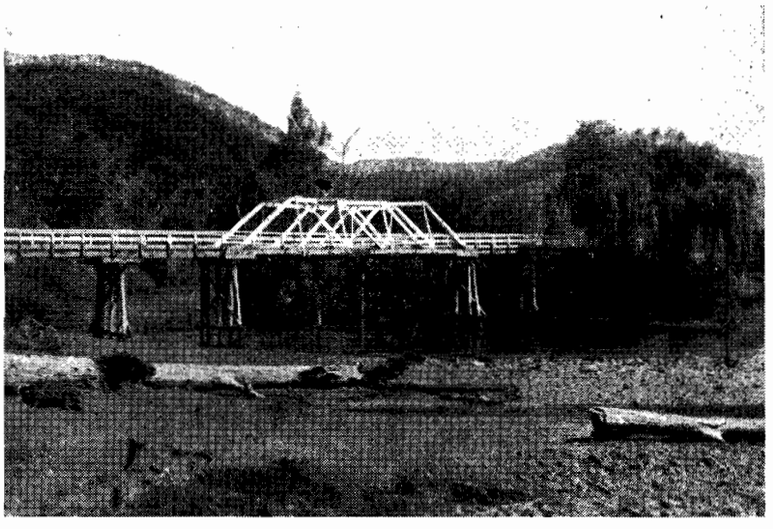

PLATE 3.—Maffra Shire—Licola Road.—Cheyne's Bridge, showing toms under timber truss.

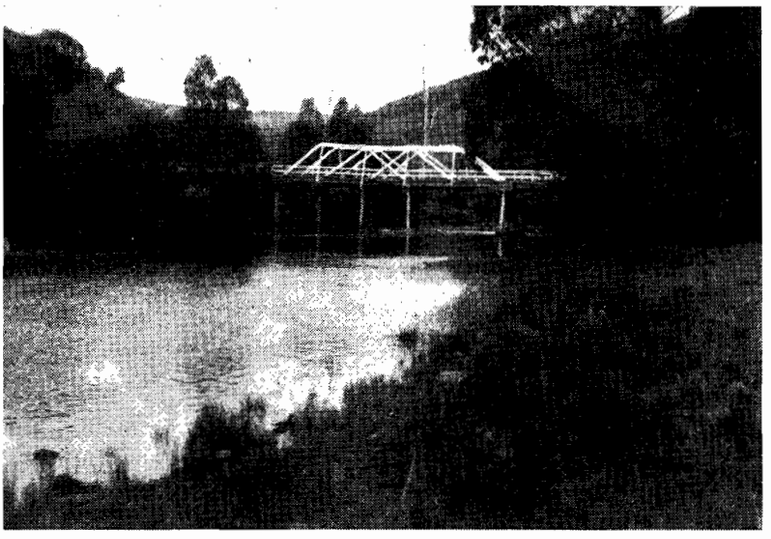

PLATE 4.—Maffra Shire—Licola Road.—McAllister River Bridge, showing toms under timber truss.

METROPOLITAN ROADS.

The only work undertaken on main roads adjacent to the City of Melbourne consisted of essential maintenance together with bituminous sealing considered necessary for the preservation of existing pavements. No construction works were carried out. The amount expended was £5,961.

ISOLATED SETTLERS' ROADS.

The provision of funds for the construction of roads to isolated farms was confined to a limited number of works which would facilitate the transport of primary produce, and for which seasonal labour was available.

A number of applications received from Councils under this heading included works of an extensive nature on roads which are used for through traffic and not essentially for individuals or small groups of settlers. In some instances, constructed roads which are now in a bad state of repair through lack of maintenance were included. Provision of funds for these types of work cannot be considered by the Board, the intention being to assist councils in constructing roads for the use of settlers isolated from the main road system for which the councils are unable to provide the necessary relief solely from their own resources.

An amount of £31,485 was allocated to municipal councils from Federal Aid road sources, which amount included commitments brought forward from the preceding year. The expenditure incurred was £18,944 supplemented by a contribution of 10 per cent. from the Councils concerned.

Three hundred and twenty-four jobs were completed, or partially completed, to the end of June.

DEFENCE WORKS.

During the financial year the Board's organization in the Northern Territory operated in the Katherine area, the headquarters having been moved from Tennant Creek, in order to undertake additional works on behalf of the Allied Works Council in the area between Mataranka and Fountain Head. A bitumen seal coat was applied to 165 miles of the Stuart Highway, thus extending the Board's bituminous treatment of this road to a total of 787 miles.

Large new aerodrome construction works were undertaken in the vicinity of Katherine on behalf of the R.A.A.F. and also the Department of Civil Aviation, whilst extensive bituminous treatment on existing R.A.A.F. aerodromes was carried out in the Fountain Head area. A large workshop was erected at Katherine to ensure constant maintenance of the plant involved.

On completion of these works the Board's organization moved southwards and undertook additional bituminous surfacing on the Civil Aviation aerodromes at Tennant Creek and at Oodnadatta in South Australia, before finally returning to Victoria. The total cost of all these works was £900,000.

In Victoria large defence projects were carried out near Wodonga and at Broadmeadows for the Department of the Army, whilst aerodrome works were continued at East Sale, Bairnsdale, and other R.A.A.F. stations. For the Department of Aircraft Production work on the Fishermen's Bend testing aerodrome was continued, a second runway being constructed in fine crushed rock with a bituminous plant mix surface. For the same Department considerable areas of concrete road pavement were constructed at Essendon aerodrome. Many of these works are still in progress.

The expenditure incurred in Victoria was approximately £370,000.

DAMAGE TO ROADS AND BRIDGES.

In recent annual reports special reference has been made to the deterioration of road surfaces and bridge structures as a result of the shortage of manpower and materials, and the necessity to curtail works to the absolute minimum. This condition has continued throughout the year, but with the prospect of the necessary labour being available in the near future it is intended to give high priority to works of maintenance and restoration, particularly on main roads, State highways, and tourists' roads.

In order that the most important of these works may be carried out immediately conditions will allow, the Board is arranging to obtain from municipalities particulars of urgent works with a view to provision being made. This will enable municipal engineers to make the necessary surveys and prepare plans with a view to the works being put in hand as early as possible.

In the case of certain roads, it was necessary to take special action on account of the damage which was being caused by timber and firewood cartage, and the urgent necessity, in the national interest, of providing transport facilities under economic conditions. Consequent upon damage caused to roads in the Noojee area as a result of cartage of timber to the Noojee railway station, provision was made by the Board for resheeting with 3 inches of crushed rock 8 miles of the Noojee–Erica Road, which involved an expenditure of £7,489.

Similar conditions applied in the Otway district necessitating provision for extensive resheeting of sections of the Forrest–Apollo Bay Road and the Beech Forest–Mt. Sabine Road, involving an expenditure of £11,056.

Provision of £6,000 has also been made for strengthening the Warburton-Woods Point Road used for the cartage of timber to Warburton and £8,000 for the Myers Creek Road near Healesville. Plate 5 shows a section of Myers Creek Road after reconditioning.

PLATE 5.—Healesville Shire—Myers Creek Road showing section of reconditioned road.

POST-WAR WORKS.

In the Thirty-first annual report reference was made to the programme of works submitted to the Deputy Works Co-ordinator under three priorities up to an amount equivalent to two years' normal work. The amount is £4,385,000, an analysis of which is as under :—

Priority.	Maintenance.	Capital.	Total.
	£	£	£
"A"	1,795,500	466,000	2,261,500
"B"	899,500	101,000	1,000,500
"C"	934,000	189,000	1,123,000
Total	3,629,000	756,000	4,385,000

The programme is designed to meet the requirements of declared State highways, main roads, tourists' roads, and forest roads. To cope with the deferred maintenance of 5,658 miles of these declared roads surfaced with bitumen, a sum of £1,000,000 is allowed, and as this work can only be carried out during the summer season it is estimated that it will take two years to effect the desired restoration of the road surfaces to satisfactory condition. For the restoration of gravel surfaces where extensive wear and tear has taken place, the sum of £150,000 will be required. For the replacement of weak old timber bridges which have reached the end of their useful life, the repair and maintenance of bridges whose life can be economically further extended, and for the resumption of organized maintenance of a large number of structures to which it has not been possible to give normal attention during the war, the sum of £920,000 is allowed.

In addition, it is intended to devote £165,000 to assist municipalities with the renewal or restoration of weak bridges on undeclared roads. The balance of the works programme consists of resheeting and reconditioning of sections of the declared roads which must be strengthened to enable them to carry the increasing weight of commercial traffic of all types, the reconstruction of sections where the existing roads are tortuous, unduly narrow or steep, or otherwise inadequate for the extent of traffic they are called upon to bear, and the construction of particularly urgent new links to complete gaps in the road system.

In order to ensure that adequate plant of all types is available for the work the sum of £250,000 will be devoted to the purchase of the necessary earth-moving and road and bridge construction machinery and equipment. For the extension and further equipping of the workshop facilities necessary for keeping all the plant units in good repair, including those facilities to be provided at the country divisional centres, the sum of £100,000 is provided.

In response to a request from the National Works Council for a further list of national works (not included in the original programme) the Board has submitted proposals amounting to £1,611,000, including such projects as the improvement and provision of new interstate connections, especially in mountainous country, the construction of new arterial routes where long distance communication across the State is at present inadequate, the strengthening of existing arterial roads which at present are not up to a standard required for all classes of heavy traffic, the provision of grade separation structures at railway level crossings on the more important arterial roads and the provision of access roads to forest areas.

During the war the sum of approximately £625,000 has been reserved by the Government in the Country Roads Board Fund towards the cost of the above works, while a proportion of the amount of £800,000 will be available from accumulated balances under the Federal Aid Roads and Works Agreement. It is contemplated that with the return of normal peace-time conditions, moneys received from registration of motor vehicles and the proportion of petrol tax received under the Federal-aid roads and works agreement will again increase, and that increased sums will be available to carry out the major portion of approved works.

FIRE PREVENTION AND SUPPRESSION.

Under the *Country Fire Authority Act* 1944 it is provided, *inter alia*, that it shall be the duty of every municipality and every public authority (including the Board) to take all practicable steps to prevent the occurrence of fires on and to minimize the danger of the spread of fires on or from any land under its control, and on any highway, road, &c., the maintenance of which is charged upon it. Provision is also made that the cost of carrying out such work shall be met in the same manner as if the cost were part of the cost of maintenance.

Under these circumstances the cost of fire prevention work undertaken on main roads, State highways, tourists' roads, and forest roads will be treated as maintenance under the provisions of the Country Roads Acts, and charged accordingly.

All practicable steps are being taken by the Board to minimize the danger on roads under its direct control. Clearing of scrub within road reserves, where that action is considered desirable, has been undertaken and the patrolmen have been provided with suitable equipment for fire fighting purposes, selected after consultation with the Country Fire Authority.

Municipal Councils have been invited to furnish particulars of the provision required for work on main roads maintained by them in order that funds might be made available.

Plates 6, 7, and 8 show types of work for fire prevention carried out by the Board.

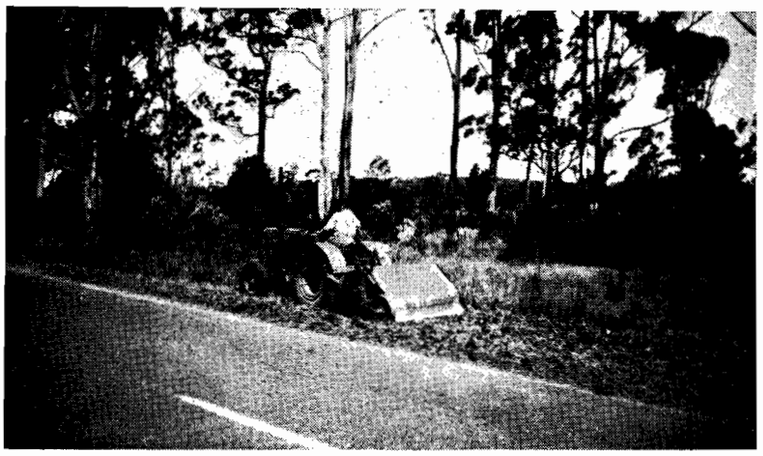

PLATE 6.—Showing road margin being treated with rotary hoe.

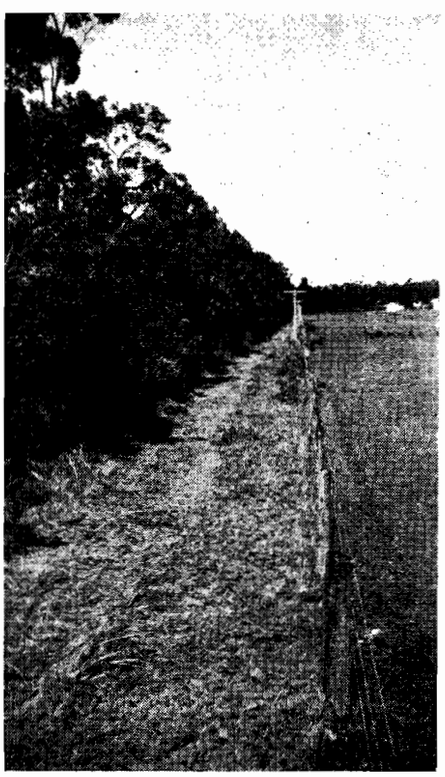

PLATE 7.—Princes Highway East, near 54 mile. Strip at road boundary after treatment with rotary hoe.

PLATE 8.—Princes Highway East, near 54 mile. Pavement margin after treatment with rotary hoe.

ROAD RESTORATION WORKS. NORTH WESTERN AREA.

Owing to the succession of dry seasons experienced in recent years considerable lengths of roads in the north-western portion of the State have been rendered impassable by sand drift, and with the consequent failure of crops, many of the farmers in the districts sought employment for themselves and their plant and horse teams. As a means of providing relief, the Government approved of the Board making provision of funds totalling £17,480 for works of this nature, subject to the expenditure of £3,886 in addition by the Councils.

The municipalities affected are the following—viz. :—Shires of Birchip, Charlton, Dimboola, Dunmunkle, Karkarooc, Mildura, Walpeup, Warracknabeal, Wimmera and Wycheproof.

In most cases the work was of an urgent character, as roads had been damaged to such an extent that the cartage of wheat in the summer would have been impossible. The work provided was much appreciated by local settlers.

SCHOOL BUS ROUTES.

Consequent upon the establishment by the Education Department of consolidated schools in country centres, necessitating the transport of children by motor omnibus from surrounding areas, applications have been made by Councils for assistance in the improvement of roads on these routes. The most extensive scheme submitted to the Board is that at Murrayville, in the Shire of Walpeup, where several bus services have been established to convey children to and from that town. The total distance covered by the several services in this area is 122 miles, for which the sum of £6,470 was provided by the Board for road construction subject to a contribution by the Shire Council of £830.

IMPROVEMENT OF ROAD ALIGNMENT.

The Board has constantly in view the desirability of improving the alignment of roads, particularly with the object of increasing safety and convenience of traffic. Opportunity for this improvement arises on numerous occasions when it is necessary to renew old bridges. The majority of the structures to be renewed were erected many years ago when considerations of speed were not of great importance. In some instances the bridges are on roads which, generally, are comparatively straight, and for that reason bad alignment constitutes a particular hazard. In all cases investigations of the possibility of adopting improved alignments have been made having regard to the general condition of the road. Frequently it is found that not only can better conditions for travel be obtained, but economy is achieved.

An aspect to which the Board has given attention has been the acquisition of land at road intersections to improve visibility. From time to time it has been brought to the knowledge of the Board that at important intersections land is likely to be built on with the result that obstructions to the view of road users would possibly be created. In a number of cases the Board has acquired land, and whilst generally no actual work is necessary until more extensive reconstruction works are required to be undertaken, the Board has achieved its object in providing the better visibility.

Plate 9 shows the intersection of Warrigal and Centre Dandenong roads at which land has been acquired and Plate 10 an old building at present on land acquired at the corner of Warrigal and Waverley roads. This building seriously restricts visibility at the road intersection shown, and its eventual removal will be included in road widening works on the main road in question when those works are proceeded with.

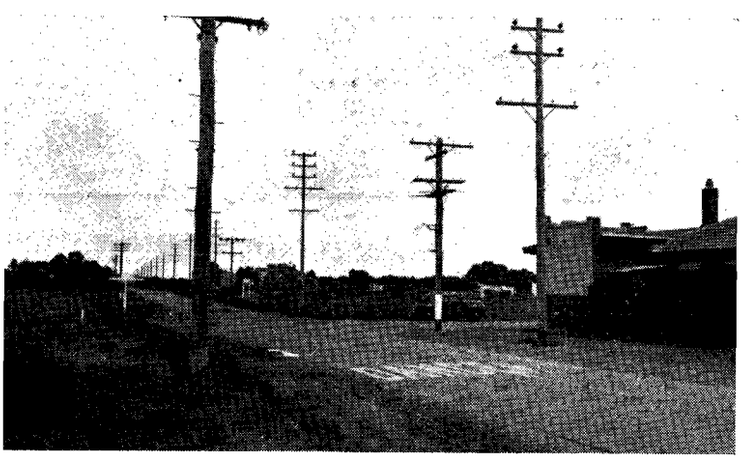

PLATE 9.—Intersection of Warrigal and Centre Dandenong Roads. Triangular areas have been acquired at unoccupied corners.

PLATE 10.—Warrigal Road-Waverley Road intersection, showing building acquired as part of widening scheme.

For some years the Board had under notice the desirability of improving the alignment of Beach Road in the City of Sandringham at a point known as " Jackson's Corner " which owing to the sharp curve, the restricted visibility, and the large volume of traffic using the road created a condition of extreme danger. An opportunity for taking action in this case arose as a result of the disastrous fires which occurred in the district early in 1944, resulting in the destruction of the house and garden on the property. The Board immediately had the necessary surveys effected and land has been acquired with a view to improving visibility, and eventually realigning the road.

Plates 11 and 12 show the visibility available before and after the fire.

PLATE 11.—Sandringham City, Beach Road, showing restricted visibility at " Jackson's Corner " before clearing.

PLATE 12.—Showing improved visibility at " Jackson's Corner " after clearing.

During the war period it has not been possible to undertake the actual road work apart from clearing, and as a temporary expedient adequate notices have been erected to warn road users of potential danger. At an opportune time the Board will proceed with the road construction works.

On some of the more heavily trafficked main roads and State highways, particularly in narrow sections, the Board followed the practice of previous years in acquiring areas of land for future widening, with the object of providing additional traffic safety and facilitating the passage of stock.

The possibility of residences being erected on land required for future road purposes has thus been avoided. In some instances the Postmaster-General's Department and the State Electricity Commission have erected their poles on the land acquired by the Board to obviate the necessity for their removal at some future date.

DECENTRALIZATION.

The extension of the Board's direct responsibilities and the necessity for concurrent control of that portion of the work throughout the State entrusted to municipalities led the Board in 1926 to adopt a measure of decentralization, and divisional offices have been established at Bairnsdale, Benalla, Stawell, and Warrnambool, and three Divisional Engineers dealing with central areas and parts of Gippsland have been located at the Board's head office in Melbourne.

To assist in the Government scheme of decentralization, the Board during the year has had under consideration the establishment of additional divisional offices in country centres and the question of transferring to the divisional offices throughout the State as much as possible of the work affecting municipalities at present carried out at head office. Decentralization of the administration will ensure that this municipal work is more expeditiously carried out. The enlarged divisional staffs will be enabled to give more attention to municipal work and to maintain closer contact with municipal officers, and generally ensure more efficient supervision of all works.

The plan submitted to the Government accordingly provides for some reduction in certain of the larger existing divisions and the creation of new divisions.

New divisional headquarters will be established at Morwell and Geelong serving areas at present administered from Melbourne. The present Stawell division will be superseded by two divisions with centres at Ballarat and Horsham. A suitable office site has already been secured at Horsham.

To overcome present congestion and provide for the full staff required at Bendigo, a building, which it is proposed to alter to meet the Board's requirements, has been purchased on a site facing the main arterial route through that city.

In other existing Divisions more commodious premises than those at present available will be required as an increase of staff will be essential and additional space necessary for the benefit of the public.

Arrangements are also being made for increasing the depot accommodation in divisional centres for carrying out of repairs to plant and for the storage of equipment, thus obviating the necessity for the transport of such plant to and from Melbourne. This will involve the acquisition of additional areas and the erection of stores and workshops. The land and buildings comprising the old abattoirs at Bendigo have been acquired and will be adapted for the purpose. It is intended to make proper provision for the housing of employees. Sites have also been purchased for the same purpose at Bairnsdale and Horsham.

TRAFFIC ACCIDENTS.

For some considerable time it has been the Board's practice to obtain, as far as possible, particulars of all traffic accidents on the sections of State highways and main roads under its direct control. Reports are furnished by patrolmen of accidents coming to their personal knowledge, and particulars are obtained from the local Police of all accidents reported to them. An endeavour is made to ascertain the cause of the accidents, particularly with a view to determining whether any road improvement might be desirable.

The number of accidents reported during the twelve months ended 30th June, 1945, was 120, of which 28 were fatal.

The following is a table setting out the number of accidents reported in each of the last six years :—

—	Fatal.	Not Fatal.	Total.
1939–40	109	489	598
1940–41	68	274	342
1941–42	27	106	133
1942–43	22	95	117
1943–44	17	52	69
1944–45	28	92	120

The Board has continued its association with the National Safety Council through its representative, Mr. J. Mathieson, Deputy Chief Engineer, who is the Chairman of that Council's Traffic Committee.

LEGISLATION.

During the year the following Acts affecting the Board were passed by Parliament :—

Country Roads Board Fund Act 1944, *No.* 5041.

Provision is made in this Act for—

(1) Fees for licences to drive motor cars not to be paid into the Country Roads Board Fund for the year ended 30th June, 1945.

(2) Suspension of annual payment of £50,000 from consolidated revenue into the Country Roads Board Fund for the year 1944–45.

Under the original Act £10,000 was to be used for the maintenance of main roads and State highways, and £40,000 for distribution amongst certain municipalities towards the construction, renewal, maintenance, &c., of streets and roads. Similar legislation has been passed in each year since the year 1932–33.

Cremorne Bridge Act 1944, *No.* 5015.

This Act gives effect to the recommendations of the State Public Works Committee relating to the construction of a new railway bridge over the River Yarra between Richmond and South Yarra, and improvements to Alexandra-avenue and Harcourt-parade, adjacent thereto. The construction of the bridge is being carried out by the Railways Department, but provision is made enabling the Board to undertake the improvement works referred to and setting out the proportion of the cost of the bridge and road works which shall be charged to the Country Roads Board Fund.

SURVEY CO-ORDINATION.

The Survey Co-ordination Act recently proclaimed, provides for active co-operation between Government Departments, State Instrumentalities and Municipalities in regard to survey matters, and considerable benefits should accrue to the State as a result of the establishment of the central plan office.

Permanent marks, each consisting of a bronze dome or plaque set in a heavy concrete block, are placed at suitable intervals on every permanent survey undertaken by the Board, and records of such marks are sent to the central plan office. These permanent marks serve the purposes of a bench mark for levels to a standard datum, and also a theodolite reference mark for position.

In accordance with the spirit of this Act, a general use is also being made of standard level data for Victoria, except for minor works where this procedure is at present impracticable on account of extreme distance from available bench marks.

DISTRIBUTION OF PLANT.

With the cessation of hostilities resulting in plant, both new and second-hand, becoming available, the Board was asked to sponsor the necessary releases by the Allied Works Council to Departments, authorities, and municipalities desiring to purchase earth-moving plant and supplies of camping and messing equipment such as huts and tents.

The State Government, however, has since appointed a committee consisting of the Chief Engineer of the Public Works Department and the Chief Mechanical Engineer of the State Rivers and Water Supply Commission to act on behalf of the authorities in the State regarding the allocation of surplus plant from the Allied Works Council. The Board is continuing assistance by assembling and sponsoring requirements of municipalities.

TRANSPORTATION SURVEYS.

In the Board's thirty-first annual report reference was made to a transportation survey undertaken on the Princes Highway East near Dandenong for the purpose of ascertaining the trend of heavy vehicle loadings, special mention being made in the report of the marked increase of wheel loads of such vehicles as disclosed by the survey. Further similar surveys were undertaken during the year on the Princes Highway West at Laverton, the main Healesville Road at Ringwood, the Calder Highway at Ravenswood, Hume Highway at Goulburn Valley Highway Junction, Western Highway near Ballarat, and the Princes Highway West near Allansford.

The additional information gained will be of very great value to the Board in determining its future maintenance and reconstruction programme on roads of various types. A great deal of information as to the tendencies of traffic can be obtained by careful study of the survey results in relation to the effect on road pavement of weight and speed of different types of commercial motor vehicles.

Analysis shows a definite tendency for heavy trucks to travel nearer to the pavement edge than cars and lighter trucks. This information as to transverse placement considered in conjunction with the figures obtained concerning the classes of vehicles using a particular road as disclosed by an ordinary census together with the speed value of a road will assist the Board to determine the width and strength of pavement required to meet the needs of traffic.

Technical details are given in the Chief Engineer's report.

CONFERENCE OF STATE ROAD AUTHORITIES.

The Seventh Conference of the State Road Authorities of Australia was held at the offices of the Board at the end of 1944, when representatives from all the States attended. These conferences have been held annually except during the earlier period of the war and have proved to be of very great value in the discussion of a number of matters of mutual interest, such as technical details of road and bridge construction, supply of materials and plant, and administrative and legislative procedure.

Conferences of senior technical officers and testing officers engaged on research work and the testing of materials have also been held.

These conferences should prove of increasing value in dealing with problems which will arise in the carrying out of extensive road and bridge works in the future.

WAGES OF CIVIL CONSTRUCTIONAL CORPS.

During the war years, the Board undertook on behalf of the Allied Works Council the responsibility for the pay organization of the Civil Constructional Corps.

In addition to income tax adjustments, the work involved the payment of the wages of members of the Civil Constructional Corps and of allotments made by members in Victoria and other States to their dependants residing in Victoria and Tasmania. Over 5,000 dependants received regular allotments, the payments to the 30th June last totalling £1,072,000.

TRAFFIC LINES.

The work done by the Board's traffic line marking machine during last year comprised the painting and repainting of 966·23 miles of State highways and main roads, 11·1 miles of roads on behalf of metropolitan municipalities, 5·54 miles of roads under the control of the State Electricity Commission at Yallourn and 4·19 miles for the Melbourne and Metropolitan Board of Works. In addition, respotting of 150 miles of pavements was completed by the Board's gang. The total expenditure was £7,157 of which £83 was charged to municipalities, £47 to the State Electricity Commission, and £31 to the Melbourne and Metropolitan Board of Works.

OFFENCES UNDER ACTS AFFECTING THE BOARD.

Under the provisions of the Motor Car Act a number of offenders was proceeded against for exceeding the limits allowed in respect of weight and speed of motor cars carrying goods for hire or in the course of trade on State highways and main roads. In 61 cases fines totalling £243 were imposed for travelling at excessive speeds and £67 in seventeen instances for carrying weights in excess of those permitted under the Act.

For allowing stock to wander unattended on State highways 33 prosecutions were launched and fines totalling £50 were imposed under the provisions of the Country Roads (Impounding of Cattle) Act. In addition, 1,162 cattle and 115 horses were impounded by the Board's ranger and patrolmen.

The total number of prosecutions for all offences under Acts administered by the Board during the year was 124. The total fines imposed amounted to £405, and costs to £46.

RESEARCH WORK.

In the construction of both roads and bridges, an ever increasing application of research is becoming necessary. Before the war the testing division of the engineering branch comprised a total of five officers, whilst at present the total number is ten, and to cope with investigation work which is essential to the efficient undertaking of the Board's future programme of work, further increases in this staff are urgently required.

One senior engineer has recently resigned from this section to join a Commonwealth Department, and the loss of a highly qualified and experienced officer from this field is a serious one.

During the war years, a large programme of testing and investigation, especially of foundation soils and gravelly materials intended for use as pavements, has been carried out in the Board's laboratory in connection with the design and construction of roads and runways in Victoria and in the Northern Territory where these works were constructed under the Board's direction on behalf of the Allied Works Council. Tests were also carried out on samples submitted by the Allied Works Council in connexion with its programme of works in all the other States. A tentative method for the design of flexible pavements, developed by the Board's engineers, using data obtained chiefly from U.S.A., has been referred to in previous annual reports of the Board, and further details are included in the Chief Engineer's report. The Board's laboratory staff has contributed very largely to the application of this method of design to Australian conditions.

Two mobile laboratories have been extensively used to assist the engineers in charge of reconstruction of distressed sections of road in the design of the new pavements required, whilst there have been detailed field investigations of the condition of sections where minor failures have occurred, in an endeavour to accumulate data for the more general aspects of this research.

The following summary gives the number of laboratory tests carried out during the year :—

—	Total Tests.		Tests Done for Commonwealth Authorities.	
	Samples.	Tests.	Samples.	Tests.
Soils and gravels	1,089	3,500	524	1,300
Concrete cylinder	360	360	336	336
Bituminous materials	33	200	..	..
Tar	33	130	19	80
Fuel and flux oils	7	22	..	..
Paint and lacquer	104	640	..	..
Lubricants	12	120	..	..
Aggregate bitumen mixture	1	3	..	..
Wood preservatives	4	24	..	..
Totals	1,643	4,999	879	1,716

APPORTIONMENT OF COSTS.

In accordance with the provisions of Section 28 (1) of the *Country Roads Act* 1928, the cost of maintenance was apportioned for the year ended 30th June, 1943, the amount apportioned to municipalities in respect of such expenditure being £93,256.

MOTOR REGISTRATION.

During the year 261,725 vehicles, including traction engines and motor cycles, were registered.

The number of motor vehicles of various classes registered for the past two financial years, as set out in the following statement, shows an increase of 11,770 in the figures of last financial year.

Vehicles.	Financial Year 1943–44.		Financial Year 1944–45.		Increase.	Decrease.
Private—						
New	525		5,484		4,959	..
Secondhand—re-registered	13,920		10,773		..	3,147
renewals	119,528		122,128		2,600	..
		133,973		138,385	..	..
Commercial—						
New	2,721		3,439		718	..
Secondhand—re-registered	2,205		2,831		626	..
renewals	29,864		30,917		1,053	..
		34,790		37,187	..	..
Primary Producers—						
New	509		1,726		1,217	..
Secondhand—re-registered	2,859		2,501		..	358
renewals	49,277		50,725		1,448	..
		52,645		54,952	..	..
Hire		2,611		2,596	..	15
Licensed under Omnibus Act		688		689	1	..
Trailers		7,240		8,053	813	..
Traction engines, &c.		71		65	..	6
Motor cycles		17,937		19,798	1,861	..
Total		249,955		261,725	15,296	3,526

The highest number of registrations was effected in 1939–40 when the total was 272,029. That number decreased in the two subsequent years, but increased in each of the later years. The total for the year 1944–45 represents a decrease of 10,304 on 1939–40, but an increase of 30,945 since 1941–42.

ACCOUNTS.

Statement of accounts for the year ended 30th June, 1945, and the Country Roads Board Fund and balances as at that date appear in the Appendix.

The following statement shows the expenditure on road construction, maintenance, &c., from moneys at the disposal of the Board in the Treasury, including expenditure under special appropriations :—

—		Under Board's Supervision.	Under Council's Supervision.	Total.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1. State Highways—				
Maintenance and reconditioning		230,254 13 11	20,792 16 4	251,047 10 3
2. Main Roads—				
Construction and restoration ..	43,794 5 9			
Maintenance and reconditioning	490,706 9 2	95,935 6 0	438,565 8 11	534,500 14 11
3. Developmental Roads—				
Construction and maintenance	134,137 8 4			
Roads for isolated settlers ..	18,943 13 4	9,744 2 9	143,336 18 11	153,081 1 8
4. Tourists' Roads—				
Construction..	2,544 12 1			
Maintenance..	27,942 2 8	26,704 18 2	3,781 16 7	30,486 14 9
5. Murray River Bridges and Punts—				
Maintenance..		3,906 18 4	208 12 1	4,115 10 5
6. Roads adjoining Commonwealth Properties—				
Maintenance..		2,006 19 1	1,590 11 8	3,597 10 9
7. Commonwealth Defence Works (Unemployment Relief Funds)—				
Construction and reconstruction		0 10 6	..	0 10 6
8. Commonwealth Defence Works (Northern Territory)—		751,340 19 1	..	751,340 19 1
9. Commonwealth Defence Works (Allied Works Council)		*Cr.* 25,961 14 1	..	*Cr.* 25,961 14 1
Totals		1,093,932 13 9	608,276 4 6	1,702,208 18 3

In addition to the amounts shown in the above statement, an expenditure of £361,465 was incurred from the Country Roads Board Fund on defence works carried out by the Board on behalf of the Commonwealth Government under the State National Security Regulations. The cost is recouped by the Commonwealth as the works progress. The amount outstanding on account of these works at the 30th June was £50,221.

OFFICERS ON SERVICE.

With deep regret the Board records that nine members of its staff paid the supreme sacrifice during the war. Each of the officers was a young man of more than ordinary ability and great promise, to whom the Board looked to fill important positions in the future. The heartfelt sympathy of the Board and staff goes out to their families in the loss they have sustained.

During the war period 48 members of the staff and 590 employees joined the fighting services.

With the cessation of hostilities, the Board is now awaiting the release of officers and employees still in the services with a view to their returning to their normal duties.

For several years a great deal of apprehension was felt for the welfare of certain members of the Board's staff who were prisoners of war. It is with a feeling of great joy that reference can now be made to the fact that all of these officers have been released. Heartiest congratulations are offered to them and to their families on their safety, and the hope is expressed that they will not suffer any permanent disability as a result of their unenviable experiences.

STAFF PATRIOTIC AND CHARITABLE ACTIVITIES.

Shortly after the outbreak of the war, a fund was inaugurated by the Board's staff for the purpose of assisting any cases of hardship suffered by members of the staff as a result of war service, for providing comforts for service personnel and to enable contributions to be made to charitable objects without the necessity for making constant appeals. The fund is built up by regular contributions by the staff supplemented by the proceeds from functions held from time to time. An amount of £2,800 has been collected from the commencement and valuable assistance has been rendered to such organizations as the Red Cross, Australian Comforts Fund, Lord Mayor's Hospital Appeal, &c.

A large number of parcels of food and comforts were forwarded to officers and employees of the Board in the fighting forces during the war period. The organization has also been utilised for assisting several appeals such as food for Britain, clothing for inhabitants of devastated areas, &c.

CHAIRMAN OF BOARD.

On 30th October, 1944, Mr. L. F. Loder, M.C.E., M.Inst.C.E., M.I.E. (Aust.), Chairman of the Board, was appointed by the Commonwealth Government to the position of Director-General of Allied Works as successor to the Hon. E. G. Theodore. Mr. Loder joined the service of the Board in November, 1923, and was appointed to the newly created position of Highways Engineer on 1st July, 1925. He subsequently held the position of Chief Engineer from 1929 until his appointment as Chairman of the Board on 1st July, 1940, following the retirement of Mr. F. W. Fricke.

Mr. W. L. Dale, A.S.A.A. (Eng.), F.C.I.S., F.A.I.S., L.C.A., member of the Board, was appointed to the Chairmanship following Mr. Loder's retirement.

Mr. D. V. Darwin, M.M., M.C.E., M.Inst. C.E., M.I.E. (Aust.), C.E., formerly Chief Engineer of the Board, was appointed to fill the vacancy on the Board.

STAFF.

Again the Board has to express its appreciation of the efficient manner in which all officers and employees loyally carried out demands made upon them under conditions of stress and strain.

ACKNOWLEDGMENTS.

The thanks of the Board are tendered to the Hon. J. H. Lienhop, M.L.C., Minister of Public Works during the year under review, for his help and interest in the Board's work.

The thanks of the Board are also due to Government Departments, State Instrumentalities and the Road Authorities of other States for their assistance, and the lively co-operation of Victorian Municipal Councils and their officers is also gratefully acknowledged.

We have the honour to be, Sir,

Your obedient servants,

L. F. LODER, Chairman.

W. L. DALE, Member.

D. V. DARWIN, Member.

R. JANSEN,
Secretary.

ILLUSTRATIONS OF DEFENCE WORKS UNDERTAKEN BY COUNTRY ROADS BOARD.

Plates 13 to 21 illustrate the construction of the Stuart Highway between Alice Springs and Larrimah, N.T. Plates 22 to 27 refer to various works in Victoria.

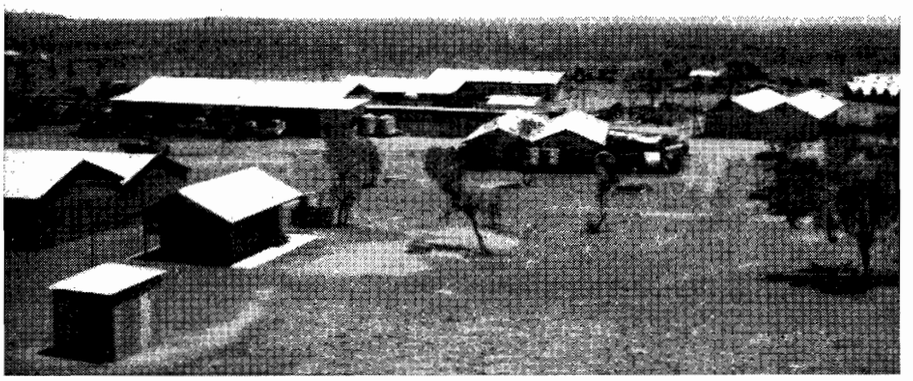

PLATE 13.—C.R.B. Headquarters office, workshops, stores, and part of fitters' camp at Tennant Creek.

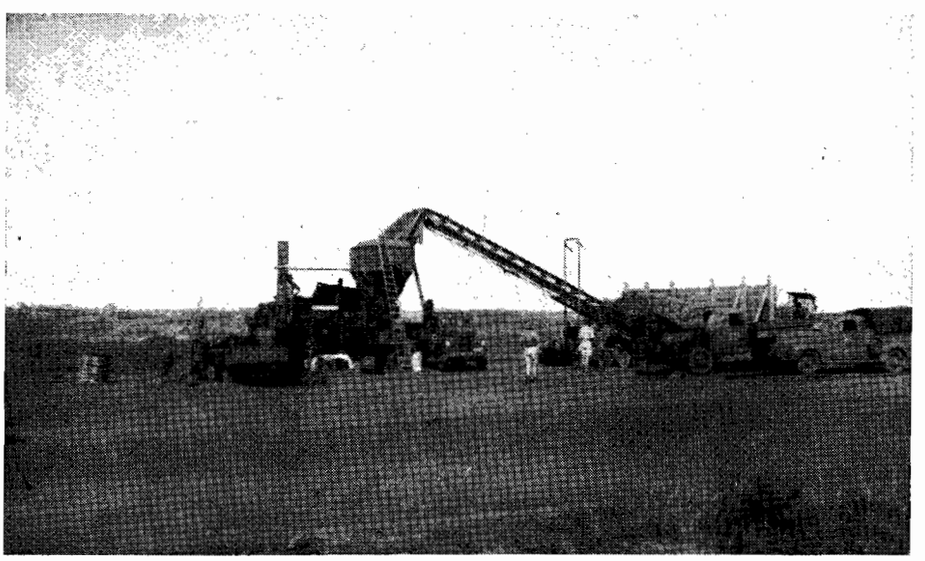

PLATE 14.—Portable plant mixing screened gravel and bitumen at Banka for construction of bituminous macadam wearing course on adjacent section of Stuart Highway.

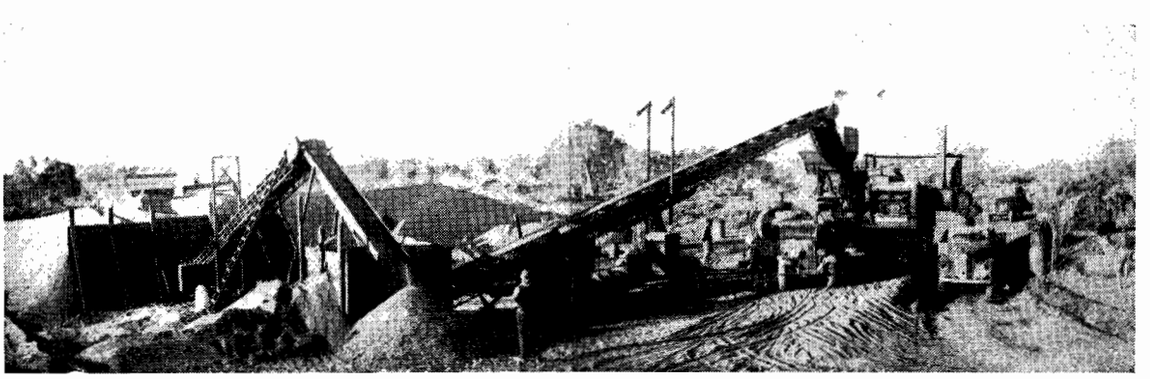

PLATE 15.—Winning and screening creek sand at Bullocky Soak, and mixing with bitumen, for construction of sand asphalt wearing course on adjacent section of Stuart Highway.

PLATE 16.—Spreading bituminous macadam wearing course on Stuart Highway near Tennant Creek.

PLATE 17.—Completed section of Stuart Highway near Alice Springs.

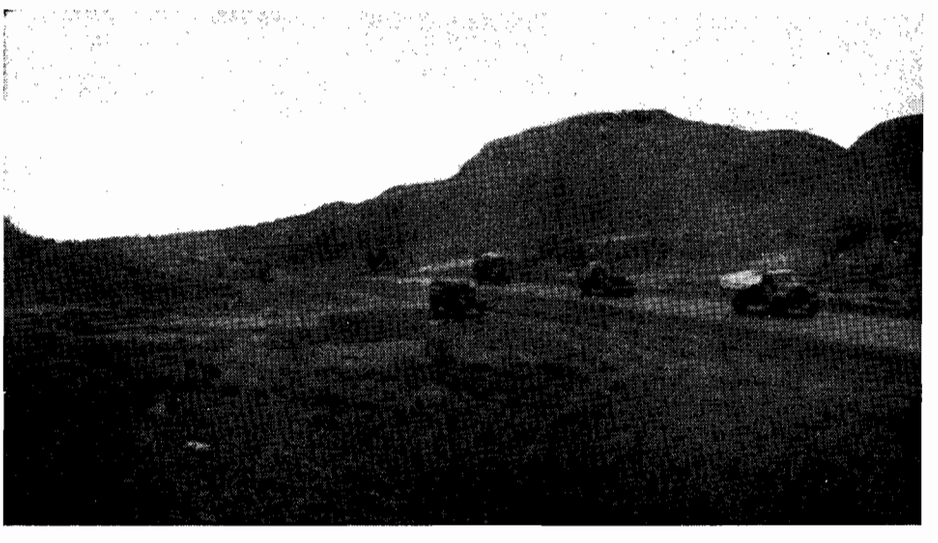

PLATE 18.—Completed section of Stuart Highway near Tennant Creek, showing military convoy.

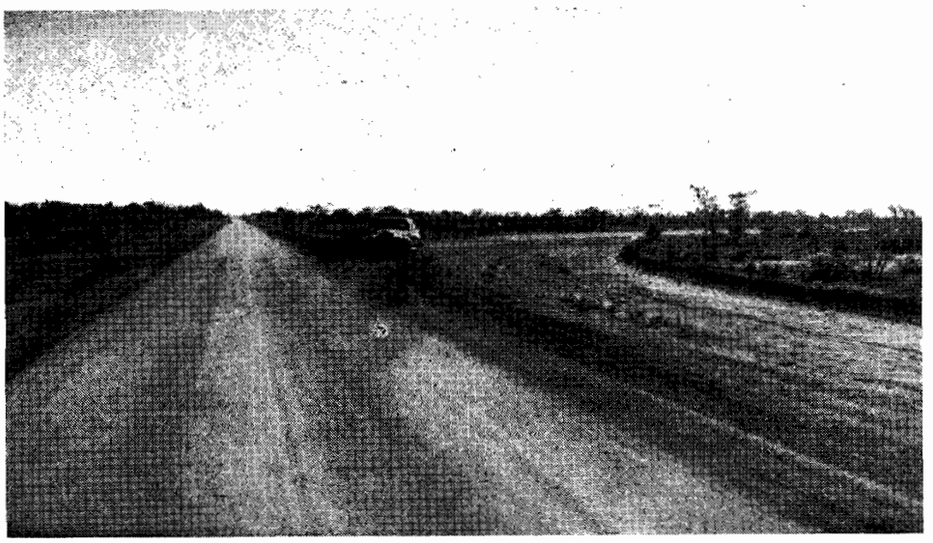

PLATE 19.—Completed section of Stuart Highway showing junction with Barkly Highway (Tennant Creek—Mt. Isa-road).

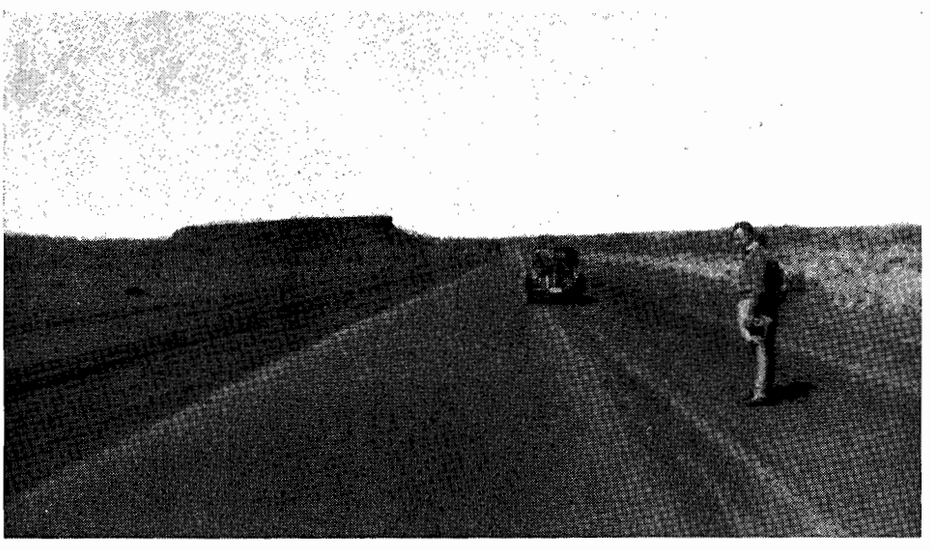

PLATE 20.—Completed section of Stuart Highway near Lubra's Lookout.

PLATE 21.—Winning limestone rubble with elevating grader, for strengthening section of Stuart Highway near Wycliffe prior to construction of bituminous surfacing.

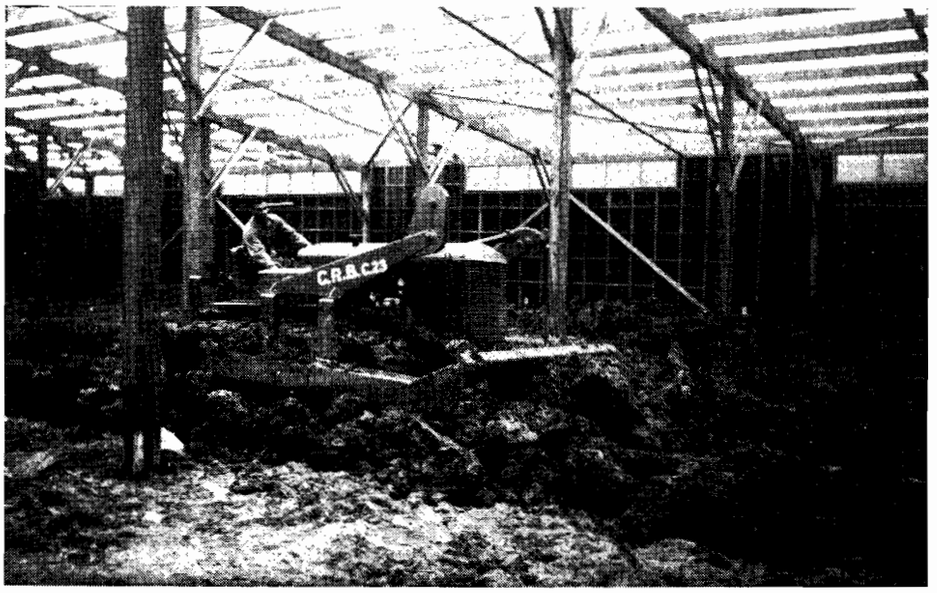

PLATE 22.—Levelling floor of Allied Works Council store, Melbourne, in preparation for construction of pavement.

PLATE 23.—Construction of concrete runways, Point Cook aerodrome.

PLATE 24.—Construction of runways, Mangalore West.

PLATE 25.—Winning gravel for construction of runways at East Sale.

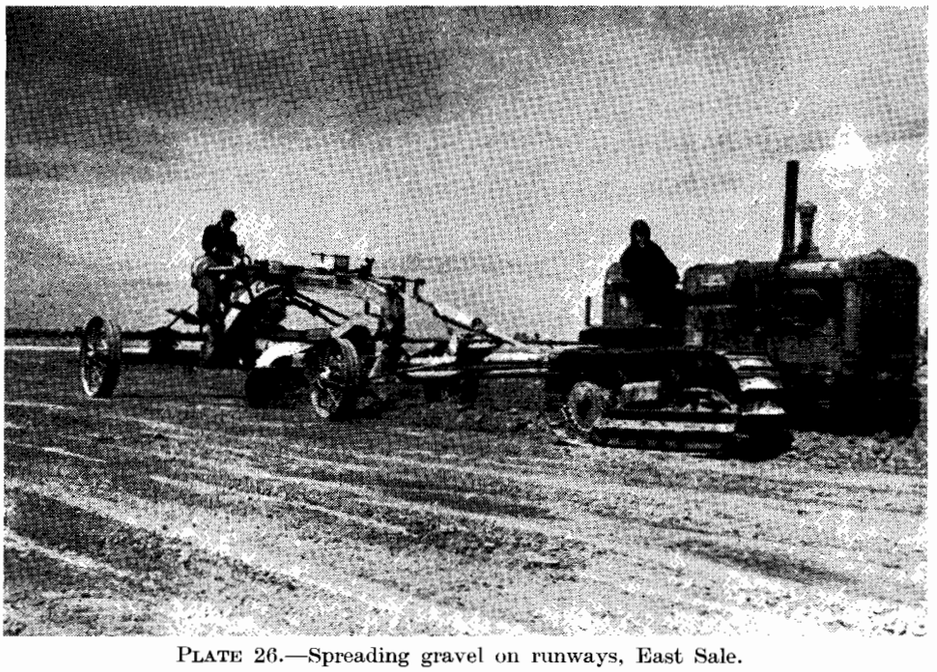

PLATE 26.—Spreading gravel on runways, East Sale.

PLATE 27.—Spreading sand filling for construction of runways, Fisherman's Bend, and consolidation by watering and trafficking.

CHIEF ENGINEER'S REPORT.

Country Roads Board,
Melbourne.
2nd November, 1945.

THE CHAIRMAN,

SIR,

I have the honour to submit particulars of certain matters of engineering interest included in the Board's work during the last year.

PAVEMENT THICKNESS.

In his report of November, 1943, the Chief Engineer referred to the increase in the number of heavy wheel loads and their effect on many lightly constructed pavements. In the last report the most important factors affecting the ability of a flexible pavement to carry traffic were listed and a chart was described (see Figure A.) showing the relation of desirable pavement thickness to the California Bearing Ratio of the sub-grade, and to the number of repetitions of a 5,000-lb. wheel load, which the pavement should be expected to carry before failure occurs. The need for discretion in using the chart, owing to uncertainty in estimating certain of the factors, was emphasized. The two most important factors are the sub-grade moisture content to be expected in the field and the number of passages of wheels of various weight (reduced to an equivalent number of "standard" 5,000-lb. loads) expected to occur along a critical strip or wheel-track during the useful life of the pavement. In developing a quantitative basis for allowing for these "climatic" and "traffic" factors some further progress has been made during the year.

The California Bearing Ratio is determined on a compacted and saturated sample. In some wet mountainous areas excessive sub-grade moisture may develop, usually for short periods and generally at localized points, but in many drier parts of the State the sub-grade moisture content may never reach that used in the C.B.R. test, while in others it may only exist for a portion of the year. Only those repetitions which occur during the critical period of saturation should be used when reading the pavement thickness from the chart. The total number of repetitions which the pavement will have to carry in a given period should, therefore, be reduced when designing thickness, e.g., by applying a multiplier "M", where M = average rainfall in inches × average number of wet days per year ÷ 10,000. This formula for the climatic factor is advanced quite tentatively pending a systematic state-wide investigation which will be carried out when qualified staff returns from the Services.

During the year additional transportation surveys have been carried out to obtain data from which, for purposes of design, the maximum number of repetitions of the equivalent of a 5,000 lb. wheel load which any particular area of a pavement will have to carry can be estimated from the information obtained by a traffic count. From these surveys, certain factors for estimating the maximum repetitions of a 5,000-lb. wheel load which any portion of a pavement will have to carry during its estimated life have been deduced.

They provide for making use of the number of "heavy" and "light" trucks counted in a normal traffic census as hitherto carried out by the Board. "Heavy trucks" are defined as "all trucks having a rated carrying capacity of more than 2 tons", and "light trucks" as "all trucks having a rated carrying capacity of 2 tons or less, but do not include touring cars with box or van bodies". The effect of buses was found to be extremely variable. If the volume of this type of traffic is small, its effect may be approximated by considering such vehicles as light or heavy trucks. If buses form a considerable portion of the traffic, a special estimate of the repetitions of a 5,000-lb. load due to them, which should be added to that due to trucks, is necessary. Vehicles such as cars and utility trucks having wheel loads considerably less than 5,000 lb. are neglected on the assumption that if the pavement is correctly designed for 5,000-lb. wheel loads, they will have little effect on plastic deformation of the sub-grade. The use of these factors is indicated in the following sub-paragraphs:—

(*a*) Let "A" be the total number of light and heavy trucks counted between 7 a.m. and 7 p.m. in a normal traffic census. Then $A \times 1{\cdot}20$ is the probable twenty-four hour count.

(*b*) "F" is a factor, the value of which is shown in Table A, depending on the day of the week on which the traffic count was taken. Factors for Saturday and Sunday are doubtful and the use of these days for counts should be avoided.

TABLE A.—DAILY TRAFFIC FACTORS.

Day of Week.	"F."
Monday	1·03
Tuesday	1·04
Wednesday	0·89
Thursday	0·99
Friday	1·04
Saturday	0·51
Sunday	0·35

This gives the average week day traffic in heavy and light trucks (neglecting Saturday) as $\frac{A}{F} \times 1{\cdot}20$. The average daily truck traffic for a week of seven days, that is, for five week days plus Saturday and Sunday, is, therefore, $\frac{A}{F} \times 1{\cdot}2 \ \frac{(5 + 0{\cdot}51 + 0{\cdot}35)}{7} = \frac{A}{F}$ approximately. The yearly traffic in light and heavy trucks as counted in a normal census is then $365 \times \frac{A}{F}$. For more important cases, traffic studies should be made on the section of road concerned in order to allow for local variations such as those caused by market days, &c.

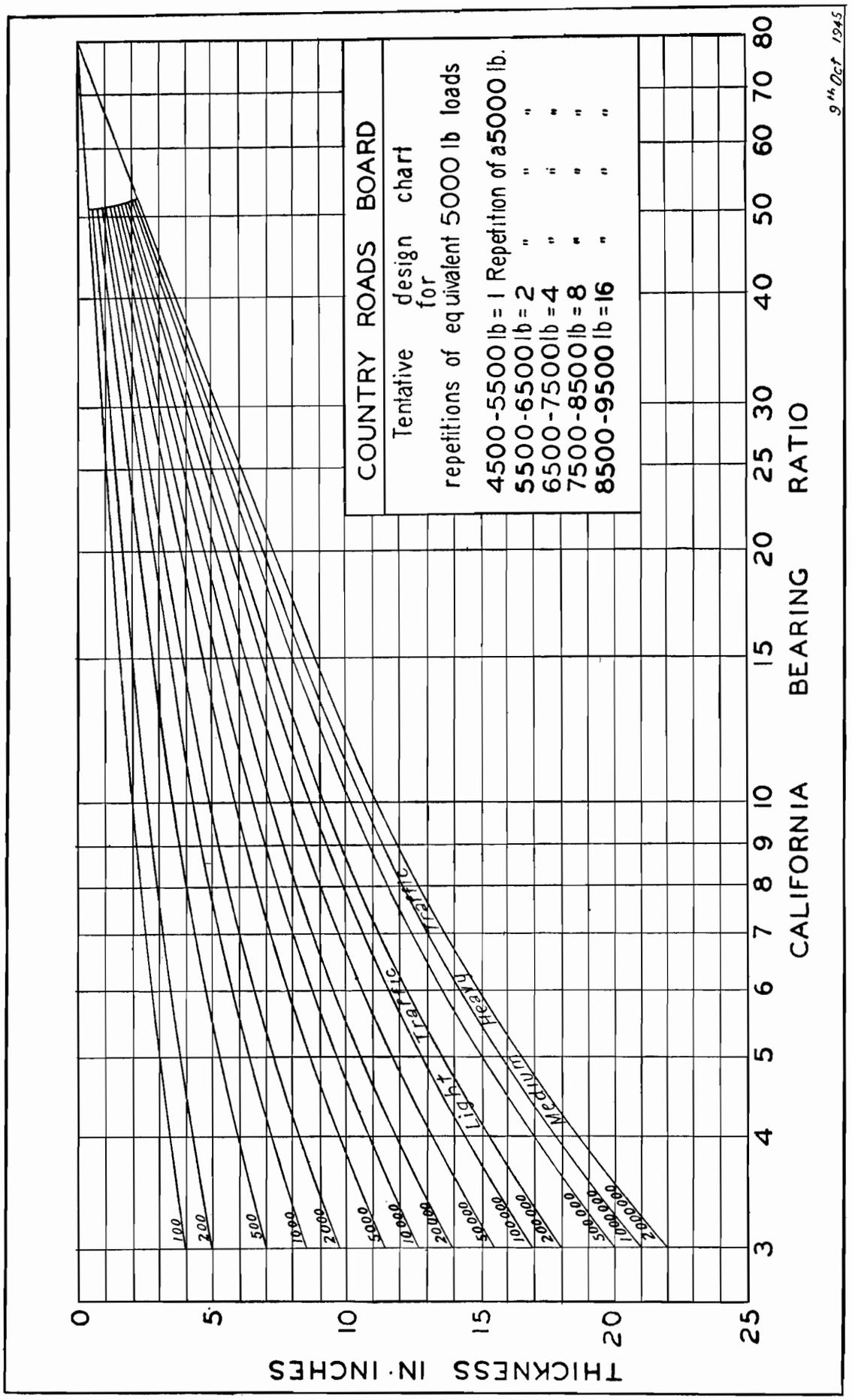

Fig. A.—Tentative Design Chart for Estimating Thicknesses of Flexible Pavements.

(*c*) To obtain the total number of repetitions of a 5,000-lb. wheel load over the whole road width in the year in which the traffic count is made, the figure of $365 \times \frac{A}{F}$ should be multiplied by a factor 0·7. The number of repetitions of a 5,000-lb. load per annum is, therefore, $255 \times \frac{A}{F}$, (approx.).

(*d*) In order to make due allowance for lateral distribution of traffic over the pavement width, traffic surveys included investigations into the transverse placement of vehicles on various pavement widths. From these have been deduced factors by which the total number of repetitions on the whole of the pavement, calculated as previously indicated, must be multiplied to give the probable number of repetitions on the most heavily loaded strip, which has been found to be approximately 3 feet wide. They are shown in Table B.

TABLE B.

Pavement Width.	Factor.
16 feet	0·30
20 feet	0·21
25 feet	0·16

By applying these factors to the total number of repetitions occurring over the whole pavement the number of repetitions for which the pavement thickness must allow, assuming uniform thickness, is obtained. The results are shown in Table C.

TABLE C.

Pavement Width.	Repetitions per Annum for Design.
16 feet	$76{\cdot}5 \frac{A}{F}$
20 feet	$54 \frac{A}{F}$
25 feet	$41 \frac{A}{F}$

(*e*) Statistical studies of traffic growth over the past twenty years indicate that, on the basis of pre-war trends, the probable average growth for the State as a whole from 1939, but for the war, would have been of the order of 5 per cent. per annum over a period of twenty years. This figure, however, should be used with considerable caution.

If we assume that a pavement must be designed to carry traffic without failure for N years and the annual increase, taking all factors into account, is estimated to be R per cent., the number of repetitions to be taken for design purposes are as set out in Table D.

TABLE D.

Pavement Width.	Total Repetitions for Design (to be multiplied by "M").
16 feet	$\frac{A}{F}(76{\cdot}5N + 0{\cdot}382RN^2)$
20 feet	$\frac{A}{F}(54N + 0{\cdot}27RN^2)$
25 feet	$\frac{A}{F}(41N + 0{\cdot}205RN^2)$

Figure B has been prepared on the basis set out in the previous lettered paragraphs and shows the number of repetitions of a 5,000-lb. wheel load on a strip of pavement three feet wide when the ratio $\frac{A}{F}$ and the required life of the pavement are known. The curves have been drawn on the assumption that $R = 5$. The repetitions so obtained must then be multiplied by the climatic factor, "M", and the thickness for purposes of design is then read from Figure A. Application of these "climatic" and "traffic" factors to a limited number of pavements in different areas and with different sub-grades appears to give results reasonably consistent with experience.

It is again desired to stress the necessity for interpreting results obtained by this method of design with caution. The "climatic factor" in particular is purely tentative and is proposed in order to make some allowance for the effect of climate pending further investigations. In addition, it will also be necessary to check the tentative curves in Figure A, as these are derived by extrapolation from Californian Highway experience, the extrapolation being based on American experiments with heavy wheel loads.

ECONOMIC WHEEL LOAD LIMITS.

In addition to traffic surveys made to determine factors affecting the design of flexible pavements, a comprehensive study was made of the operating costs of a wide range of commercial motor vehicle types, in an attempt to determine the economic limit which should be applied to wheel loads.

As expected, it was found that as wheel loads increase, the benefit to the operator also increases by reduced ton mile costs, but at a rapidly diminishing rate, so that, with wheel loads above 9,000 lb., no appreciable reduction in operating costs is gained by a further rise in the wheel load. Indeed, it seems that the benefit virtually disappears with wheel loads of 12,000 lb. and upwards.

On the other hand, investigations into the relation between wheel load and the required thickness of a flexible pavement indicate that the logarithm of the cost of providing a pavement is roughly proportional to the logarithm of the wheel load for given conditions.

The balancing of these two factors of total transport costs results in what might be termed the economic wheel load limit. A tentative conclusion is that a minimum cost of transportation to the community as a whole is afforded by the loading of vehicles up to 8,500 lb. per wheel (axle load of 17,000 lb.). Any increase beyond this economic wheel load limit for general haulage purposes seems unwarranted.

WIDENING ON CURVES.

A feature of traffic now using or anticipated on many sections of road in hilly country is the high proportion of long semi-trailer vehicles used for timber haulage. It was, therefore, considered desirable to review the amount of widening previously found satisfactory for curves commonly used on this type of road.

The extra width of pavement taken up on curves of small radius by a wide range of vehicles was investigated. Two cases were considered; that in which two of the

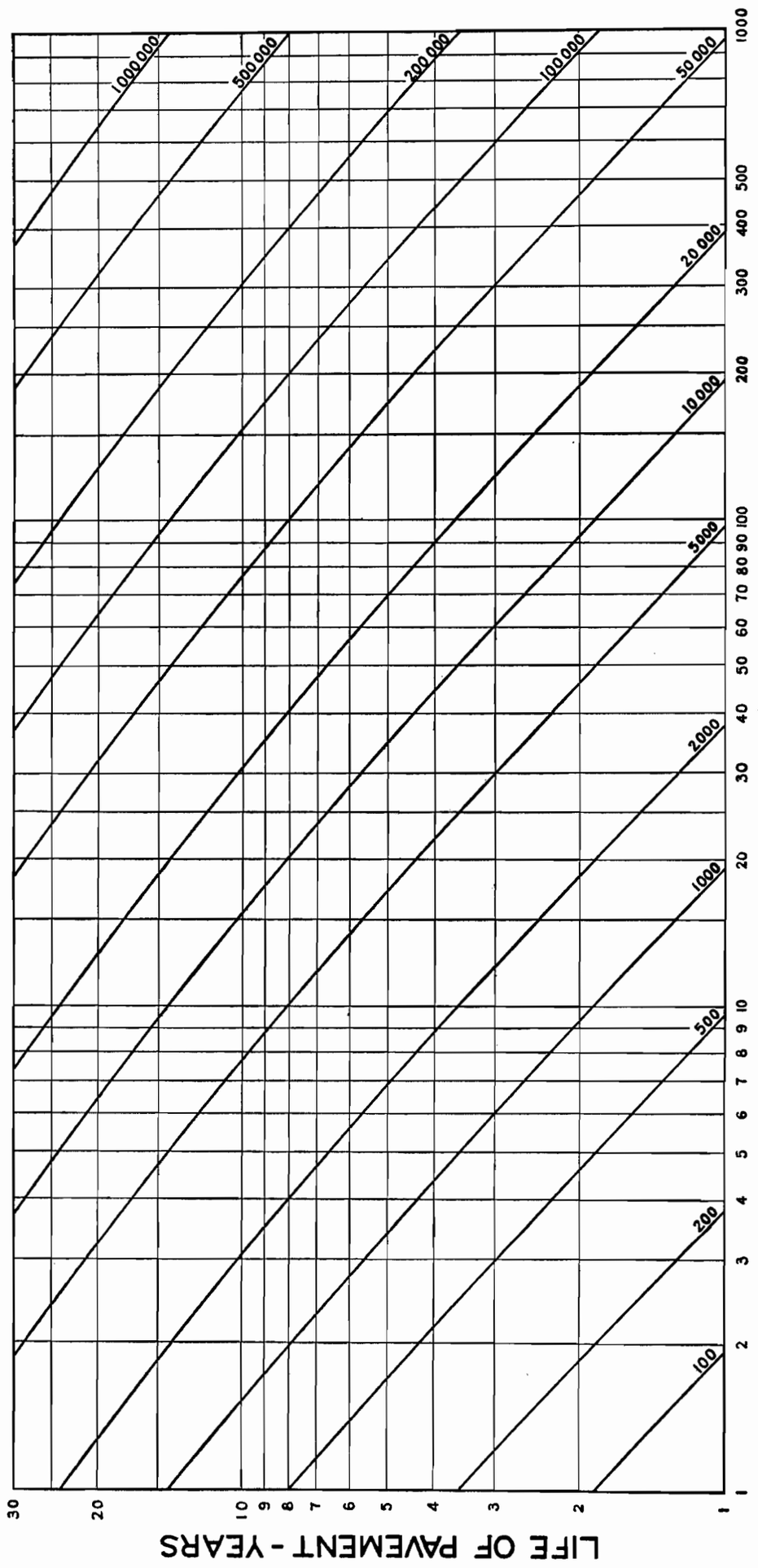

Fig. B.—Chart for Calculating Standard Wheel Load Repetitions from Traffic Data. NOTE.—Based on Traffic Increase, 5 per cent. per Annum.

large vehicles pass on a curve, and that in which a motor car passes outside a vehicle of the type considered on a curve.

Figure C gives the dimensions of three of the various vehicles considered while Table E. sets out the result of the enquiry in respect to these particular types.

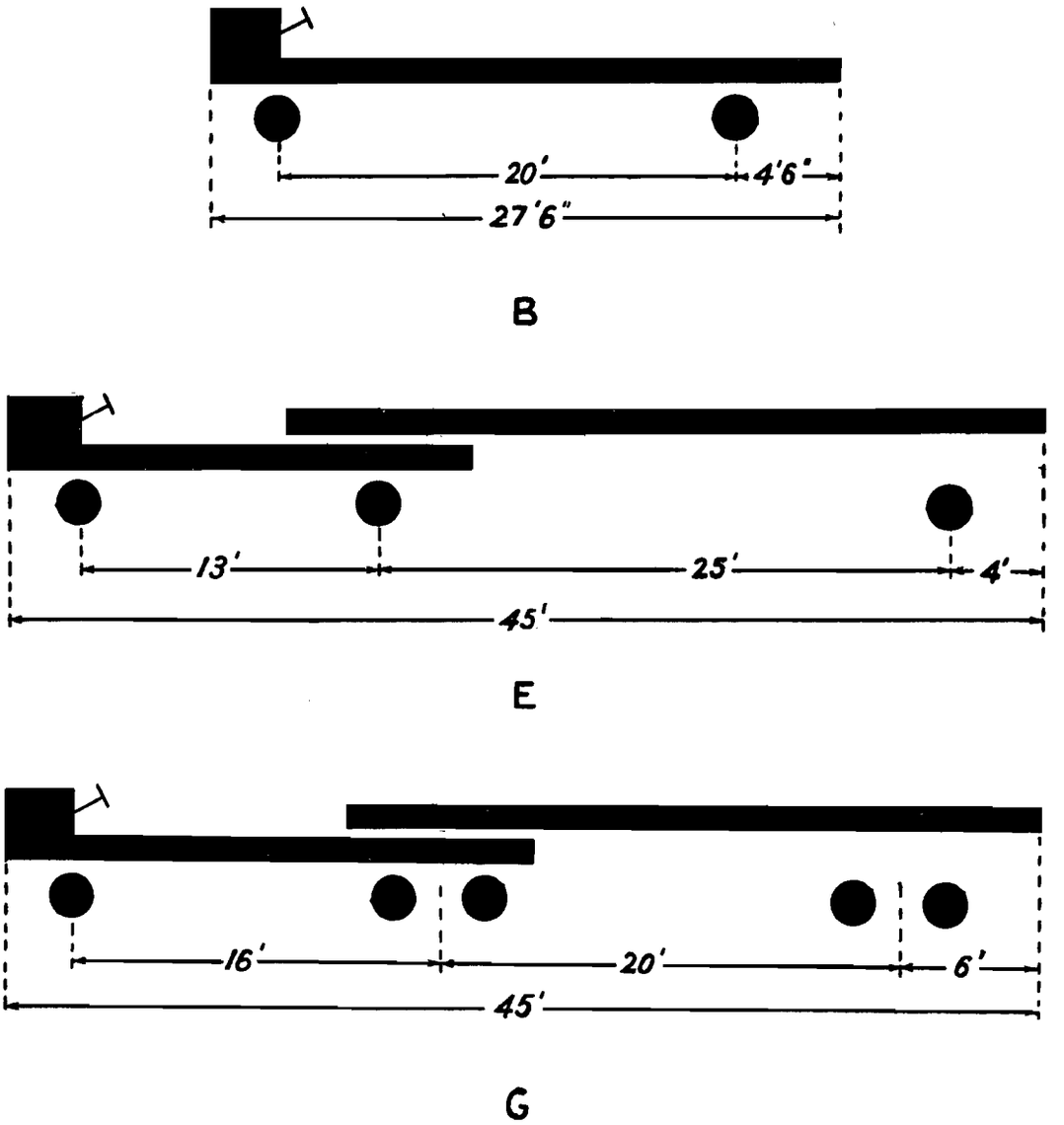

Fig. C.—Types of Vehicles Used for Timber and Log Traffic.

TABLE E.—ADDITIONAL WIDTH IN FEET OCCUPIED BY VEHICLES ON CURVES OF VARIOUS RADIUS.

(1) *Vehicle passing like vehicle.*

(2) *Vehicle passing inside a car.*

Radius of Curve.	Board's Standard Widening.	Vehicle "B".		Vehicle "E".		Vehicle "G".	
		(1).	(2).	(1).	(2).	(1).	(2).
60	4·0	9·0	5·7	16·7	9·5	14·1	8·1
100	4·0	5·3	3·4	9·3	5·4	7·8	4·7
200	3·0	2·6	1·7	4·6	2·6	3·8	2·3
300	2·0	1·8	1·1	3·0	1·6	2·6	1·4
400	0·0	1·3	0·8	2·3	1·3	2·0	1·1

The information obtained by the investigation will be used in the design of hill roads required to carry this kind of traffic.

BITUMINOUS SURFACE TREATMENT.

Continuing the practice of the preceding war years, only the minimum essential maintenance was carried out on roads under the Board's control, by retreatment of a light nature. Seventy-two per cent. of this work of re-sealing provided for binder at the rate of 0·15 gallons per square yard or less.

During the year, 657 miles of road under the Board's control were re-sealed, while a first seal was applied to 19 miles on which re-construction had become necessary. No road-mix seal or plant-mix seal was applied during the year. The average cost in pence per square yard of this work is given in Table F.

TABLE F.—AVERAGE COSTS IN PENCE PER SQUARE YARD.

Item.	First Seals Primer and One Application Seal Coat.	Retreatments (Reseals). Nominal Rate of Application of Binder in Gallons per square yard.			
		0·10.	0·15.	0·20.	0·25.
Area Costed (sq. yd.) ..	184,616	407,318	3,938,268	1,361,908	75,178
Material ..	9·62	3·57	5·30	6·86	10·59
Labour ..	2·43	0·64	0·94	1·25	1·46
Stores ..	0·38	0·12	0·20	0·25	0·26
Plant Hire ..	2·28	0·58	0·92	1·12	1·22
	14·71	4·91	7·36	9·48	13·53

Bitumen.

Bitumen used in Victoria was partly residual asphaltic bitumen supplied during 1943–44 and 1944–45, and partly fluxed native asphalt supplied during 1941–42 and 1942–43. The price varied from £23 12s. 6d. to £11 5s. 5d. per ton. The material was charged to jobs at its average price for the season, which was approximately £16 10s. per ton net *ex* Store, Melbourne. A total quantity of 4,200 tons was used on roads.

Aggregate.

The average cost of 59,071 cubic yards of aggregate used on the Board's work in Victoria during the year was 18s. 7·5d. per cubic yard stacked on the job. This price is the same as the average for the season 1943–44, compared with 13s. 9d. per cubic yard for material obtained during 1940–41.

Work carried out for the Commonwealth of Australia.

The year saw the withdrawal of the Board's organization from the Northern Territory and South Australia. Table G summarizes the bituminous surface treatment work carried out for the Commonwealth, both within and outside Victoria during the year.

Table G.—Summary of Work carried out for the Commonwealth of Australia, 1944–45.

Type of Work.	Location.	Sqnare Yards.	Cost.
			£
Aerodromes ..	Northern Territory and South Australia	1,669,678	215,230
Stuart Highway ..	Northern Territory	1,550,000	210,000
Aerodromes and roads in camps and factories	Victoria	991,357	49,647
	Totals ..	4,211,035	474,877

Table H is a summary of the bituminous surface treatment work carried out by the Board for the Commonwealth from 1942 up to 30th June, 1945.

Table H.—Summary of Work carried out for the Commonwealth since 1942.

Year.	Area in Square Yards.			
	Within Victoria.	Outside Victoria.		Total.
	All Work.	On Roads.	On Other than Roads.	
1942–43 ..	1,358,802	3,633,000	..	4,991,802
1943–44 ..	724,790	6,237,340	667,900	7,830,030
1944–45 ..	1,021,357	1,550,000	1,669,678	4,241,035
Total ..	3,104,949	11,620,340	2,337,578	17,062,867

B.S.T. Plant.

The work in Victoria was carried out with four 400-gallon, one 600-gallon, and two 1,000-gallon sprayers owned by the Board, while that in the Northern Territory and South Australia was executed with five 400-gallon sprayers belonging to the Board and one 1,000-gallon sprayer and two heavy-duty continuous type pugmill mixers hired from the Allied Works Council. All of the Board's sprayers except one have now been returned from the Northern Territory to Victoria.

Plant Operation.

Table J summarizes the conditions under which the Board's plant operated in Victoria during the years 1940–45. It indicates a small increase in the average length of jobs carried out from one dump.

Table J.—Number and Length of Jobs.

All Sprayers.	Season.				
	1940–41.	1941–42.	1942–43.	1943–44.	1944–45.
Number of jobs ..	529	388	161	243	360
Longest job (miles)	16·4	12·2	9·75	12·5	14·09
Shortest job (miles)	0·02	0·02	0·09	0·03	0·05
Average job (miles)	1·64	1·5	1·67	1·87	1·80
Total number of spraying dumps	209	157	75	115	110
Miles of work done from each dump (average) ..	4·1	3·7	3·4	4	5·9

Table K analyses the operation of the spraying units used in Victoria.

TABLE K.—ANALYSIS OF THE OPERATION OF EACH UNIT—SEASON 1944–45.

Sprayers.	400/11	400/13	400/16	400/22	400-gallon Sprayers (Average).	1000/31	1000/32	1,000-gallon Sprayers (Average).	600/1
Spraying	36·6	26·5	43·2	33·0	34·9	26·3	32·9	29·6	30·1
Moving	21·2	18·3	10·4	14·4	16·1	19·7	18·3	19·0	27·8
Weather	4·5	20·5	13·2	18·8	14·2	9·8	12·5	11·1	7·8
Holidays	8·6	8·5	10·3	7·6	8·7	7·8	7·6	7·7	9·0
Cleaning plant (end of season)	1·7	1·5	..	2·0	1·3	1·4	1·3	1·3	1·4
Mechanical delays	4·3	6·9	2·0	2·9	4·0	1·6	7·6	4·7	·6
Avoidable delays	23·1	17·8	20·9	21·3	20·8	33·4	19·8	26·6	23·3
	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Avoidable Delays.									
Poor organization	1·0	1·3	2·6	3·0	2·0	6·8	2·4	4·6	5·2
Long leads	4·8	5·9	2·0	8·1	5·2	8·5	5·1	6·8	·6
Short sections	14·0	8·5	13·4	8·5	11·1	18·1	12·0	15·0	15·9
Handpouring, &c.	1·2	..	2·1	·2	·9	..	..	..	..
Road not ready	1·5	..	·4	·5	·6	..	..	..	..
No aggregate	..	..	·3	1·0	·3	..	..	..	..
No bituminous materials	·6	..	..	..	·6	..	·3	·2	1·2
Insufficient labour	..	2·1	·1	..	·1	..	..	..	·4
	23·1	17·8	20·9	21·3	20·8	33·4	19·8	26·6	23·3

BRIDGES.

GENERAL.

As in previous years, the limited labour available for bridge construction was still further reduced by the necessity for diverting the greater part of the skilled personnel, particularly concrete workers, to Defence Works, mainly connected with aerodromes.

Bridge work was, therefore, restricted to essential maintenance and strengthening except where the condition of the structure and traffic requirements made reconstruction essential. Most structures reconstructed were comparatively small, there being insufficient labour available for the larger projects. Many structures were kept in service by patching and imposition of load limits. All of the work under the direct supervision of the Board was carried out by Direct Labour. Board's Direct Labour gangs were also used, at the request of the Councils concerned, on a large number of bridge projects which would normally have been carried out under Municipal control. Details of the more important bridges reconstructed are given in the Board's Report.

BRIDGE MAINTENANCE.

In the Chief Engineer's report for the year ending 30th June, 1941, reference was made to the appointment by the Board of a Bridge Inspector, equipped to examine and report in detail on the condition of all parts of timber bridges so that a proper system of planned maintenance might be instituted. A start was made on these inspections and the information obtained has proved very useful. However, because of war-time requirements and the diversion of labour, including the bridge inspection gang, to other work, the inspections were not completed, and over the past three years have been limited to urgent cases only. The programme of inspections originally proposed will be resumed as soon as possible, and it is hoped that sufficient permanent maintenance gangs will be instituted to follow up these inspections thoroughly.

PRESERVATION OF TIMBER.

The timber available for bridges today is, in general, of greatly inferior quality to that obtained by the early bridge builders. Proper attention to types of construction which will minimize decay and adequate maintenance is, therefore, of first importance. This maintenance should include not only the repair of or replacement of defective parts, but preventive maintenance aimed at the preservation of the existing asset from decay and insect attack.

Timber will rapidly decay by dry rot if ventilation is poor, and by wet rot if the surfaces are damp for long periods. The Board's present standards are designed, therefore, to provide for maximum ventilation and minimum water retention, whilst surfaces of timber which bear against other timber surfaces, or the ground, are liberally coated with petroleum jelly, or separated by timbers impregnated with creosote by boiling. Parts of timber structures which bear against the ground are particularly susceptible to wet rot and insect attack. This has been obviated as far as sheeting is concerned by using reinforced concrete slabs in lieu of timber. Hardwood piles at depths greater than 4 feet below the surface of the ground and below permanent water level have an indefinite life and for all practical purposes may be considered as permanent. The vulnerable section between "wind and water" can be protected by concrete sleeves, but this, however, is rather expensive.

In conjunction with the C.S.I.R., investigations were conducted some years ago into the surface treatment of green hardwoods with various preservative preparations in an endeavour to secure effective penetration of the

timber. No success was attained, however, and the applied material remained practically only as a surface coating. As a result of these and other tests, it was considered that creosote was as good as—or better than—other surface treatments, and as it is cheap and safe to use, it has been adopted exclusively on all Board's bridges. The C.S.I.R. is continuing its investigations, particularly in relation to pressure treatment. Pressure treatment is unlikely to become practicable for bridge timbers, but the treatment of round timbers, or at least the most vulnerable sections of round timbers, with creosote by the C.S.I.R. open tank method may become feasible.

In addition to its preservative properties creosote is effective against insect attack. Present treatment consists of applying two coats of creosote, by means of brushing or spraying, to the surfaces of all square and round timber with the exception of the handrails above kerb level and that section of piles more than four feet below ground.

To minimize heart rot, holes are bored into the centre of round timbers (at 4 ft. intervals in stringers and at the heads of piles); these holes are then filled with creosote until the timber will absorb no more. Some protection to the vulnerable section of piles at ground level is obtained by puddling the soil around the pile with creosote at the rate of approximately one gallon per pile.

To afford reasonable protection, the treatment outlined should be repeated at intervals of not more than three years.

LABORATORY.

General.

During the year, the volume of experimental and testing work has increased beyond that done in previous years during the war. This increase has severely taxed the laboratory space available and a combination of this lack of space and frequent changes of staff have made the establishment of orderly laboratory routine very difficult. Nevertheless, a large amount of work has been done and a list showing the number of tests carried out is given elsewhere.

Testing Machine.

In order to carry out the California bearing ratio test, which was described in earlier reports and forms the basis of a method of pavement design described in this and a previous report, it was found necessary to obtain a small testing machine. As it was impossible to import a suitable machine owing to the war, one was designed and assembled by the laboratory staff. Use was made of a dial indicating head of local manufacture and various standard motor car parts. The machine has ranges of 0 to 200 lb. by 2 lb. divisions and of 0 to 10,000 lb. by 10 lb. divisions. It has been found satisfactory for its original purpose, has been used successfully in testing concrete beams and has an accuracy better than 0·4 per cent. Figure D shows the machine being calibrated by means of proving rings.

Fig. D.—Testing Machine 10,000 lb. Capacity.

INTERNAL LECTURES.

For the purpose of assisting younger members of the Engineering staff in their studies, stimulating discussion on technical matters and informing those who work in specialized sections of the work of the Engineering Branch as a whole, a series of Internal Lectures was initiated during the year. The present series, given by senior members of the staff, deals broadly with principles of design and practice used in the Board's work. It is intended that later talks shall cover subjects which will enable more junior members to advance their ideas for discussion. It is hoped that, whatever their success in achieving the main objects may be, these talks and discussions will accustom Engineers to expressing their views in public, and, in the case of the lecturers, periodically examining the soundness of the assumptions which they are applying in their work from day to day.

COSTS.

It is desired to invite attention to the increased cost of work. The A.W.U. basic wage, plus margin for pick and shovel work, has increased by approximately 33⅓ per cent. since 1939. In other industries, where greater provision has been made for holidays, &c., the increase in cost per man hour of effective work has been even greater.

Its effect is reflected in the cost of two types of work carried out by the Board. The cost of operating a typical Highway truck patrol on the Princes Highway West, assuming the same number of man hours of work and the same quantities of material at current prices to be used, has increased approximately 38 per cent. since 1938–39. In the same period, the average cost of resealing with 0·15 gallons of binder per square yard has risen approximately 95 per cent., the increase in cost of that portion of the work independent of the price of bitumen and fluxing oils being about 87 per cent.

Yours obediently,

C. G. ROBERTS,
Chief Engineer.

APPENDIX.

COUNTRY ROADS BOARD FUND.

RECEIPTS.

1944.		£ s. d.	£ s. d.	£ s. d.	£ s. d.
July 1.	To Balance				788,747 11 3
1945.					
June 30.	„ Motor Car Act No. 3741—Registration Fees		1,500,101 7 6		
	Less Refunds		9,095 15 3		
			1,491,005 12 3		
	Fines	10,334 9 1			
	Less Refunds	8 10 0			
			10,325 19 1		
			1,501,331 11 4		
	Less Cost of Collection		106,106 3 2		
				1,395,225 8 2	
	„ Country Roads Acts Nos. 3662, 3741/13, 4332—Fees and Fines		224 16 6		
	Registration of Traction Engines		96 3 0		
				320 19 6	
	„ Acts Nos. 3662, 3741, 4332, and 4585—Costs			67 11 2	
	Municipalities' Repayments—Permanent Works—Outer Metropolitan Roads	4,839 5 2			
	Relief Acts Nos. 4140 and 4415	143,668 4 10			
			148,507 10 0		
	„ Main Roads—Maintenance		93,256 3 0		
				241,763 13 0	
	„ Hire of Plant		108,647 1 1		
	„ Stores and Materials		254,450 10 1		
	„ Sundries		125,247 16 3		
				488,345 7 5	
	„ Special Works—Outstanding 30.6.44—Recoup			52,209 17 0	
					2,177,932 16 3
					£2,966,680 7 6

PAYMENTS.

1945.		£ s. d.	£ s. d.	£ s. d.
June 30.	By Maintenance			733,696 13 9
	„ Murray River Bridges and Punts			4,115 10 5
	„ Interest and Sinking Fund—Municipalities' Repayments			106,974 14 9
	„ Interest and Sinking Fund—Great Ocean Road			1,000 0 0
	„ Recoup to Revenue—Act No. 3944—Interest—Main Roads		102,153 14 5	
	„ Developmental Roads		172,080 6 1	
	Sinking Fund Contributions		25,567 2 1	
	Exchange		39,103 0 11	
	Loan Conversion Expenses		2,453 15 1	
				341,357 18 7
	„ Relief to Municipalities—Acts Nos. 4140 and 4415			221,040 8 8
	„ Stores and Materials		212,835 2 9	
	„ Plant Purchase and Repairs		101,850 19 9	
	„ Storeyards—1, 2, and 3.		58,966 13 3	
	„ Sundry Debtors'		57,764 4 3	
	„ Traffic Administration—Motor Car Acts		3,839 13 2	
	Country Roads Acts		1,645 11 5	
	„ Bridge Inspections		26 18 2	
	„ Act No. 4332—Impounding of Cattle		902 12 10	
	„ Act No. 4609—Tourists' Resorts Fund		7,228 0 11	
	„ Act No. 4585—Traffic Line Marking		7,250 10 7	
	„ Act No. 5015—Cremorne Bridge		2,251 0 0	
	„ Recoup to Revenue—Act No. 3782—Superannuation Charges		1,591 14 3	
	„ General Expenditure—Salaries, &c.	105,127 3 3		
	Less Recoup	62,616 7 0		
			42,510 16 3	
				498,663 17 7
	„ Special Works—Outstanding			49,085 17 11
	„ Balance			*1,010,745 5 10
				£2,966,680 7 6

RECONCILIATION.

	£ s. d.
Balance as per Treasury Books	1,001,714 12 9
Add Transfers Outstanding	15,686 11 5
	1,017,401 4 2
Deduct Accounts in Transit	6,655 18 4
Balance as per Country Roads Board Account	1,010,745 5 10

£625,000 reserved in previous years for reconstruction of roads and bridges.

APPENDIX—*continued.*—REVENUE ACCOUNT, 30TH JUNE, 1945.

1945.		£ s. d.	£ s. d.	£ s. d.
June 30. To	Maintenance Works—General		449,578 1 1	
,,	Mansfield-Woods Point Road ..	3,591 16 8		
,,	Woods Point Road	2,030 11 3		
,,	Walhalla Road	1,289 11 5		
,,	State Highways	250,318 14 8		
,,	Tourists' Roads	26,887 18 8		
			284,118 12 8	
				733,696 13 9
,,	Murray River Bridges and Punts		.. ..	4,115 10 5
,,	Contribution to Sinking Fund		26,743 13 8	
,,	Interest on Loans		80,231 1 1	
				106,974 14 9
,,	Recoup to Revenue—Act No. 3944—			
	Interest—Main Roads	102,153 14 5		
	,, Developmental Roads..	172,080 6 1		
			274,234 0 6	
,,	Sinking Fund Contributions		25,567 2 1	
,,	Exchange		39,103 0 11	
,,	Loan Conversion Expenses		2,453 15 1	
				341,357 18 7
,,	Act No. 4395—Great Ocean Road—			
	Interest		519 18 0	
	Sinking Fund		480 2 0	
				1,000 0 0
,,	Tourists' Resorts Fund Act No. 4609		.. ..	7,228 0 11
,,	Recoup to Revenue—Act No. 3782—Superannuation Charges		.. ..	1,591 14 3
,,	Relief to Municipalities		.. ..	221,040 8 8
,,	Audit Fee		577 12 7	
,,	Insurance of Staff		36 15 1	
,,	Instruments and Survey Equipment		322 2 8	
,,	Motor Expenses		7,917 1 2	
,,	Offices—Exhibition Building		397 3 5	
,,	Divisional Storeyards		1,823 14 5	
,,	Storeyards, Nos. 1, 2, and 3		5,956 13 8	
,,	Storeyard Cartage Expenditure		6,065 3 10	
,,	Divisional Offices		3,451 19 4	
,,	Office Expenses..		4,549 4 11	
,,	Office Furniture		2,552 15 2	
,,	Patrolmen's Cottages and Engineers' Residences ..		1,100 18 2	
,,	Patrol Garages		11 7 7	
,,	Plans, Purchase		381 8 1	
,,	Plant purchase		39,480 0 2	
,,	Postage and Telegrams		1,569 13 0	
,,	Printing and Stationery		1,991 13 5	
,,	Salaries		62,033 8 9	
,,	Pay Roll Tax (Staff)		1,512 10 0	
,,	Telephones		1,808 18 9	
,,	Testing Materials		2,502 3 5	
,,	Timber, &c.—Revenue		1 18 5	
,,	Gravel Sites and Metal Investigation		89 11 10	
,,	Travelling Expenses		1,330 14 3	
,,	Motor Car Acts Nos. 3741, sections 11-13, and 3901, sections 24-36		3,839 13 2	
,,	Country Roads Acts		1,645 11 5	
,,	Bridge Inspections		26 18 2	
,,	Act No. 4332—Impounding of Cattle		902 12 10	

1944.		£ s. d.	£ s. d.	£ s. d.	£ s. d.
July 1. By	Balance				1,218,714 3 6
1945.					
June 30. ,,	Motor Car Act No. 3741—				
	Registration Fees		1,500,101 7 6		
	Less Refunds..		9,095 15 3		
			1,491,005 12 3		
	Fines ..	10,334 9 1			
	Less Refunds..	8 10 0			
			10,325 19 1		
			1,501,331 11 4		
	Less Cost of Collection ..		106,106 3 2		
				1,395,225 8 2	
,,	Country Roads Act No. 3662—				
	Registration of Traction Engines			96 3 0	
	Fees and Fines			224 16 6	
	Costs—Acts Nos. 3662, 3741, 4332, and 4585 ..			67 11 2	
,,	Plant Earnings		109,044 10 0		
,,	*Deduct* Working Costs		62,370 19 7		
				46,673 10 5	
,,	Sundry Earnings			13 1 11	
,,	Old Roads, Sale of			53 8 3	
,,	Rents			1,400 17 7	
,,	Royalty on Gravel and Metal			322 12 3	
,,	Storeyard Equipment Repairs			90 17 4	
,,	Storeyard Cartage Earnings			7,393 10 3	
,,	Timber, &c., Revenue Account			102 14 1	
,,	Materials, Sale of			33 16 11	
,,	Plans, Sale of			1 6 6	
,,	Great Ocean Road				
	Interest			94 15 0	
,,	Maintenance Works—				
	Contributions Payable by Municipalities ..			116,276 5 7	
,,	Permanent Works—				
	Contributions Payable by Municipalities—				
	Outer Metropolitan Roads ..		4,839 5 2		
	Other Main Roads ..		143,668 4 10		
				148,507 10 0	
					1,716,578 4 11

1945.									
June 30.	To Act No. 5015—Cremorne Bridge			2,251	0	0			
	,, Act No. 4585—Traffic Line Marking			7,250	10	7			
	,, Investigation Surveys			28	17	2			
	,, Direction Boards and Warning Signs			991	10	4			
	,, Defence Leave Employees			161	14	8			
	,, Advertising—Government Printer..			156	6	0			
	,, Legal Work—Crown Solicitor			300	0	0			
	,, Insurance—Public Risk			78	4	6			
	,, Photography			841	1	8			
	,, Transportation Survey			102	8	10			
	,, Traffic Census			56	18	1			
	,, Tree Nursery			5	0	0			
	,, Engineers' Conference			2	13	11			
				166,105	13	5			
	Less Recoup			62,616	7	0			
							103,489	6	5
	Balance			..		..	1,414,798	0	8
							£2,935,292	8	5

£2,935,292 8 5

BALANCE-SHEET AT 30TH JUNE, 1945.

LIABILITIES.	£	s.	d.	£	s.	d.
Contractors' Deposits	5,593	14	9			
Sundry Liabilities	3,956	11	11			
Revenue Account	1,414,798	0	8			
				£1,424,348	7	4

ASSETS.	£	s.	d.	£	s.	d.
Country Roads Board Fund				1,010,745	5	10
Maintenance Expenditure—						
Contributions Payable by Municipalities				116,276	5	7
Permanent Works—						
Contributions Payable by Municipalities—						
Outer Metropolitan Roads	4,839	5	2			
Other Main Roads (Subject to Relief)	143,668	4	10			
				148,507	10	0
Outstanding Accounts	14,503	17	10			
„ Special Works	49,085	17	11			
				63,589	15	9
Materials Stock—						
Storeyard	67,402	10	6			
Branches	12,233	4	11			
				79,635	15	5
Trust Fund				5,593	14	9
				£1,424,348	7	4

SUMMARY SHOWING VALUE AS AT 30TH JUNE, 1945, OF BOARD'S ASSETS CHARGED TO FUND (not included in Balance-sheet).

	£	s.	d.	£	s.	d.
Divisional Engineers' Residences	5,660	0	0			
Storeyard No. 1	6,500	0	0			
„ „ 2	12,400	0	0			
Divisional Storeyards and Offices	3,296	0	0			
Patrol Cottages, Huts and Garages	12,322	5	9			
Quarries, Gravel Pits, &c.	2,129	19	0			
Great Ocean Road Mortgage	1,895	0	0			
Workshop Plant, Tools and Equipment	6,792	12	7			
Furniture and Fittings	11,576	6	2			
Testing Laboratory Equipment	2,256	9	10			
Survey Instruments	982	7	7			
Carried forward	65,811	0	11			

	£	s.	d.	£	s.	d.
Brought forward				65,811	0	11
Pistols				18	13	4
Loadometers				260	0	0
Concrete Pipe Tester				6	0	0
New Divisional Premises				2,354	18	5
Motor Testing Branch				515	4	6
Motor Registration Branch				6,451	7	3
Police Motor Cars				9,895	15	0
Police Motor Cycles				980	0	0
Motor Cars				9,330	18	6
				95,623	17	11
Working Plant at Valuation				185,123	0	6
				£280,746	18	5

COUNTRY ROADS BOARD LOAN ACCOUNT—ACT No. 3662.

BALANCE-SHEET AT 30TH JUNE, 1945.

LIABILITIES.	£ s. d.	£ s. d.	£ s. d.
Interest on Permanent Works			18,755 17 10
Loan Securities Issued	4,860,784 7 1		
Add Increase in Expenses Renewal Loans	1,416 5 7		
		4,862,200 12 8	
Less Amount Repaid		80,000 0 0	
		4,782,200 12 8	
Deduct Discount and Expenses		73,332 16 10	
		4,708,867 15 10	
Less Securities Repurchased and Cancelled from National Debt Sinking Fund		448,078 18 10	
		4,260,788 17 0	
Less—			
Redemption Funds	85,219 1 1		
Main Roads Sinking Funds	285,688 7 7		
Repaid to State Loans Repayment Fund	569,948 10 4		
		940,855 19 0	
			3,319,932 18 0
State Loans Repayment Fund			338,258 6 1
Contribution to National Debt Sinking Fund		476,795 8 11	
Less Net Loss on Repurchase of Securities (including Exchange)		18,022 8 8	
			458,773 0 3
Loan Redemption as Itemized above			940,855 19 0
			£5,076,576 1 2

ASSETS.	£ s. d.
Permanent Works	5,047,126 1 11
Interest Capitalized on Permanent Works (Act No. 3662)	18,755 17 10
National Debt Sinking Fund (Cash on Hand)	10,694 1 5
	£5,076,576 1 2

DEVELOPMENTAL ROADS LOAN ACCOUNT—ACT No. 3662.

BALANCE-SHEET AT 30TH JUNE, 1945.

LIABILITIES.	£ s. d.	£ s. d.	£ s. d.
Loan Securities Issued	6,299,024 7 0		
Add Increase in Expenses Renewal Loans	1,943 16 6		
		6,300,968 3 6	
Deduct Discount and Expenses		115,106 18 8	
		6,185,861 4 10	
Less Securities Repurchased and Cancelled from National Debt Sinking Fund		686,776 6 2	
		5,499,084 18 8	
Less Redemption Funds	646,386 7 4		
Developmental Roads Sinking Fund	55,083 0 2		
		701,469 7 6	
			4,797,615 11 2
State Loans Repayment Fund		.. ..	239,896 6 1
Contribution to National Debt Sinking Fund		730,790 9 3	
Less Net Loss on Repurchase of Securities (including Exchange)		27,623 4 4	
			703,167 4 11
Loan Redemption Itemized above		.. ..	701,469 7 6
Interest, Act No. 3662—Sec. 86/1		77,372 3 10	
Contributions Postponed		16,656 13 7	
			94,028 17 5
			£6,536,177 7 1

ASSETS.	£ s. d.	£ s. d.
Permanent Works Expenditure	6,425,757 10 11	
National Debt Sinking Fund (Cash in Hand)	16,390 18 9	
Contributions Payable by Municipalities, Act No. 3662, Sec. 86. (Subject to Relief)	94,028 17 5	
		£6,536,177 7 1

DEVELOPMENTAL ROADS INTEREST—ACT NO. 3662—(SECTION 86/1).

RECEIPTS.	£ s. d.	£ s. d.
1945.		
June 30. To Interest on Account of Municipalities—		
Provided by Relief Act No. 3662—Sec. 86/1	77,372 3 10	
		£77,372 3 10

EXPENDITURE.	£ s. d.	£ s. d.
1945.		
June 30. By Repayments to Treasury (Relief)	77,372 3 10	
		£77,372 3 10

AUDITOR-GENERAL'S CERTIFICATE.

The Accounts have been audited and compared with the books, with which they agree. Reconciliations have also been made with the books of the Treasury. Subject to the qualification that the balance-sheets do not include as assets permanent works and improvements resulting from expenditure from revenue moneys and extraneous funds, the several statements, in my opinion, exhibit a correct view of the affairs of the Board at the 30th June, 1945.

E. A. PEVERILL,
Auditor-General,
13th December, 1945.

E. J. HICKS,
Accountant,
23rd November, 1945.

By Authority: J. J. GOURLEY, Government Printer, Melbourne.